October 20, 2023

Hillary Young, P.E.
Chief Engineer
Land Protection Division
Oklahoma Department of Environmental Quality
707 North Robinson
Oklahoma City, OK 73101-1677

RE: RCRA Post-Closure Care and Corrective Action Permit Renewal and Modification Application
Permit Number 007234586-PC, EPA ID# OKD007234586
Former Champlin Refinery, Enid, Oklahoma,

Dear Ms. Young,

Anadarko E&P Onshore LLC (Anadarko) is submitting a Resource Conservation and Recovery Act (RCRA) Post-Closure Care and Corrective Action Permit Renewal Application (Permit Renewal Application) for the Former Champlin Refinery located in Enid, Oklahoma (Site). Anadarko is a wholly-owned subsidiary of Occidental Petroleum Corporation. The existing Post-Closure Care and Corrective Action Permit Number 007234586-PC was issued by the Oklahoma Department of Environmental Quality (ODEQ), effective April 17, 2014 and expiring on April 17, 2024. In accordance with Title 40 Part 270.10(h)(1) of the Code of Federal Regulations (40 CFR 270.10(h)(1)) this Permit Renewal Application is being submitted at least 180 days before the expiration of the current Permit. A list of major modifications to the 2014 Permit, the associated permit modification request classes, and the justifications for each are provided in Table 1-1 of the Part B Application (Section 5).

This Permit Renewal Application reflects updates and changes to the Site conditions, groundwater monitoring program, and corrective action activities. Information required per 40 CFR 270.28 (Part B information for post closure permits), Title 252 Chapter 205 of the Oklahoma Administrative Code (OAC 252.205), and other applicable state and federal regulation for Post-Closure Care Permits are provide in the following sections:

- Section 1 – Facility Certification
- Section 2 – Permit Checklists
- Section 3 – Public Notice
- Section 4 – Part A Application
- Section 5 – Part B Application
- Section 6 – SEC Filing

This Renewal Application is classified as a Tier II application. In accordance with OAC 252:205-21-4 (a)(1) and (2); OAC 252:205 Appendix B; and, Oklahoma Statutes §27A-2-7-119 B., Anadarko has submitted the required $5,000 in RCRA renewal application fees to ODEQ.

Please feel free to contact me with any questions at (713) 552-8941 or by electronic mail at David_Sweeten@oxy.com.

David Sweeten
Director of Operations

Enclosures

Anadarko Petroleum Corporation

RCRA POST-CLOSURE CARE AND CORRECTIVE ACTION

PERMIT RENEWAL APPLICATION

PERMIT NUMBER 007234586-PC

ANADARKO E&P ONSHORE LLC

FORMER CHAMPLIN REFINERY

ENID, OKLAHOMA

OCTOBER 20, 2023

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SECTION 1

FACILITY CERTIFICATION

Facility certification is provided below in accordance with 40 CFR 270.11(a)(1). This certification also designates the person, or their duly authorized representative, authorized to sign reports required by the permit or other information requested by the ODEQ as specified in 40 CFR 270.11(b).

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

David Sweeten
Director of Operations
For Anadarko E&P Onshore LLC

SECTION 2

PERMIT CHECKLISTS

NOTE: Before starting Review, first answer Rows 35 (Fees) and 40 (Landowner Affidavit).

STATE CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS

TREATMENT, STORAGE, DISPOSAL AND RECYCLING REQUIREMENTS

RCRA I.D. No.
OKD007234586 (EPA ID)
007234586-PC (Permit No.)

Facility Name
Anadarko E&P Onshore LLC, Former Champlin Refinery

Row	Section and Requirement	Reference	Review Consideration	Location in Application, or "N/A"	Comment, Explanation of "N/A", or See Attached Comment Number
	OAC 252:205 - HAZARDOUS WASTE RULES				
1	**Buffer zones**	**OAC 252:205-9-3**			
2		**(a)**	**Land treatment unit**: No treatment, storage or disposal within 50' of site perimeter. No treatment, storage, or disposal in **surface impoundment, waste pile, or landfill** within 200' of site perimeter.	N/A	LTU is closed and in post-closure care (PCC).
3	**Provisions for on-site inspectors**	**OAC 252:205-9-4**	DEQ may include provisions for full-time inspector in permit conditions of commercial TSDs.	N/A	LTU is in post-closure, the facility is not an operational commercial TSD and does not accept hazardous wastes from off-site generators.
4	**Additional Closure Requirements**	**OAC 252:205-9-5(a)**	The provisions of 40 CFR 264 or 265, Subparts G and H, shall apply to all areas where hazardous waste is handled, not just permitted units.	Section 5: 3.0, 4.0	Hazardous waste is not handled at the Site. The LTU is closed and in PCC and financial assurance is provided.
5		**(b)**	The closure cost estimate may not incorporate any value that may be realized by the sale of recycled products.	N/A	The Site does not sell recycled products.

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6	**Additional waste analysis requirements**	**OAC 252:205-9-6(a)**	Prior to receipt of HW the TSD must obtain detailed chemical and physical analysis of waste sample.	N/A	The Site is not an operational commercial TSD and does not accept hazardous waste from off-site generators.
7		**(b)**	Receipt of industrial waste by TSD o/o must include records in the facility operating record as follows: (1) Information regarding the chemical and physical nature of the waste which reasonably, considering the source, establishes that the waste does not exhibit any characteristic of hazardous waste as described by 40 CFR 261, Subpart C. This information may include laboratory analyses, material safety data sheets, and analysis of raw materials, feedstocks, and process descriptions; and (2) An affidavit by the original waste generator stating that the waste does not include any listed waste	N/A	The facility is not an operational commercial TSD and does not accept hazardous waste from off-site generators.
8	**Emergency plans relating to affected property owners**	**OAC 252:205-11-1(a)**	In addition to plans required by 40 CFR 264 Subpart D, new off-site TSD applicants shall prepare a separate Emergency Plan. (Specifications and procedures may be found in 252:205-11-1(b) through (e).)	N/A	The Site is not a new TSD.
9	**Exclusionary siting criteria**	**OAC 252:205-11-2**			
10	**Groundwater resources and recharge areas**	**(a)**	(1) **Presumption of unapprovable site:** DEQ shall presume proposed location is unapprovable if it lies wholly or partially within an area designated as an actual or potential unconsolidated alluvial aquifer or terrace deposit aquifer or bedrock aquifer or recharge area as shown on described OGS maps.	N/A	The Site is not a new TSD.
11			(2) **Rebuttal of presumption**: Applicant may rebut presumption by submitting site-specific hydrological and geological data.	N/A	The Site is not a new TSD.

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12			(3) **DEQ reliance upon Oklahoma Geological Survey**: DEQ shall request review and conclusions by Oklahoma Geological Survey when making determination whether a proposed location is within a prohibited area.	N/A	The Site is not a new TSD.
13			(4) **Site-Specific Information**: DEQ may require site-specific hydrological and geological information for proposed facility locations outside designated principal groundwater resource or recharge area where reason to believe proposed location may be unsuitable due to localized groundwater conditions.	N/A	The Site is not a new TSD.
14			(5) **Groundwater protection plan**: In determining whether a groundwater protection plan with financial assurance is required for an on-site facility, the procedures used in subsection (1)-(4) of this section shall be used.	N/A	The Site is not a new TSD.
15			(6) **Existing facilities**. Existing facilities in these areas may continue to operate and modify or expand operations to extent permitted.	N/A	The Site is not a new TSD.
16	**Water wells**	**(b)**	DEQ shall not grant permit for new HW disposal facility located within one-quarter mile of any public or private water supply well except private water supply wells on applicant's property. Water wells permanently abandoned may be plugged if applicant has the right to do so. Applicant shall notify DEQ that abandoned wells have been plugged. If abandoned water wells are identified during preparation of application or during permit process, applicant shall notify DEQ so wells can be included in Class V well inventory.	N/A	The Site is not a new TSD.

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17	**Flood plain**	**(c)**	No permit or modification of existing permit granted if disposal facility is within one-hundred year flood plain, except for post-closure, corrective action or remedial activities conducted under DEQ direction.	Section 5: 1.2.5, Figure 1-3	The Site is not located within 100-year floodplain.
18	**Surface water**	**(d)**	No permit granted for a new HW disposal facility located within one mile of conservation pool elevation of any reservoir which supplies water for public water supply or within one mile of scenic river.	N/A	The Site is not a new TSD.
19	**Air pollution**	**(e)**	No permit granted for a new off-site facility located within one mile of public school, educational institution, nursing home, hospital, or park.	N/A	The Site is not a new TSD.
20	**Upgrades of county roads and bridges**	**OAC 252:205-11-3**	Owner/operator shall submit certificate of acceptance of completed upgrades by appropriate board(s) of county commissioners or ODOT as appropriate, per 27A O.S. § 2-7-115(B)(2), which specifies: (B) The Department shall not issue a permit for any new hazardous waste facility unless: (2) The applicant has agreed to upgrade or pay for the upgrading of the roads and bridges to the reasonable measures determined by the appropriate board of county commissioners or to the design standards established by the Oklahoma Department of Transportation for industrial access roads. The Department shall not authorize the operation of the facility until the necessary upgrades to the roads and bridges have been made.	N/A	The Site is not a new TSD.

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21	**Federal rules**	**OAC 252:205-19-2**	Off-site recycling facilities must comply with provisions of 40 CFR 264: (1) Subpart B - General Facility Standards; (2) Subpart C - Preparedness & Prevention; (3) Subpart D - Contingency Plan & Emergency Procedures; (4) Subpart E - Manifest System, Recordkeeping & Reporting; (5) Subpart G - Closure & Post-Closure; (6) Subpart H- Financial Requirements; (7) Subpart I - Use & Management of Containers; (8) Subpart J - Tank Systems.	N/A	The Site is not an off-site recycling facility.
22	**Replacement of Recycling Units**	**OAC 252:205-19-3**			
23		**(a)**	Owner or operator may replace recycling units not required to be permitted, with functionally equivalent units not more than 10% difference in capacity with DEQ approval.	N/A	The Site is not an off-site recycling facility.
24		**(b)**	Must apply for permit modification to increase capacity of recycling units or to add new or different recycling units.	N/A	The Site is not an off-site recycling facility.
25	**Agency Note**		The application for permit modification is a Tier I in accordance with 252:4-7-52 and a Class I in accordance with 40 CFR 270.42	No	

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26	**Operating record**	**OAC 252:205-19-4**			
27	**Operating record required**	**(a)**	Facility must keep written operating record at facility.	N/A	The Site is not an off-site recycling facility.
28	**Content**	**(b)**	To be recorded and maintained in operating record: (1) Description/quality of each HW received; (2) Method(s) and date(s) of treatment, storage, recycling of each HW received; (3) Location of all HW within facility; (4) Quantity of HW at each location, including cross-referencing to specific manifest document numbers if applicable; (5) Complete documentation of fate of all HW received from off-site or generated on-site.	N/A	The Site is not an off-site recycling facility.
29	**Processed hazardous waste to be recycled**	**OAC 252:205-19-7**	Demonstration to DEQ that units containing HW processed for recycling have demonstrable market and no longer contain hazardous constituents, are not required to obtain permit for those units, but must comply with 252:205-19-1(b) and 19-4.	N/A	The Site is not an off-site recycling facility.
30	**Mobile units**	**OAC 252:205-19-15**			
31	**Applicability**	**(a)**	Does the facility have mobile recycling units generating in excess of 1000 kilograms of HW in a month? Requirements don't apply when: (1) recycling is performed at generator's site; (2) generator retains responsibility for proper management of waste; (3) no waste generated by other person is brought onto site for treatment by the unit; (4) generator and recycler meet all requirements for HW management.	N/A	The Site does not operate mobile recycling units.

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32	**Permits**	**(b)**	Mobile recycling units Subject to Part 3 shall obtain Recycling Permit for Mobile Unit. Applications shall include application fee and three copies of the following: (1) Detailed description of proposed recycling unit(s) including flow diagrams and engineering design drawings, specifying the exact equipment necessary for unit(s) to perform as specified. (2) Amount and nature of waste streams able to be processed and amount/nature of waste streams expected from operation of proposed unit(s); (3) Description and quantification of releases to air, sewer, water, or ground that result from operation of proposed unit(s); (4) Description of procedures used to decontaminate unit, including disposal of contaminated residuals, after completion of on-site processing; (5) Evidence of compliance with personnel training requirements equivalent to 40 CFR 265.16 (6) Generic contingency and safety plan which meets applicable provision of 40 CFR 265, Subparts C and D.	N/A	The Site does not operate mobile recycling units.

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33	**Tank and Container Recyclers - Applicability**	**OAC 252:205-19-29 (c)**	This part does not apply to: (1) Facilities permitted pursuant to 40 CFR 264; (2) Facilities which only receive containers or tanks for filling with product or waste without on-site cleaning or reconditioning; or, (3) Companies, their affiliates and subsidiaries which receive back only their own containers and, as applicable: (A) Remove residues of unused commercial chemical product for use at their facilities; (B) Remove residues and manage such residues and wash wastes as hazardous or non-hazardous solid waste as determined per 40 CFR 261; or, (C) Treat removed residues and wash wastes in units permitted pursuant to sections 402 and 307(b) of the Clean Water Act.	N/A	The Site does not receive tanks or containers from off-site for cleaning or reconditioning.
34	**Treatment, storage, off-site recycling, and disposal facility fees**	**OAC 252:205-21-4**			

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35	**Permit fees**	**(a)**	(1) New permit application fees listed in Appendix B. (2) Renewal and post closure application fees are 1/2 of the fees listed in Appendix B, subject to statutory minimum. (3)Fees for re-submission of application are minimum amount established by 27A O.S. § 2-7-119(B). Re-submission occurs when DEQ requests applicant to provide additional information to make application complete, constituting substantial recomposition of the application. (4) Fees for Tier 3 modification are application fees listed in Appendix B. (5) Application fees for off-site recycling facility is statutory minimum established for permit applications by 27A O.S. § 2-7-119(B).	Cover letter	Cover letter documents renewal fee of $5,000 was submitted to ODEQ.

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	OAC 252:4 RULES OF PRACTICE AND PROCEDURE				
36	**Filing an application**	**OAC 252:4-7-4.**	What Tier is the application? (a) Tier I (b) Tier II (c) Tier III	Cover letter	Per OAC 252:4-7-53 the renewal application is a Tier II.
37	**Fees**	**OAC 252:4-7-5.**	Fees shall be submitted with application.	Cover letter	Cover letter documents renewal fee of $5,000 was submitted to ODEQ.
38	**Notices**	**OAC 252-4-7-13**			
39	**Statutory requirements for notice**	**(a)**	Uniform Env. Permitting Act requires applicant to give notice in accordance with 27A O.S. § 2-14-301, which includes: (A) Upon filing a Tier II or III application with the Department, the applicant shall publish notice of the filing as legal notice in one newspaper local to the proposed new site or existing facility. The publication shall identify locations where the application may be reviewed, including a location in the county where the proposed new site or existing facility is located. (B) For Tier III applications: notice of a thirty-day opportunity to request, or give the date, time and place for, a process meeting on the permitting process. If the Department receives timely request and determines that a significant degree of public interest in the application exists, it shall schedule and hold such meeting.	Section 3	Public notification language approved by ODEQ and will be published after permit application is submitted.
40	**Notice to landowner**	**(b)**	Applicant shall certify by affidavit that they own the real property, have a current lease or easement for accomplishing permitted purpose or have provided legal notice to landowner.	Section 5: Appendix B	

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41	**Notice content**	**(c)**	Applicant shall provide draft notice, for approval prior to publication. All published legal notice(s) shall contain: (1) Applicant Name and address; (2) Name, address and legal description of site, facility and/or activity; (3) Purpose of notice; (4) Type of permit or permit action being sought; (5) Description of activities to be regulated; (6) Locations where application may be reviewed; (7) Names, addresses and phone numbers of contact persons for DEQ and applicant; (8) Description of public participation opportunities and time period for comments and requests; (9) Any other information required by DEQ rules.	Section 3	Public notification language approved by ODEQ and will be published after permit application is submitted.
42	**Proof of publication**	**(d)**	Within 20 days after date of publication, did applicant provide a written affidavit of publication for each published notice? In case of mistake in published notice, a legal notice of correction or republication of entire notice, is required.	Section 5: 1.4	Text acknowledges providing affidavit of publication withing 20 days of publication.
43	**Additional notice.**	**(f)**	(1) Applicants for NPDES, RCRA or UIC permits are subject to additional notice provisions of federal requirements adopted by reference as DEQ rules. (See 40 CFR 124.10, 124.30, and 270.42.)	Section 3	Public notification language approved by ODEQ and will be published after permit application is submitted.

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Row	Section and Requirement	Reference	Review Consideration	Location in Application, or "N/A"	Comment, Explanation of "N/A", or See Attached Comment Number
	OKLAHOMA HAZARDOUS WASTE MANAGEMENT ACT - 27A § O.S.2-7-101 *et.seq.*				
44	**Issuance, Renewal or Transference of Permit for Certain Persons**	**27A § O.S.2-7-109.**			
45		**(A)(1)**	Is the applicant in substantial compliance with all orders and judgments regarding hazardous waste handling?	Yes	Applicant is not under any orders for hazardous waste handling
46		**(A)(2) & (3)**	Has the applicant or an affiliate evidenced a reckless disregard for public health and/or the environment?	No	Applicant has not evidenced reckless regard for public health or the environment and did not operate the former refinery.
47		**(B)(1) & (2)**	Has a disclosure statement, OR, the appropriate SEC forms been filed?	Section 6	
48		**(D)**	Has the applicant properly signed and certified the application?	Cover letter and Section 1	
49	**Disposal of Liquid Hazardous Waste - Prohibited Disposal**	**27A § O.S.2-7-110**			
50		**(A)**	If there are surface impoundments, do they receive only wastes generated by the owners?	N/A	The Site is not applying for a permit to manage liquid wastes in a surface impoundment and there are no impoundments at the Site.
51		**(B)**	Except as otherwise specifically provided by law, the disposal of any liquid hazardous waste in a landfill or in a surface impoundment is prohibited.	N/A	The Site is not applying for a permit to manage liquid wastes in a surface impoundment and there are no impoundments at the Site.
52	**Prohibited Disposal**	**27A § O.S.2-7-111**			
53		**(A)**	Plowing of hazardous waste into the soil surface is prohibited, except pursuant to an approved DEQ Plan. The site used for such disposal shall not be subject to flooding or estensive erosion.	N/A	There is no planned placement of hazardous wastes into surface soil at the Site. The LTU is in PCC.

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54		**(B)**	A hazardous waste facility for on-site treatment, recycling or storage shall not be sited in or over a principal groundwater resource or recharge area as determined in writing by the Oklahoma Geological Survey, except pursuant to a plan approved by the Department. The plan shall contain such design criteria and groundwater monitoring provisions as deemed necessary by the Department to protect the quality of said principal groundwater resource or recharge area. The plan shall also provide for the establishment and maintenance of a bond or other financial assurance in a form and amount acceptable to the Department, specifically for the purpose of assuring both immediate response and containment and comprehensive remediation as directed by the Department in the event of a release to soil or water of any hazardous waste or hazardous waste constituent. (Verify on the Maps)	N/A	The permit application is for an existing permitted facility and does not require siting.
55		**(C)(2)(a)**	If this is a new commercial facility: (1) Is there an Emergency Plan? (2) Has the DEQ approved the Plan? (3) Have the surrounding Property Owners approved the Plan?	N/A	The Site is not a new commercial facility.
56		**(C)(2)(b)**	If this is an existing facility proposing to receive hazardous waste from off-site: (1) Is there an Emergency Plan? (2) Has the DEQ approved the Plan? (3) Have the surrounding Property Owners approved the Plan?	N/A	The Site does not accept hazardous waste from off-site.

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57		**(C)(2)(c)**	If the facility is located within the city limits of any incorporated city or town, has a copy of the Plan been supplied to the City? (City has 60 days to review.)	N/A	The Site does not accept hazardous waste from off-site.
58	**Disposal Site Criteria**	**27A § O.S.2-7-112**	(1) Has the design and testing for the facility been conducted under the supervision of a professional engineer, registered in Oklahoma? (2) Is the application sealed by that PE?	N/A	The Site is not applying for construction of a hazardous waste facility.
59	**New hazardous waste facilities within eight miles of corporate limits - Exemptions**	**27A § O.S.2-7-114.**	If this is a new off-site facility for land disposal or incineration, is it located more than **eight (8) miles** outside of the corporate limits of an incorporated city or town? (If "YES" talk to Supervisor.)	N/A	The Site is neither a new facility nor does it accept hazardous waste from off-site.
60	**Requirements on the DEQ**	**27A § O.S.2-7-115**	(C)(1) Has the Department notified boards of county commissioners by certified mail, return receipt requested, of the proposed waste site? (Said boards of county commissioners shall have forty-five (45) days from receipt of such notice to review the county road classification plan and respond to the Department. The finding of each board of county commissioners shall be sent to the Department by certified mail, return receipt requested.) (2) Has the Board(s) responded? (Failure to respond within such forty-five-day response period shall constitute a finding that the roads and bridges can be used without substantial detriment and preclude the board of county commissioners failing to respond from raising the suitability of use of roads and bridges of the county as set out in subsections A and B of this section at a later date.)	N/A	The Site is neither a new facility nor does it accept hazardous waste from off-site.

APPLICATION REVIEW CHECKLIST **LAND PROTECTION DIVISION** **HAZARDOUS WASTE PROGRAM** **OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY**	Facility Name: Anadarko E&P Onshore LLC, Former Champlin Refinery Facility ID No.: ________ ODEQ Permit No.: 007234586-PC Reference No.: ________ Application Type: RCRA Permit Renewal Date: 10/20/2023 (New/Modify/Renewal)	40 CFR 270 and OAC 252:200 All Permit Applications
	Administrative Reviewer: ________ Start Date: ________ Completion Date: ________ Technical Reviewer: ________ Start Date: ________ Completion Date: ________ Issuance Deadline: ________	ODEQ Form Number XXX-XXX Shaded areas for DEQ use only

ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
G-0	**270.10**		**GENERAL APPLICATION REQUIREMENTS - 270.10**				
G-1	270.10(a)		**Permit application completed and signed**	Cover letter			
G-2	270.10(b)		**Who applies? – When a facility is owned by one person but is operated by another person, it is the operator's duty to obtain a permit, except that the owner must also sign the permit application.**	Cover letter			
G-3	270.10(c)		**Completeness – all elements included**	Section 2			SWMU, Part B, and OK checklists
G-4	270.10(d)		**Information requirements --** information in 270.13 and applicable sections in 270.14 through 270.29	Sections 4, 5			Part A and Part B

ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
Existing HWM facilities and interim status qualifications							
G-5	270.10(e)(1)		Must submit part A no later than: (i) 6 months after the date of publication of regulations requiring compliance with 265 or 266, or (ii) 30 days after being subject to standards in 265 or 266, whichever first occurs (iii) March 24, 1987, if a generator who generates more than 100 kg but less than 1,000 kg per month and treats, stores, or disposes on-site	Section 4			
G-6	270.10(e)(2)		Extension of submittal of part A if: (i) Substantial confusion whether to file a permit application, and (ii) Such confusion is due to ambiguities in 260, 261, 265, or 266	N/A			
G-7	270.10(e)(3)		Extension of submittal of part A under compliance order	N/A			
G-8	270.10(e)(4)		Timely submittal of part B	Section 5			
New HWM facilities							
G-9	270.10(f)(1)		No construction allowed before the submittal of parts A and B and receipt of the effective permit	N/A			Site is not a new HWM facility
G-10	270.10(f)(2)		Must submit parts A and B at least 180 days before construction is expected to commence	N/A			Site is not a new HWM facility
G-11	270.10(f)(3)		Construction of an incinerator of PCBs ...	N/A			Site is not a new HWM facility
Updating permit applications							
G-12	270.10(g)(1)		Amendment to part A (when part B has not yet been filed) (i) File with the Regional Administrator for new wastes (ii) File with the State Director for new wastes (iii) As necessary for compliance with 270.72	N/A			

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G-13	270.10(h)		**Reapplications** - 180 days before the expiration of the existing permit	Cover letter			
G-14	270.10(i)		**Recordkeeping** - for at least 3 years	Yes			Kept at Site Office and repository
Exposure information							
G-15	270.10(j)(1)		Re: surface impoundments and landfills, submittal of part B after 8/8/85, must have information on public exposure from releases, including: (i) Potential releases associated with normal operations, including transportation (ii) Pathways of human exposure from such releases (iii) Potential magnitude and nature of human exposure from such releases	N/A			
G-16	270.10(j)(2)		If part B submitted before 8/8/85, must submit exposure information required above, (j)(1)	N/A			
G-17	270.10(k)		**Submittal of information to establish permit conditions under 270.32(b)(2) and 270.50(d)**	Application			Sections 1 through 6 of application
SIGNATORIES TO PERMIT APPLICATIONS AND REPORTS - 270.11							
Applications - signatures							
S-1	270.11(a)(1)		For a corporation (i) President, secretary, treasurer, or vice-president; or (ii) Manager (w/authority to sign) of a facility with more than 250 employees or annual sales of more than $25 million	Section 1			
S-2	270.11(a)(2)		For a partnership or sole proprietorship: by a general partner or proprietor	N/A			
S-3	270.11(a)(3)		For a municipality, State, Federal, or other public agency (i) Chief executive officer of the agency or (ii) Senior executive officer	N/A			

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S-4	270.11(b)		Reports signed by a person described in (a) or an authorized representative of that person if:	Section 1			
S-5	270.11(b)(1)		A written authorization by a person described in (a)	Section 1			
S-6	270.11(b)(2)		An authorization for a position responsible for the overall operation	Section 1			
S-7	270.11(b)(3)		Submittal of a written authorization	Section 1			
S-8	270.11(c)		Change to authorization for signing reports	Section 1			
S-9	270.11(d)		Certification for signature (see cite)	Section 1			
I-1	**270.12**(a)		**CONFIDENTIALITY OF INFORMATION**: (a) "confidential business information" stamped on each page containing such information.	N/A			
I-2	270.12(b)		Claims for confidentiality of the name and address of any permit applicant or permittee will be denied.	N/A			
A-00	**270.13**		**CONTENTS OF PART A OF THE PERMIT APPLICATION - 270.13**	Section 4			
		SUBCHAPTER 11	**ADDITIONAL PERMIT PROCEDURES**				
AP-1		11-1 Emergency plans relating to affected property owners	(a) Applicants for new proposed off-site TSD or disposal sites are required to prepare a separate Emergency Plan in addition to the plans required by 40 CFR 264 Subpart D. This Emergency Plan shall the criteria of 40 CFR 264 Subpart D but shall specifically relate to each parcel.	N/A			

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					YES/NO/NA	YES/NO/NA	
AP-2		11-1(b) *For the purposes of these rules, a parcel of land owned by one or more affected property owners is a present possessory fee simple estate in land, excluding future interests.*	(1) All discrete parcels are required to be counted equally. (2) Owner required to represent the approval or disapproval of the Emergency Plan on behalf of the parcel for purposes of the OHWMA. (3) A calculation of approval or disapproval of the Emergency Plan by majority of the affected property owners is required. (4) Approval or disapproval of the Emergency Plan by an affected property owner does not signify approval or disapproval of the technical aspects of the facility.	N/A			
AP-3		11-1(c)	An applicant must submit to the ODEQ the written approval of the Emergency Plan form the affected property owners.	N/A			
AP-4		11-1(d)	Within forty-five days of the application, affected property owners must specify reasons for non-approval of the Emergency Plan.	N/A			
AP-5		11-1(e)	Area of affected property owners is determined by measuring one-mile from the perimeter of the site as specified in the permit application.	N/A			
AP-6		**11-2** **Exclusionary siting criteria**	**(a) Ground-water resources and recharge areas.**	N/A			
AP-7		11-2(a)(1)	**Presumption of unapprovable site.** Proposed locations lying within areas designated as unconsolidated alluvial aquifers or terrace deposit aquifers or bedrock aquifers or recharge areas as shown on Sheets 1 and 2 of “Maps Showing Principal Ground Water Resources and Recharge Areas in Oklahoma” shall be presumed to be unapprovable. Certification of notifying affected property owners	N/A			

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					YES/NO/NA	YES/NO/NA	
AP-8		11-2(a)(2)	**Rebuttal of presumption.** The applicant may rebut the presumption by submitting hydrologic and geological data sufficient to demonstrate that the proposed location does not lie within a prohibited area.	N/A			
AP-9		11-2 (a)(3)	**ODEQ reliance upon Oklahoma Geological Survey.** In determining whether a proposed location lies within a prohibited area, the ODEQ will rely upon a review by the Oklahoma Geological Survey.	N/A			
AP-10		11-2 (a)(4)	**Site-specific information.** The ODEQ may require site-specific hydrological and geological information for proposed facility locations outside a designated principal ground-water resource or discharge area where there is reason to believe that the proposed location may be unsuitable due to localized ground-water conditions.	N/A			
AP-11		11-2(a)(5)	**Ground-water protection plan.** In determining whether a ground-water protection plan with financial assurance is required for an on-site facility pursuant to 27A O.S.§ 2-7-111(B), the procedures used in subsections (1)-(4) of this section shall be used.	N/A			

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					YES/NO/NA	YES/NO/NA	
AC-0		11-2(a)(6)	**Existing facilities.** Existing facilities in these areas may continue to operate and may modify or expand their operations to the extent permitted by 27A O.S. § 2-7-111.	N/A			
AC-1		11-2(b)	**Water wells.** The ODEQ shall not grant a permit for a new hazardous waste disposal facility proposed to be located within one-quarter mile of any public or private water supply well except private water supply wells on the applicant's property. Water supply wells that arte demonstrated by the applicant to be permanently abandoned may be plugged upon a demonstration that the applicant has the right to plug them. The applicant shall notify the ODEQ that the abandoned water wells have been plugged. If abandoned water wells are identified by the applicant during the preparation of his application or during the permit process, the applicant shall notify the ODEQ so that these wells can be included in the Class V well inventory.	N/A			
AC-2		11-2(c)	**Flood plain.** No permit or modification of an existing permit which includes disposal of hazardous waste within a one-hundred-year flood plain shall be granted, except for post-closure or corrective action. For existing facilities, this modification prohibition applies only to land disposal units and to modifications of such units which would increase disposal rates or designate new areas for disposal.	N/A			
AC-3		11-2(d)	**Surface water.** No permit shall be granted for a new hazardous waste disposal facility proposed to be located within one mile of the conservation pool elevation of any reservoir which supplies water for a public water supply or within one mile off any scenic river.	N/A			

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					Yes/No/NA	Yes/No/NA	
AC-4		11-2(e)	**Air pollution.** No permit shall be granted for a new off-site hazardous waste disposal facility proposed to be located within one mile of any public school, educational institution, nursing home, hospital or public park.	N/A			
AC-5		11-2(f)	The Hazardous Waste Management Act also contains exclusionary siting criteria. See 27A O.S. § 2-7-111(B) and ()C)(1) and § 2-7-114, as amended.	N/A			
AC-6		11-3	**Upgrades of county roads and bridges.** The owner/operator shall submit a certificate of acceptance of the completed upgrades by the appropriate board(s) of county commissioners or the Oklahoma Department of Transportation, as appropriate, pursuant to 27A O.S. § 2-7-115(B)(2).	N/A			
General Requirements for Contents of Part B Application - 270.14							
General Information							
B-1	270.14(b)(1)		General description of the facility	Section 5, 1.1			
B-2	270.14(b)(2)		Chemical and physical analyses of hazardous wastes	N/A			
B-3	270.14(b)(3)		A copy of waste analysis plan	N/A			
B-4	270.14(b)(4)		A description of security measures	Section 5: 2.1			
B-5	270.14(b)(5)		A copy of the general inspection schedule	Section 5: 2.2			
B-6	270.14(b)(6)		Justification of requests for a waiver of preparedness and prevention	N/A			Provided in Section 5, 2.4
B-7	270.14(b)(7)		A copy of the contingency plan	N/A			

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					Yes/No/NA	Yes/No/NA	
B-8	270.14(b)(8)		Safety procedures, equipment, construction to prevent: (i) Hazard in unloading operations (ii) Runoff from HW areas (iii) Contamination of water supplies (iv) Effects of equipment/power failure (v) Exposure of personnel to HW (vi) Releases to atmosphere	N/A			
B-9	270.14(b)(9)		Prevention of accidental ignition, reaction of ignitable, reactive or incompatible wastes	N/A			
B-10	270.14(b)(10)		Traffic pattern information	N/A			
B-11	270.14(b)(11)		Facility location information (i) Identification of political jurisdiction (ii) Compliance with seismic standard (if located in areas listed in 264 appendix VI) (A) No faults within 3,000 ft, data based from: (1) Published geologic studies (2) Aerial reconnaissance of a 5-mile radius (3) Aerial analysis of a 3,000-foot radius (4) If needed, reconnaissance walking within 3,000-foot radius (B) Faults ... (iii) Identification of 100-year floodplain (iv) Requirements if located within 100-year floodplain ... (v) Compliance schedule for existing facilities NOT in compliance with 264.18(b)	Section 5: 1.2			
B-12	270.14(b)(12)		Training programs in compliance with 264.16	Section 5: 2.3			
B-13	270.14(b)(13)		A copy of the closure plan and, if applicable, post-closure plan	Section 5: 3.0			Post-closure care (PCC) plan only
B-14	270.14(b)(14)		Documentation filed (required under 264.119) for closed units	N/A			ODEQ approved closure of LTU Plots 1, 2, and 3 in April 1986 and Plots 4, 5, and 6 on July 17, 1997.
B-15	270.14(b)(15)		Closure estimates (required under 264.142) and financial assurance (required under 264.143)	N/A			Not required for PCC Permit Application

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					Yes/No/NA	Yes/No/NA	
B-16	270.14(b)(16)		The most recent post-closure estimates (required under 264.144) and financial assurance (required under 264.145), where applicable	Section 5: Appendix E			
B-17	270.14(b)(17)		Insurance policy or other documentation in compliance with 264.147, where applicable	N/A			Not required for PCC Permit Application
B-18	270.14(b)(18)		Coverage by a State financial mechanism in compliance with 264.149 and 264.150, where appropriate	N/A			
B-19	270.14(b)(19)		A 1" = 200 ft topographic map with contours showing 1000 ft around the facility and: (i) Map scale and date (ii) 100-year floodplain (iii) Surface waters (iv) Surrounding land uses (v) Wind rose (vi) Orientation of the map (vii) Legal boundaries of the facility (viii) Access control (ix) Injection and withdrawal wells both on and off-site (x) Buildings, structures (xi) Barriers for drainage or flood control (xii) Location of operational units	Section 5: Figures 1-2, 1-3; Appendix F Figure 1-1			
B-20	270.14(b)(21)		Notice of approval of petition for extension for land disposal facilities, if applicable	N/A			
Additional information							
B-21	270.14(c)(1)		A summary of groundwater monitoring data during interim status (under 265.90 - 94), where applicable	N/A			
B-22	270.14(c)(2)		Identification of the uppermost aquifer, hydraulically connected aquifers, flow direction and rate, and basis for such identification	Section 5: 1.2.3			

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B-23	270.14(c)(3)		On the topo map, a delineation of the waste management area, property boundary, the proposed point of compliance (264.95), proposed GW monitoring wells (264.97), and info from 270.14(c)(2)	Section 5: Figures 1-2, 1-3; Appendix F Figure 1-1			
B-24	270.14(c)(4)		Description of any plume of contamination from a regulated unit: (i) The extent of the plume on the topo map (ii) Identification of concentrations of constituents in Appendix IX of 264	Section 5: 1.2.3.4 Appendix F Figure 1-1			
B-25	270.14(c)(5)		A detailed GW monitoring program with engineering report (264.97)	Section 5: 5.0			
B-26	270.14(c)(6)		If a hazardous constituent has <u>not been detected</u> at time of application, establish a <u>detection monitoring program</u> (264.98): (i) Indicator parameters, waste constituents (ii) A proposed groundwater monitoring system (iii) Background values (iv) Proposed sampling, analysis, and statistical procedures	N/A			Site is in Corrective Action
B-27	270.14(c)(7)		If a hazardous constituent has <u>been detected</u> at time of application, establish a <u>compliance monitoring program</u> (264.99): (i) A description of wastes previously handled (ii) A characterization of the contaminated GW (iii) A list of hazardous constituents (264.97 & 264.99) (iv) Proposed concentration limits (264.94(a)) or justification for alternate limits (v) A proposed GW monitoring system (vi) Proposed sampling, analysis, and statistical procedures (vii) A proposed Engineering Feasibility Plan for corrective action	Section 5: 1.1, 3.1, 5.0, 6.0			

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B-28	270.14(c)(8)		If hazardous constituents have exceeded concentration limits (Table 1, 264.94) or background values, establish a corrective action program (264.100): (i) A characterization of contaminated GW (ii) Concentration limits (264.94) (iii) A detailed corrective action program and engineering report (iv) Demonstration of adequacy of the corrective program	Section 5: 5.0, 6.0			
Information on SWMUs							
B-29	270.14(d)(1)		Information requirements for SWMUs: (i) Location of the unit on the topo map (ii) Designation of type of unit (iii) Dimensions and structural description (iv) When the unit was operated (v) Specification of all wastes at the unit	Section 5: 1.1, 3.1, Figure 1-3			
B-30	270.14(d)(2)		Information on HW release from each SWMU	Section 5: 1.0			
B-31	270.14(d)(3)		Results of sampling and analysis of groundwater, land surface, and subsurface strata, surface water or air to determine if an RFA is needed	N/A			RFI completed, Site is in Corrective Action
SPECIFIC PART B INFORMATION REQUIREMENTS FOR CONTAINERS - 270.15 Except as otherwise provided in 264.170, the following additional information must be provided:							
C-1	270.15(a)		Description of the containment system in compliance with 264.175	N/A			
C-2	270.15(a)(1)		Basic design parameters, dimensions, and materials of construction	N/A			
C-3	270.15(a)(2)		Showing of how design promotes drainage or keeps containers from contacting standing liquid.	N/A			
C-4	270.15(a)(3)		Capacity of the containment system relative to the number and volume of containers stored	N/A			
C-5	270.15(a)(4)		Provisions for preventing or managing run-on	N/A			

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C-6	270.15(a)(5)		Showing of how accumulated liquids can be analyzed and removed to prevent overflow	N/A			
C-7	270.15(b)		For storage areas with containers that do not contain free liquid, a showing of compliance with 264.175(c)	N/A			
C-8	270.15(b)(1)		Test procedures and results or documentation to show wastes do not contain free liquids	N/A			
C-9	270.15(b)(2)		Description of storage area design and operation to drain/remove liquid or keep containers from contacting standing liquids	N/A			
C-10	270.15(c)		Sketches, drawings, or data to show compliance with 264.176 (ignitable reactive wastes) and 264.177(c) (incompatible wastes)	N/A			
C-11	270.15(d)		Procedures in compliance with 264.177(a) & (b) and 264.17(b) & (c) for storing of incompatible wastes	N/A			
Specific Part B Information Requirements for Tank Systems - 270.16 Except as otherwise provided in 264.190, the following additional information must be provided:				N/A			
T-1	270.16(a)		A written assessment by an independent P.E. to certify the structural integrity and suitability for handling of hazardous wastes of each tank system as req. under 264.191 & 192 - 270.16(a)	N/A			
T-2	270.16(b)		Dimensions and capacity of each tank	N/A			
T-3	270.16(c)		Description of feed systems, safety cutoff, bypass systems, and pressure controls	N/A			
T-4	270.16(d)		A diagram of piping, instrumentation, and process flow for each tank system	N/A			
T-5	270.16(e)		A description of corrosion protection system as required under 264.192(a)(3)(ii)	N/A			

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					YES/NO/NA	YES/NO/NA	
T-6	270.16(f)		For new tank systems, a description of how the tank system(s) will be installed in compliance with 264.192(b),(c),(d),(e)	N/A			
T-7	270.16(g)		Detailed plans and description of the secondary containment system in compliance with 264.193(a), (b), (c), (d), (e), (f)	N/A			
Variance from the requirements of 264.193							
T-8	270.16(h)(1)		Detailed plans and engineering and hydrogeologic reports showing alternative safeguards	N/A			
T-9	270.16(h)(2)		A detailed assessment of hazards in event of release	N/A			
T-10	270.16(i)		Description of spill and overflow prevention as required under 264.194(b)	N/A			
T-11	270.16(j)		Description of operating procedures, tank system design, facility design for Ignitable/Reactive and incompatible wastes as required under 264.198, 199	N/A			
SPECIFIC PART B INFORMATION REQUIREMENTS FOR SURFACE IMPOUNDMENTS - 270.17 Except as otherwise provided in 264.1, must provide the following information:							
SI-1	270.17(a)		A list of hazardous wastes to be placed in each impoundment	N/A			
SI-2	270.17(b)		Detailed plans and engineering report on design, construction, operations, and maintenance as required in 264.19, 221, 222, 223, addressing:	N/A			
SI-3	270.17(b)(1)		The liner system	N/A			
SI-4	270.17(b)(2)		The double liner and leak detection, collection, and removal system as req. under 264.221(c)	N/A			
SI-5	270.17(b)(3)		If the leak detection system is in the saturated zone, detailed plans and engineering report on the leak detection design and operation, and the location of the saturated zone in relation to the leak detection system	N/A			

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					YES/NO/NA	YES/NO/NA	
SI-6	270.17(b)(4)		The construction quality assurance plan (CQA) if required under 264.19	N/A			
SI-7	270.17(b)(5)		Proposed action leakage rate and response action plans if required under 264.222 & 223	N/A			
SI-8	270.17(b)(6)		Prevention of overtopping	N/A			
SI-9	270.17(b)(7)		Structural integrity of dikes	N/A			
SI-10	270.17(c)		The inspection program for each surface impoundment including double liner system, leak detection system, cover system, and appurtenances for control of overtopping as req. under 264.226(a),(b),(d) submitted under 270.14(b)(5)	N/A			
SI-11	270.17(d)		A certification by a qualified engineer on the structural integrity of the dikes as req. under 264.226(c)	N/A			
SI-12	270.17(e)		The procedure to remove a surface impoundment from service as req. under 264.227(b), (c) submitted under 270.14(b)(7)	N/A			
SI-12	270.17(f)		Procedure to remove hazardous waste residues and contaminated materials at closure as req. under 264.228(a)(1). For non-removed wastes, must comply with 264.228(a)(2) and (b). This information be submitted in closure and post-closure plan under 270.14(b)(13)	N/A			
SI-13	270.17(g)		Compliance with 264.229 for I/R wastes	N/A			
SI-14	270.17(h)		Compliance with 264.230 for incompatible wastes	N/A			
SI-15	270.17(i)		A waste management plan for F020 through F027 as req. under 264.231. Must address:	N/A			
SI-16	270.17(i)(1)		The volume, physical and chemical characteristics including migration potential to the environment	N/A			
SI-17	270.17(i)(2)		The attenuative properties of the underlying and surrounding soils	N/A			

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SI-18	270.17(i)(3)		The mobilizing properties of co-disposed materials	N/A			
SI-19	270.17(i)(4)		The effectiveness of additional treatment, design, or monitoring techniques	N/A			
Specific Part B Information Requirements for Waste Piles - 270.18 Except as otherwise provided in 264.1, the following information must be provided:							
W-1	270.18(a)		**A list of hazardous wastes**	N/A			
W-2	270.18(b)		**If an exemption is sought, compliance with 264.90(b)(2) and 264.250(c)**	N/A			
W-3	270.18(c)		**Detailed plans and engineering reports on the design, construction, operation, and maintenance as req. under 264.19, 251, 252, and 253, addressing:**	N/A			
W-4	270.18(c)(1)		(i) The liner system as req. under 264.251(a) (ii) The double liner and leak detection, collection, and removal system (LCRS) as req. under 264.251(c) (iii) If the leak detection system is in the saturated zone, detailed plans and engineering report on the leak detection design and operation, and the location of the saturated zone in relation to the leak detection system (iv) The construction quality assurance plan as req. under 264.19 (v) The proposed action leakage rate and response action plan as req. under 264.252 and 264.253	N/A			
W-5	270.18(c)(2)		Control of run-on	N/A			
W-6	270.18(c)(3)		Control of run-off	N/A			
W-7	270.18(c)(4)		Management of run-on/run-off collection and holding units	N/A			
W-8	270.18(c)(5)		Control of wind dispersion	N/A			

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W-9	270.18(d)		The inspection program for each waste pile including double liner system, LCRS, cover system, and appurtenances for control of run-on and run-off as req. under 264.254(a), (b), (c)	N/A			
W-10	270.18(e)		If treatment is carried out on the pile, details of the process, equipment, and nature and quality of residue	N/A			
W-11	270.18(f)		Compliance with 264.256 for I/R wastes	N/A			
W-12	270.18(g)		Compliance with 264.257 for incompatible wastes	N/A			
W-13	270.18(h)		Closure plan as req. under 264.258(a) or 264.310(a)	N/A			
W-14	270.18(i)		A waste management plan for F020 through F027 as req. under 264.259	N/A			
W-15	270.18(i)(1)		The volume, physical, and chemical characteristics of the wastes and the potential to migrate to the environment	N/A			
W-16	270.18(i)(2)		The attenuative properties of soils	N/A			
W-17	270.18(i)(3)		The mobilizing properties of the co-disposed materials	N/A			
W-18	270.18(i)(4)		The effectiveness of additional treatment, design, or monitoring techniques	N/A			
SPECIFIC PART B INFORMATION REQUIREMENTS FOR INCINERATORS - 270.19 Except as otherwise provided in 264.340, must fulfill the following (a), (b), or (c)							
IN-1	270.19(a)		Seeking an exemption under 264.340(b) or (c) (ignitable, corrosive, or reactive)	N/A			
IN-2	270.19(a)(1)		Documentation waste listed in 261 subpart D, solely because ignitable (Hazard Code I) or corrosive (Hazard Code C) or both, or	N/A			
IN-3	270.19(a)(2)		Documentation that waste listed in 261 subpart D, solely because reactive (Hazard Code R) for characteristics other than those listed in 261.23(a)(4) and (5) and will not be burned with other HW, or	N/A			

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IN-4	270.19(a)(3)		Documentation that waste hazardous solely for the characteristic of ignitability, corrosivity, or both, or	N/A			
IN-5	270.19(a)(4)		Documentation that waste hazardous solely for the characteristics of reactivity listed in 261.23(a)(1),(2),(3),(6),(7), or (8) and will not be burned with other HW, or	N/A			
IN-6	270.19(b)		Trial burn plan or results as req. under 270.62	N/A			
In lieu of a trial burn							
IN-7	270.19(c)(1)		Waste analysis, including: (i) Heat value (ii) Viscosity or physical form (iii) Organic constituents listed in 261, appendix VIII (test methods referenced in 261, appendix III) (iv) Quantification of constituents (see test methods by reference in 270.6) (v) Quantification of constituents designated as POHC's as req. under 264.343	N/A			
IN-8	270.19(c)(2)		Detailed engineering description of the incinerator, including: (i) Manufacturer's name and model (ii) Type of incinerator (iii) Dimensions (linear and x-section area) (iv) Auxiliary fuel system (type/feed) (v) Capacity of prime mover (vi) Automatic cutoff system (vii) Stack gas and pollution control monitoring systems (viii)Nozzle and burner design (ix) Construction materials (x) Temperature, pressure, and flow indicating devices and control devices	N/A			
IN-9	270.19(c)(3)		A description and analysis (specifying POHC's) of the waste to be burned. Include data in (c)(1)	N/A			

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					YES/NO/NA	YES/NO/NA	
IN-10	270.19(c)(4)		The design and operating conditions of the incinerator compared with those of trial burns	N/A			
IN-11	270.19(c)(5)		Results of trial burns, including: (i) Sampling and analysis techniques to calculate performance standards in 264.343 (ii) Methods and results of temperatures, feed rates, CO, combustion gas velocity	N/A			
IN-12	270.19(c)(6)		The expected operation information in compliance with 264.343 and 345 including: (i) CO in the exhaust (ii) Waste feed rate (iii) Combustion zone temperature (iv) Combustion gas velocity (v) Stack gas volume, flow rate, and temperature (vi) Residence time (vii) Hydrochloric acid removal efficiency (viii)Fugitive emissions and control procedures (ix) Feed cut-off limits based on operating parameters	N/A			
IN-13	270.19(c)(7)		Supplemental information necessary to achieve the purposes of this paragraph	N/A			
IN-14	270.19(c)(8)		Waste analysis data (permit POHC's)	N/A			
Approval of permit without a trial burn if:							
IN-15	270.19(d)(1)		Wastes are sufficiently similar	N/A			
IN-16	270.19(d)(2)		Incinerator units are sufficiently similar and data from other trial burns are adequate to specify (under 264.345) operating conditions will meet performance standards (under 264.343)	N/A			
SPECIFIC PART B INFORMATION REQUIREMENTS FOR LAND TREATMENT FACILITIES - 270.20 Except as provided in 264.1, must provide the following information:							

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					Yes/No/NA	Yes/No/NA	
LT-1	270.20(a)		Plans to conduct a treatment demonstration as req. under 264.272, must include:	N/A			LTU is in PCC
LT-2	270.20(a)(1)		Wastes for demonstration and their hazardous constituents	N/A			LTU is in PCC
LT-3	270.20(a)(2)		Data sources to be used to make demonstration	N/A			LTU is in PCC
LT-4	270.20(a)(3)		Specific lab or field test: (i) Type of test (ii) Materials and methods, inc. analytical procedures (iii) Expected time of completion (iv) Simulated characteristics: treatment zone, climatic conditions, and operating practices	N/A			LTU is in PCC
LT-5	270.20(b)		Description of land treatment program as req. under 264.271, must include:	Section 5: 3.0			
LT-6	270.20(b)(1)		Wastes to be treated	Section 5: 3.0			
LT-7	270.20(b)(2)		Design measures and operating practices as req. under 264.273(a), including: (i) Application method and rate (ii) Measures to control soil pH (iii) Enhancement of microbial or chemical reactions (iv) Control of moisture content	N/A			LTU is in PCC and non-operational
LT-8	270.20(b)(3)		Monitoring unsaturated zone: (i) Sampling equipment, procedures, and frequency (ii) Procedures for selecting sampling locations (iii) Analytical procedures (iv) Chain of custody (v) Procedures for establishing background values (vi) Statistical methods for interpreting results (vii) Justification for selecting principal hazardous constituents under 264.278(a) criteria	N/A			Unsaturated zone monitoring not proposed at this time.
LT-9	270.20(b)(4)		List of hazardous constituents derived from or in wastes based on analytical procedures in 264.13	Section 5: 3.0			
LT-10	270.20(b)(5)		Dimensions of the treatment zone	Section 5: 3.0			

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					Yes/No/NA	Yes/No/NA	
LT-11	270.20(c)		Description of the design, construction, operations, and maintenance as req. under 264.273, must include:	Section 5: 3.0			
LT-12	270.20(c)(1)		Control of run-on	Section 5: 3.0			
LT-13	270.20(c)(2)		Collection and control of run-off	Section 5: 3.0			
LT-14	270.20(c)(3)		Minimization of run-off of hazardous constituents from the treatment zone	Section 5: 3.0			
LT-15	270.20(c)(4)		Management of collection and holding facilities associated with run-on and run-off control systems	Section 5: 3.0			
LT-16	270.20(c)(5)		Periodic inspection as included in 270.14(b)(5)	Section 5: 3.0			
LT-17	270.20(c)(6)		Control of wind dispersal of particulate matter	Section 5: 3.0			
LT-18	270.20(d)		Description of the demonstration as req. under 264.276(a) if food-chain crops are to be grown in the treatment zone, including:	N/A			
LT-19	270.20(d)(1)		Characteristics of the food-chain crop for which the demonstration will be made	N/A			
LT-20	270.20(d)(2)		Characteristics of the waste, treatment zone, and waste application method and rate	N/A			
LT-21	270.20(d)(3)		Procedures for crop growth, sample collection, sample analysis, and data evaluation	N/A			
LT-22	270.20(d)(4)		Characteristics of the comparison crop including the location and conditions	N/A			
LT-23	270.20(e)		Compliance with requirements under 264.276(b) if food- chain crops are to be grown and cadmium is present	N/A			
LT-24	270.20(f)		Description of the vegetative cover and its post-closure care as req. under 264.280(a)(8) and (c)(2). Submittal under 270.14(b)(13)	Section 5: 3.0			
LT-25	270.20(g)		Compliance with 264.281 if I/R wastes will be placed in the treatment zone	N/A			

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					YES/NO/NA	YES/NO/NA	
LT-26	270.20(h)		Compliance with 264.282 if incompatible wastes will be placed in the treatment zone	N/A			
LT-27	270.20(i)		Waste management plan for F020 through F027 and description of the design, construction, operations, and maintenance as req. under 264.283. Must address:	N/A			
LT-28	270.20(i)(1)		Volume, physical, and chemical characteristics, including the potential to migrate to the environment	N/A			
LT-29	270.20(i)(2)		Attenuative characteristics of the soils	N/A			
LT-30	270.20(i)(3)		Mobilizing properties of co-disposed materials	N/A			
LT-31	270.20(i)(4)		Effectiveness of additional treatment, design, or monitoring techniques.	N/A			
SPECIFIC PART B INFORMATION REQUIREMENTS FOR LANDFILLS - 270.21 Except as otherwise provided in 264.1, the following information must be provided:							
LF-1	270.21(a)		List of hazardous wastes	N/A			
LF-2	270.21(b)		Plans and engineering report on the design, construction, operations, and maintenance as req. under 264.19, 301, 302, and 303, addressing:	N/A			
LF-3	270.21(b)(1)		(i) the liner system as req. under 264.301(a) or an exemption as req. under 264.301(b) (ii) The double liner and leachate detection, collection, and removal as req. under 264.301(c) or an exemption as req. under 264.301(d),(e), or (f) (iii) Plans and engineering report if the leak detection is located in the saturated zone (iv) The construction quality assurance plan as req. under 264.19 (v) The proposed action leakage rate (264.302) and response action plan (264.303)	N/A			

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					YES/NO/NA	YES/NO/NA	
LF-4	270.21(b)(2)		Control of run-on	N/A			
LF-5	270.21(b)(3)		Control of run-off	N/A			
LF-6	270.21(b)(4)		Management of collection and holding facilities associated with run-on and run-off control systems	N/A			
LF-7	270.21(b)(5)		Control of wind dispersal	N/A			
LF-8	270.21(c)		Inspection of each landfill, including the double liner system, LCRS, leak detection, cover system, appurtenances for control of run-on and run-off as req. under 264.303(a),(b) and (c). This information to be submitted under 270.14(b)(5)	N/A			
LF-9	270.21(d)		Description of the proposed inspection of each landfill, including the liner and cover systems as req. under 264.303(a),and (b). Inspection plan to be submitted under 270.14(b)(5)	N/A			
LF-10	270.21(e)		Plans and engineering report on the final cover at closure as req. under 264.310(a), and maintenance and monitoring after closure as req. under 264.310(b). This information be submitted under 270.14(b)(13)	N/A			
LF-11	270.21(f)		If I/R wastes to be landfilled, explanation of compliance with 264.312	N/A			
LF-12	270.21(g)		If incompatible wastes to be landfilled, explanation of compliance with 264.313	N/A			
LF-13	270.21(i)		If containers of HW are to be landfilled, explanation of compliance with 264.315 or 316	N/A			
LF-14	270.21(j)		Waste management plan for F020 through F027 and description of the design, construction, operations, and maintenance as req. under 264.317. Must address:	N/A			
LF-15	270.21(j)(1)		Volume, physical and chemical characteristics, and potential to migrate to the environment	N/A			
LF-16	270.21(j)(2)		Attenuative properties of soils	N/A			

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					Yes/No/NA	Yes/No/NA	
LF-17	270.21(j)(3)		Mobilizing properties of co-disposed materials	N/A			
LF-18	270.21(j)(4)		Effectiveness of additional treatment, design, and monitoring techniques	N/A			
Specific Part B Information requirements for Boilers and Industrial Furnaces - 270.22				N/A			
Trial burns							
BF-1	270.22(a)(1)		*General*. Subject to standards by 266.104, 105, 106, and 107 and plan and results of a trial burn as req. under 270.66 (i) Waiver of trial burn under 266.104 through 107 and (a)(2) through (5) of this section (ii) Submittal of data in lieu of a trial burn as prescribed in (a)(6) of this section	N/A			

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BF-2	270.22(a)(2)		*Waiver of trial burn for DRE* (i) Boilers operated under special operating requirements by 266.110 (ii) Boilers and industrial furnaces burning low risk waste provided by 266.104(a)(5) and 266.109(a), must submit: (A) Documentation that the device is operated as req. under 266.109(a)(1) (B) Results of analyses of each waste to be burned, documenting non-metal compounds in appendix VIII of 261. Identification and basis for constituents excluded from the analysis. Analysis techniques in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (see 260.11) (C) Documentation of firing rates and calculations of worst-case emission rates for each constituent in (a)(2)(ii)(B) using procedures in 266.109(a)(2)(ii) (D) Results of dispersion modeling for emissions in (a)(2)(ii)(C) using procedures in 266.106(h). Director is to approve the modeling or recommend an alternate method (E) Documentation that the maximum annual average ground level concentration of each constituent in (a)(2)(ii)(B) in conformance with (a)(2)(ii)(D) does not exceed the allowable ambient level in appendices IV or V of 266. For levels not established, use 0.1 micrograms per cubic meter.	N/A			

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					YES/NO/NA	YES/NO/NA	
BF-3	270.22(a)(3)		*Waiver of trial burn for metals* Under Tier I (or adjusted Tier I) metals feed rate screening limits by 266.106(b) and (e), must submit: (i) Feed rate of HW and other fuels, and industrial furnace feed stocks (ii) Concentration of each metal controlled by 266.106(b) or (e), and calculations of the total feed rate (iii) Documentation that Tier I feed rate screening limits by 266.106(b) or (e) will not be exceeded during the averaging period (iv) Determination of the terrain-adjusted effective stack height, good engineering practice stack height, terrain type, and land use by 266.106(b)(3) through (5) (v) Documentation of compliance with 266.106(b)(6) for multiple stacks (vi) Documentation of no failure of criteria in 266.106(b)(7) for eligibility to comply with screening limits (vii) Sampling and metals analysis plan for the HW, other fuels, and industrial furnace feed stocks	N/A			
BF-4	270.22(a)(4)		*Waiver of trial burn for particulate matter* Under the low risk waste by 266.109(b), must submit documentation supporting conformance with (a)(2)(ii) and (a)(3)	N/A			

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					YES/NO/NA	YES/NO/NA	
BF-5	270.22(a)(5)		*Waiver of trial burn for HCl and Cl_2* Under the Tier I (or adjusted Tier I) feed rate screening limits by 266.107(b)(1) and (e), must submit: (i) Feed rate of HW and other fuels, and industrial furnace feed stocks (ii) Levels of total chloride and chlorine and calculations of the total feed rate (iii) Documentation that Tier I feed rate screening limits by 266.107(b) or (e) will not be exceeded during the averaging period (iv) Determination of the terrain-adjusted effective stack height, good engineering practice stack height, terrain type, and land use by 266.107(b)(3) (v) Documentation of compliance with 266.107(b)(4) for multiple stacks (vi) Documentation of no failure of criteria in 266.107(b)(3) for eligibility to comply with screening limits (vii) Sampling and analysis plan for total chloride and chlorine for the HW, other fuels, and industrial furnace feed stocks	N/A			

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					YES/NO/NA	YES/NO/NA	
BF-6	270.22(a)(6)		*Data in lieu of trial burn* Providing information required by 270.66 from previous compliance testing in conformance with 266.103, or from trial burns of similar devices burning similar wastes under similar conditions in conformance with 266.102(c). In addition, submit: (i) For a waiver of any trial burn: (A) A description and analysis of the HW to be burned compared with HW of the compliance testing (B) The design and operating conditions of the furnace compared with that of the comparative burn (C) Supplemental information (ii) For a waiver of the DRE trial burn - basis for selection of POHCs used in comparative burns in compliance with DRE standard in 266.104(a). The analysis should specify constituents in appendix VIII of 261	N/A			
Alternate HC limit (under 266.104(f)) for industrial furnaces with organic matter in raw materials, submit:				N/A			
BF-7	270.22(b)(1)		Documentation of design and operation to minimize HC emissions	N/A			
BF-8	270.22(b)(2)		Baseline flue gas HC (and CO) concentration and levels under normal conditions when burning and not burning HW	N/A			
BF-9	270.22(b)(3)		Test burn protocol	N/A			
BF-10	270.22(b)(4)		Trial burn plan to: (i) Demonstrate flue gas HC (and CO) when burning HW do not exceed the base line (ii) Identify the types and concentrations of organic compounds listed in appendix VIII of 261 emitted when burning HW	N/A			
BF-11	270.22(b)(5)		Plan to monitor over time changes in the operation to reduce the baseline and procedures to periodically confirm the base line	N/A			

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					YES/NO/NA	YES/NO/NA	
BF-12	270.22(b)(6)		Other necessary information	N/A			
BF-13	270.22(c)		*Alternate metals implementation approach* (under 266.106(f)) in compliance with 266.106(c) or (d). How the approach is to be implemented and monitored	N/A			
BF-14	270.22(d)		*Automatic waste feed cutoff system* including pre-alarm systems	N/A			
BF-15	270.22(e)		*Direct transfer* submit information to conform with 266.111	N/A			
BF-16	270.22(f)		*Residues* submit information to conform with 266.112	N/A			
SPECIFIC PART B INFORMATION REQUIREMENTS FOR MISCELLANEOUS UNITS - 270.23 Except as otherwise provided in 264.600, the following information must be provided:				N/A			
M-1	270.23(a)		Description of the unit:	N/A			
M-2	270.23(a)(1)		Physical characteristics, materials of construction, and dimensions of the unit	N/A			
M-3	270.23(a)(2)		Plans and engineering reports on the location, design, construction, operations, maintenance, monitoring, inspection, and closure to comply with 264.601 and 602	N/A			
M-4	270.23(a)(3)		Plans to comply with post-closure requirements of 264.603, if applicable	N/A			
M-5	270.23(b)		Detailed hydrologic, geologic, and meteorologic assessments and land-use maps in compliance with 264.601	N/A			
M-6	270.23(c)		Information on the potential exposure to humans or the environment, the potential magnitude and nature of such exposures	N/A			
M-7	270.23(d)		Report on effectiveness of the treatment	N/A			

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M-8	270.23(e)		Any additional information to comply with 264.601	N/A			
SPECIFIC PART B INFORMATION REQUIREMENTS FOR PROCESS VENTS - 270.24 Except as otherwise provided in 264.1, process vents subject to subpart AA of 264 must provide the following information:				N/A			
V-1	270.24(a)		For facilities that can not timely comply with 264 subpart AA, implementation schedule as specified in 264.1033(a)(2)	N/A			
V-2	270.24(b)		Documentation of compliance with 264.1032, including:	N/A			
V-3	270.24(b)(1)		Data on all affected process vents, their annual throughput and operating hours, the individual and total emission rate, and their locations.	N/A			
V-4	270.24(b)(2)		Data on vent emissions and emission reductions	N/A			
V-5	270.24(b)(3)		Data used in determination if a process vent is subject to 264.1032	N/A			
V-6	270.24(c)		When use a control device other than a thermal vapor incinerator, catalytic vapor incinerator, flare, boiler, process heater, condenser, or carbon adsorption system, and use test data to determine the organic removal efficiency or the total organic compound concentration, submit a performance test plan as specified in 264.1035(b)(3)	N/A			
V-7	270.24(d)		Documentation of compliance with 264.1033, including:	N/A			
V-8	270.24(d)(1)		List of references and sources to prepare the documentation	N/A			
V-9	270.24(d)(2)		Records, including dates, of each compliance test as req. by 264.1033(k)	N/A			

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V-10	270.24(d)(3)		Design analysis, specifications, drawings, schematics, and piping and instrumentation diagrams (260.11) or other acceptable engineering texts presenting basic control device design information. Must address the vent stream characteristics and control device operation parameters as specified in 264.1035(b)(4)(iii)	N/A			
V-11	270.24(d)(4)		A statement signed and dated, certifying that the operating parameters in design represent the conditions when the HW management unit would be operating at the highest capacity.	N/A			
V-12	270.24(d)(5)		A statement signed and dated, certifying that the control device is designed to operate at a minimum 95 weight percent efficiency unless the total organic emission limits of 264.1032(a) can be attained by a control device involving vapor recovery less than 95 weight percent efficiency	N/A			
SPECIFIC PART B INFORMATION REQUIREMENTS FOR EQUIPMENT - 270.25 Except as otherwise provided in 264.1, equipment subject to subpart BB of 264, must provide the following information:				N/A			
For each piece of equipment subject to 264 subpart BB:				N/A			
E-1	270.25(a)(1)		Equipment ID and HW management unit ID numbers	N/A			
E-2	270.25(a)(2)		Location within the facility	N/A			
E-3	270.25(a)(3)		Type of equipment	N/A			
E-4	270.25(a)(4)		Percent by weight total organics	N/A			
E-5	270.25(a)(5)		Hazardous waste state at equipment	N/A			
E-6	270.25(a)(6)		Compliance method (e.g., monthly leak detection and repair or dual mechanical seals)	N/A			

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E-7	270.25(b)		For facilities that can not timely comply with 264 subpart BB, an implementation schedule as specified in 264.1033(a)(2)	N/A			
E-8	270.25(c)		When use a control device other than a thermal vapor incinerator, catalytic vapor incinerator, flare, boiler, process heater, condenser, or carbon adsorption system, <u>and</u> use test data to determine the organic removal efficiency or the total organic compound concentration, submit a performance test plan as specified in 264.1035(b)(3)	N/A			
E-9	270.25(d)		Documentation of compliance with 264.1052 through 1059 containing records req. under 264.1064	N/A			
E-10	270.25(e)		Documentation of compliance with 264.1060, including:	N/A			
E-11	270.25(e)(1)		References and sources to prepare the documentation	N/A			
E-12	270.25(e)(2)		Records and dates of compliance test as req. under 264.1033(j)	N/A			
E-13	270.25(e)(3)		Design analysis, specifications, drawings, schematics, and piping and instrumentation diagrams (260.11) or other acceptable engineering texts presenting basic control device design information. Must address the vent stream characteristics and control device operation parameters as specified in 264.1035(b)(4)(iii)	N/A			
E-14	270.25(e)(4)		A statement signed and dated, certifying that the operating parameters in design represent the conditions when the HW management unit would be operating at the highest capacity.	N/A			
E-15	270.25(e)(5)		A statement signed and dated, certifying that the control device is designed to be operated at a minimum 95 weight percent efficiency	N/A			

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SPECIAL PART B INFORMATION REQUIREMENTS FOR DRIP PADS - 270.26 Except as otherwise provided in 264.1, the following information must be provided:				N/A			
D-1	270.26(a)		List of hazardous wastes	N/A			
D-2	270.26(b)		Plans and engineering report as required by 264.90(b)(2) if an exemption is sought (264 subpart F, 264.90)	N/A			
D-3	270.26(c)		Plans and engineering report on the design, construction, operations, and maintenance as req. under 264.573 including as-built drawings and specs. Must address requirements of 264.571, including:	N/A			
D-4	270.26(c)(1)		Design characteristics	N/A			
D-5	270.26(c)(2)		Liner system	N/A			
D-6	270.26(c)(3)		Leakage detection system, including detection of failure or fluid accumulation	N/A			
D-7	270.26(c)(4)		Maintenance practices	N/A			
D-8	270.26(c)(5)		Collection system	N/A			
D-9	270.26(c)(6)		Control of run-on	N/A			
D-10	270.26(c)(7)		Control of run-off	N/A			
D-11	270.26(c)(8)		Removal interval of drippage/materials from the collection system and a statement demonstrating such interval be sufficient to prevent overflow	N/A			
D-12	270.26(c)(9)		Procedures and documentation of cleaning the drip pad once every 7 days	N/A			
D-13	270.26(c)(10)		Operating practices and procedures to ensure the tracking of HW and the minimization of waste off the drip pad	N/A			

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					YES/NO/NA	YES/NO/NA	
D-14	270.26(c)(11)		Procedures to ensure that treated woods are held on the drip pad until the cessation of drippage, including recordkeeping practices	N/A			
D-15	270.26(c)(12)		Provisions to ensure the collection and holding units are emptied or managed ASAP after storms	N/A			
D-16	270.26(c)(13)		If treatment is at the drip pad, state the equipment used, and the nature and quality of residuals	N/A			
D-17	270.26(c)(14)		Description of the inspection of each drip pad, including appurtenances for control of run-on and run-off, to meet 264.573	N/A			
D-18	270.26(c)(15)		A certification by a P.E. that the drip pad design meets 264.573(a) through (f)	N/A			
D-19	270.26(c)(16)		Removal of residues/contaminants at closure to meet 264.575(a). Compliance plan as req. under 264.310(a) and (b) for non-removal waste after closure. This information should be included in the closure and post-closure plans under 270.14(b)(13)	N/A			

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APPLICATION REVIEW CHECKLIST LAND PROTECTION DIVISION HAZARDOUS WASTE PROGRAM OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY	Facility Name: Anadarko E&P Onshore LLC, Former Champlin Refinery Facility ID No.: ______ ODEQ Permit No.: 007234586-PC Reference No.: ______ Application Type: RCRA Permit Renewal Date: 10/20/2023 (New/Modify/Renewal)	40 CFR 264 Subpart F RELEASES FROM SOLID WASTE MANAGEMENT UNITS
	Administrative Reviewer: ______ Start Date: ______ Completion Date: ______ Technical Reviewer: ______ Start Date: ______ Completion Date: ______ Issuance Deadline: ______	ODEQ Form Number XXX - XXX Shaded areas for ODEQ use only

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APPLICABILITY - 264.90							

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Item #	Federal Regulations 40 CFR	State Regulations OAC 252:205	General Description	Info Location	Admin. Complete	Technically Complete	Remarks
					Yes/No/NA	Yes/No/NA	
SWMU 1	264.90(a)(1)		Applicable to facilities that treat, store, or dispose of hazardous waste, except as provided in paragraph (b) of this section. The facility must satisfy paragraph (a)(2) of this section for all wastes placed in solid waste management units (SWMUs).	Section 5: 5.0, 6.0			The SWMUs received a No Further Action (NFA). The remaining impacts at the Site are limited to a dissolved phase groundwater plume and LNAPL. The Site is implementing sitewide corrective action and groundwater monitoring.
SWMU 2	264.90(a)(2)		All SWMUs must comply with 264.101. A surface impoundment, waste pile, and land treatment unit or landfill that receives wastes after 7/26/82 (hereinafter referred to as a "regulated unit") must comply with 264.91 through 264.100 in lieu of 264.101 for detecting, characterizing and responding to releases to the uppermost aquifer. The financial responsibility of 264.101 applies to regulated units.	Section 5: 5.0, 6.0			The SWMUs received a No Further Action (NFA). The remaining impacts at the Site are limited to a dissolved phase groundwater plume and LNAPL. The Site is implementing sitewide corrective action and groundwater monitoring.
SWMU 3	264.90(b)		A regulated unit is not subject to regulation for releases into the uppermost aquifer if:	N/A			The Site does not meet the exemption requirements.
SWMU 4	264.90(b)(1)		The facility is exempted under 264.1; or	N/A			The Site does not meet the exemption requirements.

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					YES/NO/NA	YES/NO/NA	
SWMU 5	264.90(b)(2)		The facility operates a unit which the Agency finds: (i) Is an engineered structure, (ii) Does not receive or contain liquid waste or waste containing free liquids, (iii) Is designed and operated to exclude liquid, precipitation, run-on and run-off, (iv) Has both inner and outer layers of containment enclosing the waste, (v) Has a leak detection system built into each containment layer, (vi) The facility will continue to operate and maintain these leak detection systems during the active life, and closure and post-closure care periods, and (vii) To a reasonable degree of certainty, will not allow hazardous constituents to migrate out of the outer containment layer prior to the end of the post-closure care period; or	N/A			The Site does not meet the exemption requirements.
SWMU 6	264.90(b)(3)		The Agency finds, pursuant to 264.280(d), that the treatment zone of a land treatment unit (regulated unit) does not contain hazardous constituents above background (statistically significant), and if an unsaturated zone monitoring program meeting 264.278 has not shown a statistically significant increase in hazardous constituents below the treatment zone during the operating life. An exemption under this paragraph only applies for the post-closure care period; or	Section 5: 3.0			The SWMUs received a NFA and groundwater impacts are being addressed through a sitewide monitoring and corrective action program.

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					YES/NO/NA	YES/NO/NA	
SWMU 7	264.90(b)(4)		The Agency finds no potential migration of liquid from a regulated unit to the uppermost aquifer. This demonstration must be certified by a qualified geologist or geotechnical engineer. Prediction must be based on the maximum rate of liquid migration; or	N/A			The Site does not meet the exemption requirements.
SWMU 8	264.90(b)(5)		The facility designs and operates a pile in compliance with 264.250(c)	N/A			The Site does not operate a pile.
SWMU 9	264.90(c)		The regulations under this subpart apply during the active life and closure periods. After closure, the regulations in this subpart:	Section 5: 5.0			As allowed under 40 CRF 264.90(f), the facility addresses groundwater monitoring, detection monitoring, and corrective action requirements of 40 CFR 264.91-264.100 under a sitewide program.
SWMU 10	264.90(c)(1)		Do not apply if the unit is clean closed, or closed to an acceptable health risk level;	Section 5: 5.0			
SWMU 11	264.90(c)(2)		Apply during the post-closure care period under 264.117 if the facility conducts a detection monitoring program under 264.98; or	N/A			The Site is under Corrective Action.
SWMU 12	264.90(c)(3)		Apply during the compliance period under 264.96 if the facility conducts a corrective action program under 264.99 or corrective action program under 264.100.	Section 5: 5.0, 6.0			
SWMU 13	264.90(d)		Apply to miscellaneous units to comply with 264.601 through 264.603	N/A			The Site does not maintain any miscellaneous units.
REQUIRED PROGRAMS - 264.91							
SWMU 14	264.91(a)		The facility must conduct a monitoring and response program as follows:	N/A			The sitewide Groundwater Monitoring Program is described in the application in lieu of providing information specified by 40 CFR 264.91 through 264.99.

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					YES/NO/NA	YES/NO/NA	
SWMU 15	264.91(a)(1)		When hazardous constituents (264.93) are detected at a compliance point (264.95), the facility must institute a compliance monitoring program under 264.99. Detected is defined as statistically significant as described in 264.98(f);	N/A			See remark for 264.91(a)
SWMU 16	264.91(a)(2)		When the groundwater protection standard (264.92) is exceeded, the facility must institute a corrective action program under 264.100. Exceeded is defined as statistically significant as described in 264.99(d);	Section 5: 6.0			The Site is under Corrective Action.
SWMU 17	264.91(a)(3)		When hazardous constituents (264.93) exceed concentration limits (264.94) in groundwater between the compliance point (264.95) and the downgradient facility boundary, the facility must institute a corrective action program under 264.100; or	Section 5: 6.0			The Site is under Corrective Action.
SWMU 18	264.91(a)(4)		In all other cases, the facility must institute a detection monitoring program under 264.98.	N/A			See remark for 264.91(a)
SWMU 19	264.91(b)		The Agency will specify in the permit, specific elements of the monitoring and response program. The Agency may include one or more of the programs in paragraph (a) of this section in the permit.	N/A			See remark for 264.91(a)
GROUNDWATER PROTECTION STANDARD - 264.92 Hazardous constituents (264.93) detected in the groundwater from a regulated unit can not exceed the concentration limits (264.94) in the uppermost aquifer beyond the point of compliance (264.95) during the compliance period (264.96). The Agency will establish this groundwater protection standard in the permit when hazardous constituents have been detected in groundwater.				N/A			The sitewide Groundwater Monitoring Program is described in the application in lieu of providing information specified by 40 CFR 264.91 through 264.99.

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					YES/NO/NA	YES/NO/NA	
HAZARDOUS CONSTITUENTS - 264.93							
SWMU 20	264.93(a)		The Agency will specify in the permit the hazardous constituents (appendix VIII of part 261) to which the groundwater protection standard applies.	N/A			The sitewide Groundwater Monitoring Program is described in the application in lieu of providing information specified by 40 CFR 264.91 through 264.99.
SWMU 21	264.93(b)		The Agency will exclude an appendix VIII constituent if that constituent does not pose hazard to human health of the environment. To grant an exemption, the Agency will consider the following:	N/A			
SWMU 22	264.93(b)(1)		Potential adverse effects on groundwater quality, considering: (i) The physical and chemical characteristics of the waste, including its potential for migration; (ii) The hydrogeological characteristics; (iii) The quantity of groundwater and the flow direction; (iv) The proximity and withdrawal rates of groundwater users; (v) The current and future uses of groundwater; (vi) The existing quality of groundwater, including sources of contamination and cumulative impact on groundwater; (vii) The potential human exposure health risks; (viii)The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; (ix) The persistence and permanence of the potential adverse effects; and	N/A			See remark for 264.93(a)

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					YES/NO/NA	YES/NO/NA	
SWMU 23	264.93(b)(2)		Potential adverse effects on hydraulically-connected surface water quality, considering: (i) The volume, physical and chemical characteristics of the waste; (ii) The hydrogeological characteristics; (iii) The quantity and quality of groundwater and the flow direction; (iv) The pattern of rainfall; (v) The proximity of the regulated unit to surface waters; (vi) The current and future uses of surface waters and any established quality standards; (vii) The existing quality of surface water, including sources of contamination and cumulative impact on surface water; (viii)The potential human exposure health risks; (ix) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; (x) The persistence and permanence of the potential adverse effects.	N/A			See remark for 264.93(a)
SWMU 24	264.93(c)		In making any determination under paragraph (b) of this section, the Agency will consider any identification of underground sources of drinking water and exempted aquifers under 40 CFR 144.8.	N/A			See remark for 264.93(a)

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					Yes/No/NA	Yes/No/NA	
Concentration Limits - 264.94							
SWMU 25	264.94(a)		The Agency will specify in the permit concentration limits for hazardous constituents (264.93) in the groundwater. The concentration of a hazardous constituent:	N/A			The sitewide Groundwater Monitoring Program is described in the application in lieu of providing information specified by 40 CFR 264.91 through 264.99.
SWMU 26	264.94(a)(1)		Must not exceed the background level at time of permit; or	N/A			See remark for 264.94(a)
SWMU 27	264.94(a)(2)		Must not exceed levels in Table 1 (see at the end of the checklist) when background levels are under those in Table 1; or	N/A			See remark for 264.94(a)
SWMU 28	264.94(a)(3)		Must not exceed an alternate limit set by the Agency under paragraph (b) of this section.	N/A			See remark for 264.94(a)
SWMU 29	264.94(b)		The Agency may establish an alternate concentration limit and considering the following factors:	N/A			See remark for 264.94(a)

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					YES/NO/NA	YES/NO/NA	
SWMU 30	264.94(b)(1)		Potential adverse effects on groundwater quality, considering: (i) The physical and chemical characteristics of the waste, including its potential for migration; (ii) The hydrogeological characteristics; (iii) The quantity of groundwater and the flow direction; (iv) The proximity and withdrawal rates of groundwater users; (v) The current and future uses of groundwater; (vi) The existing quality of groundwater, including sources of contamination and cumulative impact on groundwater; (vii) The potential human exposure health risks; (viii)The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; (ix) The persistence and permanence of the potential adverse effects; and	N/A			See remark for 264.94(a)

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					YES/NO/NA	YES/NO/NA	
SWMU 31	264.94(b)(2)		Potential adverse effects on hydraulically-connected surface water quality, considering: (i) The volume, physical and chemical characteristics of the waste; (ii) The hydrogeological characteristics; (iii) The quantity and quality of groundwater and the flow direction; (iv) The pattern of rainfall; (v) The proximity of the regulated unit to surface waters; (vi) The current and future uses of surface waters and any established quality standards; (vii) The existing quality of surface water, including sources of contamination and cumulative impact on surface water; (viii) The potential human exposure health risks; (ix) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; (x) The persistence and permanence of the potential adverse effects.	N/A			See remark for 264.94(a)
SWMU 32	264.94(c)		To make determination under paragraph (b) of this section about the use of groundwater, the Agency will consider any identification of underground sources of drinking water and exempted aquifers (144.8)	N/A			See remark for 264.94(a)

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Item #	Federal Regulations 40 CFR	State Regulations OAC 252:205	General Description	Info Location	Admin. Complete Yes/No/NA	Technically Complete Yes/No/NA	Remarks
Point of Compliance - 264.95							
SWMU 33	264.95(a)		The Agency will determine in the permit the point of compliance at which the groundwater protection standard (264.92) applies and monitoring must be conducted. The point of compliance is a vertical surface located at the hydraulically downgradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated unit.	N/A			The sitewide Groundwater Monitoring Program is described in the application in lieu of providing information specified by 40 CFR 264.91 through 264.99.
SWMU 34	264.95(b)		The waste management area is the limit projected in the horizontal plane of the area on which waste will be placed during the active life of a regulated unit.	N/A			See remark for 264.95(a)
SWMU 35	264.95(b)(1)		The waste management area includes liner, dike, or other barrier to contain waste in a regulated unit.	N/A			See remark for 264.95(a)
SWMU 36	264.95(b)(2)		For more than one regulated unit, the waste management area is an imaginary line circumscribing the several regulated units.	N/A			See remark for 264.95(a)
Compliance Period - 264.96							
SWMU 37	264.96(a)		The Agency will specify in the permit the compliance period during which the groundwater protection standard (264.92) applies. The compliance period includes the active and closure periods.	N/A			The sitewide Groundwater Monitoring Program is described in the application in lieu of providing information specified by 40 CFR 264.91 through 264.99.
SWMU 38	264.96(b)		The compliance period begins when the facility initiates the compliance monitoring programs (264.99).	N/A			

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					Yes/No/NA	Yes/No/NA	
SWMU 39	264.96(c)		If the facility is engaged in a corrective action program at the end of the compliance period in paragraph (a) of this section, the compliance period is extended until the groundwater protection standard (264.92) has not been exceeded for three consecutive years.	Section 5: 5.0, 6.0			
General Groundwater Monitoring Requirements - 264.97 The facility must comply with the following requirements for any groundwater monitoring program to satisfy Detection Monitoring Program (264.98), Compliance Monitoring Program (264.99), or Corrective Action Program (264.100).							The sitewide Groundwater Monitoring Program is described in the application in lieu of providing information specified by 40 CFR 264.91 through 264.99.
SWMU 40	264.97(a)		The groundwater monitoring system must consist of sufficient wells at appropriate locations and depths to yields samples from the uppermost aquifer that:	Section 5: 5.0			Sitewide Groundwater Monitoring Program described in Part B Application
SWMU 41	264.97(a)(1)		Represent the quality of unaffected background water; (i) A determination of background quality may include wells that are not upgradient where: (A) Hydrogeologic conditions do not allow the facility to determine what wells are upgradient; and (B) Sampling at other wells will provide background quality that is representative or more representative than that of the upgradient wells; and	Section 5: 5.0			
SWMU 42	264.97(a)(2)		Represent the quality of groundwater passing the point of compliance.	Section 5: 5.0			
SWMU 43	264.97(a)(3)		Allow for the detection of contamination from the waste management area to the uppermost aquifer.	Section 5: 5.0			

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					YES/NO/NA	YES/NO/NA	
SWMU 44	264.97(b)		If a facility contains more than one regulated unit, separate groundwater monitoring systems are not required for each regulated unit, provided that provisions for sampling the groundwater in the uppermost aquifer will enable detection and measurement at the compliance point.	Section 5: 5.0			
SWMU 45	264.97(c)		All monitoring wells must be cased. This casing must be screened or perforated and packed. The annular space above the sampling depth must be sealed to prevent contamination.	Section 5: 5.0			
SWMU 46	264.97(d)		The groundwater monitoring program must include consistent sampling and analysis procedures. At a minimum the program must include procedures and techniques for:	Section 5: Appendix F			
SWMU 47	264.97(d)(1)		Sample collection;	Section 5: Appendix F			
SWMU 48	264.97(d)(2)		Sample preservation and shipment;	Section 5: Appendix F			
SWMU 49	264.97(d)(3)		Analytical procedures; and	Section 5: Appendix F			
SWMU 50	264.97(d)(4)		Chain of custody control.	Section 5: Appendix F			
SWMU 51	264.97(e)		The groundwater monitoring program must include appropriate sampling and analytical methods.	Section 5: Appendix F			
SWMU 52	264.97(f)		The ground-water monitoring program must include a determination of groundwater elevation each time groundwater is sampled.	Section 5: Appendix F			

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					Yes/No/NA	Yes/No/NA	
SWMU 53	264.97(g)		In detection or compliance monitoring, data will be collected from background wells and wells at compliance points. The number and kinds of samples must be adequate to establish appropriate statistical background. Sample size shall be large enough to ensure reasonable confidence. The facility will determine the sampling procedure and interval subject to approval by the Agency. The sampling procedure shall be:	N/A			The Site is under Corrective Action
SWMU 54	264.97(g)(1)		A sequence of at least four samples to assure that an independent sample is obtained referencing the uppermost aquifer's effective porosity, hydraulic conductivity, and hydraulic gradient, and the fate and transport of contaminants, or	N/A			The Site is under Corrective Action
SWMU 55	264.97(g)(2)		An alternate sampling procedure proposed by the facility and approved by the Agency.	N/A			The Site is under Corrective Action
SWMU 56	264.97(h)		The facility will specify one of the following statistical methods which, upon approval by the Agency, will be specified in the permit. The statistical test chosen shall be conducted separately for each hazardous constituent in each well. Where practical quantification limits (pqls) are used in any statistical procedures [(264.97(i)(5)], the pql must be proposed by the facility and approved by the Agency. Use of any of the following statistical methods must be protective of human health and the environment and must comply with performance standards outlined in paragraph (i) of this section.	Section 5: 5.0			The Site is under Corrective Action, therefore statistical evaluation of groundwater data is not proposed. Benzene trend analysis for a subgroup of wells is proposed.

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					YES/NO/NA	YES/NO/NA	
SWMU 57	264.97(h)(1)		A parametric analysis of variance (ANOVA) followed by multiple comparisons procedures to identify evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean for each constituent.	N/A			
SWMU 58	264.97(h)(2)		An analysis of variance (ANOVA) based on ranks followed by multiple comparisons procedures to identify evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median for each constituent.	N/A			
SWMU 59	264.97(h)(3)		A tolerance or prediction interval procedure in which an interval for each constituent is established from the distribution of background data, and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.	N/A			
SWMU 60	264.97(h)(4)		A control chart approach that gives control limits for each constituent.	N/A			
SWMU 61	264.97(h)(5)		Another statistical test method submitted by the facility and approved by the Agency.	N/A			
SWMU 62	264.97(i)		Any statistical method under 264.97(h) shall comply with the following performance standards:				The Site is under Corrective Action

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					YES/NO/NA	YES/NO/NA	
SWMU 63	264.97(i)(1)		The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of hazardous constituents. If the distribution of hazardous constituents is shown to be inappropriate for a normal theory test, then the data should be transformed or a distribution-free theory test should be used. If the distributions for the constituents differ, more than one statistical method may be needed.	N/A			
SWMU 64	264.97(i)(2)		If an individual well comparison procedure is used to compare a constituent concentration with background or a groundwater protection standard, the test shall be done at Type I error level no less than 0.01 for each testing period. If a multiple comparisons procedure is used, the Type I error rate for each testing period shall be no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts.	N/A			
SWMU 65	264.97(i)(3)		If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its parameter values shall be proposed by the facility and for approval by the Agency.	N/A			

Item #	Federal Regulations 40 CFR	State Regulations OAC 252:205	General Description	Info Location	Admin. Complete	Technically Complete	Remarks
					Yes/No/NA	Yes/No/NA	
SWMU 66	264.97(i)(4)		If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population, shall be proposed by the facility and for approval by the Agency. These parameters will be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent.	N/A			
SWMU 67	264.97(i)(5)		The statistical method shall account for data below the limit of detection with one or more statistical procedures. Any practical quantification limit (pql) approved by the Agency under 264.97(h) that is used in the statistical method shall be the lowest concentration level that can be reliably achieved.	N/A			
SWMU 68	264.97(i)(6)		If necessary, the statistical method shall include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.	N/A			
SWMU 69	264.97(j)		Groundwater monitoring data collected as under paragraph (g) of this section including actual levels of constituents must be maintained in the operating record. The Agency will specify in the permit when the data must be submitted for review.	N/A			
Detection Monitoring Program - 264.98							
SWMU 70	264.98(a)		The facility must monitor for indicator parameters, waste constituents, or reaction products in groundwater. The Agency will specify the parameters or constituents in the permit after considering:	N/A			The sitewide Groundwater Monitoring Program is described in the application in lieu of providing information specified by 40 CFR 264.91 through 264.99.

Facility Name ___________________________
Reference No. ___________________________

A. Reviewer's Initials ________ Tracking Date ________

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ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
SWMU 71	264.98(a)(1)		The types, quantities, and concentrations of constituents in wastes;	N/A			See remark for 264.98(a)
SWMU 72	264.98(a)(2)		The mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone;	N/A			See remark for 264.98(a)
SWMU 73	264.98(a)(3)		The detectability of indicator parameters, waste constituents, and reaction products in groundwater; and	N/A			See remark for 264.98(a)
SWMU 74	264.98(a)(4)		The concentration and coefficients of variation of monitoring parameters in the groundwater background.	N/A			See remark for 264.98(a)
SWMU 75	264.98(b)		The facility must install a groundwater monitoring system at the compliance point (264.95). The groundwater monitoring system must comply with 264.97(a)(2), (b), and (c).	N/A			See remark for 264.98(a)
SWMU 76	264.98(c)		The facility must conduct a groundwater monitoring program for each chemical parameter and hazardous constituent pursuant to paragraph (a) of this section in acc. with 264.97(g). The facility must maintain groundwater data as measured and in form for determination of statistical significance under 264.97(h).	N/A			See remark for 264.98(a)
SWMU 77	264.98(d)		The Agency will specify the frequencies for sampling and statistical testing to determine evidence of contamination for any parameter under paragraph (a) of this section in acc with 264.97(g). A sequence of at least 4 samples from each well (background and compliance) must be collected at least semi-annually.	N/A			See remark for 264.98(a)
SWMU 78	264.98(e)		The facility must determine the groundwater flow rate and direction in the uppermost aquifer annually.	N/A			See remark for 264.98(a)

Facility Name ___________________________
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Item #	Federal Regulations 40 CFR	State Regulations OAC 252:205	General Description	Info Location	Admin. Complete	Technically Complete	Remarks
					Yes/No/NA	Yes/No/NA	
SWMU 79	264.98(f)		The facility must determine statistically whether there is evidence of contamination for any chemical parameter in the permit pursuant to paragraph (a) of this section at a frequency under paragraph (d) of this section.	N/A			See remark for 264.98(a)
SWMU 80	264.98(f)(1)		In determining evidence of contamination, the facility must use methods in the permit under 264.97(h). These methods must compare compliance point data and background data.	N/A			See remark for 264.98(a)
SWMU 81	264.98(f)(2)		The facility must determine statistically whether there is evidence of contamination at each monitoring well at the compliance point within a reasonable period after sampling. The Agency will specify in the permit the reasonable period, after considering the statistical test and lab testing.	N/A			See remark for 264.98(a)
SWMU 82	264.98(g)		If the facility determines pursuant to paragraph (f) of this section that there is evidence of contamination pursuant to paragraph (a) of this section at the compliance point, the facility must:	N/A			See remark for 264.98(a)
SWMU 83	264.98(g)(1)		Notify the Agency in writing within 7 days which includes what chemical parameters;	N/A			See remark for 264.98(a)
SWMU 84	264.98(g)(2)		Immediately sample all monitoring wells and determine whether constituents in appendix IX of 264 are present and the concentrations.	N/A			See remark for 264.98(a)
SWMU 85	264.98(g)(3)		For any appendix IX compounds found, the facility may resample and reanalyze within one month. If the second analyses confirm the initial results, then the constituents will form the basis for compliance monitoring If the facility does not resample, the initial findings will form the basis for compliance monitoring.	N/A			See remark for 264.98(a)

Facility Name ___________________________
Reference No. ___________________________

A. Reviewer's Initials ________ Tracking Date ________

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Item #	Federal Regulations 40 CFR	State Regulations OAC 252:205	General Description	Info Location	Admin. Complete	Technically Complete	Remarks
					Yes/No/NA	Yes/No/NA	
SWMU 86	264.98(g)(4)		Within 90 days, the facility must submit a permit modification to establish a compliance monitoring program (264.99). The application must include: (i) Concentration of any appendix IX constituent detected at each monitoring well at the compliance point; (ii) Any proposed changes to the groundwater monitoring system to meet 264.99; (iii) Any proposed changes to the monitoring frequency, sampling and analysis procedures, or statistical methods to meet 264.99 (iv) For each constituent detected at the compliance point, a proposed concentration limit under 264.94(a)(1) or (2), or alternate concentration limit under 264.94(b); and	N/A			See remark for 264.98(a)
SWMU 87	264.98(g)(5)		Within 180 days, the facility must submit: (i) All data to justify an alternate concentration limit under 264.94(b); and (ii) An engineering feasibility plan for a corrective action plan to meet 264.100, unless: (A) All hazardous constituents identified under paragraph (g)(2) of this section are listed in Table 1 of 264.94 and their concentrations are below those in Table 1; or (B) The facility has sought an alternate concentration limit under 264.94(b).	N/A			See remark for 264.98(a)

Facility Name ______________________________
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A. Reviewer's Initials ________ Tracking Date ________

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ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
SWMU 88	264.98(g)(6)		If the facility so determines, pursuant to paragraph (f) of this section, it may demonstrate that the statistically significant difference of hazardous constituents is from a source other than a regulated unit or is from an error in sampling, analysis, or statistical evaluation, or natural variation in groundwater. The facility may make a demonstration in addition or in lieu of a permit modification under paragraph (g)(4) of this section. However, the facility is not relieved of the requirement to submit a permit modification unless the demonstration is approved. In making a demonstration, the facility must: (i) Within 7 days of the finding of contamination, notify the Agency that the facility intends to make a demonstration; (ii) Within 90 days, submit a report to demonstrate the source of contamination is other than a regulated unit, or resulted from an error; (iii) Within 90 days, submit an application for a permit modification to make any appropriate changes to detection monitoring program; and (iv) Continue to monitor.	N/A			See remark for 264.98(a)
SWMU 89	264.98(h)		If the facility determines that the detection monitoring program no longer satisfies the requirements of this section, the facility must submit, within 90 days, a permit modification.	N/A			See remark for 264.98(a)
COMPLIANCE MONITORING PROGRAM - 264.99							

ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
SWMU 90	264.99(a)		The facility must monitor groundwater to determine whether regulated units comply with groundwater protection standard (264.92). The groundwater protection standard includes:	N/A			The sitewide Groundwater Monitoring Program is described in the application in lieu of providing information specified by 40 CFR 264.91 through 264.99.
SWMU 91	264.99(a)(1)		A list of hazardous constituents (264.93);	N/A			See remark for 264.99(a)
SWMU 92	264.99(a)(2)		Concentration limits (264.94) for each of the hazardous constituents.	N/A			See remark for 264.99(a)
SWMU 93	264.99(a)(3)		The compliance point (264.95); and	N/A			See remark for 264.99(a)
SWMU 94	264.99(a)(4)		The compliance period (264.96).	N/A			See remark for 264.99(a)
SWMU 95	264.99(b)		The facility must install a groundwater monitoring system at the compliance point (264.95). The system must comply with 264.97(a)(2), (b), and (c).	N/A			See remark for 264.99(a)
SWMU 96	264.99(c)		The Agency will specify the sampling procedures and statistical methods consistent with 264.97(g) and (h).	N/A			See remark for 264.99(a)
SWMU 97	264.99(c)(1)		The facility must conduct a sampling program for each hazardous constituent (264.97(g)).	N/A			See remark for 264.99(a)
SWMU 98	264.99(c)(2)		The facility must record groundwater data as measured in form to determine statistical significance (264.97(h)) for the compliance period.	N/A			See remark for 264.99(a)
SWMU 99	264.99(d)		The facility must determine whether there is statistically significant evidence of increased contamination for any hazardous constituent in the permit, pursuant to paragraph (a) of this section, at a frequency under paragraph (f) under this section.	N/A			See remark for 264.99(a)

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Item #	Federal Regulations 40 CFR	State Regulations OAC 252:205	General Description	Info Location	Admin. Complete	Technically Complete	Remarks
					Yes/No/NA	Yes/No/NA	
SWMU 100	264.99(d)(1)		In determining an increase in contamination, the facility must use the methods in the permit under 264.97(h). The methods must compare data collected at the compliance point to a concentration limit (264.94).	N/A			See remark for 264.99(a)
SWMU 101	264.99(d)(2)		The facility must determine whether there is an increase in contamination at the compliance point within a reasonable time after completion of sampling. The Agency will specify that time period in the permit after considering the statistical and sampling tests.	N/A			See remark for 264.99(a)
SWMU 102	264.99(e)		The facility must determine the groundwater flow rate and direction in the uppermost aquifer annually.	N/A			See remark for 264.99(a)
SWMU 103	264.99(f)		The Agency will specify the frequencies for sampling and statistical testing to determine evidence of contamination in acc with 264.97(g). A sequence of at least 4 samples from each well (background and compliance) must be collected at least semi-annually.	N/A			See remark for 264.99(a)

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ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
SWMU 104	264.99(g)		The facility must analyze samples from the compliance point for all constituents in appendix IX of 264 annually to determine whether additional hazardous constituents are present in the uppermost aquifer and, if so, at what concentration, pursuant to 264.98(f). If additional appendix IX constituents are present, the facility may resample within 1 month and repeat the appendix IX analysis. If the second analysis confirms new constituents, the facility must report to the Agency within 7 days and add them to the monitoring list. If the facility chooses not to resample, the facility must report to the Agency initial analysis of constituents within 7 days and add them to the monitoring list.	N/A			See remark for 264.99(a)
SWMU 105	264.99(h)		If the facility determines, pursuant to paragraph (d) of this section, that any concentration limits (264.94) are being exceeded at the compliance point, the facility must:	N/A			See remark for 264.99(a)
SWMU 106	264.99(h)(1)		Notify the Agency in writing within 7 days indicating what concentration limits have been exceeded.	N/A			See remark for 264.99(a)

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ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
SWMU 107	264.99(h)(2)		Submit a permit modification application to establish a corrective action program (264.100) within 180 days, or within 90 days if an engineering study has been submitted under 264.98(h)(5). The application must include: (i) A detailed description of corrective actions that will achieve compliance with the groundwater protection standard under paragraph (a) of this section; and (ii) A groundwater monitoring program that will demonstrate the effectiveness of the corrective action. Such a groundwater monitoring program may be based on a compliance monitoring program developed to meet the requirements of this section.	N/A			See remark for 264.99(a)
SWMU 108	264.99(i)		If the facility determines, pursuant to paragraph (d) of this section, that the concentration limits are being exceeded at the compliance point, the facility may demonstrate that a source other than a regulated unit, or an error in sampling, analysis, or statistical evaluation, or natural variation in groundwater caused the concentration limits to be exceeded. In making a demonstration, the facility must:	N/A			See remark for 264.99(a)
SWMU 109	264.99(i)(1)		Within 7 days, notify the Agency that the facility intends to make a demonstration;	N/A			See remark for 264.99(a)
SWMU 110	264.99(i)(2)		Within 90 days, submit a report to demonstrate a source other than the regulated unit caused the standard to be exceeded, or that the apparent noncompliance is due to error;	N/A			See remark for 264.99(a)
SWMU 111	264.99(i)(3)		Within 90 days, submit an application for a permit modification to make any appropriate changes to the compliance monitoring program; and	N/A			See remark for 264.99(a)
SWMU 112	264.99(i)(4)		Continue to monitor.	N/A			See remark for 264.99(a)

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ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
SWMU 113	264.99(j)		If the facility determines that the compliance monitoring program no longer satisfies the requirements of this section, the facility must submit, within 90 days, a permit modification.	N/A			See remark for 264.99(a)
CORRECTIVE ACTION PROGRAM - 264.100							
SWMU 114	264.100(a)		The facility must take corrective action to ensure that regulated units comply with groundwater protection standard (264.92). The groundwater protection standard includes:	Section 5: 5.0, 6.0			The sitewide Groundwater Monitoring and Corrective Action Programs are described in the application in lieu of providing information specified by 40 CFR 264.100.
SWMU 115	264.100(a)(1)		A list of hazardous constituents (264.93);	Section 5: 5.0, 6.0			See remark for 264.100(a)
SWMU 116	264.100(a)(2)		Concentration limits (264.94) for each of the hazardous constituents.	Section 5: 5.0, 6.0			See remark for 264.100(a)
SWMU 117	264.100(a)(3)		The compliance point (264.95); and	Section 5: 5.0, 6.0			See remark for 264.100(a)
SWMU 118	264.100(a)(4)		The compliance period (264.96).	Section 5: 5.0, 6.0			See remark for 264.100(a)
SWMU 119	264.100(b)		The facility must implement a corrective action plan that prevents hazardous constituents from exceeding the concentration limits at the compliance point by removing the hazardous constituents or treating them in place. The permit will specify measures to be taken.	Section 5: 5.0, 6.0			See remark for 264.100(a)

ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
SWMU 120	264.100(c)		The facility must begin corrective action within a reasonable time after the groundwater protection standard is exceeded. The Agency will specify that time period in the permit. If the permit includes a corrective action program in addition to a compliance monitoring program, the permit will specify the commencement of the corrective action program and will operate in lieu of 264.99(i)(2).	Section 5: 5.0, 6.0			See remark for 264.100(a) Corrective action has been implemented
SWMU 121	264.100(d)		In conjunction with a corrective action program, the facility must establish and implement a groundwater monitoring program to demonstrate the effectiveness of the corrective action program. Such a monitoring program may be based on the requirements of a compliance monitoring program (264.99) and must be as effective as that program in determining compliance with the groundwater protection standard (264.92) and in determining the success of a corrective action program under paragraph (e) of this section.	Section 5: 6.3			Remedial performance evaluation to assess effectiveness of remedy.
SWMU 122	264.100(e)		In addition, the facility must conduct a corrective action program to remove or treat in place any hazardous constituents (264.93) that exceed concentration limits in groundwater (264.94):	Section 5: 5.0, 6.0			See remark for 264.100(a)
SWMU 123	264.100(e)(1)		Between the compliance point (264.95) and the downgradient boundary; and	Section 5: 5.0, 6.0			See remark for 264.100(a)
SWMU 124	264.100(e)(2)		Beyond the facility boundary, unless the facility demonstrates of inability to obtain permission to undertake such action. The facility is not relieved of all responsibility to clean up an offsite migration where off-site access is denied.	Section 5: 5.0, 6.0			See remark for 264.100(a)
SWMU 125	264.100(e)(3)		Corrective action measures must be initiated and completed within a reasonable time.	Section 5: 5.0, 6.0			See remark for 264.100(a)

ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
SWMU 126	264.100(e)(4)		Corrective action measures may be terminated once the concentration of hazardous constituents (264.93) is reduced to levels below the concentration limits (264.94)	Section 5: 5.0, 6.0			See remark for 264.100(a)
SWMU 127	264.100(f)		The facility must continue corrective action measures during the compliance period to extent necessary to ensure that the groundwater protection standard is not exceeded. If the facility is conducting corrective action at the end of the compliance period, the facility must continue that corrective action for as long as necessary to achieve compliance with the groundwater protection standard. The facility may terminate corrective action measures beyond the active life (inc. Closure) if the facility can demonstrate, based on groundwater monitoring program under paragraph (d) of this section, that the groundwater protection standard (264.92) has not been exceeded for a period of 3 consecutive years.	Section 5: 5.0, 6.0			See remark for 264.100(a)
SWMU 128	264.100(g)		The facility must report semi-annually the effectiveness of the corrective action plan.	Section 5: 5.0, 6.0			See remark for 264.100(a). Semi-annual project status meetings with ODEQ.
SWMU 129	264.100(h)		If the facility determines that the corrective action plan no longer satisfies the reqs of this section, the facility must, within 90 days, submit a permit modification.	Section 5: 5.0, 6.0			See remark for 264.100(a)
CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS (SWMUS) - 264.101							
SWMU 130	264.101(a)		A facility seeking a permit for TSD must institute corrective action for all releases of hazardous waste or HW constituents from any SWMU, regardless of time at which waste was placed in the unit.	Section 5: 5.0, 6.0			

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ITEM #	FEDERAL REGULATIONS 40 CFR	STATE REGULATIONS OAC 252:205	GENERAL DESCRIPTION	INFO LOCATION	ADMIN. COMPLETE	TECHNICALLY COMPLETE	REMARKS
					YES/NO/NA	YES/NO/NA	
SWMU 131	264.101(b)		Corrective action will be in the permit in accordance with this section and subpart of this part. The permit will contain the compliance schedules for such corrective action and financial assurances.	Section 5: 4.2, 6.2, 6.5			
SWMU 132	164.101(c)		The facility must implement corrective actions beyond the facility boundary as necessary, unless the facility demonstrates inability to obtain permission to undertake such action. The facility is not relieved of all responsibility to clean up an offsite migration where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis. Assurances of financial responsibility for such corrective action must be provided.	Section 5: 5.0, 6.0			

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Table 1
MAXIMUM CONCENTRATION OF CONSTITUENTS
FOR GROUNDWATER PROTECTION
(264.94)

Constituents	Max. Conc. (mg/L)
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
Endrin *	0.0002
Lindane *	0.004
Methoxychlor	0.1
Toxaphene	0.005
2,4-D *	0.1
2,4,5-TP Silvex *	0.01

* See chemical names in 40 CFR

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SECTION 3

PUBLIC NOTICE

NOTICE OF PERMIT RENEWAL APPLICATION SUBMITTAL AND PUBLIC REPOSITORY AVAILABILITY

On October 20, 2023, Anadarko E&P Onshore LLC (Anadarko) submitted a Resource Conservation and Recovery Act (RCRA) Part B Post-Closure Care and Corrective Action Permit Renewal Application (Permit Renewal Application) for the Former Champlin Refinery, Enid, Oklahoma (Site) to the Oklahoma Department of Environmental Quality (DEQ). The Permit Renewal Application is requesting significant changes to the corrective action program. Those changes include transitioning to a Sitewide interim final remedy of Natural Source Zone Depletion (NSZD) and Monitored Natural Attenuation (MNA). In accordance with Title 40 Code of Federal Regulations § 124.32, Oklahoma Administrative Code (OAC) Title 252 Chapter 4-7-13 and Oklahoma Statute Title 27A § 2-14-301, Anadarko posts this notice of the Permit Renewal Application submittal and repository availability.

The Site is located at 2529 East Willow Road in Enid, Garfield County, Oklahoma on approximately 362 acres in Sections 3 and 4, Township 22 North, Range 6 West Indian Meridian, on the northeast side of the City of Enid, Oklahoma. The Site was previously occupied by the Champlin Refinery, which operated from 1916 until 1983. The main products of the refinery were leaded gasoline, unleaded gasoline, diesel fuel, and heating oil. Lubricating oils, greases, and JP-4 jet fuel were also produced on a limited basis. The refinery was dismantled, with decommissioning and demolition work completed between 1983 and 1987. Anadarko performs post-closure care (i.e., monitoring and maintenance) for the closed hazardous waste Land Treatment Unit (LTU), Plots 1 to 6. DEQ approved closure for Plots 1, 2, and 3 in 1986 and Plots 4, 5, and 6 on July 17, 1997. Anadarko also implements sitewide corrective action to address historical releases to groundwater from past refinery operations.

Anadarko currently performs post-closure care and corrective action activities in accordance with RCRA Part B Post-Closure and Corrective Action Permit Number 007234586-PC issued by DEQ and effective on April 17, 2014. This Permit Renewal Application is to renew that permit.

In accordance with 27A O.S. § 2-14-301(A), interested citizens are invited to review copies of the Permit Renewal Application at the Enid Public Library, 120 West Maine Street, Enid, Oklahoma (phone 580-234-6313). The application may also be reviewed at DEQ's Office of Central Records located on the second floor of the DEQ building at 707 N. Robinson Avenue, Oklahoma City, Oklahoma 73101. The application can also be reviewed on DEQ's website at https://www.deq.ok.gov/land-protection-division/permit-public-participation-process/.

The designated facility contact who will address questions regarding the Permit Renewal Application is:

David Sweeten
Director of Operations
Glenn Springs Holdings, Inc
an affiliate of Anadarko E&P Onshore LLC
5 Greenway Plaza, Suite 110
Houston, Texas 77046-0521
Telephone: 918-561-4111
Email: David_Sweeten@oxy.com

The DEQ contact is:

Hillary Young, P.E.
Chief Engineer, Land Protection Division
Oklahoma Department of Environmental Quality
707 N. Robinson, P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677
Telephone: 405-702-5100
Email: Hillary.Young@deq.ok.gov

After reviewing the application for compliance with Title 40 of the Code of Federal Regulations, Title 252 of the Oklahoma Administrative Code, Title 27A of the Oklahoma Statutes and the Oklahoma Hazardous Waste Management Act, 27A O.S. § 2-7-101 through 2-7-134. and correcting any deficiencies noted, DEQ will prepare either a draft permit or draft denial. At that time, notice of the prepared draft will be published and the public will be given 45 days to review, submit written comments, and/or request a public meeting.

The permittee's compliance history during the life of the permit being renewed is available from the Agency contact person. Further information about this notice can be obtained from the DEQ contact listed above.

SECTION 4

PART A APPLICATION

United States Environmental Protection Agency

RCRA SUBTITLE C SITE IDENTIFICATION FORM

1. Reason for Submittal (Select only one.)

☐	Obtaining or updating an EPA ID number for on-going regulated activities (Items 10-17 below) that will continue for a period of time.
☐	Submitting as a component of the Hazardous Waste Report for ________ (Reporting Year)
	☐ Site was a TSD facility, a reverse distributor, and/or generator of ≥ 1,000 kg of non-acute hazardous waste, > 1 kg of acute hazardous waste, or > 100 kg of acute hazardous waste spill cleanup in **one or more months of the reporting year** (or State equivalent LQG regulations)
☐	Notifying that regulated activity is no longer occurring at this Site
☐	Obtaining or updating an EPA ID number for conducting Electronic Manifest Broker activities
☑	Submitting a new or revised Part A (permit) Form

2. Site EPA ID Number

O	K	D	0	0	7	2	3	4	5	8	6

3. Site Name

Former Champlin Refinery

4. Site Location Address

Street Address 2529 East Willow Road		
City, Town, or Village Enid		County Garfield
State Oklahoma	Country USA	Zip Code 73701
Latitude 36.418408	Longitude -97.845592	☐ Use Lat/Long as Primary Address

5. Site Mailing Address ☐ Same as Location Street Address

Street Address 2529 East Willow Road		
City, Town, or Village Enid		
State Oklahoma	Country Garfield	Zip Code 73701

6. Site Land Type

☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other

7. North American Industry Classification System (NAICS) Code(s) for the Site (at least 5-digit codes)

A. (Primary) 562910	C.
B.	D.

8. Site Contact Information ☐ Same as Location Address

First Name **Jennifer**	MI	Last Name **Douma**
Title **Onsite Manager**		
Street Address **2529 East Willow Road**		
City, Town, or Village **Enid**		
State **Oklahoma**	Country **USA**	Zip Code **73701**
Email **Jennifer_Douma@oxy.com**		
Phone **580-402-1454**	Ext	Fax

9. Legal Owner and Operator of the Site

A. Name of Site's Legal Owner ☐ Same as Location Address

Full Name **Anadarko E&P Onshore LLC**		Date Became Owner (mm/dd/yyyy) **7/14/2000**
Owner Type ☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other		
Street Address **5 Greenway Plaza**		
City, Town, or Village **Houston**		
State **Texas**	Country **USA**	Zip Code **77046**
Email **David_Sweeten@oxy.com**		
Phone **713-552-8941**	Ext	Fax
Comments		

B. Name of Site's Legal Operator ☐ Same as Location Address

Full Name **N/A - the facility is has been closed since 1983 (i.e., non-operational)**		Date Became Operator (mm/dd/yyyy) **7/14/2000**
Operator Type ☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other		
Street Address **5 Greenway Plaza**		
City, Town, or Village **Houston**		
State **Texas**	Country **Harris**	Zip Code **77046**
Email **David_Sweeten@oxy.com**		
Phone **713-552-8941**	Ext	Fax
Comments		

10. Type of Regulated Waste Activity (at your site)
Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities

☐ Y ☑ N	1. Generator of Hazardous Waste—If "Yes", mark only one of the following—a, b, c		
	☐	a. LQG	-Generates, in any calendar month, 1,000 kg/mo (2,200 lb/mo) or more of non-acute hazardous waste (includes quantities imported by importer site); or - Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lb/mo) of acute hazardous waste; or - Generates, in any calendar month or accumulates at any time, more than 100 kg/mo (220 lb/mo) of acute hazardous spill cleanup material.
	☐	b. SQG	100 to 1,000 kg/mo (220-2,200 lb/mo) of non-acute hazardous waste and no more than 1 kg (2.2 lb) of acute hazardous waste and no more than 100 kg (220 lb) of any acute hazardous spill cleanup material.
	☐	c. VSQG	Less than or equal to 100 kg/mo (220 lb/mo) of non-acute hazardous waste.
☐ Y ☑ N	2. Short-Term Generator (generates from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section. *Note: If "Yes", you MUST indicate that you are a Generator of Hazardous Waste in Item 10.A.1 above.*		
☐ Y ☑ N	3. Treater, Storer or Disposer of Hazardous Waste—Note: Part B of a hazardous waste permit is required for these activities.		
☐ Y ☑ N	4. Receives Hazardous Waste from Off-site		
☐ Y ☑ N	5 Recycler of Hazardous Waste		
	☐	a. Recycler who stores prior to recycling	
	☐	b. Recycler who does not store prior to recycling	
☐ Y ☑ N	6. Exempt Boiler and/or Industrial Furnace—If "Yes", mark all that apply.		
	☐	a. Small Quantity On-site Burner Exemption	
	☐	b. Smelting, Melting, and Refining Furnace Exemption	

B. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g. D001, D003, F007, U112). Use an additional page if more spaces are needed.

C. Waste Codes for State Regulated (non-Federal) Hazardous Wastes. Please list the waste codes of the State hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

11. Additional Regulated Waste Activities (NOTE: Refer to your State regulations to determine if a separate permit is required.)

A. Other Waste Activities

☐ Y ☑ N		1. Transporter of Hazardous Waste—If "Yes", mark all that apply.
	☐	a. Transporter
	☐	b. Transfer Facility (at your site)
☐ Y ☑ N		2. Underground Injection Control
☐ Y ☑ N		3. United States Importer of Hazardous Waste
☐ Y ☑ N		4. Recognized Trader—If "Yes", mark all that apply.
	☐	a. Importer
	☐	b. Exporter
☐ Y ☑ N		5. Importer/Exporter of Spent Lead-Acid Batteries (SLABs) under 40 CFR 266 Subpart G—If "Yes", mark all that apply.
	☐	a. Importer
	☐	b. Exporter

B. Universal Waste Activities

☐ Y ☑ N		1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) - If "Yes" mark all that apply. Note: Refer to your State regulations to determine what is regulated.
	☐	a. Batteries
	☐	b. Pesticides
	☐	c. Mercury containing equipment
	☐	d. Lamps
	☐	e. Aerosol Cans
	☐	f. Other (specify) ____________
	☐	g. Other (specify) ____________
☐ Y ☑ N		2. Destination Facility for Universal Waste Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities

☐ Y ☑ N		1. Used Oil Transporter—If "Yes", mark all that apply.
	☐	a. Transporter
	☐	b. Transfer Facility (at your site)
☐ Y ☑ N		2. Used Oil Processor and/or Re-refiner—If "Yes", mark all that apply.
	☐	a. Processor
	☐	b. Re-refiner
☐ Y ☑ N		3. Off-Specification Used Oil Burner
☐ Y ☑ N		4. Used Oil Fuel Marketer—If "Yes", mark all that apply.
	☐	a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
	☐	b. Marketer Who First Claims the Used Oil Meets the Specifications

D. Pharmaceutical Activities

☐ Y ☑ N		1. Operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals—if "Yes", mark only one. Note: See the item-by-item instructions for definitions of healthcare facility and reverse distributor.
	☐	a. Healthcare Facility
	☐	b. Reverse Distributor
☐ Y ☑ N		2. Withdrawing from operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals. Note: You may only withdraw if you are a healthcare facility that is a VSQG for all of your hazardous waste, including hazardous waste pharmaceuticals.

12. Eligible Academic Entities with Laboratories—Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262, Subpart K.

☐ Y ☑ N		A. Opting into or currently operating under 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories— If "Yes", mark all that apply. Note: See the item-by-item instructions for definitions of types of eligible academic entities.
	☐	1. College or University
	☐	2. Teaching Hospital that is owned by or has a formal written affiliation with a college or university
	☐	3. Non-profit Institute that is owned by or has a formal written affiliation with a college or university
☐ Y ☑ N		B. Withdrawing from 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories.

13. Episodic Generation

☐ Y ☑ N	Are you an SQG or VSQG generating hazardous waste from a planned or unplanned episodic event, lasting no more than 60 days, that moves you to a higher generator category. If "Yes", you must fill out the Addendum for Episodic Generator.

14. LQG Consolidation of VSQG Hazardous Waste

☐ Y ☑ N	Are you an LQG notifying of consolidating VSQG Hazardous Waste Under the Control of the Same Person pursuant to 40 CFR 262.17(f)? If "Yes", you must fill out the Addendum for LQG Consolidation of VSQG hazardous waste.

15. Notification of LQG Site Closure for a Central Accumulation Area (CAA) (optional) OR Entire Facility (required)

☐ Y ☑ N	LQG Site Closure of a Central Accumulation Area (CAA) or Entire Facility.
	A. ☐ Central Accumulation Area (CAA) or ☐ Entire Facility
	B. Expected closure date: ____________ mm/dd/yyyy
	C. Requesting new closure date: ____________ mm/dd/yyyy
	D. Date closed : ____________ mm/dd/yyyy ☐ 1. In compliance with the closure performance standards 40 CFR 262.17(a)(8) ☐ 2. Not in compliance with the closure performance standards 40 CFR 262.17(a)(8)

16. Notification of Hazardous Secondary Material (HSM) Activity

☐ Y ☑ N	Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 260.30, 40 CFR 261.4(a)(23), (24), (25), or (27)? If "Yes", you must fill out the Addendum to the Site Identification Form for Managing Hazardous Secondary Material.

17. Electronic Manifest Broker

☐ Y ☑ N	Are you notifying as a person, as defined in 40 CFR 260.10, electing to use the EPA electronic manifest system to obtain, complete, and transmit an electronic manifest under a contractual relationship with a hazardous waste generator?

18. Comments (include item number for each comment)

19. Certification I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. **Note: For the RCRA Hazardous Waste Part A permit Application, all owners and operators must sign (see 40 CFR 270.10(b) and 270.11).**

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
[signature]	8/21/2023
Printed Name (First, Middle Initial Last): **David Sweeten**	Title: **Director of Operations**
Email: **David_Sweeten@oxy.com**	

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
Printed Name (First, Middle Initial Last)	Title
Email	

SECTION 5

PART B APPLICATION

RCRA POST-CLOSURE CARE AND CORRECTIVE ACTION PERMIT

PART B RENEWAL APPLICATION

PERMIT NUMBER 007234586-PC

ANADARKO E&P ONSHORE LLC

FORMER CHAMPLIN REFINERY, ENID, OKLAHOMA

October 20, 2023

PREPARED BY: Trihydro Corporation

1252 Commerce Drive, Laramie, WY 82070

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1.0 INTRODUCTION

Anadarko E&P Onshore LLC (Anadarko) oversees environmental activities at the Former Champlin Refinery (Site) under a Resource Conservation and Recovery Act (RCRA) Post-Closure and Corrective Action Permit (Permit Number 007234586-PC). The 10-year permit was issued by the Oklahoma Department of Environmental Quality (ODEQ) on March 17, 2014, and became effective on April 17, 2014 (2014 Permit). The 2014 Permit expires on April 17, 2024. Per Title 40 Part 270.10(h)(1) of the Code of Federal Regulations (40 CFR 270.10[h][1]), Anadarko is required to submit a RCRA Part B Permit Renewal Application (Permit Renewal Application) at least180 days before the expiration of the current 2014 Permit or by October 20, 2023.

This Permit Renewal Application provides the information required under 40 CFR 270.28 and Title 252 Chapter 205 of the Oklahoma Administrative Code (OAC 252:205) in support of the renewal process. The OAC 252:205 sections that relate to hazardous waste incorporate, by reference, federal regulations in 40 CFR Parts 124, 260 through 268, 270, 273, and 279 as revised July 1, 2015. Therefore, only federal regulatory citations are referenced, unless expressly provided in the OAC rules. Where application content is specified in the regulations but is not applicable to the Site (e.g., tanks, containers, incinerators) or to a post-closure care (PCC) permit application, a statement to that effect is included in the Permit Completeness Checklists (RCRA Part B, SWMU, and State Checklist), which are provided in Section 2 of this Permit Renewal Application package. A list of major modifications to the 2014 Permit, the associated permit modification request class, and the justification for each are provided in Table 1-1.

The text within this Section 5, Part B Application references the Part B Appendices, which contain the bulk of the required information. The Permit Renewal Application text references previously approved ODEQ documents (e.g., annual groundwater and remediation reports, work plans) instead of attaching them to the application. Our efforts at streamlining and simplifying this application and the subsequent Permit, are designed to minimize the need for, and complexity of, future Permit modifications and lessen the ODEQ's burden for managing the Permit.

This Permit Renewal Application provides information relevant to the PCC of the Land Treatment Unit (LTU) and sitewide Corrective Action for groundwater impacts above the groundwater protection standards established in the 2014 Permit and proposed in this application. The interim final sitewide remedy is Natural Source Zone Depletion (NSZD) and Monitored Natural Attenuation (MNA). NSZD is the combined action of natural processes that reduce the mass and change the chemical composition of light non-aqueous phase liquids ([LNAPL] [ITRC 2018]). These processes are maintaining a stable dissolved phase plume and are reducing benzene concentrations as demonstrated through MNA.

Anadarko began the transition to a NSZD remedy for Corrective Action of groundwater in 2020. Implementation of an NSZD remedy follows many decades of active remediation efforts. Deployment of active remedial technologies began in the 1980s and included numerous large-scale field tests. The transition to NSZD as a sitewide remedy began after the active remediation systems had reached their logical endpoints. Thus, the Site is appropriate for NSZD and MNA as a remedy based on both site-specific data and the fact that numerous active remedial technologies were deployed and have operated to their maximum effectiveness.

NSZD is being implemented together with two additional Corrective Action components, which are designed to ensure the protectiveness of human health and the environment. First, is the previously completed vapor intrusion evaluation demonstrating the absence of a complete vapor intrusion to indoor air exposure pathway in areas overlying the groundwater plume. Second, is the ongoing implementation of measures to control the off-site groundwater exposure pathway.

The 2014 Permit discusses Areas of Interest (AOIs) A through F, which were designed to prioritize, cleanup, and close out individual areas across the Site. AOIs are not retained in this Permit Renewal Application. Removal of AOIs is based on the current sitewide Corrective Action approach for groundwater impacts which do not factor in the use of AOIs.

1.1 REFINERY BACKGROUND INFORMATION

The Site is located in the northeast portion of the City of Enid, Garfield County, Oklahoma and occupies approximately 362 acres. The Site was previously occupied by the Champlin Refinery, which operated from 1916 until 1983. The main products of the refinery were leaded gasoline, unleaded gasoline, diesel fuel, and heating oil. Lubricating oils, greases, and JP-4 jet fuel were also produced on a limited basis. The refinery was dismantled, with decommissioning and demolition work completed between 1983 and 1987.

1.1.1 REGULATORY HISTORY

Hazardous wastes generated at the refinery were placed into LTU Plots 1, 2 and 3, as shown on Figure 1-1. RCRA closure of LTU Plots 1, 2, and 3 was approved by the Oklahoma State Department of Health (OSDH), now the ODEQ, in 1986. A Joint Post-Closure Operating Permit (Permit No. 3524007), between the OSDH and the United States Environmental Protection Agency (USEPA) was issued on November 14, 1989 for the RCRA-regulated hazardous waste management units (i.e., LTU Plots 1, 2 and 3). As a requirement of the 1989 Permit a RCRA Facility Investigation (RFI) was performed at the Site to investigate environmental conditions at Solid Waste Management Units (SWMUs). The SWMUs requiring assessment were identified in a RCRA Facility Assessment (RFA) conducted by the USEPA in 1988. The 1992 RFI Report (UPRC 1992) presented the SWMU investigation results and indicated all but SWMU Group 1 (i.e., non-hazardous LTU Plots 4, 5 and 6) warranted no further action. In 1997, ODEQ approved the Closure and Post-Closure Plans with Final Analytical Survey for the LTU Plots 4, 5, and 6 and formally confirmed no further action was required in relation to the RFI.

In November 1998, ODEQ approved the renewed/modified Post-Closure Permit No. 3524007-PC1 for the LTU. A Consent Order was signed by the ODEQ and Anadarko in October 2003 to address impacted groundwater and potential associated risk. A feasibility study of remedial alternatives to address residual hydrocarbon contamination and groundwater impacts was initiated in 2004 in response to the Consent Order. In 2014, the Consent Order was replaced with the issuance of the 2014 Permit (Number 007234586-PC), which addressed the LTU and sitewide groundwater impacts.

1.1.2 HISTORICALLY REGULATED UNITS

As noted above, hazardous waste generated at the refinery was placed into LTU Plots 1, 2, and 3. The 3 plots are each approximately 940 feet long (north to south) by 120 feet wide, covering 8.1 acres. A 2.5-foot-high earthen berm surrounds the plots. The plots were opened in 1977, received waste until 1986, and were approved for RCRA closure in April 1986. LTU Plots 1, 2, and 3 are managed for PCC and groundwater monitoring in accordance with the 1989 Post Closure Permit No. 3524007-PC1 and permit renewals in 1998 and 2014.

Non-hazardous waste generated at the refinery was placed into LTU Plots 4, 5, and 6 as shown on Figure 1-1. Plots 4 and 6 are approximately 940 feet long by 120 feet wide, with a surface area of approximately 3.7 acres each. Plot 5 is approximately 725 feet long and 120 feet wide and covers approximately 2 acres. A 2.5-foot-high earthen berm surrounds the plots. Plots 4 and 5 were opened in 1977 and Plot 6 was opened in 1986. Wastes were received at the units through 1994 and the ODEQ approved closure of the Plots 4, 5, and 6 on July 17, 1997. The units are managed for PCC and groundwater monitoring in accordance with the 1998 Post Closure Permit No. 3524007-PC1 and the subsequent 2014 Permit (No. 007234586-PC).

1.1.3 SOLID WASTE MANAGEMENT UNITS

The SWMUs investigated during the RFI were grouped and discussed by area as shown on Figure 1-1. A detailed listing of the SWMUs is contained in Section V.B.1. of the 2014 Permit. The 1992 RFI determined that historical SWMU groupings 2 through 8 warranted no further action. SWMU Group 1 (non-hazardous LTU Plots 4, 5, and 6) is subject to PCC monitoring. LTU Plots 1, 2, and 3 are not included in a SWMU but are subject to PCC monitoring per the 2014 Permit. The 1992 RFI indicated releases of petroleum hydrocarbons were related to sitewide refining operations and not directly related to releases from individual SWMUs; therefore, assignment of specific SWMUs would not be a viable approach for evaluating remedial alternatives. Accordingly, the sitewide remedy of NSZD and MNA is consistent with and applicable to the release.

1.2 REFINERY LOCATION AND CURRENT CONDITIONS

The Site is located in the northeast portion of the City of Enid, in Garfield County, Oklahoma on approximately 362 acres in Sections 3 and 4, Township 22 North, Range 6 West Indian Meridian. The facility address is 2529 E. Willow, Enid Oklahoma. The Site is comprised of open land with a few small office and maintenance buildings. The surrounding area includes industrial, agricultural, residential, and government-owned facilities. Figure 1-2 shows the Site location, adjacent property ownership, and existing features.

1.2.1 TOPOGRAPHIC MAP

A topographic map of the area is included as Figure 1-3, which provides items listed in 40 CFR 270.14(b)(19), with the exception of gates and Site features which are provided on Figure 1-2.

1.2.2 CONCEPTUAL SITE MODEL

The following Conceptual Site Model (CSM) was developed from years of data collection and evaluation. The geology, hydrogeology, and extent of impacts have been described and delineated in annual groundwater and remediation reports, in addition to the RFI and other early investigation reports. There is very minimal potential for new releases because the Site is an inactive refinery that was decommissioned in the 1980s. Therefore, the extent of impacts described below is expected to decrease over time in accordance with the corrective action described below.

1.2.2.1 GEOLOGY

Geologically, the Site is located on the northeastern edge of the Enid Isolated Terrace. The Isolated Terrace is comprised of shallow, discontinuous fluvial (river) and lacustrine (freshwater lake) deposits of Quaternary Age. Soils at and near the Site consist of a 15- to 20-foot-thick upper sequence of interbedded silty clays and clayey silts underlain by a 10- to 15-foot-thick lower sequence of poorly sorted sands and gravels. The unconsolidated clays, silts, and sands unconformably overlie less permeable, massive, fine-grained, Permian-age Hennessey Group mudstones (Oklahoma Geological Survey 1991). A geologic map is provided as Figure 1-4.

1.2.2.2 HYDROGEOLOGY

A generalized block diagram of the hydrogeological environment is shown on Figure 1-5. The groundwater potentiometric surface is typically located 10 to 15 feet below ground surface (ft-bgs) and 5 to 10 feet above the sand unit. The fine-grained soils immediately above the sands are generally dry to moist, indicating unconfined to semiconfined conditions. A groundwater elevation potentiometric surface map for April 2023 is provided on Figure 1-6 and shows groundwater flow is generally from the west to the east. A northeast flow direction is evident to the north of the Site in the vicinity of Skeleton Creek. South of the Site groundwater flow bends slightly to the southeast. Although groundwater elevations vary over time, the groundwater flow directions and gradients are generally consistent across seasons and years.

Sitewide hydraulic gradients in presented in the 2022 Annual Groundwater Monitoring Report (Anadarko 2023a) ranged from approximately 0.003 to 0.004 feet per foot (ft/ft) in the center of the Site to 0.001 to 0.002 ft/ft near the southwestern margin of the property to 0.011 to 0.012 ft/ft in the northeast portion of the Site near Skeleton Creek. Based on numerical modeling of the most permeable units (Cameron-Cole 2006), groundwater flow velocities associated with these hydraulic gradients fall within the range of 100 to 1,000 feet per year. The highest velocities are encountered in the coarse-grained sand units.

1.2.2.3 SURFACE WATER

Regionally the shallow aquifer discharges into creeks incising the terrace deposits. Seepage located at the contact between the terrace deposits and the underlying bedrock is reported to supply these creeks with their baseflow as shown in the generalized block diagram on Figure 1-5. Skeleton Creek is the closest surface water stream and is located approximately 1,500 ft to 2,000 ft north and east of the Site (Figure 1-3). The dissolved groundwater plume does not extend to Skeleton Creek and at its closest is 500 to 1,000 feet from the creek.

1.2.2.4 EXTENT AND NATURE OF IMPACTS

Petroleum hydrocarbons attributable to the operation of the former refinery have impacted the shallow groundwater underlying the Site. The hydrocarbons present in the saturated media within the plume boundaries exists primarily in three forms:

- Aqueous Phase Hydrocarbons: Aqueous phase hydrocarbons are those that are present within groundwater as the result of dissolution of mobile or residual LNAPL.
- Residual LNAPL: Residual LNAPL is a pore-scale concept and is LNAPL that occupies a discontinuous fraction of pore space too small for LNAPL flow to occur. Residual LNAPL spans a range of pore saturation levels for a given soil and LNAPL type. Residual LNAPL does not accumulate into a well, but rather is trapped in the soil pore network and is immobile. Most of the residual LNAPL mass at the Site is in the LNAPL smear zone in the sand aquifer.
- Mobile LNAPL: Mobile LNAPL occupies a sufficient fraction (saturation level) of the total porosity to form an interconnected network but does not contain sufficient driving force (e.g., head) to migrate. Small but measurable

thicknesses of LNAPL in some interior monitoring wells indicate the occurrence of mobile LNAPL at these locations. Remaining LNAPL has relatively low recoverability due to prior successful operation of the total fluids extraction system in the 1980's and 1990's that removed the majority of the hydraulically recoverable mass of the LNAPL. Mobile, migrating LNAPL that exists at sufficient head and saturation levels to increase its footprint under natural hydrogeologic conditions no longer exists at the Site due to past recovery efforts.

Water table fluctuations are known to spread LNAPL over a smear zone (ITRC 2018), and this is the case at this Site where historical operation of the total fluids pumping system between 1986 and 1998 lowered the water table as part of LNAPL recovery efforts. The lateral and vertical subsurface distribution of the LNAPL smear zone have been delineated based on Cone Penetrometer/Laser-Induced Fluorescence (CPT/LIF) logging at 350 borings across the Site between 2006 and 2014 (Anadarko 2020). A map showing the interpolated extent and thickness of LNAPL (mobile and residual phase) based on recorded LIF thicknesses for strong responses (>50%) is provided in the 2022 Annual Remediation Report (Anadarko 2023b).

In locations where LNAPL was noted in the LIF logs, it typically is present within the sand aquifer at approximately 15 to 30 ft-bgs. The LNAPL smear zone in the sand represents residual LNAPL based on the absence of measurable LNAPL thickness in adjacent wells. LNAPL smear zone thicknesses tend to be greatest within the Site interior (8 to 20 feet thick) and thin (less than 2 feet thick) at the margins. LIF data also indicates hydrocarbon types are complex and variable within the Site interior, consistent with the belief that releases of different hydrocarbon products occurred during the former refinery's operational history. In the southern area, the LNAPL smear zone thicknesses are relatively thin (generally less than 4 feet) and consists of light molecular weight hydrocarbons.

A dissolved phase plume, with benzene as the key constituent, is present where groundwater is in contact with the LNAPL smear zone as shown on Figure 1-7. Aqueous phase hydrocarbons in groundwater are derived from the continuing dissolution of LNAPL. The horizontal extent of aqueous phase benzene in the Enid Isolated Terrace Aquifer is defined by monitoring wells located around the margins of the residual LNAPL where benzene concentrations have been historically non-detect or less than the Federal Maximum Contaminant Level (MCL) of 0.005 milligrams per Liter (mg/L). While minor changes in the extent of the dissolved phase plume have occurred, monitoring since 2003 (following initial stabilization of the plume after the shutdown of the total fluids extraction system) demonstrates that the plume is not migrating. The areal extent of dissolved benzene has remained similar since at least 2004. These observations indicate the plume is in a steady-state condition where concentrations are typically not increasing, but rather decreasing or oscillating within a relatively narrow range. Data indicates the groundwater plume has reached an equilibrium between advective transport and the natural attenuation processes of biological degradation, hydrodynamic dispersion, and sorption.

1.2.3 SEISMIC REQUIREMENTS

The Site is located in the City of Enid, Garfield County, Oklahoma, which is not listed in 40 CFR Part 264, Appendix VI. Therefore, 40 CFR 270.14(b)(11)(ii), relating to demonstration of compliance with location standards for siting of hazardous waste management facilities near active seismic faults, does not apply.

1.2.4 FLOOD PLAIN REQUIREMENTS

The 100-year flood plain and base flood elevations, based on the June 19, 2012 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM Map No. 40047C0215E), are identified in Figure 1-3. There are no portions of the Site property located within the 100-year flood plain of Skeleton Creek.

1.2.5 ADDITIONAL MAP INFORMATION REQUIREMENTS FOR LAND TREATMENT UNITS

Additional mapping requirements for land disposal facilities specified in 40 CFR 270.14(c)(3) that apply to the closed LTU are identified in Table 1-2.

1.3 RENEWAL APPLICATION SCOPE

Potential issues regarding groundwater impacts and/or remediation at the Site were initially addressed in the ODEQ Consent Order 03-352, effective October 31, 2003. Sitewide groundwater monitoring and Corrective Action were subsequently incorporated into the 2014 Permit, which nullified the Consent Order. This Permit Renewal Application, Section 5, Part B includes a sitewide Groundwater Monitoring Plan and Corrective Action as described below. As discussed above, the current and recommended sitewide Corrective Action is NSZD and MNA with performance monitoring. Additional remedy-related actions include a public outreach program, private water well monitoring and plugging, and the establishment of institutional controls to eliminate the off-site groundwater exposure pathway.

The only permitted hazardous waste management unit is the 17-acre closed LTU Plots 1 to 6 located on the eastern end of the former refinery property. Therefore, this Permit Renewal Application is based on 40 CFR 270.28 (Part B information for post-closure permits), and other applicable federal and state regulations in 40 CFR Parts 264 and 270, and OAC 252:205, respectively.

1.4 LOCAL COMMUNITY ENGAGEMENT

Per OAC 252:4-7-53(8), this Permit Renewal Application is classified as a Tier II application, necessitating public notice requirements under Oklahoma Statutes Title 27A, Part 2-14-301 (§27A-2-14-301). Anadarko provided a draft public notice for ODEQ review prior to publication in the local newspaper. The ODEQ-approved public notice is provided in this Permit Renewal Application as Section 3 and contains the information specified in

OAC 252:4-7-13(c). Upon submittal of this Permit Renewal Application, Anadarko will publish the notice in the Enid News & Eagle. Within 20 days of publication, Anadarko will provide documentation to the ODEQ that the appropriate notifications were completed.

As directed by the ODEQ, Anadarko will also send a written notice to the “interested parties” mailing list maintained by the ODEQ, the adjacent landowners, and to state and local authorities. The facility mailing list and map identifying adjacent landowners are provided in Appendix A. The applicable affidavit of property ownership is provided in Appendix B.

When the ODEQ deems the Permit Renewal Application to be administratively and technically complete, Anadarko will issue public notice of the draft renewed and modified Permit in compliance with 40 CFR Part 124 Subparts A and B and 40 CFR Part 270.

The USEPA has developed national RCRA permitting priorities, one of the current priorities is environmental justice (EJ). Anadarko will continue coordination with ODEQ and local communities related to the protection of human health and the environment in its Corrective Action obligations.

A public repository of key Site documents is maintained at the Enid Public Library, 120 West Maine Street, Enid Oklahoma for information regarding Site activities. Anadarko will continue to conduct local public outreach and involvement activities, as needed.

1.4.1 PRIVATE WATER WELL SAMPLING, PLUGGING AND APPLICATION OF INSTITUTIONAL CONTROLS

Anadarko implemented the ODEQ-approved Work Plan for Private Well Testing, Removal of Affected Wells, and Establishment of Institutional Controls (Anadarko 2021) in 2021. The Work Plan identified 27 potential private water wells within the residential area south of the Site (i.e., the Study Area) and proposed sampling and reporting activities for private water wells. The Study Area is defined as the area where groundwater concentrations of benzene are at or above the 0.005 mg/L MCL, plus an additional 200-foot buffer zone. The Study Area is serviced by the City of Enid potable water supply system. Water samples have been collected from these private water wells in the Study Area where the property owner/resident granted access and the well was accessible to sample. In addition, Anadarko has offered to plug and abandon any private water well within the Study Area as well as the buffer zone.

Furthermore, Anadarko is working with the landowners to file a Notice of Remediation and Land Use Restriction that prohibits future installation of water wells on their property. Anadarko provided these documents in English and Spanish to the residents. The results from the initial implementation of the Work Plan were provided in the Private

Well Work Report (Trihydro 2022a). Anadarko plans to continue collection of groundwater samples from the identified private water wells within the Study Area where access is granted by the property owner. For water wells in the Study Area not sampled, Anadarko will continue to send an annual request to sample and/or plug the water well.

1.4.2 GROUNDWATER COMMUNICATIONS PLAN

Anadarko implemented the ODEQ-approved Groundwater Communications Plan (Anadarko 2021) in 2021. The Plan included public and private outreach efforts and was proposed for a 3-year period. The goal of the Plan was to engage and inform the community about Site conditions and to discourage and prevent use of groundwater within the Study Area. The results from the initial year of implementation were provided in the Groundwater Communications Plan 2022 Report (Trihydro 2023). The 2021 Plan proposed a 3-year demonstration period, 2022 through 2024, where Anadarko would send property owners and residents in the Study Area an updated notification letter. The 2022 letter advised residents of current groundwater conditions and provided contact information for Anadarko project representatives. Anadarko plans to continue the community outreach efforts throughout the duration of the upcoming 10-year permit renewal period, including routine engagement with property owners in the Study Area as well as local water well drillers.

1.4.3 ENVIRONMENTAL SUSTAINABILITY

Green Remediation Best Management Practices (BMPs) are considered when completing Site activities in accordance with U.S. EPA 542-F-16-002 "Green Remediation Best Management Practices" to evaluate and minimize the environmental footprint of activities involved in cleaning up contaminated sites. The following BMPs are routinely assessed for implementation on-Site:

- Wherever practicable, local staff, vendors, product suppliers, etc. will be utilized to minimize the amount of travel, freight and shipping, etc.
- Minimally invasive drilling techniques such as direct-push will be used whenever feasible to reduce drilling duration, avoid or minimize use of water, and prevent or reduce generation of cuttings and associated disposal of investigation derived waste (IDW).
- Segregate and screen drill cuttings and other waste streams for potential use (e.g., onsite backfill, berms, road base) if allowed under applicable state or federal cleanup programs and in accordance with the site-specific Waste Management Plan.
- Assess the use of disposal facilities in proximity to the Site.
- Pursue the establishment of electronic networks for data transfers, team meetings, document preparation and storage, and electronic data collection in the field.

- Reduce Site travel through teleconferencing.
- Avoid field work during extreme hot or cold weather to prevent excess fuel usage.

Additional Green Remediation BMPs will also be evaluated and considered for future Site activities as the project progresses over time.

1.4.4 USE OF LOCAL RESOURCES

Local consultants and contractors will be utilized, where practicable, to perform Site activities. Local vendors have and will continue to perform administrative Site management, surveying, utility clearance, hydro-excavation, and environmental sampling tasks.

2.0 GENERAL FACILITY CONDITIONS

The Site is a closed and decommissioned refinery undergoing Corrective Action and long-term monitoring. The LTU is in PCC and is not an active unit. The following sections address security, inspections, training, preparedness and prevention, and contingency plans and emergency procedures, as required by applicable CFR 264 sections referenced below. The following items are applicable sitewide and include the LTU, unless specifically noted otherwise.

2.1 SECURITY

There are no operating waste management units, industrial processes, or active remediation systems at the Site. A Site Office is located on the property to oversee inspection and maintenance activities, corrective action tasks, and security activities. Onsite workers typically carry two-way radios and/or cellular telephones to communicate with each other, contractors working onsite, and the Site Office.

The Site has several security measures in place to minimize the possibility of unauthorized entry and meet the requirements of 270.14(b)4 and 5, 264.14, 264.15, 264.32, and 264.33, 2. Access is controlled by fencing and locked gates that surround the property as shown on Figure 1-2. These security conditions are not anticipated to change during the term of this Permit; however, security procedures and equipment are routinely evaluated, and minor modifications are periodically implemented based on risk. The current security measures listed below meet the requirements of 264.14(b)(2):

- Security fence surrounds the Site including property leased back from the BNSF railroad.
- Twenty locked gates restrict access to the Site (gates shown on Figure 1-2) and each exterior gate has a sign showing Anadarko's 24-hour emergency number.
- Access to the Site is through Gate 1, which is located off of East Willow Road and is open during operating hours when staff are onsite. This is needed so that suppliers, deliveries, visitors, and contractors can check-in at the Site Office. Contractors working onsite initially report to the Site Office via Gate 1 and then are escorted to various work areas through locked access gates.
- Two perimeter gates (Gates 16 and 17) provide access to the LTU. Access to both gates is controlled 24-hours per day and gates are only unlocked to conduct interior monitoring and maintenance activities. There is also an inner security fence around the LTU with posted warning signs.
- Lighting is provided in the area of the Site Office and is also located near the permanent structures in the southern portion of the Site.

- A security camera network monitors the area of the Site Office and the southern portion of the Site.
- Warning signs are posted at each of the 20 gates and on the interior LTU fencing. The signs are legible from a distance of 25 feet. The signs on the gate entrances warn against trespassing and direct visitors to the Site Office.

2.2 INSPECTIONS

Anadarko is currently implementing an inspection plan for the sitewide infrastructure, groundwater monitoring well network, and the closed LTU. The inspection plan meets the requirements of 40 CFR 264.15 for general facility inspections and 40 CFR 264.273 for the closed LTU. Appendix C contains a table with permit-related inspection and maintenance activities. Sitewide monitoring wells and the LTU are inspected during the semi-annual groundwater monitoring events. Sitewide security features and roads are inspected monthly and after significant weather events. Deficiencies noted during inspections will be remedied as soon as practicable and as required by 40 CFR 264.15(c). Records of inspections, maintenance, and repair activities will be retained at the Site for at least three years from the date of inspection as required by 40 CFR 264.15(d).

2.3 PERSONNEL TRAINING PROGRAM

Site personnel are trained in accordance with 40 CFR 264.16. Existing and new field staff are largely trained via on-the-job training provided by qualified staff. Refresher training is scheduled on an as-needed basis. Site personnel performing monitoring and maintenance activities related to compliance with the Permit are required to complete 40-Hour Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training and a subsequent annual 8-hour OSHA HAZWOPER refresher training course. Training verification documents and records are kept on-site and as required by 40 CFR 264.16(d) and (e).

2.4 PREPAREDNESS AND PREVENTION

Anadarko is implementing preparedness and prevention measures at the Site in accordance with their Emergency Response Plan (ERP) and corporate Health and Safety protocols in alignment with 40 CFR 264 Subpart C. The ERP details prevention of hazards as well as sitewide procedures and equipment to be used in response to emergencies. The Site is a closed decommissioned refinery that does not accept hazardous wastes or conduct activities likely to cause a fire, explosion, or release of a hazardous waste or hazardous waste constituents, which could threaten human health or the environment. If an emergency situation should arise, the Site has preparedness and prevention measures to address the expected hazards.

The Site internal communications system includes two-way radios and cellular telephones, which will be used to alert onsite personnel and emergency responders. Onsite personnel are required to carry two-way radios and visitors/contractors must check into the Site and also carry a radio. The onsite staff monitor Site and weather conditions and communicate concerns via the Site radio communication system. If needed, communication between the Site and local Emergency Response Agencies will be completed by personal cellular phones.

The Site is equipped with handheld fire extinguishers placed throughout the Site to extinguish or control small fires. Fire hydrants and hydrocarbon gas detectors are also present. The LTU is in PCC and there are no active hazardous waste management activities that have the potential to cause fires or spills. The fire extinguishers and other safety equipment are inspected and maintained in accordance with the manufacturer's recommendations. The Site has the phone contacts for local authorities (e.g., police, fire, hospital) located in the Site Office.

2.5 CONTINGENCY PLAN AND EMERGENCY PROCEDURES

Anadarko maintains an on-site Health & Safety Plan (HASP) that addresses plans for the Site to minimize hazards to human health and the environment from fires, explosions, or any unplanned release of hazardous waste or hazardous waste constituents to the environment. The HASP is reviewed annually and modified, if needed, to incorporate changing conditions. The HASP contains:

- Emergency Medical Information
- Worker Exposure/Safety Information
- Hazard Assessment for both chemical and physical hazards
- Proper handling of chemicals

Anadarko will make the HASP available for inspection by ODEQ personnel during normal business hours, and, if requested, will submit a copy of the HASP to the ODEQ. The plan's contents are applicable to a closed facility and meet the requirements of 40 CFR 264.52. Copies of the plan are maintained in accordance with 40 CFR 264.53.

2.6 OPERATING RECORDS

Anadarko maintains written operating records and reports at the Site in accordance with 40 CFR 264.73, 264.74, and 264.77. Records are also maintained at the public repository located at the Enid Library.

3.0 POST-CLOSURE CARE PLAN FOR LAND TREATMENT UNIT

3.1 LTU HISTORY, CLOSURE, AND CORRECTIVE ACTION

As discussed above in Section 1.1.2, The LTU is composed of 6 plots on the eastern portion of the Site as shown on Figure 3-1. The LTU started receiving wastes while the Site was operating, beginning in 1977 and ending in 1986 for Plots 1, 2, and 3 and 1994 for Plots 4, 5, and 6. The LTU was closed in accordance with the agency-approved closure plans. The LTU is being managed in accordance with the existing and previous PCC Permits. Site geology and extent of impacts are discussed in Section 1.2.3 (Conceptual Site Model) and include the LTU.

3.2 POST-CLOSURE CARE PERIOD AND REQUIREMENTS

The PCC period is set by 40 CFR 264.117(a)(1) as 30 years from the date of closure of the hazardous waste management unit (HWMU). 40 CFR 264.280(d) provides a process for facilities to request a variance to reduce or end the PCC period at any time during the PCC period.

OSDH approved closure of the LTU Plots 1, 2, and 3 in April 1986 and PCC requirements were established in the PC Operating Permit (Permit No. 3524007) dated November 14, 1989. The 30-year PCC period for Plots 1, 2, and 3 ended in 2016; however, Anadarko has not requested termination of the PCC period. ODEQ approved closure of the LTU Plots 4, 5, and 6 on July 17, 1997, thereby initiating the PCC period. The 30-year PCC period for Plots 4, 5, and 6 ends on July 17, 2027. At a future date, Anadarko may choose to submit information to the ODEQ demonstrating regulatory compliance with PCC requirements for all or a portion of the 6 LTU plots and request modification or ending long-term monitoring requirements.

The existing Permit indicates that once the LTU is released from PCC requirements it will be incorporated into AOI F. Since this Permit Renewal Application is proposing removal of AOIs, the LTU will not be incorporated into AOI F. Once PCC requirements are terminated, the LTU will not require additional monitoring or maintenance.

3.3 UNIT IDENTIFICATION

LTU Plots 1, 2, and 3 were permitted for hazardous waste and Plots 4, 5, and 6 were permitted for non-hazardous waste. Wastes that were placed in the LTU are listed in the table below.

Type of Waste Unit	*Unit No.*	*Description of Wastes Contained*	*Type of Waste*
Land Treatment Unit	Plots 1, 2 & 3	Separator sludge	K051
		Slop oil emulsion solids	K049
		DAF float	K048
		Heat exchanger bundle cleaning sludges	K050
		Petroleum refinery primary oil/water/solids separation sludge	F037
Land Treatment Unit	Plots 4, 5 & 6	Biological pond bottom sludge and sediments	Non-hazardous

3.4 POST-CLOSURE CARE ACTIVITIES

3.4.1 GROUNDWATER MONITORING

In accordance with the existing 2014 Permit, groundwater monitoring is under a sitewide program. Revisions and clarifications to the current groundwater monitoring program are discussed below in the Groundwater Monitoring Plan. The current and proposed sitewide groundwater monitoring programs meet the requirements of 40 CFR Part 264 Subpart F (Releases from Solid Waste Management Units) for the LTU during the PCC period per 40 CFR 264.117(a).

3.4.2 INSPECTIONS

The LTU is inspected in accordance with the sitewide inspection protocols listed above in Section 2.2 (Inspections) [40 CFR 264.117(a)(1)(ii)].

3.4.3 MAINTENANCE

The LTU is being maintained during the PCC period to prevent disturbing the integrity of the final cover or components of the containment system, or the function of the facility's groundwater monitoring system [40 CFR 264.117(c)]. PCC activities for the LTU are being conducted in accordance with the provisions of the PCC Plan provided in Appendix D and 40 CFR 264.117(d) and 264.118(b).

3.4.4 RECORD KEEPING AND SITE CONTACT

During the PCC period, the Anadarko Site Manager will serve as the Site's PCC contact. The Site Manager's contact information is provided below:

Jennifer Douma
Anadarko
2529 East Willow Road
Enid, OK 73701
(580) 402-1454

Anadarko will retain pertinent records of monitoring information, including maintenance records, monitoring instrumentation certifications and calibrations, reports, and other records specified in the Permit, as required under 40 CFR 264.73(b)(9), and records of data used to complete this Permit Renewal Application. Records will be maintained for a period of at least 3 years from the date of the pertinent sample, measurement, report, record, certification, or application. These periods may be extended by request of the ODEQ at any time and will be automatically extended during the course of any unresolved enforcement action regarding this facility per 40 CFR 270.30(j)(2).

Pursuant to 40 CFR 270.30(j)(3), records of monitoring information will specify:

1. The date(s), exact place, and times of sampling or measurements.
2. The individual(s) who performed the sampling or measurements.
3. The date(s) analyses were performed.
4. The individual(s) who performed the analyses.
5. The analytical techniques or methods used.
6. The results of such analyses.

4.0 POST-CLOSURE CARE ACTIONS AND FINANCIAL ASSURANCE

4.1 COMPLETION OF POST-CLOSURE CARE ACTIVITIES

At the end of the established PCC period, Anadarko will submit a closure request confirming that the required activities have been completed. Supporting documentation will also be furnished in accordance with 40 CFR 264.120. Once ODEQ concurs that necessary actions have been completed, Anadarko will request to be released from the financial assurance requirements for PCC under 40 CFR 264.145(i).

4.2 FINANCIAL ASSURANCE

As sitewide NSZD has been proposed, but not confirmed by ODEQ as the final sitewide Corrective Action, the cost estimates presented in Appendix E are for the expected activities that will be completed over the 10-year term of this permit application (2024-2034). At the end of the pending permit's term, in approximately 2034; and with a successful technical demonstration of NSZD as the final Corrective Action, Anadarko will request formal transition to NSZD as the final sitewide Correction Action. The cost estimates presented are based on work being performed by independent third-party contractors and will be reviewed annually. The annual financial assurance update will be provided to the ODEQ per the schedule defined in 40 CFR 264 Subpart H and prepared in accordance with 40 CFR 264.145(f).

5.0 GROUNDWATER MONITORING PLAN

5.1 INTRODUCTION AND APPROACH

Under the existing Permit, groundwater is monitored semi-annually on a sitewide basis as required by 40 CFR 264.91. Monitoring wells are currently grouped by AOIs and include point of compliance (POC), sentry, detection, sampling, and gauging wells. The existing POC wells are located adjacent to and within the Site property boundary and do not define the extent of groundwater impacts above the groundwater protections standards. The sentry wells are outside of the extent of impacts.

This Permit Renewal Application proposes a modification of the groundwater monitoring program. Proposed changes to the groundwater monitoring plan requiring a permit modification are identified in Table 1-1. The requested changes to the current monitoring program are based on:

- The Site ceased refining operations in 1983 and there is no potential for new releases from facility operations. The extent of groundwater impacts has been stable for approximately 20 years.
- Groundwater impacts exist on-site and off-site above the groundwater protection standards. The facility is in the Corrective Action phase; therefore, detection and compliance monitoring are not applicable.
- The AOIs are no longer applicable.
- The existing POC wells do not define the extent of groundwater impacts detected above the groundwater protection standards.
- The LTU is located downgradient of the other SWMUs. The extent of groundwater impacts detected at concentrations above the groundwater protection standards has been located upgradient of the LTU since 2019 (LW-6). Once the PCC period of the LTU is terminated groundwater monitoring at the 6 LTU wells may be modified.
- Two rounds of Modified Skinner List sampling were completed during the current Permit period. The only new constituent detected above the groundwater protection standards during those sampling events was arsenic.

The revised Groundwater Monitoring Plan is being submitted as part of the RCRA Part B Permit Renewal Application in accordance with 40 CFR Part 270.14(c). This Groundwater Monitoring Plan provides a sitewide groundwater monitoring program that details the performance monitoring necessary for compliance with applicable regulatory programs, including historical releases from the SWMUs and Corrective Action. This Groundwater Monitoring Plan includes groundwater monitoring for the LTU, which is under PCC, and performance monitoring for NSZD and MNA. Monitoring under the proposed Groundwater Monitoring Plan will provide the necessary information to evaluate current conditions and the effectiveness of the ongoing Corrective Action approach. A summary of the proposed changes to the existing Groundwater Monitoring Plan includes:

- Removal of detection and sentry well designations.
- Reassignment/removal of various POC, gauging, and sampling wells.
- POC wells will define the area where groundwater concentrations off-site have historically been below the groundwater protection standards. POC wells will trigger an action if concentrations are detected above the groundwater protection standard.
- Establishment of a monitoring well network around the benzene MCL plume boundary and evaluation of trend data to assess plume stability.
- Removal of Modified Skinner List sampling requirement.

A revised Groundwater Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) is included in Appendix F. Tables listing the groundwater monitoring network (1-1), groundwater protection standards (1-2), and field and laboratory analysis (1-3) are provided in the SAP along with a Figure 1-1 showing the proposed groundwater monitoring network.

5.2 GROUNDWATER PROTECTION STANDARDS

Table 1-2 of the SAP lists the proposed groundwater protection standards. Hazardous constituents for LTU wells are included since the LTU is still in the PCC monitoring program. The standards are consistent with National Drinking Water Standards, MCLs, USEPA Regional Screening Levels (RSLs), and ODEQ 252:730-7-4 criteria for groundwater quality protection. Shallow groundwater beneath and downgradient of the refinery is not used as a drinking water supply; therefore, these standards are conservative regarding protection of human health. Anadarko may develop and propose risk-based screening levels in the future following conversations with ODEQ.

5.3 MONITORING WELL NETWORK

Figure 1-1 of the SAP shows the proposed monitoring well locations and designations. Table 1-1 of the SAP lists the proposed monitoring wells and their designation, proximity to SWMU Group, sampling and gauging frequency, and analytical suite.

5.4 SAMPLING AND ANALYSIS

Sampling and analysis will be performed in accordance with the Groundwater SAP included in Appendix F.

5.4.1 SCHEDULE

Monitoring wells listed on Table 1-1 of the SAP will be gauged and sampled semi-annually in spring and fall of each year. Wells monitored in support of NSZD (BTEX and geochemical parameters) along the 4 transects are sampled annually; however, most of those wells are also sampled during the semi-annual events.

5.4.2 WELL GAUGING AND INSPECTION

Monitoring wells listed on Table 1-1 of the SAP will be gauged and inspected in accordance with the SAP.

5.4.3 GROUNDWATER SAMPLING

Monitoring wells listed on Table 1-1 of the SAP will be sampled in accordance with the SAP.

5.4.4 FIELD DOCUMENTATION AND SAMPLE HANDLING

Semi-annual sampling events will be documented, and samples managed in accordance with the SAP.

5.4.5 QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control (QAQC) procedures for semi-annual monitoring events will be performed in accordance with the SAP and QAPP.

5.4.6 LABORATORY ANALYSIS

Samples collected during the semi-annual monitoring events will be analyzed in accordance with the SAP and QAPP. Table 1-3 of the SAP lists the field parameters and laboratory analysis methods for the semi-annual monitoring events.

5.5 STATISTICAL EVALUATION

The 2014 Permit includes detection and compliance monitoring and an evaluation of the data using statistical procedures. Because the facility is under Corrective Action, the need for detection and compliance monitoring and evaluation is not required. Instead, a trend evaluation will be performed on the monitoring wells identified on Table 1-1 of the SAP, which are located around the periphery of the benzene plume. Changes in trends will be used to evaluate the performance of the remedy. Detections in POC wells above the groundwater protection standards will trigger an action as discussed below in the Corrective Action section.

5.6 REPORTING

A summary of groundwater monitoring activities conducted each calendar year will be documented in an Annual Groundwater Monitoring Report. The report will include gauging data and groundwater analytical results from the events, typically scheduled in April and October.

5.6.1 SCHEDULE

The annual Groundwater Monitoring Report will be submitted no later than March 30th of the year following the sampling events.

5.6.2 REPORT CONTENTS

The Groundwater Monitoring Report will include:

- A summary of sampling and analysis activities, including any deviations from the SAP.
- Figures showing property boundaries, sampling and gauging locations, groundwater results for benzene, and benzene trends.
- Potentiometric surface maps depicting the groundwater gradient for each semi-annual monitoring event of the reporting period, including the groundwater flow direction.
- Summary tables of semi-annual groundwater analytical and gauging data during the reporting period, with corrected water table elevation for wells containing LNAPL.
- An evaluation of the laboratory analytical data during the reporting period.
- An evaluation of the trend analyses.
- An evaluation of LTU monitoring well data and inspection results.
- Conclusions and recommendations.
- Appendices: groundwater monitoring field forms, laboratory reports, data validation summaries, and select benzene trend charts.

5.7 WASTE MANAGEMENT

Waste management will be conducted in accordance with the Waste Management Plan provided in Appendix G.

6.0 CORRECTIVE ACTION

6.1 INTRODUCTION AND APPROACH

Anadarko began the transition to an NSZD remedy for groundwater Corrective Action in 2020. NSZD is the combined action of natural processes that reduce the mass and change the chemical composition of LNAPL (ITRC 2018). NSZD is being used at other closed refineries throughout the country as either an interim or final remedy. The use of NSZD as a remedy involves quantifying the natural loss of hydrocarbon mass, which often occurs at rates exceeding engineered remediation systems at the end of their life cycle.

In addition to documenting degradation rates, two additional components of the NSZD Corrective Action approach are designed to protect human health and the environment. The first is the previously completed vapor intrusion evaluation indicating the absence of a complete vapor intrusion to indoor air exposure pathway (Geosyntec 2007, 2018) in areas overlying the groundwater plume. The second is the ongoing implementation of measures to control the groundwater use exposure pathway. While the City of Enid established Ordinance 8-2-2, which requires residents to use City water if available, a potential groundwater exposure pathway exists in the residential neighborhood south of the Site through private, non-potable water well use (e.g., irrigation, outside cleaning, pools). Anadarko is addressing this potential risk through implementation of the ODEQ-approved Work Plan for Private Well Testing, Removal of Affected Wells, and Establishment of Institutional Controls and Groundwater Communications Plan (Section 1.4). The goal of these plans is to prevent current and future use of private water wells in the residential area south of the Site.

The transition to an NSZD remedy follows fluid recovery operations conducted between 1986 and 1998 to remove LNAPL to the extent practical and subsequent decades of large-scale remedial field tests to evaluate remedies to address on- and off-site groundwater impacts. Technologies included multi-year pilot tests using in-situ chemical oxidation (ISCO), various forms of oxygen injection, air sparging (AS), soil vapor extraction (SVE), high vacuum multiphase extraction, high vacuum SVE, groundwater extraction, enhanced biodegradation (Bioplugs), and phytoremediation. The operation of these prolonged technology tests showed limited effectiveness in reducing the plume boundary or significantly reducing benzene concentrations in groundwater. The large-scale pilot tests were ultimately terminated because they had reached their logical endpoints. The last active remedial pilot test was the NORCE oxygen injection system, which ODEQ approved shutting down in December 2022.

Evaluation of NSZD rates and remedy effectiveness at the Site was initially performed in July 2019 and February 2020 through groundwater geochemical sampling, carbon dioxide (CO_2) efflux measurements, and radiocarbon analysis. Initial data indicated natural rates of hydrocarbon degradation that were favorable by comparison with removal rates achieved by the active remedial systems tested. These results, together with implementation of the private water well abandonment and institutional controls program are the basis for transitioning the entire Site to NSZD as the remedial Corrective Action strategy.

6.2 NATURAL SOURCE ZONE DEPLETION DATA COLLECTION

NSZD monitoring is being implemented in accordance with the ODEQ-approved NSZD Remedy Implementation Work Plan (Trihydro 2020). NSZD data collection consists of CO_2 efflux measurements, radiocarbon analysis, and groundwater geochemistry sampling. CO_2 efflux is measured using a LI-COR field instrument at the 20 locations shown on Figure 6-1. This includes 2 background locations (BG-01R and BG-02R) with the remaining 18 points spread across the LNAPL smear zone. CO_2 samples are also collected in static chambers at these locations for radiocarbon analysis. These data are used to correct the CO_2 efflux measurements to remove modern CO_2 contributions from natural respiration and show only the rate associated with petroleum hydrocarbon degradation (i.e., ancient CO_2). NSZD attenuation rate estimates are calculated for the LNAPL smear zone based on the radiocarbon corrected CO_2 efflux measurements as total petroleum hydrocarbons per square meter per day (g TPH/m^2/day) and extrapolated to kilograms per day over the smear zone footprint (340 acres). Data collection methods for CO_2 efflux and radiocarbon analysis is being performed in accordance with ODEQ-approved work plans and reports.

NSZD and MNA are being supported by groundwater geochemistry sampling along the three transects displayed on Figure 6-1. Data from along the transects provide information on hydrocarbon attenuation rates, the biodegradation reactants, and products entering the LNAPL smear zone, their utilization, and their rebound downgradient. Data collection methods for groundwater geochemical sampling are being performed in accordance with ODEQ-approved work plans and reports.

Additionally, recently installed soil vapor monitoring points are being used to collect vertical concentration profiles for soil gas constituents (i.e., CO_2, oxygen, methane, volatile organic compounds) to further assess NSZD processes. Four of the proposed six soil vapor point clusters (MP-2, MP-3, MP-5, and MP-6) were installed in June 2023 with the remaining two clusters (MP-1 and MP-4) to be installed once access is secured. Soil vapor point installation and monitoring is being performed in accordance with ODEQ-approved work plans and reports (e.g., Soil Vapor Work Plan, Trihydro 2022b).

6.3 REMEDIAL PERFORMANCE EVALUATION

This section describes the current remedial performance evaluation program that is proposed for the next 10-year permit period. NSZD and MNA monitoring are currently being conducted to demonstrate that natural processes are continuing to degrade LNAPL and dissolved-phase benzene. Groundwater monitoring, as discussed in Section 5.0, supports NSZD and MNA by documenting declines in contaminant concentrations. NSZD and MNA monitoring is designed to collect data to demonstrate:

- Loss of contaminant mass by CO_2 efflux measurements.
- Reductions of contaminant concentrations along the groundwater flow path by geochemistry sampling.
- Hydrocarbon degradation evaluation through groundwater geochemistry sampling, soil vapor monitoring, and CO_2 efflux measurements.

The CO_2 efflux and radiocarbon sampling results are being used to estimate the hydrocarbon attenuation rate. This allows for the development of a sitewide NSZD rate. Individual measurement values are also being considered, such as for the southern residential area and locations adjacent to groundwater geochemistry sampling locations.

Groundwater geochemistry sampling results are being used to generate concentration versus distance plots. This provides information on biodegradation reactant utilization and biodegradation product generation along the groundwater flow path. Also, the data are being converted stoichiometrically to equivalent hydrocarbons to help identify dominant biodegradation mechanisms of hydrocarbons. Finally, benzene concentrations are being plotted versus time for individual wells on each transect, to provide information on temporal trends for benzene degradation in groundwater.

To date there have been two rounds of soil vapor data collected. An initial baseline event in June 2023 and in October 2023 in conjunction with the annual NSZD field event. Soil vapor data will be collected along vertical profiles at soil vapor clusters to evaluate degradation of hydrocarbons by natural processes. Soil vapor concentrations will be measured in the field for CO_2, oxygen (O_2), methane (CH_4), and volatile organic compounds (VOCs). Vertical profiles will be plotted to demonstrate NSZD is occurring in the smear zone and resulting changes in soil vapor concentrations moving upward. Additionally, a one-time soil vapor sampling event for laboratory analysis of volatiles organics, gasoline range organics, and fixed gases will be performed to further assist the evaluation of NSZD.

The planned schedule for groundwater geochemical sampling is annually for the first five years of this permit. The ODEQ-approved NSZD Remedy Work Plan specified transitioning to biennial (i.e., once every two years) sampling after 5 years of sampling (which would begin in 2025), after which the sampling frequency will be evaluated. Groundwater geochemistry will be performed annually for the 10-year period of this permit. At year 10 sampling frequency will be re-evaluated.

The 2019 and 2020 NSZD data collection efforts indicated there is seasonal variability in CO_2 efflux measurements. Seasonal variability has been observed at other NSZD project Sites (e.g., Sihota et al. 2016 and Eichert et al. 2017) and typically during the fall the best representation of an average annual rate is generated. Therefore, CO_2 efflux measurements will be collected annually in the fall for the first five years of this permit. After the first five years, the measurement frequency and CO_2 efflux locations will be reevaluated.

6.4 REPORTING

Corrective Action activities from each calendar year will be documented in an Annual Remediation Report. The report will include a discussion of NSZD, MNA, and private water well outreach activities.

6.4.1 SCHEDULE

The Annual Remediation Report will be submitted no later than March 30th of the year following.

6.4.2 REPORT CONTENTS

The Annual Remediation Report will include:

- A summary of data collection activities for the previous year as well as an evaluation of NSZD/MNA.
- A summary of private water well sampling, plugging, institutional controls, and outreach activities.
- Figures showing property boundaries, sampling locations, CO_2 efflux results, geochemistry versus distance plots, and saturated zone attenuation rates.
- Tables of CO_2 efflux measurements, radiocarbon analysis data, groundwater geochemistry data, and soil vapor point measurements.
- Conclusions and recommendations.
- Appendices such as field forms, data evaluation, laboratory reports, and data validation summaries.

6.5 CONTINGENCY PLAN

As described in the Remedial Performance Evaluation above, the NSZD and MNA remedy will monitor and document:

- Natural attenuation and degradation of hydrocarbons from the LNAPL smear zone.
- Stability of the dissolved phase benzene plume.

The annual reports will be used to present the data and verify by multiple lines of evidence that NSZD and MNA is occurring, and the plume is stable. If the data indicates one of these conditions is not met, then the remedy will transition to a multi-step contingency plan as described below:

1. Available data will be evaluated to determine if Site conditions have changed (e.g., drought that affected microbial degradation processes). A secondary step will be to determine if the change is transient or becoming a steady-state condition. This evaluation will be provided in the Annual Remediation Report.
2. If the evaluation determines that additional data are needed to ascertain the cause of the stalled NSZD and MNA processes, or to confirm whether the condition is transient, these data will be collected and provided in the next Annual Remediation Report.
3. If it is determined that NSZD and MNA has stalled sitewide and the condition is expected to persist, a review of remedy alternatives will be developed. This remedy review will be provided in the Annual Remediation Report or a supplemental report.

If groundwater sample data indicates that the plume is expanding beyond a POC well at concentrations greater than the MCL, the following steps will be taken:

1. A second groundwater sample will be collected from the POC well within 3 months of the last sampling event. The confirmation sample results will be discussed as part of the Annual Groundwater Monitoring and Remediation Reports or a supplemental report.
2. If the exceedance is confirmed, then an evaluation of its cause will be performed. This evaluation will include a review of groundwater elevations, flow direction, or flow velocity. It will also include an assessment of groundwater geochemistry in the area of the exceedance.
3. If the exceedance is confirmed a third time within 6 months of the original data, a plan will be developed for addressing the exceedance. The specifics of the plan will depend on the location and nature of the exceedance. The plan will be presented in an Annual Groundwater Monitoring and Remediation Reports or a supplemental report.

7.0 REFERENCES

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TABLES

TABLE 1-1. SUMMARY OF REQUESTED MODIFICATIONS OF RCRA POST-CLOSURE CARE AND CORRECTIVE ACTION PERMIT FORMER CHAMPLIN REFINERY ENID, OKLAHOMA

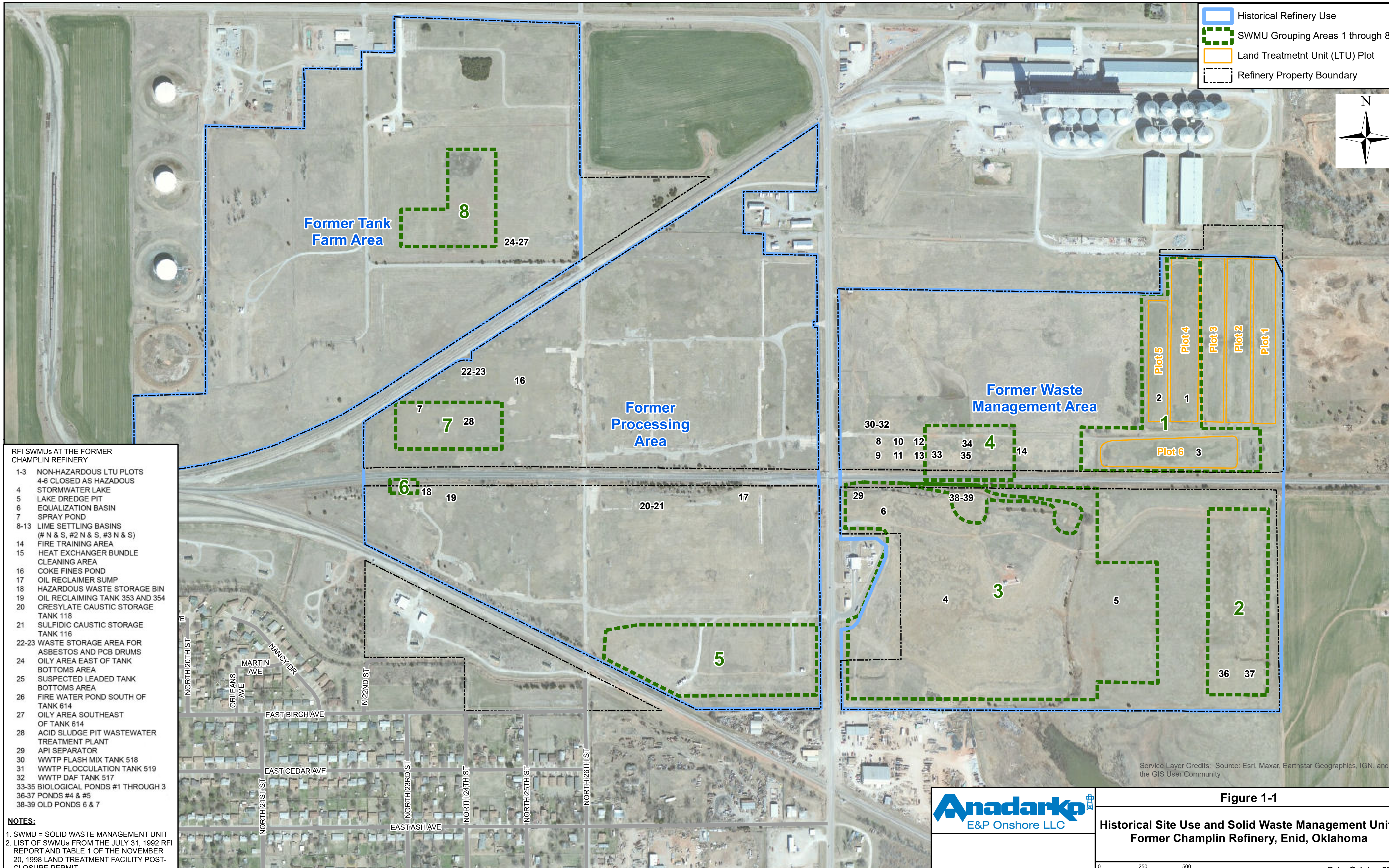
Renewal Application Section	Change	Modification Class	Justification (40 CFR)	Purpose	Notes
Section 1.0	Remove Areas of Interest (AOIs)	1	40 CFR 270.42 Appendix I.A.1; Administrative and informational changes.	Remove AOIs to reflect the sitewide Groundwater Monitoring and Corrective Action programs.	
Appendix D Appendix E Appendix F Appendix G	Changing format/content of Permit Attachments for Post-Closure Care (PCC) Plan for LTU; PCC and Corrective Action Cost Estimate; Groundwater Sampling and Analysis Plan (SAP); and, Materials and Waste Management Plan	1	40 CFR 270.42 Appendix I.A.1; Administrative and informational changes.	Update attachments/appendices based on current conditions for the Site. Changes maintain compliance with regulatory requirements.	
Section 5.1	Remove Modified Skinner List sampling	3	40 CFR 270.42 Appendix I.C.5.a; Changes in indicator parameters, hazardous constituents, or concentration limits.	Remove unnecessary sampling since constituents of concern (COC) list has been established for the Site and in consideration the facility is non-operational and the potential for new releases has been eliminated	Monitoring wells with arsenic added as a result of previous Modified Skinner List sampling.
Section 5.3	Remove wells from semi-annual monitoring list	2	40 CFR 270.42 Appendix I.C.1.a.; changes in the number, location, depth, or design of upgradient or downgradient wells of permitted ground-water monitoring system.	Remove redundant or irrelevant monitoring wells from the monitoring well network.	
Section 5.3	Redefine/modify Point of Compliance (POC), detection, compliance, and sentry well designations	2	40 CFR 270.42 Appendix I.C.4.; Changes in point of compliance.	Reassign wells so that POC wells define areas with historical non-detects for COCs; remove detection and compliance wells since the Site is in Corrective Action phase.	See notes below for details
Section 1.0 Section 6.0	Establish NSZD as sitewide remedy	2	40 CFR 270.42 Appendix I.C.8.b.; Changes to Corrective Action program as required by § 264.100(h), unless otherwise specified in this appendix	Establish an appropriate sitewide interim final remedy.	
Section 5.5	Remove statistical evaluation requirements for detection and compliance monitoring	1	40 CFR 270.42 Appendix I.C.3.; Changes in statistical procedure for determining whether a statistically significant change in ground-water quality between upgradient and downgradient wells has occurred, with prior approval of the Director.	Remove irrelevant statistical evaluation requirements since the Site is in the Corrective Action phase. Prepare trend plots to evaluate benzene trends at select monitoring wells.	

Notes:
1. Wells previously designated as "Monitoring" designated as "LNAPL" due to location inside residual line: MW-457, R-56, R-76
2. Wells previously designated as "Detection" designated as "Monitoring": LW-1, LW-2, LW-3, LW-7RR, MW-111, MW-414, MW-434S, MW-435SR, MW-450, MW-601, MW-613, MW-623, MW-625, MW-628A, MW-735, MW-736, MW-737, MW-738, MW-742, MW-745, MW-746, MW-748B, MW-749, MW-750, MW-751
3. Wells previously designated as "SPH" designated as "Monitoring": MW-3BR
4. Well removed from semi-annual monitoring program will be monitored annually for NSZD suite: MW-113
5. Wells removed from semi-annual monitoring program and will be plugged: MW-409, MW-612R, MW-730, MW-740, MW-741, MW-748A

**TABLE 1-2. ADDITIONAL MAP INFORMATION REQUIREMENTS
FOR LAND TREATMENT UNIT
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA**

Figure	Federal Regulation	Informational Requirements
Figures 1-4 and 1-5	40 CFR 270.14(c)(2)	Uppermost aquifer and hydraulically connected aquifers beneath the Site (Note that no hydraulically connected aquifers are known to be present beneath the Site)
Figure 1-6	40 CFR 270.14(c)(2)	Groundwater flow direction and rate (rate discussed in Section 5.2 of this Renewal Application)
Appendix F (SAP), Figure 1-1	40 CFR 270.14(c)(3)	Point of Compliance locations on a topographic map
Appendix F (SAP), Figure 1-1	40 CFR 270.14(c)(3)	Location of groundwater monitoring wells on a topograhic map
Figure 1-3	40 CFR 270.14(c)(3)	Waste Management Areas on a topographic map
Figures 1-3	40 CFR 270.14(c)(3)	Property Boundaries on a topographic map
Appendix F (SAP), Figure 1-1	40 CFR 270.14(c)(4)(i)	Extent of any groundwater contaminant plume on a topographic map

FIGURES



RFI SWMUs AT THE FORMER CHAMPLIN REFINERY

1-3	NON-HAZARDOUS LTU PLOTS 4-6 CLOSED AS HAZADOUS
4	STORMWATER LAKE
5	LAKE DREDGE PIT
6	EQUALIZATION BASIN
7	SPRAY POND
8-13	LIME SETTLING BASINS (# N & S, #2 N & S, #3 N & S)
14	FIRE TRAINING AREA
15	HEAT EXCHANGER BUNDLE CLEANING AREA
16	COKE FINES POND
17	OIL RECLAIMER SUMP
18	HAZARDOUS WASTE STORAGE BIN
19	OIL RECLAIMING TANK 353 AND 354
20	CRESYLATE CAUSTIC STORAGE TANK 118
21	SULFIDIC CAUSTIC STORAGE TANK 116
22-23	WASTE STORAGE AREA FOR ASBESTOS AND PCB DRUMS
24	OILY AREA EAST OF TANK BOTTOMS AREA
25	SUSPECTED LEADED TANK BOTTOMS AREA
26	FIRE WATER POND SOUTH OF TANK 614
27	OILY AREA SOUTHEAST OF TANK 614
28	ACID SLUDGE PIT WASTEWATER TREATMENT PLANT
29	API SEPARATOR
30	WWTP FLASH MIX TANK 518
31	WWTP FLOCCULATION TANK 519
32	WWTP DAF TANK 517
33-35	BIOLOGICAL PONDS #1 THROUGH 3
36-37	PONDS #4 & #5
38-39	OLD PONDS 6 & 7

NOTES:

1. SWMU = SOLID WASTE MANAGEMENT UNIT
2. LIST OF SWMUs FROM THE JULY 31, 1992 RFI REPORT AND TABLE 1 OF THE NOVEMBER 20, 1998 LAND TREATMENT FACILITY POST-CLOSURE PERMIT

Anadarko E&P Onshore LLC

Figure 1-1

Historical Site Use and Solid Waste Management Units Former Champlin Refinery, Enid, Oklahoma

Date: October 2023

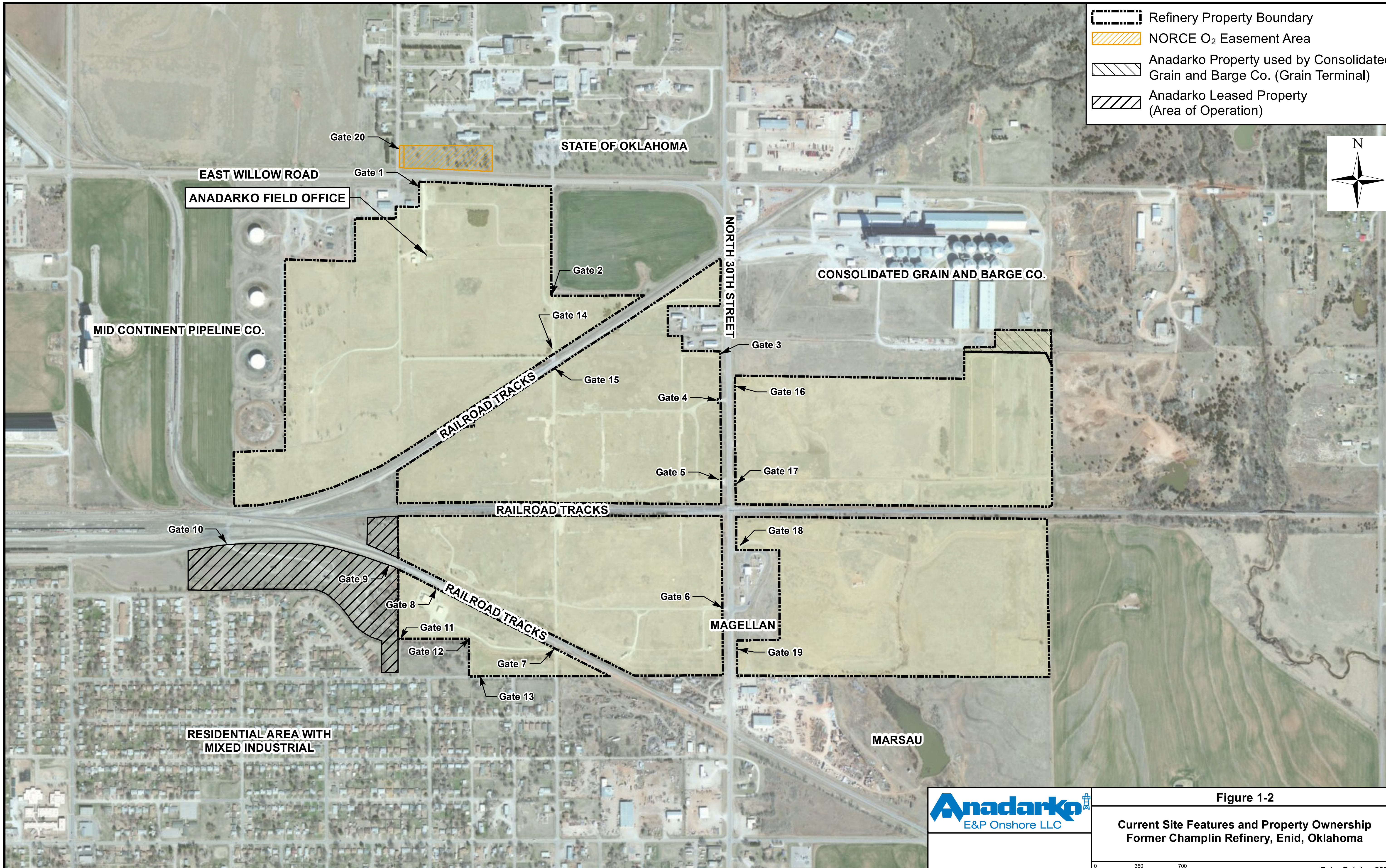


Figure 1-2

Current Site Features and Property Ownership Former Champlin Refinery, Enid, Oklahoma

Anadarko E&P Onshore LLC

Figure 1-3

Topographic Map
Former Champlin Refinery, Enid, Oklahoma

Date: October 2023

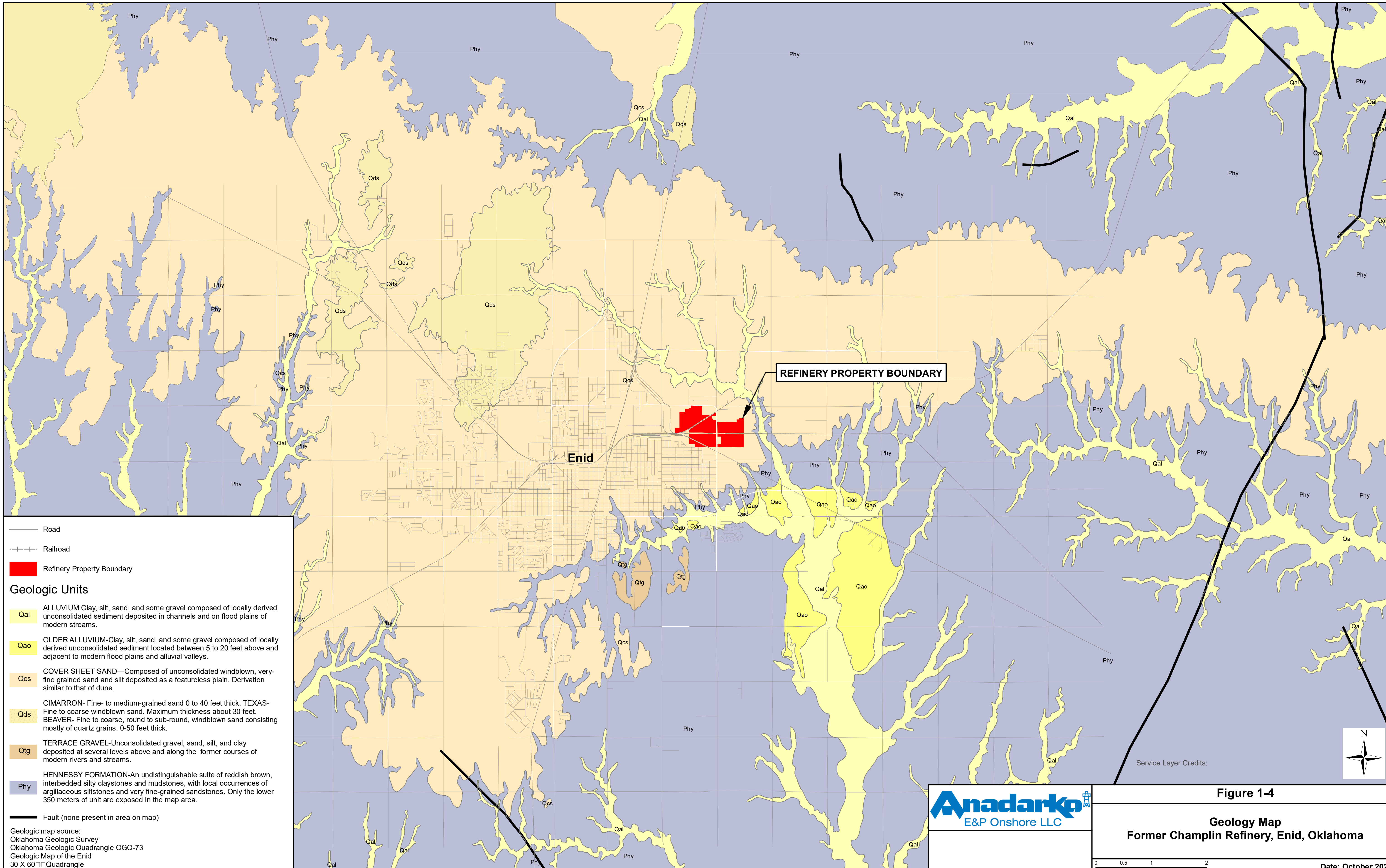
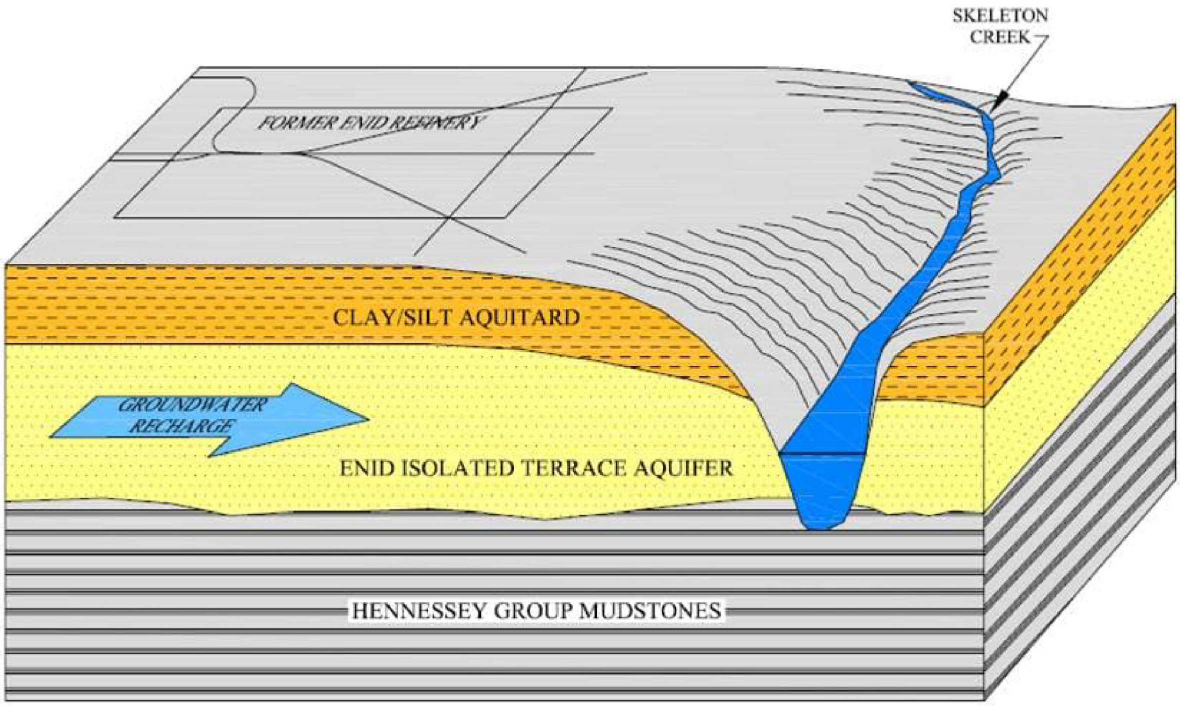


Figure 1-4

Geology Map
Former Champlin Refinery, Enid, Oklahoma



Anadarko E&P Onshore LLC

Figure 1-5

Block Diagram of Hydrogeologic Environment
Former Champlin Refinery, Enid, Oklahoma

Date: October 2023

Anadarko E&P Onshore LLC

Figure 1-6

Potentiometric Surface Map
First Semiannual Event, April 2023
Former Champlin Refinery, Enid, Oklahoma

Date: October 2023


Point of Compliance Well - Skinner List Sample
Monitoring Well
Oxygen Injection Point
NORCE Oxygen Monitoring Point
0.005 Aqueous-Phase Benzene Concentration (mg/L)
ND Non-Detect
Aqueous-Phase Benzene Concentration Contour (mg/L)
0.005
0.1
1
Inferred
Benzene Sink
GTAP Projected Limit of Residual PSH
Anadarko Property used by Consolidated Grain and Barge Co. (Grain Terminal)
Anadarko E&P Onshore LLC
Figure 1-7
Residual LNAPL (2014) and Aqueous-Phase Benzene Distribution
First Semiannual Event, April 2023
Former Champlin Refinery, Enid, Oklahoma
Date: October 2023
Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

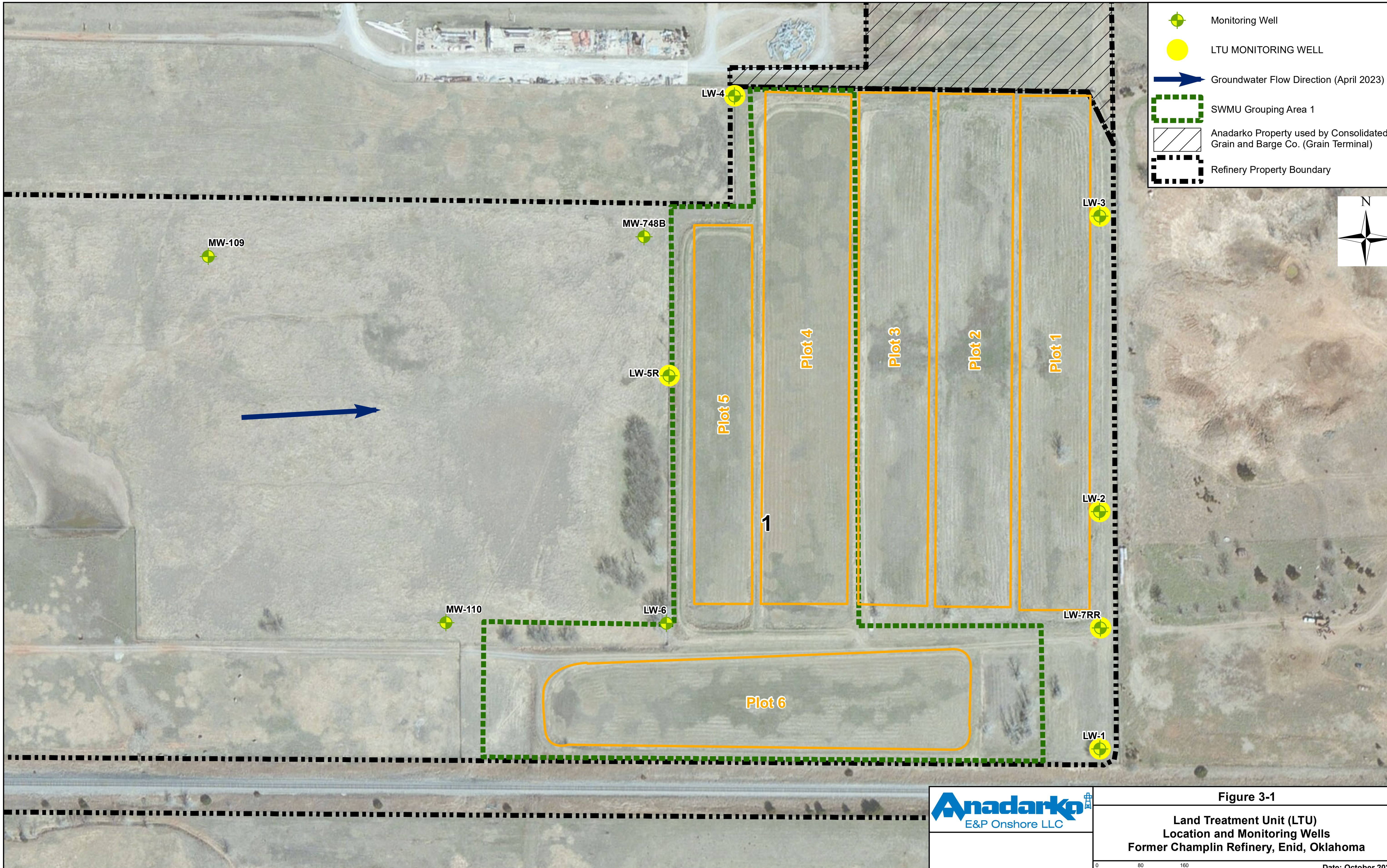


Figure 3-1

Land Treatment Unit (LTU)
Location and Monitoring Wells
Former Champlin Refinery, Enid, Oklahoma

Date: October 2023

Figure 6-1

Natural Source Zone Depletion (NSZD) Monitoring Locations
Former Champlin Refinery, Enid, Oklahoma

Date: October 2023

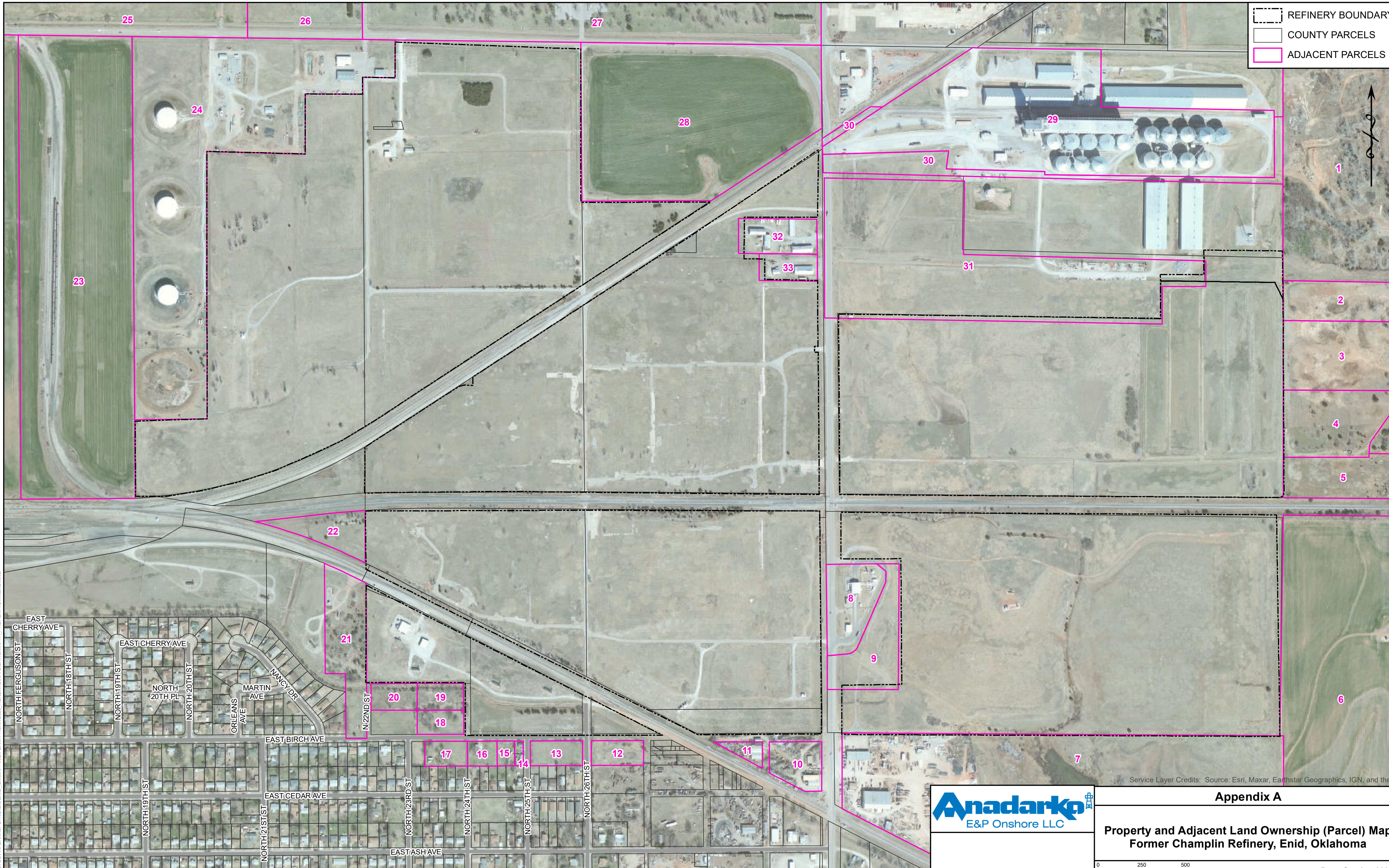
APPENDIX A

FACILITY MAILING LIST

FACILITY MAILING LIST
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Anadarko E&P Onshore LLC
5 Greenway Plaza, Suite 110
Houston, TX 77046-0521

Figure ID	Company	Contact	Facility Address	Mailing Address	City	State	Zip	Phone - office
1-5; 23; 28-31	WB Johnston Grain Co.; Johnston Terminal LLC; Consolidated Grain and Barge Co.	Dillon Streber	2301 N. 30th St.	411 W. Chestnut	Enid	OK	73701	580-233-5800
6	N/A	William H. Easterly & Linda Easterly	9112 E. Chestnut Ave.	3017 Falcon Crest	Enid	OK	73703	
7	Marsau Enterprises, Inc.	Marlin Esau	1209 N. 30th St.	1209 N. 30th St.	Enid	OK	73701	580-233-3910
8-9	Magellan Midstream Partners L.P.	Laura Porter	1401 N. 30th St.	One Williams Center OTC-8	Tulsa	OK	74172	580-234-6748
10-11	Enid Iron & Metal, Inc.	John Boone	1202 N. 30th St.	P.O. Box 5408	Enid	OK	73702	580-237-5505
12	N/A	Phil Edwards	E. Birch Ave	P.O. Box 1753	Enid	OK	73702	
13	N/A	Jerry Ray Derr	2513 E. Birch	2524 E. Cedar	Enid	OK	73701	
14	N/A	Tony McGill	E. Birch Ave	2105 E. Chestnut Ave.	Enid	OK	73701	
15	N/A	Tony Bookout	E. Birch Ave	2018 N. 4th St.	Enid	OK	73701	
16	N/A	Bryan & Holli Willard	E. Birch Ave	2406 E. Cedar Ave.	Enid	OK	73701	
17	Prelesnick Trust	Gary L. Prelesnick, Trustee	2301 E. Birch	2 Elsworth Ln	Bella Vista	AR	72714	
18	N/A	Calvin Hollingshad	E. Birch Ave	1206 N. 12th St.	Enid	OK	73701	
19-20	N/A	Russell Meloy	2 lots S. of MPX 4	1821 Calico Lane	Enid	OK	73703	
21	N/A	Marie Gleichmann c/o Wayne Daniel	2142 E. Birch	17528 S. 30th	Bison	OK	73720	
22	BNSF Railway Company	Joshua Teets	Railroad ROW	930 E. Cherry	Enid	OK	73701	580-242-4258
24	Mid Continent Pipeline Co.	William Lassley	2501 E. Willow	2501 E. Willow	Enid	OK	73701	580-242-8612
25-27	OMES	Jennifer Ramsey	former NORCE facility 2601 E. Willow Rd. Enid, OK 73701	2401 N. Lincoln Blvd. Suite #126	Oklahoma City	OK	73105	Jennifer.Ramsey@omes.ok.gov
Operator - 27	Liberty of Oklahoma Corp. - Robert M. Greer Center	Dr. Hugh Sage or Lesley Hofberger	2501 NE Delaware	2501 NE Delaware	Enid	OK	73701	580-213-2700
32	N. 30th Autos & More	Doug Vestal	1902 N. 30th St.	1902 N. 30th St.	Enid	OK	73701	580-233-6441
33	Sanner Oil	Nettie Horner	1900 N. 30th St.	P.O. Box 5942	Enid	OK	73702	580-233-2442
N/A	N/A	Chris FawFaw	3101 N. 30th St.	3101 N. 30th St.	Enid	OK	73701	
N/A	Hamm & Phillips Service Company	Troy Terrell	2429 N. 30th	2429 N. 30th	Enid	OK	73701	580-242-1440
N/A	Mustang Gas Products	Tony Coffman	Pipeline ROW	910 W. Park	Enid	OK	73701	580-237-7404
N/A	Anadarko Minerals, Inc.	Scott Betts	Pipeline ROW	100 N. Broadway, Suite 2110	Oklahoma City	OK	73102	800-217-6664
N/A	Cattle Grazing	Marty Meyer	N. & E. of 1401 N. 30th St.	2615 S. 90th St.	Enid	OK	73701	580-237-2535
N/A	City of Enid	Murali Katta	401 West Owen K. Garriott Rd.	401 West Owen K. Garriott Rd.	Enid	OK	73701	580-234-0400



Anadarko E&P Onshore LLC

Appendix A

Property and Adjacent Land Ownership (Parcel) Map
Former Champlin Refinery, Enid, Oklahoma

Date: October 2023

APPENDIX B

AFFIDAVIT OF PROPERTY OWNERSHIP

DEQ LANDOWNER NOTIFICATION AFFIDAVIT

Tier I, II, or III permit applications in which the applicant does not own all the land subject to the application must notify the owner(s) of leases and/or pipeline right-of-ways. The basis for this requirement is Title 27A of the Oklahoma Statutes § 2-14-103(9), as described in OAC 252:004-7-13(b).

Please note that you MUST fill out and return this affidavit even if you don't have to give any landowner notice.

A	NOTICE TO THE LANDOWNER(S) IS NOT REQUIRED because: (check one)		
☐	My application does not involve any land.	☐	My application involves only land owned by me (or applicant business).

OR

B	NOTICE TO THE LANDOWNER(S) IS REQUIRED because the land is owned by someone other than myself or the applicant business AND I HAVE NOTIFIED the following (check one):				
☑	Landowner(s)	☐	Lessor or Administrator or Executor of the land		
METHOD OF DELIVERY (check one):					
☐	Actual notice, for which I have a signed and dated receipt				
☐	Service by Sheriff or private process server, for which I have an affidavit				
☑	Service by certified mail, restricted delivery, for which I have a signed return receipt				
☐	Legal publication, for which I have an affidavit of publication from the newspaper, because the landowners could not be located through due diligence				
MY RIGHT TO USE THIS LAND is by:					
☐ Lease	☐ Easement	☑ Other, Specify	Multiple properties, multiple access arrangements		

LANDOWNER AFFIDAVIT CERTIFICATION			
I, as the applicant or an authorized representative of the applicant, hereby certify that notice to the landowner(s) about the permit application for the facility described below was provided per Option A or B above.			
Company Name	Andarko E&P Onshore LLC	Facility Name	Former Champlin Refinery
Facility Address or Legal Description.	2529 East Willow Rd, Enid, Oklahoma 73701		
Responsible Official (signature)	[signature]	Date Signed	9/22/23
Responsible Official (typed)	David Sweeten	Title	Director of Operations

If the landowner notice applies to your application (Option B Above) you can send the following form to them as your notice:

NOTICE TO LANDOWNER OF FILING

Dear Landowner: (Name)____________________

(Applicant name)____________________ has filed a permit application with the Oklahoma Department of Environmental Quality for (Name) Former Champlin Refinery facility.

This application involves the land owned by you located at:

Address or Legal Description:____________________

Signed:____________________ Date:____________________

APPENDIX C

INSPECTION AND MAINTENANCE ACTIVITIES

INSPECTION AND MAINTENANCE ACTIVITIES
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Item	Potential Problems	Maintenance Response
Monitoring Well Equipment	Broken riser tubing Tampered, broken or stolen locks Broken, lost or stolen bailers Minimal or no sample recovery Damaged well cap /casing Damaged well pad Damaged well protection equipment Erosion or deposition around the well pad	Repair or replace Replace locks Replace dedicated bailers Workover or replace monitoring well Replace cap or well Repair pad Repair or replace stick-up protection or bumpers Regrade vicinity of well
Surveyed benchmarks	Physical damage Severe weathering Evidence of tampering Physically obstructed	Establish substitute benchmark Establish substitute benchmark Establish substitute benchmark Uncover and provide protection
Security fence	Damaged or broken fence section Tampered, broken, or stolen locks Damaged or broken gates	Repair or replace section Replace lock(s) Repair or replace gate
Land Treatment Unit (LTU)	Berms damaged Drainage blocked Land cover eroded	Repair section Unblock and provide protection Replace and monitor

APPENDIX D

POST-CLOSURE CARE PLAN FOR LAND TREATMENT UNIT (LTU)

POST-CLOSURE CARE PLAN FOR THE LAND TREATMENT UNIT
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

This Post-Closure Care (PCC) Plan is a continuation of the plan outlined in the original 1998 Post-Closure Permit for the Land Treatment Unit (LTU). PCC at the LTU supports the final stabilization of materials historically deposited into the units, while monitoring for any unexpected changes in the system that could negatively impact human health or the environment.

1.0 PCC PLAN

PCC meeting the requirements of 40 CFR 264.117 and 264.280 has been conducted at the LTU since 1998. The LTU consists of 6 plots. Hazardous wastes were disposed of in Plots 1, 2, and 3 between 1977 and 1986. Non-hazardous wastes were disposed of in Plots 4, 5, and 6 between 1977 and 1994.

2.0 PCC ACTIVITIES AND GROUNDWATER MONITORING

The primary activity being conducted at the LTU during the PCC period is the continued implementation of the Groundwater Monitoring Plan described in Section 5.0 of the October 2023 Part B Permit Renewal Application. Groundwater monitoring at the LTU under the renewed permit will be performed in accordance with the Groundwater Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP), included as Appendix F of the Permit Renewal Application. Routine inspections of the vegetative cover, stormwater run-on/run-off control system, and the integrity of LTU are performed on a semi-annual basis and after significant storm events. In addition, Site personnel routinely inspect the LTU area and the perimeter security fencing. A summary of the PCC activities conducted each year will be presented in the Annual Groundwater Monitoring Report.

2.1 Vegetative Cover

The vegetative cover has been maintained since 1998 and will continue to be maintained. The LTU is mowed as part of a sitewide vegetative management plan, typically twice per growing season. These conditions may be modified in accordance with such provisions as 40 CFR 264.110(c) or 264.118(d) when PCC requirements have been met.

2.2 Run-On/Run-Off Control

The final grading of the LTU has maintained the berms surrounding the unit to control run-on/run-off for a 24-hour, 25-year storm event.

POST-CLOSURE CARE PLAN FOR THE LAND TREATMENT UNIT
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

2.3 Wind Dispersal

The vegetative cover over the LTU prevents wind erosion. Therefore, no additional wind control measures are necessary.

2.4 Food-Chain Crops

Food-chain crops are not grown in the LTU. The secure, fenced area is maintained as a non-grazed pasture.

3.0 PCC PLAN AMENDMENTS

If modification or amendments are needed to this PCC Plan, written notification will be provided to ODEQ along with supporting documentation justifying the request.

APPENDIX E

POST-CLOSURE CARE AND CORRECTIVE ACTION COST ESTIMATE

FINANICAL ASSURANCE COST ESTIMATE
POST-CLOSURE CARE AND CORRECTIVE ACTION
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Groundwater Monitoring (2 events per year)					
Labor	$	10,000	2	$	20,000
Expenses	$	1,750	2	$	3,500
Laboratory & Validation	$	24,000	2	$	48,000
subtotal				**$**	**71,500**
Annual GWM Report	$	17,500	1	$	17,500
				$	**89,000**
NSZD Sampling (1 event per year)					
Labor	$	9,000	1	$	9,000
Expenses	$	4,500	1	$	4,500
Laboratory & Validation	$	22,500	1	$	22,500
subtotal				**$**	**36,000**
Annual Remediation Report	$	21,000	1	$	21,000
				$	**57,000**
Private Well Sampling					
Labor	$	3,000	1	$	3,000
Expenses	$	750	1	$	750
Laboratory & Validation	$	6,500	1	$	6,500
Summary Letters	$	9,000	1	$	9,000
subtotal				**$**	**19,250**
General O&M Activities					
Inspections & Maintenance & Security					
Labor and Expenses				**$**	**16,750**
Various data collection efforts					
Labor and Expenses				**$**	**22,500**
Vegetation Management Program (WHC)					
Labor and Expenses				**$**	**84,000**
Administrative					
communications, reporting, community engagement					
Labor and Expenses				**$**	**14,250**
Remaining Well P&A and Demolition Efforts					
Estimate of remaining scope	$	325,000	/10 years	**$**	**32,500**
Estimated Annual Cost				**$**	**335,250**
Permit Duration					10 years
Estimated Annual Cost over Life of Permit				**$**	**3,352,500**
Hazardous Waste Permit Renewal					
2034 Permit Renewal	$	28,500	1	**$**	**28,500**
Total Financial Assurance Amount				**$**	**3,381,000**

As the Sitewide remedy is proposed as "interim final" and in alignment with the current financial assurance methodology that only covers the testing period before the final remedy is confirmed, the proposed financial assurance amount is based on the duration of the current permit application 2024-2034, or until the NSZD Sitewide Remedy is finalized. Once the Sitewide final remedy is confirmed, financial assurance methodology will be reevaluated and adjusted as appropriate.

APPENDIX F

GROUNDWATER SAMPLING AND ANALYSIS PLAN (SAP) AND QUALITY ASSURANCE PROJECT PLAN (QAPP)

FORMER CHAMPLIN REFINERY

ENID, OKLAHOMA

SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN

October 20, 2023

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List of Acronyms

CFR	Code of Federal Regulations
COC	Chemicals of Concern
CSM	Conceptual Site Model
DOT	Department of Transportation
DQO	Data Quality Objectives
FCR	Former Champlin Refinery
FOC	Field Operations Coordinator
GC	Gas Chromatography
GC/MS	Gas Chromatography Mass Spectrometry
GFAA	Graphite Furnace Atomic Absorption
GWMP	Groundwater Monitoring Plan
GWPS	Groundwater Protection Standards
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
ICP	Inductively Coupled Plasma
ICPMS	Inductively Coupled Plasma Mass Spectrometry
LCS	Laboratory Control Sample
LIMS	Laboratory Information Management System
LNAPL	Light Non-aqueous Phase Liquid
MDL	Method Detection Limit
MR	Monitoring Report
MS/MSD	Matrix Spike/Matrix Spike Duplicate

List of Acronyms (cont.)

NSZD	Natural Source Zone Depletion
ODEQ	Oklahoma Department of Environmental Quality
OSHA	Occupational Safety and Health Administration
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PM	Project Manager
PQL	Practical Quantitation Limit
QAM	Quality Assurance Manual
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QCI	Quality Control Indicators
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RSD	Relative Standard Deviations
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedures
VOC	Volatile Organic Compounds

1.0 PROJECT MANAGEMENT

1.1 PROJECT ORGANIZATION AND RESPONSIBILITIES

This Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) has been prepared to identify the scope, procedures, and Quality Assurance/Quality Control (QA/QC) protocols for the collection of supporting data for the semi-annual groundwater sampling and monitoring program occurring at the Anadarko E&P Onshore LLC (Anadarko), Former Champlin Refinery (FCR), in Enid, Oklahoma (Site). The semi-annual sampling activities include collection of groundwater samples from select monitoring wells and the collection of groundwater and light non-aqueous phase liquid (LNAPL) fluid levels from the monitoring well network. The scope of the monitoring program is presented in the Resource Conservation and Recovery Act (RCRA) Post-Closure and Corrective Action Permit Renewal Application (hereafter referenced as Permit Renewal Application), Section 6.0 Groundwater Monitoring Plan (GWMP) (May 2023). A list of the monitoring well network including their designation, gauging and sampling frequency, and sample analysis is included as Table 1-1. A Groundwater Monitoring Well Network map is included as Figure 1-1.

Anadarko's environmental consultant will be responsible for performing, or providing oversight of subcontractors completing the field investigations, preparing required reports, and performing any subsequent work required to complete the semi-annual groundwater sampling and other agency required field activities related to the RCRA Permit. The Oklahoma Department of Environmental Quality (ODEQ) will review and approve this combined SAP and QAPP (hereafter referenced as SAP-QAPP). The various quality assurance and management responsibilities of key project personnel are defined below.

1.1.1 MANAGEMENT RESPONSIBILITIES

RCRA Permit & Project Manager, Oklahoma Department of Environmental Quality

The ODEQ appointed RCRA Permit and Project Manager(s)(PM) is/are responsible for oversight of RCRA permitting and compliance pertaining to the Site. The ODEQ will review and approve Anadarko's RCRA permit-related reports and other relevant documents.

Facility Project Manager, David Sweeten, Director of Operations, Glenn Springs Holdings, Inc.

Mr. Sweeten (or a designated representative), has final responsibility for environmental related issues at the Site. Mr. Sweeten provides overall direction to the Site environmental remediation staff. Mr. Sweeten serves as one of the primary communication links between the ODEQ and Anadarko project team. Glenn Springs Holdings, Inc. is a subsidiary of Occidental Petroleum, which acquired Anadarko in 2019.

Environmental Consultant Project Manager

The Consultant PM will be involved in the planning and implementation of the semi-annual sampling events and the evaluation of the data. The Consultant PM is responsible for meeting technical, financial, and scheduling objectives for the project and is the primary communication link between Anadarko, subcontractors, and the analytical laboratory. The Consultant PM will help plan project update meetings and will provide senior technical quality control and project oversight. Duties and responsibilities of the Consultant PM include the following:

- Administrate and supervise various phases of the project.
- Ensure project objectives are met.
- Provide technical support to the project team.
- Work with the Consultant quality assurance officer (QAO) and field personnel to plan and conduct project operations, progress meetings, etc.
- Review reports and other work products prior to their issuance.

1.1.2 QUALITY ASSURANCE RESPONSIBILITIES

Environmental Consultant Quality Assurance Officer (QAO)

The Environmental Consultant QAO will be responsible for enforcing the provisions of the SAP-QAPP and will remain independent of the day-to-day operations. Specific functions and duties will be to:

- Establish QA/QC procedures for the project.
- Evaluate data quality and maintain QC records.
- Provide the final quality control review of analytical data.
- Provide a communication link between project personnel and the laboratory.
- Revise work practices or identified procedural deviations to align work with approved SAP-QAPP procedures and guidelines.

1.1.3 FIELD RESPONSIBILITIES

Environmental Consultant Field Operations Coordinator (FOC)

The Environmental Consultant FOC will be responsible for overseeing the day-to-day project activities. Duties and responsibilities of the FOC will be to:

- Ensure the sampling activities are conducted in a manner that follows the procedures outlined in this SAP-QAPP and the health and safety plan (HASP).
- Coordinate the sampling activities with the Consultant QAO and field personnel.
- Oversee the use, maintenance and operation of sampling equipment.
- Report daily activities, problems, etc. to the Consultant QAO.

The FOC will be in routine communication with field support personnel and may conduct field audits over the duration of the project.

1.1.4 LABORATORY RESPONSIBILITIES

The analytical laboratory will have its own project organization with responsibilities related to project data objectives. An Anadarko-contracted laboratory will be used to support the semi-annual groundwater sampling and analysis work.

Laboratory Director

The Laboratory Director will be responsible for the overall operation of the laboratory. The Laboratory Director will provide final review of data packages before reporting results and will be responsible for initiating corrective action measures when analytical data do not meet the requirements of this plan or the laboratory's Quality Assurance Manual (QAM).

Laboratory Project Manager

The Laboratory PM will be the primary communications link between the laboratory and the Environmental Consultant's QAO/PM. The Laboratory PM will be responsible for relating any special needs of the field operations personnel to the laboratory. The Laboratory PM will also provide the final review of data deliverables, ensuring they meet the requirements of this SAP-QAPP, before reporting results.

Laboratory Quality Assurance Officer

The Laboratory QAO will be primarily responsible for implementing the laboratory's QAM within the laboratory, and monitoring compliance with the laboratory's QAM. The Laboratory QAO's duties will also include: conducting laboratory audits, reviewing QC data, and reporting problems to the Laboratory Director for corrective action.

1.1.5 SPECIAL TRAINING REQUIREMENTS / CERTIFICATIONS

Project personnel must be qualified and trained in the project tasks for which they are responsible.

1.1.5.1 FIELD PERSONNEL

It is not anticipated that the execution of required activities will require uniquely trained personnel. However, field personnel must complete the mandatory site-specific safety classes required by Anadarko. If specialized training is required for any portions of the project, training will be provided by a qualified trainer and the date and type of training will be documented. The site-specific HASP specifies the training necessary for compliance with the Occupational Safety and Health Administration (OSHA) requirements. All field personnel will have completed OSHA 40-hour and annual 8-hour refresher Hazardous Waste Operations and Emergency Response (HAZWOPER) standard training, as required for personnel potentially exposed to hazardous substances, as specified by Title 29 Part 1910.120 of the Code of Federal Regulations (29 CFR 1910.120). If hazardous materials are moved off-site, compliance with the Department of Transportation (DOT) training requirements for shipping hazardous materials will be adhered to, as required.

1.1.5.2 LABORATORY PERSONNEL

Every employee has direct access to the QAM and training is provided in order to help each employee apply the QAM to their specific responsibilities. Records of relevant qualifications, training, skills and experience of the technical personnel are maintained by the laboratory.

Analysts that operate Graphite Furnace Atomic Absorption (GFAA), Inductively Coupled Plasma (ICP), Inductively Coupled Plasma Mass Spectrometry (ICPMS), Gas Chromatography (GC), or Gas Chromatography Mass Spectrometry (GC/MS) equipment must satisfactorily complete a short course offered by an equipment manufacturer, professional organization, university, or other qualified training facility (formal in-house training is acceptable). The minimum experience requirement for the operation of GFAA, ICP, ICPMS, GC, and GCMS equipment is 1 year.

1.2 SITE BACKGROUND INFORMATION

Site background information is detailed in the Permit Renewal Application, Part B Application, Section 1.0 Introduction (October 2023).

1.3 PROJECT DESCRIPTION AND SCHEDULE

The GWMP summarizes the monitoring requirements for the Site. As part of the RCRA permit, Anadarko is required to conduct groundwater, LNAPL fluid level gauging, groundwater sampling, and to submit annual Monitoring Reports (MRs) summarizing the field and analytical results. The groundwater monitoring well network, sampling and gauging frequency, and analytical suite per well is provided in Table 1-1. The groundwater protection standards (GWPS) and laboratory analytical limits for chemicals of concern (COC) are provided in Table 1-2. Groundwater field parameters and laboratory analytical details are contained in Table 1-3. Figure 1-1 shows the locations of monitoring wells, site-wide sampling and gauging well network, land treatment units (LTUs), and other pertinent Site features.

1.4 DATA QUALITY OBJECTIVES

1.4.1 PROJECT QUALITY OBJECTIVES

The Data Quality Objectives (DQO) process is a mechanism to translate project goals into specific tasks, which are conducted to produce data needed to support decision making for the project. The DQO process typically comprises a seven-step process. The first step is to develop a Conceptual Site Model (CSM) that includes Site-specific data such as analytical results, historic use, exposure pathways, cleanup concerns, and future land use. Section 5 of the Permit Renewal Application provides a CSM for the Site. The model will be refined as additional data is collected and evaluated. With a well-defined CSM, the goals of investigative work are translated into qualitative and quantitative statements that define the type of data needed. These data needs include the number and type of samples to be collected, analytical detection limits, and certainty. Based on the outputs of the DQO process, a detailed work plan can be prepared. The following provides the Site DQO steps that will be used for the collection of semi-annual monitoring data.

1.4.1.1 STEP 1: STATING THE PROBLEM

Routine groundwater sampling is required to monitor the conditions of the dissolved phase and LNAPL plumes in the subsurface and the potential effects of such conditions on human health and the environment, as set forth in the RCRA permit.

The purpose of this SAP-QAPP is to document methods and procedures for fluid level gauging, groundwater sampling, laboratory analyses, data evaluation, and resultant changes in sampling protocols for the sitewide groundwater sampling events. These data will be used to evaluate current conditions of groundwater and LNAPL in compliance with post-closure care and corrective action requirements set forth in the effective RCRA permit.

1.4.1.2 STEP 2: IDENTIFYING THE DECISION

Data collected during routine groundwater monitoring will be used to determine the following:

- What is the current groundwater elevation, flow direction, and estimated hydraulic gradient? Is this consistent with historical groundwater flow patterns?
- Have the COC concentrations increased or decreased for wells within the plume since the last monitoring period(s)? Have COCs been detected in POC wells?
- Does the dissolved phase plume and/or LNAPL plume appear to be migrating, expanding or shrinking?
- What is the current estimated LNAPL footprint and thickness?
- Does the LNAPL plume appear to be expanding, shrinking or stable compared to the previous reporting periods?
- Do groundwater quality parameters suggest an environment conducive to natural attenuation of COCs?
- Are changes to the monitoring well network and/or the well gauging network warranted to fill data gaps or eliminate redundancies?
- Are additional groundwater quality, chemical or geochemical parameters necessary to further evaluate plume effects, natural attenuation characteristics, and/or potential remedies?
- Is the Site in compliance with the effective RCRA Permit?
- Are additional investigations or actions warranted based on the findings of items 1 through 9?

1.4.1.3 STEP 3: IDENTIFYING INPUTS TO THE DECISION

Groundwater samples will be collected and analyzed, and wells will be gauged to support the decision and answer the questions posed in DQO step 2. The decision inputs include:

- Evaluation of semi-annual monitoring data to historical ranges of COC concentrations
- Comparison of data to groundwater protection standards established in the RCRA Permit
- Spatial and temporal variation in groundwater COC data under current conditions

- Spatial and temporal variation of LNAPL
- Spatial and temporal variation in groundwater level data and groundwater gradients
- Appropriate laboratory analysis methods and analytical limits

1.4.1.4 STEP 4: DEFINING THE BOUNDARIES OF THE STUDY

The boundary of the study refers to both the spatial and temporal boundaries. The boundaries are defined to ensure that samples are representative of the area for which decisions will be made. Practical constraints on data collection need to be recognized. These constraints include meteorological conditions that would preclude sampling; inability to secure necessary access agreements; or the unavailability of personnel, time, or equipment. The groundwater monitoring network includes wells located on- and off-site.

1.4.1.5 STEP 5: DEVELOPING A DECISION RULE

A decision rule usually compares an output parameter to an action level, which then is used to determine course of action for the Site. A series of "*if…then*" statements has been developed to define the conditions that assist in choosing courses of action. Based on analytical results obtained from previous groundwater samples, the following "if…then" statements will be applied to the data obtained during each groundwater sampling event:

- *If* analytical results demonstrate a detection of a COC at a POC well, the well may be re-sampled and/or additional investigation or remedial measures may be implemented.
- *If* analytical results demonstrate COC concentrations greater than applicable groundwater protection standards at a POC well, the well will be re-sampled and/or additional investigation or remedial measures may be implemented.
- *If* analytical results demonstrate increasing COC concentrations in monitoring wells around the periphery of the dissolved phase plume, additional investigations may be implemented to assess potential new release(s) from on- or off-site sources.
- *If* data gaps or redundancies are identified, additional monitoring wells may be installed and sampled, or select wells may be recommended to be eliminated from the monitoring or sampling plans.
- *If* evaluations of the dissolved phase and/or LNAPL plumes indicate plume expansion, mobility or migration, additional investigation or remedial measures or modifications to any existing corrective action may be implemented.

1.4.1.6 STEP 6: SPECIFYING LIMITS ON DECISION ERRORS

The monitoring well placement has been developed, in part, from current groundwater COC concentrations and predominant groundwater flow directions. The number of sampling and gauging program wells in the program are determined with respect to the ODEQ requirements.

Sampling may not capture all the variations in concentrations and analyses can only estimate the “true” value. Sampling “error” occurs when the sampling scheme does not adequately detect the variability in the amount of contaminant in the environmental matrix from point to point across the Site. The potential for these errors may be reduced by implementing the DQO process when outlining the monitoring plan.

Data may also be questionable due to measurement errors. Measurement errors can happen during sample collection, handling, preparation, analysis, data reduction, or data handling. There may be corrective steps that can be taken or additional qualifying information that can be collected that will allow for the full or limited use of the data. Corrective actions are discussed in Section 2.6.4 of this document.

1.4.1.7 STEP 7: OPTIMIZING THE DESIGN

The purpose of this step is to identify the most resource-effective sampling design that generates data to satisfy the DQOs specified in the preceding steps. The sampling and analysis program designed for this project was developed by through the evaluation of historical COC and gauging data, surrounding properties/uses, groundwater flow gradients, and the ability to meet the previously defined DQOs.

1.5 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The QA objective for each project is to develop and implement procedures for field sampling, Chain-of-Custody, laboratory analysis, and reporting that will provide legally defensible results. Specific procedures for sampling, Chain-of-Custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control, audits, preventive maintenance of field equipment, and corrective action are described in other sections of this SAP-QAPP.

Data quality objectives for measurements collected during the semi-annual sampling events will be addressed in terms of precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters. The collection of data used in this project will require that the sampling and testing be performed using standard methods, with properly operated and calibrated equipment, and trained personnel. The following sections provide detailed discussion of PARCC elements.

1.5.1 PARCC ELEMENT – PRECISION

1.5.1.1 DEFINITION

Precision is a measure of the mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. The overall precision of measurement data is a mixture of sampling and analytical factors. Precision is evaluated through field and laboratory duplicate samples. The precision of analytical data can be evaluated by calculating the relative percent difference (RPD) between duplicate samples. The RPD is calculated according to the following formula:

$$RPD = \frac{|C_1 - C_2|}{0.5 * (C_1 + C_2)} * 100$$

Where:
C1 = the first sample value and
C2 = the duplicate sample value

1.5.1.2 FIELD PRECISION OBJECTIVES

Field precision will be assessed through the collection and measurement of blind duplicates for groundwater samples. Blind duplicate RPDs must be < 30 percent for aqueous samples if one or both results are greater than five times the quantitation limit, otherwise results must be within +/- the absolute difference of the quantitation limit.

1.5.1.3 LABORATORY PRECISION OBJECTIVES

Precision in the laboratory is assessed through calculation of the RPD for duplicate and spike duplicate samples, and by calculation of relative standard deviations (RSD) if three or more replicate samples are analyzed. Precision control limits for the subcontracted analytical laboratory will be provided in laboratory SOPs to be supplied by the contracted laboratory selected to perform the work.

1.5.2 PARCC ELEMENT – ACCURACY

1.5.2.1 DEFINITION

Accuracy is the degree of agreement between an observed value and an accepted reference or true value.

1.5.2.2 FIELD ACCURACY OBJECTIVES

Accuracy in the field is assessed using equipment blanks and trip blanks and through the adherence to sample handling, preservation, and holding times. Equipment blanks and trip blanks will be submitted to the analytical laboratories to help assess the quality of the data resulting from the field sampling program.

1.5.2.3 LABORATORY ACCURACY OBJECTIVES

Laboratory accuracy shall be assessed by the preparation and analysis of method blank analyses for each analytical sequence. Laboratory accuracy is also assessed through the analysis of Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples, laboratory control samples (LCSs) and surrogate compounds, and the determination of percent recoveries. Accuracy control limits will be provided in laboratory SOPs to be supplied by the contracted laboratory selected to perform the work.

In order to assure the accuracy of the analytical procedures, one environmental sample will be collected for every 20 primary samples and designated as the MS/MSD sample. The increase in concentration of the analyte will be observed in the spiked sample, due to the addition of a known quantity of the analyte, compared to the reported value of the same analyte in the unspiked sample to determine the percent recovery. Daily control charts will be plotted for each commonly analyzed compound and maintained on instrument-specific, matrix-specific, and analyte-specific bases.

Percent recovery for MS/MSD results is determined according to the following equation:

$$\%R = [(\text{Spiked Sample Concentration} - \text{Sample Concentration}) / \text{Known Concentration Added}] \times 100$$

Percent recovery for LCS and surrogate compound results is determined according to the following equation:

$$\%R = (\text{Experimental Concentration} / \text{Known Concentration Added}) \times 100$$

Additional information on laboratory accuracy will be provided in the method specific SOPs to be supplied by the contracted laboratory selected to perform the work.

1.5.3 PARCC ELEMENT – REPRESENTATIVENESS

1.5.3.1 DEFINITION

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary.

1.5.3.2 MEASURES TO ENSURE REPRESENTATIVENESS OF FIELD DATA

Representativeness will be achieved by ensuring that sampling locations are properly selected and that a sufficient number of samples are collected. Representativeness is dependent upon the proper design of the sampling program and will be accomplished by ensuring that this SAP-QAPP and relevant SOPs are followed. The QA goal will be to have samples and measurements representative of the media sampled. Monitoring and stabilization of pH, temperature, specific conductance, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity stabilization prior to groundwater sampling will help ensure that representative samples are collected.

1.5.3.3 MEASURES TO ENSURE REPRESENTATIVENESS OF LABORATORY DATA

Using the proper analytical procedures, appropriate methods, meeting sample holding times and analyzing and assessing field duplicate samples, ensures representativeness in the laboratory.

1.5.4 PARCC ELEMENT – COMPLETENESS

1.5.4.1 DEFINITION

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected under normal conditions.

1.5.4.2 FIELD COMPLETENESS OBJECTIVES

Field completeness is a measure of the amount of valid measurements obtained from measurements taken during the project. Field completeness objective for this project will be greater than ninety percent.

1.5.4.3 LABORATORY COMPLETENESS OBJECTIVES

Laboratory completeness is a measure of the number of valid measurements obtained from measurements taken during the project. Laboratory completeness for this project will be greater than ninety percent.

Completeness is the ratio of the number of valid sample results to the total number of samples analyzed with a specific matrix and/or analysis. Following completion of the analytical testing, the percent completeness will be calculated by the following equation:

$$\text{Completeness} = \frac{\text{Number of Valid Measurements}}{\text{Numbers of Valid Measurements Planned}} \times 100$$

1.5.5 PARCC ELEMENT - COMPARABILITY

1.5.5.1 DEFINITION

Comparability is an expression of the confidence with which one data set can be compared with another. Comparability is also dependent on similar QA objectives.

1.5.5.2 MEASURES TO ENSURE COMPARABILITY OF FIELD DATA

Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that this SAP-QAPP is followed and that proper sampling techniques are used.

1.5.5.3 MEASURES TO ENSURE COMPARABILITY OF LABORATORY DATA

Planned analytical data will be comparable when similar sampling and analytical methods are used and documented in the SAP-QAPP. Comparability is also dependent on similar QA objectives.

1.6 DOCUMENTATION AND REPORTING

Data collected during the semi-annual monitoring events will be submitted to the ODEQ annually and will, at a minimum, include:

- Text describing sampling and analysis activities (focusing on deviations from the GWMP and SAP-QAPP)
- Figures showing property location, property boundaries, sampling and gauging locations
- Tables summarizing groundwater and LNAPL gauging data
- Potentiometric surface maps based on the gauging event data
- Tables summarizing analytical results
- Parameter concentration maps

- A summary of findings and recommendations for future activities
- Laboratory data reports
- Data validation reports
- Other relevant materials required to support the DQO objectives
- A bibliography of references and appendices of supporting documents

Records generated during the semi-annual monitoring events will be kept on file at the Site or a corporate storage facility. These records will include field data, annual reports, associated agency correspondence, and other relevant documents.

2.0 FIELD SAMPLING AND ANALYSIS PLAN

2.1 SAMPLING PROCESS AND DESIGN

The purpose of this section is to describe the data collection and sampling procedures that will be used during the semi-annual monitoring events. Sampling efforts will be uniform and follow the SAP-QAPP to ensure the quality of the data collected. The groundwater sampling plan for the Site consists of the following tasks:

- Semi-annual gauging of the sitewide monitoring wells (collectively known as the monitoring well network).
- Semi-annual sampling of a select set of monitoring wells.
- Annual sampling (during the second semi-annual event) of a select set of monitoring wells for geochemical analysis to support natural source zone depletion (NSZD) data collection.

Primary COCs are listed in Table 1-2. Parameters for NSZD data collection are provided in Table 1-3. QA/QC samples will be submitted in accordance with the protocols presented in the following sections of this SAP-QAPP. Requirements for QA/QC samples are identified in Section 2.4.

2.2 GROUNDWATER AND LNAPL GAUGING

Groundwater and LNAPL fluid levels and LNAPL thickness measurements will be collected as described in Section 2.2.1. The purpose of a semi-annual gauging event is to assess current groundwater flow and LNAPL plume characteristics.

2.2.1 GROUNDWATER LEVEL AND LNAPL MEASUREMENTS

Groundwater and LNAPL level and LNAPL thickness measurements will be collected using manual methods.

2.2.1.1 MEASUREMENT LOCATIONS AND FREQUENCY

Groundwater and LNAPL fluid levels and LNAPL thickness measurements will be collected from the sitewide program wells on a semi-annual basis. The list of wells to be gauged during each semi-annual event is presented in Table 1-1.

2.2.1.2 EQUIPMENT AND PROCEDURES

Groundwater and LNAPL fluid levels and LNAPL thickness measurements will be collected using an electronic water level indicator and an oil-water interface probe. Each measurement shall be taken to the nearest hundredth of one foot from the reference point of each well. The reference point, unless otherwise marked, shall be the north side of the top of the well casing (i.e., riser). The total well depth will be measured to the nearest 0.01 foot annually during the first semi-annual event. Monitoring wells will be opened prior to gauging to allow for equilibration before water level measurements are collected. Before opening the well cap of flush-mounted wells, standing water will be removed from around the protective casing to eliminate standing water from entering the well casing.

For wells in which LNAPL is detected, measured LNAPL thickness (LT) will be recorded via measurements of product depth (PD) and groundwater depth (GD); LT will then be calculated as:

$$LT\ (measured) = GD - PD$$

To correct groundwater elevations for wells in which LNAPL is detected, the following formula will be used:

$$CPE = Well\ Datum - GD + (LT \times SG)$$

Where:

CPE = Corrected Potentiometric Elevation GD = Groundwater Depth (measured)

LT = LNAPL Thickness (measured) SG = Specific Gravity of the LNAPL

Historical LNAPL specific gravity measurements will be used to best approximate the specific gravity of LNAPL in individual wells, as outlined in the GWMP.

2.2.1.3 DOCUMENTATION

Groundwater and LNAPL level measurements will be recorded on the task-specific forms, where appropriate. These forms include site groundwater and LNAPL level measurement (fluid level) forms and groundwater monitoring forms. Appendix A includes the Site groundwater monitoring form.

2.2.1.4 DECONTAMINATION

The electronic water level indicator and oil-water interface probe will be decontaminated with mild, non-phosphate soap such as *Liquinox*, and thoroughly rinsed with tap water. The probe will be decontaminated in the field prior to use at each well.

2.2.1.5 INVESTIGATIVE DERIVED WASTE

Decontamination fluids from gauging events will be disposed off-site in accordance with the Waste Management Plan (Permit Application, Appendix G).

2.3 GROUNDWATER SAMPLING

2.3.1 GENERAL SAMPLING REQUIREMENTS

The purpose of this section is to describe the general sampling procedures for groundwater monitoring events. These procedures may be updated in the future without permit modification, to maintain most up-to-date sampling and field data collection methodologies. Sampling efforts will be uniform and follow the SAP-QAPP to ensure the quality of the data collected. Routine groundwater monitoring includes laboratory analysis for site-specific COCs and field data acquisition of water quality parameters (i.e., pH, temperature, specific conductance, DO, ORP, and turbidity) as listed in Table 1-3.

2.3.2 MONITORING WELLS REQUIRING GROUNDWATER SAMPLING

During each semi-annual groundwater sampling event, monitoring wells listed in Table 1-1 will be gauged to evaluate groundwater and LNAPL elevations and apparent LNAPL thicknesses, as described in Section 2.2. Select monitoring wells will then be sampled for target COCs. Table 1-1 Status column designates which monitoring wells are gauged only (LNAPL) and gauged and sampled (Mon) and also includes gauging and sampling frequency, and the applicable analytical suite.

Low-flow sampling techniques will be used to collect groundwater samples during each semi-annual sampling event. The groundwater sampling results will be used to evaluate current conditions of the dissolved phase plume, maintain compliance with the RCRA permit, and evaluate the need for modifications to any corrective actions and/or sampling protocol.

2.3.3 LABORATORY ANALYSIS

Environmental samples and QA/QC samples will be collected and submitted for laboratory analysis of the COCs listed in Tables 1-1 and 1-3. Samples will be analyzed on standard turn-around times.

Table 1-2 lists the practical quantitation limits (PQLs), method detection limits (MDLs), and GWPS for groundwater COCs. The purpose of Table 1-2 is to demonstrate that the laboratory limits of the selected laboratory analytical methods are less than or equal to the GWPS. Sample QA/QC requirements are detailed in Section 2.4.

2.3.4 EQUIPMENT PREPARATION AND DECONTAMINATION

Reusable sampling equipment and equipment used to develop or purge groundwater from a monitoring well (e.g., submersible pumps) will be thoroughly decontaminated between sampling locations. Decontamination will consist of washing equipment with mild, non-phosphate soap such as *Liquinox*, thoroughly rinsing with tap water, and allowing to air dry. If complete cleaning of any piece of sampling equipment is not possible, a substituted piece of clean equipment will be used.

The field team leader is responsible for ensuring that equipment coming into contact with soil or groundwater is free of contamination and will not compromise the validity of the sample results.

2.3.5 MONITORING WELL PURGING PROCEDURES

Before opening the well cap, any standing water will be removed from around the protective casing. Standing water will not be allowed to enter the well casing. Wells with slow recharge (wells unable to yield at least three casing volumes) will be pumped dry and then sampled as soon as sufficient recharge has occurred to fill the sample containers. Wells will be sampled within 24 hours of purging, including those wells that are purged dry.

If sediment has accumulated in a monitoring well or if turbidity levels cannot be maintained within acceptable limits during purging, the well may be considered for redevelopment at the discretion of the FOC or Consultant PM. Well redevelopment will be accomplished using standard methods and protocols.

2.3.5.1 LOW-FLOW PURGING PROCEDURES

When placing the pump/tubing in the well to be sampled, lower the pump/tubing with one continuous smooth motion to minimize the disturbance of any sediment that may have accumulated in the well. The water level interface probe may be lowered with the pump/tubing to monitor the depth. The pump should be placed within three feet of the bottom of the screened interval. Do not raise and lower the pump/tubing in the well. It is important to minimize mixing of stagnant borehole water and disturbing sediment which may have collected at the bottom of the well. Secure the pump/tubing at the wellhead when it reaches the appropriate depth.

Set up the water quality meter and flow-through cell:

- Retract the water level interface probe to the top of the water and record the water level. If the water level has not changed significantly (<0.3 feet), the well will likely sustain low-flow sampling. Secure the water level interface probe at the appropriate depth to monitor draw-down as pumping proceeds.
- Record the time and depth to water.
- Begin pumping. Adjust the discharge to a rate that is just high enough to pump water to the surface. Attach the flow through cell and adjust the flow rate as necessary to maintain flow through the cell. The flow rate must be set and maintained constant throughout the purge and sampling process.
- Monitor the flow rate and draw down. The highest flow rate that produces no drawdown is ideal. The flow rate must be less than 500 milliliters per minute and create drawdown of no more than half the length of the submerged screen portion of the well. If the well will not sustain a 40 milliliters per minute purge rate the well will be pumped dry and allowed to recharge for no more than 24 hours before a grab sample is collected via low-flow. The standard suite of water quality parameters will be recorded at the time of sample collection.
- While purging, initially measure and record the stabilization parameters every five minutes. As the readings begin to stabilize, begin recording the parameters every three minutes. The monitoring well will be considered purged when all parameters are stabilized for three consecutive readings. The three readings should be within:
  - 1.5 degrees F for Temperature
  - 3% for specific conductivity
  - 10% for DO
  - 0.1 for pH
  - 10mv ORP
  - Turbidity as low as possible (<10 NTU ideal)

Once stabilization has been confirmed with three consecutive readings, sample collection may begin. All monitoring wells should be purged for a minimum of 30 minutes or one casing volume before sample collection.

2.3.5.2 SPECIFIC CASING VOLUME PURGING PROCEDURES

Wells will be purged prior to sample collection to remove stagnant well water and to ensure that representative samples are collected. Purging of wells will be accomplished using a portable purging system(s), such as a peristaltic and/or submersible pump with discharge hose, or a bailer. If a peristaltic and/or submersible pump is used, it will be powered by portable 12volt DC power source. If bailers are used, they will be pre-cleaned or new, disposable bailers.

Monitoring wells will be purged by removing one to three casing volumes of water from each well. A casing volume is equal to the amount of water present inside the well. To determine the casing volume, the depth-to-water (DTW) (in feet), the total depth (TD) of the well (feet), and the well casing radius (R) (in inches) must be known. To obtain one casing volume (in gallons), apply the following equation:

$$\text{One casing volume (gallons)} = [\pi(R)^2 \times (TD\text{-}DTW) \times (7.48)] / 144$$

Alternatively, for typical well casing diameters, the volume can be determined using the casing factor (CF) (in gallons per linear foot) as shown below:

Well Diameter (inches)	Casing Factor (CF) (gallons/foot)
1	0.04
2	0.17
4	0.65
5	1.0
6	1.5

During the purging procedures, groundwater quality parameters consisting of turbidity, pH, temperature, conductivity, ORP and DO, will be measured every five minutes. Well purging data will be recorded on the groundwater monitoring form.

The well will be sampled after a minimum of one casing volume has been purged and the groundwater quality parameters have stabilized (or five casing volumes have been purged, whichever occurs first). Groundwater quality parameters will be considered stabilized when the results of the last three measurements are within the outlined tolerance range.

2.3.6 GROUNDWATER QUALITY MEASUREMENT EQUIPMENT

Commercially available, field rugged analytical instrumentation will be used to collect field measurements. Measurements will be taken in accordance with manufacturer specifications and guidelines. The instrumentation will meet or exceed applicable state and federal guidelines associated with groundwater sampling.

2.3.7 GROUNDWATER MONITORING WELL SAMPLING PROCEDURES

Groundwater samples obtained during the semi-annual sampling events will be collected using low-flow sampling techniques. The sampler will wear disposable nitrile gloves and will change to new gloves between each monitoring well location. For samples collected for VOC analysis, the pumping rate will be no greater than 100 milliliters per minute to prevent agitation of the water. Sampling will progress from the least contaminated well to the most contaminated well. Otherwise, up-gradient wells will be sampled before down-gradient wells.

Pre-cleaned sample containers will be filled directly from the pump discharge tube or sampling device. Samples will be preserved prior to shipment to the laboratory for analysis. The groundwater sampling suite per well is provided in Table 1-1 and the analytical methods are provided in Table 1-3. COCs, GWPS, and associated detection limits are listed in Table 1-2. Samples will be collected (when applicable) in the following sequence:

- Benzene, Toluene, Ethylbenzene and Xylene (BTEX)
- Semi-Volatile Organic Compounds (SVOCs)
- Metals
- Nitrate, Sulfate, and Methane

Samples collected for dissolved metals analysis (iron and manganese) will be field filtered through a 0.45 µm membrane filter.

2.3.8 SAMPLE CONTAINERS AND PRESERVATIVES

Sample containers for environmental analysis will consist of certified laboratory supplied glass and plastic bottles. Table 1-3 lists the sample containers, preservatives, and holding times for COCs for the semi-annual sampling events. The subcontracted analytical laboratory will supply unpreserved and pre-preserved sample containers and VOC trip blanks as needed to complete the scope.

2.3.9 SAMPLE STORAGE AND TRANSPORTATION

Samples will be shipped in coolers via commercial carrier to the designated analytical laboratory(s). Coolers will be used to store and transport samples prior to shipping. Samples will be placed in an iced cooler as soon as practical after collection. The inside of each cooler will be lined with a plastic commercial grade trash bag to prevent leaking, and samples and sample packing materials will be placed inside the bag. The cooler will also be lined with bubble wrap. Should a drain hole be present on the cooler, it will be sealed with tape. Once the samples are in the cooler double-bagged ice will be placed in the cooler with the samples. A sufficient amount of ice will be added to the coolers to ensure that they arrive at the laboratory at a temperature of 4° Celsius.

The original chain-of-custody record will be placed in a watertight plastic bag and taped to the inside lid of the cooler. The cooler will be secured with shipping tape and custody seals will be affixed to the seal/lip of the cooler lid. The custody seals will be covered with wide, clear adhesive tape. Appropriate shipping labels will be placed on each cooler. These labels should identify the shipper and the laboratory, points of contact, phone numbers and street addresses. Coolers will not be shipped for Saturday delivery unless arrangements have been made with the respective laboratory prior to shipment.

2.3.10 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final files. The Site remediation files, including originals of laboratory reports and groundwater monitoring forms, are maintained in a secure area.

2.3.10.1 CHAIN-OF-CUSTODY PROCEDURES

The Chain-of-Custody document records the history of the sample custody from acquisition to ultimate disposal. Samples collected may be used as legal evidence. As such, the hand-to-hand custody from the point of collection to delivery at the laboratory must be clearly documented.

2.3.10.2 FIELD CUSTODY PROCEDURES

The sample packaging and shipment procedures summarized above are designed to ensure that the samples will arrive at the laboratory with the Chain-of-Custody intact. Field custody procedures include:

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. Field procedures have been designed to limit the handling of the samples to as few people as possible.
- Bottles will be identified using sample labels with unique sample numbers, sampling locations, date/time of collection, and type of analysis.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a groundwater monitoring form notation would explain that a pencil was used to fill out the sample label because the ballpoint pen may not function appropriately under certain freezing weather.
- A properly completed Chain-of-Custody form will accompany the samples. The sample numbers will be listed on the Chain-of-Custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person or to the permanent laboratory.
- Samples will be properly packaged and shipped according to the procedures of this SAP-QAPP.

2.3.10.3 SAMPLE LABELING

Sample containers will be labeled at the time of sampling. Each label will be completed with the required information and then secured to the container to prevent accidental loss or damage from water or mishandling. Required information on the sample label include sample identification number, date, time, and requested analyses. Additionally, any preservatives or special handling instructions will be clearly displayed on the label and the Chain-of-Custody.

2.3.10.4 SAMPLE IDENTIFICATION

Field samples will be identified by monitoring well name. Blind duplicates will be identified by a fictitious sample identification number that does not indicate to the laboratory that the sample is a duplicate (e.g., MW-2008). The blind duplicate identification number will be recorded on the groundwater sampling data sheet and the sampling notebook.

Equipment blanks will be identified as the well ID followed by “EQ BLANK” (e.g., MW-750 EQ BLANK). The equipment blank time, date, and the monitoring wells sampled before and after the collection of the equipment blank will be recorded on the groundwater monitoring form(s).

Field blanks will be identified as “FB” followed by the day of the event (e.g., FB-Day 3).

Trip blanks will be identified as “CG” followed by a unique identification number (e.g., CG-01).

2.3.10.5 FIELD SAMPLING NOTES

Field notes will be recorded on the appropriate groundwater monitoring form and will be completed for each sampling location. The following data will be recorded on the form for each well gauged/sampled:

- Groundwater and LNAPL level measurements
- Groundwater water quality field data

A copy of groundwater monitoring forms with data entries and field notes will be given to the PM after returning from the Site, while the originals will be maintained in the sampling notebook. No one shall remove information from job files, QA files, or the sampling notebook for field use or other use. If copies of previous work are required, then arrangements will be made with the Consultant FOC or Consultant PM to copy a portion of the file.

Groundwater monitoring forms will not be obscured, destroyed, or discarded, even if they contain errors or are illegible. Entries will be described in as much detail as possible so that people going to the Site can reconstruct a particular situation without reliance on memory. Entries will be made in permanent ink, signed, and dated and no erasures made. Corrections will be made by drawing a single line through the error and writing in correct information. The use of white-out, obliterating, or writing directly over the erroneous entry will be prohibited. Corrections will be dated and initialed by the person making the correction.

2.3.10.6 LABORATORY DOCUMENTATION

Workbooks, bench sheets, instrument logbooks, and instrument printouts are used to trace the history of samples through the analytical process and to document and relate important aspects of the work, including the associated quality controls. Logbooks, bench sheets, instrument logs, and instrument printouts are part of the permanent record of the laboratory. Laboratory supervisors will periodically review laboratory notebooks for accuracy, completeness, and compliance with internal QA/QC procedures. Completed workbooks and instrument logbooks will be submitted to the Laboratory QAO (or designee) for storage.

Good laboratory practices require that the following (or equivalent) procedures be used. Each entry will be dated and initialed by the analyst when the record is made. Errors in entry will be crossed out in indelible ink with a single stroke. The use of white-out, obliterating, or writing directly over the erroneous entry will be prohibited. The individual making the correction will initial any corrections.

2.3.10.7 SITE REMEDIATION FILES

The Site remediation file(s) will be the central repository for documents, which constitute evidence relevant to sampling and analysis activities as described in this SAP-QAPP. The Site FOC is the custodian of the remediation file(s) and maintains the contents of files for the investigation, including all relevant records, reports, logs, sampling notebooks, pictures, subcontractor reports and data reviews in a secured, limited access area.

The remediation file(s) may include hard copies or electronic copies of:

- Sampling notebook.
- Field data and data deliverables.
- Photographs.
- Drawings.
- Soil boring logs/well construction logs.
- Laboratory data deliverables.
- Data validation reports.
- Data assessment reports.
- Progress reports, QA reports, project reports, etc.
- Custody documentation (tags, forms, airbills, etc.).

2.3.11 INVESTIGATIVE DERIVED WASTE

Well purge water, redevelopment fluids and decontamination fluids will be containerized and disposed off-site in accordance with the Waste Management Plan (Permit Renewal Application, Section 5 (Part B), Appendix G).

2.4 QUALITY CONTROL REQUIREMENTS

2.4.1 LEVEL OF QUALITY CONTROL EFFORT

Equipment blanks, field blanks, trip blanks, field duplicates, method blanks, laboratory duplicates, laboratory control, and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs.

Equipment blanks are analyzed to check for procedural decontamination at the Site that may cause sample contamination and will be collected if non-dedicated equipment is used for sampling. Equipment blanks will be collected by pouring laboratory-prepared deionized water over or through the sampling equipment and collecting the rinsate in the proper analytical containers. Equipment blanks will be analyzed for the same parameters as the field samples. Equipment blanks are required at a rate of one per 10 investigative samples when non-dedicated equipment is used in sampling procedures.

Field blanks are analyzed to check for procedural sample handling that may cause sample contamination. Field blanks are samples of clean deionized water that are handled (i.e., collected, filtered, and preserved) in the field in the same manner as actual field samples. Field blanks are required at a rate of one per day.

Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage. Trip blanks pertain to samples with volatile organic compounds (VOC) analyses only. Trip blanks are prepared by the laboratory and accompany the sample containers from the laboratory to the field and are kept with the investigative samples throughout the sampling event. They are then packaged for shipment with other samples and sent for analysis. At no time after their preparation will the sample containers be opened before they reach the laboratory. Trip blanks will be submitted for analysis at the rate of one trip blank per shipping container containing samples for VOC analyses.

Blind duplicates are used to assess analytical precision, field precision, and sample homogeneity. Blind duplicates are a second sample collected at the same time and location, under the same conditions as the field sample, and submitted in separate containers with coded sample IDs. Blind duplicate samples will be collected at a rate of one duplicate per 10 investigative samples.

Method blank samples are generated within the laboratory and used to assess contamination resulting from laboratory procedures. Duplicate samples are analyzed to check for sampling and analytical reproducibility. Laboratory control samples provide information on analytical system biases. Matrix spikes provide information about the effect of the sample matrix on the digestion, extraction, and/or measurement methodology. Matrix spikes will be performed in duplicate and are referred to as MS/MSD samples. Additional sample containers will be filled for designated MS and MSD samples.

Samples will be sent to the designated Anadarko-approved analytical laboratory for analysis. Analyses will be completed in accordance with the specified methods. The level of laboratory QC effort for this project and the quantitation limits will be in accordance with the laboratory's SOPs, to be supplied by the contracted laboratory selected to perform the work.

2.4.2 INTERNAL QUALITY CONTROL

The purpose of internal quality control measures is to document the validity of analytical data generated by the laboratory. Laboratory internal quality control may include, but is not limited to, the analysis of blanks, reference standards, analytical spikes, and surrogate spikes. Every analytical series will include some of these controls depending on the analytical methods used. The internal quality controls used by the laboratory will be combined so they are completely representative of every aspect of the analytical task from sample preparation to sample analysis.

The following sections present a summary of, and suggested frequencies for, various quality control measures that may be used dependent upon the analytical method(s) selected.

2.4.2.1 BLANK SAMPLES

Blanks are used to assess contamination introduced in transit, storage, or in the laboratory. The types and frequencies of laboratory blank samples are specified by the analytical methods used for analysis.

Method Blanks

Method blanks identify sources of contamination throughout the analytical process, whether a contribution of specific analytes or a source of interference, which will need to be identified, isolated, and corrected. To accomplish this, the method blank must be initiated at the beginning of the analytical process and include various aspects of the analytical work. This includes glassware, reagents, and instrumentation, as well as any other possible source of contamination. Method blanks will meet the criteria specified in the subcontracted laboratory's SOPs or the analytical method.

Instrument Blanks

Instrument blanks are analyzed after a sample or dilution has run which contains a target compound at a concentration greater than 25 ug/l, a non-target compound at a concentration greater than 100 ug/l or saturated ions from a compound (excluding compound peaks in the solvent front). The results of the instrument blank analysis indicate whether there is residual contamination in the instrument from a previous sample.

2.4.2.2 ANALYTICAL SPIKES

The purpose of an analytical spike is to assess the efficiency and proficiency of an analytical series. This includes quantitation standards, sample preparation, instrument set-up, and the premises inherent in quantitation. This control reflects the competency of sample analysis within an analytical series. Matrix and surrogate spikes may also indicate influence of sample matrix interferences that are not within the control of the analyst. The types and frequencies of analytical spikes are specified by the analytical methods used for analysis.

Laboratory Control Spikes

The LCS is a matrix interference-free blank sample that is spiked with known and verified concentrations of the analytes being measured. The LCS is processed through the same preparation and analytical steps, and the recoveries of the spiked analytes obtained are used to assess the accuracy of the analytical system.

Matrix Spike

Within an analytical series, a representative sample portion is designated as a separate sample and spiked with known concentrations of the analytes under consideration. The advantages of spikes are that the spiked portion is handled and prepared in exactly the same way as the samples. Sample related interference affecting analysis would be reflected in the results from the spiked sample. Results of spikes exceeding tolerances specified by the analytical methods need to be evaluated thoroughly in conjunction with other measures of control.

Surrogate Spike

Surrogates, which have properties similar to the analytes of interest, are compounds unlikely to be found in nature. The intent of a surrogate spike is to provide broader insight into the proficiency and efficiency of an analytical method on a sample specific basis. This control reflects analytical conditions, which may not be attributable to the sample matrix. If results of a surrogate spike analysis exceed method-specified tolerances, then the analytical results need to be evaluated thoroughly in conjunction with other control measures. Re-analysis of the sample with additional controls, or different analytical methodologies, will be necessary.

2.4.2.3 REPLICATE ANALYSIS

Replicate analysis is a measure of analytical precision and can be limited in its scope. If used in conjunction with reference standards or analytical spikes, it can measure the reliability of the analytical systems. Replicate analyses can be significant in the interpretation of analytical results for samples with complex matrices.

2.4.2.4 CALIBRATION CHECK STANDARDS

The purpose of a calibration check standard is to assess an instrument's stability. A calibration check standard will be analyzed at the beginning and end of an analytical series or periodically throughout large series of samples. Calibration check standards will be run after every twelve hours. In analyses where internal standards are used, a calibration check standard needs only be run at the beginning of an analytical series. If results of the calibration check standard exceed method specified tolerances, then samples analyzed since the last acceptable calibration check standard will be re-analyzed.

2.4.2.5 INTERNAL STANDARDS

Internal standards will be monitored when required by the analytical method. The internal standard is present in the samples to be analyzed with the exception of performance standards. The standard responses must meet the criteria stipulated in the analytical method. If internal standard areas in one or more samples exceed the specified tolerances, then the instrument will be re- calibrated, and all affected samples re-analyzed.

2.4.3 SAMPLING QUALITY CONTROL

Several sampling quality control measures will be necessary to assess the integrity of samples collected and determine if the QA objectives discussed in this SAP-QAPP are being met. These measures include the use of field duplicate samples, equipment blanks, field blanks, and trip blanks to locate possible sources of sample contamination.

2.5 INSTRUMENT CALIBRATION AND MAINTENANCE REQUIREMENTS

2.5.1 FIELD INSTRUMENT CALIBRATION AND PREVENTATIVE MAINTENANCE

Field equipment for this project may include multi-parameter meters (i.e., temperature, pH conductivity meters, DO, ORP, etc.), turbidimeters, and other monitoring equipment, as needed. Specific preventative maintenance procedures to be followed for field equipment are those recommended by the manufacturer. Field instruments will be calibrated daily before use, and checked as field conditions necessitate throughout the day. Initial calibration and calibration checks will be documented in the calibration notebook.

2.5.2 LABORATORY INSTRUMENT PREVENTATIVE MAINTENANCE

As part of the QA Program Plan, a routine preventative maintenance program is conducted by the analytical subcontractor to minimize the occurrence of instrument failure and other system malfunctions. Designated laboratory employees regularly perform routine scheduled maintenance and repair of (or coordinate with the vendor for the repair of) all instruments. Maintenance that is performed is documented within the laboratory's operating record. Laboratory instruments are maintained in accordance with manufacturer's specifications and the requirements of the specific method employed. This maintenance is carried out on a regular, scheduled basis and is documented for each instrument service logbook.

2.5.3 LABORATORY INSTRUMENTATION CALIBRATION PROCEDURES

Calibration procedures for a specific laboratory instrument will consist of initial five-point calibration, initial calibration verification and continuing calibration verification. The selected analytical subcontractor will provide SOPs describing the calibration procedures for each specific laboratory instrument, including their frequency, acceptance criteria, and the conditions that will require recalibration. Laboratory instrumentation calibration procedures will meet the requirements of the appropriate Method.

2.5.4 FIELD AND LABORATORY CONSUMABLES

An adequate supply of supplies and consumables will be available for field and laboratory work. Supplies will be inspected prior to use to ensure that they are free from visible debris and defects. Sampling equipment and analytical supplies will be subject to the various QC measures (i.e., equipment blanks and method blanks) previously discussed. Any unacceptable supplies or consumables will be discarded and replaced with an acceptable item.

2.6 DATA MANAGEMENT

2.6.1 SAMPLE DOCUMENTATION

Sample documents will be legibly written in ink. Any corrections or revisions to sample documentation shall be made by drawing a single line through the error, writing in the correct information, and initialing any changes. The following sections are provided to outline sample documentation procedures that will be employed when conducting the semi-annual groundwater sampling activities.

2.6.2 FIELD DATA NOTES

Field notes will be recorded on the groundwater monitoring form using indelible ink. Copies of the documentation will be provided to the Consultant PM as necessary. Sampling notebooks or groundwater monitoring forms will not be obscured, destroyed, or discarded, even if it contains errors or is illegible. Corrections will be made by drawing a single line through the error, writing in the correct information, and initialing any changes. Corrections will be dated and initialed by the person making the correction.

2.6.3 LABORATORY DATA REDUCTION, REVIEW AND REPORTING

2.6.3.1 DATA REDUCTION

Analytical results will be reduced to the concentration units using the equations specified in the analytical procedure. Senior laboratory staff will check the calculations.

2.6.3.2 DATA REVIEW

Each laboratory section will provide extensive data review prior to reporting results. In general, there are three levels of data review.

The analyst will be responsible for primary review of data generated from sample analysis. If recoveries of the quality control samples are within the method-specified tolerances, then the data will be presented to data review groups for secondary review. If recoveries of any quality control samples exceed specified tolerances, affected samples will be re-analyzed as required by the method.

Data review groups will conduct secondary review to determine if the analytical results are acceptable. If recoveries of the quality control samples are within the method specified tolerances, then the data will be presented to the Laboratory PM for final review. If recoveries of quality control samples exceed the specified tolerances, affected samples will be submitted for re-analysis as required by the method.

Final review of analytical results will consist of the Laboratory Director's determination that the analytical results of a sample(s) are consistent. If so, the data will be presented in a final report. If discrepancies or deficiencies exist in the analytical results, corrective action will be taken. Audits of final reports by the Laboratory QAO may be conducted to determine the precision, accuracy, completeness, and representativeness of sample analyses.

2.6.3.3 DATA REPORTING

Data reporting will be in accordance with the appropriate method used for analysis and will be prepared in a standard deliverable. Laboratory reports shall include the following:

- Narrative including statement of samples received, sample condition upon receipt, description and rationale for any deviations from approved methods/SOPs, summary of data quality, and documentation of any significant problems encountered during analysis.
- Documentation of laboratory events including date/times of sample receipt, sample preparation or extraction, and sample analysis.
- Analytical data including method reference, results, reporting limits, dilutions, etc.
- A summary of QA/QC results, control limits, and supporting documentation as requested.
- A copy of the signed Chain-of-Custody for samples submitted for analysis.

The Laboratory QAO and/or the Laboratory Director should sign the laboratory reports prior to issue. Reports will be issued to the Consultant PM and Consultant QAO.

2.6.4 CORRECTIVE ACTION

Corrective actions may be required for either analytical and equipment problems or non-compliance problems. Analytical and equipment problems may occur during sampling and sample handling, sample preparation, laboratory analysis, and data review. Non-compliance problems are often associated with non-conformance to this plan or the analytical methods being used.

2.6.4.1 LABORATORY CORRECTIVE ACTION

When deficiencies or "out-of-control" situations exist, the laboratory will provide a means of detecting and correcting these situations. An "out-of-control" situation is defined as data exceeding control limits. Samples analyzed during "out-of-control" situations will be re-analyzed prior to reporting results. The laboratory's corrective action procedures are documented in their QAM and method specific SOPs. In general, there are several levels of "out-of-control" situations that may occur in the laboratory during analysis.

2.6.4.2 BENCH LEVEL

Corrective action procedures will often be handled at the bench level. If an analyst finds a non-linear response during calibration of an instrument, then the instrument will be recalibrated before sample analysis. The problem may be corrected by a careful examination of the preparation or extraction procedure, spike and calibration mixes, or instrument sensitivity. If the problem persists, it will be brought to the management level.

2.6.4.3 MANAGEMENT LEVEL

If resolution at the bench level was not achieved, or a deficiency is detected after the data has left the bench level, then corrective action becomes the responsibility of the Laboratory PM or Laboratory Director. Unacceptable laboratory control, matrix, or surrogate spike recoveries detected by data review will be reported to the Laboratory QAO. A decision to re-analyze the sample or report results will be made depending on the circumstance.

2.6.4.4 RECEIVING LEVEL

If discrepancies exist in either the documentation of a sample or its container, a decision will be made after consulting with the appropriate management personnel. Decisions will be fully documented. Some examples of container discrepancies are broken samples, inappropriate containers, or improper preservation. In these cases, corrective action will involve the Laboratory PM contacting the Consultant PM and/or Consultant QAO.

2.6.4.5 FIELD CORRECTIVE ACTION

Corrective actions for field equipment problems will consist of reporting the problem to the Consultant FOC and/or the Consultant PM so that maintenance can be performed, or new equipment can be acquired. Non-compliance problems will be reported immediately to the Consultant QAO. The Consultant QAO will consult with the Consultant PM and corrective actions will be initiated. Corrective actions may include resampling when necessary to meet the data objectives. The nature, extent, and corrective action for non-compliances will be documented.

2.6.5 QUALITY ASSURANCE REPORTS TO MANAGEMENT

2.6.5.1 LABORATORY INTERNAL REPORTING

The Laboratory QAO will report the status of the laboratory QA/QC program to the laboratory management. Each report should include:

- Periodic assessment of measurement data accuracy, precision, and completeness.

- Results of audits.
- Significant QA/QC problems and recommended solutions.
- Resolutions of previously stated problems.

The laboratory will determine the content and frequency of these reports in accordance with its QAM or SOPs. The laboratory will report to the Consultant QAO or Consultant PM if the laboratory's internal quality control issues have affected the results of the samples.

2.6.5.2 ADDITIONAL REPORTING

Laboratory analytical reports will include a summary of the quality assurance activities and quality control data for the project as related to sample analysis. The Laboratory PM will report suspected field QA/QC problems to the Consultant QAO. The Consultant QAO will report to the Consultant PM when appropriate. These reports may be either oral or written depending upon the nature and complexity of the issues in the report. The Consultant QAO will report any known issues potentially affecting the quality of the analytical or field data to the Consultant PM. The Consultant PM is responsible for further dissemination of these reports.

2.6.6 DATA MANAGEMENT

The raw data obtained during field activities will be recorded on the appropriate field forms or in dedicated sampling notebooks. This data will become part of the project files to be maintained as previously described in this SAP-QAPP. The analytical subcontractor will maintain all raw data for a minimum of seven (7) years. The analytical subcontractor will not destroy any data or records without the consent of the Environmental Consultant or Anadarko.

3.0 ASSESSMENT AND OVERSIGHT

3.1 PERFORMANCE AND SYSTEM AUDITS

Performance and system audits of both field and laboratory activities may be conducted to verify that sampling and analysis are performed within the constraints of this plan. These audits can either be conducted internally by field or laboratory staff or externally by Anadarko or state or federal agencies. The laboratory should participate in any performance or system audit conducted or requested by Anadarko or the ODEQ.

3.1.1 PERFORMANCE AUDITS

Performance audits may be conducted periodically to determine the accuracy of the total measurement system(s) or components. In this program, blind performance evaluation samples, submitted by state agencies, are analyzed and evaluated throughout the year as part of an on-going participation in their certification programs. Any deficiencies in the results of these analyses are reported to the laboratory and corrective action is initiated.

In addition to blind sample analyses, the laboratory will also participate in any audits from state and federal agencies. These agencies submit a report noting any deficiencies and necessary corrective action. The laboratory will respond with evidence of compliance within a limited time.

The laboratory also maintains a schedule of internal audits whereby the Laboratory QAO audits each section of the laboratory. When the audit is completed, a formal report will be issued to the Laboratory Director. This report shall note any deficiencies and a follow-up date to confirm corrective action.

3.1.2 SYSTEM AUDITS

A system audit is an evaluation of the various components of the measurement system to assess their proper selection and use. This includes a careful evaluation of all laboratory quality control measures. System audits will be conducted internally by the laboratory.

3.1.3 FIELD AUDITS

Anadarko or the Environmental Consultant may conduct internal audits of field activities involving sampling and measurements. These audits may include a thorough examination of field sampling records, field instrument operating records, sample collection, shipping and handling, Chain-of-Custody, etc. These audits may occur at the discretion of

Anadarko or the Consultant PM, at the beginning of the project, or when new or modified sampling procedures are introduced to verify that the established procedures are followed. Follow-up audits will be conducted to correct deficiencies and to verify the QA/QC procedures are being maintained. Additionally, audits will occur periodically throughout the monitoring period, especially when changes to sampling teams or subcontractors are implemented. When an audit is completed, a written report will be submitted to the Consultant PM and Anadarko.

Consultant personnel will participate in any external audit requested by regulatory agencies. The results and recommendations or any external audit should be reported to the Consultant QAO and/or Consultant PM in a timely manner so that corrective actions may be initiated.

3.2 REPORTS

3.2.1 INTERNAL REPORTING

Written reports of field audits will be issued to the Consultant PM. The Consultant PM is responsible for further dissemination of these reports.

The Laboratory QAO (or designees) will report the status of the laboratory QA/QC program to the laboratory management. Each report should include:

- Periodic assessment of measurement data accuracy, precision, and completeness
- Results of audits
- Significant QA/QC problems and recommended solutions
- Resolutions of previously stated problems

The laboratory will determine the content and frequency of these reports in accordance with its QAM and its SOPs. The laboratory will report to the Consultant QAO or Consultant PM if the laboratory's internal quality control issues have affected the results of the Consultant's samples.

3.2.2 ADDITIONAL REPORTING

Laboratory analytical reports will include a summary of the quality assurance activities and quality control data for the project as related to sample analysis. The Laboratory PM will report suspected field QA/QC problems to the Consultant QAO or Consultant PM.

4.0 DATA REDUCTION, VERIFICATION, VALIDATION, AND REPORTING

The quality of field and analytical data must be assessed to ensure that these data are being properly used. In order to support the conclusions of the assessment, data must meet the DQOs identified in Section 1.4. Data generated through field activities or by the laboratory operation shall be reduced, verified, and validated prior to reporting. Data shall not be disseminated until it has been subjected to these procedures, which are summarized in subsections below.

4.1 REVIEW OF FIELD DATA

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. Only direct-read instrumentation will be employed in the field. Field data will be written into the groundwater monitoring form(s) immediately after measurements are taken. If corrections are required, the error will be legibly crossed out with a single line and the correction will be made in a space adjacent to the original. Corrections will be initialed and dated by the individual making the correction. Later, when the results calculation forms required for the semi-annual sampling events are being filled out (i.e., corrected LNAPL thicknesses, groundwater elevations, etc.), the FOC will review the forms to determine whether any errors have been made.

4.2 DATA VALIDATION

Data verification is the process of checking the completeness, correctness, and compliance of data with the field and analytical methods, SOPs, and this SAP-QAPP. Data validation is the process of assessing overall data quality with respect to the PARCC parameters. Data verification and validation procedures shall be performed for both field and laboratory operations as described below.

4.2.1 PROCEDURES USED TO VERIFY AND VALIDATE FIELD DATA

The Consultant PM or designee will verify all data generated during field activities. Data verification will consist of reviewing field data and documentation for transcription errors. Any data that is entered into project databases, spreadsheets, drawings, etc. will be checked against the original field measurements. Field custody records will be checked against the work plan to determine that the appropriate samples were collected. Similarly, the custody records will be checked against the analytical data generated by the laboratory to determine that requested analyses were complete.

Field measurements will be validated under the direction of the Consultant QAO according to the PARCC parameters. Additionally, the analytical results of field QC samples will be evaluated to determine that the field investigation and sampling methods employed meet the PARCC requirements. Any identified non-compliant data will be evaluated to determine the potential effect on overall validity and usability of the data generated. If the data is determined not suitable for its intended purpose it will not be used and new data may be collected.

4.2.2 PROCEDURES USED TO VERIFY AND VALIDATE LABORATORY DATA

The analytical subcontractor generating the data will perform initial data verification and validation in accordance with individual methods and the laboratory's QA/QC program prior to reporting any analytical results. Data validation on the final analytical data reported by the analytical subcontractor will be performed in accordance with individual methods and national guidelines. Data validation on the final analytical data will be performed by either the Consultant QAO or a designee.

Data verification and validation is the process through which proper quantification, recording, transcription, and calculations are confirmed. It also confirms that the data is reasonable and complete. The process should be such that errors are minimized and that corrective action steps are taken when errors are detected. The laboratory's data verification and validation processes include three steps: primary, secondary, and final review. The independent data validation is conducted by the Consultant QAO or designee after the laboratory data review process is completed.

4.2.2.1 PRIMARY REVIEW

The analyst performs the initial review of the data. The analyst is responsible for verifying the correctness of the data entered into the Laboratory Information Management System (LIMS). This review includes, but is not limited to, verifying that the quality control indicators (QCI) meet protocol criteria, calibration criteria are met, appropriate detection limits were used, and data was reduced correctly and that any corrective action was documented properly. The primary reviewer is responsible for verifying any documentation associated with the data, completing review records associated with the process, and compiling QC Reports. The analyst must perform primary review on 100% of the data generated.

4.2.2.2 SECONDARY REVIEW

The Laboratory QAO or designee can be responsible for a secondary review of the data. This step is intended as a validation of the primary review. Secondary review focuses on the calibration criteria, QCIs, compound identification, results expression, reporting limits, and level of documentation. Approximately 10% of the data is validated. If problems exist during this review, the data is returned, a 100% review is done, and corrective action is performed as appropriate.

4.2.2.3 FINAL REVIEW

The Laboratory PM must review the completed project before releasing the final report. This review ensures that the client requirements have been met and that the final report has been properly completed. The process includes verifying that chemical relationships are evaluated, Chain-of-Custody is completed, cover letters/ narratives are present, flags are appropriate, and project specific requirements are met.

4.2.2.4 DATA VALIDATION

The Consultant QAO or designee will review the analytical data package and will provide independent validation of the laboratory data according to method and/or regulatory protocols. The basis for validation will be the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Data Review (most current versions for both organic and inorganic data), modified to accommodate the criteria in the analytical methods reported. Final data qualifiers may be assigned to the original laboratory data reported as a result of the independent validation effort.

4.2.3 LABORATORY DATA REPORTING

After the laboratory has verified and validated the analytical data it will be reported to the Consultant's QAO. The laboratory reports will consist of:

- A summary page referencing the laboratories sample number, client sample number, date/time collected, and date/time received for each sample submitted.
- Analytical results for each sample documenting the results, QC flags, units, chronology of analytical events, reporting limits, analyst, dilutions, and method references. Surrogate recoveries and other QC data (as appropriate) are also reported along with the appropriate control limits.
- Definitions of quality control flags used in report.
- Notes and comments of any identified QC problems or concerns that potentially affect the quality of the data generated.
- Copy of the completed Chain-of-Custody record and sample receipt temperature and condition.

Data will also be received electronically from the laboratory in the approved format and uploaded to the project database. These data will be double checked against the hardcopy reports for accuracy and completeness. Final qualifiers assigned during the independent data validation process will also be checked. After being double checked, the data will be tabulated for subsequent presentation for reporting purposes.

The original laboratory data received by the Consultant QAO will be maintained in the QA files after the review process is completed. The Consultant QAO will give a copy of laboratory data to the Consultant PM after review. No one shall, at any time, remove information from job files, QA files, or the project notebook for field use or other use. If additional copies of laboratory data are required, then arrangements will be made with the Consultant's QAO to copy a portion of the file. Job files, QA files, and project notebooks will be kept at the Consultant's office for a period of ten (10) years, after that they will be moved to a secure location.

4.3 RECONCILIATION WITH USER REQUIREMENTS

Data collected during the semi-annual sampling events will be used to evaluate the current conditions of the dissolved phase and LNAPL plumes beneath the Site. These data will be reconciled with the DQOs and PARCC parameters. Specifically, these data will be qualitatively and quantitatively assessed to determine that appropriate sample collection and analytical procedures were used. These assessments will include:

- Determination of adherence to applicable SOPs.
- Determination that samples were collected from the proposed sample locations.
- Evaluation of detection limits, matrix interferences, and other factors potentially biasing data.
- Evaluation of the data verification results.
- Evaluation of qualified data for environmental assessment purposes.
- Determination that the DQO procedures followed and/or refined during the investigation.
- Determination if there are any data gaps identified that need further evaluation.

5.0 REFERENCES

A variety of technical manuals, administrative documents, and publications were referred to in preparing this document. Some of the references consulted are presented below. Referenced documents and publications may or may not have been reviewed in their entirety.

Anadarko E&P Onshore LLC. RCRA Post-Closure and Corrective Action Permit Renewal Application. October 20, 2023.

USEPA. Contract Laboratory Program, National Guidelines for Data Review. January 2017.

TABLES

TABLE 1-1. GROUNDWATER MONITORING WELL NETWORK
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Well ID	Proximity to SWMU Group	Designation	Status	Gauging Frequency	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual Routine Analyte/COC 4th Quarter
LW-1	1	LTU	Mon	Semiannual	BTEX, Chrysene, Phenol, total Lead, total Chromium, Arsenic	
LW-2	1	LTU	Mon	Semiannual	BTEX, Chrysene, Phenol, total Lead, total Chromium	
LW-3	1	LTU	Mon	Semiannual	BTEX, Chrysene, Phenol, total Lead, total Chromium	
LW-4	1	LTU	Mon	Semiannual	BTEX, Chrysene, Phenol, total Lead, total Chromium	
LW-5R	1	LTU	Mon	Semiannual	BTEX, Chrysene, Phenol, total Lead, total Chromium	
LW-6	1	POC	Mon	Semiannual	BTEX	
LW-7RR	1	LTU	Mon	Semiannual	BTEX, Chrysene, Phenol, total Lead, total Chromium	
MW-2			LNAPL	Semiannual		
MW-3AR	3	Trendline	Mon	Semiannual	BTEX	
MW-3BR	3		Mon	Semiannual	BTEX	
MW-4	3		LNAPL	Semiannual		
MW-7			LNAPL	Semiannual		
MW-8			LNAPL	Semiannual		
MW-10			LNAPL	Semiannual		
MW-109		Trendline	Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-110	3A, 9	Trendline	Mon	Semiannual	BTEX	
MW-111	3A, 9	POC	Mon	Semiannual	BTEX, Arsenic	
MW-112	3A, 9		Mon	Semiannual	BTEX, Arsenic	
MW-113	2		LNAPL NSZD	Semiannual		BTEX; Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-114			LNAPL	Semiannual		
MW-115			Mon	Semiannual	BTEX, Arsenic	
MW-203			LNAPL	Semiannual		
MW-211			LNAPL	Semiannual		
MW-213			LNAPL	Semiannual		
MW-215			LNAPL	Semiannual		
MW-216			LNAPL	Semiannual		
MW-301			LNAPL	Semiannual		
MW-305			LNAPL	Semiannual		
MW-311			LNAPL	Semiannual		
MW-315	5		LNAPL NSZD	Semiannual		BTEX; Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-401			LNAPL	Semiannual		

**TABLE 1-1. GROUNDWATER MONITORING WELL NETWORK
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA**

Well ID	Proximity to SWMU Group	Designation	Status	Gauging Frequency	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual Routine Analyte/COC 4th Quarter
MW-403			LNAPL	Semiannual		
MW-404	7		LNAPL	Semiannual		
MW-405			LNAPL	Semiannual		
MW-413	8		LNAPL	Semiannual		
MW-414		POC	Mon	Semiannual	BTEX	
MW-419R			Mon	Semiannual	BTEX, Arsenic	
MW-420	8		LNAPL	Semiannual		
MW-424			LNAPL	Semiannual		
MW-430	5		LNAPL	Semiannual		
MW-432	5		LNAPL	Semiannual		
MW-434S		POC	Mon	Semiannual	BTEX	
MW-435SR		POC	Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-437			LNAPL	Semiannual		
MW-439			LNAPL	Semiannual		
MW-440	8		LNAPL	Semiannual		
MW-443			LNAPL	Semiannual		
MW-444			LNAPL	Semiannual		
MW-445			LNAPL	Semiannual		
MW-446			LNAPL	Semiannual		
MW-447			LNAPL	Semiannual		
MW-448			LNAPL	Semiannual		
MW-449			LNAPL	Semiannual		
MW-450		POC	Mon NSZD	Semiannual	BTEX, Arsenic	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-451			LNAPL	Semiannual		
MW-452			LNAPL	Semiannual		
MW-454		Trendline	LNAPL NSZD	Semiannual		BTEX (NSZD geochem only); Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-456			LNAPL	Semiannual		
MW-457			LNAPL	Semiannual		
MW-458			LNAPL	Semiannual		
MW-459			LNAPL NSZD	Semiannual		BTEX; Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-460			LNAPL	Semiannual		

TABLE 1-1. GROUNDWATER MONITORING WELL NETWORK
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Well ID	Proximity to SWMU Group	Designation	Status	Gauging Frequency	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual Routine Analyte/COC 4th Quarter
MW-461	3		Mon NSZD	Semiannual	BTEX, Arsenic	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-463			LNAPL NSZD	Semiannual		BTEX (NSZD geochem only); Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-464			LNAPL	Semiannual		
MW-466			LNAPL	Semiannual		
MW-469			LNAPL	Semiannual		
MW-471			LNAPL	Semiannual		
MW-473			LNAPL	Semiannual		
MW-474			LNAPL	Semiannual		
MW-475			LNAPL	Semiannual		
MW-476			LNAPL	Semiannual		
MW-477			LNAPL	Semiannual		
MW-478			LNAPL	Semiannual		
MW-480			LNAPL	Semiannual		
MW-482			LNAPL	Semiannual		
MW-483			LNAPL	Semiannual		
MW-486			LNAPL	Semiannual		
MW-601		POC	Mon	Semiannual	BTEX	
MW-603			LNAPL	Semiannual		
MW-604			LNAPL	Semiannual		
MW-605	3	Trendline	Mon	Semiannual	BTEX, Arsenic	
MW-606			LNAPL	Semiannual		
MW-607			LNAPL	Semiannual		
MW-608			Mon	Semiannual	BTEX, Arsenic	
MW-609		Trendline	Mon	Semiannual	BTEX, Arsenic	
MW-610		Trendline	Mon	Semiannual	BTEX, Arsenic	
MW-611	3		Mon	Semiannual	BTEX	
MW-613		POC	Mon	Semiannual	BTEX	
MW-614			LNAPL	Semiannual		
MW-615			Mon	Semiannual	BTEX, Arsenic	
MW-616			Mon	Semiannual	BTEX, Arsenic	
MW-617		Trendline	Mon	Semiannual	BTEX, Arsenic	
MW-618A			Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-619A			Mon	Semiannual	BTEX	

TABLE 1-1. GROUNDWATER MONITORING WELL NETWORK
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Well ID	Proximity to SWMU Group	Designation	Status	Gauging Frequency	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual Routine Analyte/COC 4th Quarter
MW-620			Mon	Semiannual	BTEX	
MW-622A			Mon	Semiannual	BTEX	
MW-623			Mon	Semiannual	BTEX, Arsenic	
MW-624			Mon	Semiannual	BTEX, Arsenic	
MW-625		POC	Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-626A			Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-627A		Trendline	Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-628A			Mon	Semiannual	BTEX	
MW-729			Mon	Semiannual	BTEX	
MW-731		Trendline	Mon	Semiannual	BTEX	
MW-733			Mon	Semiannual	BTEX, Arsenic	
MW-734			Mon	Semiannual	BTEX, Arsenic	
MW-735			Mon	Semiannual	BTEX, Arsenic	
MW-736		POC	Mon	Semiannual	BTEX, Arsenic	
MW-737		POC	Mon	Semiannual	BTEX	
MW-738			Mon	Semiannual	BTEX, Arsenic	
MW-739		POC	Mon	Semiannual	BTEX, Arsenic	
MW-742		POC	Mon	Semiannual	BTEX, Arsenic	
MW-743			Mon	Semiannual	BTEX	
MW-744			Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-745		POC	Mon	Semiannual	BTEX, Arsenic	
MW-746	3	POC	Mon	Semiannual	BTEX	
MW-747			Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-748B		POC	Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-749		POC	Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane

TABLE 1-1. GROUNDWATER MONITORING WELL NETWORK
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Well ID	Proximity to SWMU Group	Designation	Status	Gauging Frequency	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual Routine Analyte/COC 4th Quarter
MW-750		POC	Mon NSZD	Semiannual	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane
MW-751		POC	Mon	Semiannual	BTEX	
PZ-1			LNAPL	Semiannual		
R-56			LNAPL	Semiannual		
R-76			LNAPL	Semiannual		
TW-1			LNAPL	Semiannual		
TW-6			LNAPL	Semiannual		

Wells Proposed for Removal from Groundwater Monitoring Program

Well ID	In Proximity to SWMU Group	Current Designation	Current Status	Gauging Frequency	Current Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual Routine Analyte/COC 4th Quarter
MW-409		--	Mon	Semiannual	BTEX	--
MW-612R		Sentry	Det	Semiannual	BTEX	--
MW-730		--	Mon	Semiannual	BTEX	--
MW-740		Sentry	Det	Semiannual	BTEX, Arsenic	--
MW-741		--	Det	Semiannual	BTEX	--
MW-748A		POC	Det	Semiannual	BTEX	--

Notes:
POC = Point of Compliance Well
Trendline = benzene concentration trendlines will be run on these wells
Mon = Monitoring Well - gauge and sample
LNAPL = Light Non-Aqueous Phase Liquids - gauge (LNAPL was previously refered to as SPH - separate phase hydrocarbons)
MW-113 is only sampled annually for NSZD

Analytical Methods:
BTEX - EPA Method 8260C
Arsenic, Lead, and Chromium (totals) - EPA Method 6020A

TABLE 1-2. GROUNDWATER PROTECTION STANDARDS AND LABORATORY ANALYTICAL LIMITS
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

CONSTITUENT	GWPS (mg/L)	SOURCE	APPLICABLE SWMU	ALS-Houston PQL (mg/L)	ALS-Houston MDL (mg/L)
Benzene	0.005	MCL	sitewide	0.001	0.0002
Ethylbenzene	0.7	MCL	sitewide	0.001	0.0003
Toluene	1	MCL	sitewide	0.001	0.0002
Xylene	10	MCL	sitewide	0.001	0.0003
Arsenic	0.01	MCL	sitewide	0.002	0.0004
Chromium	0.1	MCL	LTU	0.004	0.0004
Chrysene	0.0025	tap water	LTU	0.0001	0.000021
Lead (total)	0.15	MCL	LTU	0.002	0.0006
Phenol	58	tap water	LTU	0.0002	0.000035

NOTES:
GWPS - groundwater protection standard
mg/L - milligram per liter
SWMU - solid waste management unit
MCL - federal maximum contaminant level
LTU - land treament unit
tap water - value from 2023 USEPA Regoinal Screening Levels (target cancer risk of 1E-05 and target hazard
ALS-Houston - analytical laboratory
PQL - practical quantitation limit
MDL - method detection limit

**TABLE 1-3. GROUNDWATER FIELD PARAMETERS AND LABORATORY ANALYSIS
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA**

Parameter	Container/Minimum Sample Volume	Holding Time	Preservation	Method
Water (Groundwater, Wastewater, Trip Blanks, Rinsate Blanks)				
VOC	3 X 40 mL Vial with PTFE septa cap	14 days to analysis	HCl to pH < 2 4°C with no headspace	BTEX - SW-8260C
SVOC	2 X 1L AG	7 days to extraction; 40 days to analysis	NP, 4°C	Chrysene and Phenol - SW-8270D
Metals	1 X 120 mL HDPE bottle	6 months, except for Mercury (28) days	HNO3 to pH < 2 4°C	Arsenic, Lead, Chromium (total) Iron, Manganese (dissolved) SW-6020A
Methane	3 X 40 mL Vial with PTFE septa cap	14 days to analysis	HCl to pH < 2 4°C with no headspace	RSK-175
Nitrate (as Nitrogen)	1x120 mL HDPE	48 hours to analysis	NP, 4°C	EPA-300
Sulfate		28 days to analysis	NP, 4°C	EPA-300

Field Parameters	Acroynms
pH (std. units)	°C- degrees Celsius
Specific Conductance (mS/cm)	mL - milliliter
Temp (°F)	L - liter
DO (mg/L	VOC - volatile organic compound
ORP (mV)	SVOC - semi-volatile organic compound
Turbidity (NTU)	BTEX - Benzene, Toluene, Ethylbenzene, Xylenes (total)
	SW- Solid Waste

**Container type codes: PTFE: Polytetrafluoroethylene, AG: Glass Amber, HDPE: High density polythylene, Vial: VOA Vial
Preservation codes: NP: No Preservative, HCl: Hydrochloric acid, HNO3: Nitric acid
Sulfuric acid, MeOH: Methanol, ZnAc2: Zinc Acetate, Na2S203: Sodium thiosulfate**

FIGURE

Figure 1-1

Groundwater Monitoring Well Network
Former Champlin Refinery, Enid, Oklahoma

Date: October 2023

APPENDIX A

GROUNDWATER MONITORING FORM

GROUNDWATER MONITORING FORM
ANADARKO - FORMER CHAMPLIN REFINERY FACILITY

Project Name:	**Anadarko - Former Champlin Refinery Facility Groundwater Monitoring - Sitewide/LTF Wells**			**Well No:**	
Measuring Point:	☐ TOC ☐ Other	Other Measuring Point		**Geographic Region:**	
Casing Diameter :			inches	**Sample Date:**	MM-DD-YYYY
Total Well Depth/Measured Well Depth:	00.00	00.00	feet	**Time Arrived:**	HH : MM
Depth to Product (Below TOC):	00.00		N/A	**Calculated Purge Amount:**	00.00
Depth to Groundwater (Below TOC):	00.00		N/A	**Site Conditions:**	Wind Direction
Protective Casing in Good Condition:	☐ Yes ☐ No	N/A	**Inner Casing in Good Condition:** ☐ Yes ☐ No	Wind Speed(mph) 00.00	
Well Locked:	☐ Yes	☐ No	☐ No Lock	Ambient Temperature °F	
Well IDed:	☐ Yes	☐ No	☐ Needs Replacing	00.00	
Method of Well Purge:	☐ Submersible Pump	☐ Waterra System	☐ Bailer	☐ Sunny ☐ Cloudy	00.00
Type:	☐ PVC	☐ HDPE (Disposable)		☐ Windy ☐ Precipitation	
Sampling Collection Method:	☐ Submersible Pump	☐ Waterra System	☐ Bailer	**Sample Collected:** ☐ TSS ☐ TDS	
Type:	☐ PVC	☐ HDPE (Disposable)		☐ BTEX ☐ T.Metals ☐ Dis.Metals	
Concrete Pad in Good Condition:	☐ Yes	☐ No	☐ No Pad	☐ Gen Chem ☐ Nutrients ☐ LTF Suite	
				☐ Add.Nutrients ☐ VOC Metals (6010) Cr only	
Sampling Problems (if any):				☐ Other	Other Sample Collected
				Visible Sheen : ☐ Yes ☐ No ☐ FP	

Wind Direction:

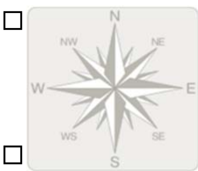
N W ☐ ☐ N E

☐ ☐

☐ ☐

☐ ☐

S W ☐ S E



Time	pH (std. units)	Specific Conductance (mS/cm)	Temp (°F)	Cumulative Vol. of H2O Removed From Well (Gallons)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	General Comments/Notes	Same as above
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		☐
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		☐
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		☐
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		☐
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00	<------Final Value	☐

Begin Development/Purging Activities @:	HH : MM		
Sample Type Collected @:	HH : MM	**Duplicate Sample Name:**	ID

At Least 3 Well Casing Volumes Were Evacuated Before Sampling

Monitoring Information: Water in well: TD-DTW * (.17) = gallons of water in casing
Gallons per foot of water: 1" = .04 2" = 0.17, 4" = 0.65, 5" = 1.0, 6" = 1.5
*Purge volumes are calculated as follows:1" well purge vol. = 0.04 x (TD-DTW),
2" well purge vol. = 0.17 x (TD-DTW).

Legend:

TOC - top-of-casing	HDPE - high den poly
TOS - top-of-screen	TD - total depth
MSL - mean sea level	DTW – depth to water
	LTF - landfarm

Form Completed By:	Print Your Name (First and Last)	**Date:**	MM-DD-YYYY
	Sign Your Name		

APPENDIX G

WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

This Waste Management Plan provides procedures for use by Site personnel for the management of waste materials generated at the Former Champlin Refinery in Enid, Oklahoma (Site). The objectives of the Waste Management Plan are:

1. Minimize wastes generated through material selection, segregation and recycling/reuse.
2. Manage wastes generated on-site that cannot be recycled/reused.
3. Operate in an environmentally sound manner in accordance with applicable laws, regulations, and ordinances.
4. Use only corporate approved off-site disposal/recycling facilities.

Wastes that are anticipated to be managed are divided into the following categories:

- Soils
- Groundwater and decontamination fluids
- Subsurface debris encountered during excavation
- Recyclable/reusable materials
- Liquid materials and wastes
- Universal wastes
- Municipal solid waste.

1.0 SOILS

A variety of activities conducted on-site may generate soils that need to be managed, including:

1. Machine and hand excavating
2. HydroVac excavating
3. Drill cuttings generated during well installation and abandonment
4. Drill cuttings generated during soil sampling

Soils that are encountered during Site activities will be managed based on the following methodology:

WASTE MANAGEMENT PLAN
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Site Personnel will use a photoionization detector (PID) to screen soils as they are generated. A background PID concentration will be measured each working day prior to the start of work in order to establish baseline conditions. The background reading will be of ambient air. Soils will be observed during generation for staining and/or odor; and segregated into one of two Groups:

- **Group A Soils:**

  Soils from depths of less than 10 feet below grade with PID readings less than 100 parts per million (ppm) above background level[A] and with no staining or odors.

- **Group B Soil:**

  Soils produced from depths greater than ten feet below grade; or

  Soil in which the PID reading is greater than 100 ppm above the background level[A]; or are visibly stained and/or have odors.

As generated, soils will be segregated into stockpiles near the work area. An evaluation of the soil will be made daily to determine the grouping (Group A or B) of the soil or if the soil can be placed back into the excavation/trench. If the Site Manager decides that the soil cannot be replaced from where it was removed, the soil will be moved from the work area to a predetermined consolidation area on-site. Relocated Group A soil will be stockpiled on a minimum of 10-mil plastic sheeting, concrete, or asphalt areas until Site personnel determine how to manage the material on-site.

Group B soil will be placed in stockpiles on a minimum of 10-mil plastic sheeting, concrete, or asphalt. Unless precluded for safety reasons, newly generated Group B soil will be covered at the end of the workday and will remain covered except when additional soil is combined into the existing stockpiles. Group B soil stockpiles will be labeled so that it is legible, clearly visible, and with the following information:

1. Description of contents (e.g., Soil Cuttings - Pending Analysis)
2. Anadarko Petroleum Corporation – Contact the Site Manager; 1-918-561-4111
3. Date of first accumulation

[A] Photoionization detector (PID) readings were compared to TPH concentrations in soil from direct push borings from the South Perimeter Work conducted in 2007. The maximum TPH-GRO and TPH-DRO concentrations associated with PID readings of less than 100 ppm were 25 mg/kg and 10 mg/kg, respectively. A PID screening level of 100 ppm is therefore deemed appropriate for this program.

WASTE MANAGEMENT PLAN
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The task supervisor will collect soil samples of Group B soils to characterize for either off-site disposal or on-site management. The number of samples and analytical parameters are listed in the table below. If the Oklahoma Department of Environmental Quality (ODEQ) approves a different analytical method, the most recent ODEQ version will be used.

Analytical Parameters	Number of Samples[1] for Group B Soils
TCLP-Benzene by EPA Method 1311/8260B	One grab sample per 20 cubic yards (cy) of material
TPH by TCEQ Method 1005	One composite sample per 20 cy, comprised of a minimum three-point composite sample
TCLP-Lead* by EPA Method 1311/6010B	One composite sample per 20 cy, comprised of a minimum three-point composite sample

The Toxicity Characteristic Leaching Procedure (TCLP) data will be evaluated to characterize the waste as either RCRA-hazardous or non-hazardous. The TCLP analytical results will be compared to the following thresholds:

Constituent	TCLP Threshold Concentration
Benzene	0.5 milligrams per Liter (mg/L)
Lead	5.0 mg/L

Although not anticipated, soils that exceed the TCLP threshold concentration for benzene and/or lead will be characterized as RCRA-hazardous waste and will be handled accordingly. Should RCRA-hazardous waste be generated, the appropriate ODEQ and/or United States Environmental Protection Agency (USEPA) forms outlining the generator status and associated requirements will be submitted.

Once the analytical results are received, stockpile signage will be updated to reflect the waste characterization determination (i.e., hazardous or non-hazardous waste).

For non-hazardous waste, Total Petroleum Hydrocarbon (TPH) concentrations will be used to determine whether soils will be managed on-site or transported off-site for disposal:

Hydrocarbon Range	TPH Threshold Concentration[2]
Gasoline Range (C6-C12)	500 milligrams per kilogram (mg/kg)
Diesel Range (C12-C28)	2,500 mg/kg

If TPH concentrations are below the TPH thresholds, soils will be managed on-site as Group A soils. Soils will be applied to the ground surface with a maximum thickness of 2 inches. After application, the soils will be worked into the surface material. Spraying with potable water will be used as needed to control dust. Where appropriate Group A (i.e., non-impacted soils) may also be used for maintaining roads and building pads.

Soils that exceed the TPH thresholds will be transported for off-site disposal. Any disposal facility utilized for this Site must be included on the Anadarko list of corporate approved waste management facilities. For an up-to-date list of corporate approved facilities contact the Site Project Manager.

If the Site disposes of quantities greater than 10 cy per month of TPH-impacted soils with TPH concentrations of greater than 1,000 mg/kg, Anadarko (i.e., the generator) will complete, sign, and submit to the ODEQ a non-hazardous industrial solid waste certification form available at: https://www.deq.ok.gov/wp-content/uploads/land-division/Replacement_nhiw-disposal-request-form.pdf. [1]

2.0 GROUNDWATER AND DECONTAMINATION FLUIDS

Fluids generated during well development, purging, sampling, and decontamination activities will be containerized and characterized pending off-site disposal. These fluids may contain hydrocarbons. The holding containers will be clearly labeled and include the following information:

1. Description of contents (e.g., Well Development Water - Pending Analysis)

WASTE MANAGEMENT PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

2. Anadarko Petroleum Corporation – Contact the Site Manager; 1-(918) 561-4111
3. Date of first accumulation

3.0 SUBSURFACE DEBRIS ENCOUNTERED DURING EXCAVATION

During excavation and other types of subsurface work, there is a potential that subsurface structures/debris may be encountered. Materials encountered will most likely be concrete foundations, piping, conduit, etc. Subsurface debris, not handled as recyclable/reusable materials described below, may be placed on-site as fill material, in accordance with state, federal and local laws and regulations, at designated on-site locations.

4.0 RECYCLABLE/REUSABLE MATERIALS

Examples of recyclable/reusable materials that may be generated include, but are not limited to:

- Paper and packaging
- Scrap metal
- Wood/wood chips/organic wastes
- Corrugated and non-corrugated cardboard
- Plastic piping
- Empty waste containers (e.g., metal, plastic)

To the extent feasible, materials will be recycled or reused to minimize the amount of waste disposed. Potentially reusable materials will be inspected by Site personnel to ensure they are in reusable condition prior to being reused onsite. Scrap metal and organic debris will typically be taken to the City of Enid (COE) Landfill, 16th & Southgate Road, Enid.

5.0 LIQUID MATERIALS AND WASTES

The amount of liquid materials and wastes (e.g., paints, cleaning products) routinely generated is not expected to be significant. The following procedures will typically be used for waste minimization:

- Where equivalent substitutions can be made, less toxic products will be used
- Liquid products will be used in the manner intended by the manufacturer

WASTE MANAGEMENT PLAN
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- Liquid products and wastes will not be disposed of on-site
- Unused liquid products will be reused by the contractor(s) for future jobs rather than discarded as wastes, if appropriate

6.0 UNIVERSAL WASTE

Universal waste, including batteries, pesticides, mercury-containing devices, fluorescent lamps, and aerosol cans will be consolidated in a type-specific package or container. The container will be labeled to be legible, clearly visible, and with the following information:

1. Description of Contents (e.g., Used Batteries – Universal Waste)
2. Anadarko Petroleum Corporation – Contact the Site Manager; 1-918-561-4111
3. Date of first accumulation

The storage container will be shipped off-site to a corporate approved disposal/recycling facility within one year of the accumulation start date.

7.0 MUNICIPAL SOLID WASTE

Municipal solid waste dumpsters or similar containers will be used to store non-hazardous solid waste and office trash that is not addressed in previous sections. Waste and trash generated that cannot be recycled, reused, or does not require specific waste management procedures will be disposed of off-site.

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[1] ODEQ, Fact Sheet: Procedures for the Remediation of Diesel & Gasoline Spills, November 2021

SECTION 6

SEC FILING

UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Form 10-K

☑ Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

For the fiscal year ended December 31, 2022

☐ Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

For the transition period from **to**

Commission File Number 1-9210

Occidental Petroleum Corporation

(Exact name of registrant as specified in its charter)

State or other jurisdiction of incorporation or organization	**Delaware**	
I.R.S. Employer Identification No.	**95-4035997**	
Address of principal executive offices	**5 Greenway Plaza, Suite 110**	**Houston, Texas**
Zip Code	**77046**	
Registrant's telephone number, including area code	**(713) 215-7000**	

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common Stock, $0.20 par value	OXY	New York Stock Exchange
Warrants to Purchase Common Stock, $0.20 par value	OXY WS	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes ☑ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.

Yes ☐ No ☑

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☑ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☑ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer	☑	Accelerated Filer	☐	Emerging Growth Company	☐
Non-Accelerated Filer	☐	Smaller Reporting Company	☐		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☑

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☑

The aggregate market value of the registrant's Common Stock held by nonaffiliates of the registrant was approximately $53.0 billion computed by reference to the closing price on the New York Stock Exchange of $58.88 per share of Common Stock on June 30, 2022.

As of January 31, 2023, there were 900,072,447 shares of Common Stock outstanding, par value $0.20 per share.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement, relating to its 2022 Annual Meeting of Stockholders, are incorporated by reference into Part III of this Form 10-K.

TABLE OF CONTENTS

ABBREVIATIONS USED WITHIN THIS DOCUMENT

AAPG	American Association of Petroleum Geologists
AOC	Administrative Order on Consent
Anadarko	Anadarko Petroleum Corporation and its consolidated subsidiaries
Anadarko Acquisition	A transaction pursuant to the Agreement and Plan of Merger dated May 9, 2019, in which Occidental acquired all of the outstanding shares of Anadarko on August 8, 2019, and in which a wholly owned subsidiary of Occidental merged with and into Anadarko
Andes	Andes Petroleum Ecuador Ltd.
ARO	asset retirement obligations
Bcf	billions of cubic feet
Bcf/d	billions of cubic feet per day
Berkshire Hathaway	Berkshire Hathaway Inc.
BLM	U.S. Bureau of Land Management
the Board	Occidental Board of Directors
Boe	barrels of oil equivalent
BOEM	U.S. Bureau of Ocean Energy Management
CCUS	carbon capture, utilization and storage
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CO_2	carbon dioxide
COGCC	Colorado Oil and Gas Conservation Commission
Common Stock Warrants	a distribution of warrants to holders of Occidental common stock
CROCE	cash returns on capital employed
CROCEI	cash return on capital employed incentive
DAC	direct air capture
DASS	Diamond Alkali Superfund Site
DD&A	depreciation, depletion and amortization
DEL	Dolphin Energy Limited
DIB	diversity, inclusion and belonging
DOJ	U.S. Department of Justice
DSCC	Diamond Alkali Chemicals Company
EDC	ethylene dichloride
EOR	enhanced oil recovery
EPA	U.S. Environmental Protection Agency
EPS	earnings per share
ERG	Employee Resource Group
Exchange Act	Securities Exchange Act of 1934
GAAP	Generally accepted accounting principles
GHG	greenhouse gas
HSE	health, safety and environmental
Kerr-McGee	Kerr-McGee Corporation and certain of its subsidiaries
LIBOR	London Interbank Offered Rate
LIFO	last-in, first-out
OCI	other comprehensive income
Maxus	Maxus Energy Corporation
Mbbl	thousands of barrels
Mbbl/d	thousands of barrels per day
Mboe	thousands of barrels equivalent

ABBREVIATIONS USED WITHIN THIS DOCUMENT

Mboe/d	thousands of barrels equivalent per day
Mcf	thousand cubic feet
MMbbl	millions of barrels
MMbtu	million British thermal units
MMcf	millions of cubic feet
NAV	net asset value
NEPA	National Environmental Policy Act
NGL	natural gas liquids
NPL	National Priorities List
NYMEX	New York Mercantile Exchange
NYSE	New York Stock Exchange
Occidental	Occidental Petroleum Corporation, a Delaware corporation and one or more entities in which it owns a controlling interest (subsidiaries)
OEPC	Occidental Exploration and Production Company
OLCV	Occidental's low-carbon ventures businesses
OPEC	Organization of the Petroleum Exporting Countries
Options	stock options
OTC	Over-the-Counter
OU	Operable Unit
OxyChem	Occidental Chemical Corporation, and its consolidated subsidiaries
the Plan	stockholder-approved 2015 Long-Term Incentive Plan, as amended and restated, for certain employees and directors
PP&E	property, plant & equipment
PSC	production sharing contracts
PUD	proved undeveloped
PVC	polyvinyl chloride
RCF	revolving credit facility
Reserves Committee	Corporate Reserves Review Committee
ROD	Record of Decision
RSUs	restricted stock units
Ryder Scott	Ryder Scott Company, L.P.
S&P 500	Standard & Poor's 500 Stock Index
SEC	U.S. Securities and Exchange Commission
SOFR	Secured Overnight Financing Rate
Sonatrach	The national oil and gas company of Algeria
STEP	Strategic Technical Excellence Program
the Trust	Maxus Liquidating Trust
TSRI	total shareholder return incentive
UAE	United Arab Emirates
VCM	Vinyl chloride monomer
WES	Western Midstream Partners, LP
WTI	West Texas Intermediate
Zero Coupons	Zero Coupon senior notes due 2036
2022 Form 10-K	Occidental's Annual Report on Form 10-K for the year ended December 31, 2022

Part I
ITEMS 1 AND 2. BUSINESS AND PROPERTIES

In this Form 10-K, “Occidental”, “we”, “our” and “the Company” refers to Occidental Petroleum Corporation, a Delaware corporation incorporated in 1986, or Occidental and one or more entities in which it owns a controlling interest (subsidiaries). Occidental conducts its operations through its various subsidiaries and affiliates. Occidental’s executive offices are located at 5 Greenway Plaza, Suite 110, Houston, Texas 77046; telephone (713) 215-7000.

GENERAL

Occidental’s principal businesses consist of three reporting segments: oil and gas, chemical and midstream and marketing. The oil and gas segment explores for, develops and produces oil (which includes condensate), NGL and natural gas. The chemical segment primarily manufactures and markets basic chemicals and vinyls. The midstream and marketing segment purchases, markets, gathers, processes, transports and stores oil, NGL, natural gas, CO_2 and power. It also optimizes its transportation and storage capacity, and invests in entities that conduct similar activities, such as WES.

The midstream and marketing segment also includes OLCV. OLCV seeks to leverage Occidental’s legacy of carbon management expertise to develop CCUS projects, including the commercialization of DAC technology, and invests in other low-carbon technologies intended to reduce GHG emissions from its operations and strategically partner with other industries to help reduce their emissions.

HUMAN CAPITAL RESOURCES

Occidental’s culture is built upon the following core values:

- Lead with Passion
- Outperform Expectations
- Deliver Results Responsibly
- Unleash Opportunities
- Commit to Good

Occidental’s human capital resources and programs are managed by its Human Resources department, with support from business leaders across the company. Occidental’s senior management team plays a key role in setting and monitoring Occidental’s culture, values and broader human capital management practices, with oversight by Occidental’s Board of Directors, the Sustainability and Shareholder Engagement Committee of the Board and the Environmental, Health & Safety Committee of the Board. The Sustainability and Shareholder Engagement Committee periodically receives briefings on Occidental’s human capital strategy and the Environmental, Health & Safety Committee receives briefings on employee and contractor health and safety statistics and related matters, including workforce health and safety initiatives. Senior management and the Board also engage regularly on workforce-related topics.

To enhance senior leadership’s engagement with employees, Occidental hosts quarterly executive virtual conversations where Occidental’s President and CEO, Vicki Hollub, and other executive officers review recent financial and operational performance as well as topics pertinent to employees. Occidental’s CEO also answers employee questions during these conversations. The quarterly executive virtual conversations form one piece of Occidental’s employee outreach and engagement, which consists of newsletters, focus groups and employee resource groups, among other channels and tools.

DIVERSITY, INCLUSION AND BELONGING

The intent of Occidental’s DIB culture is to create an environment where employees’ differences are appreciated, celebrated and encouraged. Occidental conducted a robust survey across the organization, the results of which were reviewed by the Board and became a basis for Occidental’s core values.

The Company’s human capital resources extend across several regions. Occidental has attracted, and continues to recruit, a diverse workforce of exceptional talent, including employees from many nations. This diversity enriches Occidental’s culture, its employees' experiences on the job and contributes to an innovative and effective business model that encourages local communities to thrive. DIB powers Occidental’s innovation and spirit of excellence, as well as its knowledge and results. Embedding DIB into Occidental’s culture enhances collaboration, performance and growth and helps uphold its organizational values.

The DIB Advisory Board, which is chaired by Occidental’s President and CEO and includes members of senior leadership, provides DIB governance and oversight to ensure that Occidental’s integrated DIB strategy is executed and aligns with the Company’s mission, vision and strategic objectives. The DIB Ambassador Committee, which is chaired by Occidental’s Vice President of Diversity and Inclusion, consists of a diverse group of employee representatives from all business segments, domestic and international. This committee leads company-wide initiatives to raise DIB awareness through educational resources and programs. Educational sessions are available to the entire workforce for continued growth and development on topics such as inclusive leadership, diversity advocacy, recognizing and addressing micro aggressions, overcoming unconscious bias and psychological safety at work.

Occidental's senior management, together with the support of Occidental's DIB Advisory Board and the DIB Ambassador Committee, works to leverage employees' varied backgrounds, unique experiences and points of view to spark innovation, empower growth, outperform expectations and maximize results.

In October 2022, as part of Occidental's integrated DIB strategy, the Human Resources department launched eight new Employee Resource Groups. An ERG is a group of employees who actively engage in communicating or gathering around a central purpose, mission, background or activity. ERGs can help advance inclusion and a sense of belonging of employees with a common set of interests and/or goals. The mission and goals of ERGs are fully aligned with Occidental's expectation to be an employer, partner, and neighbor of choice. Each ERG is inclusive of all employees—everyone can benefit from and participate in an ERG, either as a member or an ally. Occidental's ERGs are as follows:

- Allyship
- Black Employee Network
- Early Career Network
- FRIEND (Friends, Relatives and Individuals Empowering Neurodiversity)
- Hispanic Network
- Mental Health Matters
- Mosaic (Multicultural) Network
- Out (LGBT+) Network
- Veterans Network
- Women of Oxy Network

TALENT ATTRACTION AND RETENTION

Occidental recruits candidates through job fairs, professional societies and campus recruiting, including expanded recruiting at historically black colleges and universities.

In 2022, Occidental began to return to in-person interviews, and the university relations team worked with universities and their staff to ensure that any in-person interviews and events were conducted safely. In addition, all college internships were in-person with appropriate health and safety precautions as senior leadership continued to monitor federal, state and local guidance and public health data.

In response to employee feedback received by the Human Resources department, to attract and retain talent, Occidental implemented the Balanced Workplace Program in 2022 under which eligible office-based employees may opt to work three days in the office and two days at home each week. The program affords employees more flexibility and promotes increased balance. The Human Resources department solicited feedback from employees participating in the Balanced Workplace Program regarding their experience and to gauge interest in other work arrangements. Following review of such feedback, in June 2022, the Human Resources department began conducting a fully remote pilot program for employees in certain functions.

In 2021, Occidental implemented its global Strategic Technical Excellence Program to recruit, develop and retain highly skilled and valued geoscientists, engineers, scientists and other petrotechnical professionals who will collectively drive innovation, advance performance and inspire the future of energy. STEP is a highly valued program for technical contributors to focus and advance on a technical, non-managerial career path and provides a competitive advantage for Occidental through the optimum application of technology. The Chief Petrotechnical Officer leads all aspects of STEP and reports directly to Occidental's President and CEO.

Occidental also offers employees development opportunities, competitive compensation and attractive benefits, as discussed further below.

DEVELOPMENT AND TRAINING

Occidental employees have access to extensive development and training opportunities and programs to expand their personal and professional skills and knowledge. Occidental's approach to education includes:

- Leadership/management training to develop leadership skills at all levels;
- Self-directed learning and development, including web-based and instructor-led training;
- An employee development library;
- Mentoring programs;
- Employee resource groups; and
- Educational assistance to support employees' continuing education.

In January 2022, Occidental expanded its development and training opportunities and programs from 94 on-demand professional development classes to over 3,000 on-demand classes with over 26,000 types of learning materials (videos, audio books, etc.).

In May 2022, Occidental launched its new domestic mentoring program, EMPower. The purpose of this program is to provide an avenue for enhancing critical business skills, broadening employee networks, and engaging our employees. This program is available for all domestic employees. EMPower is intended to help employees reach their potential through training and empowerment, allowing employees to advance in their careers and develop critical skills.

EMPLOYEE COMPENSATION AND BENEFITS

In addition to prioritizing employee engagement and development, Occidental's compensation and benefits program is designed to attract and retain the talent necessary to achieve its business strategy. The compensation and benefits program recognizes and rewards strong company and individual performance with competitive base salaries, an annual bonus program, recognition awards, long-term performance incentives and advancement opportunities. In 2022, Occidental awarded a one-time special bonus to recognize the innovative and dedicated work of the company's employees and resulting strong operational and financial performance. The Company's compensation and benefits program is routinely reviewed and benchmarked to ensure competitiveness and to provide the benefits that matter most to current and future employees.

Occidental strives to give employees the tools and resources they need to succeed both professionally and personally and to foster a safe and collaborative work environment. To that end, Occidental offers, and regularly evaluates, its comprehensive health, welfare and retirement and savings benefits plans, professional memberships and work/life balance benefits. It also provides programs to enhance and support employees' overall well-being, including their physical, mental, social and financial health.

In January 2022, Occidental introduced a new benefit service provider that provides a health care concierge service to help families manage and navigate medical, in-home care, housing, and social/emotional support, for their own or their families' complex care needs. Furthermore, to make the most of employees' benefits, it is important employees are aware of all that the company has to offer to help employees live well and work well. In the fall of 2022, members of the company's Employee Benefits department presented a Total Rewards Roadshow and traveled to numerous Occidental sites to connect with employees, answer questions and share valuable information about benefits.

MENTAL HEALTH

Addressing well-being is imperative to ensure that Occidental's employees stay resilient, healthy and productive. In 2021, Occidental launched the global well-being campaign "Commit to You" to educate employees and leaders about how its benefits can support them under the four pillars of well-being: mental, physical, social and financial.

In 2022, Occidental prioritized the importance of mental health and well-being through manager and employee programs and events. One program, sponsored by OxyHealth and the Mental Health Matters ERG, was a "Talk Saves Lives" conversation with the American Foundation for Suicide Prevention to learn about common risk factors, how to spot warning signs in others, and how to keep employees, loved ones, and those in the community safe. Most recently, on January 1, 2023, the company launched an enhanced mental health benefit through Lyra Health. Lyra Health provides mental and emotional healthcare that is effective, convenient and personalized to all employees globally.

Occidental continues to be a member of One Mind at Work, an employer coalition dedicated to implementing a gold standard for workplace mental health by combating stigma, improving access to treatment and prevention services and fostering a psychologically safe culture. In 2022, Occidental's CEO and the Chairman of One Mind at Work participated in a video broadcast for employees about breaking down the stigma around mental health challenges at work and what Occidental employees can expect as we transition into an organization where mental health is an accepted and visible part of its well-being.

HEALTH AND SAFETY

The health and safety of Occidental's workforce and communities is a top priority. In 2022, the Board approved updates to the company's longstanding Health, Safety and Environmental Principles (as revised, the HSE and Sustainability Principles) that management recommended based on engagement with shareholders, employees and other stakeholders. The HSE and Sustainability Principles reinforce the alignment among Occidental's core values, goals and strategies, underpin the operational management system, and help to guide Occidentals global workforce. Occidental endeavors to apply these principles to improve workplace and contractor safety, prevent and mitigate incidents, and safeguard people and the environment in the communities where it operates. In addition to complying with applicable HSE laws, regulations, policies and procedures, employees and contractors are empowered and expected to stop any job or activity if they observe conditions that may give rise to a safety or environmental incident, and they are often recognized for doing so.

WORKFORCE COMPOSITION

The below table approximates regional distribution of Occidental's employees as of December 31, 2022:

	North America	Middle East	Latin America	Other [(a)]	Total [(b)]
Union	416	800	50	—	1,266
Non-Union	7,842	2,624	121	120	10,707
Total	8,258	3,424	171	120	11,973

(a) Other headcount included North Africa, Europe and Asia.
(b) Included approximately 2,800 employees in OxyChem.

The below table approximates the self-reported gender and ethnicity, excluding non-specified ethnicities, of Occidental's domestic leadership and other employees as of December 31, 2022. Executive and senior officials and managers are considered top leadership while first- and mid-level officials and managers are considered junior leadership. Individual contributors are excluded from the leadership categories but included in all employee percentages.

	Male	Female	White	non-White
All employees	78 %	22 %	66 %	34 %
All leadership	78 %	22 %	75 %	25 %
Top leadership	83 %	17 %	85 %	15 %
Junior leadership	78 %	22 %	75 %	25 %

We have also publicly disclosed the Consolidated EEO-1 Report that Occidental submitted in 2022 to the U.S. Equal Employment Opportunity Commission for the 2021 fiscal year, which can be found on the sustainability section of our website.

ENVIRONMENTAL REGULATION

For environmental regulation information, including associated costs, see the information under Environmental Liabilities and Expenditures in the Management's Discussion and Analysis of Financial Condition and Results of Operations section under Part II, Item 7 of this Form 10-K, Risk Factors under Part I, Item 1A of this Form 10K and in Note 12 - Environmental Liabilities and Expenditures and Note 13 - Lawsuits, Claims, Commitments and Contingencies in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

AVAILABLE INFORMATION

Occidental's annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and any amendments to those reports are available free of charge on its website, www.oxy.com, as soon as reasonably practicable after Occidental electronically files the material with, or furnishes it to, the SEC. In addition, copies of Occidental's annual report will be made available, free of charge, upon written request.

From time to time, Occidental has made and expects in the future to use its website as a channel of distribution of material information regarding the Company. Financial and other material information regarding the Company is routinely posted on Occidental's website and accessible at www.oxy.com/investors/.

Information contained on Occidental's website is not part of or incorporated into this Form 10-K or any other filings with the SEC.

OIL AND GAS OPERATIONS

GENERAL

Occidental primarily conducts its ongoing exploration and production activities in the United States, the Middle East and North Africa. Within the United States, Occidental has operations primarily in Texas, New Mexico and Colorado, as well as offshore in the Gulf of Mexico. Internationally, Occidental primarily conducts operations in the UAE, Oman and Algeria. Refer to the Oil and Gas Acreage section in Supplemental Oil and Gas Information under Item 8 of this Form 10-K for further disclosure of Occidental's holdings of developed and undeveloped oil and gas acreage.

COMPETITION

As a producer of oil, NGL and natural gas, Occidental competes with numerous other domestic and international public, private and government producers. Oil, NGL and natural gas are sensitive to prevailing global and local market conditions, as well as anticipated market conditions. Occidental's competitive strategy relies on producing hydrocarbons in a capital efficient manner through developing conventional and unconventional fields, and utilizing primary, secondary (waterflood) and tertiary (CO_2 and steam flood) recovery techniques in areas where Occidental has a competitive advantage as a result of its successful operations or investments in shared infrastructure. Occidental also competes to develop and produce its worldwide oil and gas reserves safely, sustainably and cost-effectively, maintain a skilled workforce and use high quality service providers. Occidental believes that its core competencies in CO_2 separation, transportation, use, recycling and storage in EOR provide a competitive advantage over its peers as the world transitions to a less carbon-intensive economy and seeks to remove CO_2 from the atmosphere.

PROVED RESERVES AND SALES VOLUMES

The table below shows Occidental's year-end oil, NGL and natural gas proved reserves. See the information under Oil and Gas Segment in the Management's Discussion and Analysis section under Part II, Item 7, of this Form 10-K for details regarding Occidental's proved reserves, the reserves estimation process, sales and production volumes, production costs and other reserves-related data.

COMPARATIVE OIL AND GAS PROVED RESERVES AND SALES VOLUMES

Oil and NGL is in MMbbl; natural gas is in Bcf.

	2022				2021				2020			
	Oil	NGL	Gas	Boe [(a)]	Oil	NGL	Gas	Boe [(a)]	Oil	NGL	Gas	Boe [(a)]
Proved Reserves [(b)]												
United States	1,639	654	4,073	2,972	1,466	564	3,419	2,600	1,144	384	2,446	1,936
International	274	192	2,277	845	305	202	2,431	912	331	215	2,573	975
Total	1,913	846	6,350	3,817	1,771	766	5,850	3,512	1,475	599	5,019	2,911
Sales Volumes												
United States	185	83	445	342	182	79	477	341	205	81	561	380
International	41	12	164	81	44	12	172	85	59	13	195	104
Total	226	95	609	423	226	91	649	426	264	94	756	484

(a) Natural gas volumes are converted to Boe at six Mcf of gas per one barrel of oil. Conversion to Boe does not necessarily result in price equivalency.
(b) Excluded reserves and sales volumes related to Occidental's discontinued operations.

CHEMICAL OPERATIONS

GENERAL

OxyChem owns and operates manufacturing plants at 21 domestic sites in Alabama, Georgia, Illinois, Kansas, Louisiana, Michigan, New Jersey, Ohio, Tennessee and Texas and at two international sites in Canada and Chile.

COMPETITION

OxyChem competes with numerous other domestic and international chemical producers. OxyChem's market position was first or second in the United States in 2022 for the principal basic chemical products it manufactured and marketed as well as for VCM. OxyChem ranks in the top three producers of PVC in the United States. OxyChem's competitive strategy is to be a low-cost producer of its products in order to compete on price.

OxyChem produced the following products:

Principal Products	Major Uses	Annual Capacity
Basic Chemicals		
Chlorine	Raw material for EDC, water treatment and pharmaceuticals	3.2 million tons
Caustic soda	Pulp, paper and aluminum production	3.3 million tons
Chlorinated organics	Refrigerants[a], silicones and pharmaceuticals	1 billion pounds
Potassium chemicals	Fertilizers, batteries, soaps, detergents and specialty glass	0.4 million tons
EDC	Raw material for VCM	2.1 billion pounds
Chlorinated isocyanurates	Swimming pool sanitation and disinfecting products	150 million pounds
Sodium silicates	Catalysts, soaps, detergents and paint pigments	0.6 million tons
Calcium chloride	Ice melting, dust control, road stabilization and oil field services	0.7 million tons
Vinyls		
VCM	Precursor for PVC	6.2 billion pounds
PVC	Piping, building materials and automotive and medical products	3.7 billion pounds
Ethylene	Raw material for VCM	1.3 billion pounds[b]

(a) Included 4CPe, a raw material used in making next generation refrigerants with low global warming and zero ozone depletion potential.
(b) Amount is gross production capacity for 50/50 joint venture with Orbia.

MIDSTREAM AND MARKETING OPERATIONS

GENERAL

Occidental's midstream and marketing operations primarily support and enhance its oil and gas and chemical businesses. The midstream and marketing segment strives to optimize the use of its gathering, processing, transportation, storage and terminal commitments and to provide access to domestic and international markets. To generate returns, the segment evaluates opportunities across the value chain to provide services to Occidental subsidiaries, as well as third parties. The midstream and marketing segment operates or contracts for services on gathering systems, gas plants, co-generation facilities and storage facilities and invests in entities that conduct similar activities, such as WES and DEL, which are accounted for as equity method investments. WES owns gathering systems, plants and pipelines and earns revenue from fee-based and service-based contracts with Occidental and third parties. DEL owns and operates a pipeline that connects its gas processing and compression plant in Qatar and its receiving facilities in the UAE, and uses its network of DEL-owned and other existing leased pipelines to supply natural gas across the UAE and to Oman. The midstream segment includes Al Hosn Gas, a processing facility in the UAE that removes sulfur from natural gas and processes the natural gas and sulfur for sale. The midstream and marketing segment also includes OLCV businesses.

LOW-CARBON BUSINESS

Leveraging Occidental's carbon management expertise, OLCV primarily focuses on advancing carbon removal and CCUS projects, including developing and commercializing DAC technology. OLCV also invests in third-party entities that are developing technologies that advance other low-carbon initiatives, including NET Power, a clean energy technology company.

COMPETITION

Occidental's midstream and marketing businesses operate in competitive and highly regulated markets. Occidental competes for capacity and infrastructure for the gathering, processing, transportation, storage and delivery of its products, which are sold at current market prices or on a forward basis to refiners, end users and other market participants. Occidental's marketing business competes with other market participants on exchange platforms and through other bilateral transactions with direct counterparties. OLCV and its businesses and investees also face a broad range of competitors including state-owned enterprises; multinational companies in the energy, infrastructure, manufacturing, transportation, technology and financial sectors; and startup companies, with nascent markets for low-carbon products and CO_2 removal credits that are subject to rapidly changing laws, regulations, policies and reporting and verification mechanisms that can significantly impact the financing, construction and operation of projects and the development of markets.

Occidental's midstream and marketing operations are conducted in the locations described below as of December 31, 2022:

Location	Description	Capacity [a]
Gas Plants		
Texas, New Mexico and Colorado	Occidental and third-party-operated natural gas/CO_2 gathering, compression and processing systems	2.2 Bcf/d
Texas, Rocky Mountains and Other	Equity investment in WES - gas processing facilities	5.0 Bcf/d
UAE	Natural gas processing facilities for Al Hosn Gas	1.3 Bcf/d
Pipelines and Gathering Systems		
Texas, New Mexico and Colorado	CO_2 fields and pipeline systems transporting CO_2 to oil and gas producing locations	2.8 Bcf/d
Qatar, UAE and Oman	Equity investment in the DEL natural gas pipeline	3.2 Bcf/d
United States	Equity investment in WES involved in gathering and transportation	14,712 miles of pipeline
Power Generation		
Texas and Louisiana	Occidental-operated power and steam generation facilities	1,218 megawatts of electricity and 1.6 million pounds of steam per hour
OLCV		
Texas	Occidental-owned solar generation facility	16.8 megawatts of electricity
Texas	Equity investment in a zero-emission natural gas generation demonstration facility	up to 50 megawatts of electricity
Canada	Equity investment in developing DAC technology, which captures CO_2 directly from the atmosphere	N/A

(a) Amounts are gross, including interests held by third parties. Gas capacities are expressed in Bcf/d.

ITEM 1A. RISK FACTORS

Risks related to government regulations and the environment

Governmental actions and political instability may adversely affect Occidental's businesses and results of operations.

Occidental's businesses are subject to, and may be adversely affected by, the actions and decisions of many federal, state, local and international governments and political interests. As a result, Occidental faces risks of:

- New or amended laws and regulations, or new or different applications or interpretations of existing laws and regulations, including those related to drilling, manufacturing or production processes (including flaring and well stimulation techniques such as hydraulic fracturing and acidization), pipelines, labor and employment, taxes, royalty rates, permitted production rates, entitlements, import, export and use of raw materials, equipment or products, use or increased use of land, water and other natural resources, air emissions (including restrictions, taxes or fees on emissions of methane, CO_2,or other substances), water recycling and disposal, waste minimization and disposal, public and occupational health and safety, the manufacturing of chemicals, asset integrity management, the marketing or export of commodities, security, environmental protection, and climate change-related and sustainability initiatives, all of which may restrict or prohibit activities of Occidental or its contractors or customers, increase Occidental's costs or reduce demand for Occidental's products.
- Violation of certain governmental laws and regulations, which may result in strict, joint and several liability and the imposition of significant administrative, civil or criminal fines and penalties and may also result in liability for remedial actions or assessments. Litigation, orders or other proceedings asserting strict, joint and several liability under such laws and regulations may seek to impose significant administrative, civil or criminal fines and penalties, damages or remedial actions or to require significant changes to, or even closure of, facilities or operations;
- Refusal of, or delay in, the extension or grant of exploration, development or production contracts; and
- Development delays and cost overruns due to approval delays for, or denial of, drilling, construction, environmental and other regulatory approvals, permits and authorizations

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In November 2021, Congress passed and President Biden signed the Infrastructure Investment and Jobs Act. The Infrastructure Investment and Jobs Act reinstated the federal Superfund excise taxes on various chemicals that OxyChem manufactures. These excise taxes could lead to higher costs and impact margins. The Infrastructure Investment and Jobs Act also authorized the U.S. government to award grants for CCUS research, development and demonstration; carbon transport and storage infrastructure and permitting; carbon utilization and market development; and carbon removal. These grant programs were developed during 2022 and the awarding of grants in 2023 or future years could affect the selection and deployment of competing low-carbon technologies and the financing and market acceptance of proposed projects.

In August 2022, Congress passed and President Biden signed the Inflation Reduction Act, which expanded policy support and incentives for deployment of DAC, CCUS, hydrogen and other low-carbon projects, including several enhancements to federal tax credits. The Inflation Reduction Act also established an escalating methane emissions fee that the EPA will impose on certain upstream and midstream oil and gas operations per metric ton of methane emissions above certain thresholds commencing in 2024. The impact of this fee on Occidental will depend on implementing regulations that are expected to be issued in 2023.

In November 2021, the U.S. Department of the Interior released its Report on the Federal Oil and Gas Leasing Program, recommending increasing royalty rates and rents for drilling programs on federal public lands and in federal offshore waters, in addition to prioritizing leasing in areas with known resource potential and in proximity to existing oil and gas infrastructure and avoiding leasing in areas with competing uses such as recreation, wildlife habitat, conservation and historical and cultural resources. If the U.S. Department of the Interior were to issue regulations implementing these recommendations, Occidental's subsidiaries could incur increased federal royalties and face restrictions on future potential drilling sites or infrastructure on federal lands.

In January 2022, the U.S. District Court for the District of Columbia invalidated the results of the BOEM oil and gas lease sale 257 in the Gulf of Mexico, in which an Occidental subsidiary was the high bidder on 30 additional new blocks located nearby to its existing host platforms, ruling that the BOEM's environmental analysis of GHG emissions was inadequate under NEPA. The U.S. Department of the Interior, which oversees federal oil and gas development, is currently reviewing the decision. In August 2022, Congress reinstated the lease sale in the IRA, and the Occidental subsidiary received the leases in October 2022. Motions to dismiss are pending in the legal challenge to the lease sale. The BOEM's authorization to hold lease sales expired in July 2022. The Bureau of Ocean Energy Management has issued a proposed 2023-2028 Five-Year Program which is subject to environmental review and public comment, and must be approved before future lease sales can occur.

In June 2022, advocacy groups filed a petition in the U.S. District Court for the District of Columbia against the BLM seeking to invalidate numerous drilling permits for oil and gas wells on federal lands in New Mexico and Wyoming, and potentially other states, that were approved by the BLM during the Biden Administration, including certain permits obtained by Occidental subsidiaries. The plaintiffs allege that the BLM failed to comply with various statutes, including NEPA, the Endangered Species Act and the Federal Land Policy and Management Act, by not adequately addressing GHG emissions and climate change in the environmental documents underlying the approvals. Occidental, other producers and multiple trade associations have intervened and the BLM is preparing an administrative record. Similar cases challenge permits issued to other operators with respect to the BLM's consideration of GHG and other air emissions under NEPA and other statutes.

In January 2023, the White House Council on Environmental Quality issued interim guidance to federal agencies for evaluating GHG emissions under NEPA that applies to certain federal actions such as oil and gas leasing and permitting on federal lands. The interim guidance, which is subject to public comment until March 2023, recommends that agencies quantify a project's reasonably foreseeable direct and indirect GHG emissions and assign a monetary impact of the GHGs by applying a social cost of carbon selected by the government.

Although the foregoing BOEM proposed Five-Year Program for offshore leasing, the White House Council on Environmental Quality guidance and lawsuits do not affect Occidental's existing production or planned 2023 drilling and completions activity, restrictions or uncertainty regarding federal lease sales and permits and associated royalty and regulatory requirements could impact the future ability to develop resources efficiently on federal lands and in federal waters.

Significant areas of the Permian Basin in West Texas and Southeast New Mexico are subject to current or proposed land use restrictions under the Endangered Species Act. In August 2022, in response to a lawsuit by advocacy groups, the U.S. Fish and Wildlife Service agreed to decide before the end of June 2023 whether to add the Dunes Sagebrush Lizard to the list of threatened and endangered species. In November 2022, the U.S. Fish and Wildlife Service published a final rule listing the Lesser Prairie Chicken as endangered. Although Occidental has entered into voluntary conservation agreements with respect to these and other species and their associated habitat in the Permian Basin, listing of such species may impose significant operational requirements and costs and increase the potential for litigation and enforcement actions.

In January 2021, the COGCC adopted new regulations that impose siting requirements or "setbacks" on certain oil and gas drilling locations based on the distance of a proposed well pad to occupied structures. Pursuant to the regulations, well pads cannot be located within 500 feet of an occupied structure without the consent of the property owner. As part of the permitting process, the COGCC will consider a series of siting requirements for all drilling locations located between 500 feet and 2,000 feet of an occupied structure. Alternatively, the operator may seek a waiver from each owner and tenant within the designated distance. Occidental has a dedicated, multidisciplinary stakeholder relations team that conducts regulatory and community outreach with respect to its permit applications and operations in Colorado. Under these new regulations and through thoughtful surface location planning, Occidental has obtained COGCC approval for five Oil and Gas Development Plans, inclusive of 12 well pad and facility locations and approximately 150 wells. In addition to the approximately 150 wells approved through the Oil and Gas Development Plan process, during the third quarter of 2022, Occidental became the first oil and gas operator in Colorado to obtain COGCC approval for the first Comprehensive Area Plan under the new COGCC rules. This comprehensive plan will support nine well pads and approximately 140 new wells and will provide for substantial future development in a geographically remote area on Colorado's eastern plains. Oil and Gas Development Plans associated with the Comprehensive Area Plan will be submitted in 2023. While, as of December 31, 2022, Occidental is permitted, or had permit applications submitted to applicable regulatory agencies, for nearly all planned 2023 drilling and completions activity in the DJ Basin, any significant delays could result in changes to our development program in the DJ Basin and our ability to establish new proved undeveloped locations by meeting the SEC's "reasonably certain" threshold for adding PUD reserves.

Texas and New Mexico have experienced an increase in seismic activity, with events measuring magnitude 3 or greater in each state. In the fourth quarter of 2021, both states issued new guidelines for operators to prevent or mitigate seismic activity, focused on produced water disposal wells. These guidelines also require operators to implement response plans for activities within agency-designated seismic response areas. These states have curtailed water disposal and suspended permits in seismic response areas, particularly in deep disposal wells. Occidental does not operate deep disposal wells in the seismic response areas established by the state agencies to date, and its shallow disposal wells have been authorized to operate at agency-approved volume limits. Occidental also has central water treatment and recycling facilities that reduce the need for disposal of produced water. While Occidental's ability to drill and complete wells or to dispose of surplus produced water has not been impacted by these seismic guidelines to date, increased seismicity, or regulatory responses to seismic events, could impact the location, timing and cost of Occidental's development program and existing operations in seismic response areas.

In 2016, the Toxic Substances Control Act (TSCA) was amended to expand the EPA's authority to evaluate and regulate new and existing chemicals. The EPA is currently evaluating, or developing regulations with respect to, certain chemicals that OxyChem produces or uses in its chemical manufacturing operations. In April 2022, the EPA issued a proposed rule with respect to one chemical used in OxyChem's manufacturing operations, but the EPA has not issued final regulations under the 2016 TSCA amendments with respect to any of these chemicals to date. Depending on the scope of any such final regulations, or of future TSCA regulations, OxyChem's ability to use certain chemicals or to manufacture or sell certain of its products could be restricted and its costs could increase.

In addition, Occidental has experienced and may continue to experience adverse consequences, such as risk of loss or production limitations, because certain of its international operations are located in countries affected by political instability, nationalizations, corruption, armed conflict, terrorism, insurgency, civil unrest, security problems, labor unrest, OPEC production restrictions, equipment import restrictions and sanctions. Exposure to such risks may increase if a greater percentage of Occidental's future oil and gas production or revenue comes from international sources.

Climate change and further regulation of GHG and other air emissions may adversely affect Occidental's businesses and results of operations.

Continuing political, social and industry attention to climate change has resulted in both existing and pending international agreements and national, regional and local legislation and regulatory programs to reduce GHG emissions. The Biden Administration has identified climate change as a priority and has described a variety of avenues to prohibit or restrict oil and gas development activities in certain areas. In addition to the governmental actions described above, in February 2021, the Biden Administration established an Interagency Working Group to assign a price to the impact of each metric ton of GHG emissions that federal agencies could use to assess the benefits of more stringent GHG regulations and policy support for low-carbon projects. The Interagency Working Group set an interim value of $51 per metric ton of CO_2 emissions at a 3% discount rate, and is expected to issue an updated value in April 2023.

In June 2021, Congress and President Biden reinstated the methane provisions of EPA's 2012 and 2016 regulations, an action that Occidental supported. In November 2021, the White House Office of Domestic Climate Policy issued a U.S. Methane Emissions Reduction Action Plan that solicited public comment on the EPA's proposed framework to expand federal regulation of methane and volatile organic compound emissions from a broader set of new upstream and midstream oil and gas operations, as well as various existing operations.

In November 2022, the EPA issued a supplemental proposal that would, through a combination of direct EPA regulation and state implementation plans, expand leak detection and repair programs, require rapid reporting and correction of larger emission sources, require emission controls for new and existing wells and facilities and certain types of activities, require replacement or conversion of certain emitting equipment such as pneumatic controllers, and encourage the use of advanced technologies to detect and measure methane emissions. Provisions applicable to emission sources built or modified after November 2021 would apply upon publication of the final rule, expected in 2023, provisions applicable to existing sources would take effect in 2028, and state plans to implement the rule would be due in 2025. The EPA has also requested public comments on the implementation of the IRA's methane fee, and on the future expansion of the methane and volatile organic compound regulations to cover additional potential emission sources from abandoned but unplugged wells and certain pipeline and trucking activities. In November 2022, the BLM also proposed regulations to restrict venting and flaring from oil and gas operations on federal lands which are expected to be issued in 2023.

In June 2022, the EPA proposed to amend its GHG Reporting Rule to incorporate additional oil and gas sources and equipment, revise existing emissions estimation methodologies and calculations, and increase data collection, particularly for new or modified emissions sources. The EPA has proposed the amendments to apply to 2023 emissions that must be reported in the first quarter of 2024. These proposed amendments could increase Occidental's reported estimated emissions from certain sources or types of equipment in its U.S. oil and gas operations. The EPA also proposed changes to the reporting that Occidental submits as a CO_2 supplier and for the injection of CO_2, as well as a new reporting category for sequestration of CO_2 associated with enhanced oil recovery. The IRA also directed the EPA to update its GHG Reporting Rule to require greater use of measurements or empirical data, instead of emissions factors, by the third quarter of 2024.

Several state governments have also established rules aimed at reducing GHG emissions, some including GHG cap and trade programs and others directly regulating equipment that emits GHGs, including methane, and other compounds. Most of these cap and trade programs work by requiring major sources of emissions, such as electric power plants, or major producers of fuels, including refineries and natural gas processing plants, to acquire and surrender emission allowances. Other U.S. states where Occidental operates, including Colorado, New Mexico and Texas, adopted or proposed new regulations, policies or strategies in 2021 and 2022 that increase inspection, recordkeeping, reporting, enforcement and controls on flaring, venting and equipment that emit methane and other compounds at oil and gas facilities. In certain instances, these states anticipate tying the processing and active status of oil and gas permits, including drilling permits, to air emissions and compliance. For example, Colorado has established GHG intensity targets for DJ Basin operators in 2025, 2027 and 2030, which Occidental currently meets.

These and other governmental actions relating to GHG and other air emissions are expected to require Occidental to incur increased operating and maintenance costs including higher rates charged by service providers and costs to purchase, operate and maintain emissions control systems, acquire emission allowances, pay taxes or fees for methane or carbon emissions and comply with new regulatory or reporting requirements; and they could prevent Occidental from conducting oil and gas development activities in certain areas. They could also promote the use of alternative sources of energy and thereby decrease demand for oil, NGL and natural gas and other products that Occidental's businesses produce, and could also materially impact OLCV's current or future operations and strategy. Any such legislation or regulatory programs could also increase the cost of consuming, and thereby reduce demand for, oil, NGL, natural gas or other products produced by Occidental's businesses and lower the value of its reserves. Consequently, governmental actions designed to reduce GHG emissions could have an adverse effect on Occidental's businesses, financial condition, results of operations, cash flows and reserves.

It is difficult to predict the timing, certainty and scope of such government actions and their ultimate effect on Occidental, which could depend on, among other things, the type and extent of GHG emissions reductions required, the availability and price of emission allowances or credits, the availability and price of alternative fuel sources, the energy sectors covered and

Occidental's ability to recover the costs incurred through its operating agreements or the pricing of its oil, NGL, natural gas and other products and whether service providers are able to pass increased costs through to Occidental.

There also have been efforts in the investment community, including investment advisers, financial institutions and certain sovereign wealth, pension and endowment funds, as well as political actors and other stakeholders, promoting divestment of fossil fuel equities, reducing access to capital markets and pressuring lenders to limit funding or increase the cost of lending to companies engaged in the extraction of fossil fuel reserves. Additionally, institutional lenders who provide financing to oil and gas companies have become more attentive to sustainable lending practices, and some of them may substantially reduce, or elect not to provide, funding for oil and gas companies. Such environmental initiatives aimed at limiting climate change and reducing air emissions could adversely affect Occidental's business activities, operations and ability to access capital, cause the market value of its securities to decrease or its cost of capital to increase, and adversely affect its reputation. Finally, increasing attention to climate change risks has resulted in an increased possibility of governmental investigations and additional private litigation against Occidental without regard to causation or its contribution to the asserted damage, which could increase its costs or otherwise adversely affect our businesses.

Compliance costs and liabilities associated with health, safety and environmental laws and regulations could have a material adverse effect on Occidental's or its subsidiaries' businesses, financial condition and results of operations.

Occidental and its subsidiaries and their respective operations are subject to numerous laws and regulations relating to public and occupational health, safety and environmental protection, including those governing air and GHG emissions, water use and discharges, waste management and protection of wildlife and ecosystems. The requirements of these laws and regulations are becoming increasingly complex, stringent and expensive to implement. Costs of compliance with these laws and regulations are significant and can be unpredictable. These laws sometimes provide for strict liability for events that pose an impact or threat to public health and safety or to the environment, including for funding or performance of remediation and, in some cases, compensation for alleged personal injury, property damage, natural resource damages, punitive damages, civil penalties, injunctive relief and government oversight costs. Strict liability can render Occidental or its subsidiaries liable for damages without regard to their degree of care or fault. Some environmental laws provide for joint and several strict liability for remediation of spills and releases of hazardous substances or materials, and, as a result, Occidental or its subsidiaries could be liable for the actions of others.

Occidental and its subsidiaries use and generate hazardous substances or materials in their respective operations. In addition, many of their current and former properties are, or have been, used for industrial purposes. Accordingly, Occidental or its subsidiaries have been, and could become, subject to significant liabilities relating to the investigation, assessment and remediation of potentially contaminated properties and to claims alleging personal injury or property damage as a result of exposures to, or releases of, hazardous substances or materials. As of the date of this filing, Occidental believes its range of reasonably possibly additional losses of its subsidiaries beyond those amounts currently recorded for environmental remediation could be up to $2.7 billion on a consolidated basis. For additional discussion of some of these matters, see Note 12 – Environmental Liabilities and Expenditures and Note 13 - Lawsuits, Claims, Commitments and Contingencies in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

In addition, stricter enforcement or changing interpretations of existing laws and regulations, the enactment of new laws and regulations, the discovery of previously unknown contamination or the imposition of new or increased requirements could require Occidental or its subsidiaries to incur costs or become the basis for new or increased liabilities that could have a material adverse effect on their respective businesses, financial condition and results of operations.

Occidental's businesses may experience catastrophic events.

The occurrence of severe weather events such as hurricanes, floods, freezes and heat waves, droughts, earthquakes or other acts of nature, pandemics, well blowouts, fires, explosions, pipeline ruptures, chemical releases, oil releases, including maritime releases, releases into navigable waters and groundwater contamination, material or mechanical failure, power outages, industrial accidents, physical or cyber attacks, abnormally pressured or structured formations and other events that cause operations to cease or be curtailed may negatively affect Occidental's businesses and the communities in which it operates. Coastal operations are particularly susceptible to disruption from severe weather events. Any of these risks could adversely affect Occidental's ability to conduct operations or result in substantial losses as a result of:

- Damage to and destruction of property and equipment, including property and equipment owned by third-parties which its operations rely upon;
- Damage to natural resources;
- Pollution and other environmental damage, including spillage or mishandling of recovered chemicals or fluids;
- Regulatory investigations, fines and penalties;
- Loss of well location, acreage, expected production and related reserves;
- Suspension or delay of its operations;
- Substantial liability claims; and
- Significant repair and remediation costs that increase its break-even economics.

Third-party insurance may not provide adequate coverage or Occidental or its subsidiaries may be self-insured with respect to the related losses. In addition, under certain circumstances, Occidental or its subsidiaries may be liable for environmental conditions on properties that they currently own, lease or operate that were caused by previous owners or operators of those properties. As a result, Occidental or its subsidiaries may incur substantial liabilities to third parties or governmental entities for environmental matters for which they do not have insurance coverage, which could reduce or eliminate funds available for exploration, development, acquisitions or other investments in their respective businesses, or cause them to incur losses.

The COVID-19 pandemic and resulting adverse economic conditions have had, and may continue to have, an adverse effect on Occidental's businesses and operations and financial condition.

The COVID-19 pandemic caused, and any resurgence of the pandemic could again cause, disrupted global supply chains and significant volatility in the financial markets. Current crude oil, NGL and natural gas demand and prices could be negatively impacted by a resurgence of COVID-19 cases, slow vaccine distribution in certain large international economies or the recurrence or tightening of travel restrictions and stay-at-home orders. If reduced demand for and lower prices of crude oil, NGL and natural gas persist for a prolonged period, Occidental's operations, financial condition, cash flows, level of expenditures and the quantity of estimated proved reserves that may be attributed to its properties may be materially and adversely affected. Occidental has not experienced any significant disruptions as a result of any new COVID-19 variants, and it continues to monitor national, state and local government directives where we have operations or offices. The extent to which the COVID-19 pandemic adversely affects Occidental's businesses, results of operations and financial condition will depend on future developments, many of which are outside of its control. To the extent the COVID-19 pandemic may continue to adversely affect Occidental's businesses, results of operations and financial condition, it may also have the effect of heightening the other risks described herein.

Risks related to Occidental's businesses and operations

Volatile global and local commodity pricing strongly affect Occidental's results of operations.

Occidental's financial results correlate closely to the prices it obtains for its products, particularly oil and, to a lesser extent, NGL, natural gas and its chemical products.

Prices for oil, NGL and natural gas fluctuate widely. Historically, the markets for oil, NGL and natural gas have been volatile and may continue to be volatile in the future. If the prices of oil, NGL or natural gas continue to be volatile or decline, Occidental's operations, financial condition, cash flows, level of expenditures and the quantity of estimated proved reserves that may be attributed to its properties may be materially and adversely affected. Prices are set by global and local market forces which are not in Occidental's control. These factors include, among others:

- Worldwide and domestic supplies of, and demand for, oil, NGL, natural gas and refined products;
- The cost of exploring for, developing, producing, refining and marketing oil, NGL, natural gas and refined products;
- Operational impacts such as production disruptions, technological advances and regional market conditions, including available transportation capacity and infrastructure constraints in producing areas;
- Changes in weather patterns and climate;
- The impacts of the members of OPEC and other non-OPEC member-producing nations that may agree to and maintain production levels;
- The ongoing global impact of the Russia-Ukraine war;
- The worldwide military and political environment, including uncertainty or instability resulting from an escalation or outbreak of armed hostilities or acts of terrorism in the United States or elsewhere;
- The price and availability of and demand for alternative and competing fuels and emissions reducing technology;
- Technological advances affecting energy consumption and supply;
- Government policies and support and market demand for low-carbon technologies;
- Domestic and international governmental regulations and taxes, including those that restrict the export of hydrocarbons;
- Shareholder activism or activities by non-governmental organizations to restrict the exploration, development and production of oil, NGL and natural gas;
- Additional or increased nationalization and expropriation activities by international governments;
- The impact and uncertainty of world health events, including the COVID-19 pandemic and the spread of new variants;
- The effect of releases from the U.S. Strategic Petroleum Reserve;
- Volatility in commodity markets;
- The effect of energy conservation efforts; and
- Global inventory levels and general economic conditions.

The long-term effects of these and other conditions on the prices of oil, NGL, natural gas and chemical products are uncertain and there can be no assurance that the demand or pricing for Occidental's products will follow historic patterns in the near term. Prolonged or substantial decline, or sustained market uncertainty, in these commodity prices may have the following effects on Occidental's business:

- Adversely affect Occidental's financial condition, results of operations, liquidity, ability to reduce debt, access to and cost of capital, and ability to finance planned capital expenditures, pay dividends and repurchase shares;
- Reduce the amount of oil, NGL and natural gas that Occidental can produce economically;
- Cause Occidental to delay or postpone some of its capital projects;
- Reduce Occidental's revenues, operating income or cash flows;
- Reduce the amounts of Occidental's estimated proved oil, NGL and natural gas reserves;
- Reduce the carrying value of Occidental's oil and natural gas properties due to recognizing impairments of proved properties, unproved properties and exploration assets;
- Reduce the standardized measure of discounted future net cash flows relating to oil, NGL and natural gas reserves; and
- Adversely affect the ability of Occidental's partners to fund their working interest capital requirements.

Generally, Occidental's historical practice has been to remain exposed to the market prices of commodities. As of December 31, 2022, there were no active commodity hedges in place. Management may choose to put hedges in place in the future for oil, NGL and natural gas commodities. Commodity price risk management activities may prevent Occidental from fully benefiting from price increases and may expose it to regulatory, counterparty credit and other risks.

The prices obtained for Occidental's chemical products correlate to the strength of the United States and global economies, as well as chemical industry expansion and contraction cycles. Occidental also depends on feedstocks and energy to produce chemicals, which are commodities subject to significant price fluctuations.

Occidental may experience delays, cost overruns, losses or other unrealized expectations in development efforts and exploration activities.

Oil, NGL and natural gas exploration and production activities are subject to numerous risks beyond Occidental's control, including the risk that drilling will not result in commercially viable oil, NGL and natural gas production. In its development and exploration activities, Occidental bears the risks of:

- Equipment failures;
- Construction delays;
- Escalating costs or competition for services, materials, supplies or labor;
- Increasing prices as a result of broad inflation
- Property or border disputes;
- Disappointing drilling results or reservoir performance;
- Title problems and other associated risks that may affect its ability to profitably grow production, replace reserves and achieve its targeted returns;
- Actions by third-party operators of its properties;
- Permit delays and costs of drilling wells on lands subject to complex development terms and circumstances; and
- Oil, NGL and natural gas gathering, transportation and processing availability, restrictions or limitations.

Exploration is inherently risky and is subject to delays, misinterpretation of geologic or engineering data, unexpected geologic conditions or finding reserves of disappointing quality or quantity, which may result in significant losses.

Claims, litigation, government investigations and other proceedings may adversely affect Occidental's business, consolidated financial position, results of operations and cash flows.

Occidental is subject to actual and threatened claims, litigation, reviews, investigations, and other proceedings, including proceedings by governments and regulatory authorities, involving a wide range of issues, including regarding our drilling, manufacturing or production processes, commercial disputes, environmental compliance, public health and safety and taxes. The outcomes of these matters are inherently unpredictable and subject to significant uncertainties. Determining legal reserves or possible losses from such matters involves judgment and may not reflect the full range of uncertainties and unpredictable outcomes. Until the final resolution of such matters, Occidental may be exposed to losses in excess of the amount recorded, and such amounts could be material. Should any of our estimates and assumptions change or prove to have been incorrect, it could have a material adverse effect on Occidental's business, consolidated financial position, results of operations and cash flows.

For additional discussion of some of these matters, see Note 12 – Environmental Liabilities and Expenditures and Note 13 - Lawsuits, Claims, Commitments and Contingencies in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

Disruptions in the political, regulatory, economic, and social environments of the countries in which Occidental operates could adversely affect its reputation, financial condition, results of operations and cash flows.

Occidental's non-US operations accounted for approximately 15% of its consolidated revenue in 2022, 16% in 2021 and 19% in 2020. Instability and unforeseen changes in any of the markets in which Occidental operates could result in business disruptions or operational challenges that may adversely affect the demand for Occidental's products and services, or its reputation, financial condition, results of operations or cash flows. These factors include, but are not limited to, the following:

- Uncertain or volatile political, social, and economic conditions;
- Social unrest, acts of terrorism, war, or other armed conflict;
- Public health crises and other catastrophic events, such as the COVID-19 pandemic;
- Confiscatory taxation or other adverse tax policies;
- Theft of, or lack of sufficient legal protection for, proprietary technology and other intellectual property;
- Unexpected changes in legal and regulatory requirements, including changes in interpretation or enforcement of existing laws;
- Restrictions on the repatriation of income or capital;
- Currency exchange controls;
- Inflation; and
- Currency exchange, rate fluctuations and devaluations.

Occidental's oil and gas business operates in highly competitive environments, which affect, among other things, its ability to source production and replace reserves.

Results of operations, reserves replacement and the level of oil and gas production depend, in part, on Occidental's ability to profitably acquire additional reserves. Occidental has many competitors (including national oil companies), some of which: (i) are larger and better funded; (ii) may be willing to accept greater risks; (iii) have greater access to capital; (iv) have substantially larger staffs; or (v) have special competencies. Competition for access to reserves may make it more difficult to find attractive investment opportunities or require delay of reserve replacement efforts. Further, during periods of low product prices, any cash conservation efforts may delay production growth and reserve replacement efforts. Also, there is substantial competition for capital available for investment in the oil and natural gas industry. Occidental's failure to acquire properties, potentially grow production, replace reserves and attract and retain qualified personnel could have a material adverse effect on its cash flows and results of operations.

In addition, Occidental's acquisition activities carry risks that it may: (i) not fully realize anticipated benefits due to less-than-expected reserves or production or changed circumstances, such as declines in oil, NGL and natural gas prices; (ii) bear unexpected integration costs or experience other integration difficulties; (iii) experience share price declines based on the market's evaluation of the activity; or (iv) be subject to liabilities that are greater than anticipated.

Occidental's oil and gas reserves are estimates based on professional judgments and may be subject to revision.

Reported oil and gas reserves are an estimate based on periodic review of reservoir characteristics and recoverability, including production decline rates, operating performance and economic feasibility at the prescribed weighted average commodity prices, future operating costs and capital expenditures, workover and remedial costs, assumed effects of regulation by governmental agencies, the quantity, quality and interpretation of relevant data, taxes and availability of funds. The procedures and methods for estimating the reserves by Occidental's internal engineers were reviewed by independent petroleum consultants; however, there are inherent uncertainties in estimating reserves. Actual production, revenues, expenditures, oil, NGL and natural gas prices and taxes with respect to Occidental's reserves may vary from estimates and the variance may be material. Additional regulation around GHG emissions and future costs related to a less carbon-intensive economy could result in a shortened oil and gas reservoir reserve life as the underlying reserves become uneconomical. If Occidental were required to make significant negative reserve revisions, its results of operations and stock price could be adversely affected.

In addition, the discounted cash flows included in this Form 10-K should not be construed as the fair value of the reserves attributable to Occidental's properties. The estimated discounted future net cash flows from proved reserves are based on an unweighted arithmetic average of the first-day-of-the-month price for each month within the year in accordance with SEC regulations. Actual future prices and costs may differ materially from SEC regulation-compliant prices and costs used for purposes of estimating future discounted net cash flows from proved reserves. Also, actual future net cash flows may differ from these discounted net cash flows due to the amount and timing of actual production, availability of financing for capital expenditures necessary to develop Occidental's undeveloped reserves, supply and demand for oil, NGL and natural gas, increases or decreases in consumption of oil, NGL and natural gas and changes in governmental regulations or taxation.

Occidental's future results could be adversely affected if it is unable to execute new business strategies effectively.

Occidental's results of operations depend on the extent to which it can execute new business strategies effectively relative to both the societal transition to a less carbon-intensive economy and laws, regulations and governmental and private actions regarding the environment and climate change. Occidental's strategies seek to advance its goals of achieving net-zero emissions (i) from its operations and energy use before 2040, with an ambition to do so before 2035, and (ii) from its total carbon inventory, including the use of its sold products, with an ambition to do so before 2050. Occidental's strategies and goals are subject to business, economic and competitive uncertainties and contingencies, many of which are beyond its control. Additionally, Occidental may be forced to develop or implement new technologies at substantial costs to achieve its strategies. Effective execution of these goals may require substantial new capital, which might not be available to Occidental in the amounts or at the times expected. In addition, raising such capital may increase its leverage or overall costs of doing business. These uncertainties and costs could cause Occidental to not be able to fully implement or realize the anticipated results and benefits of its business strategies.

Certain of Occidental's emissions goals are dependent upon the successful implementation of new and existing technologies on an industrial scale. These technologies are in various stages of development or implementation and may require more capital, or take longer to develop, than currently expected. Further, these carbon management technologies are in competition with technologies being developed by other companies. The carbon management solutions are not well established and, while Occidental believes it has access to the technologies and the expertise necessary to develop these solutions on an industrial scale, Occidental may not ultimately succeed in achieving its GHG emissions reduction and net-zero goals.

Occidental's strategy to include carbon management in its product line is also dependent upon demand for carbon sequestration and related CO_2 removal credits, offsets or other attributes. If this market does not develop, or if the regulatory environment does not support carbon management activities, Occidental may not be successful in entering this industry.

Occidental's aspirations, goals and initiatives related to carbon management and overall sustainability expose it to numerous risks.

Occidental continues to develop new technologies and strategies to position it to meet its emissions reduction and net-zero goals. Occidental's efforts to research, establish, accomplish and accurately report on our emissions goals, targets and strategies expose it to numerous operational, reputational, financial, legal and other risks. Occidental's ability to reach our target emissions is subject to a multitude of factors and conditions, many of which are out of its control. Examples of such factors include evolving government regulation and voluntary protocols for reporting or verification of emissions, capture or sequestration, the pace of changes in technology, the successful development and deployment of existing or new technologies and business solutions on a commercial scale, the availability, timing and cost of equipment, manufactured goods and services, and the availability of requisite financing and federal and state incentive programs.

In addition, historical, current and forward-looking sustainability-related statements may be based on standards for measuring progress that are still developing, internal controls and processes that continue to evolve and assumptions that are subject to change in the future. There are multiple proposed or recently adopted changes to various GHG reporting regulations and protocols, including from the EPA, as noted earlier, as well as the SEC, the GHG Protocol and certain countries and states, as well as for additional controls, fees or taxes on emissions. In March 2022, for example, the SEC proposed climate disclosure rules that would require public companies to significantly increase disclosure of GHG emissions and strategies, targets, costs and risks associated with climate change and the energy transition. While Occidental has reported voluntarily on its net-zero pathway and associated goals and targets, as well as GHG emissions estimates, the proposed rules would require both significant additional disclosure and integration of such disclosure directly into financial reporting processes. Occidental and numerous other stakeholders submitted comments to the SEC on the proposed rules. The SEC is expected to issue final rules in 2023. Given the potential significance of these changes for estimation, reporting and verification of GHG emissions, establishing and reporting on goals targets, and estimating and disclosing costs of emissions reduction and the energy transition, Occidental may be required or elect to modify or update reported emissions and its current set of GHG goals and targets to reflect such new or changed regulations and protocols, although we currently expect to retain our overarching net-zero goals and to continue to implement emissions reduction plans that we believe will complement our investments in DAC, CCUS and other low-carbon technologies and infrastructure.

Occidental may face increased scrutiny from the investment community, customers, other stakeholders and the media related to its emissions reduction and net-zero goals and strategies. If Occidental's emissions goals and strategies to achieve them do not meet evolving investor or other stakeholder expectations or standards, Occidental's reputation, ability to attract and retain employees and attractiveness as an investment, business partner, supplier or acquirer could be negatively impacted. Similarly, Occidental's failure or perceived failure to fulfill its emissions goals and targets, to comply with ethical, health, safety, environmental, social, governance or other standards, regulations, or expectations, or to satisfy various reporting standards with respect to these matters effectively could have the same negative impacts and further expose Occidental to government enforcement actions and private litigation. Even if Occidental achieves its goals, targets and objectives, it may not realize all of the benefits that it expected at the time the goals were established.

Occidental has previously recorded impairments of its proved and unproved oil and gas properties and will continue to assess further impairments in the future.

Occidental has recorded impairments of its proved and unproved oil and gas properties resulting from prolonged declines in oil and gas prices and may record such impairments in the future. Past impairments included pre-tax impairment and related charges to both proved and unproved oil and gas properties and a lower of cost or net realizable value adjustment for crude inventory. If there is an adverse downturn of the macroeconomic conditions and if such downturn is expected to or does persist for a prolonged period of time, Occidental's oil and gas properties may be subject to further testing for impairment, which could result in additional non-cash asset impairments. Such impairments could be material to the financial statements.

Future costs associated with reducing emissions and carbon impacts, as well as impacts resulting from other risk factors described herein, could lead to impairments in the future, if such costs significantly increase Occidental's breakeven economics.

Occidental uses CO_2 for its EOR operations. Occidental's production from these operations may decline if Occidental is not able to obtain sufficient amounts of CO_2.

Occidental's CO_2 EOR operations are critical to Occidental's long-term strategy. Oil production from Occidental's CO_2 EOR projects depends largely on having access to sufficient amounts of naturally occurring or anthropogenic (human-made) CO_2. Occidental's ability to produce oil from its CO_2 EOR projects would be hindered if the supply of CO_2 was limited due to, among other things, problems with current CO_2 producing wells and facilities, including compression equipment, catastrophic pipeline failure or the ability to economically purchase naturally occurring or anthropogenic CO_2. This could have a material adverse effect on Occidental's financial condition, results of operations or cash flows. Future oil production from its CO_2 EOR operations is dependent on the timing, volumes and location of CO_2 injection and, in particular, Occidental's ability to obtain sufficient volumes of CO_2. Market conditions may cause the delay or cancellation of the development of naturally occurring CO_2 sources or construction of plants that produce anthropogenic CO_2 as a byproduct that can be purchased, thus limiting the amount of CO_2 available for use in Occidental's CO_2 EOR operations.

Occidental is exposed to cyber-related risks.

The oil and gas industry is increasingly dependent on digital and industrial control technologies to conduct certain exploration, development and production activities. Occidental relies on digital and industrial control systems, related infrastructure, technologies and networks to run its business and to control and manage its oil and gas, chemicals, marketing and pipeline operations. Use of the internet, cloud services, mobile communication systems and other public networks exposes Occidental's business and that of other third parties with whom Occidental does business to cyber attacks. Cyber attacks on businesses have escalated in recent years.

Information and industrial control technology system failures, network disruptions and breaches of data security could disrupt our operations by causing delays, impeding processing of transactions and reporting financial results, leading to the unintentional disclosure of company, partner, customer or employee information or could damage our reputation. A cyber attack involving our information or industrial control systems and related infrastructure, or that of our business associates, could negatively impact our operations in a variety of ways, including, but not limited to, the following:

- Unauthorized access to seismic data, reserves information, strategic information or other sensitive or proprietary information could have a negative impact on Occidental's ability to compete for oil and natural gas resources;
- Data corruption, communication or systems interruption or other operational disruption during drilling activities could result in delays and failure to reach the intended target or cause a drilling incident;
- Data corruption, communication or systems interruption or operational disruptions of production-related infrastructure could result in a loss of production or accidental discharge;
- A cyber attack on OxyChem's operations could result in a disruption of the manufacturing and marketing of its products or a potential HSE hazard;
- A cyber attack on a vendor or service provider could result in supply chain disruptions, which could delay or halt our construction and development projects;
- A cyber attack on third-party gathering, pipeline, processing, terminal or other infrastructure systems could delay or prevent Occidental from producing, transporting, processing and marketing its production;
- A cyber attack involving commodities exchanges or financial institutions could slow or halt commodities trading, thus preventing Occidental from marketing its production or engaging in hedging activities;
- A cyber attack that halts activities at a power generation facility or refinery using natural gas as feedstock could have a significant impact on the natural gas market;
- A cyber attack on a communications network or power grid could cause operational disruption;
- A cyber attack on Occidental's automated and surveillance systems could cause a loss in production and potential HSE hazards;
- A deliberate corruption of Occidental's financial or operating data could result in events of non-compliance which could then lead to regulatory fines or penalties; and
- A cyber attack resulting in the loss or disclosure of, or damage to, Occidental's or any of its customer's or supplier's data or confidential information could harm its business by damaging its reputation, subjecting Occidental to

potential financial or legal liability and requiring it to incur significant costs, including costs to repair or restore its systems and data or to take other remedial steps.

Although Occidental has implemented controls and multiple layers of security that it believes are reasonable to mitigate the risks of a cyber attack, there can be no assurance that such cyber security measures will be sufficient to prevent security breaches of its systems from occurring, and if a breach occurs, it may remain undetected for an extended period of time. Further, Occidental has no control over the comparable systems of the third parties with whom it does business. While Occidental has experienced cyber attacks in the past, Occidental has not suffered any material losses. However, if in the future Occidental's cyber security measures are compromised or prove insufficient, the potential consequences to Occidental's businesses and the communities in which it operates could be significant. As cyber attacks continue to evolve in magnitude and sophistication, Occidental may be required to expend additional resources in order to continue to enhance its cyber security measures and to investigate and remediate any digital and operational systems, related infrastructure, technologies and network security vulnerabilities, which would increase its costs. A system failure or data security breach, or a series of such failures or breaches, could have a material adverse effect on Occidental's financial condition, results of operations or cash flows.

Occidental's oil and gas reserve additions may not continue at the same rate and a failure to replace reserves may negatively affect Occidental's business.

Producing oil and natural gas reservoirs generally are characterized by declining production rates that vary depending upon reservoir characteristics and other factors. Unless Occidental conducts successful exploration or development activities, acquires properties containing proved reserves, or both, proved reserves will generally decline and negatively impact our business. The value of Occidental's securities and its ability to raise capital will be adversely impacted if it is not able to replace reserves that are depleted by production or replace our declining production with new production by successfully allocating annual capital to maintain our reserves and production base. Occidental expects infill development projects, extensions, discoveries and improved recovery to continue as main sources for reserve additions but factors such as geology, government regulations and permits, the effectiveness of development plans and the ability to make the necessary capital investments or acquire capital are partially or fully outside management's control and could cause results to differ materially from expectations.

Occidental's operations and financial results could be significantly negatively impacted by its offshore operations.

Occidental is vulnerable to risks associated with offshore operations that could negatively impact its operations and financial results. Certain Occidental subsidiaries conduct offshore operations primarily in the Gulf of Mexico and their operations and financial results are vulnerable to certain unique risks associated with operating offshore, including conditions relating to the following:

- Hurricanes and other adverse weather conditions;
- Geological complexities and water depths associated with such operations;
- Limited number of partners available to participate in projects;
- Oilfield service costs and availability;
- Compliance with HSE and other laws and regulations;
- Terrorist attacks or piracy;
- Remediation and other costs and regulatory changes resulting from oil spills, emissions or releases of hazardous substances or materials;
- Failure of equipment or facilities; and
- Response capabilities for personnel, equipment or environmental incidents.

In addition, certain Occidental subsidiaries conduct some of their exploration in deep waters (greater than 1,000 feet) where operations, support services and decommissioning activities are more difficult and costly than in shallower waters. The deep waters in the Gulf of Mexico, as well as international deep-water locations, lack the physical and oilfield service infrastructure present in shallower waters. As a result, deep-water operations may require significant time between a discovery and the time that Occidental can market its production, thereby increasing the risk involved with these operations.

Anadarko's Tronox settlement may not be deductible for income tax purposes; Occidental may be required to repay the tax refund Anadarko received in 2016 related to the deduction of the Tronox settlement payment, which may have a material adverse effect on Occidental's results of operations, liquidity and financial condition.

In April 2014, Anadarko and Kerr-McGee entered into a settlement agreement for $5.2 billion, resolving, among other things, all claims that were or could have been asserted in connection with the May 2009 lawsuit filed by Tronox against Anadarko and Kerr-McGee in the U.S. Bankruptcy Court for the Southern District of New York. After the settlement became effective in January 2015, Anadarko paid $5.2 billion and deducted this payment on its 2015 federal income tax return. Due to the deduction, Anadarko had a net operating loss carryback for 2015, which resulted in a tentative tax refund of $881 million in 2016.

The IRS audited Anadarko's tax position regarding the deductibility of the payment and in September 2018 issued a statutory notice of deficiency rejecting Anadarko's refund claim. Anadarko disagreed and filed a petition with the U.S. Tax Court to dispute the disallowance in November 2018. In December 2022, the parties filed competing motions for partial summary judgment. The motions are not fully briefed. Trial is set for May 2023. Occidental expects to continue pursuing resolution. In accordance with Accounting Standards Codification (ASC) Topic 740's guidance on the accounting for uncertain tax positions, as of December 31, 2022, Occidental had recorded no tax benefit on the tentative cash tax refund. If the payment is ultimately determined not to be deductible, Occidental would be required to repay the tentative refund received plus interest totaling approximately $1.8 billion as of December 31, 2022, which could have a material adverse effect on our liquidity and consolidated balance sheets. Occidental's Consolidated Financial Statements include an uncertain tax position for the approximate repayment of $1.4 billion ($1.4 billion federal and $28 million in state taxes) plus accrued interest of approximately $415 million. This amount is not covered by insurance. For additional information on income taxes, see Note 10 - Income Taxes in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

Occidental's indebtedness may make it more vulnerable to economic downturns and adverse developments in its businesses. Downgrades in Occidental's credit ratings or future increases in interest rates may negatively impact Occidental's cost of capital, and ability to access capital markets.

Occidental's level of indebtedness could increase its vulnerability to adverse changes in general economic and industry conditions, economic downturns and adverse developments in its businesses or limit Occidental's flexibility in planning for or reacting to changes in its business and the industries in which it operates. From time to time, Occidental has relied on access to capital markets for funding. Occidental's ability to obtain additional financing or refinancing will be subject to a number of factors, including general economic and market conditions, Occidental's performance, investor sentiment and its ability to meet existing debt compliance requirements. If Occidental is unable to generate sufficient funds from its operations to satisfy its capital requirements, including its existing debt obligations, or to raise additional capital on acceptable terms, Occidental's business could be adversely affected. As of the date of this filing, Occidental's long-term debt was rated BB+ by Fitch Ratings, Ba1 by Moody's Investors Service and BB+ by Standard and Poor's.

One of Occidental's subsidiaries acts as the general partner of WES, a publicly traded master limited partnership, which may involve potential legal liability.

One of Occidental's subsidiaries acts as the general partner of WES, a publicly traded master limited partnership. Its general partner interest in WES may increase the possibility that it could be subject to claims of breach of duties owed to WES, including claims of conflict of interest. Any such claims could increase Occidental's costs and any liability resulting from such claims could have a material adverse effect on Occidental's financial condition, operating results or cash flows.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 3. LEGAL PROCEEDINGS

Occidental has elected to use a $1 million threshold for disclosing certain proceedings arising under federal, state or local environmental laws when a governmental authority is a party and potential monetary sanctions are involved. Occidental believes proceedings under this threshold are not material to Occidental's business and financial condition. In January 2023, the U.S. District Court for the District of New Mexico entered a consent decree under which two Occidental subsidiaries settled a previously-reported citizen suit alleging violations of certain federal air quality regulations, which the subsidiaries deny, by paying a civil penalty of $500,000 to the U.S. Department of the Treasury and depositing an additional $500,000 with the U.S. District Court for the District of New Mexico to fund a supplemental environmental project in lieu of penalties, among other terms. For information regarding other legal proceedings, see the information under Lawsuits, Claims, Commitments and Contingencies in the Management's Discussion and Analysis section of this Form 10-K and in Note 13 - Lawsuits, Claims, Commitments and Contingencies in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

INFORMATION ABOUT EXECUTIVE OFFICERS

Each executive officer holds his or her office from the date of election by the Board of Directors until the first board meeting held after the next Annual Meeting of Stockholders or until his or her removal or departure or a successor is duly elected, if earlier.

The following table sets forth the executive officers of Occidental as of February 27, 2023:

Name Current Title	**Age as of February 27, 2023**	**Positions with Occidental and Employment History**
Peter J. Bennett Vice President	55	President, Commercial Development U.S. Onshore Resources and Carbon Management since October 2020; President and General Manager of Permian Resources and the Rockies, 2020; Senior Vice President, Permian Resources, 2018-2020; President and General Manager - Permian Resources New Mexico, 2017-2018; Chief Transformation Officer, 2016-2017.
Christopher O. Champion Vice President, Chief Accounting Officer and Controller	53	Vice President, Chief Accounting Officer and Controller since August 2019; Anadarko Petroleum Corporation: Senior Vice President, Chief Accounting Officer and Controller, 2017-2019, Vice President, Chief Accounting Officer and Controller, 2015-2017.
Kenneth Dillon Senior Vice President	63	Senior Vice President since December 2016; President – International Oil and Gas Operations since June 2016.
Vicki Hollub President and Chief Executive Officer	63	President, Chief Executive Officer and Director since April 2016.
Richard A. Jackson Senior Vice President	47	President Operations U.S. Onshore Resources and Carbon Management since October 2020; President and General Manager, EOR and Oxy Low Carbon Ventures, LLC, 2020; President Low Carbon Ventures, 2019-2020; Senior Vice President, Operation Support, 2018-2019; Vice President, Investor Relations, 2017-2018; President and General Manager Permian Resources Delaware Basin, 2014-2017.
Sylvia J. Kerrigan Senior Vice President and Chief Legal Officer	57	Senior Vice President and Chief Legal Officer since October 2022; Executive Director of the Kay Bailey Hutchison Energy Center for Business, Law and Policy at The University of Texas, 2017-2022; Executive Vice President, General Counsel and Corporate Secretary of Marathon Oil Corporation, 2009-2017.
Robert L. Peterson Senior Vice President and Chief Financial Officer	52	Senior Vice President and Chief Financial Officer since April 2020; Senior Vice President, Permian EOR, 2019-2020; Vice President Permian Strategy, 2018-2019; Director Permian Business Area, 2017-2018; President OxyChem, 2014-2017.

Part II
ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

MARKET INFORMATION, HOLDERS AND DIVIDEND POLICY

Occidental's common stock is listed and traded on the NYSE under the ticker symbol "OXY." The common stock was held by approximately 24,400 stockholders of record as of January 31, 2023, which does not include beneficial owners for whom Cede and Co. or others act as nominees.

Occidental declared dividends of $0.52 per share for the year ended December 31, 2022. In February 2023, the Board of Directors declared a regular quarterly dividend of $0.18 per share on common stock, an increase of five cents from the previous quarter, payable in April 2023. The declaration of future dividends is a business decision made by the Board of Directors from time to time and will depend on Occidental's financial condition and other factors deemed relevant by the Board of Directors.

SHARE REPURCHASE ACTIVITIES

Occidental's share repurchase activities for the year ended December 31, 2022, were as follows:

Period	Total Number of Shares Purchased [(a)]	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Value of Shares that May Yet Be Purchased Under the Plans or Programs [(b)]
First Quarter 2022	730,746	$ 50.05	—	$ 3,000
Second Quarter 2022	11,679,732	58.38	11,190,640	2,350
Third Quarter 2022	28,571,576	63.02	28,409,099	562
October 1 - 31, 2022	2,330,221	67.35	2,205,352	414
November 1 - 30, 2022	5,993,013	70.68	5,859,478	—
December 1 - 31, 2022	—	—	—	—
Fourth Quarter 2022	8,323,234	69.75	8,064,830	—
Total 2022	49,305,288	62.86	47,664,569	—

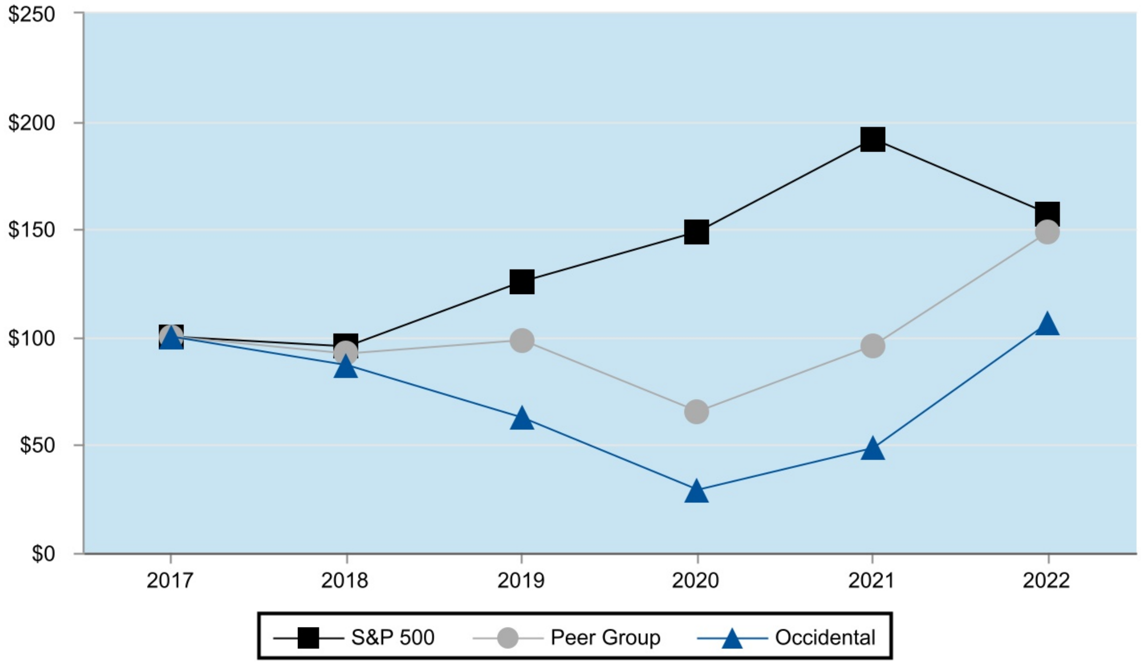
(a) Included purchases of 1,640,719 shares from the trustee of Occidental's defined contribution savings plan that are not part of publicly announced plans or programs.

(b) Represented the value remaining in Occidental's share repurchase plan. In February 2022, Occidental announced an authorization to repurchase up to $3.0 billion of Occidental's shares of common stock. The plan was completed in the fourth quarter of 2022. In February 2023, the Board authorized a new share repurchase program of up to $3.0 billion of Occidental's shares of common stock.

PERFORMANCE GRAPH

The following graph compares the yearly percentage change in Occidental's cumulative total return on its common stock with the cumulative total return of the S&P 500, which includes Occidental, with that of Occidental's peer group over the five-year period ended December 31, 2022. The graph assumes that $100 was invested at the beginning of the five-year period shown in the graph below and that all dividends were reinvested in: (i) Occidental common stock, (ii) the stock of the companies in the S&P 500 and (iii) each of the peer group companies' common stock weighted by their relative market capitalization within the peer group.

Occidental's peer group consists of BP p.l.c., Chevron Corporation, ConocoPhillips, EOG Resources, Inc., ExxonMobil Corporation, Shell, and TotalEnergies.



Fiscal Year Ended December 31,	2017	2018	2019	2020	2021	2022
Occidental	$ 100	$ 87	$ 62	$ 29	$ 49	**$ 107**
Peer Group	$ 100	$ 92	$ 98	$ 65	$ 96	**$ 149**
S&P 500	$ 100	$ 96	$ 126	$ 149	$ 191	**$ 157**

The information provided in this Performance Graph shall not be deemed "soliciting material" or "filed" with the SEC or subject to Regulation 14A or 14C under the Exchange Act, other than as provided in Item 201 to Regulation S-K under the Exchange Act, or subject to the liabilities of Section 18 of the Exchange Act and shall not be deemed incorporated by reference into any filing under the Securities Act of 1933 or the Exchange Act except to the extent Occidental specifically requests that it be treated as soliciting material or specifically incorporates it by reference.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion should be read together with the Consolidated Financial Statements and the Notes to Consolidated Financial Statements, which are included in this Form 10-K in Item 8 and the information set forth in Risk Factors under Part 1, Item 1A. The following sections include a discussion of results for fiscal 2022 compared to fiscal 2021 as well as certain 2020 results. The comparative results for fiscal 2021 with fiscal 2020 generally have not been included in this Form 10-K, but may be found in "Part II - Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations" of the Company's Annual Report on Form 10-K for the year ended December 31, 2021.

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CURRENT BUSINESS OUTLOOK AND STRATEGY

GENERAL

Occidental's operations, financial condition, cash flows and levels of expenditures are highly dependent on oil prices and, to a lesser extent, NGL and natural gas prices, the Midland-to-Gulf-Coast oil spreads, chemical product prices and inflationary pressures in the macro-economic environment. In 2022, as compared to 2021, the average annual price per barrel of WTI crude increased to $94.23 from $67.91 and the average annual Brent price per barrel increased to $98.83 from $70.78. The return of oil demand to its pre-pandemic levels, the ongoing global impact of the Russia-Ukraine war and the limited increase in supply in 2022 have resulted in an increase in benchmark oil prices year-over-year. Occidental does not operate or own assets in either Russia or Ukraine. It is expected that the price of oil will be volatile for the foreseeable future given the current geopolitical risks, the ongoing global impact of the Russia-Ukraine war, and uncertainty around the global economy, oil demand in China as it emerges from its zero-COVID policy, production levels in OPEC and non-OPEC oil producing countries and further releases from or additions to the US Strategic Petroleum Reserve.

Occidental works to manage inflation impacts by capitalizing on operational efficiencies, locking in pricing on longer term contracts and working closely with vendors to secure the supply of critical materials. As of December 31, 2022, substantially all of Occidental's outstanding debt is fixed rate.

STRATEGY

Occidental is focused on delivering a unique shareholder value proposition with its portfolio of oil and gas, chemicals and midstream and marketing assets and its ongoing development of carbon management and storage solutions and GHG emissions reduction efforts. Occidental conducts its operations with a priority on HSE, sustainability and social responsibility. Occidental aims to maximize shareholder returns through a combination of:

- Returning capital to shareholders, while redeeming a portion of preferred equity to continue improving Occidental’s financial position;
- Enhancing its existing asset base with new investments in its core cash-generative oil and gas and chemical businesses as well as emerging low-carbon businesses with a focus on its net-zero pathway;
- Advancing technologies and business solutions to help drive a sustainable low-carbon future; and
- Further reducing long-term financial leverage.

OPERATIONAL EXCELLENCE AND CAPITAL EFFICIENCY

Occidental's operational priorities for 2022 were to maximize operational efficiencies by investing $4.5 billion in high return assets to generate long-term sustainable free cash flow that will provide cash flow stability throughout the commodity cycle. Occidental set new operational records and efficiency benchmarks in the Permian, Rockies, Gulf of Mexico, Oman and UAE. OxyChem generated record earnings, beating its previous record set in 2021. With the increase in commodity prices and Occidental’s focus on its operational efficiencies, Occidental’s higher cash flow allowed it to reduce its leverage and advance its shareholder return framework.

DEBT AND INTEREST RATE SWAPS

Strong cash flow in 2022 allowed Occidental to continue its deleveraging efforts. In 2022, Occidental reduced its debt principal by more than $10.5 billion, leaving less than $18.0 billion outstanding as of December 31, 2022, and meeting its near-term debt reduction goal. As of December 31, 2022, Occidental had debt maturities of approximately $22 million in 2023, $1.1 billion in 2024 and $1.2 billion in 2025. The current maturity of $22 million was paid in January 2023, leaving no debt maturing in 2023.

Occidental’s $673 million Zero Coupons can be put to Occidental in October of each year, in whole or in part, for the then accreted value of the outstanding Zero Coupons. The Zero Coupons can next be put to Occidental in October 2023, which, if put in whole, would require a payment of approximately $344 million at such date. Occidental currently has the intent and ability to meet this obligation, including, if necessary, using amounts available under the RCF should the put right be exercised.

In the year ended December 31, 2022, Occidental settled all outstanding interest rate swaps with $255 million in cash and the application of $144 million collateral, leaving none outstanding as of December 31, 2022.

DEBT RATINGS

As of the date of this filing, Occidental’s long-term debt was rated BB+ by Fitch Ratings, Ba1 by Moody’s Investors Service and BB+ by Standard and Poor’s. Occidental believes the deleveraging performed to date may lead to future ratings upgrades, but cannot determine the timing of any potential ratings change. Any downgrade in credit ratings could impact Occidental's ability to access capital markets and increase its cost of capital. Occidental’s non-investment grade debt rating may require Occidental or its subsidiaries to provide financial assurance in the form of cash, letters of credit, surety bonds or other acceptable support under certain contractual arrangements.

SHAREHOLDER RETURN FRAMEWORK

Capital is returned to shareholders through Occidental's dividend and share repurchases. Occidental's current dividend is $0.18 per share per quarter, or $0.72 on an annualized basis. During the fourth quarter of 2022, Occidental completed its $3.0 billion share repurchase program. In February 2023, the Board authorized a new share repurchase program of up to $3.0 billion of Occidental's shares of common stock. Occidental anticipates that a higher percentage of excess free cash flow is expected to be allocated to shareholder returns in 2023 with the intention to begin redeeming the preferred stock. Occidental's preferred stock includes a mandatory redemption provision that obligates Occidental to redeem the preferred at 110% of the par value on a dollar-for-dollar basis for every dollar distributed to common shareholders above $4.00 per share, on a trailing 12-month basis.

SUSTAINABILITY AND ENVIRONMENTAL STEWARDSHIP STRATEGY

In 2020, Occidental was the first U.S. oil and gas company to announce goals to achieve net-zero GHG emissions for its total emissions inventory including use of sold products. These goals include achieving net-zero GHG emissions (i) from its operations and energy use before 2040, with an ambition to do so before 2035, and (ii) from its total carbon inventory, including the use of its sold products, with an ambition to do so before 2050. In 2020, Occidental also set various interim targets, including 2025 carbon and methane intensity targets, and Occidental was the first U.S. oil and gas company to endorse the World Bank's initiative for zero routine flaring by 2030. In 2022, the Board of Directors adopted Occidental's updated HSE and Sustainability Principles, based on engagement with shareholders, employees and other stakeholders. The Principles reinforce the alignment among Occidental's core values, goals and strategies, underpin our operational management system, and help to guide our workforce across our businesses.

Occidental seeks to meet its sustainability and environmental goals through its development and commercialization of technologies that lower both GHG emissions from industrial processes and existing atmospheric concentrations of CO_2. Occidental believes that carbon removal technologies, including DAC and CCUS, can, with incentives necessary for their development and deployment, provide essential CO_2 reductions to assist the world's transition to a less carbon-intensive economy. During 2022, Occidental undertook the following actions, among others, toward advancing its low-carbon strategy:

- Achieved zero routine flaring of gas across its U.S. oil and gas operations, 8 years ahead of the World Bank's 2030 target;
- Reduced estimated methane emissions by 33% from the 2020 baseline;
- Began construction activities for DAC 1 in the Permian;
- Acquired interests in approximately 265,000 net acres of pore space access along the U.S. Gulf Coast; and
- Invested approximately $530 million in low-carbon businesses, technologies, and net-zero pathway advancements, including the aforementioned pore space.

The future costs associated with emissions reduction, carbon removal and CCUS to meet its long-term net-zero GHG goals may be substantial and execution of its plans and net-zero pathway depends on securing third-party capital investments. Occidental is pursuing multiple pathways to fund these projects including project financing, long-term carbon removal or CCUS agreements, and identifying business opportunities with stakeholders in carbon-intensive industries

KEY PERFORMANCE INDICATORS

Occidental seeks to meet its strategic goals by continually measuring its success against key performance indicators that drive total stockholder return. In addition to efficient capital allocation and deployment discussed below in the section titled Oil and Gas Segment - Business Strategy*,* Occidental believes its most significant performance indicators are:

OPERATIONAL

- Total spend per barrel - In 2023, Occidental will continue to focus on controlling total costs from a per-barrel perspective. Total spend per barrel is the sum of capital spending, general and administrative expenses, other operating and non-operating expenses and oil and gas lease operating costs divided by global oil, NGL and natural gas sales volumes.
- Daily production - Occidental seeks to maximize field operability and minimize production down-time.

FINANCIAL

- CROCE - CROCE is calculated as (i) the cash flows from operating activities, before changes in working capital, plus distributions from WES classified as investing cash flows, divided by (ii) the average of the opening and closing balances of total equity plus total debt.
- Maintain and improve financial leverage to a level consistent with investment grade credit metrics.

SUSTAINABILITY AND ENVIRONMENTAL

- Specific interim emissions reduction and emissions intensity targets to advance our goal of net-zero operational and energy use emissions before 2040, with an ambition to achieve before 2035.
- Milestones in specific carbon removal and CCUS projects that advance our net-zero total emissions inventory, including use of sold products, with an ambition to achieve before 2050.
- Facilitate deployment of carbon removal, CCUS and other solutions to advance total carbon impact past 2050.

OIL AND GAS SEGMENT

BUSINESS STRATEGY

Occidental's oil and gas segment focuses on long-term value creation and leadership in sustainability, health, safety and the environment. In each core operating area, Occidental's operations benefit from scale, technical expertise, decades of high-margin inventory, environmental and safety leadership and commercial and governmental collaboration. These attributes allow Occidental to bring additional production quickly to market, extend the life of older fields at lower costs and provide low-cost returns-driven growth opportunities with advanced technology.

Occidental is one of the largest U.S. producers of liquids, which includes oil and NGL, allowing Occidental to maximize cash margins on a per barrel basis. The advantages that Occidental's portfolio provides, coupled with its advanced subsurface characterization ability and the proven ability to execute, position Occidental for full-cycle success in the years ahead. The oil and gas segment maximizes efficiencies to deliver lower breakeven costs and generate excess free cash flow. The oil and gas segment strives to achieve low development and operating costs to maximize full-cycle value of the assets.

The oil and gas business implements Occidental's strategy primarily by:

- Operating and developing areas where reserves are known to exist and optimizing capital intensity in core areas, primarily in the Permian Basin, DJ Basin, Gulf of Mexico, UAE, Oman and Algeria;
- Maintaining a disciplined and prudent approach to capital expenditures with a focus on high-return, short and mid-cycle, cash-flow-generating opportunities and an emphasis on creating value and further enhancing Occidental's existing positions;
- Focusing Occidental's subsurface characterization and technical activities on unconventional opportunities, primarily in the Permian Basin and Rockies;
- Using secondary and tertiary recovery techniques in mature fields; and
- Focusing on cost-reduction efficiencies and innovative technologies to reduce carbon emissions.

In 2022, oil and gas capital expenditures were approximately $3.8 billion and primarily focused on Occidental's assets in the Permian Basin, DJ Basin, Gulf of Mexico and Oman. In 2023, Occidental plans to spend $4.3 billion to $4.7 billion to develop its oil and gas assets.

OIL AND GAS PRICE ENVIRONMENT

Oil and gas prices are the major variables that drive the industry's financial performance. The following table presents the average daily WTI and Brent prices for oil and NYMEX natural gas prices for 2022 and 2021:

	2022	2021	% Change
WTI Oil ($/Bbl)	$ 94.23	$ 67.91	39 %
Brent Oil ($/Bbl)	$ 98.83	$ 70.78	40 %
NYMEX Natural Gas ($/Mcf)	$ 6.35	$ 3.61	76 %

The following table presents Occidental's average realized prices for continuing operations as a percentage of WTI, Brent and NYMEX for 2022 and 2021:

	2022	2021
Worldwide oil as a percentage of average WTI	100 %	97 %
Worldwide oil as a percentage of average Brent	95 %	93 %
Worldwide NGL as a percentage of average WTI	38 %	44 %
Worldwide NGL as a percentage of average Brent	36 %	42 %
Domestic natural gas as a percentage of NYMEX	86 %	91 %

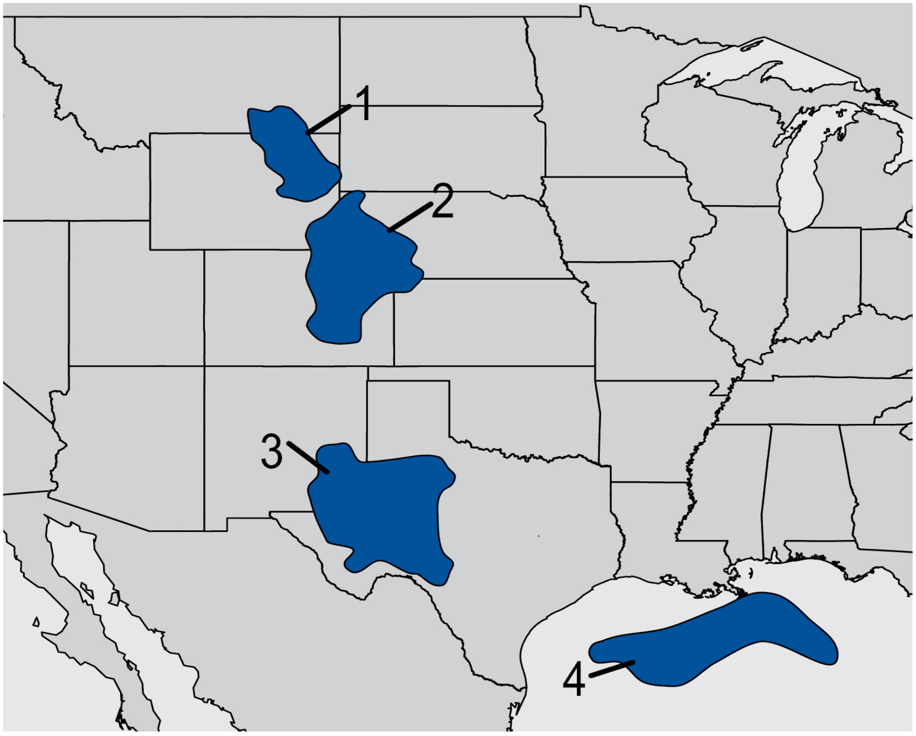
Prices and differentials can vary significantly, even on a short-term basis, making it difficult to predict realized prices with a reliable degree of certainty.

DOMESTIC INTERESTS

BUSINESS REVIEW

Occidental conducts its domestic operations through land leases, subsurface mineral rights it owns, or a combination of both. Occidental’s domestic oil and gas leases have a primary term ranging from one to 10 years, which is extended through the end of production once it commences. Occidental has leasehold and mineral interests in 9.5 million net acres, of which approximately 52% is leased, 47% is owned subsurface mineral rights and 1% is owned land with mineral rights. Approximately \$3.6 billion to \$4.0 billion of Occidental’s worldwide capital budget is expected to be allocated to its domestic operations in 2023.

DOMESTIC ASSETS [(a)]



1. Powder River Basin
2. DJ Basin
3. Permian Basin
4. Gulf of Mexico

[(a)] Map represents geographic outlines of the respective basins.

The Permian Basin

The Permian Basin extends throughout West Texas and Southeast New Mexico and is one of the largest and most active oil basins in the United States, accounting for more than 43% of total United States oil production in 2022. Overall in 2022, Occidental’s production in the Permian Basin was approximately 513 Mboe/d.

Occidental manages its Permian Basin operations through two businesses: Permian Resources, which includes unconventional opportunities, and Permian EOR, which utilizes secondary and tertiary recovery techniques. Occidental had a leading position in the Permian Basin, producing approximately 8% of the total oil in the basin in 2022. By exploiting the natural synergies between Permian Resources and Permian EOR, Occidental is able to deliver unique short- and long-term advantages, efficiencies and expertise across its Permian Basin operations.

The Permian Resources unconventional business is focused on developing and producing unconventional reservoir targets using horizontal drilling technology. The development programs are designed to create long-term value from primary development by maximizing the recovery of oil, utilizing sustainable practices and providing strong financial returns. Occidental’s unconventional oil and gas operations in Permian Resources include approximately 1.4 million net acres. In 2022, our activities were focused in the core development areas with emphasis on maintaining the industry leading capital intensity through optimized surface infrastructure and customized well designs. Overall, in 2022, Permian Resources produced from approximately 3,300 gross wells and added 387 MMboe to Occidental’s proved reserves through development and extensions of proved areas.

The Permian Basin’s concentration of large conventional reservoirs, strong CO_2 flooding performance and the expansive CO_2 transportation and processing infrastructure has resulted in decades of high-value enhanced oil production. With 34 active CO_2 floods and over 50 years of experience, Occidental is the industry leader in Permian Basin CO_2 flooding, which can increase ultimate oil recovery by 10% to 25%. Technology improvements, such as the recent trend toward vertical expansion of the CO_2 flooded interval into residual oil zone targets, continue to yield more recovery from existing projects, and Permian EOR produced from approximately 13,000 gross wells in 2022.

Significant opportunities also remain to gain additional recovery by expanding Occidental's existing CO_2 projects into new portions of reservoirs that have only been waterflooded. Permian EOR has a large inventory of future CO_2 projects, which could be developed over the next 20 years or accelerated, depending on market conditions.

In 2022, Occidental spent approximately $2.3 billion of capital in the Permian Basin, of which approximately 93% was spent on Permian Resources assets.

Rockies and Other Domestic

In 2022, Occidental produced approximately 277 Mboe/d net in the Rockies and Other Domestic locations. Production in the DJ Basin is derived from 2,000 operated vertical wells and 2,400 operated horizontal wells primarily focused in the Niobrara and Codell formations. The DJ Basin, including the North DJ Basin, comprises approximately 800,000 total net acres and provides competitive economics, low breakeven costs and free cash flow generation through Occidental's contiguous acreage position and royalty uplift.

In the DJ Basin, horizontal drilling results in the field continue to be strong, with improved operational efficiencies in drilling and completions. In 2022, Occidental drilled 68 operated horizontal wells and completed 54 operated horizontal wells.

Occidental is focusing on obtaining the necessary state, local and federal permits required to construct facilities and drill and complete wells in the DJ Basin. In January 2021, the COGCC adopted new regulations that impose siting requirements, or "setbacks," on certain oil and gas drilling locations based on the distance of a proposed well pad to occupied structures. Under these new regulations and through thoughtful surface location planning, Occidental obtained COGCC approval for five Oil and Gas Development Plans, inclusive of 12 well pad and facility locations and approximately 150 wells. In addition to the approximately 150 wells approved through the Oil and Gas Development Plan process, during the third quarter of 2022, Occidental became the first oil and gas operator in Colorado to obtain COGCC approval for the first Comprehensive Area Plan under the new COGCC rules. This comprehensive plan will support nine well pads and approximately 140 new wells and will provide for substantial future development in a geographically remote area on Colorado's eastern plains. Oil and Gas Development Plans associated with the Comprehensive Area Plan will be submitted in 2023.

As of December 31, 2022, Occidental is permitted, or had permit applications submitted to applicable regulatory agencies, for nearly all planned 2023 drilling and completions activity in the DJ Basin. In 2023, Occidental plans to submit state and local permits with the goal of building operational inventory and maintaining its social license to operate in Colorado. Occidental has a dedicated stakeholder relations team that conducts regulatory and community outreach with respect to its permit applications and operations in Colorado with a focus on building trust and fostering open communication with those that live and work near our operations.

Occidental has gained efficiencies in the permitting process and will continue to look for additional opportunities to do so. As discussed above, Occidental does not anticipate significant near-term changes to our development program in the DJ Basin based on these regulations. However, if Occidental is unable to obtain new drilling permits to develop a significant portion of the company's undeveloped acreage in the DJ Basin, the company's DJ Basin assets may be subject to testing for impairment, and if deemed to be impaired, such impairment could be material to our financial statements.

Occidental has interest in over 300,000 net acres in the Powder River Basin, mainly located in Converse County and Campbell County, Wyoming. The field contains the Turner, Niobrara, Mowry and Parkman formations that hold both liquids and natural gas. In 2022, Occidental drilled 19 operated horizontal wells and completed 14 horizontal wells in the Powder River Basin. The company plans to run one continuous operated drilling rig in 2023 with targeted completion activity throughout the year.

Occidental holds approximately 4.6 million net acres in other domestic locations, which consist of legacy acreage and fee minerals outside of Occidental's core operated areas including parts of Arkansas, Colorado, Louisiana, Texas, West Virginia and Wyoming.

OFFSHORE DOMESTIC ASSETS

Gulf of Mexico

Occidental is the fourth-largest oil and gas producer in the deep-water Gulf of Mexico, operating 10 strategically located deep-water floating platforms, the highest number among all the deep water operators, and producing from 18 active fields while owning a working interest across 252 blocks, including approximately 1.0 million net acres. Occidental's position is one of the largest portfolios in the Gulf of Mexico.

Occidental further operates two marine shore-bases in Galveston, Texas, and Port Fourchon, Louisiana, as well as two helicopter bases in Louisiana that all provide back up and redundancy to each other to support the Gulf operations. A central logistics base with an integrated training center is located in Broussard, Louisiana, and the Gulf of Mexico operations and development are managed and supported with engineering and technical staff from The Woodlands, Texas, office tower.

In 2022, Occidental increased net production to 147 Mboe/d from approximately 88 gross wells, investing over $450 million in capital, including exploration capital, primarily directed towards drilling activity in its new Horn Mountain West subsea development, Lucius and Holstein facilities, drilling five wells using one floating drill ship, one platform rig and several service rigs. Occidental successfully and safely initiated first production from its new Horn Mountain West field and tied back to the Horn Mountain facility, increasing production at the platform by over 34 Mboe/d from three subsea oil wells, on budget and three months ahead of schedule. In the fourth quarter of 2022, the new Caesar-Tonga Subsea Expansion project was also started several months ahead of schedule, debottlenecking the prolific giant Caesar-Tonga field and thus enabling future field expansion projects. Major subsea-pumping projects supporting the Marco Polo/K2 field and the Marlin/King field were progressed as well as extensive 4D seismic shoots in the Holstein field and elsewhere, setting up a runway of future development opportunities.

Operational excellence and efficiency continued as the prime objective in 2022 and gathered further momentum, reducing overall base production decline rates through the implementation of several successful well stimulations and artificial lift projects. Platform operating efficiencies were significantly improved and machinery uptimes were increased all through subordinated focus and condition monitoring initiatives as well as multiple upgrade projects. Continued optimum sequencing of annual platform turn-arounds provided further operational efficiencies, avoiding around two hundred days per year of shut-ins.

During 2022, all necessary regulatory permits for new wells and existing operations were obtained timely without any operational delays. Occidental was further awarded 30 new leases from BOEM’s Lease Sale 257 and was the second most successful bidder.

Occidental’s Gulf of Mexico assets continued to be among the lowest carbon emissions operations in the industry with zero routine flaring and zero cold venting.

The following table shows key areas of ongoing development in the Gulf of Mexico, along with the corresponding working interest in those areas.

	Working Interest
Horn Mountain	100 %
Holstein	100 %
Marlin	100 %
Lucius	67 %
K2 Complex	42 %
Caesar Tonga	34 %
Constellation	33 %

In 2023, Occidental expects to continue development and expansion of its existing assets across the Gulf of Mexico, to safely deliver high-margin production while continuing to add to its drill well inventory on existing leases through expansion and infrastructure led exploration opportunities around existing infrastructure. Occidental plans to conduct development and exploration activities in 2023 using one to two floating drill ships, one platform rig and several other well service vessels and continue to optimize its extensive portfolio of lease working interests.

INTERNATIONAL INTERESTS

BUSINESS REVIEW

Occidental conducts its ongoing international operations in two sub-regions: the Middle East and North Africa. Its activities include oil, NGL and natural gas production through direct working-interests, PSAs and PSCs. Under the PSCs, Occidental records a share of production and reserves to recover certain development and production costs and an additional share for profit. These contracts do not transfer any right of ownership to Occidental and reserves reported from these arrangements are based on Occidental's economic interest as defined in the contracts. Occidental's share of production and reserves from these contracts decreases when product prices rise and increases when prices decline. Overall, Occidental's net economic benefit from these contracts is greater when product prices are higher. Approximately $0.5 billion of Occidental's worldwide capital budget is expected to be allocated to its international operations in 2023.

MIDDLE EAST / NORTH AFRICA ASSETS

1. Algeria
2. Oman
3. Qatar
4. UAE

Algeria

Occidental's interest in Algeria involves development and production rights in 18 fields within Blocks 404a and 208, which are located in the Berkine Basin in Algeria's Sahara Desert and are governed by an agreement amongst Occidental, Sonatrach and other partners. Occidental is responsible for 24.5% of the development and production costs. The El Merk central processing facility in Block 208 processes produced oil, NGL and natural gas, while the Hassi Berkine South and Ourhoud central processing facilities in Block 404a process produced oil. The rights to produce from the Block 404a fields expire between May 2023 and 2036, and the rights to produce from the Block 208 fields expire in 2032.

In 2022, net production in Algeria was 45 Mbbl/d, two gross development wells were drilled and annual net capital expenditures were $25 million.

In July 2022, Occidental signed a new PSC with Sonatrach and other partners which, upon approval by the Algerian government, will be for a new 25-year term for all of the fields under the current hydrocarbon agreement. With respect to the new PSC, Occidental is responsible for 35% of the development and production costs, and government approval is expected in the first half of 2023.

Oman

In Oman, Occidental is the operator of Block 9, Block 27, Block 53 (Mukhaizna Field), Block 62 and Block 65 and has additional interests in Blocks 30, 51 and 72, which are under the Exploration phase. The working interest and contract expiration year for each of the respective blocks are shown in the table below. Occidental holds 6.0 million gross acres and has 10,000 potential well inventory locations. In 2022, Occidental's share of production was 65 Mboe/d.

	Working Interest	Block Expiration (Year)
Block 9	50 %	2030
Block 27	65 %	2035
Block 53	47 %	2035
Block 62	100 %	2028
Block 65	51 %	2037
Blocks 30, 51 and 72	100 %	Exploration Phase

Occidental has produced over 754 million gross barrels from Block 9 since the beginning of its operation through successful exploration, continuous drilling improvements and EOR projects. The Mukhaizna Field in Block 53 is a major pattern steam flood project for EOR that utilizes some of the largest mechanical vapor compressors ever built. Since assuming operations in the Mukhaizna Field in 2005, Occidental has drilled close to 3,580 new wells and has produced over 575 million gross barrels. In 2022, Occidental declared commerciality for Block 65 and invested capital of $362 million across all of the Oman blocks to drill 92 wells and execute facilities projects to support development and EOR activities.

In 2023, Occidental will continue to enhance production by adding extended and dual laterals, stimulating wells with the OXY JETTING™ wellbore stimulation system, and expanding thermal conformance. Occidental will also continue to execute projects in Oman targeting emissions reductions.

Qatar

In Qatar, Occidental partners in the Dolphin Energy Project, an investment that is comprised of two separate economic interests. Occidental has a 24.5% interest in the upstream operations (Dolphin) to develop and produce NGL, natural gas and condensate from Qatar's North Field through mid-2032. Occidental also has a 24.5% interest in DEL, which operates a pipeline and is discussed further in the midstream and marketing segment section in this Form 10-K under Pipeline. In 2022, Occidental's net share of production from Dolphin was 37 Mboe/d.

UAE

In 2011, Occidental acquired a 40% participating interest in the Shah gas field (Al Hosn Gas), joining with the Abu Dhabi National Oil Company, which expires in 2041. In 2022, Occidental's net share of production from Al Hosn Gas was 227 million cubic feet per day (MMcf/d) of natural gas and 35 Mbbl/d of NGL and condensate. Al Hosn Gas includes gas processing facilities which are discussed further in the midstream and marketing segment section in this Form 10-K under Gas Processing, Gathering and CO_2.

In 2019 and 2020, Occidental acquired 9-year exploration concessions and, subject to a declaration of commerciality, 35-year production concessions for Onshore Block 3 and Block 5, which cover an area approximately 1.5 million acres and 1.0 million acres, respectively, and are adjacent to Al Hosn Gas. In 2022 and 2021, Occidental announced multi-zone oil and gas discoveries in Onshore Block 3.

In 2023, Occidental plans to complete an expansion project that commenced in 2022 to increase the production capacity of the Al Hosn Gas processing facilities from 1.28 Bcf/d to 1.45 Bcf/d and continue further exploration and appraisal activities in Onshore Block 3 and Block 5.

PROVED RESERVES

Proved oil, NGL and natural gas reserves were estimated using the unweighted arithmetic average of the first-day-of-the-month price for each month within the year, unless prices were defined by contractual arrangements. Oil, NGL and natural gas prices used for this purpose were based on posted benchmark prices and adjusted for price differentials including gravity, quality and transportation costs.

The following table shows the 2022, 2021 and 2020 calculated first-day-of-the-month average prices for both WTI and Brent oil prices, as well as the Henry Hub gas prices measured in MMbtu:

	2022	2021	2020
WTI Oil ($/Bbl)	$ 93.67	$ 66.56	$ 39.57
Brent Oil ($/Bbl)	$ 97.77	$ 69.24	$ 43.41
Henry Hub Natural Gas ($/MMbtu)	$ 6.36	$ 3.60	$ 1.98
Mt. Belvieu NGL ($/Bbl)	$ 47.81	$ 44.22	$ 18.74

Occidental had proved reserves from continuing operations at year-end 2022 of 3,817 MMboe, compared to the year-end 2021 amount of 3,512 MMboe. Proved developed reserves represented approximately 71% and 75% of Occidental's total proved reserves at year-end 2022 and 2021, respectively. The following table shows the breakout of Occidental's proved reserves from continuing operations by commodity as a percentage of total proved reserves:

	2022	2021
Oil	50 %	50 %
NGL	22 %	22 %
Natural gas	28 %	28 %

Occidental does not have any reserves from non-traditional sources. For further information regarding Occidental's proved reserves, see the Supplemental Oil and Gas Information section in Item 8 of this Form 10-K.

CHANGES IN PROVED RESERVES

Changes in Occidental's 2022 reserves were as follows:

MMboe	2022
Revisions of previous estimates	474
Improved recovery	89
Extensions and discoveries	176
Purchases	10
Sales	(21)
Production	(423)
Total	305

Occidental's ability to add reserves, other than through purchases, depends on the success of infill development, extension, discovery and improved recovery projects, each of which depends on reservoir characteristics, technology improvements and oil and natural gas prices, as well as capital and operating costs. Many of these factors are outside management's control and may negatively or positively affect Occidental's reserves.

Revisions of Previous Estimates

Revisions can include upward or downward changes to previous proved reserve estimates for existing fields due to the evaluation or interpretation of geologic, production decline or operating performance data. In addition, product price changes affect proved reserves recorded by Occidental. For example, lower prices may decrease the economically recoverable reserves, particularly for domestic properties, because the reduced margin limits the expected life of the operations. Offsetting this effect, lower prices increase Occidental's share of proved reserves under PSCs because more oil is required to recover costs. Conversely, when prices rise, Occidental's share of proved reserves decreases for PSCs and economically recoverable reserves may increase for other operations. Reserve estimation rules require that estimated ultimate recoveries be much more likely to increase or remain constant than to decrease, as changes are made due to increased availability of technical data.

In 2022, Occidental's revisions of previous estimates of proved reserves were positive 474 MMboe. These revisions were primarily due to 335 MMboe of positive revisions related to additions associated with infill development projects, mainly in the Permian Basin (232 MMboe) and the DJ Basin (94 MMboe). An additional 136 MMboe of positive revisions were related price revisions. The positive price revisions were primarily associated with the Permian Basin (147 MMboe), the Gulf of Mexico (8 MMboe) and the DJ Basin (4 MMboe), which were partially offset by negative price revisions of 29 MMboe on international PSCs.

Further positive revisions of 93 MMboe were associated with updates based on reservoir performance and 5 MMBoe were associated with management changes in development plans. The positive revisions were offset by negative revisions associated with various other cost and interest related revisions (95 MMboe).

Improved Recovery

In 2022, Occidental added proved reserves of 89 MMboe related to improved recovery, primarily in the Permian EOR, which accounted for 87% of the improved recovery reserve additions. These properties comprise conventional projects, which are characterized by the deployment of EOR development methods, largely employing application of CO_2 flood, waterflood or steam flood. These types of conventional EOR development methods can be applied through existing wells, though additional drilling is frequently required to fully optimize the development configuration. Waterflooding is the technique of injecting water into the formation to displace the oil to the offsetting oil production wells. The use of either CO_2 or steam flooding depends on the geology of the formation, the evaluation of engineering data, availability and cost of either CO_2 or steam and other economic factors. Both techniques work similarly to lower viscosity causing the oil to move more easily to the producing wells. The remaining improved recovery additions were due to secondary and tertiary projects for certain international assets.

Extensions and Discoveries

Occidental also added proved reserves from extensions and discoveries, which are dependent on successful exploration and exploitation programs. In 2022, extensions and discoveries added 176 MMboe primarily related to the recognition of proved reserves in the Permian Basin (155 MMboe) and Powder River Basin (7 MMboe).

Purchases of Proved Reserves

In 2022, Occidental purchased proved reserves of 10 MMboe primarily consisting of proved reserves in the Permian Basin.

Sales of Proved Reserves

In 2022, Occidental sold 21 MMboe in proved reserves related to the divestitures of certain non-strategic assets in the Permian Basin.

Proved Undeveloped Reserves

Occidental had PUD reserves at year-end 2022 of 1,119 MMboe, compared to the year-end 2021 amount of 865 MMboe.

Changes in PUD reserves were as follows:

MMboe	**2022**
Revisions of previous estimates	**270**
Improved recovery	**49**
Extensions and discoveries	**107**
Purchases	**1**
Sales	**(10)**
Transfer to proved developed reserves	**(163)**
Total	**254**

Revisions of previous estimates were a positive 270 MMboe. Approximately 263 MMboe of the positive revisions were related to additions associated with infill development projects in the Permian Basin (170 MMboe) and the DJ Basin (93 MMboe). Additionally, the revisions included positive price revisions of 24 MMboe. The positive price revisions were primarily associated with the Permian Basin. The remaining positive revisions were associated with various updates based on reservoir performance. The positive revisions were offset by negative revisions associated with various other cost and interest related revisions (21 MMboe).

Extensions and discoveries added 107 MMboe primarily related to the recognition of proved reserves in the Permian Basin (100 MMboe). Total improved recovery additions of 49 MMboe were primarily the result of conventional projects in the Permian EOR (44 MMboe) and secondary and tertiary projects in international assets (5 MMboe). The 2022 additions to

PUD reserves were partially offset by transfers to proved developed reserves of 163 MMboe. The transfers were primarily associated with the Permian Basin (89 MMboe), the DJ Basin (40 MMboe) and Gulf of Mexico (21 MMboe).

In 2022, Occidental incurred approximately $1.2 billion to convert PUD reserves to proved developed reserves, and in 2022 Occidental converted approximately 19% of its PUD reserves to proved developed, when adjusted for revisions and sales. As of December 31, 2022, Occidental had 1,119 MMboe of PUD reserves of which 73% were associated with domestic onshore, 4% with Gulf of Mexico and 23% with international assets. Occidental's most active development areas are located in the Permian Basin, which represented 54% of the PUD reserves as of December 31, 2022. Occidental's total planned 2023 capital expenditures are between $5.4 billion and $6.2 billion. Overall, Occidental plans to spend approximately $4.6 billion over the next five years to develop its PUD reserves in the Permian Basin.

PUD reserves are supported by a five-year detailed field-level development plan, which includes the timing, location and capital commitment of the wells to be drilled. Only PUD reserves which are reasonably certain to be drilled within five years of booking and are supported by a final investment decision to drill them are included in the development plan. A portion of the PUD reserves are expected to be developed beyond the five years and are tied to approved long-term development projects.

As of December 31, 2022, Occidental had 241 MMboe of pre-2018 PUD reserves that remained undeveloped. These PUD reserves relate to approved long-term development plans, 175 MMboe of which are primarily associated with international development projects with physical limitations in existing gas processing capacity and 66 MMboe of which are related to approved long-term development plans for Permian EOR projects, also with physical limitations in existing gas processing capacity. Occidental remains committed to these projects and continues to actively progress the development of these volumes. In addition to the above, Occidental has 57 MMboe of PUD reserves that are scheduled to be developed more than five years from their initial date of booking. These PUD reserves are related to approved long-term development plans, 41 MMboe of which are associated with international development projects and 16 MMboe with the Gulf of Mexico projects.

RESERVES EVALUATION AND REVIEW PROCESS

Occidental's estimates of proved reserves and associated future net cash flows as of December 31, 2022, were made by Occidental's technical personnel and are the responsibility of management. The estimation of proved reserves is based on the requirement of reasonable certainty of economic producibility and funding commitments by Occidental to develop the reserves. This process involves reservoir engineers, geoscientists, planning engineers and financial analysts. As part of the proved reserves estimation process, all reserve volumes are estimated by a forecast of production rates, operating costs and capital expenditures. Price differentials between benchmark prices (the unweighted arithmetic average of the first-day-of-the-month price for each month within the year) and realized prices and specifics of each operating agreement are then used to estimate the net reserves. Production rate forecasts are derived by a number of methods, including estimates from decline curve analysis, type well profile analysis, computer simulation of the reservoir performance, volumetric analysis and material balance calculations that take into account the volumes of substances replacing the volumes produced and associated reservoir pressure changes supported by various technologies including seismic analysis. These reliable field-tested technologies have demonstrated reasonably certain results with consistency and repeatability in the formation being evaluated or in an analogous formation. Operating and capital costs are forecast using the current cost environment applied to expectations of future operating and development activities.

Net proved developed reserves are those volumes that are expected to be recovered through existing wells with existing equipment and operating methods for which the incremental cost of any additional required investment is relatively minor.

Net PUD reserves are those volumes that are expected to be recovered from new wells on undrilled acreage, or from existing wells where a relatively major expenditure is required for recompletion. PUD reserves are supported by a five-year, detailed, field-level development plan, which includes the timing, location and capital commitment of the wells to be drilled. The development plan is reviewed and approved annually by senior management and technical personnel. Annually, a detailed review is performed by Occidental's Corporate Reserves Group and its technical personnel on a lease-by-lease basis to assess whether PUD reserves are being converted on a timely basis within five years from the initial disclosure date. Any leases not showing timely transfers from PUD reserves to proved developed reserves are reviewed by senior management to determine if the remaining reserves will be developed in a timely manner and have sufficient capital committed in the development plan. Only PUD reserves that are reasonably certain to be drilled within five years of booking and are supported by a final investment decision to drill them are included in the development plan. A portion of the PUD reserves associated with international operations are expected to be developed beyond the five years and are tied to approved long-term development plans.

The current Senior Vice President, Reserves for Oxy Oil and Gas is responsible for overseeing the preparation of reserve estimates, in compliance with SEC rules and regulations, including the internal audit and review of Occidental's oil and gas reserves data. He has over 40 years of experience in the upstream sector of the exploration and production business and has held various assignments in North America, Asia and Europe. He is a three-time past Chair of the Society of Petroleum Engineers Oil and Gas Reserves Committee. He is an AAPG Certified Petroleum Geologist and currently serves on the AAPG Committee on Resource Evaluation. He is a member of the Society of Petroleum Evaluation Engineers, the Colorado School of Mines Potential Gas Committee and the United Nations Economic Commission for Europe Expert

Group on Resource Management. He has Bachelor of Science and Master of Science degrees in geology from Emory University in Atlanta.

Occidental has a Reserves Committee, consisting of senior corporate officers, to review and approve Occidental's oil and gas reserves. The Reserves Committee reports to the Audit Committee of Occidental's Board of Directors during the year. Since 2003, Occidental has retained Ryder Scott, independent petroleum engineering consultants, to review its annual oil and gas reserve estimation processes. For additional reserves information, see Supplemental Oil and Gas Information under Item 8 of this Form 10-K.

In 2022, Ryder Scott conducted a process review of the methods and analytical procedures utilized by Occidental's engineering and geological staff for estimating the proved reserves volumes, preparing the economic evaluations and determining the reserves classifications as of December 31, 2022, in accordance with SEC regulatory standards. Ryder Scott reviewed the specific application of such methods and procedures for selected oil and gas properties considered to be a valid representation of Occidental's 2022 year-end total proved reserves portfolio. In 2022, Ryder Scott reviewed approximately 42% of Occidental's proved oil and gas reserves. Since being engaged in 2003, Ryder Scott has reviewed the specific application of Occidental's reserve estimation methods and procedures for approximately 92% of Occidental's existing proved oil and gas reserves.

Management retained Ryder Scott to provide objective third-party input on its methods and procedures and to gather industry information applicable to Occidental's reserve estimation and reporting process. Ryder Scott has not been engaged to render an opinion as to the reasonableness of reserves quantities reported by Occidental. Occidental has filed Ryder Scott's independent report as an exhibit to this Form 10-K.

Based on its reviews, including the data, technical processes and interpretations presented by Occidental, Ryder Scott has concluded that the overall procedures and methodologies Occidental utilized in estimating the proved reserves volumes, preparing the economic evaluations and determining the reserves classifications for the reviewed properties are appropriate for the purpose thereof and comply with current SEC regulations.

INDUSTRY OUTLOOK

The oil and gas exploration and production industry is highly competitive, is subject to significant volatility due to various market conditions and operations are highly dependent on oil prices and, to a lesser extent, NGL and natural gas prices. Oil prices increased significantly in 2022. During 2022, as compared to 2021, the average annual $/Bbl of WTI crude increased to $94.23 from $67.91 and the average annual Brent price per barrel increased to $98.83 from $70.78.

Oil prices will continue to be affected by: (i) global supply and demand, which are generally a function of global economic conditions, inventory levels, production or supply chain disruptions, technological advances, regional market conditions and the actions of OPEC, other significant producers and governments; (ii) transportation capacity, infrastructure constraints, and costs in producing areas; (iii) currency exchange rates and inflation rates; and (iv) the effect of changes in these variables on market perceptions. The ongoing global impact of the Russia-Ukraine war and whether the oil industry will be able to sustain a continued supply response have resulted in an increase in benchmark oil prices year-over-year. Occidental does not operate or own assets in either Russia or Ukraine. It is expected that the price of oil will be volatile for the foreseeable future given the current geopolitical risks, the ongoing global impact of the Russia-Ukraine war, the evolving macro-economic environment and supply activity (as a result of COVID-19) from OPEC and non-OPEC oil producing countries and the Biden Administration's releases from the US Strategic Petroleum Reserve.

NGL prices are related to the supply and demand for the components of products making up these liquids. Some of them more typically correlate to the price of oil while others are affected by natural gas prices as well as the demand for certain chemical products for which they are used as feedstock. In addition, infrastructure constraints magnify the pricing volatility from region to region.

Domestic natural gas prices and local differentials are strongly affected by local supply and demand fundamentals, as well as government regulations, global LNG demand and availability of transportation capacity from producing areas.

We expect that oil prices in the near term will continue to be influenced by the duration and severity of the COVID-19 pandemic and its resulting impact on oil and gas supply and demand.

These and other factors make it difficult to predict the future direction of oil, NGL and domestic gas prices reliably. For purposes of the current capital plan, Occidental will continue to focus on allocating capital to high return assets with the flexibility to adjust based on fluctuations in commodity prices. International gas prices are generally fixed under long-term contracts. Occidental continues to adjust capital expenditures in line with current economic conditions, such as supply chain constraints, rising interest rates, global logistics and high inflation, which has continued to disrupt global supply and demand balances, with the goal of keeping returns well above its cost of capital.

The timing, process and ultimate cost to transition to a less carbon-intensive economy remains largely unknown; various industry forecasts indicate a growing demand for hydrocarbons for the remainder of the current decade. Occidental believes its operational flexibility to achieve low development and operating costs to maximize full-cycle value of its assets and its knowledge and experience in CO_2 separation, transportation, use, recycling and storage position its oil and gas segment to support Occidental's transition to net zero as well as create opportunities in a low-carbon future.

CHEMICAL SEGMENT

BUSINESS STRATEGY

OxyChem concentrates on the chlorovinyls chain, beginning with the co-production of caustic soda and chlorine. Caustic soda and chlorine are marketed to external customers. In addition, chlorine, together with ethylene, is converted through a series of intermediate products into PVC. OxyChem seeks to be a low-cost producer in order to generate cash flow in excess of its normal capital expenditure requirements and achieve above-cost-of-capital returns. OxyChem's focus on chlorovinyls allows it to maximize the benefits of integration and take advantage of economies of scale. Capital is employed to sustain production capacity and to focus on projects and developments designed to improve the competitiveness of segment assets. Acquisitions and plant development opportunities may be pursued when they are expected to enhance the existing core chlor-alkali and PVC businesses or take advantage of other specific opportunities. The conversion of the Battleground chlor-alkali plant to membrane technology is expected to commence in 2023 with completion expected in 2026. In 2022, capital expenditures for OxyChem totaled $322 million.

BUSINESS ENVIRONMENT

Although the United States economic growth lagged significantly behind that of 2021, demand for domestically produced products remained high, including liquid caustic soda and PVC. Lockdowns in China, along with Russia's invasion of Ukraine increased the demand for U.S. produced products in 2022, as ethylene and energy costs remained advantaged over global pricing. Caustic soda prices were significantly higher in 2022 and PVC pricing trended downward during the second half of 2022, as supply chain constraints, rising interest rates, global logistics and high inflation continued to disrupt global supply and demand balances.

BUSINESS REVIEW

BASIC CHEMICALS

Despite the slower U.S. economic growth in 2022, chlor-alkali operating rates increased compared to 2021 as the U.S. maintained its competitive advantage in energy and feedstock costs. Pricing and margins for most products were higher in 2022 due to strong demand in most market segments, and weather events and other supply disruptions restricted supply.

VINYLS

PVC demand softened in 2022 from record highs in 2021 resulting in a 7% decrease in domestic PVC demand. Export demand strengthened in 2022 by 46% compared to 2021. Year over year operating rates were flat in 2022 due to a softening PVC market during the second half of 2022 that was offset by the weather-related events experienced in early 2021. Higher interest rates, lower housing starts, and inflation contributed to the lower domestic PVC demand and US producers shifted available volumes to the export markets. PVC exports represented 27% of total North American production in 2022 compared to 19% in 2021.

INDUSTRY OUTLOOK

Industry performance will depend on the health of the global economy. Response to inflation will continue to control the housing and construction sectors during 2023. Automotive markets are expected to improve as semiconductor supply normalizes and demand responds. Product margins will depend on market supply and demand balances, feedstock and energy prices, supply chain interruptions, labor constraints and rising inflation rates. Further recovery in the petroleum industry should strengthen the demand and margins for some of Occidental's products that are consumed by industry participants. U.S. commodity export markets could be impacted by the relative strength of the U.S. dollar.

BASIC CHEMICALS

Demand for basic chemicals is expected to decline from the robust levels of 2022. Demand in most market segments is expected to follow the trend of the general economy throughout 2023. Demand for chlorine and derivatives should gradually improve across the year as international growth returns and the domestic housing, general construction and automotive markets begin to stabilize. Demand for alkali products, particularly caustic soda, may decline moderately with lower demand in the pulp and paper, industrial and alumina markets. Chlor-alkali operating rates should remain relatively flat overall in comparison with 2022 due to continued globally advantaged energy and raw material pricing as compared to global feedstock costs.

VINYLS

Domestic PVC demand is expected to remain neutral to lower in 2023. Residential construction spending is expected to be lower in 2023, while new domestic infrastructure projects and recovering global demand is expected to offset the domestic decline. New domestic PVC capacity came online in 2022 but is not expected to have a material impact on PVC production rates.

MIDSTREAM AND MARKETING SEGMENT

BUSINESS STRATEGY

The midstream and marketing segment strives to maximize value by optimizing the use of its gathering, processing, transportation, storage and terminal commitments and by providing the oil and gas segment access to domestic and international markets. To generate returns, the segment evaluates opportunities across the value chain and uses its assets to provide services to Occidental's subsidiaries, as well as third parties. The midstream and marketing segment operates or contracts for services on gathering systems, gas plants, co-generation facilities and storage facilities and invests in entities that conduct similar activities.

This segment also seeks to minimize the costs of gas and power used in Occidental's various businesses. Capital is employed to sustain or expand assets to improve the competitiveness of Occidental's businesses. In 2022, capital expenditures related to the midstream and marketing segment totaled $268 million.

Also included in the midstream and marketing segment is OLCV. OLCV seeks to leverage Occidental's carbon management expertise through the development of CCUS projects, and invests in emerging low-carbon technologies that are expected to reduce our carbon footprint and enable others to do the same.

BUSINESS ENVIRONMENT

Midstream and marketing segment earnings are affected by the performance of its various businesses, including its marketing, gathering and transportation, gas processing and power-generation assets. The marketing business aggregates, markets and stores Occidental and third-party volumes. Marketing performance is affected primarily by commodity price changes and margins in oil and gas transportation and storage programs. The marketing business results can experience significant volatility depending on commodity prices and the Midland-to-Gulf-Coast oil spreads. The Midland-to-Gulf-Coast oil spreads have decreased from an average of $0.48 per barrel in 2021 to $0.36 per barrel for the year ended December 31, 2022. A $0.25 change in the Midland-to-Gulf-Coast oil spreads impacts total year operating cash flows by approximately $65 million. Gas gathering, processing and transportation results are affected by fluctuations in commodity prices and the volumes that are processed and transported through the segment's plants, as well as the margins obtained on related services from investments in which Occidental has an equity interest.

BUSINESS REVIEW

MARKETING

The marketing group markets substantially all of Occidental's oil, NGL and natural gas production and optimizes its transportation and storage capacity. Occidental's third-party marketing activities focus on purchasing oil, NGL and natural gas for resale from parties whose oil and gas supply is located near its transportation and storage capacity. These purchases allow Occidental to aggregate volumes to better utilize and optimize its assets. In 2022, compared to the prior year, marketing results were impacted by the timing of crude oil sales, partially offset by higher gas marketing margin from transportation capacity optimization.

DELIVERY AND TRANSPORTATION COMMITMENTS

Occidental has made long-term commitments to certain refineries and other buyers to deliver oil, NGL and natural gas. The total amount contracted to be delivered is approximately 80 MMbbl of oil through 2025, 567 MMbbl of NGL through 2029 and 845 Bcf of gas through 2029. The price for these deliveries is set at the time of delivery of the product.

Occidental has crude pipeline take-or-pay capacity of approximately 850 Mbbl/d to the Gulf Coast, leased crude storage capacity of approximately 10 MMbbl and capacity at the crude terminal of approximately 525 Mbbl/d. Certain of Occidental's crude pipeline take-or-pay agreements expire in 2025 and take-or-pay commitments will reduce by two thirds by 2027.

PIPELINE

Occidental's pipeline business mainly consists of its 24.5% ownership interest in DEL. DEL owns and operates a 230-mile-long, 48-inch-diameter natural gas pipeline, known as the Dolphin Pipeline, which transports dry natural gas from Qatar to the UAE and Oman. The Dolphin Pipeline has capacity to transport up to 3.2 Bcf/d and currently transports approximately 2.0 Bcf/d and up to 2.2 Bcf/d in the summer months.

GAS PROCESSING, GATHERING AND CO_2

Occidental processes its own and third-party domestic wet gas to extract NGL and other gas byproducts, including CO_2 and delivers dry gas to pipelines. Margins primarily result from the difference between inlet costs of wet gas and market prices for NGL.

As of December 31, 2022, Occidental owned all of the 2.3% non-voting general partner interest and 49.5% of the limited partner units in WES. On a combined basis, with its 2% non-voting limited partner interest in WES Operating, Occidental's total effective economic interest in WES and its subsidiaries was 51.7%. See Note 1 - Summary of Significant Accounting Policies in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K for more information regarding

Occidental's equity method investment in WES. WES owns gathering systems, plants and pipelines and earns revenue from fee-based and service-based contracts with Occidental and third parties.

Occidental's 40% participating interest in Al Hosn Gas also includes sour gas processing facilities that are designed to process 1.33 Bcf/d of natural gas and separate it into salable gas, condensate, NGL and sulfur. In 2022, the project produced 568 MMcf/d of natural gas, 88 Mbbl/d of NGL and condensate, and 10,700 tons/d of sulfur, of which Occidental's net share was 227 MMcf/d of natural gas, 35 Mbbl/d of NGL and condensate and 4,280 tons/d of sulfur.

In 2022, compared to the prior year, gas processing, gathering and CO_2 results increased primarily due to higher sulfur and NGL prices.

POWER GENERATION FACILITIES

Earnings from power and steam generation facilities are derived from sales to affiliates and third parties.

LOW-CARBON VENTURES

OLCV was formed to execute on Occidental's vision to reduce global emissions and provide a more sustainable future through the development of low-carbon energy and products. OLCV capitalizes on Occidental's extensive experience in utilizing CO_2 in its development of CCUS projects and providing services to third parties to facilitate the implementation of their CCUS projects. Moreover, OLCV is fostering emerging technologies, including DAC and low-carbon power sources, and other business models with the potential to position Occidental as a leader in the production of low-carbon energy and products.

Occidental has developed standards and protocols recognized by the EPA for monitoring, reporting and verifying the amount, safety and permanence of CO_2 stored through secure geologic sequestration. Occidental holds the nation's first two EPA-approved monitoring, reporting and verification plans for geologic sequestration through EOR production and obtained a third monitoring, reporting and verification plan in 2021. In 2022, OLCV acquired approximately three hundred thousand acres of pore space. In 2022, Occidental also commenced EPA Class 6 permitting with the intention of developing five sequestration hubs.

OLCV commenced construction on the world's largest DAC facility in 2022, which is expected to be online in 2025. OLCV is also currently conducting front-end engineering design work and feasibility studies on a number of projects to capture and sequester CO_2, either from the atmosphere or from industrial point sources. In 2023, OLCV plans to invest between $100 million and $500 million, dependent upon potential partner participation, to pursue various projects.

The profitability of sequestration projects is dependent upon the costs of developing, building and operating sequestration infrastructure, demand for sequestration services from emitters and the availability of certain tax attributes and credits generated from the capture and storage of CO_2.

In August 2022, Congress passed the Inflation Reduction Act that contains, among other provisions, certain tax incentives related to climate change and clean energy. These incentives may attract more third-party investment of OLCV's projects which may help accelerate certain projects. The ultimate impact of the Inflation Reduction Act on Occidental's emerging low-carbon businesses and net-zero pathway will depend on a number of factors, interpretations and assumptions as well as additional regulatory guidance.

INDUSTRY OUTLOOK

Midstream and marketing segment results can experience volatility depending on commodity price changes, demand impacting export sales and the Midland-to-Gulf-Coast oil spreads. Gas gathering, processing and transportation results are affected by fluctuations in commodity prices and the volumes that are processed and transported through the segment's plants, as well as the margins obtained on related services from investments in which Occidental has an equity interest.

Throughout 2022, the U.S. experienced economy-wide cost increases, which could increase the cost of sequestration projects. Occidental saw increased interest from third parties in providing sequestration services during the year. Additionally, grants, credits and other tax-advantaged low-carbon attributes continue to be actively discussed at both state and federal levels. These trends are expected to continue, which Occidental believes will enhance the economics of sequestration projects.

SEGMENT RESULTS OF OPERATIONS AND ITEMS AFFECTING COMPARABILITY

SEGMENT RESULTS OF OPERATIONS

Segment earnings exclude income taxes, interest income, interest expense, environmental remediation expenses, unallocated corporate expenses and discontinued operations, but include gains and losses from divestitures of segment assets and income from the segments' equity investments. Seasonality is not a primary driver of changes in Occidental's consolidated quarterly earnings during the year.

The following table sets forth the sales and earnings of each operating segment and corporate items for the years ended December 31:

millions, except per share amounts	**2022**	2021	2020
NET SALES [a]			
Oil and gas	**$ 27,165**	$ 18,941	$ 13,066
Chemical	**6,757**	5,246	3,733
Midstream and marketing	**4,136**	2,863	1,768
Eliminations	**(1,424)**	(1,094)	(758)
Total	**$ 36,634**	$ 25,956	$ 17,809
SEGMENT RESULTS AND EARNINGS			
Domestic	**$ 10,439**	$ 2,900	$ (8,758)
International	**2,580**	1,497	(742)
Exploration	**(216)**	(252)	(132)
Oil and gas	**12,803**	4,145	(9,632)
Chemical	**2,508**	1,544	664
Midstream and marketing	**273**	257	(4,175)
Total	**$ 15,584**	$ 5,946	$ (13,143)
Unallocated corporate items			
Interest expense, net	**(1,030)**	(1,614)	(1,424)
Income tax benefit (expense)	**(813)**	(915)	2,172
Other	**(437)**	(627)	(1,138)
Income (loss) from continuing operations	**$ 13,304**	$ 2,790	$ (13,533)
Discontinued operations, net	**—**	(468)	(1,298)
Net income (loss)	**13,304**	2,322	(14,831)
Less: Preferred stock dividends	**(800)**	(800)	(844)
Net income (loss) attributable to common stockholders	**$ 12,504**	$ 1,522	$ (15,675)
Net income (loss) attributable to common stockholders—basic	**$ 13.41**	$ 1.62	$ (17.06)
Net income (loss) attributable to common stockholders—diluted	**$ 12.40**	$ 1.58	$ (17.06)

(a) Intersegment sales eliminate upon consolidation and are generally made at prices approximating those that the selling entity would be able to obtain in third-party transactions.

ITEMS AFFECTING COMPARABILITY

OIL AND GAS SEGMENT

Results of Operations

millions		2022		2021		2020
Segment Sales	$	27,165	$	18,941	$	13,066
Segment Results [(a)]						
Domestic	$	10,439	$	2,900	$	(8,758)
International		2,580		1,497		(742)
Exploration		(216)		(252)		(132)
Total	$	12,803	$	4,145	$	(9,632)
Items affecting comparability						
Asset sale gains (losses), net - domestic [(b)]	$	148	$	27	$	(1,275)
Asset sale gains (losses), net - international [(c)]	$	55	$	43	$	(353)
Asset impairments and related items - domestic [(d)]	$	—	$	(282)	$	(5,904)
Asset impairments and related items - international [(e)]	$	—	$	—	$	(1,195)
Oil, natural gas and CO_2 mark-to-market gains (losses)	$	—	$	(280)	$	1,090
Rig terminations and other - domestic	$	—	$	—	$	(59)
Rig terminations and other - international	$	—	$	—	$	(13)

(a) Results included significant items affecting comparability discussed in the footnotes below.

(b) The 2022 amount included $148 million of gains, primarily related to the sale of certain non-strategic assets in the Permian Basin. The 2021 amount included $27 million in post-closing consideration earned from 2020 asset sales as a result of certain production and pricing targets being met. The 2020 amount included a $440 million loss on the sale of Occidental's mineral and fee surface acres in Wyoming, Colorado and Utah and losses of $820 million related to the sale of non-core, largely non-operated acreage in the Permian Basin.

(c) The 2022 amount included $55 million related to post-closing consideration earned from 2020 asset sales as a result of certain production and pricing targets being met as well as the closing of the sale of certain assets that were negotiated with the 2020 Colombia divestiture. The 2021 amount primarily included $55 million in post-closing consideration earned from 2020 asset sales as a result of certain production and pricing targets being met. The 2020 amount included a loss on the sale of Occidental's Colombia assets of $353 million.

(d) The 2021 amount included $282 million of asset impairments primarily related to undeveloped leases that either expired or were set to expire in the near term where Occidental had no plans to pursue exploration activities. The 2020 amount included pre-tax impairments of $4.5 billion primarily related to domestic onshore unproved acreage as well as $1.3 billion primarily related to other domestic onshore assets and the Gulf of Mexico.

(e) The 2020 amount included $1.2 billion of impairment and related charges associated with Occidental's proved properties in Algeria and Oman.

Average Realized Prices

The following table sets forth the average realized prices for oil, NGL and natural gas from ongoing operations for each of the three years in the period ended December 31, 2022, and includes a year-over-year change calculation:

	2022	Year over Year Change	2021	Year over Year Change	2020
Average Realized Prices					
Oil ($/Bbl)					
United States	$ 94.12	42 %	$ 66.39	82 %	$ 36.39
International	$ 95.46	47 %	$ 65.08	57 %	$ 41.50
Total worldwide	$ 94.36	43 %	$ 66.14	77 %	$ 37.34
NGL ($/Bbl)					
United States	$ 35.69	17 %	$ 30.62	156 %	$ 11.98
International	$ 34.09	30 %	$ 26.13	61 %	$ 16.22
Total worldwide	$ 35.48	18 %	$ 30.01	139 %	$ 12.58
Natural Gas ($/Mcf)					
United States	$ 5.48	66 %	$ 3.30	180 %	$ 1.18
International	$ 1.89	12 %	$ 1.69	1 %	$ 1.67
Total worldwide	$ 4.51	57 %	$ 2.87	119 %	$ 1.31

Domestic oil and gas results, excluding significant items affecting comparability, increased in 2022 compared to 2021 primarily due to higher realized oil, NGL and natural gas prices and lower DD&A rates, partially offset by higher lease operating costs.

International oil and gas results, excluding significant items affecting comparability, increased in 2022 compared to 2021 primarily due to higher oil prices.

Realized Price and Sales Volume Variance

The following table presents an analysis of the impacts of changes in average realized prices and sales volumes with regard to Occidental's domestic and international oil and gas revenue:

millions	Year Ended December 31, 2021 (a)	Increase (Decrease) Related to: Price Realizations	Increase (Decrease) Related to: Net Sales Volumes	Year Ended December 31, 2022 (a)
United States Revenue				
Oil	$ 12,072	$ 5,118	$ 231	$ 17,421
NGL	2,203	332	96	2,631
Natural gas	1,524	969	(71)	2,422
Total	$ 15,799	$ 6,419	$ 256	$ 22,474
International Revenue				
Oil (b)	$ 2,844	$ 902	$ 189	$ 3,935
NGL	325	85	11	421
Natural gas	291	23	(3)	311
Total	$ 3,460	$ 1,010	$ 197	$ 4,667

(a) Excludes "other" oil and gas revenue. See Note 2 - Revenue in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K for additional information regarding other revenue.

(b) Includes the impact of international production sharing contracts.

Production

The following table sets forth the production volumes of oil, NGL and natural gas per day from ongoing operations for each of the three years in the period ended December 31, 2022, and includes a year-over-year change calculation:

Production per Day, Ongoing Operations (Mboe/d)	2022	Year over Year Change	2021	Year over Year Change	2020
United States					
Permian	**513**	**5 %**	487	(15)%	575
Rockies & Other Domestic	**277**	**(8)%**	302	(9)%	332
Gulf of Mexico	**147**	**2 %**	144	11 %	130
Total	**937**	**0 %**	933	(10)%	1,037
International					
Algeria & Other International	**47**	**7 %**	44	(2)%	45
Al Hosn Gas	**73**	**(4)%**	76	(3)%	78
Dolphin	**37**	**(8)%**	40	(9)%	44
Oman	**65**	**(12)%**	74	(13)%	85
Total	**222**	**(5)%**	234	(7)%	252
Total Production from Ongoing Operations	**1,159**	**(1)%**	1,167	(9)%	1,289
Operations exited [(a)]	**—**	**(100)%**	16	(72)%	58
Total Production (Mboe/d) [(b)]	**1,159**	**(2)%**	1,183	(12)%	1,347

(a) Operations exited include the Ghana assets (sold in October 2021) and the Colombia onshore assets (sold in December 2020).

(b) Natural gas volumes have been converted to Boe based on energy content of six Mcf of gas to one barrel of oil. Boe equivalent does not necessarily result in price equivalency. Please refer to the Supplemental Oil and Gas Information (unaudited) section of this Form 10-K for additional information on oil and gas production and sales.

Average daily production volumes from ongoing operations remained materially consistent in 2022 as compared to 2021. Production increased in the Permian Basin due to increased development activity, which was partially offset by a decrease in production, especially natural gas, in the DJ Basin reflecting reduced capital investment and the impact of rising commodity prices that reduce Occidental's share of production under international production sharing contracts.

Lease Operating Expense

The following table sets forth the average lease operating expense per Boe from ongoing operations for each of the three years in the period ended December 31, 2022:

	2022	2021	2020
Average lease operating expense per Boe	**$ 9.52**	$ 7.58	$ 6.38

Average lease operating expense per Boe increased in 2022 compared to 2021 primarily as a result of inflationary pressures which led to higher workover, support and maintenance costs in the Permian Basin, Rockies and Other and Gulf of Mexico, as well as higher purchase injectant costs in the Permian Basin.

CHEMICAL SEGMENT

millions		**2022**		2021		2020
Segment Sales	**$**	**6,757**	$	5,246	$	3,733
Segment Results	**$**	**2,508**	$	1,544	$	664

Chemical segment results increased in 2022 compared to 2021 due to improved demand and stronger realized prices across most product lines, including caustic soda, partially offset by higher raw material costs, primarily energy costs.

MIDSTREAM AND MARKETING SEGMENT

millions		**2022**		2021		2020
Segment Sales	**$**	**4,136**	$	2,863	$	1,768
Segment Results [(a)]	**$**	**273**	$	257	$	(4,175)
Items affecting comparability						
Asset sales gains (losses) and others, net [(b)]	**$**	**98**	$	124	$	(46)
Derivative gains (losses), net	**$**	**(259)**	$	(252)	$	97
Goodwill impairments and other charges [(c)]	**$**	**—**	$	(21)	$	(4,194)

(a) Results included significant items affecting comparability discussed in the footnotes below.

(b) The 2022 amount included $62 million relating to a gain on the sale of 10 million limited partner units in WES and a $36 million gain on the sale of a joint venture. The 2021 amount included a $102 million gain from the sale of 11.5 million limited partner units in WES. The 2020 amount represented a loss on the exchange of WES common units to retire a $260 million note.

(c) The 2020 amount included a $2.7 billion other-than-temporary impairment of the equity investment in WES and $1.4 billion of impairments related to the write-off of goodwill and a loss from an equity investment related to WES' write-off of its goodwill.

Midstream and marketing segment results, excluding items affecting comparability, increased in 2022 compared to 2021, primarily due to higher equity income from WES, improved gas marketing margin from transportation capacity optimization and improved sulfur prices at Al Hosn Gas, partially offset by the timing impact of crude oil sales in the marketing business.

CORPORATE

Significant corporate items include the following:

millions		**2022**		2021		2020
Items Affecting Comparability						
Anadarko acquisition-related costs	**$**	**(89)**	$	(153)	$	(339)
Interest rate swap gains (losses), net [(a)]	**$**	**317**	$	122	$	(428)
Maxus environmental reserve adjustment	**$**	**(22)**	$	—	$	—
Early debt extinguishment	**$**	**149**	$	(118)	$	—
Acquisition-related pension & termination benefits	**$**	**—**	$	—	$	114
Warrants gains, net [(a)]	**$**	**—**	$	—	$	5

(a) See Note 8 - Derivatives in the Notes to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for more information.

INCOME TAXES

Total deferred tax assets, after valuation allowance, were $2.2 billion and $3.5 billion as of December 31, 2022 and 2021, respectively. Occidental expects to realize the recorded deferred tax assets, net of any allowances, through future operating income and reversal of temporary differences. The total deferred tax liabilities were $7.7 billion and $10.5 billion as of December 31, 2022 and 2021, respectively. The decrease in net deferred tax liability in 2022 compared to 2021 was primarily driven by the legal entity reorganization that Occidental undertook in the first quarter of 2022. See more discussion below.

WORLDWIDE EFFECTIVE TAX RATE

The following table sets forth the calculation of the worldwide effective tax rate for income from continuing operations:

millions		2022		2021		2020
SEGMENT RESULTS						
Oil and gas	**$**	**12,803**	$	4,145	$	(9,632)
Chemical		**2,508**		1,544		664
Midstream and marketing		**273**		257		(4,175)
Unallocated corporate items		**(1,467)**		(2,241)		(2,562)
Income (loss) from continuing operations before taxes	**$**	**14,117**	$	3,705	$	(15,705)
Income tax benefit (expense)						
Federal and state		**248**		(247)		2,607
Foreign		**(1,061)**		(668)		(435)
Total income tax benefit (expense)		**(813)**		(915)		2,172
Income (loss) from continuing operations	**$**	**13,304**	$	2,790	$	(13,533)
Worldwide effective tax rate		**6%**		25 %		14%

In 2022, Occidental's worldwide effective tax rate was 6%, which was impacted by a tax benefit associated with Occidental's legal entity reorganization, as further described below.

In 2021, Occidental's worldwide effective tax rate was 25%, which was higher than the U.S. statutory rate of 21% due to higher tax rates in the foreign jurisdictions in which Occidental operates, partially offset by the tax impact of business credits, state tax revaluations and other domestic tax benefits.

In 2020, Occidental's worldwide effective tax rate was 14%, which was largely a result of the impairment of the WES goodwill and certain international assets for which Occidental received no tax benefit and higher-taxed international operations which generally caused Occidental's tax rate to vary significantly from the U.S. corporate tax rate.

LEGAL ENTITY REORGANIZATION

To align Occidental's legal entity structure with the nature of its business activities after completing the Anadarko Acquisition and subsequent large scale post-acquisition divestiture program, management undertook a legal entity reorganization that was completed in the first quarter of 2022.

As a result of this legal entity reorganization, management made an adjustment to the tax basis in a portion of its operating assets, thus reducing Occidental's deferred tax liabilities. Accordingly, in 2022, Occidental recorded a tax benefit of $2.7 billion in connection with this reorganization. The timing of any reduction in Occidental's future cash taxes as a result of this legal entity reorganization will be dependent on a number of factors, including prevailing commodity prices, capital activity level and production mix. The legal entity reorganization transaction is currently under IRS review as part of the Company's 2022 federal tax audit.

INFLATION REDUCTION ACT

In August 2022, Congress passed the Inflation Reduction Act that contains, among other provisions, a corporate book minimum tax on financial statement income, an excise tax on stock buybacks, a methane emissions fee and certain tax incentives related to climate change and clean energy. Occidental is currently evaluating the provisions of this act. The ultimate impact of the act is yet to be determined and will depend on additional regulatory guidance and interpretations.

CONSOLIDATED RESULTS OF OPERATIONS

REVENUE AND OTHER INCOME ITEMS

millions		2022		2021		2020
Net sales	$	36,634	$	25,956	$	17,809
Interest, dividends and other income	$	153	$	166	$	118
Gains (losses) on sale of assets, net	$	308	$	192	$	(1,666)

NET SALES

Price and volume changes generally represent the majority of the change in the oil and gas and chemical segments sales. Midstream and marketing sales generally represent the margins earned by the marketing business at it strives to optimize the use of its transportation, storage and terminal commitments to provide access to domestic and international markets and, to a lesser extent, NGL and sulfur revenues from the gas processing business.

The increase in net sales in 2022 compared to 2021 was primarily due to higher realized commodity prices in the oil and gas segment. Chemical sales increased primarily due to higher prices and volumes across all product lines. The increase in midstream and marketing sales was due to higher crude oil prices impacting the marketing businesses.

EXPENSE ITEMS

millions		2022		2021		2020
Oil and gas operating expense	$	4,028	$	3,160	$	3,065
Transportation and gathering expense	$	1,475	$	1,419	$	1,600
Chemical and midstream cost of sales	$	3,273	$	2,772	$	2,408
Purchased commodities	$	3,287	$	2,308	$	1,395
Selling, general and administrative	$	945	$	863	$	864
Other operating and non-operating expense	$	1,271	$	1,065	$	884
Taxes other than on income	$	1,548	$	1,005	$	622
Depreciation, depletion and amortization	$	6,926	$	8,447	$	8,097
Asset impairments and other charges	$	—	$	304	$	11,083
Anadarko Acquisition-related costs	$	89	$	153	$	339
Exploration expense	$	216	$	252	$	132
Interest and debt expense, net	$	1,030	$	1,614	$	1,424

OIL AND GAS OPERATING EXPENSE

Oil and gas operating expense increased in 2022 from the prior year, primarily as a result of higher workovers, supports and maintenance costs in the Permian Basin, Rockies and Other and Gulf of Mexico, as well as higher purchase injectant costs in the Permian Basin.

CHEMICAL AND MIDSTREAM COST OF SALES

Chemical and midstream cost of sales increased in 2022 from the prior year, primarily due to higher raw material costs in the chemical segment, primarily energy costs, and increased power generation costs in the midstream and marketing segment.

PURCHASED COMMODITIES

Purchased commodities increased in 2022 from the prior year, largely as a result of higher prices on third-party crude purchases related to the midstream and marketing segment.

OTHER OPERATING AND NON-OPERATING EXPENSE

Other operating and non-operating expense increased in 2022 from the prior year, primarily due to increases in employee related costs and environmental remediation expenses.

DEPRECIATION, DEPLETION AND AMORTIZATION

DD&A expense decreased in 2022 from the prior year, primarily as a result of lower per Boe DD&A rates due to higher proved reserves as a result of positive program adds during 2021.

ASSET IMPAIRMENTS AND OTHER CHARGES

There were no asset impairments in 2022. In 2021, asset impairments and other charges of $304 million were mainly comprised of the impairment of undeveloped leases that either expired or were set to expire in the near term where Occidental had no plans to pursue exploration activities.

TAXES OTHER THAN ON INCOME

Taxes other than on income in 2022 increased from the prior year, primarily due to higher production taxes, which are directly tied to revenues, and higher ad valorem taxes.

INTEREST AND DEBT EXPENSE, NET

Interest and debt expense decreased in 2022 from the prior year, due to lower outstanding debt as a result of debt repayments.

OTHER ITEMS

Income (expense) *millions*		**2022**		2021		2020
Gains (losses) on interest rate swaps and warrants	**$**	**317**	$	122	$	(423)
Income from equity investments	**$**	**793**	$	631	$	370
Income tax benefit (expense)	**$**	**(813)**	$	(915)	$	2,172
Loss from discontinued operations, net	**$**	**—**	$	(468)	$	(1,298)

LOSS FROM DISCONTINUED OPERATIONS, NET

There were no discontinued operations in 2022. In 2021, discontinued operations, net primarily included a $437 million after-tax loss contingency associated with Occidental's former operations in Ecuador, see Note - 13 Lawsuits, Claims, Commitments and Contingencies in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K for more information. In addition, discontinued operations, net was associated with operations in Ghana which were sold in October 2021.

LIQUIDITY AND CAPITAL RESOURCES

CASH ON HAND

As of December 31, 2022, Occidental had approximately $1.0 billion in cash and cash equivalents. A substantial majority of this cash is held and available for use in the United States.

SOURCES AND USES OF CASH

Occidental currently expects its operational cash flows and cash on hand to be sufficient to meet its current debt maturities and other obligations for the next 12 months from the date of this filing. Should commodity prices return to their 2020 lows, Occidental's $4.0 billion RCF, receivables securitization facility and access to capital markets are available to meet its ongoing capital needs, purchase obligations, near-term debt maturities and other liabilities and financial obligations, if required.

Occidental's planned 2023 capital expenditures are between $5.4 billion and $6.2 billion, of which only a small percentage is allocated to non-cancellable commitments.

As of December 31, 2022, Occidental had $22 million in current maturities of long-term debt which were paid in January 2023, and an additional $1.1 billion in long-term obligations due in 2024.

As of December 31, 2022, Occidental had $433 million in non-cancelable lease payments due in 2023, and an additional $335 million in non-cancelable lease payments due in 2024.

Dividends paid to common and preferred shareholders were $1.2 billion for the year ended December 31, 2022.

Occidental is party to various purchase agreements that are not accounted for as leases or otherwise accrued as liabilities as of December 31, 2022. These agreements consist primarily of obligations to secure terminal, pipeline and processing capacity, purchase services used in the normal course of business including transporting and disposing of produced water, purchase goods used in the production of finished goods including certain chemical raw materials and power and agreements relating to equipment maintenance and service. The amounts that will be paid for such outstanding off-balance sheet purchase obligations as of December 31, 2022 are $3.0 billion in 2023, $4.2 billion in 2024 and 2025, $2.5 billion in 2026 and 2027 and $2.2 billion in 2028 and thereafter.

SHARE REPURCHASE PROGRAM

Under the $3.0 billion share repurchase program announced and completed in 2022, Occidental purchased approximately 47.7 million shares. In February 2023, the Board authorized a new share repurchase program of up to $3.0 billion of Occidental's shares of common stock.

CONTRACTUAL OBLIGATIONS

The following table summarizes and cross-references Occidental's contractual obligations and indicates on- and off-balance sheet obligations as of December 31, 2022. Commitments related to held for sale assets are excluded.

		Payments Due by Year			
millions	**Total**	**2023**	**2024 and 2025**	**2026 and 2027**	**2028 and thereafter**
On-Balance Sheet					
Current portion of long-term debt (Note 6) [a]	$ 22	$ 22	$ —	$ —	$ —
Long-term debt (Note 6) [a]	17,936	—	2,264	2,351	13,321
Expected interest payments on long-term debt	11,400	1,060	2,042	1,754	6,544
Leases (Note 7) [b]	1,818	433	538	320	527
Asset retirement obligations (Note 1)	3,805	169	1,124	961	1,551
Other long-term liabilities [c]	2,594	11	851	253	1,479
Off-Balance Sheet					
Purchase obligations [d]	11,963	2,983	4,246	2,510	2,224
Total	$ 49,538	$ 4,678	$ 11,065	$ 8,149	$ 25,646

(a) Excluded unamortized debt discount and interest.
(b) Occidental is the lessee under various agreements for real estate, equipment, plants and facilities.
(c) Included long-term obligations and current portions of long-term obligations under postretirement benefits, accrued transportation commitments, ad valorem taxes and other accrued liabilities.
(d) Amounts included payments which will become due under long-term agreements to purchase goods and services used in the normal course of business to secure terminal, pipeline and processing capacity, CO_2, electrical power, steam and certain chemical raw materials including but not limited to capital commitments. Amounts excluded certain product purchase obligations related to marketing activities for which there are no minimum purchase requirements or the amounts are not fixed or determinable. Long-term purchase contracts were discounted at a 5.03% discount rate.

DEBT ACTIVITY

For the twelve months ended December 31, 2022, Occidental repaid debt with a face value of more than $10.5 billion, reducing the face value of Occidental's debt to less than $18.0 billion. The net book value of the full year repayments was $9.8 billion, which resulted in a gain of $149 million.

See Note 6 - Long-Term Debt in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K for more information related to Occidental's debt issuance and repayments.

GUARANTEES

Occidental has entered into various guarantees, indemnities and commitments provided by Occidental to third parties, mainly to provide assurance that Occidental or its consolidated subsidiaries or affiliates will meet their various obligations.

As of the date of this filing, Occidental has provided required financial assurance through a combination of cash, letters of credit and surety bonds. Occidental has not issued any letters of credit under the RCF or other committed facilities. For additional information, see Risk Factors in Part I, Item 1A of this Form 10-K.

CASH FLOW ANALYSIS

CASH PROVIDED BY OPERATING ACTIVITIES

millions	**2022**	2021	2020
Operating cash flow from continuing operations	**$ 16,810**	$ 10,253	$ 3,842
Operating cash flow from discontinued operations, net of taxes	**—**	181	113
Net cash provided by operating activities	**$ 16,810**	$ 10,434	$ 3,955

Cash provided by operating activities increased in 2022 compared to 2021, primarily due to higher commodity prices, as average WTI and Brent prices increased by 39% and 40%, respectively and NYMEX natural gas prices increased by 76%. The chemical segment also generated substantial operating cash flows largely due to higher prices for most chemical products, especially caustic soda, compared to 2021.

CASH USED BY INVESTING ACTIVITIES

millions		**2022**		2021		2020
Capital expenditures						
Oil and gas	**$**	**(3,844)**	$	(2,409)	$	(2,208)
Chemical		**(322)**		(308)		(255)
Midstream and marketing		**(268)**		(106)		(50)
Corporate		**(63)**		(47)		(22)
Total	**$**	**(4,497)**	$	(2,870)	$	(2,535)
Changes in capital accrual		**147**		97		(519)
Purchase of businesses, assets and equity investments, net		**(990)**		(431)		(114)
Proceeds from sale of assets and equity investments, net		**584**		1,624		2,281
Other investing activities, net		**(116)**		406		109
Investing cash flows from continuing operations	**$**	**(4,872)**	$	(1,174)	$	(778)
Investing cash flows from discontinued operations		**—**		(79)		(41)
Net cash used by investing activities	**$**	**(4,872)**	$	(1,253)	$	(819)

Cash flows used by investing activities increased by $3.6 billion in 2022 compared to 2021. In 2022, Occidental increased capital spending as a result of increased activity in the Permian. Occidental acquired additional primarily producing assets in the Permian Basin for approximately $400 million and additional interests in emerging low-carbon businesses and net-zero pathway for approximately $350 million. Occidental sold certain strategic assets in the Permian Basin for approximately $190 million. See Note 5 - Acquisitions, Divestitures and Other Transactions in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K for a listing of assets and equity investments acquired and sold in 2022, 2021 and 2020. In addition in 2022, Occidental sold 10 million limited partner units of WES for proceeds of approximately $250 million.

CASH USED BY FINANCING ACTIVITIES

millions		**2022**		2021		2020
Financing cash flows from continuing operations	**$**	**(13,715)**	$	(8,564)	$	(4,508)
Financing cash flows from discontinued operations		**—**		(8)		(8)
Net cash used by financing activities	**$**	**(13,715)**	$	(8,572)	$	(4,516)

Cash used by financing activities increased by $5.1 billion compared to 2021 primarily due to the 2022 debt tenders and repayments and treasury share repurchase activity. See Note 6 - Long-Term Debt in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K for more information related to Occidental's debt repayments and see Item 5 Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities in Part II of this Form 10-K and Note 14 - Stockholders' Equity in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K for additional information related to Occidental's share repurchases. In addition, cash used by financing activities reflected cash dividend payments of $1.2 billion on preferred and common stock and $111 million, related to net interest rate swap settlements and collateral activity.

LAWSUITS, CLAIMS, COMMITMENTS AND CONTINGENCIES

LEGAL MATTERS

For information on Occidental's Lawsuits, Claims, Commitments and Contingencies, see the information in Note 13 - Lawsuits, Claims, Commitments and Contingencies in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

ENVIRONMENTAL LIABILITIES AND EXPENDITURES

ENVIRONMENTAL COSTS

Environmental costs relate to the prevention, monitoring, control, treatment or abatement of waste, emissions or releases to air, water or land from operations of Occidental's subsidiaries. These activities are generally integrated with ongoing operations or development projects, so the costs in this table include estimates. The environmental costs in the table do not include litigation-related costs, including fines, penalties or settlements, or Occidental's investments in low-carbon ventures. Occidental's environmental costs are presented below for each segment for each of the years ended December 31:

millions		2022		2021		2020
Operating Expenses						
Oil and gas	$	304	$	267	$	176
Chemical		115		88		73
Midstream and marketing		6		6		4
Total	$	425	$	361	$	253
Capital Expenditures						
Oil and gas	$	110	$	87	$	74
Chemical		53		66		40
Midstream and marketing		5		1		1
Total	$	168	$	154	$	115
Remediation Expenses						
Corporate	$	65	$	28	$	36

Operating expenses are incurred on a continual basis. Capital expenditures relate to longer-lived improvements in properties currently operated by Occidental. Remediation expenses relate to existing conditions from past operations of Occidental or its subsidiaries.

For additional information on Occidental's Environmental Liabilities and Expenditures, see the information in Note 12 - Environmental Liabilities and Expenditures in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

GLOBAL INVESTMENTS

A portion of Occidental's assets are located outside North America. The following table shows the geographic distribution of Occidental's assets as of December 31, 2022, at both the segment and consolidated level related to Occidental's ongoing operations:

millions		Oil and gas		Chemical		Midstream and marketing		Corporate and other		Total Consolidated
North America										
United States	$	49,786	$	4,323	$	8,701	$	1,917	$	64,727
Canada		—		111		104		—		215
Middle East		3,602		—		3,133		—		6,735
North Africa and Other		670		124		138		—		932
Consolidated	$	54,058	$	4,558	$	12,076	$	1,917	$	72,609

For the year ended December 31, 2022, net sales outside North America totaled $5.5 billion, or approximately 15% of total net sales.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

The process of preparing financial statements in accordance with United States GAAP requires Occidental's management to make informed estimates and judgments regarding certain items and transactions. Changes in facts and circumstances or discovery of new information may result in revised estimates and judgments and actual results may differ from these estimates upon settlement but generally not by material amounts. The selection and development of these policies and estimates have been discussed with the Audit Committee of the Board of Directors. Occidental considers the following to be its most critical accounting policies and estimates that involve management's judgment.

OIL AND GAS PROPERTIES

The carrying value of Occidental's PP&E represents the cost incurred to acquire or develop the asset, including any AROs and capitalized interest, net of DD&A and any impairment charges. For assets acquired in a business combination, PP&E cost is based on fair values at the acquisition date. AROs and interest costs incurred in connection with qualifying capital expenditures are capitalized and amortized over the useful lives of the related assets.

Occidental uses the successful efforts method to account for its oil and gas properties. Under this method, Occidental capitalizes costs of acquiring properties, costs of drilling successful exploration wells and development costs. The costs of exploratory wells are initially capitalized pending a determination of whether proved reserves have been found. If proved reserves have been found, the costs of exploratory wells remain capitalized. For exploratory wells that find reserves that cannot be classified as proved when drilling is completed, costs continue to be capitalized as suspended exploratory drilling costs if there have been sufficient reserves found to justify completion as a producing well and sufficient progress is being made in assessing the economic and operating viability of the project. At the end of each quarter, management reviews the status of all suspended exploratory drilling costs in light of ongoing exploration activities and in particular, whether Occidental is making sufficient progress in its ongoing exploration and appraisal efforts or, in the case of discoveries requiring government sanctioning, analyzing whether development negotiations are underway and proceeding as planned. If management determines that future appraisal drilling or development activities are unlikely to occur, associated suspended exploratory well costs are expensed.

Occidental expenses annual lease rentals, the costs of injectants used in production and geological and geophysical costs as incurred for exploration activities.

Occidental determines depreciation and depletion of oil and gas producing properties by the unit-of-production method. It amortizes leasehold acquisition costs over total proved reserves and capitalized development and successful exploration costs over proved developed reserves.

Proved oil and gas reserves are those quantities of oil and gas which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible—from a given date forward, from known reservoirs, and under existing economic conditions, operating methods, and government regulations—prior to the time at which contracts providing the right to operate expire, unless evidence indicates that renewal is reasonably certain, regardless of whether deterministic or probabilistic methods are used for the estimation.

Several factors could change Occidental's proved oil and gas reserves. For example, Occidental receives a share of production from PSCs to recover its costs and generally an additional share for profit. Occidental's share of production and reserves from these contracts decreases when product prices rise and increases when prices decline. Generally, Occidental's net economic benefit from these contracts is greater at higher product prices. In other cases, particularly with long-lived properties, lower product prices may lead to a situation where production of a portion of proved reserves becomes uneconomical. For such properties, higher product prices typically result in additional reserves becoming economical. Estimation of future production and development costs is also subject to change partially due to factors beyond Occidental's control, such as energy costs and inflation or deflation of oil field service costs. These factors, in turn, could lead to changes in the quantity of proved reserves. Additional factors that could result in a change of proved reserves include production decline rates and operating performance differing from those estimated when the proved reserves were initially recorded. Changes in the political and regulatory climate could lead to decreases in proved reserves as development horizons may be extended into the future.

Occidental performs impairment tests with respect to its proved properties whenever events or circumstances indicate that the carrying value of property may not be recoverable. If there is an indication the carrying amount of the asset may not be recovered due to significant and prolonged declines in current and forward prices, significant changes in reserve estimates, changes in management's plans or other significant events, management will evaluate the property for impairment. Under the successful efforts method, if the sum of the undiscounted cash flows is less than the carrying value of the proved property, the carrying value is reduced to estimated fair value and reported as an impairment charge in the period. Individual proved properties are grouped for impairment purposes at the lowest level for which there are identifiable cash flows unless observable and comparable transactions are available. The fair value of impaired assets is typically determined based on the present value of expected future cash flows using discount rates believed to be consistent with those used by market participants. The impairment test incorporates a number of assumptions involving expectations of future cash flows which can change significantly over time. These assumptions include estimates of future production, product prices, contractual prices, estimates of risk-adjusted oil and gas proved and unproved reserves and estimates of future operating and development costs. It is reasonably possible that prolonged declines in commodity prices, reduced capital spending in response to lower prices or increases in operating costs could result in impairments.

For impairment testing, unless prices are contractually fixed, Occidental uses observable forward strip prices for oil and natural gas prices when projecting future cash flows. Future operating and development costs are estimated using the current cost environment applied to expectations of future operating and development activities to develop and produce oil and gas reserves. Market prices for oil, NGL and natural gas have been volatile and may continue to be volatile in the future. Changes in global supply and demand, transportation capacity, currency exchange rates, applicable laws and regulations and the effect of changes in these variables on market perceptions could impact current forecasts. Future fluctuations in commodity prices could result in estimates of future cash flows to vary significantly.

Net capitalized costs attributable to unproved properties were $12.6 billion as of December 31, 2022, and $14.8 billion as of December 31, 2021. The unproved amounts are not subject to DD&A until they are classified as proved properties. Individually insignificant unproved properties are combined and amortized on a group basis based on factors such as lease terms, success rates and other factors to provide for full amortization upon lease expiration or abandonment.

Significant unproved properties, primarily as a result of the Anadarko Acquisition, are assessed individually for impairment and when events or circumstances indicate that the carrying value of property may not be recovered a valuation allowance is provided if an impairment is indicated. Occidental periodically reviews significant unproved properties for impairments; numerous factors are considered, including but not limited to, availability of funds for future exploration and development activities, current exploration and development plans, favorable or unfavorable exploration activity on the property or the adjacent property, geologists’ evaluation of the property, the current and projected political and regulatory climate, contractual conditions and the remaining lease term for the properties. If an impairment is indicated, Occidental will first determine whether a comparable transaction for similar properties or implied acreage valuation derived from domestic onshore market participants is available and will adjust the carrying amount of the unproved property to its fair value using the market approach. In situations where the market approach is not observable and unproved reserves are available, undiscounted future net cash flows used in the impairment analysis are determined based on managements’ risk adjusted estimates of unproved reserves, future commodity prices and future costs to produce the reserves. If undiscounted future net cash flows are less than the carrying value of the property, the future net cash flows are discounted and compared to the carrying value for determining the amount of the impairment loss to record. Occidental utilizes the same assumptions and methodology discussed above for cash flows associated with proved properties.

PROVED RESERVES

Occidental estimates its proved oil and gas reserves according to the definition of proved reserves provided by the SEC’s Rule 4-10 (a) of Regulation S-X and Financial Accounting Standards Board. Proved oil and gas reserves are those quantities of oil and gas which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible—from a given date forward, from known reservoirs, and under existing economic conditions, operating methods, and government regulations—prior to the time at which contracts providing the right to operate expire, unless evidence indicates that renewal is reasonably certain, regardless of whether deterministic or probabilistic methods are used for the estimation. Prices include consideration of price changes provided only by contractual arrangements and do not include adjustments based on expected future conditions. For reserves information, see the Supplemental Information on Oil and Gas Exploration and Production Activities under Item 8 of this Form 10-K.

Engineering estimates of the quantities of proved reserves are inherently imprecise and represent only approximate amounts because of the judgments involved in developing such information. Occidental’s estimates of proved reserves are made using available geological and reservoir data as well as production performance data. The reliability of these estimates at any point in time depends on both the quality and quantity of the technical and economic data and the efficiency of extracting and processing the hydrocarbons. These estimates are reviewed annually by internal reservoir engineers and revised, either upward or downward, as warranted by additional data. Revisions are necessary due to changes in, among other things, development plans, reservoir performance, prices, economic conditions and governmental restrictions as well as changes in the expected recovery associated with infill drilling. Decreases in prices, for example, may cause a reduction in some proved reserves due to reaching economic limits at an earlier projected date. A material adverse change in the estimated volume of proved reserves could have a negative impact on DD&A and could result in property impairments.

The most significant ongoing financial statement effect from a change in Occidental’s oil and gas reserves or impairment of its proved properties would be to the DD&A rate. For example, a 5% increase or decrease in the amount of oil and gas reserves would change the DD&A rate by approximately $0.60/Bbl, which would increase or decrease pre-tax income by approximately $270 million annually at current production rates.

FAIR VALUES

Occidental estimates fair-value of long-lived assets for impairment testing, assets and liabilities acquired in a business combination or exchanged in non-monetary transactions, pension plan assets and initial measurements of AROs.

Accounting for the acquisition of a business requires the allocation of the purchase price to the various assets and liabilities of the acquired business and recording deferred taxes for any differences between the allocated values and tax basis of assets and liabilities. Any excess of the purchase price over the amounts assigned to assets and liabilities is recorded as goodwill. The purchase price allocation is accomplished by recording each asset and liability at its estimated fair value, which may be determined using different methods of fair value measurements, largely based on the availability and quality of market information. Occidental primarily applies the market approach for recurring fair value measurements, maximizes its use of observable inputs and minimizes its use of unobservable inputs.

FINANCIAL ASSETS AND LIABILITIES

Occidental utilizes published prices or counterparty statements for valuing the majority of its financial assets and liabilities measured and reported at fair value. In addition to using market data, Occidental makes assumptions in valuing its assets and liabilities, including assumptions about the risks inherent in the inputs to the valuation technique. For financial assets and liabilities carried at fair value, Occidental measures fair value using the following methods:

- Occidental values exchange-cleared commodity derivatives using closing prices provided by the exchange as of the balance sheet date. These derivatives are classified as using quoted prices in active markets for the assets or liabilities (Level 1).
- OTC bilateral financial commodity contracts, international exchange contracts, options and physical commodity forward purchase and sale contracts are generally classified as using observable inputs other than quoted prices for the assets or liabilities (Level 2) and are generally valued using quotations provided by brokers or industry-standard models that consider various inputs, including quoted forward prices for commodities, time value, volatility factors, credit risk and current market and contractual prices for the underlying instruments, as well as other relevant economic measures. Substantially all of these inputs are observable in the marketplace throughout the full term of the instrument and can be derived from observable data or are supported by observable prices at which transactions are executed in the marketplace.
- Occidental values commodity derivatives based on a market approach that considers various assumptions, including quoted forward commodity prices and market yield curves. The assumptions used include inputs that are generally unobservable in the marketplace or are observable but have been adjusted based upon various assumptions and the fair value is designated as using unobservable inputs (Level 3) within the valuation hierarchy.
- Occidental values debt using market-observable information for debt instruments that are traded on secondary markets. For debt instruments that are not traded, the fair value is determined by interpolating the value based on debt with similar terms and credit risk.

NON-FINANCIAL ASSETS

Occidental uses market-observable prices for assets when comparable transactions can be identified that are similar to the asset being valued. When Occidental is required to measure fair value and there is not a market-observable price for the asset or for a similar asset then the cost or income approach is used depending on the quality of information available to support management's assumptions. The cost approach is based on management's best estimate of the current asset replacement cost. The income approach is based on management's best assumptions regarding expectations of future net cash flows and the expected cash flows are discounted using a commensurate risk-adjusted discount rate. Such evaluations involve significant judgment. The results are based on expected future events or conditions such as sales prices, estimates of future oil and gas production or throughput, development and operating costs and the timing thereof, economic and regulatory climates and other factors, most of which are often outside of management's control. However, assumptions used reflect a market participant's view of long-term prices, costs and other factors and are consistent with assumptions used in Occidental's business plans and investment decisions.

ENVIRONMENTAL LIABILITIES AND EXPENDITURES

Certain subsidiaries of Occidental incur environmental liabilities and expenditures that relate to current operations and are expensed or capitalized by such subsidiaries as appropriate. Certain subsidiaries also incur environmental liabilities and expenditures with respect to remediation of existing conditions from alleged past practices at Third-Party, Currently Operated, and Closed or Non-operated Sites. Those environmental liabilities and related charges and expenses for estimated remediation costs from past operations are recorded when environmental remediation efforts are probable and the costs can be reasonably estimated. Occidental discloses such remediation liabilities on a consolidated basis. In determining the environmental remediation liability and the range of reasonably possible additional losses, Occidental refers to currently available information, including relevant past experience, remedial objectives, available technologies, applicable laws and regulations and cost-sharing arrangements. These environmental remediation liabilities are based on management's estimate of the most likely cost to be incurred, using the most cost-effective technology reasonably expected to achieve the remedial objective. Occidental periodically reviews these environmental remediation liabilities and adjusts them as new information becomes available. Occidental's subsidiaries generally record reimbursements or recoveries of environmental remediation costs in income when received, or when receipt of recovery is highly probable.

Many factors could affect future remediation costs incurred by Occidental's subsidiaries and result in adjustments to environmental remediation liabilities and the range of reasonably possible additional losses. The most significant are: (1) cost estimates for remedial activities may vary from the initial estimate; (2) the length of time, type or amount of remediation necessary to achieve the remedial objective may change due to factors such as site conditions, the ability to identify and control contaminant sources or the discovery of additional contamination; (3) a regulatory agency may ultimately reject or modify proposed remedial plans; (4) improved or alternative remediation technologies may change remediation costs; (5) laws and regulations may change remediation requirements or affect cost sharing or allocation of liability; and (6) changes in allocation or cost-sharing arrangements may occur.

Certain sites involve multiple parties with various cost-sharing arrangements, which generally fall into the following three categories: (1) environmental proceedings that result in a negotiated or prescribed allocation of remediation costs among the affected Occidental’s subsidiary and other alleged potentially responsible parties; (2) oil and gas ventures in which each participant pays its proportionate share of remediation costs reflecting its working interest; or (3) contractual arrangements, typically relating to purchases and sales of properties, in which the parties to the transaction agree to methods of allocating remediation costs. In these circumstances, the affected subsidiary evaluates the financial viability of other parties with whom it is alleged to be jointly liable, the degree of their commitment to participate and the consequences to such subsidiary of their failure to participate when estimating its ultimate share of liability. Occidental subsidiaries record environmental remediation liabilities at their expected net cost of remedial activities. Based on these factors, except as otherwise disclosed in Note 12 - Environmental Liabilities and Expenditures in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K, Occidental’s subsidiaries believe that they will not be required to assume a share of liability of such other potentially responsible parties in an amount materially above amounts reserved.

In addition to the costs of investigations and clean-up measures, which often take in excess of 10 years at CERCLA NPL sites, Occidental subsidiaries’ environmental remediation liabilities include estimates of the costs to operate and maintain remedial systems. If remedial systems are modified over time in response to significant changes in site-specific data, laws, regulations, technologies or engineering estimates, Occidental’s subsidiaries review and adjust their environmental remediation liabilities accordingly.

If Occidental or its subsidiaries were to adjust the balance of their environmental remediation liabilities based on the factors described above, the amount of the increase or decrease would be recognized in earnings. For example, if the balance were reduced by 10%, Occidental would record a pre-tax increase to income of $105 million. If the balance were increased by 10%, Occidental would record an additional remediation expense of $105 million.

INCOME TAXES

Occidental and its subsidiaries file various U.S. federal, state and foreign income tax returns. The impact of changes in tax regulations are reflected when enacted. In general, deferred federal, state and foreign income taxes are provided on temporary differences between the financial statement carrying amounts of assets and liabilities and their respective tax basis. Occidental routinely assesses the realizability of its deferred tax assets. If Occidental concludes that it is more likely than not that some of the deferred tax assets will not be realized, the tax asset is reduced by a valuation allowance. Occidental recognizes a tax benefit from an uncertain tax position when it is more likely than not that the position will be sustained upon examination, based on the technical merits of the position. The tax benefit recorded is equal to the largest amount that is greater than 50% likely to be realized through final settlement with a taxing authority. Interest and penalties related to unrecognized tax benefits are recognized in income tax expense (benefit). See Note 10 - Income Taxes in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

LOSS CONTINGENCIES

Occidental or certain of its subsidiaries are involved, in the normal course of business, in lawsuits, claims and other legal proceedings and audits. Occidental or its affected subsidiaries, as appropriate, accrues reserves for these matters when it is probable that a liability has been incurred and the liability can be reasonably estimated. In addition, Occidental discloses, in aggregate on a consolidated basis, exposure to loss in excess of the amount recorded on the balance sheet for these matters if it is reasonably possible that an additional material loss may be incurred. Occidental reviews such loss contingencies on an ongoing basis.

Loss contingencies are based on judgments made by management with respect to the likely outcome of these matters and are adjusted as appropriate. Management’s judgments could change based on new information, changes in, or interpretations of, laws or regulations, changes in management’s plans or intentions, opinions regarding the outcome of legal proceedings or other factors. See Note 13 - Lawsuits, Claims, Commitments and Contingencies in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K for additional information.

SAFE HARBOR DISCUSSION REGARDING OUTLOOK AND OTHER FORWARD-LOOKING DATA

Portions of this report contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. All statements other than statements of historical fact are “forward-looking statements” for purposes of federal and state securities laws, and they include, but are not limited to: any projections of earnings, revenue or other financial items or future financial position or sources of financing; any statements of the plans, strategies and objectives of management for future operations, business strategy or financial position; any statements regarding future economic conditions or performance; any statements of belief; and any statements of assumptions underlying any of the foregoing. Words such as “estimate,” “project,” “predict,” “will,” “would,” “should,” “could,” “may,” “might,” “anticipate,” “plan,” “intend,” “believe,” “expect,” “aim,” “goal,” “target,” “objective,” "commit," "advance," “likely” or similar expressions that convey the prospective nature of events or outcomes are generally indicative of forward-looking statements. You should not place undue reliance on these forward-looking statements, which speak only as of the date of this report. Unless legally required, Occidental does not undertake any obligation to update, modify or withdraw any forward-looking statements as a result of new information, future events or otherwise.

Although Occidental believes that the expectations reflected in any of its forward-looking statements are reasonable, actual results may differ from anticipated results, sometimes materially. In addition, historical, current and forward-looking sustainability-related statements may be based on standards for measuring progress that are still developing, internal controls and processes that continue to evolve and assumptions that are subject to change in the future. Factors that could cause results to differ from those projected or assumed in any forward-looking statement include, but are not limited to: general economic conditions, including slowdowns and recessions, domestically or internationally; Occidental’s indebtedness and other payment obligations, including the need to generate sufficient cash flows to fund operations; Occidental’s ability to successfully monetize select assets and repay or refinance debt and the impact of changes in Occidental’s credit ratings; the scope and duration of the global or regional health pandemics or epidemics, including the COVID-19 pandemic and ongoing actions taken by governmental authorities and other third parties in response to the pandemic; assumptions about energy markets; global and local commodity and commodity-futures pricing fluctuations and volatility; supply and demand considerations for, and the prices of, Occidental’s products and services; actions by OPEC and non-OPEC oil producing countries; results from operations and competitive conditions; future impairments of Occidental's proved and unproved oil and gas properties or equity investments, or write-downs of productive assets, causing charges to earnings; unexpected changes in costs; inflation, its impact on markets and economic activity and related monetary policy actions by governments in response to inflation; availability of capital resources, levels of capital expenditures and contractual obligations; the regulatory approval environment, including Occidental's ability to timely obtain or maintain permits or other governmental approvals, including those necessary for drilling and/or development projects; Occidental's ability to successfully complete, or any material delay of, field developments, expansion projects, capital expenditures, efficiency projects, acquisitions or dispositions; risks associated with acquisitions, mergers and joint ventures, such as difficulties integrating businesses, uncertainty associated with financial projections, projected synergies, restructuring, increased costs and adverse tax consequences; uncertainties and liabilities associated with acquired and divested properties and businesses; uncertainties about the estimated quantities of oil, NGL and natural gas reserves; lower-than-expected production from development projects or acquisitions; Occidental’s ability to realize the anticipated benefits from prior or future streamlining actions to reduce fixed costs, simplify or improve processes and improve Occidental’s competitiveness; exploration, drilling and other operational risks; disruptions to, capacity constraints in, or other limitations on the pipeline systems that deliver Occidental’s oil and natural gas and other processing and transportation considerations; volatility in the securities, capital or credit markets; governmental actions, war (including the Russia-Ukraine war) and political conditions and events; environmental risks and liability under federal, regional, state, provincial, tribal, local and international environmental laws, and regulations, and litigation (including the potential liability for remedial actions or assessments under existing or future laws, regulations and litigation); legislative or regulatory changes, including changes relating to hydraulic fracturing or other oil and natural gas operations, retroactive royalty or production tax regimes, deep-water and onshore drilling and permitting regulations and environmental regulations (including regulations related to climate change); Occidental's ability to recognize intended benefits from its business strategies and initiatives, such as Occidental's low carbon ventures businesses or announced greenhouse gas emissions reduction targets or net-zero goals; potential liability resulting from pending or future litigation; disruption or interruption of production or manufacturing or facility damage due to accidents, chemical releases, labor unrest, weather, power outages, natural disasters, cyber-attacks, terrorist acts or insurgent activity; the creditworthiness and performance of Occidental's counterparties, including financial institutions, operating partners and other parties; failure of risk management; Occidental’s ability to retain and hire key personnel; supply, transportation, and labor constraints; reorganization or restructuring of Occidental’s operations; changes in state, federal or international tax rates; and actions by third parties that are beyond Occidental's control.

Additional information concerning these and other factors that may cause Occidental’s results of operations and financial position to differ from expectations can be found in Item 1A, “Risk Factors” and elsewhere in this Form 10-K, as well as in Occidental’s other filings with the SEC, including Occidental’s Quarterly Reports on Form 10-Q and Current Reports on Form 8-K.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

COMMODITY PRICE RISK

GENERAL

Occidental's results are sensitive to fluctuations in oil, NGL and natural gas prices. Price changes at current global prices and levels of production affect Occidental's budgeted 2023 pre-tax annual income by approximately $200 million for a $1 per barrel change in oil prices and approximately $30 million for a $1 per barrel change in NGL prices. If domestic natural gas prices varied by $0.10 per Mcf, it would have an estimated annual effect on Occidental's budgeted 2023 pre-tax income of approximately $30 million. These price-change sensitivities include the impact of PSC and similar contract volume changes on income. If production levels change in the future, the sensitivity of Occidental's results to prices also will change. Marketing results are sensitive to price changes of oil, natural gas and, to a lesser degree, other commodities. A $0.25 change in the Midland-to-Gulf-Coast oil spreads impacts budgeted 2023 operating cash flows by approximately $65 million.

Occidental's results are also sensitive to fluctuations in chemical prices. A variation in chlorine and caustic soda prices of $10 per ton would have a pre-tax annual effect on income of approximately $10 million and $30 million, respectively. A variation in PVC prices of $0.01 per lb. would have a pre-tax annual effect on income of approximately $30 million. Historically, over time, product price changes have tracked raw material and feedstock product price changes, somewhat mitigating the effect of price changes on margins.

RISK MANAGEMENT

Occidental conducts its risk management activities for marketing and trading under the controls and governance of its risk control policies. The controls under these policies are implemented and enforced by a risk management group which monitors risk by providing an independent and separate evaluation and check. Members of the risk management group report to the Corporate Vice President and Treasurer. Controls for these activities include limits on value at risk, limits on credit, limits on total notional trade value, segregation of duties, delegation of authority, daily price verifications, reporting to senior management on various risk measures and a number of other policy and procedural controls.

FAIR VALUE OF MARKETING DERIVATIVE CONTRACTS

Occidental carries derivative contracts it enters into in connection with its marketing activities at fair value. Fair values for these contracts are derived from Level 1 and Level 2 sources. The fair values in future maturity periods are insignificant.

The following table shows the fair value of Occidental's derivatives (excluding collateral), segregated by maturity periods and by methodology of fair value estimation:

Source of Fair Value Assets (Liabilities) *millions*	Maturity Periods 2023	2024 and 2025	2026 and 2027	2028 and thereafter	Total
Prices actively quoted	$ (18)	$ —	$ —	$ —	$ (18)
Prices provided by other external sources	31	1	—	—	32
Total	$ 13	$ 1	$ —	$ —	$ 14

QUANTITATIVE INFORMATION

Occidental uses value at risk to estimate the potential effects of changes in fair values of commodity contracts used in trading activities. This measure determines the maximum potential negative one day change in fair value with a 95% level of confidence. Additionally, Occidental uses complementary trading limits including position and tenor limits and maintains liquid positions as a result of which market risk typically can be neutralized or mitigated on short notice. As a result of these controls, Occidental believes that the market risk of its trading activities is not reasonably likely to have a material adverse effect on its performance.

INTEREST RATE RISK

GENERAL

As of December 31, 2022, Occidental had fixed rate debt with a fair value of $17.5 billion outstanding. A 25-basis point change in Treasury rates would change the fair value of the fixed rate debt approximately $295 million.

The table below provides information about Occidental's long-term debt obligations. Debt amounts represent principal payments by maturity date.

millions except percentages	U.S. Dollar Fixed-Rate Debt	U.S. Dollar Variable-Rate Debt	Total [(a)]
2023	$ 22	$ —	$ 22
2024	1,056	—	1,056
2025	1,208	—	1,208
2026	1,448	—	1,448
2027	903	—	903
Thereafter	13,253	68	13,321
Total	$ 17,890	$ 68	$ 17,958
Weighted-average interest rate	5.92%	5.32%	5.91%
Fair Value	$ 17,508	$ 68	$ 17,576

(a) Excluded net unamortized debt premiums of $1.3 billion and debt issuance costs of $73 million.

FOREIGN CURRENCY RISK

Occidental's international operations have limited currency risk. Occidental manages its exposure primarily by balancing monetary assets and liabilities and limiting cash positions in foreign currencies to levels necessary for operating purposes. A vast majority of international oil sales are denominated in United States dollars. Additionally, all of Occidental's consolidated international oil and gas subsidiaries have the United States dollar as the functional currency. The effect of exchange rates on transactions in foreign currencies is included in periodic income.

CREDIT RISK

The majority of Occidental's counterparty credit risk is related to the physical delivery of energy commodities to its customers and any inability of these customers to meet their settlement commitments. Occidental manages credit risk by selecting counterparties that it believes to be financially strong, by entering into netting arrangements with counterparties and by requiring collateral or other credit risk mitigants, as appropriate. Occidental actively evaluates the creditworthiness of its counterparties, assigns appropriate credit limits and monitors credit exposures against those assigned limits. Occidental also enters into futures contracts through regulated exchanges with select clearinghouses and brokers, which are subject to minimal credit risk, if any.

As of December 31, 2022, the substantial majority of the credit exposures were with investment grade counterparties. Occidental believes its exposure to credit-related losses as of December 31, 2022, was not material and losses associated with credit risk have been insignificant for all years presented.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Occidental Petroleum Corporation:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Occidental Petroleum Corporation and subsidiaries (the Company) as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive income (loss), stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2022, and the related notes and financial statement schedule II - valuation and qualifying accounts (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 27, 2023 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Assessment of the estimated proved oil and gas reserves on the determination of depreciation and depletion expense for proved oil and gas properties.

As discussed in Note 1 to the consolidated financial statements, the Company determines depreciation and depletion of oil and gas producing properties by the unit-of-production method. Under this method, capitalized costs are amortized over estimated proved reserves. For the year ended December 31, 2022, the Company recorded depreciation and depletion expense related to proved oil and gas properties of $6.2 billion.

We identified the assessment of the estimated proved oil and gas reserves on the determination of depreciation and depletion expense related to proved oil and gas properties as a critical audit matter. Complex auditor judgment was required to assess the Company's estimate of proved oil and gas reserves, which is a key input for the determination of depreciation and depletion expense. Estimating proved oil and gas reserves requires the expertise of professional petroleum reservoir engineers. The key assumptions included (1) estimated future production quantities, and (2) estimated operating and capital costs.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls over the Company's depreciation and depletion process, including the estimation of proved oil and gas reserves. We analyzed and assessed the determination of depreciation and depletion expense for compliance with industry and regulatory standards. We assessed compliance of the methodology used by the Company's engineering and technical staff to estimate proved oil and gas reserves with industry and regulatory standards. We read the findings of the independent reservoir engineering specialist's review of the methods and procedures used by the Company in estimating the proved reserves for compliance with industry and regulatory standards. To assess the Company's ability to accurately estimate future production quantities, we compared the future production quantity assumptions used by the Company in prior periods to the actual production amounts. We compared the estimated future production quantities used by the Company in the current period to historical production rates. We evaluated the operating and capital cost assumptions used by the Company's engineering and technical staff by comparing them to historical costs. We evaluated the professional qualifications and the knowledge, skills, and ability of the Company's internal reserve engineers and the independent reservoir engineering specialists engaged by the Company.

Evaluation of the environmental liability associated with the lower 8.3 miles of the Lower Passaic River site.

As discussed in Notes 1 and 12 to the consolidated financial statements, the Company accrues a liability for estimated environmental remedial activities when it is probable a liability has been incurred and the amount of remediation costs can be estimated. The Company accrued a liability related to its estimated allocable share of the costs to perform the remedial activities required for the lower 8.3 miles of the Lower Passaic River site. As of December 31, 2022, the Company's total estimated environmental liabilities were $1 billion, which includes the estimated environmental liability for the lower 8.3 miles of the Lower Passaic River Site.

We identified the evaluation of the environmental liability associated with the lower 8.3 miles of the Lower Passaic River site as a critical audit matter. There was a high degree of subjective auditor judgment in applying and evaluating the results of our procedures due to possible changes to the Company's estimated allocable share of the remediation costs.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls over the Company's environmental liability process to estimate the Company's allocable share of the remediation costs associated with the lower 8.3 miles of the Lower Passaic River site. We assessed the Company's assumption for its allocable share of the remediation costs and analyzed publicly available data sources for information that might be contrary to the information used by the Company. We involved an environmental analysis professional with specialized skills and knowledge who assisted in the evaluation of information used by management, including publicly available data sources.

Determination of tax impact of the legal entity reorganization

As discussed in Note 10 to the consolidated financial statements, the Company completed a legal entity reorganization in the first quarter of 2022 that resulted in an adjustment to the tax basis in a portion of its operating assets that reduced its deferred tax liabilities. As a result of the legal entity reorganization, the Company recorded a tax benefit of $2.7 billion.

We identified the evaluation of the tax impact due to the legal entity reorganization as a critical audit matter. Evaluating the application of the United States tax laws and regulations, which can be complex, and the tax impact required a high degree of auditor effort and specialized skills and knowledge.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls related to the Company's process of determining the tax impact due to the legal entity reorganization including the application of United States tax laws and regulations. We evaluated the information, including third party opinions, United States tax laws and regulations, and other relevant evidence used by management to support its position regarding the tax impact of the transaction; and evaluated the legal entity reorganization related tax impact. We involved income tax professionals with specialized skills and knowledge who assisted in the evaluation of:

- the tax impact of the legal entity reorganization
- certain facts, representations and assumptions from management
- the application of relevant United States tax laws and regulations.

We have served as the Company's auditor since 2002.

Houston, Texas
February 27, 2023

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Occidental Petroleum Corporation:

Opinion on Internal Control Over Financial Reporting

We have audited Occidental Petroleum Corporation and subsidiaries' (the Company) internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive income (loss), stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2022, and the related notes and financial statement schedule II - valuation and qualifying accounts (collectively, the consolidated financial statements), and our report dated February 27, 2023 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Annual Assessment of and Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Houston, Texas
February 27, 2023

Consolidated Balance Sheets

Occidental Petroleum Corporation
and Subsidiaries

millions	December 31, 2022	2021
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	**$ 984**	$ 2,764
Trade receivables, net of reserves of $37 in 2022 and $35 in 2021	**4,281**	4,208
Inventories	**2,059**	1,846
Other current assets	**1,562**	1,393
Total current assets	**8,886**	10,211
INVESTMENTS IN UNCONSOLIDATED ENTITIES	**3,176**	2,938
PROPERTY, PLANT AND EQUIPMENT		
Oil and gas	**104,487**	101,251
Chemical	**7,808**	7,571
Midstream and marketing	**7,550**	8,371
Corporate	**889**	964
	120,734	118,157
Accumulated depreciation, depletion and amortization	**(62,350)**	(58,227)
Total property, plant and equipment, net	**58,384**	59,930
OPERATING LEASE ASSETS	**903**	726
LONG-TERM RECEIVABLES AND OTHER ASSETS, NET	**1,260**	1,231
TOTAL ASSETS	**$ 72,609**	$ 75,036

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Balance Sheets

Occidental Petroleum Corporation
and Subsidiaries

millions except share and per-share amounts	December 31, 2022	2021
LIABILITIES AND EQUITY		
CURRENT LIABILITIES		
Current maturities of long-term debt [a]	$ 165	$ 186
Current operating lease liabilities	273	186
Accounts payable	4,029	3,899
Accrued liabilities	3,290	4,053
Total current liabilities	7,757	8,324
LONG-TERM DEBT, NET		
Long-term debt, net [b]	19,670	29,431
DEFERRED CREDITS AND OTHER LIABILITIES		
Deferred income taxes, net	5,512	7,039
Asset retirement obligations	3,636	3,687
Pension and postretirement obligations	1,055	1,540
Environmental remediation liabilities	905	944
Operating lease liabilities	657	585
Other	3,332	3,159
Total deferred credits and other liabilities	15,097	16,954
EQUITY		
Preferred stock, at $1.00 per share par value (100,000 shares as of December 31, 2022 and 2021)	9,762	9,762
Common stock, $0.20 per share par value, authorized shares: 1.5 billion, issued shares: 2022 — 1,098,512,626 and 2021 — 1,083,423,094	220	217
Treasury stock: 2022 — 198,653,682 shares and 2021 — 149,348,394 shares	(13,772)	(10,673)
Additional paid-in capital	17,181	16,749
Retained earnings	16,499	4,480
Accumulated other comprehensive income (loss)	195	(208)
Total stockholders' equity	30,085	20,327
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$ 72,609	$ 75,036

(a) Included $143 million and $85 million of current finance lease liabilities as of December 31, 2022 and 2021, respectively.
(b) Included $546 million and $504 million of finance lease liabilities as of December 31, 2022 and 2021, respectively.

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Operations

Occidental Petroleum Corporation
and Subsidiaries

millions except per-share amounts	Years Ended December 31, 2022	2021	2020
REVENUES AND OTHER INCOME			
Net sales	$ 36,634	$ 25,956	$ 17,809
Interest, dividends and other income	153	166	118
Gains (losses) on sale of assets, net	308	192	(1,666)
Total	37,095	26,314	16,261
COSTS AND OTHER DEDUCTIONS			
Oil and gas operating expense	4,028	3,160	3,065
Transportation and gathering expense	1,475	1,419	1,600
Chemical and midstream cost of sales	3,273	2,772	2,408
Purchased commodities	3,287	2,308	1,395
Selling, general and administrative	945	863	864
Other operating and non-operating expense	1,271	1,065	884
Taxes other than on income	1,548	1,005	622
Depreciation, depletion and amortization	6,926	8,447	8,097
Asset impairments and other charges	—	304	11,083
Anadarko Acquisition-related costs	89	153	339
Exploration expense	216	252	132
Interest and debt expense, net	1,030	1,614	1,424
Total	24,088	23,362	31,913
Income (loss) before income taxes and other items	13,007	2,952	(15,652)
OTHER ITEMS			
Gains (losses) on interest rate swaps and warrants, net	317	122	(423)
Income from equity investments	793	631	370
Total	1,110	753	(53)
Income (loss) from continuing operations before income taxes	14,117	3,705	(15,705)
Income tax benefit (expense)	(813)	(915)	2,172
Income (loss) from continuing operations	13,304	2,790	(13,533)
Loss from discontinued operations, net of tax	—	(468)	(1,298)
NET INCOME (LOSS)	13,304	2,322	(14,831)
Less: Preferred stock dividends	(800)	(800)	(844)
NET INCOME (LOSS) ATTRIBUTABLE TO COMMON STOCKHOLDERS	$ 12,504	$ 1,522	$ (15,675)
PER COMMON SHARE			
Income (loss) from continuing operations—basic	$ 13.41	$ 2.12	$ (15.65)
Loss from discontinued operations—basic	—	(0.50)	(1.41)
Net income (loss) attributable to common stockholders—basic	$ 13.41	$ 1.62	$ (17.06)
Income (loss) from continuing operations—diluted	$ 12.40	$ 2.06	$ (15.65)
Loss from discontinued operations—diluted	—	(0.48)	(1.41)
Net income (loss) attributable to common stockholders—diluted	$ 12.40	$ 1.58	$ (17.06)

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Comprehensive Income (Loss)

Occidental Petroleum Corporation
and Subsidiaries

		Years Ended December 31,				
millions		2022		2021		2020
Net income (loss)	$	13,304	$	2,322	$	(14,831)
Other comprehensive income (loss) items:						
Gains on derivatives [(a)]		80		14		4
Pension and postretirement gains (losses) [(b)]		321		67		(71)
Other		2		(1)		—
Other comprehensive income (loss), net of tax		403		80		(67)
Comprehensive income (loss)		13,707		2,402		(14,898)
Comprehensive income (loss) attributable to preferred and common stockholders	$	13,707	$	2,402	$	(14,898)

(a) Net of tax expense of $(22), $(4) and $(1) in 2022, 2021 and 2020, respectively.
(b) Net of tax benefit (expense) of $(99), $(18) and $24 in 2022, 2021 and 2020, respectively. See Note 11 - Retirement and Postretirement Benefit Plans in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K for additional information.

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Stockholders' Equity

Occidental Petroleum Corporation
and Subsidiaries

	Preferred Stock	Equity Attributable to Common Stock: Common Stock	Treasury Stock	Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Total Equity
Balance, December 31, 2019	$ 9,762	$ 209	$ (10,653)	$ 14,955	$ 20,180	$ (221)	$ 34,232
Net loss	—	—	—	—	(14,831)	—	(14,831)
Other comprehensive loss, net of tax	—	—	—	—	—	(67)	(67)
Dividends on common stock, $0.82 per share	—	—	—	—	(746)	—	(746)
Dividends on preferred stock, $8,444 per share	—	6	—	438	(844)	—	(400)
Issuance of warrants on common stock	—	—	—	767	(763)	—	4
Berkshire Warrants	—	—	—	103	—	—	103
Issuance of common stock and other, net	—	1	—	289	—	—	290
Purchases of treasury stock	—	—	(12)	—	—	—	(12)
Balance, December 31, 2020	$ 9,762	$ 216	$ (10,665)	$ 16,552	$ 2,996	$ (288)	$ 18,573
Net income	—	—	—	—	2,322	—	2,322
Other comprehensive income, net of tax	—	—	—	—	—	80	80
Dividends on common stock, $0.04 per share	—	—	—	—	(38)	—	(38)
Dividends on preferred stock, $8,000 per share	—	—	—	—	(800)	—	(800)
Shareholder warrants exercised	—	—	—	7	—	—	7
Issuance of common stock and other, net	—	1	—	190	—	—	191
Purchases of treasury stock	—	—	(8)	—	—	—	(8)
Balance, December 31, 2021	$ 9,762	$ 217	$ (10,673)	$ 16,749	$ 4,480	$ (208)	$ 20,327
Net income	—	—	—	—	13,304	—	13,304
Other comprehensive income, net of tax	—	—	—	—	—	403	403
Dividends on common stock, $0.52 per share	—	—	—	—	(485)	—	(485)
Dividends on preferred stock, $8,000 per share	—	—	—	—	(800)	—	(800)
Shareholder warrants exercised	—	2	—	252	—	—	254
Options Exercised	—	—	—	27	—	—	27
Issuance of common stock and other, net	—	1	—	153	—	—	154
Purchases of treasury stock	—	—	(3,099)	—	—	—	(3,099)
Balance, December 31, 2022	$ 9,762	$ 220	$ (13,772)	$ 17,181	$ 16,499	$ 195	$ 30,085

The accompanying notes are an integral part of these Consolidated Financial Statements.

Consolidated Statements of Cash Flows

Occidental Petroleum Corporation
and Subsidiaries

millions	Years Ended December 31, 2022	2021	2020
CASH FLOW FROM OPERATING ACTIVITIES			
Net income (loss)	$ 13,304	$ 2,322	$ (14,831)
Adjustments to reconcile net income (loss) to net cash from operating activities:			
Discontinued operations, net	—	468	1,298
Depreciation, depletion and amortization of assets	6,926	8,447	8,097
Deferred income tax provision (benefit)	(1,644)	46	(2,517)
Noncash charges (benefit) to income and other	(8)	229	419
Asset impairments and other charges	—	304	11,002
(Gain) loss on sales of equity investments and other assets, net	(308)	(192)	1,666
Undistributed earnings from affiliates	(219)	(70)	(61)
Dry hole expense	84	125	47
Changes in operating assets and liabilities:			
(Increase) decrease in receivables	(97)	(2,086)	2,062
(Increase) decrease in inventories	(230)	(86)	(484)
(Increase) decrease in other current assets	(335)	(119)	350
Increase (decrease) in accounts payable and accrued liabilities	(478)	865	(3,228)
Increase (decrease) in current domestic and foreign income taxes	(185)	—	22
Operating cash flow from continuing operations	16,810	10,253	3,842
Operating cash flow from discontinued operations, net of taxes	—	181	113
Net cash provided by operating activities	16,810	10,434	3,955
CASH FLOW FROM INVESTING ACTIVITIES			
Capital expenditures	(4,497)	(2,870)	(2,535)
Change in capital accrual	147	97	(519)
Purchase of businesses, assets and equity investments, net	(990)	(431)	(114)
Proceeds from sale of assets and equity investments, net	584	1,624	2,281
Equity investments and other, net	(116)	406	109
Investing cash flow from continuing operations	(4,872)	(1,174)	(778)
Investing cash flow from discontinued operations	—	(79)	(41)
Net cash used by investing activities	(4,872)	(1,253)	(819)
CASH FLOW FROM FINANCING ACTIVITIES			
Draws on receivables securitization facility	400	—	—
Payment of receivables securitization facility	(400)	—	—
Proceeds from long-term debt, net	—	—	6,936
Payments of long-term debt, net	(9,484)	(6,834)	(8,916)
Proceeds from issuance of common stock	293	31	134
Purchases of treasury stock	(3,099)	(8)	(12)
Cash dividends paid on common and preferred stock	(1,184)	(839)	(1,845)
Payment of liabilities associated with the sale of future royalties	—	—	(386)
Financing portion of net cash paid for derivative instruments	(111)	(834)	(362)
Other financing, net	(130)	(80)	(57)
Financing cash flow from continuing operations	(13,715)	(8,564)	(4,508)
Financing cash flow from discontinued operations	—	(8)	(8)
Net cash used by financing activities	(13,715)	(8,572)	(4,516)
Increase (decrease) in cash, cash equivalents, restricted cash and restricted cash equivalents	(1,777)	609	(1,380)
Cash, cash equivalents, restricted cash and restricted cash equivalents — beginning of year	2,803	2,194	3,574
Cash, cash equivalents, restricted cash and restricted cash equivalents — end of year	$ 1,026	$ 2,803	$ 2,194

The accompanying notes are an integral part of these Consolidated Financial Statements.

Notes to Consolidated Financial Statements

Occidental Petroleum Corporation
and Subsidiaries

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

NATURE OF OPERATIONS

Occidental conducts its operations through various subsidiaries and affiliates. Occidental’s principal businesses consist of three reporting segments: oil and gas, chemical and midstream and marketing. The oil and gas segment explores for, develops and produces oil (which includes condensate), NGL and natural gas. OxyChem primarily manufactures and markets basic chemicals and vinyls. The midstream and marketing segment purchases, markets, gathers, processes, transports and stores oil (which includes condensate), NGL, natural gas, CO_2 and power. It also optimizes its transportation and storage capacity, and invests in entities that conduct similar activities, such as WES.

The midstream and marketing segment also includes OLCV. OLCV seeks to leverage Occidental’s legacy of carbon management expertise to develop CCUS projects, including the commercialization of DAC technology, and invests in other low-carbon technologies intended to reduce GHG emissions from our operations and strategically partner with other industries to help reduce their emissions.

PRINCIPLES OF CONSOLIDATION

The Consolidated Financial Statements have been prepared in conformity with GAAP and include the accounts of Occidental, its subsidiaries, its undivided interests in oil and gas exploration and production ventures and, previously, variable interest entities, for which Occidental was the primary beneficiary. Occidental accounts for its share of oil and gas exploration and production ventures, in which it has a direct working interest, by reporting its proportionate share of assets, liabilities, revenues, costs and cash flows within the relevant lines on the balance sheets, statements of operations and statements of cash flows. Certain prior period amounts have been reclassified to conform to the current presentation.

INVESTMENTS IN UNCONSOLIDATED ENTITIES

Occidental’s percentage interest in the underlying net assets of affiliates for which it exercises significant influence without having a controlling interest (excluding oil and gas ventures in which Occidental holds an undivided interest) are accounted for under the equity method. Occidental reviews equity-method investments for impairment whenever events or changes in circumstances indicate that an other-than-temporary decline in value may have occurred. The amount of impairment, if any, is based on quoted market prices, when available, or other valuation techniques, including discounted cash flows. Occidental evaluates the facts and circumstances of any distributions in excess of its carrying amount in the investment to determine the appropriate accounting, including the source of the proceeds and any implicit or explicit commitments to fund the affiliate. If there is no implicit or explicit commitment the distribution is treated as a gain. If an implicit or explicit commitment exists to possibly fund the affiliate at a future date the distribution is recorded against the equity-method investment. See Note 4 - Investments and Related-Party Transactions for further discussion regarding investments in unconsolidated entities.

WES INVESTMENT

WES is a publicly traded limited partnership with its common units traded on the NYSE under the ticker symbol “WES.” WES owns the entire non-economic general partner interest and a 98% limited partner interest in WES Operating.

In July 2022, Occidental sold 10.0 million limited partner units of WES for proceeds of approximately $250 million, resulting in a gain of $62 million.

As of December 31, 2022, Occidental owned all of the 2.3% non-voting general partner interest and 49.5% of the limited partner units in WES. On a combined basis, with its 2% non-voting limited partner interest in WES Operating, Occidental's total effective economic interest in WES and its subsidiaries was 51.7% and Occidental’s carrying value of WES was approximately $2.0 billion, which exceeds Occidental’s pro-rata interest in the net assets of WES by $390 million. This basis difference is primarily associated with WES' PP&E and equity investments and is subject to amortization over their estimated average lives. See Note 4 - Investment and Related-Party Transactions for further information.

BERKSHIRE HATHAWAY OWNERSHIP

Berkshire Hathaway is a related party of Occidental due to its level of ownership of Occidental's common stock. During the third quarter of 2022, Berkshire Hathaway increased its ownership in Occidental to approximately 194 million shares of common stock. Occidental has, from time to time, contracted with Berkshire Hathaway for the provision of electricity, rail and insurance. In addition, certain Berkshire Hathaway subsidiaries purchase various chemicals from our chemical segment.

DISCONTINUED OPERATIONS

Unless otherwise indicated, information presented in the Notes to Consolidated Financial Statements relates only to Occidental's continuing operations. Information related to discontinued operations is included in Note 5 - Acquisitions, Divestitures and Other Transactions and in some instances, where appropriate, is included as a separate disclosure within the individual Notes to Consolidated Financial Statements.

RISKS AND UNCERTAINTIES

The process of preparing Consolidated Financial Statements in conformity with GAAP requires Occidental's management to make informed estimates and judgments regarding certain types of financial statement balances and disclosures. Such estimates primarily relate to unsettled transactions and events as of the date of the Consolidated Financial Statements and judgments on expected outcomes as well as the materiality of transactions and balances. Changes in facts and circumstances or discovery of new information relating to such transactions and events may result in revised estimates and judgments and actual results may differ from estimates upon settlement. Management believes that these estimates and judgments provide a reasonable basis for the fair presentation of Occidental's financial statements. Occidental establishes a valuation allowance against net operating losses and other deferred tax assets to the extent it believes the future benefit from these assets will not be realized in the statutory carryforward periods. Realization of deferred tax assets is dependent upon Occidental generating sufficient future taxable income and reversal of temporary differences in jurisdictions where such assets originate.

The accompanying Consolidated Financial Statements include assets of approximately $7.7 billion as of December 31, 2022 and net sales of approximately $5.5 billion for the year ended December 31, 2022, relating to Occidental's operations in countries outside North America. Occidental has experienced and may continue to experience adverse consequences, such as risk of loss or production limitations, because certain of its international operations are located in countries affected by political instability, nationalizations, corruption, armed conflict, terrorism, insurgency, civil unrest, security problems, labor unrest, OPEC production restrictions, equipment import restrictions and sanctions. Exposure to such risks may increase if a greater percentage of Occidental's future oil and gas production or revenue comes from international sources. Occidental attempts to conduct its affairs so as to mitigate its exposure to such risks and would seek compensation in the event of nationalization.

Because Occidental's major products are commodities, significant changes in the prices of oil, NGL, natural gas and chemical products may have a significant impact on Occidental's results of operations. Also, see Property, Plant and Equipment section below.

RECEIVABLES AND OTHER CURRENT ASSETS

Trade receivables, net of $4.3 billion and $4.2 billion as of December 31, 2022 and 2021, respectively, represent rights to payment for which Occidental had satisfied its obligations under a contract with a customer and its right to payment was conditioned only on the passage of time.

Other current assets includes amounts receivable from working interest partners in Occidental's oil and gas operations, derivative assets and taxes receivable.

INVENTORIES

Materials and supplies are valued at weighted-average cost and are reviewed periodically for obsolescence. Oil, NGL and natural gas inventories are valued at the lower of cost or market.

For the chemical segment, Occidental's finished goods inventories are valued at the lower of cost or market. For most of its domestic inventories, other than materials and supplies, the chemical segment uses the LIFO method as it better matches current costs and current revenue. For other countries, Occidental uses the first-in, first-out method (if the costs of goods are specifically identifiable) or the average-cost method (if the costs of goods are not specifically identifiable).

PROPERTY, PLANT AND EQUIPMENT

OIL AND GAS

The carrying value of Occidental's PP&E represents the cost incurred to acquire or develop the asset, including any AROs and capitalized interest, net of accumulated DD&A and any impairment charges. For assets acquired, PP&E cost is based on fair values at the acquisition date. AROs and interest costs incurred in connection with qualifying capital expenditures are capitalized and amortized over the lives of the related assets.

Occidental uses the successful efforts method to account for its oil and gas properties. Under this method, Occidental capitalizes costs of acquiring properties, costs of drilling successful exploration wells and development costs. The costs of exploratory wells are initially capitalized pending a determination of whether proved reserves have been found. If proved reserves have been found, the costs of exploratory wells remain capitalized. For exploratory wells that find reserves that cannot be classified as proved when drilling is completed, costs continue to be capitalized as suspended exploratory drilling costs if there have been sufficient reserves found to justify completion as a producing well and sufficient progress is being made in assessing the reserves and the economic and operating viability of the project. At the end of each quarter, management reviews the status of all suspended exploratory drilling costs in light of ongoing exploration activities, in particular, whether Occidental is making sufficient progress in its ongoing exploration and appraisal efforts or, in the case of discoveries requiring government sanctioning, analyzing whether development negotiations are underway and proceeding as planned. If management determines that future appraisal drilling or development activities are unlikely to occur, associated suspended exploratory well costs are expensed.

The following table summarizes the activity of capitalized exploratory well costs for continuing operations for the years ended December 31:

millions		2022		2021		2020
Balance — beginning of year	$	213	$	211	$	424
Additions to capitalized exploratory well costs pending the determination of proved reserves		323		163		122
Reclassifications to property, plant and equipment based on the determination of proved reserves		(183)		(67)		(309)
Capitalized exploratory well costs charged to expense		(77)		(94)		(26)
Balance — end of year	$	276	$	213	$	211

Occidental expenses annual lease rentals, the costs of injectants used in production and geological and geophysical costs as incurred.

Occidental determines depreciation and depletion of oil and gas producing properties by the unit-of-production method. It amortizes leasehold costs over total proved reserves and capitalized development and successful exploration costs over proved developed reserves.

Proved oil and gas reserves are those quantities of oil and gas which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible from a given date forward, from known reservoirs and under existing economic conditions, operating methods and government regulations prior to the time at which contracts providing the right to operate expire, unless evidence indicates that renewal is reasonably certain, regardless of whether deterministic or probabilistic methods are used for the estimation. Proved reserves include PUD reserves. PUD reserves are supported by a management-approved, detailed, field-level development plan where sufficient capital has been committed to develop those reserves. Only PUD reserves which are reasonably certain to be drilled within five years of booking and are supported by a final investment decision to drill them are included in the development plan. A portion of the PUD reserves associated with international operations are expected to be developed beyond the five years and are tied to approved long-term development projects.

Occidental performs impairment tests with respect to its proved properties whenever events or circumstances indicate that the carrying value of property may not be recoverable. If there is an indication the carrying amount of the asset may not be recovered due to significant and prolonged declines in current and forward prices, significant changes in reserve estimates, changes in management's plans, or other significant events, management will evaluate the property for impairment. Under the successful efforts method, if the sum of the undiscounted cash flows is less than the carrying value of the proved property, the carrying value is reduced to estimated fair value and reported as an impairment charge in the period. Individual proved properties are grouped for impairment purposes at the lowest level for which there are identifiable cash flows unless observable and comparable transactions are available. The fair value of impaired assets is typically determined based on the present value of expected future cash flows using discount rates believed to be consistent with those used by market participants. The impairment test incorporates a number of assumptions involving expectations of future cash flows which can change significantly over time. These assumptions include estimates of future production, product prices, contractual prices, estimates of risk-adjusted oil and gas proved and unproved reserves and estimates of future operating and development costs. It is reasonably possible that prolonged declines in commodity prices, reduced capital spending in response to lower prices or increases in operating costs could result in additional impairments. See Note 9 - Fair Value Measurements and below for further discussion of asset impairments.

Net capitalized costs attributable to unproved properties were $12.6 billion as of December 31, 2022 and $14.8 billion as of December 31, 2021. The unproved amounts are not subject to DD&A until they are classified as proved properties. Individually insignificant unproved properties are combined and amortized on a group basis based on factors such as lease terms, success rates and other factors to provide for full amortization upon lease expiration or abandonment.

Significant unproved properties, primarily as a result of the Anadarko Acquisition, are assessed individually for impairment and when events or circumstances indicate that the carrying value of property may not be recovered a valuation allowance is provided if an impairment is indicated. Occidental periodically reviews significant unproved properties for impairments; numerous factors are considered, including but not limited to, availability of funds for future exploration and development activities, current exploration and development plans, favorable or unfavorable exploration activity on the property or the adjacent property, geologists' evaluation of the property, the current and projected political and regulatory climate, contractual conditions and the remaining lease term for the properties. If an impairment is indicated, Occidental will first determine whether a comparable transaction for similar properties or implied acreage valuation derived from domestic onshore market participants is available and will adjust the carrying amount of the unproved property to its fair value using the market approach. In situations where the market approach is not observable and unproved reserves are available, undiscounted future net cash flows used in the impairment analysis are determined based on managements' risk adjusted estimates of unproved reserves, future commodity prices and future costs to produce the reserves. If undiscounted future net cash flows are less than the carrying value of the property, the future net cash flows are discounted and compared to the carrying value for determining the amount of the impairment loss to record. Occidental utilizes the same assumptions and methodology discussed above for cash flows associated with proved properties.

CHEMICAL

Occidental's chemical assets are depreciated using either the unit-of-production or the straight-line method, based upon the estimated useful lives of the facilities. The estimated useful lives of Occidental's chemical assets, which range from three years to 50 years, are also used for impairment tests. The estimated useful lives for the chemical facilities are based on the assumption that Occidental will provide an appropriate level of annual expenditures to ensure productive capacity is sustained. Such expenditures consist of ongoing routine repairs and maintenance, as well as planned major maintenance activities. Ongoing routine repairs and maintenance expenditures are expensed as incurred. Planned major maintenance activities costs are capitalized and amortized over the period until the next planned overhaul. Additionally, Occidental incurs capital expenditures that extend the remaining useful lives of existing assets, increase their capacity or operating efficiency beyond the original specification or add value through modification for a different use. These capital expenditures are not considered in the initial determination of the useful lives of these assets at the time they are placed into service. The resulting revision, if any, of the asset's estimated useful life is measured and accounted for prospectively.

Without these continued expenditures, the useful lives of these assets could decrease significantly. Other factors that could change the estimated useful lives of Occidental's chemical assets include sustained higher or lower product prices, which are affected by domestic and international competition, demand, feedstock costs, energy prices, environmental regulations and technological changes.

Occidental performs impairment tests on its chemical assets whenever events or changes in circumstances lead to a reduction in the estimated useful lives or estimated future cash flows that would indicate that the carrying amount may not be recoverable, or when management's plans change with respect to those assets. Any impairment loss would be calculated as the excess of the asset's net book value over its estimated fair value.

MIDSTREAM AND MARKETING

Occidental's midstream and marketing PP&E is depreciated over the estimated useful lives of the assets, using either the unit-of-production or straight-line method.

Occidental performs impairment tests on its midstream and marketing assets whenever events or changes in circumstances lead to a reduction in the estimated useful lives or estimated future cash flows that would indicate that the carrying amount may not be recoverable, or when management's plans change with respect to those assets. Any impairment loss would be calculated as the excess of the asset's net book value over its estimated fair value.

IMPAIRMENTS AND OTHER CHARGES

During 2021, Occidental's oil and gas segment recognized pre-tax impairment and related charges of $282 million primarily related to undeveloped leases that either expired or were set to expire in the near-term, where Occidental had no plans to pursue exploration activities and, to a lesser extent, impairments of oil and gas materials and supplies inventories.

During 2020, Occidental's oil and gas segment recognized pre-tax impairment and related charges of $7.0 billion related to proved and unproved properties. An additional pre-tax impairment of $2.2 billion related to Ghana was included in discontinued operations.

During 2020, Occidental's midstream and marketing segment recognized pre-tax impairment and related charges of $1.2 billion related to goodwill associated with Occidental's ownership in WES. Significant declines in the market value of WES' publicly traded units resulted in management's determination that, more likely than not, the fair value of the reporting unit was significantly less than its carrying value and the entire balance was fully impaired. The market value of WES' publicly traded units is considered a Level 1 input.

Prolonged declines in commodity prices, reduced capital spending in response to lower prices or increases in operating costs could result in additional impairments.

FAIR VALUE MEASUREMENTS

Occidental has categorized its assets and liabilities that are measured at fair value in a three-level fair value hierarchy, based on the inputs to the valuation techniques: Level 1 – using quoted prices in active markets for the assets or liabilities; Level 2 – using observable inputs other than quoted prices for the assets or liabilities; and Level 3 – using unobservable inputs. Transfers between levels, if any, are reported at the end of each reporting period.

FAIR VALUES - RECURRING

Occidental primarily applies the market approach for recurring fair value measurements, maximizes its use of observable inputs and minimizes its use of unobservable inputs. Occidental utilizes the mid-point between bid and ask prices for valuing the majority of its assets and liabilities measured and reported at fair value. In addition to using market data, Occidental makes assumptions in valuing its assets and liabilities, including assumptions about the risks inherent in the inputs to the valuation technique. For assets and liabilities carried at fair value, Occidental measures fair value using the following methods:

- Occidental values exchange-cleared commodity derivatives using closing prices provided by the exchange as of the balance sheet date. These derivatives are classified as Level 1.
- OTC bilateral financial commodity contracts, foreign exchange contracts, interest rate swaps, warrants, options and physical commodity forward purchase and sale contracts are generally classified as Level 2 and are generally valued using quotations provided by brokers or industry-standard models that consider various inputs, including quoted forward prices for commodities, time value, volatility factors, credit risk and current market and contractual prices for the underlying instruments, as well as other relevant economic measures. Substantially all of these inputs are observable in the marketplace throughout the full term of the instrument, and can be derived from observable data or are supported by observable prices at which transactions are executed in the marketplace.
- Occidental values commodity derivatives based on a market approach that considers various assumptions, including quoted forward commodity prices and market yield curves. The assumptions used include inputs that are generally unobservable in the marketplace or are observable but have been adjusted based upon various assumptions and the fair value is designated as Level 3 within the valuation hierarchy.
- Occidental values debt using market-observable information for debt instruments that are traded on secondary markets. For debt instruments that are not traded, the fair value is determined by interpolating the value based on debt with similar terms and credit risk.

NON-FINANCIAL ASSETS

Occidental uses market-observable prices for assets when comparable transactions can be identified that are similar to the asset being valued. When Occidental is required to measure fair value and there is not a market-observable price for the asset or for a similar asset then the cost or income approach is used depending on the quality of information available to support management’s assumptions. The cost approach is based on management’s best estimate of the current asset replacement cost. The income approach is based on management’s best assumptions regarding expectations of future net cash flows. The expected cash flows are discounted using a commensurate risk-adjusted discount rate. Such evaluations involve significant judgment, and the results are based on expected future events or conditions such as sales prices, estimates of future oil and gas production or throughput, development and operating costs and the timing thereof, economic and regulatory climates and other factors, most of which are often outside of management’s control. However, assumptions used reflect a market participant’s view of long-term prices, costs and other factors and are consistent with assumptions used in Occidental’s business plans and investment decisions.

ACCRUED LIABILITIES - CURRENT

Accrued liabilities - current included accrued payroll, commissions and related expenses of $582 million and $677 million as of December 31, 2022 and 2021, respectively, and taxes other than on income of $544 million and $445 million as of December 31, 2022 and 2021, respectively. Dividends payable, also included in accrued liabilities - current, were $289 million and $188 million as of December 31, 2022, and 2021, respectively.

ENVIRONMENTAL LIABILITIES AND EXPENDITURES

Certain subsidiaries of Occidental incur environmental liabilities and expenditures that relate to current operations and are expensed or capitalized by such subsidiaries as appropriate. Certain subsidiaries also incur environmental liabilities and expenditures with respect to remediation of existing conditions from alleged past practices at Currently Operated, Closed or Non-Operated, and Third-Party Sites, which categories may include NPL sites. Those environmental liabilities and related charges and expenses for estimated remediation costs from past operations are recorded when environmental remediation efforts are probable and the costs can be reasonably estimated. Occidental discloses such remediation liabilities on a consolidated basis. In determining the environmental remediation liability and the range of reasonably possible additional losses, Occidental refers to currently available information, including relevant past experience, remedial objectives, available technologies, applicable laws and regulations and cost-sharing arrangements. These environmental remediation liabilities are based on management’s estimate of the most likely cost to be incurred, using the most cost-effective technology reasonably expected to achieve the remedial objective. Occidental periodically reviews these environmental remediation liabilities and adjusts them as new information becomes available. Occidental’s subsidiaries generally record reimbursements or recoveries of environmental remediation costs in income when received, or when receipt of recovery is highly probable.

Many factors could affect future remediation costs incurred by Occidental’s subsidiaries and result in adjustments to environmental remediation liabilities and the range of reasonably possible additional losses. The most significant are: (1)

cost estimates for remedial activities may vary from the initial estimate; (2) the length of time, type or amount of remediation necessary to achieve the remedial objective may change due to factors such as site conditions, the ability to identify and control contaminant sources or the discovery of additional contamination; (3) a regulatory agency may ultimately reject or modify Occidental's proposed remedial plan; (4) improved or alternative remediation technologies may change remediation costs; (5) laws and regulations may change remediation requirements or affect cost sharing or allocation of liability; and (6) changes in allocation or cost-sharing arrangements may occur.

Certain sites involve multiple parties with various cost-sharing arrangements, which fall into the following three categories: (1) environmental proceedings that result in a negotiated or prescribed allocation of remediation costs among the affected Occidental subsidiary and other alleged potentially responsible parties; (2) oil and gas ventures in which each participant pays its proportionate share of remediation costs reflecting its working interest; or (3) contractual arrangements, typically relating to purchases and sales of properties, in which the parties to the transaction agree to methods of allocating remediation costs. In these circumstances, the affected subsidiary evaluates the financial viability of other parties with whom it is alleged to be jointly liable, the degree of their commitment to participate and the consequences to such subsidiary of their failure to participate when estimating its ultimate share of liability. Occidental records its environmental remediation liabilities at its expected net cost of remedial activities and, based on these factors, believes that it will not be required to assume a share of liability of such other potentially responsible parties in an amount materially above amounts reserved.

In addition to the costs of investigations and clean-up measures, which often take in excess of 10 years at CERCLA NPL sites, Occidental's environmental remediation liabilities include management's estimates of the costs to operate and maintain remedial systems. If remedial systems are modified over time in response to significant changes in site-specific data, laws, regulations, technologies or engineering estimates, Occidental reviews and adjusts its environmental remediation liabilities accordingly.

ASSET RETIREMENT OBLIGATIONS

Occidental recognizes the fair value of AROs in the period in which a determination is made that a legal obligation exists to dismantle an asset and reclaim or remediate the property at the end of its useful life and the cost of the obligation can be reasonably estimated. The liability amounts are based on future retirement cost estimates and incorporate many assumptions such as time to abandonment, future inflation rates and the risk-adjusted discount rate. When the liability is initially recorded, Occidental capitalizes the cost by increasing the related PP&E balances. If the estimated future cost of the AROs changes, Occidental records an adjustment to both the AROs and PP&E. Over time, the liability is increased, expense is recognized for accretion and the capitalized cost is depreciated over the useful life of the asset.

The majority of Occidental's AROs relate to the plugging of wells and the related abandonment of oil and gas properties.

At a certain number of its facilities, Occidental has identified conditional AROs that are related mainly to plant decommissioning. Occidental does not know or cannot estimate when it may settle these obligations. Therefore, Occidental cannot reasonably estimate the fair value of these liabilities. Occidental will recognize these conditional AROs in the periods in which sufficient information becomes available to reasonably estimate their fair values.

The following table summarizes the activity of AROs for the years ended December 31:

millions		**2022**		2021
Beginning balance	**$**	**4,026**	$	4,130
Liabilities incurred – capitalized to PP&E		**55**		27
Liabilities settled and paid		**(342)**		(174)
Accretion expense		**145**		205
Acquisitions, divestitures and other, net		**(54)**		(53)
Revisions to previous estimates		**(25)**		(109)
Ending balance [(a)]	**$**	**3,805**	$	4,026

(a) The ending balance included $169 million and $339 million related to the current balance of AROs that are presented in accrued liabilities on the Consolidated Balance Sheets as of December 31, 2022 and 2021, respectively.

DERIVATIVE INSTRUMENTS

Derivatives are carried at fair value and on a net basis when a legal right of offset exists with the same counterparty. Occidental applies hedge accounting when transactions meet specified criteria for cash flow hedge treatment and management elects and documents such treatment. Otherwise, any fair value gains or losses are recognized in earnings in the current period. For cash flow hedges, the gain or loss on the effective portion of the derivative is reported as a component of OCI with an offsetting adjustment to the carrying value of the item being hedged. Realized gains or losses from cash flow hedges, and any ineffective portion, are recorded as a component of net sales in the Consolidated Statements of Operations. Ineffectiveness is primarily created by a lack of correlation between the hedged item and the hedging instrument due to location, quality, grade or changes in the expected quantity of the hedged item. Gains and losses from derivative instruments are reported net in the Consolidated Statements of Operations. There were no fair value hedges as of and during the years ended December 31, 2022, 2021 and 2020.

STOCK-BASED INCENTIVE PLANS

Occidental has established the Plan that is more fully described in Note 15 - Stock-Based Incentive Plans. A summary of Occidental's accounting policy for awards issued under the Plan is as follows.

For cash- and stock-settled RSUs and CROCEI awards, compensation value is initially measured on the grant date using the quoted market price of Occidental's common stock and the estimated payout on the grant date. The fair value of stock options is estimated using a Black Scholes model. For TSRI awards, compensation value is initially measured on the grant date using the fair value derived from a Monte Carlo valuation model. Compensation expense for all awards is recognized on a straight-line basis over the requisite service periods, which is generally over the awards' respective vesting or performance periods. The stock-settled awards are expensed using the initially measured compensation value. The liability resulting from cash settled awards and accrued dividends are remeasured at each reporting period. Dividends accrued on unvested awards are adjusted quarterly for any changes in the number of share equivalents expected to be paid based on the relevant performance and market criteria, if applicable.

RETIREMENT AND POSTRETIREMENT BENEFIT PLANS

Occidental recognizes the overfunded or underfunded amounts of its defined benefit pension and postretirement plans, which are more fully described in Note 11 - Retirement and Postretirement Benefit Plans, in its financial statements using a December 31 measurement date.

Occidental's defined benefit pension and postretirement benefit plan obligations are actuarially determined based on various assumptions and discount rates. The discount rate assumptions used are meant to reflect the interest rate at which the obligations could effectively be settled on the measurement date. Occidental estimates the rate of return on assets with regard to current market factors but within the context of historical returns. Occidental funds and expenses negotiated pension increases for domestic union employees over the terms of the applicable collective bargaining agreements.

Pension and any postretirement plan assets are measured at fair value. Common stock, preferred stock, publicly registered mutual funds, U.S. government securities and corporate bonds are valued using quoted market prices in active markets when available. When quoted market prices are not available, these investments are valued using pricing models with observable inputs from both active and non-active markets. Common and collective trusts are valued at the fund units' NAV provided by the issuer, which represents the quoted price in a non-active market. Short-term investment funds are valued at the fund units' NAV provided by the issuer.

SUPPLEMENTAL CASH FLOW INFORMATION

The following table represents U.S. federal, domestic state and international income taxes paid, tax refunds received and interest paid related to continuing operations during the year ended December 31, 2022, 2021 and 2020, respectively.

millions	2022	2021	2020
Income tax payments	**$ 2,184**	$ 763	$ 498
Income tax refunds received	**$ 89**	$ 70	$ 223
Production, property and other tax payments	**$ 1,093**	$ 790	$ 629
Interest paid [(a)]	**$ 1,425**	$ 1,685	$ 1,521

(a) Net of capitalized interest of $69 million, $61 million and $84 million, for the years 2022, 2021 and 2020, respectively.

Occidental swapped oil and gas acreage with a fair value of $340 million in non-monetary exchange transactions during the year ended December 31, 2022.

CASH EQUIVALENTS AND RESTRICTED CASH EQUIVALENTS

Occidental considers all highly liquid investments with a maturity of three months or less when purchased to be cash equivalents or restricted cash equivalents. The cash equivalents and restricted cash equivalents balance as of December 31, 2022, included investments in government money market funds in which the carrying value approximates fair value.

The following table provides a reconciliation of cash, cash equivalents, restricted cash and restricted cash equivalents as reported at the end of the period in the Consolidated Statements of Cash Flows for the year ended December 31, 2022 and 2021:

millions		2022		2021
Cash and cash equivalents	$	984	$	2,764
Restricted cash and restricted cash equivalents		26		24
Restricted cash and restricted cash equivalents included in long-term receivables and other assets, net		16		15
Cash, cash equivalents, restricted cash and restricted cash equivalents	$	1,026	$	2,803

FOREIGN CURRENCY TRANSACTIONS

The functional currency applicable to all of Occidental's international oil and gas operations is the U.S. dollar since cash flows are denominated principally in U.S. dollars. In Occidental's other operations, Occidental's use of non-United States dollar functional currencies was not material for all years presented. The effect of exchange rates on transactions in foreign currencies is included in periodic income. Occidental reports the exchange rate differences arising from translating foreign-currency-denominated balance sheet accounts to the United States dollar as of the reporting date in OCI. Exchange-rate gains and losses for continuing operations were not material for all years presented.

INCOME TAXES

Occidental files various U.S. federal, state and foreign income tax returns. The impact of changes in tax regulations are reflected when enacted. In general, deferred federal, state and foreign income taxes are provided on temporary differences between the financial statement carrying amounts of assets and liabilities and their respective tax basis. Occidental routinely assesses the realizability of its deferred tax assets. If Occidental concludes that it is more likely than not that some of the deferred tax assets will not be realized, the tax asset is reduced by a valuation allowance. Occidental recognizes a tax benefit from an uncertain tax position when it is more likely than not that the position will be sustained upon examination, based on the technical merits of the position. The tax benefit recorded is equal to the largest amount that is greater than 50% likely to be realized through final settlement with a taxing authority. Interest and penalties related to unrecognized tax benefits are recognized in income tax expense (benefit). See Note 10 - Income Taxes for more information.

LOSS CONTINGENCIES

Occidental or certain of its subsidiaries are involved, in the normal course of business, in lawsuits, claims and other legal proceedings that seek, among other things, compensation for alleged personal injury, breach of contract, property damage or other losses, punitive damages, civil penalties, or injunctive or declaratory relief. Occidental or certain of its subsidiaries also are involved in proceedings under CERCLA and similar federal, state, local and international environmental laws. These environmental proceedings seek funding or performance of remediation and, in some cases, compensation for alleged property damage, punitive damages, civil penalties and injunctive relief. Usually Occidental or such subsidiaries are among many companies in these environmental proceedings and have to date been successful in sharing response costs with other financially sound companies. Further, some lawsuits, claims and legal proceedings involve acquired or disposed assets with respect to which a third party or Occidental or its subsidiaries retains liability or indemnifies the other party for conditions that existed prior to the transaction.

In accordance with applicable accounting guidance, Occidental accrues reserves for outstanding lawsuits, claims and proceedings when it is probable that a liability has been incurred and the liability can be reasonably estimated. In Note 12 - Environmental Liabilities and Expenditures, Occidental has disclosed its reserve balances for environmental remediation matters that satisfy this criteria. See Note 13 - Lawsuits, Claims, Commitments and Contingencies.

NOTE 2 - REVENUE

Revenue from customers is recognized when obligations under the terms of a contract are satisfied; this generally occurs with the delivery of oil, NGL, gas, chemicals or services such as transportation. Revenue from customers is measured as the amount of consideration Occidental expects to receive in exchange for the delivery of goods or services. Contracts may last from one month to one year or more and may have renewal terms that extend indefinitely at the option of either party. Price is typically based on market indexes. Volumes fluctuate due to production and, in certain cases, customer demand and transportation availability. Occidental records revenue net of certain taxes, such as sales taxes, that are assessed by governmental authorities on Occidental's customers.

Occidental does not incur significant costs to obtain contracts. Incidental items that are immaterial in the context of the contract are recognized as expenses. Sales of hydrocarbons and chemicals to customers are invoiced and settled on a monthly basis. Occidental is not usually subject to obligations for warranties, rebates, returns or refunds except in the case of customer incentive payments as discussed for the chemical segment below. Occidental does not typically receive payment in advance of satisfying its obligations under the terms of its sales contracts with customers; therefore, liabilities related to such payment are immaterial to Occidental. Occidental does not disclose consideration for remaining performance obligations with an original expected duration of one year or less or for variable consideration related to unsatisfied performance obligations.

OIL AND GAS SEGMENT

Revenue from oil and gas production is recognized when production is delivered and control passes to the customer. Revenues from the production of oil and gas properties in which Occidental has an interest with other producers are recognized on the basis of Occidental's net revenue interest.

CHEMICAL SEGMENT

Revenue from chemical product sales is recognized when control passes to the customer. Certain incentive programs may provide for payments or credits to be made to customers based on the volume of product purchased over a defined period. Customer incentives are estimated and recorded as a reduction to revenue ratably over the contract period. Such estimates are evaluated and revised as warranted. Revenue from exchange contracts is excluded from revenue from customers.

MIDSTREAM AND MARKETING SEGMENT

Revenue from pipeline and gas processing is recognized upon the completion of the transportation or processing service. Revenue from power sales is recognized upon delivery. Net marketing revenue is recognized upon completion of contract terms that are a prerequisite to payment and upon title transfer for physical deliveries. Unless the normal purchases and sales exception has been elected, net marketing revenue is classified as a derivative, reported on a net basis, recorded at fair value. Changes in fair value are reflected in net sales and excluded from revenue from customers in the table below.

DISAGGREGATION OF REVENUE FROM CONTRACTS WITH CUSTOMERS

The following table reconciles revenue from customers to total net sales for the years ended December 31:

millions	**2022**	2021	2020
Revenue from customers	**$ 36,234**	$ 25,959	$ 17,130
All other revenues [(a)]	**400**	(3)	679
Net sales	**$ 36,634**	$ 25,956	$ 17,809

(a) Included net marketing derivatives, oil collars and calls and chemical exchange contracts.

The table below presents Occidental's revenue from customers by segment, product and geographical area. The oil and gas segment typically sells its oil, NGL and natural gas at the lease or concession area. Chemical segment revenues are shown by geographic area based on the location of the sale. Excluding net marketing revenue, midstream and marketing segment revenues are shown by the location of sale.

millions	United States	International	Eliminations	Total
Year ended December 31, 2022				
Oil and gas				
Oil	$ 17,421	$ 3,935	$ —	$ 21,356
NGL	2,631	421	—	3,052
Gas	2,422	311	—	2,733
Other	20	4	—	24
Segment total	$ 22,494	$ 4,671	$ —	$ 27,165
Chemical	$ 6,359	$ 379	$ —	$ 6,738
Midstream and marketing	$ 3,167	$ 588	$ —	$ 3,755
Eliminations	$ —	$ —	$ (1,424)	$ (1,424)
Consolidated	$ 32,020	$ 5,638	$ (1,424)	$ 36,234
Year ended December 31, 2021				
Oil and gas				
Oil	$ 12,072	$ 2,844	$ —	$ 14,916
NGL	2,203	325	—	2,528
Gas	1,524	291	—	1,815
Other	24	2	—	26
Segment total	$ 15,823	$ 3,462	$ —	$ 19,285
Chemical	$ 4,995	$ 248	$ —	$ 5,243
Midstream and marketing	$ 1,969	$ 556	$ —	$ 2,525
Eliminations	$ —	$ —	$ (1,094)	$ (1,094)
Consolidated	$ 22,787	$ 4,266	$ (1,094)	$ 25,959
Year ended December 31, 2020				
Oil and gas				
Oil	$ 7,485	$ 2,403	$ —	$ 9,888
NGL	838	217	—	1,055
Gas	660	326	—	986
Other	65	1	—	66
Segment total	$ 9,048	$ 2,947	$ —	$ 11,995
Chemical	$ 3,524	$ 202	$ —	$ 3,726
Midstream and marketing	$ 1,595	$ 572	$ —	$ 2,167
Eliminations	$ —	$ —	$ (758)	$ (758)
Consolidated	$ 14,167	$ 3,721	$ (758)	$ 17,130

NOTE 3 - INVENTORIES

Finished goods primarily represents oil, which is carried at the lower of weighted-average cost or net realizable value, and caustic soda and chlorine, which are valued under the LIFO method. Inventories consisted of the following as of December 31:

millions		2022		2021
Raw materials	$	120	$	96
Materials and supplies		913		783
Commodity inventory and finished goods		1,147		1,066
		2,180		1,945
Revaluation to LIFO		(121)		(99)
Total	$	2,059	$	1,846

NOTE 4 - INVESTMENTS AND RELATED-PARTY TRANSACTIONS

EQUITY INVESTMENTS

Occidental's significant equity investments are presented in investments in unconsolidated entities and in deferred credits and other liabilities - other. As of December 31, 2022 and 2021, investments in unconsolidated entities were $3.2 billion and $2.9 billion, respectively. Occidental's equity investments presented in investments in unconsolidated entities primarily consist of the following:

millions	**% Economic Interest**		**Carrying amount**
WES [(a)]	51.7 %	$	2,006
OxyChem Ingleside Facility	50.0 %		566
OLCV - related	various		416
Other	various		188
Total Investments in unconsolidated entities [(b)]		$	3,176

(a) In July 2022, Occidental sold 10.0 million limited partner units of WES for proceeds of approximately $250 million, resulting in a gain of $62 million. In 2021, Occidental sold 14.0 million limited partner units of WES for proceeds of $250 million, resulting in a gain of $102 million. In the first quarter of 2020, Occidental recorded an impairment of $1.2 billion in goodwill related to its ownership in WES and in the third quarter of 2020, recorded an other than temporary impairment of $2.7 billion related to the WES equity method investment. See Note 9 - Fair Value Measurements for more information on the impairments.

(b) Not presented in investments in unconsolidated entities is Occidental's 24.5% ownership in DEL, which had a carrying value of $213 million and is presented in deferred credits and other liabilities - other. Refer to the discussion below regarding the presentation of Occidental's equity investment in DEL.

As of December 31, 2022 and 2021, Occidental's significant equity investments consisted of investments in WES, OxyChem Ingleside Facility, Net Power and DEL.

As a result of a refinancing transaction at DEL in November 2021, Occidental received cash distributions comprised of $110 million in dividends and $450 million in excess distributions. Since Occidental may be requested to provide financial support to DEL in the future, the excess distributions were recorded against the carrying amount of the equity investment and in deferred credits and other liabilities - other. The $110 million in dividends were recorded as a return on investment in cash flow from operations and the $450 million excess distribution was recorded as a return of investment in cash flow from investing.

Equity investments in certain oil and gas properties and gathering and processing assets and associated notes payable were presented net on the Consolidated Balance Sheets. The notes payable were net settled in 2022. The carrying value of the investment and note payable were $2.9 billion as of December 31, 2021.

Dividends received from equity investments were $643 million, $652 million and $678 million to Occidental in 2022, 2021 and 2020, respectively. As of December 31, 2022 and 2021, cumulative undistributed earnings of equity-method investees since they were acquired was $475 million and $242 million, respectively. As of December 31, 2022, Occidental's investments in equity investees exceeded the underlying equity in net assets by approximately $640 million, of which,

$373 million represented PP&E and equity investments with the remainder comprised of intangibles, both are subject to amortization over their estimated average lives.

The following table presents the summarized financial information of its equity-method investments combined for the years ended and as of December 31:

millions		2022		2021		2020
Summarized Results of Operations						
Revenues and other income	$	6,342	$	6,252	$	5,455
Costs and expenses		4,514		4,569		5,455
Net income	$	1,828	$	1,683	$	—
Summarized Balance Sheet						
Current assets	$	3,482	$	3,387	$	1,419
Non-current assets	$	15,282	$	19,341	$	18,693
Current liabilities	$	1,342	$	1,976	$	1,549
Long-term debt	$	9,512	$	9,464	$	7,860
Other non-current liabilities	$	1,289	$	1,187	$	866
Stockholders' equity	$	6,621	$	10,101	$	9,837

RELATED-PARTY TRANSACTIONS

Occidental sells oil, NGL, natural gas, chemicals, power and steam to and purchases oil, NGL and chemicals from its equity method investees and other related parties. Occidental is charged service fees primarily related to gathering, processing, oil, NGL and natural gas treatment by certain of its equity investees and other related parties. Berkshire Hathaway is a related party of Occidental due to its ownership of Occidental's common stock. Occidental has, from time to time, contracted with Berkshire Hathaway for the provision of electricity, rail and insurance. In addition, certain Berkshire Hathaway subsidiaries purchase various chemicals from our chemical segment. During 2022, 2021 and 2020, Occidental entered into the following related-party transactions and had the following amounts due from or to its related parties for the years ended December 31:

millions		2022		2021		2020
Sales [(a)]	$	337	$	261	$	301
Purchases [(b)]	$	948	$	773	$	1,112
Services [(c)]	$	1,006	$	942	$	1,101
Advances and amounts due from related parties	$	40	$	57	$	62
Amounts due to related parties	$	306	$	280	$	296

(a) In 2022 and 2021 and 2020 sales of Occidental-produced oil and NGL to WES accounted for 42% and 58% and 70% of these totals, respectively.

(b) In 2022 and 2021 and 2020, purchases of gas and NGL marketed on behalf of WES accounted for 24% and 27% and 59% of related party purchases, respectively, while purchases of ethylene from the OxyChem Ingleside Facility accounted for 64% and 70% in 2022 and 2021 respectively, and, in 2020, for 41% of related party purchases.

(c) In 2022 and 2021 and 2020, services primarily related to fees charged by WES to gather, process and treat Occidental produced oil, NGL and natural gas. Excluded charges to WES for shared corporate services.

NOTE 5 - ACQUISITIONS, DIVESTITURES AND OTHER TRANSACTIONS

ACQUISITIONS, DIVESTITURES AND OTHER TRANSACTIONS

2022

Throughout 2022, Occidental entered into non-monetary exchange agreements, primarily in the Permian Basin. These exchanges were recorded as acquisitions and divestitures at a total combined fair value of $340 million.

In 2022, Occidental acquired additional interests in emerging low-carbon businesses to advance net-zero pathway for a combined net purchase price of approximately $350 million.

In November 2022 and December 2022, Occidental acquired additional primarily producing assets in the Permian Basin for a combined net purchase price of approximately $400 million.

In November 2021, Occidental entered into an agreement to sell certain non-strategic assets in the Permian Basin. The transaction closed in January 2022 for net cash proceeds of approximately $190 million. The difference in the proved assets' net book value and adjusted purchase price was treated as a normal retirement, which resulted in no gain or loss being recognized. The difference in the unproved assets' net book value and adjusted purchase price resulted in a gain on sale of approximately $123 million. The gain has been presented within gains on sales of assets and equity investments, net in the Consolidated Statements of Operations.

In 2022, Occidental sold 14.0 million limited partner units of WES for proceeds of $250 million, resulting in a gain of $102 million, see Note 4 - Investments and Related-Party Transactions.

2021

In November 2021, Occidental acquired additional working interests in certain assets in the Permian EOR business for a net purchase price of approximately $285 million.

In October 2021, Occidental closed the sale of its Ghana assets. See below discussion on Discontinued Operations for additional information. This divestiture completed Occidental's large-scale asset divestiture program.

In June 2021, Occidental entered into an agreement to sell certain non-strategic assets in the Permian Basin. The transaction closed in July 2021 for net cash proceeds of approximately $475 million. The difference in the assets' net book value and adjusted purchase price was treated as a recovery of cost and normal retirement, which resulted in no gain or loss being recognized.

In March 2021, Occidental completed the sale of certain non-operated assets in the DJ Basin for net cash proceeds of approximately $280 million. The difference in the assets' net book value and adjusted purchase price was treated as a recovery of cost and normal retirement, which resulted in no gain or loss being recognized.

In 2021, Occidental sold 14 million limited partner units of WES for proceeds of approximately $250 million, see Note 4 - Investments and Related-Party Transactions.

2020

In November 2020 and December 2020, Occidental divested of certain non-core, largely non-operated proved and unproved acreage in the Permian for a loss of approximately $820 million. The losses have been presented within gains (losses) on sale of assets, net in the Consolidated Statement of Operations.

In October 2020, Occidental entered into an agreement to sell its onshore oil and gas Colombia assets. The transaction closed in December 2020, and Occidental recorded a loss on sale of approximately $353 million. The loss has been presented within gains (losses) on sale of assets, net in the Consolidated Statement of Operations.

In August 2020, Occidental entered into an agreement to sell approximately 4.5 million mineral acres and 1 million fee surface acres located in Wyoming, Colorado and Utah for approximately $1.33 billion. The transaction closed in October 2020 for net cash proceeds of approximately $1.0 billion, after satisfying $329 million of liabilities associated with the sale of future royalties. Occidental recorded a loss on sale of $440 million. The loss has been presented within gains (losses) on sale of assets, net in the Consolidated Statement of Operations.

DISCONTINUED OPERATIONS

In 2021, Occidental recorded a $437 million after-tax loss contingency in discontinued operations associated with its former operations in Ecuador, see Note 13 - Lawsuits, Claims, Commitments and Contingencies.

In October 2021, Occidental closed the sale of its Ghana assets for $750 million and net proceeds of $555 million, after closing adjustments to reflect an April 1, 2021 effective date. In addition, Occidental settled certain tax claims related to historical operations in Ghana for $170 million. Prior to the sale, 2021 operations in Ghana resulted in an after-tax loss of $31 million.

The following table presents the amounts reported in discontinued operations, net of income taxes, related to the Ghana assets for the years ended December 31, 2021 and 2020:

millions		2021		2020
Revenues and other income				
Net sales	$	458	$	419
Costs and other deductions				
Oil and gas lease operating expense		71		117
Fair value adjustment on assets held for sale [(a)]		409		2,263
Other		24		48
Total costs and other deductions	$	504	$	2,428
Income (loss) before income taxes	$	(46)	$	(2,009)
Income tax benefit (expense)		15		711
Discontinued operations, net of tax	$	(31)	$	(1,298)

[(a)] For 2021, included effective date to close date adjustments as well as settlements of certain tax claims.

NOTE 6 - LONG-TERM DEBT

As of December 31, 2022 and 2021, Occidental's debt consisted of the following:

millions	2022	2021
2.600% senior notes due 2022	—	101
2.700% senior notes due 2023	—	442
8.750% medium-term notes due 2023 [(a)]	22	22
2.900% senior notes due 2024	654	949
6.950% senior notes due 2024	291	650
3.450% senior notes due 2024	111	127
8.000% senior notes due 2025	—	500
5.875% senior notes due 2025	606	900
3.500% senior notes due 2025	137	326
5.500% senior notes due 2025	465	750
5.550% senior notes due 2026	870	1,100
3.200% senior notes due 2026	182	797
3.400% senior notes due 2026	284	779
7.500% debentures due 2026	112	112
8.500% senior notes due 2027	489	500
3.000% senior notes due 2027	216	634
7.125% debentures due 2027	150	150
7.000% debentures due 2027	48	48
6.625% debentures due 2028	14	14
7.150% debentures due 2028	232	235
7.200% senior debentures due 2028	82	82
6.375% senior notes due 2028	578	600
7.200% debentures due 2029	135	135
7.950% debentures due 2029	116	116
8.450% senior debentures due 2029	116	116
3.500% senior notes due 2029	286	1,477
Variable rate bonds due 2030 (5.32% and 0.900% as of December 31, 2022 and 2021, respectively)	68	68
8.875% senior notes due 2030	1,000	1,000
6.625% senior notes due 2030	1,449	1,500
6.125% senior notes due 2031	1,143	1,250
7.500% senior notes due 2031	900	900
7.875% senior notes due 2031	500	500
6.450% senior notes due 2036	1,727	1,750
Zero Coupon senior notes due 2036	673	2,269
4.300% senior notes due 2039	247	693
7.950% senior notes due 2039	325	325
6.200% senior notes due 2040	737	750
4.500% senior notes due 2044	191	608
4.625% senior notes due 2045	296	634
6.600% senior notes due 2046	1,117	1,157
4.400% senior notes due 2046	424	976
4.100% senior notes due 2047	258	663
(continued on next page)		

millions (continued)		2022		2021
4.200% senior notes due 2048		304		961
4.400% senior notes due 2049		280		704
7.730% debentures due 2096		58		58
7.500% debentures due 2096		60		60
7.250% debentures due 2096		5		5
Total borrowings at face value	$	17,958	$	28,493
Adjustments to book value:				
Unamortized premium, net		1,261		670
Debt issuance costs		(73)		(135)
Net book value of debt	$	19,146	$	29,028
Long-term finance leases		546		504
Current finance leases		143		85
Total debt and finance leases	$	19,835	$	29,617
Less current maturities of financing leases		(143)		(85)
Less current maturities of long-term debt		(22)		(101)
Long-term debt, net	$	19,670	$	29,431

[a] The 8.750% senior notes due 2023 were repaid in January 2023.

DEBT MATURITIES

As of December 31, 2022, future principal payments on debt were less than $18.0 billion, of which, $22 million is due in 2023, $1.1 billion is due in 2024, $1.2 billion is due in 2025, $1.4 billion is due in 2026, and $14.2 billion is due in 2027 and thereafter.

ZERO COUPONS

The Zero Coupons have an aggregate principal amount due at the 2036 maturity of approximately $673 million. The Zero Coupons can be put to Occidental in October of each year, in whole or in part, for the then-accreted value of the outstanding Zero Coupons. The Zero Coupons can next be put to Occidental in October 2023, which, if put in whole, would be $344 million at such date. Occidental currently has the ability to meet this obligation and may use available capacity under the RCF to satisfy the put should it be exercised.

FAIR VALUE OF DEBT

Occidental estimates the fair value of fixed-rate debt based on the quoted market prices for those instruments or on quoted market yields for similarly rated debt instruments, taking into account such instruments' maturities. The estimated fair values of Occidental's debt as of December 31, 2022, and 2021, the majority of which were classified as Level 1, were approximately $17.6 billion and $31.1 billion, respectively. Occidental's exposure to changes in interest rates relates primarily to its variable-rate, long-term debt obligations, and is not material. As of December 31, 2022 and 2021, variable-rate debt constituted approximately 0.4% and 0.2% of Occidental's total debt, respectively.

DEBT RATINGS

As of December 31, 2022, Occidental's long-term debt was rated BB+ by Fitch Ratings, Ba1 by Moody's Investors Service and BB+ by Standard and Poor's. Any downgrade in credit ratings could impact Occidental's ability to access capital markets and increase its cost of capital. In addition, given that Occidental's current debt ratings are non-investment grade, Occidental may be requested, and in some cases required, to provide collateral in the form of cash, letters of credit, surety bonds or other acceptable support as financial assurance of its performance and payment obligations under certain contractual arrangements such as pipeline transportation contracts, environmental remediation obligations, oil and gas purchase contracts and certain derivative instruments.

As of the date of this filing, Occidental had provided required financial assurances through a combination of cash, letters of credit and surety bonds and had not issued any letters of credit under the RCF or other committed facilities. For additional information, see Risk Factors in Part I, Item IA of this Form 10-K.

DEBT ACTIVITY

For the twelve months ended December 31, 2022, Occidental repaid debt with a face value of more than $10.5 billion, reducing the face value of Occidental's debt to less than $18.0 billion. The net book value of the full year repayments was $9.8 billion, which resulted in a gain of $149 million.

For the twelve months ended December 31, 2021, Occidental repaid debt with a face value of $6.7 billion, reducing the face value of Occidental's debt to $28.5 billion. The net book value of the full year repayments was $6.8 billion which resulted in a loss of $118 million.

DEBT ACTIVITY - 2022

The following table summarizes Occidental's debt activity for the year ended December 31, 2022:

millions		**Borrowings at face value**
Total borrowings at face value as of December 31, 2021	$	28,493
Repayments:		
2.600% senior notes due 2022	**$**	**(101)**
2.700% senior notes due 2023		**(442)**
6.950% senior notes due 2024		**(359)**
3.450% senior notes due 2024		**(16)**
2.900% senior notes due 2024		**(295)**
3.500% senior notes due 2025		**(189)**
8.000% senior notes due 2025		**(500)**
5.875% senior notes due 2025		**(294)**
5.500% senior notes due 2025		**(285)**
5.550% senior notes due 2026		**(230)**
3.200% senior notes due 2026		**(615)**
3.400% senior notes due 2026		**(495)**
3.000% senior notes due 2027		**(418)**
8.500% senior notes due 2027		**(11)**
7.150% debentures due 2028		**(3)**
6.375% senior notes due 2028		**(22)**
3.500% senior notes due 2029		**(1,191)**
6.625% senior notes due 2030		**(51)**
6.125% senior notes due 2031		**(107)**
6.450% senior notes due 2036		**(23)**
Zero Coupon senior notes due 2036		**(1,596)**
4.300% senior notes due 2039		**(446)**
6.200% senior notes due 2040		**(13)**
4.500% senior notes due 2044		**(417)**
4.625% senior notes due 2045		**(338)**
6.600% senior notes due 2046		**(40)**
4.400% senior notes due 2046		**(552)**
4.100% senior notes due 2047		**(405)**
4.200% senior notes due 2048		**(657)**
4.400% senior notes due 2049		**(424)**
Total borrowings at face value as of December 31, 2022	**$**	**17,958**

DEBT ACTIVITY - 2021

The following table summarizes Occidental's debt activity for the year ended December 31, 2021:

millions		Borrowings at face value
Total borrowings at face value as of December 31, 2020	$	35,235
Activity:		
4.850% senior notes due 2021	$	(147)
Variable rate bonds due 2021		(27)
2.600% senior notes due 2021		(224)
3.125% senior notes due 2022		(276)
2.700% senior notes due 2022		(629)
Floating interest rate notes due August 2022		(1,052)
2.700% senior notes due 2023		(484)
3.450% senior notes due 2024		(121)
2.900% senior notes due 2024		(2,051)
3.500% senior notes due 2025		(424)
3.400% senior notes due 2026		(371)
3.200% senior notes due 2026		(203)
3.000% senior notes due 2027		(116)
3.500% senior notes due 2029		(23)
4.300% senior notes due 2039		(57)
4.500% senior notes due 2044		(17)
4.625% senior notes due 2045		(116)
6.600% senior notes due 2046		57
4.400% senior notes due 2046		(224)
4.100% senior notes due 2047		(87)
4.200% senior notes due 2048		(39)
4.400% senior notes due 2049		(46)
7.730% debentures due 2096		(3)
7.500% debentures due 2096		(18)
7.250% debentures due 2096		(44)
Total borrowings at face value as of December 31, 2021	$	28,493

REVOLVING CREDIT FACILITY

In December 2021, Occidental entered into the Second Amended and Restated Credit Agreement in which the total committed borrowing capacity of $4.0 billion is based on a SOFR benchmark. The interest rate margin and the facility fee rates are subject to adjustments based on Occidental's performance on specified sustainability target thresholds with respect to absolute reductions in GHG emissions from its worldwide operated assets. The RCF maturity date is June 30, 2025.

Borrowings under the RCF bear interest at SOFR benchmark rates, plus a margin based on Occidental's senior debt ratings. The facility has similar terms to other debt agreements and does not contain material adverse change clauses or debt ratings triggers that could restrict Occidental's ability to borrow, or that would permit lenders to terminate their commitments or accelerate debt repayment. The facility provides for the termination of loan commitments and requires immediate repayment of any outstanding amounts if certain events of default occur. As of the date of this filing, Occidental had no drawn amounts under the RCF. In 2022, Occidental paid average annual facility fees of 0.302% on the total commitment amount.

RECEIVABLES SECURITIZATION FACILITY

In December 2021, Occidental amended and extended its existing receivables securitization facility to December 2024. As of December 31, 2022, the facility had $400 million of available borrowing capacity and no drawn amounts. Subsequent to December 31, 2022, but before the date of this filing, Occidental amended the facility to expand its available borrowing capacity to $600 million. The amended facility includes adjustments based on the same specified sustainability target thresholds as contained in the RCF.

NOTE 7 - LEASE COMMITMENTS

Occidental identifies leases through its accounts payable and contract monitoring processes. Lease assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. Lease assets include the lease liability, upfront payments and costs incurred to execute the lease and are amortized on a straight-line basis over the lease term. Occidental assesses the likelihood of exercising renewal, termination and purchase options to determine the lease term. Occidental uses its incremental borrowing rate at commencement date to determine the present value of lease payments. The incremental borrowing rate is the rate of interest that Occidental would pay to borrow an amount equal to the lease payments over a similar term on a collateralized basis in a similar economic environment. Certain leases include variable lease payments based on the underlying asset's operations that are not included in the lease asset and liability.

Occidental has operating leases for oil and gas exploration and development equipment, including office space of $352 million, offshore and onshore drilling rigs of $169 million, compressors of $113 million and $60 million consisting of storage facilities and other field equipment. Operating lease terms generally range from one to eight years. Operating leases also include pipelines, rail cars, easements, aircraft and real estate of $236 million. These operating leases have contract expiration terms ranging from one to 10 years.

Occidental's finance leases include compressors of $378 million, real estate offices of $266 million and $45 million consisting of drilling rigs, vehicles and aircraft leases.

The following table presents lease balances and their classification on the Consolidated Balance Sheets as of December 31:

millions	Balance sheet classification		**2022**		2021
Assets:					
Operating	Operating lease assets	**$**	**903**	$	726
Finance	Property, plant and equipment		**686**		581
Total lease assets		**$**	**1,589**	$	1,307
Liabilities:					
Current					
Operating	Current operating lease liabilities	**$**	**273**	$	186
Finance	Current maturities of long-term debt		**143**		85
Non-current					
Operating	Deferred credits and other liabilities - Operating lease liabilities		**657**		585
Finance	Long-term debt, net		**546**		504
Total lease liabilities		**$**	**1,619**	$	1,360

As of December 31, 2022, Occidental's outstanding lease payments, excluding variable component, consisted of the following:

millions		**Operating Leases [(a)]**		**Finance Leases [(b)]**		**Total**
2023	**$**	**287**	**$**	**146**	**$**	**433**
2024		**226**		**109**		**335**
2025		**108**		**95**		**203**
2026		**89**		**84**		**173**
2027		**81**		**66**		**147**
Thereafter		**250**		**277**		**527**
Total lease payments		**1,041**		**777**		**1,818**
Less: Interest		**(111)**		**(88)**		**(199)**
Total lease liabilities	**$**	**930**	**$**	**689**	**$**	**1,619**

(a) The weighted-average remaining lease term is 5.4 years and the weighted-average discount rate is 3.84%.
(b) The weighted-average remaining lease term is 7.7 years and the weighted-average discount rate is 3.05%.

The following tables present Occidental's total lease cost classifications for operating and finance lease liabilities for the years ended December 31:

millions Lease cost classification [(a)]		2022		2021
Operating lease costs [(b)]				
Property, plant and equipment, net	$	246	$	222
Operating expense and cost of sales		234		487
Selling, general and administrative expenses		78		109
Finance lease cost				
Amortization of ROU assets		83		39
Interest on lease liabilities		20		13
Total lease cost	$	661	$	870

(a) Amounts reflected are gross before joint-interest recoveries. Lease payments are reduced by joint-interest recoveries on the income statement through the joint-interest billing process.
(b) Included short-term lease cost of $184 million and $238 million and variable lease cost of $101 million and $120 million for the years ended December 31, 2022 and 2021, respectively.

The following tables present Occidental's total cash paid for operating and finance lease liabilities for the years ended December 31

millions		2022		2021
Operating cash flows	$	211	$	401
Investing cash flows	$	81	$	73
Financing cash flows	$	83	$	39

NOTE 8 - DERIVATIVES

OBJECTIVE AND STRATEGY

Occidental uses a variety of derivative financial instruments and physical contracts to manage its exposure to commodity price fluctuations, transportation commitments and to fix margins on the future sale of stored commodity volumes. Occidental also enters into derivative financial instruments for trading purposes. Derivatives are carried at fair value and on a net basis when a legal right of offset exists with the same counterparty.

Occidental may elect normal purchases and normal sales exclusions when physically delivered commodities are purchased or sold to a customer. Occidental occasionally applies cash flow hedge accounting treatment to derivative financial instruments to lock in margins on the forecasted sales of its natural gas storage volumes. The value of cash flow hedges was insignificant for all periods presented. See Note 1 - Summary of Significant Accounting Policies for Occidental's accounting policy on derivatives.

DERIVATIVES NOT DESIGNATED AS HEDGING INSTRUMENTS

As of December 31, 2022, Occidental's derivatives not designated as hedges consisted of marketing derivatives. All interest rate swaps were settled prior to December 31, 2022.

Derivative instruments that are not designated as hedging instruments are required to be recorded on the balance sheet at fair value. Changes in fair value will impact Occidental's earnings through mark-to-market adjustments until the physical commodity is delivered or the financial instrument is settled.

MARKETING DERIVATIVES

Occidental's marketing derivative instruments not designated as hedges are short-duration physical and financial forward contracts. A substantial majority of Occidental's physically settled derivative contracts are index-based and carry no mark-to-market valuation in earnings. As of December 31, 2022, the weighted-average settlement price of these forward contracts was $81.37/Bbl and $7.89/Mcf for crude oil and natural gas, respectively. The weighted-average settlement price was $74.85/Bbl and $4.61/Mcf for crude oil and natural gas, respectively, as of December 31, 2021. Net gains and losses associated with marketing derivative instruments not designated as hedging instruments are recognized currently in net sales.

The following table summarizes net short volumes associated with the outstanding marketing commodity derivatives not designated as hedging instruments as of December 31:

	2022	2021
Oil commodity contracts		
Volume (MMbbl)	**(33)**	(28)
Natural gas commodity contracts		
Volume (Bcf)	**(112)**	(136)

INTEREST RATE SWAPS

Occidental retired all remaining outstanding interest rate swaps in the twelve months ended December 31, 2022. Occidental's interest rate swap contracts locked in a fixed interest rate in exchange for a floating interest rate indexed to the three-month LIBOR throughout the reference period. Net gains and losses associated with interest rate swaps and warrants, were recognized currently in gains (losses) on interest rate swaps, net in the Consolidated Statements of Operations.

Interest rate swaps and collateralization are classified as cash flows from financing activities. For the twelve months ended December 31, 2022, the interest rate swaps were terminated through the application of $144 million of collateral and cash payments of $255 million. Prior to termination, Occidental paid $35 million of periodic settlements and $179 million of collateral was returned.

FAIR VALUE OF DERIVATIVES

Occidental has categorized its assets and liabilities that are measured at fair value in a three-level fair value hierarchy, based on the inputs to the valuation techniques: Level 1 – using quoted prices in active markets for the assets or liabilities; Level 2 – using observable inputs other than quoted prices for the assets or liabilities; and Level 3 – using unobservable inputs. Transfers between levels, if any, are reported at the end of each reporting period. The following table presents the fair values of Occidental's outstanding derivatives. Fair values are presented at gross amounts below, including when derivatives are subject to netting arrangements, and are presented on a net basis in the Consolidated Balance Sheets.

millions	Fair Value Measurements Using				
Balance Sheet Classification	**Level 1**	**Level 2**	**Level 3**	**Netting [(a)]**	**Total Fair Value**
December 31, 2022					
Marketing Derivatives					
Other current assets	**$ 920**	**$ 127**	**$ —**	**$ (980)**	**$ 67**
Long-term receivables and other assets, net	**1**	**2**	**—**	**(1)**	**2**
Accrued liabilities	**(938)**	**(96)**	**—**	**980**	**(54)**
Deferred credits and other liabilities - other	**(1)**	**(1)**	**—**	**2**	**—**
December 31, 2021					
Marketing Derivatives					
Other current assets	$ 1,516	$ 173	$ —	$ (1,645)	$ 44
Long-term receivables and other assets, net	4	1	—	(4)	1
Accrued liabilities	(1,608)	(196)	—	1,645	(159)
Deferred credits and other liabilities - other	(4)	—	—	4	—
Interest Rate Swaps					
Accrued liabilities	—	(315)	—	—	(315)
Deferred credits and other liabilities - other	—	(436)	—	—	(436)

(a) These amounts do not include collateral. As of December 31, 2021, $323 million of collateral related to interest rate swaps had been netted against derivative liabilities. Occidental netted $15 million and $110 million of collateral deposited with brokers against derivative liabilities related to marketing derivatives as of December 31, 2022, and December 31, 2021, respectively.

GAINS AND LOSSES ON DERIVATIVES

The following table presents gains and (losses) related to Occidental's derivative instruments in the Consolidated Statements of Operations for the years ended December 31:

millions **Income Statement Classification**	**2022**	2021	2020
Collars and Calls[(a)]			
Net sales	**$ —**	$ (344)	$ 1,064
Marketing Derivatives			
Net sales [(b)]	**381**	338	(393)
Interest Rate Swaps			
Gains (losses) on interest rate swaps and warrants, net	**317**	122	(428)

(a) All of Occidental's collars and calls expired on or before December 31, 2021.
(b) Includes derivative and non-derivative marketing activity.

CREDIT RISK

The majority of Occidental's counterparty credit risk is related to the physical delivery of energy commodities to its customers and their inability to meet their settlement commitments. Occidental manages credit risk by selecting counterparties that it believes to be financially strong, by entering into netting arrangements with counterparties and by requiring collateral or other credit risk mitigants, as appropriate. Occidental actively evaluates the creditworthiness of its counterparties, assigns appropriate credit limits and monitors credit exposures against those assigned limits. Occidental also enters into futures contracts through regulated exchanges with select clearinghouses and brokers, which are subject to minimal credit risk, if any.

Certain of Occidental's OTC derivative instruments contain credit-risk-contingent features, primarily tied to credit ratings for Occidental or its counterparties, which may affect the amount of collateral that each party would need to post. The aggregate fair value of derivative instruments with credit-risk-contingent features for which a net liability position existed as of December 31, 2022 was $18 million. The aggregate fair value of derivative instruments with credit-risk-contingent features for which a net liability position existed as of December 31, 2021 was $107 million (net of $323 million of collateral), which was primarily related to interest rate swaps.

NOTE 9 - FAIR VALUE MEASUREMENTS

FAIR VALUES – NONRECURRING

There were no significant non-recurring fair value measurements during the year ended December 31, 2022.

For the year ended December 31, 2021, Occidental recorded pre-tax impairments of $276 million related to undeveloped leases that either expired or were set to expire in the near-term, where Occidental had no plans to pursue exploration activities.

The table below summarizes the significant impairments and other charges incurred to measure assets to their fair value on a nonrecurring basis throughout the year ended December 31, 2020:

millions		**Total Fair Value**
Asset impairments and other charges		
Goodwill	$	1,153
Oil and gas properties - proved	$	2,436
Oil and gas properties - unproved	$	4,591
Oil and gas properties - discontinued operations	$	2,191
WES equity investment	$	2,673

GOODWILL

In the first quarter of 2020, Occidental impaired $1.2 billion in goodwill related to Occidental's ownership in WES, which was previously included in long-term receivables and other assets, net. The market value of WES' publicly traded units is considered a Level 1 input.

OIL AND GAS PROPERTIES

In the second quarter of 2020, as a result of the expected prolonged period of lower commodity prices brought on by the COVID-19 pandemic's impact on oil demand, Occidental tested substantially all of its oil and gas assets for impairment. Occidental recognized total pre-tax impairments to its oil and gas proved and unproved properties of $8.6 billion, of which $6.4 billion was included in oil and gas segment results and $2.2 billion ($1.4 billion net of tax) related to Ghana was included in discontinued operations.

In the second quarter of 2020, Occidental recorded proved property pre-tax impairments of $1.2 billion primarily related to certain assets for its domestic onshore and Gulf of Mexico assets and $0.9 billion to adjust the Algeria oil and gas proved properties to their fair value. The fair value of the proved properties was measured based on the income approach.

Unproved property pre-tax impairments of $4.3 billion were primarily related to domestic onshore unproved acreage. The fair value of this acreage was measured based on a market approach using an implied acreage valuation derived from domestic onshore market participants excluding the fair value assigned to proved properties.

Income approaches are considered Level 3 fair value estimates and include significant assumptions of future production and timing of production, commodity price assumptions and operating and capital cost estimates, discounted using a 10 percent weighted average cost of capital. Taxes were based on current statutory rates. Future production and timing of production is based on internal reserves estimates and internal economic models for a specific oil and gas asset. Internal reserve estimates consist of proved reserves and unproved reserves, the latter adjusted for uncertainty based on reserve category. Price assumptions were based on a combination of market information and published industry resources adjusted for historical differentials. Price assumptions ranged from approximately $40 per barrel of oil in 2020 increasing to approximately $70 per barrel of oil in 2034, with an unweighted arithmetic average price of $59.17 and $62.42 for WTI and Brent indexed assets for the 15 year period, respectively. Natural gas prices ranged from approximately $2.00 per Mcf in 2020 to approximately $3.60 per Mcf in 2034, with an unweighted arithmetic average price of $3.13 for NYMEX based assets for the 15 year period. Both oil and natural gas commodity prices were held flat after 2034 and were adjusted for location and quality differentials. Operating and capital cost estimates were based on current observable costs and were further escalated 1 percent in every period where commodity prices exceeded $50 per barrel and 2 percent in every period where commodity prices exceeded $60 per barrel. The weighted average cost of capital is calculated based on industry peers and best approximates the cost of capital an external market participant would expect to obtain.

In the first quarter of 2020, Occidental's oil and gas segment recognized pre-tax impairment and related charges of $581 million primarily related to both proved and unproved oil and gas properties and a lower of cost or net realizable value adjustment for crude inventory. Occidental recorded proved property impairments of $293 million related to certain international assets and the Gulf of Mexico. Occidental recorded unproved property impairments, of approximately $241 million, primarily related to domestic onshore undeveloped leases and offshore Gulf of Mexico where Occidental no longer intends to pursue exploration, appraisal or development activities primarily due to the reduction in near-term capital plans.

If there is an adverse downturn of the macroeconomic conditions and if such downturn is expected to or does persist for a prolonged period of time, Occidental's oil and gas properties may be subject to further testing for impairment, which could result in additional non-cash asset impairments. Such impairments could be material to the financial statements.

WES EQUITY INVESTMENT

At the end of the third quarter of 2020, Occidental recorded an other-than-temporary impairment of $2.7 billion, as the fair value of Occidental's investment in WES had remained significantly lower than its book value for the majority of the nine months ended September 30, 2020. Occidental concluded that the difference between the fair value and book value of WES was not temporary, primarily given both the magnitude and the duration that the fair value was below its book value. This other-than-temporary impairment was calculated based on the closing market price of WES as of September 30, 2020. The market value of WES' publicly traded common units is considered a Level 1 input.

FINANCIAL INSTRUMENTS FAIR VALUE

The carrying amounts of cash, cash equivalents, restricted cash, restricted cash equivalents and other on-balance sheet financial instruments, other than fixed-rate debt, approximate fair value. See Note 6 - Long-Term Debt for the fair value of long-term debt.

NOTE 10 - INCOME TAXES

LEGAL ENTITY REORGANIZATION

To align Occidental's legal entity structure with the nature of its business activities after completing the acquisition of Anadarko and subsequent large scale post-acquisition divestiture program, management undertook a legal entity reorganization that was completed in the first quarter of 2022.

As a result of this legal entity reorganization, management made an adjustment to the tax basis in a portion of its operating assets, thus reducing Occidental's deferred tax liabilities. Accordingly, in 2022, Occidental recorded a tax benefit of $2.7 billion in connection with this reorganization. The timing of any reduction in Occidental's future cash taxes as a result of this legal entity reorganization will be dependent on a number of factors, including prevailing commodity prices, capital activity level and production mix. The legal entity reorganization transaction is currently under IRS review as part of the Company's 2022 federal tax audit.

INFLATION REDUCTION ACT

In August 2022, Congress passed the Inflation Reduction Act that contains, among other provisions, a corporate book minimum tax on financial statement income, an excise tax on stock buybacks, a methane emissions fee and certain tax incentives related to climate change and clean energy. Occidental is currently evaluating the provisions of this act. The ultimate impact of the Inflation Reduction Act to Occidental will depend on a number of factors including future commodity prices, interpretations and assumptions as well as additional regulatory guidance.

The following summarizes domestic and foreign components of income (loss) from continuing operations before domestic and foreign income taxes for the years ended December 31:

millions	**2022**	2021	2020
Domestic	**$ 11,314**	$ 1,966	$ (15,322)
Foreign	**2,803**	1,739	(383)
Total	**$ 14,117**	$ 3,705	$ (15,705)

The following summarizes components of income tax expense (benefit) on continuing operations for the years ended December 31:

millions	2022	2021	2020
Current			
Federal	$ 1,272	$ 173	$ (126)
State and local	105	36	6
Foreign	1,080	660	465
Total current tax expense	$ 2,457	$ 869	$ 345
Deferred			
Federal	(1,569)	191	(2,384)
State and local	(57)	(153)	(103)
Foreign	(18)	8	(30)
Total deferred tax expense (benefit)	$ (1,644)	$ 46	$ (2,517)
Total income tax expense (benefit)	$ 813	$ 915	$ (2,172)

The following reconciliation of the U.S federal statutory income tax rate to Occidental's worldwide effective tax rate on income from continuing operations for the years ended December 31 is stated as a percentage of income (loss) from continuing operations before income taxes:

	2022	2021	2020
U.S. federal statutory tax rate	21 %	21 %	21 %
Legal entity reorganization	(18)	—	—
Enhanced oil recovery credit and other general business credits	—	(3)	—
Goodwill impairment	—	—	(3)
Capital loss	—	(2)	—
Tax impact from foreign operations	3	8	(4)
State income taxes, net of federal benefit	—	(2)	—
Other	—	3	—
Worldwide effective tax rate	6 %	25 %	14 %

In 2022, Occidental's worldwide effective tax rate was 6%, which was lower than the U.S. statutory rate of 21% and primarily driven by a tax benefit associated with Occidental's legal entity reorganization, as described above, partially offset by higher tax rates in the foreign jurisdictions in which Occidental operates.

In 2021, Occidental's worldwide effective tax rate was 25%, which was higher than the U.S. statutory rate of 21% due to higher tax rates in the foreign jurisdictions in which Occidental operates, partially offset by the tax impact of business credits, state tax revaluations and other domestic tax benefits.

The tax effects of temporary differences resulting in deferred income taxes as of December 31:

millions		2022		2021
Deferred tax liabilities				
Property, plant and equipment differences	$	(7,218)	$	(9,905)
Equity investments, partnerships and international subsidiaries		(441)		(571)
Gross long-term deferred tax liabilities		(7,659)		(10,476)
Deferred tax assets				
Environmental reserves		229		242
Postretirement benefit accruals		235		285
Deferred compensation and benefits		207		286
Asset retirement obligations		799		850
Foreign tax credit carryforwards		3,622		3,904
General business credit carryforwards		30		698
Net operating loss carryforward		1,058		1,628
Interest expense carryforward		11		28
All other		771		689
Gross long-term deferred tax assets		6,962		8,610
Valuation allowance		(4,785)		(5,136)
Net long-term deferred tax assets	$	2,177	$	3,474
Total deferred income tax liability, net	$	(5,482)	$	(7,002)
Less: foreign deferred tax asset in long-term receivables and other assets, net		(30)		(37)
Total deferred income tax liability, gross	$	(5,512)	$	(7,039)

Total deferred tax assets, after valuation allowances, were $2.2 billion and $3.5 billion as of December 31, 2022 and 2021, respectively. Occidental expects to realize the recorded deferred tax assets, net of any allowances, through future operating income and reversal of temporary differences. The total deferred tax liabilities were $7.7 billion and $10.5 billion as of December 31, 2022 and 2021, respectively. The decrease in the net deferred tax liability in 2022 compared to 2021 was primarily driven by a tax benefit associated with Occidental's legal entity reorganization, as described above, partially offset by the utilization of net operating losses and other tax attributes.

As of December 31, 2022, Occidental had foreign tax credit carryforwards of $3.6 billion and state tax credit carryforwards of $30 million. Occidental had recorded a valuation allowance for $3.6 billion of the foreign tax credit carryforwards and $27 million of the state tax credit carryforwards.

As of December 31, 2022, Occidental had tax-effected federal net operating loss carryforwards of $3 million, foreign net operating loss carryforwards of $841 million and state net operating loss carryforwards of $214 million. The carryforward balances have varying carryforward periods through 2042, excluding certain attributes for which there is an indefinite carryforward period. A valuation allowance was recorded for $184 million of the tax-effected state net operating loss carryforwards and $801 million of the tax-effected foreign net operating loss carryforwards. Occidental had an additional valuation allowance of $145 million against other foreign deferred tax assets.

Occidental had no tax-effected federal interest expense carryforward and tax-effected state interest expense carryforward of $11 million as of December 31, 2022. Occidental recorded a valuation allowance for $9 million of the state interest expense carryforward.

A deferred tax liability had not been recognized for temporary differences related to unremitted earnings of certain consolidated international subsidiaries aggregating approximately $924 million as of December 31, 2022, as it is Occidental’s intention to reinvest such earnings indefinitely. If the earnings of these international subsidiaries were not indefinitely reinvested, an additional deferred tax liability of approximately $221 million would be required.

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows:

millions		**2022**		2021		2020
Balance as of January 1	**$**	**2,026**	$	2,045	$	2,173
Increases related to prior-year positions		**2**		75		14
Settlements		**—**		(80)		(42)
Reductions for tax positions of prior years		**(18)**		(14)		(100)
Balance as of December 31	**$**	**2,010**	$	2,026	$	2,045

The December 31, 2022 balance of unrecognized tax benefits of $2.0 billion included potential benefits of $2.0 billion of which, if recognized, $1.5 billion would affect the effective tax rate on income. Also included were benefits of $45 million related to tax positions for which the ultimate deductibility is highly certain, but the timing of such deductibility is uncertain. Unrecognized tax benefits are included in deferred credits and other liabilities - other. Occidental records estimated potential interest and penalties related to liabilities for unrecognized tax benefits in the provisions for domestic and foreign income taxes. During 2022, Occidental recorded interest related to liabilities for unrecognized tax benefits of $95 million, for a cumulative accrued interest related to liabilities for unrecognized tax benefits of $416 million as of December 31, 2022. There were no penalties associated with liabilities for unrecognized tax benefits recorded for the years ended December 31, 2022 and 2021. Over the next 12 months, it is reasonably possible that the total amount of unrecognized tax benefits could decrease by $50 million to $60 million due to settlements with taxing authorities or lapses in statutes of limitation.

Occidental recognized $280 million and $105 million in federal and state income tax receivables as of December 31, 2022 and 2021, respectively, which was recorded in other current assets. In addition, Occidental recognized $33 million associated with the December 31, 2021 audit, which was recorded in long-term receivables and other assets, net.

Occidental is subject to audit by various tax authorities in varying periods. See Note 13 - Lawsuits, Claims, Commitments and Contingencies for a discussion of these matters.

NOTE 11 - RETIREMENT AND POSTRETIREMENT BENEFIT PLANS

Occidental has various defined contribution and defined benefit plans for its salaried, domestic union and nonunion hourly and certain foreign national employees. In addition, Occidental also provides medical and other benefits for certain active, retired and disabled employees and their eligible dependents.

In 2021, Occidental settled a significant portion of retiree liability through an annuity purchase. This annuity purchase applied to participants in certain defined benefit plans. The impact of this settlement transaction was approximately $109 million and is reflected in the December 31, 2021 projected benefit obligation.

DEFINED CONTRIBUTION PLANS

All domestic employees and certain foreign national employees are eligible to participate in one or more of the defined contribution retirement or savings plans that provide for periodic contributions by Occidental based on plan-specific criteria, such as base pay, level and employee contributions. Certain salaried employees participate in a supplemental retirement plan that restores benefits lost due to governmental limitations on qualified retirement benefits. The accrued liabilities for the supplemental retirement plan were $288 million and $249 million as of December 31, 2022 and 2021, respectively. Occidental expensed $202 million in 2022, $166 million in 2021 and $192 million in 2020 under the provisions of these defined contribution and supplemental retirement plans.

DEFINED BENEFIT PLANS

Participation in defined benefit plans is limited. Approximately 400 domestic and 300 foreign national employees, mainly union, nonunion hourly and certain employees that joined Occidental from acquired operations with grandfathered benefits, are currently accruing benefits under these plans.

Pension costs for Occidental's defined benefit pension plans, determined by independent actuarial valuations, are generally funded by payments to trust funds, which are administered by independent trustees.

POSTRETIREMENT AND OTHER BENEFIT PLANS

Occidental provides medical and dental benefits and life insurance coverage for certain active, retired and disabled employees and their eligible dependents. Occidental generally funds the benefits as they are paid during the year. These benefit costs, including the postretirement costs for the years ended December 31, were $211 million in 2022, $211 million in 2021 and $235 million in 2020.

OBLIGATIONS AND FUNDED STATUS

The following tables show the amounts recognized in Occidental's Consolidated Balance Sheets related to its pension and postretirement benefit plans as of December 31:

	Pension Benefits		Postretirement Benefits	
millions	**2022**	2021	**2022**	2021
Amounts recognized in the Consolidated Balance Sheet:				
Long-term receivables and other assets, net	**$ 102**	$ 192	**$ —**	$ —
Accrued liabilities	**(3)**	(4)	**(62)**	(71)
Deferred credits and other liabilities — pension and postretirement obligations	**(344)**	(391)	**(711)**	(1,149)
	$ (245)	$ (203)	**$ (773)**	$ (1,220)
Accumulated other comprehensive loss included the following after-tax balances:				
Net (gain) loss	**$ 17**	$ (17)	**$ (190)**	$ 163
Prior service credit	**—**	—	**(52)**	(50)
	$ 17	$ (17)	**$ (242)**	$ 113

The following tables show the funding status, obligations and plan asset fair values of Occidental related to its pension and postretirement benefit plans for the years ended December 31:

	Pension Benefits		Postretirement Benefits	
millions	**2022**	2021	**2022**	2021
Changes in the benefit obligation:				
Benefit obligation — beginning of year	**$ 1,273**	$ 1,613	**$ 1,220**	$ 1,259
Service cost — benefits earned during the period	**7**	8	**38**	42
Interest cost on projected benefit obligation	**36**	35	**33**	33
Actuarial gain	**(297)**	(55)	**(468)**	(54)
Benefits paid	**(123)**	(219)	**(58)**	(67)
Settlement due to annuity purchase	**—**	(109)	**—**	—
Other	**(10)**	—	**8**	7
Benefit obligation — end of year	**$ 886**	$ 1,273	**$ 773**	$ 1,220
Changes in plan assets:				
Fair value of plan assets — beginning of year	**$ 1,070**	$ 1,193	**$ —**	$ —
Actual return on plan assets	**(304)**	44	**—**	—
Employer contributions	**16**	162	**49**	59
Benefits paid	**(123)**	(219)	**(57)**	(67)
Payments due to annuity purchase	**—**	(109)	**—**	—
Other	**(18)**	(1)	**8**	8
Fair value of plan assets — end of year	**$ 641**	$ 1,070	**$ —**	$ —
Unfunded status:	**$ (245)**	$ (203)	**$ (773)**	$ (1,220)

Changes in actuarial gains and losses in the projected benefit obligation are primarily driven by discount rate movement.

The following table sets forth details of the obligations and assets of Occidental's defined benefit pension plans for the years ended December 31:

	Accumulated Benefit Obligation in Excess of Plan Assets		Plan Assets in Excess of Accumulated Benefit Obligation	
millions	**2022**	2021	**2022**	2021
Projected benefit obligation	**$ 738**	$ 963	**$ 148**	$ 310
Accumulated benefit obligation	**$ 736**	$ 960	**$ 146**	$ 308
Fair value of plan assets	**$ 458**	$ 656	**$ 183**	$ 414

COMPONENTS OF NET PERIODIC BENEFIT COST

The following table sets forth the components of net periodic benefit costs for the years ended December 31:

	Pension Benefits			Postretirement Benefits		
millions	**2022**	2021	2020	**2022**	2021	2020
Net periodic benefit costs:						
Service cost — benefits earned during the period	**$ 7**	$ 8	$ 37	**$ 38**	$ 42	$ 39
Interest cost on projected benefit obligation	**36**	35	52	**33**	33	37
Expected return on plan assets	**(38)**	(59)	(73)	**—**	—	—
Recognized actuarial loss	**1**	2	5	**5**	15	11
Recognized prior service credit	**—**	—	—	**(9)**	(9)	(8)
(Gain) loss due to curtailment	**—**	—	(124)	**—**	—	2
Gain due to settlement	**(1)**	(19)	(19)	**—**	—	—
Special termination benefits	**—**	—	22	**—**	—	—
Other costs and adjustments	**—**	—	1	**—**	—	—
Net periodic benefit cost	**$ 5**	$ (33)	$ (99)	**$ 67**	$ 81	$ 81

The service cost component of net periodic benefit cost is included in selling, general and administrative, oil and gas operating expense, chemical and midstream costs and exploration expense on Occidental's Consolidated Statements of Operations. All other components of net periodic benefit cost are included in other operating and non-operating expense.

ADDITIONAL INFORMATION

The following table sets forth the weighted-average assumptions used to determine Occidental's benefit obligation and net periodic benefit cost for domestic plans for the years ended December 31:

	Pension Benefits		Postretirement Benefits	
	2022	2021	**2022**	2021
Benefit Obligation Assumptions:				
Discount rate	**5.27 %**	2.67 %	**5.43 %**	2.94 %
Rate of increase in compensation levels	**3.95 %**	3.98 %	**—**	—
Net Periodic Benefit Cost Assumptions:				
Discount rate	**2.65 %**	2.19 %	**2.94 %**	3.05 %
Rate of increase in compensation levels	**3.98 %**	5.07 %	**—**	—
Assumed long-term rate of return on assets	**4.36 %**	4.92 %	**—**	—

For domestic pension plans and postretirement benefit plans, Occidental based the discount rate on a AA-AAA Universe yield curve in 2022 and 2021. The assumed long-term rate of return on assets is estimated with regard to current market factors but within the context of historical returns for the asset mix that exists at year end. Assumed rates of compensation increases for active participants in certain plans and vary by age group.

In 2021, Occidental adopted the Society of Actuaries Pri-2012 Private Retirement Plans Mortality Tables with MP-2021 Mortality Improvement Scale, which updated the mortality assumptions that private defined-benefit plans in the United States use in the actuarial valuations that determine a plan sponsor's pension obligations. The new mortality assumption reflects additional data that the Social Security Administration has released since the previous mortality tables and improvement scales were released.

The postretirement benefit obligation was determined by application of the terms of medical and dental benefits and life insurance coverage, including the effect of established maximums on covered costs, together with relevant actuarial assumptions and health care cost trend rates. Health care cost trend rates for medicare advantaged prescription drug plans of 9.2% starting in 2022, then grading down to 4.5% in 2028 and beyond. Health care cost trend rates used for non-medicare advantaged prescription drug plans are 6.0% to 6.5% in 2022, then grading down to 4.5% in 2028 and beyond.

The actuarial assumptions used could change in the near-term as a result of changes in expected future trends and other factors that, depending on the nature of the changes, could cause increases or decreases in the plan assets and liabilities.

FAIR VALUE OF PENSION PLAN ASSETS

Qualified defined benefit plan assets are monitored by Occidental's Pension and Retirement Trust and Investment Committee in its role as a fiduciary. The Investment Committee selects and employs various external professional investment management firms to manage specific investments across the spectrum of asset classes. The Investment Committee employs a liability driven investment approach that uses a diversified blend of investments (equity securities, fixed-income securities, and alternative investments) along a glide path to optimize the long-term return of plan assets relative to plan liabilities, at a prudent level of risk. Equity investments are diversified across U.S. and non-U.S. stocks, as well as differing styles and market capitalizations. Investment performance is measured and monitored on an ongoing basis through quarterly investment portfolio and manager guideline compliance reviews, annual liability measurements and periodic studies.

The fair values of Occidental's pension plan assets by asset category were as follows:

millions	Level 1	Level 2	Level 3	Total
December 31, 2022				
Asset Class:				
Cash and cash equivalents	**$ 8**	**$ —**	**$ —**	**$ 8**
Government securities	**29**	**—**	**—**	**29**
Corporate bonds [a]	**—**	**16**	**—**	**16**
Equity securities [b]	**34**	**—**	**—**	**34**
Other	**—**	**46**	**—**	**46**
Investments measured at fair value	**$ 71**	**$ 62**	**$ —**	**$ 133**
Investments measured at net asset value [c]	**—**	**—**	**—**	**509**
Total pension plan assets [d]	**$ 71**	**$ 62**	**$ —**	**$ 642**
December 31, 2021				
Asset Class:				
Cash and cash equivalents	$ 19	$ —	$ —	$ 19
Government securities	63	—	—	63
Corporate bonds [a]	—	36	—	36
Equity securities [b]	46	—	—	46
Other	—	76	—	76
Investments measured at fair value	$ 128	$ 112	$ —	$ 240
Investments measured at net asset value [c]	—	—	—	836
Total pension plan assets [d]	$ 128	$ 112	$ —	$ 1,076

(a) This category represents investment grade bonds of U.S. and non-U.S. issuers from diverse industries.
(b) This category represents direct investments in mutual funds and common and preferred stocks from diverse U.S. and non-U.S. industries.
(c) Certain investments measured at fair value using the NAV per share (or its equivalent) have not been categorized in the fair value hierarchy. Amounts presented in this table are intended to reconcile the fair value hierarchy to the pension plan assets.
(d) Amounts exclude net payables of approximately $1 million as of December 31, 2022 and $6 million as of December 31, 2021.

Occidental expects to contribute approximately $100 million to its defined benefit pensions plans during 2023.

Estimated future benefit payments, which reflect expected future service, as appropriate, are as follows for the years ended December 31:

millions	Pension Benefits	Postretirement Benefits
2023	$ 75	$ 64
2024	78	62
2025	70	59
2026	67	57
2027	68	55
2028 - 2032	303	261

NOTE 12 - ENVIRONMENTAL LIABILITIES AND EXPENDITURES

Occidental and its subsidiaries and their respective operations are subject to stringent federal, state, local and international laws and regulations related to improving or maintaining environmental quality. The laws that require or address environmental remediation, including CERCLA and similar federal, state, local and international laws, may apply retroactively and regardless of fault, the legality of the original activities or the current ownership or control of sites. Occidental or certain of its subsidiaries participate in or actively monitor a range of remedial activities and government or private proceedings under these laws with respect to alleged past practices at Third-Party, Currently Operated, and Closed or Non-operated Sites. Remedial activities may include one or more of the following: investigation involving sampling, modeling, risk assessment or monitoring; clean-up measures including removal, treatment or disposal; or operation and maintenance of remedial systems. The environmental proceedings seek funding or performance of remediation and, in some cases, compensation for alleged property damage, natural resource damages, punitive damages, civil penalties, injunctive relief and government oversight costs.

ENVIRONMENTAL REMEDIATION

As of December 31, 2022, certain Occidental subsidiaries participated in or monitored remedial activities or proceedings at 162 sites. The following table presents the current and non-current environmental remediation liabilities of such subsidiaries on a consolidated basis as of December 31, 2022 and 2021, the current portion of which is included in accrued liabilities ($141 million in 2022 and $155 million in 2021) and the remainder in deferred credits and other liabilities - environmental remediation liabilities ($0.9 billion in 2022 and $0.9 billion in 2021).

These environmental remediation sites are grouped into NPL sites and the following three categories of non-NPL sites —Third-Party Sites, Currently Operated Sites and Closed or Non-operated Sites.

	2022		2021	
millions, except number of sites	**Number of Sites**	**Remediation Balance**	Number of Sites	Remediation Balance
NPL sites	**30**	**$ 445**	30	$ 427
Third-Party Sites	**68**	**238**	69	273
Currently Operated Sites	**13**	**106**	15	122
Closed or Non-operated Sites	**51**	**257**	51	277
Total	**162**	**$ 1,046**	165	$ 1,099

As of December 31, 2022, environmental remediation liabilities of Occidental subsidiaries exceeded $10 million each at 17 of the 162 sites described above, and 94 of the sites had liabilities from $0 to $1 million each.

The Diamond Alkali Superfund Site (DASS) in Newark, New Jersey accounted for a significant portion of the liabilities associated with the category of NPL sites.

Five of the 68 Third-Party Sites — a chrome site in New Jersey, a former copper mining and smelting operation in Tennessee, a former oil field and a landfill in California and an active refinery in Louisiana where Occidental reimburses the current owner for certain remediation activities — accounted for nearly two-thirds of the liabilities associated with this category.

Three Currently Operated Sites — oil and gas operations in Colorado and chemical plants in Kansas and Louisiana — accounted for approximately two-thirds of the liabilities associated with this category.

Eight Closed or Non-operated Sites — a landfill in Western New York, a former refinery in Oklahoma, former chemical plants in California, Michigan, Ohio, Tennessee and Washington, and a closed coal mine in Pennsylvania — accounted for more than two-thirds of the liabilities associated with this category.

The consolidated estimate of environmental remediation liabilities in the table above varies over time depending on factors such as acquisitions or divestitures, identification of additional sites, remedy selection and implementation and changes in applicable laws or regulations, among other factors. Occidental's subsidiaries recorded environmental remediation expenses of $65 million, $28 million and $36 million for the years ended December 31, 2022, 2021, and 2020, respectively, on a consolidated basis. Environmental remediation expenses primarily relate to changes to existing conditions from past operations. Based on current estimates, Occidental expects its subsidiaries to expend funds corresponding to approximately 40% of the year-end remediation balance over the next three to four years with the remainder over the subsequent 10 or more years.

Occidental believes its range of reasonably possible additional losses of its subsidiaries beyond those amounts currently recorded for environmental remediation for the 162 environmental sites in the table above could be up to $2.7 billion.

MAXUS ENVIRONMENTAL SITES

A significant portion of aggregate estimates of environmental remediation liabilities and reasonably possible additional losses described above relates to the former Diamond Alkali Chemicals Company (DSCC). When OxyChem acquired DSCC in 1986, Maxus agreed to indemnify OxyChem for a number of environmental sites, including the DASS. In June 2016, Maxus and several affiliated companies filed for Chapter 11 bankruptcy in the U.S. Bankruptcy Court for the District of Delaware. Prior to filing for bankruptcy, Maxus defended and indemnified OxyChem in connection with remediation costs and other liabilities associated with the sites subject to the indemnity. Any additional recovery of indemnified costs would come from the proceeds of litigation brought by the Maxus Liquidating Trust. For additional information on the Maxus Liquidating Trust, see Note 13 - Lawsuits, Claims, Commitments and Contingencies.

DIAMOND ALKALI SUPERFUND SITE

The EPA has organized the DASS into four Operable Units (OUs) for evaluating, selecting and implementing remediation under CERCLA. OxyChem's current activities in each OU are summarized below, many of which are performed on OxyChem's behalf by Glenn Springs Holdings, Inc.

OU1 – The Former Diamond Alkali Plant at 80-120 Lister Avenue in Newark: Maxus and its affiliates implemented an interim remedy of OU1 pursuant to a 1990 Consent Decree, for which OxyChem currently performs maintenance and monitoring. The EPA is conducting a periodic evaluation of the interim remedy for OU1.

OU2 – The Lower 8.3 Miles of the Lower Passaic River: In March 2016, the EPA issued a Record of Decision (ROD) specifying remedial actions required for OU2. During the third quarter of 2016, and following Maxus's bankruptcy filing, OxyChem and the EPA entered into an Administrative Order on Consent (AOC) to complete the design of the remedy selected in the ROD. At that time, the EPA sent notice letters to approximately 100 parties notifying them that they were potentially responsible to pay the costs to implement the remedy in OU2 and announced that it would pursue similar agreements with other potentially responsible parties. In June 2018, OxyChem filed a complaint under CERCLA in Federal District Court in the State of New Jersey against numerous potentially responsible parties seeking contribution and cost recovery of amounts incurred or to be incurred to comply with the AOC and the OU2 ROD, or to perform other remediation activities related to the DASS. That action remains pending and the District Court has not adjudicated OxyChem's relative share of responsibility for those costs. The EPA has estimated the cost to remediate OU2 to be approximately $1.4 billion.

OU3 – Newark Bay Study Area, including Newark Bay and Portions of the Hackensack River, Arthur Kill, and Kill van Kull: Maxus and its affiliates initiated a remedial investigation and feasibility study of OU3 pursuant to a 2004 AOC which was amended in 2010. OxyChem is currently performing feasibility study activities in OU3.

OU4 – The 17-mile Lower Passaic River Study Area, comprising OU2 and the Upper 9 Miles of the Lower Passaic River: In September 2021, the EPA issued a ROD selecting an interim remedy for the portion of OU4 that excludes OU2, and is located upstream from the Lister Avenue Plant site for which OxyChem inherited legal responsibility. The EPA had estimated the cost to remediate OU4 to be approximately $440 million. At this time, OxyChem's role or responsibilities under the OU4 ROD, and those of other potentially responsible parties, have not been adjudicated. To provide continued, efficient remediation progress, in January 2022, OxyChem offered to design and implement the interim remedy for OU4 subject to certain conditions, including a condition that the EPA would not seek to bar OxyChem's right to seek contribution or cost recovery from any other parties that are potentially responsible to pay for the OU4 interim remedy. In March 2022, the EPA sent a notice letter to OxyChem and other parties requesting good faith offers to implement the selected remedies at OU2 and OU4. OxyChem submitted a good faith offer in June 2022, reaffirming the offer to design the remedy for OU4 and offering to enter into additional sequential agreements to remediate OU2 and OU4, subject to similar conditions, including that the EPA not seek to bar OxyChem from pursuing contribution or cost recovery from other responsible parties. The EPA did not accept OxyChem's June 2022 offer and, as such, OxyChem believes that the EPA may issue a Unilateral Administrative Order or commence CERCLA litigation against it, and potentially other parties, to require further design and/or implementation activities of the EPA's selected remedies at the DASS.

Ongoing Assessment by Natural Resource Trustees: In addition to the activities of the EPA and OxyChem in the OUs described above, federal and state natural resources trustees are conducting an assessment of natural resources in the Lower Passaic River and Greater Newark Bay to evaluate potential claims for natural resource damages.

ALDEN LEEDS LITIGATION

In December 2022, the EPA and the DOJ filed a proposed Consent Decree in the Alden Leeds litigation seeking court approval to settle with 85 parties for a total of $150 million and release them from liability for remediation costs in DASS OU2 and OU4, which OxyChem believes is based on a disproportionate allocation of responsibility to OxyChem despite overwhelming evidence regarding the responsibility of others, and, among other infirmities, is contrary to site-specific sampling and other relevant evidence concerning the liability of the settling parties. The EPA and DOJ also seek entry of an order that would bar OxyChem from pursuing contribution against those parties for remediation costs OxyChem had incurred or may incur in the future to design and implement the remedies in OU2 and OU4.

OxyChem intends to challenge the proposed settlement vigorously in the Alden Leeds litigation and to seek contribution and cost recovery from other potentially responsible parties for remediation costs it had incurred or may incur at the DASS. If OxyChem is denied leave to intervene in the Alden Leeds litigation, its anticipated settlement objections are overruled by the Court or in any subsequent appeals, or the proposed settlement is approved by the Court and not overturned on appeal, then, notwithstanding OxyChem's vigorous, good faith effort to contest the settlement proposed in the Alden Leeds litigation, the EPA could attempt to compel OxyChem to bear substantially all of the estimated cost to design and implement the OU2 and OU4 remedies, which would have a material adverse impact on OxyChem and Occidental's consolidated results of operations in the period recorded. While the remedies for OU2 and OU4 are expected to take over ten years to complete, the EPA may seek to require OxyChem to provide financial assurance to secure its performance. The amount of financial assurance is not subject to estimation at this time, as it is uncertain when or to what extent the EPA may take action to compel OxyChem to perform further remediation in OU2 or OU4 or the amount of assurance OxyChem would be required to post if the EPA takes such actions before the proposed settlement at issue in Alden Leeds is resolved. For further information on the Alden Leeds litigation, see Note 13 - Lawsuits, Claims, Commitments and Contingencies.

OTHER INFORMATION

For the DASS, OxyChem has accrued a reserve relating to its estimated allocable share of the costs to perform the maintenance and monitoring required in the OU1 Consent Decree, the design and implementation of remedies selected in the OU2 ROD and AOC and the OU4 ROD, and the remedial investigation and feasibility study required in the OU3.

OxyChem's accrued environmental remediation reserve does not reflect the potential for additional remediation costs or natural resource damages for the DASS that OxyChem believes are not reasonably estimable. OxyChem's ultimate liability at the DASS may be higher or lower than the reserved amount and the reasonably possible additional losses, and is subject to final design plans, further action by the EPA and natural resource trustees, and the resolution of OxyChem's allocable share with other potentially responsible parties, among other factors.

OxyChem continues to evaluate the estimated costs currently recorded for remediation at the DASS and other Maxus-indemnified sites, as well as the range of reasonably possible additional losses beyond those amounts currently recorded. Given the complexity and extent of the remediation efforts, estimates of the remediation costs may increase or decrease over time as new information becomes available.

NOTE 13 - LAWSUITS, CLAIMS, COMMITMENTS AND CONTINGENCIES

LEGAL MATTERS

Occidental or certain of its subsidiaries are involved, in the normal course of business, in lawsuits, claims and other legal proceedings that seek, among other things, compensation for alleged personal injury, breach of contract, property damage or other losses, punitive damages, civil penalties, or injunctive or declaratory relief. Occidental or certain of its subsidiaries also are involved in proceedings under CERCLA and similar federal, regional, state, provincial, tribal, local and international environmental laws. These environmental proceedings seek funding or performance of remediation and, in some cases, compensation for alleged property damage, natural resource damages, punitive damages, civil penalties, injunctive relief and government oversight costs. Usually Occidental or such subsidiaries are among many companies in these environmental proceedings and have to date been successful in sharing remediation costs with other financially sound companies. Further, some lawsuits, claims and legal proceedings involve acquired or disposed assets with respect to which a third party or Occidental or its subsidiary retains liability or indemnifies the other party for conditions that existed prior to the transaction.

In accordance with applicable accounting guidance, Occidental or its subsidiaries accrue reserves for outstanding lawsuits, claims and proceedings when it is probable that a liability has been incurred and the liability can be reasonably estimated. Reserves for matters, other than for the arbitration award (disclosed below), tax matters or environmental remediation, that satisfy these criteria as of December 31, 2022 and 2021, were not material to Occidental's Consolidated Balance Sheets.

If unfavorable outcomes of these matters were to occur, future results of operations or cash flows for any particular quarterly or annual period could be materially adversely affected. Occidental's estimates are based on information known about the legal matters and its experience in contesting, litigating and settling similar matters. Occidental reassesses the probability and estimability of contingent losses as new information becomes available.

ANDES ARBITRATION

In 2016, Occidental received payments from the Republic of Ecuador of approximately $1.0 billion pursuant to a November 2015 arbitration award for Ecuador's 2006 expropriation of Occidental's Participation Contract for Block 15. The awarded amount represented a recovery of Occidental's 60% of the value of Block 15. In 2017, Andes commenced an arbitration, against OEPC, claiming it is entitled to a 40% share of the judgment amount obtained by Occidental. Occidental contended that Andes is not entitled to any of the amounts paid under the 2015 arbitration award because Occidental's recovery was limited to Occidental's own 60% economic interest in the block. On March 26, 2021, the arbitration tribunal issued an award in favor of Andes and against OEPC in the amount of $391 million plus interest. In June 2021, OEPC filed a motion to vacate the award due to concerns regarding the validity of the award. In December 2021, the U.S. District Court for the Southern District of New York confirmed the arbitration award, plus prejudgment interest, in the aggregate amount of $558 million. OEPC has appealed the judgment. Oral argument with respect to OEPC's appeal occurred on February 2, 2023, and a ruling is expected later this year. Andes has filed state court claims in New York and Delaware against OEPC, OPC, and OXY USA to attempt to recover on its judgment against OEPC during the pendency of the appeal. All Occidental entities are vigorously defending against these actions. In addition, OEPC commenced an arbitration against Andes to recover significant additional claims not addressed by the prior arbitration tribunal relating to Andes' 40% share of costs, liabilities, losses and expenses due under the parties' agreements. A hearing on these claims occurred in December 2022. A ruling from the arbitration tribunal is expected in the first half of 2023.

ALDEN LEEDS LITIGATION

In December 2022, the EPA and the DOJ filed a proposed Consent Decree with the Federal District Court in New Jersey in the Alden Leeds litigation seeking court approval of a proposed settlement in which the EPA seeks to release 85 potentially responsible parties from all remediation costs in OU2 and OU4 of the DASS for approximately $150 million. OxyChem believes the proposed settlement relies, improperly, on an allocation report prepared by an EPA contractor in which the contractor purports to assign a disproportionate share of the responsibility for remediation costs in OU2 and OU4 to OxyChem. In the proposed settlement, the EPA also seeks to bar OxyChem from pursuing contribution claims against the 85 settling parties for remediation costs in OU2 and OU4. The settlement does not address the liability of any party with respect to OU3 or natural resource damages. OxyChem intends to contest the proposed settlement vigorously.

The proposed EPA settlement is subject to a public comment process that closes in March 2023. OxyChem believes the proposed settlement exceeds the EPA's statutory authority and is based on a flawed allocation process. OxyChem also believes that process was unreasonably limited in scope and unreliably based on voluntary reporting by the settling parties, instead of sworn evidence, publicly available sampling results, and historical documents reflecting the operating history and disposal practices of the 85 parties that the EPA proposes to release as part of this settlement. OxyChem expects to show that the EPA's proposed settlement does not fairly and reasonably reflect the settling parties' contribution of hazardous substances to the DASS, and, among other things, incorrectly attributes to OxyChem substances that were contributed by one or more of the 85 settling parties.

OxyChem has sought to intervene in the Alden Leeds proceeding to protect its rights under federal law to challenge the proposed settlement, seek contribution and cost recovery from potentially responsible parties, and obtain a judicial allocation of responsibility under CERCLA. It is unclear when the Court will rule on OxyChem's request to intervene or will address whether the underlying settlement will be approved. In the related CERCLA litigation, OxyChem also intends to defend and prosecute vigorously its right to seek contribution and cost recovery from all potentially responsible parties to pay remediation costs in the DASS. As the Alden Leeds case is in its early stages, OxyChem is unable to estimate the timing of the Court's decision, its outcome, or the outcome of any appeals from the Court's decision.

MAXUS LIQUIDATING TRUST

As described in Note 12 – Environmental Liabilities and Expenditures, Maxus was contractually obligated to indemnify, defend, and hold harmless OxyChem against environmental liabilities arising from the former operations of DSCC. In June 2016, Maxus filed for bankruptcy protection in the U.S. Bankruptcy Court for the District of Delaware. In June 2017, the Bankruptcy Court approved a Plan of Liquidation to liquidate Maxus and create the Trust for the benefit of Maxus' creditors, including OxyChem, to pursue claims against Maxus' current and former parents, YPF and Repsol, certain of their respective subsidiaries and affiliates, and others to satisfy claims by OxyChem and other creditors for past and future remediation and other costs. In July 2017, the court-approved Plan of Liquidation became final and the Trust became effective. Pursuant to the Plan, the Trust is governed by an independent trustee and is not controlled by OxyChem. The Plan authorizes the Trust to distribute any assets it recovers from such litigation claims to the Trust's beneficiaries, which include OxyChem and other creditors, in accordance with the Plan and governing Trust Agreement.

In June 2018, the trust filed its complaint against YPF and Repsol in Delaware Bankruptcy Court asserting claims based upon, among other things, fraudulent transfer and alter ego. During 2019, the Bankruptcy Court denied Repsol's and YPF's motions to dismiss the complaint as well as their motions to move the case to a different court. These rulings were upheld on appeal. The Trust, YPF, and Repsol each filed motions for summary judgment, and the Bankruptcy Court denied all but one motion in the second quarter of 2022. The Bankruptcy Court's summary judgment decision indicated that, at trial, the Trust must establish a causal link between its claimed damages and the alter ego conduct of Repsol and YPF. OxyChem is currently uncertain what amount of recovery it will ultimately obtain from the Trust. Trial is scheduled for March and April 2023.

TAX MATTERS

During the course of its operations, Occidental is subject to audit by tax authorities for varying periods in various federal, state, local and international tax jurisdictions. Tax years through 2020 for U.S. federal income tax purposes have been audited by the IRS pursuant to its Compliance Assurance Program and subsequent taxable years are currently under review. Tax years through 2014 have been audited for state income tax purposes. Significant audit matters in international jurisdictions have been resolved through 2010. During the course of tax audits, disputes have arisen and other disputes may arise as to facts and matters of law.

For Anadarko, its taxable years through 2014 and tax year 2016 for U.S. federal tax purposes have been audited by the IRS. Tax years through 2010 have been audited for state income tax purposes. There is one outstanding significant tax matter in an international jurisdiction related to a discontinued operation. As stated above, during the course of tax audits, disputes have arisen and other disputes may arise as to facts and matters of law.

Other than the matter discussed below, Occidental believes that the resolution of these outstanding tax matters would not have a material adverse effect on its consolidated financial position or results of operations.

Anadarko received an $881 million tentative refund in 2016 related to its $5.2 billion Tronox Adversary Proceeding settlement payment in 2015. In September 2018, Anadarko received a statutory notice of deficiency from the IRS disallowing the net operating loss carryback and rejecting Anadarko's refund claim. As a result, Anadarko filed a petition with the U.S. Tax Court to dispute the disallowances in November 2018. In December 2022, the parties filed competing motions for partial summary judgment. The motions are not fully briefed. Trial is set for May 2023. Occidental expects to continue pursuing resolution.

In accordance with ASC 740's guidance on the accounting for uncertain tax positions, Occidental has recorded no tax benefit on the tentative cash tax refund of $881 million. As a result, should Occidental not ultimately prevail on the issue, there would be no additional tax expense recorded relative to this position for financial statement purposes other than future interest. However, in that event, Occidental would be required to repay approximately $1.4 billion in federal taxes, $28 million in state taxes and accrued interest of $415 million. A liability for this amount plus interest is included in deferred credits and other liabilities - other.

INDEMNITIES TO THIRD PARTIES

Occidental, its subsidiaries, or both, have indemnified various parties against specified liabilities those parties might incur in the future in connection with purchases and other transactions that they have entered into with Occidental or its subsidiaries. These indemnities usually are contingent upon the other party incurring liabilities that reach specified thresholds. As of December 31, 2022, Occidental is not aware of circumstances that it believes would reasonably be expected to lead to indemnity claims that would result in payments materially in excess of reserves.

PURCHASE OBLIGATIONS AND COMMITMENTS

Occidental, its subsidiaries, or both, have entered into agreements providing for future payments, primarily to secure terminal and pipeline capacity, and also for drilling rigs and services, electrical power, steam and certain chemical raw materials. Occidental has certain other commitments under contracts, guarantees and joint ventures, including purchase commitments for goods and services at market-related prices and certain other contingent liabilities. The amounts that will be paid for such outstanding off-balance sheet purchase obligations as of December 31, 2022 are $3.0 billion in 2023, $4.2 billion in 2024 and 2025, $2.5 billion in 2026 and 2027 and $2.2 billion in 2028 and thereafter.

NOTE 14 - STOCKHOLDERS' EQUITY

The following table presents the effects of Occidental's share repurchases as part of the $3.0 billion stock repurchase plan announced in February 2022, along with other transactions in Occidental's stock:

Period	Exercise of Warrants and Options [a]	Other [b]	Treasury Stock Purchases [c]	Common Stock Outstanding [d]
December 31, 2021				934,074,700
First Quarter 2022	1,082,282	2,764,746	(730,746)	937,190,982
Second Quarter 2022	3,409,920	42,342	(11,679,732)	928,963,512
Third Quarter 2022	7,667,545	18,280	(28,571,576)	908,077,761
Fourth Quarter 2022	86,309	18,108	(8,323,234)	899,858,944
Total 2022	12,246,056	2,843,476	(49,305,288)	899,858,944

[a] Approximately $280 million of cash was received as a result of the exercise of common stock warrants and options.
[b] Consisted of issuances for the 2015 long-term incentive plan, the OPC savings plan, dividend reinvestment plan and Anadarko restricted stock awards.
[c] Included purchases of 1,640,719 shares from the trustee of Occidental's defined contribution savings plan that are not part of publicly announced plans or programs.
[d] As of December 31, 2022, Occidental had 104 million outstanding warrants with a strike of $22 per share and 83.9 million of warrants with a strike of $59.62 per share.

TREASURY STOCK

Under the share repurchase program announced and completed in 2022, Occidental purchased 47.7 million shares for $3.0 billion. Additionally, Occidental purchased shares from the trustee of its defined contribution savings plan in 2022, 2021 and 2020. As of December 31, 2022, 2021 and 2020, treasury stock shares numbered 198.7 million, 149.3 million and 149.1 million, respectively.

PREFERRED STOCK

In connection with the Anadarko Acquisition, Occidental issued 100,000 shares of series A preferred stock, having a face value of $100,000 per share and a liquidation preference of $105,000 per share plus unpaid accrued dividends. The agreement includes a mandatory redemption provision that obligates Occidental to redeem the preferred at 110% of the par value on a dollar-for-dollar basis for every dollar distributed to common shareholders above $4.00 per share, on a trailing 12-month basis. Occidental cannot voluntarily redeem the preferred shares before August 2029. After August 2029, Occidental can voluntarily redeem the preferred shares at a 5% premium at par. Dividends on the preferred stock will accrue on the face value at a rate per annum of 8%, but will be paid only when, as and if declared by Occidental's Board of Directors. At any time, when such dividends have not been paid in full, the unpaid amounts will accrue dividends, compounded quarterly, at a rate per annum of 9%. Following the payment in full of any accrued but unpaid dividends, the dividend rate will remain at 9% per annum. If preferred dividends are not paid in full, Occidental is prohibited from paying dividends on common stock. Occidental paid $200 million in preferred stock dividends in each quarter of 2022.

As of December 31, 2022, 2021 and 2020, Occidental had 100,000 shares of preferred stock issued and outstanding.

BERKSHIRE WARRANT

In connection with the preferred stock issuance, Occidental also issued the Berkshire Warrant. The Berkshire Warrant is exercisable at the holder's option, in whole or in part, until the first anniversary of the date on which no shares of preferred stock remain outstanding, at which time the Berkshire Warrant expires. The holder of the Berkshire Warrant and the preferred stock may redeem the preferred stock as payment for the exercise price of the Warrant in lieu of cash payment upon exercise. As of December 31, 2022, the Berkshire warrant would result in the issuance of 83.9 million shares of Occidental common stock, if exercised in full for its current strike price of $59.624 per share of Occidental common stock.

COMMON STOCK WARRANTS

On June 26, 2020, the Board of Directors declared Common Stock Warrants, at a rate of 0.125 warrants per share of Occidental common stock. Occidental issued approximately 116 million Common Stock Warrants on August 3, 2020 to holders of record of outstanding shares of Occidental's common stock as of the close of business on July 6, 2020, and pursuant to Occidental's outstanding equity-based incentive awards in connection with anti-dilution adjustments resulting from such distribution. The Common Stock Warrants have an exercise price of $22.00 per share and will expire on August 3, 2027. The Common Stock Warrants are listed on the NYSE and trade under the symbol "OXY WS".

The Common Stock Warrants were measured at fair value on the declaration date using the Black-Scholes option model and were classified as equity in "Additional paid-in capital". The following level 2 inputs were used in the Black-Scholes option model: the expected life of the Common Stock Warrants, a volatility factor and the exercise price. The expected life is based on the estimated term of the Common Stock Warrants, the volatility factor is based on historical volatilities of Occidental common stock and the exercise of $22.00 per share of Occidental common stock.

EARNINGS PER SHARE

Occidental's instruments containing rights to nonforfeitable dividends granted in stock-based awards are considered participating securities prior to vesting and, therefore, have been deducted from earnings in computing basic and diluted EPS under the two-class method.

Basic EPS was computed by dividing net income attributable to common stock, net of income allocated to participating securities, by the weighted-average number of common shares outstanding during each period, including vested but unissued shares and share units. The computation of diluted EPS reflects the additional dilutive effect of stock options, warrants and unvested stock awards.

The following table presents the calculation of basic and diluted EPS for the years ended December 31:

millions except per share amounts		2022		2021		2020
Income (loss) from continuing operations	$	13,304	$	2,790	$	(13,533)
Loss from discontinued operations		—		(468)		(1,298)
Net income (loss)	$	13,304	$	2,322	$	(14,831)
Less: Preferred stock dividends		(800)		(800)		(844)
Net income (loss) attributable to common stock	$	12,504	$	1,522	$	(15,675)
Less: Net income allocated to participating securities		(83)		(10)		—
Net income (loss), net of participating securities	$	12,421	$	1,512	$	(15,675)
Weighted-average number of basic shares		926.2		935.0		918.7
Basic earnings (loss) per common share	$	13.41	$	1.62	$	(17.06)
Net income (loss) attributable to common stock	$	12,504	$	1,522	$	(15,675)
Less: Net income allocated to participating securities		(77)		(10)		—
Net income (loss), net of participating securities	$	12,427	$	1,512	$	(15,675)
Weighted-average number of basic shares		926.2		935.0		918.7
Dilutive securities		75.8		23.8		—
Total diluted weighted-average common shares		1,002.0		958.8		918.7
Diluted earnings (loss) per common share	$	12.40	$	1.58	$	(17.06)

As of December 31, 2022, no potentially dilutive shares of Occidental common stock were excluded from the diluted shares. As of December 31, 2021, warrants and options covering 87 million shares of Occidental common stock were excluded from the diluted shares as their effect would have been anti-dilutive.

ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)

Accumulated OCI (loss) consisted of the following after-tax amounts as of December 31:

millions		2022		2021
Foreign currency translation adjustments	$	(5)	$	(8)
Derivatives		(25)		(104)
Pension and postretirement adjustments [a]		225		(96)
Total	$	195	$	(208)

[a] See Note 11 - Retirement and Postretirement Benefit Plans for further information.

NOTE 15 - STOCK-BASED INCENTIVE PLANS

Occidental issues stock-based awards to employees in accordance with the terms of the Plan, as amended and restated. An aggregate of 133 million shares of Occidental common stock were authorized for issuance and approximately 16.1 million shares had been reserved for issuance for employee awards through December 31, 2022. As of December 31, 2022, approximately 57.0 million shares were available for grants of future awards. The plan requires each share covered by an award (other than options) to be counted as if three shares were issued in determining the number of shares that are available for future awards. Accordingly, the number of shares available for future awards may be less than 57.0 million depending on the type of award granted, and shares available for future awards may increase by the number of shares that are forfeited, canceled, or correspond to the portion of any stock-based awards settled in cash, including awards that were issued under a previous plan that remain outstanding. Current outstanding awards include RSUs, stock options, CROCEI awards and TSRI awards.

During 2022, non-employee directors were granted awards for 33,575 shares of common stock. Compensation expense for these awards was measured using the closing quoted market price of Occidental's common stock on the grant date and was fully recognized at that time.

Occidental incurred expenses of $258 million, $287 million and $202 million related to stock-based incentive plans in the years ended December 31, 2022, 2021, and 2020, respectively. The income tax benefit associated with this expense was $54 million, $60 million and $42 million in the years ended December 31, 2022, 2021, and 2020, respectively.

As of December 31, 2022, unrecognized compensation expense for all unvested stock-based incentive awards was $236 million. This expense is expected to be recognized over a weighted-average period of 1.8 years. Occidental accounts for forfeitures as they occur.

RESTRICTED STOCK UNITS

Certain employees are awarded the right to receive RSUs, some of which have performance criteria, and are in the form of, or equivalent in value to, actual shares of Occidental common stock. Depending on their terms, RSUs may be settled in stock or may be cash settled liabilities. These awards vest from one to three years following the grant date. For certain RSUs, dividend equivalents are paid during the vesting period.

CASH-SETTLED RSU LIABILITY AWARDS

The weighted-average, grant-date fair values of cash-settled RSUs granted in 2022, 2021 and 2020 were $47.41, $25.83 and $40.86 per share, respectively. Cash-settled RSUs resulted in payments of $203 million, $4 million and $3 million, during the years ended December 31, 2022, 2021 and 2020, respectively.

STOCK-SETTLED RSU EQUITY AWARDS

The weighted-average, grant-date fair values of the stock-settled RSUs granted in 2022, 2021, and 2020 were $45.14, $25.45 and $41.60, respectively. The fair value of RSUs settled in shares during the years ended December 31, 2022, 2021 and 2020 was $160 million, $70 million and $62 million, respectively.

A summary of changes in Occidental's unvested cash- and stock-settled RSUs during the year ended December 31, 2022, is presented below:

	Cash-Settled			Stock-Settled		
thousands, except fair values	**RSUs**		**Weighted-Average Grant-Date Fair Value**	**RSUs**		**Weighted-Average Grant-Date Fair Value**
Unvested as of January 1	5,375	$	41.44	8,589	$	33.10
Granted	150	$	47.41	4,362	$	45.14
Vested	(5,188)	$	41.86	(3,654)	$	38.04
Forfeitures	(39)	$	35.80	(403)	$	39.09
Unvested as of December 31	298	$	37.96	8,894	$	36.70

TOTAL SHAREHOLDER RETURN INCENTIVE AWARDS

Certain executives are awarded TSRIs that vest at the end of a three-year period following the grant date. Payout is based upon Occidental's absolute total shareholder return and performance relative to its peers. TSRIs have payouts that range from 0% to 200% of the target award and settle in stock once certified. Dividend equivalents for TSRIs are accumulated and paid upon certification of the award. The fair value of TSRIs settled in shares during the years ended December 31, 2022, 2021 and 2020 was zero, $4 million and $9 million, respectively.

The fair values of TSRIs are initially determined on the grant date using a Monte Carlo simulation model based on Occidental's assumptions, noted in the following table, and the volatility from corresponding peer group companies. The expected life is based on the Term. The risk-free interest rate is the implied yield available on zero coupon Treasury notes at the time of grant with a remaining term equal to the Term. The dividend yield is the expected annual dividend yield over the Term, expressed as a percentage of the stock price on the grant date. Estimates of fair value may not accurately predict the value ultimately realized by the employees who receive the awards, and the ultimate value may not be indicative of the reasonableness of the original estimates of fair value made by Occidental.

The grant-date assumptions used in the Monte Carlo simulation models for the estimated payout level of TSRIs were as follows:

			TSRIs
	2022	2021	2020
Assumptions used:			
Risk-free interest rate	**1.7%**	0.2%	1.4%
Volatility factor	**80%**	75%	26%
Expected life (years)	**2.89**	2.88	3.00
Grant-date fair value of underlying Occidental common stock	**$ 42.98**	$ 25.39	$ 41.60

A summary of changes in Occidental's unvested TSRIs during the year ended December 31, 2022 is presented below:

		TSRIs
thousands, except fair values	**Awards**	**Weighted-Average Grant-Date Fair Value of Occidental Stock**
Unvested as of January 1	1,769	$ 43.12
Granted	403	$ 42.98
Vested [(a)]	(520)	$ 67.19
Forfeitures	(9)	$ 35.43
Unvested as of December 31	1,643	$ 35.51

(a) Presented at the target payouts. No payouts occurred in 2022.

STOCK OPTIONS

Certain employees are granted options that vest over three years, expire on the tenth anniversary of the grant date, and settle in stock. Exercise prices of the options were equal to the quoted market value of Occidental's stock on the grant date. The inputs to this and results of this model are presented below:

			Options
	2022	2021	2020
Assumptions used:			
Risk-free interest rate	**1.87%**	0.7%	1.4%
Volatility factor	**58%**	55%	25%
Expected life (years)	**6.02**	6.00	6.00
Dividend yield	**0.09%**	0.16%	7.60%
Exercise price	**$ 42.98**	$ 25.39	$ 41.60
Grant-date fair value of underlying Occidental common stock	**$ 23.39**	$ 12.72	$ 3.19

A summary of Occidental's outstanding stock options as of December 31, 2022 and changes during the year ended December 31, 2022 is presented below:

	Vested			Unvested		
thousands, except fair values	**Options**		**Weighted Average Strike Price**	**Options**		**Weighted Average Strike Price**
January 1	2,236	$	49.13	1,430	$	35.52
Granted	—	$	—	286	$	42.98
Vested	641	$	36.68	(641)	$	36.68
Forfeited	(551)	$	76.96	—	$	—
Exercised	(673)	$	39.78	—	$	—
December 31	1,653	$	38.83	1,075	$	36.82

The intrinsic value of options exercised in 2022 was $17 million. No options were exercised during the years ended December 31, 2021 and 2020. As of December 31, 2022, the remaining life of fully vested options was 5.9 years.

CASH RETURN ON CAPITAL EMPLOYED INCENTIVE AWARDS

Certain executives are awarded CROCEI awards that vest at the end of a three-year period if performance targets based on CROCE are met. These awards are settled in stock upon certification of the performance target, with payouts that range from 0% to 200% of the target award. Dividend equivalents are accumulated and paid upon certification of the award. A summary of changes in Occidental's unvested CROCEI during the year ended December 31, 2022 is presented below:

	CROCEI		
thousands, except fair values	**Awards**		**Weighted-Average Grant-Date Fair Value of Occidental Stock**
Unvested as of January 1	418	$	33.03
Granted	156	$	42.98
Unvested as of December 31	574	$	35.73

NOTE 16 - INDUSTRY SEGMENTS AND GEOGRAPHIC AREAS

Occidental conducts its operations through three segments: (1) oil and gas; (2) chemical; and (3) midstream and marketing. The factors used to identify these segments are based on the nature of the operations that are undertaken in each segment. Income taxes, interest income, interest expense, environmental remediation expenses, Anadarko Acquisition-related costs and unallocated corporate expenses are included under corporate and eliminations. Intersegment sales eliminate upon consolidation and are generally made at prices approximating those that the selling entity would be able to obtain in third-party transactions. Identifiable assets are those assets used in the operations of the segments. Corporate assets consist of cash and restricted cash, certain corporate receivables and PP&E. The chief operating decision maker analyzes each segment's operating results to make decisions about resources to be allocated to the segment and to assess its performance as well as Occidental's overall performance.

millions	Oil and gas	Chemical	Midstream and marketing	Corporate and eliminations	Total
Year ended December 31, 2022					
Net sales	$ 27,165	$ 6,757	$ 4,136	$ (1,424)	$ 36,634
Income (loss) from continuing operations before income taxes	$ 12,803 [(a)]	$ 2,508	$ 273 [(b)]	$ (1,467) [(c)]	$ 14,117
Income tax expense	—	—	—	(813) [(d)]	(813)
Income (loss) from continuing operations	$ 12,803	$ 2,508	$ 273	$ (2,280)	$ 13,304
Investments in unconsolidated entities	$ 142	$ 578	$ 2,456	$ —	$ 3,176
Property, plant and equipment additions [(e)]	$ 3,898	$ 331	$ 270	$ 67	$ 4,566
Depreciation, depletion and amortization	$ 6,179	$ 370	$ 328	$ 49	$ 6,926
Total assets	$ 54,058	$ 4,558	$ 12,076	$ 1,917	$ 72,609
Year ended December 31, 2021					
Net sales	$ 18,941	$ 5,246	$ 2,863	$ (1,094)	$ 25,956
Income (loss) from continuing operations before income taxes	$ 4,145 [(a)]	$ 1,544	$ 257 [(b)]	$ (2,241) [(c)]	$ 3,705
Income tax benefit	—	—	—	(915) [(d)]	(915)
Income (loss) from continuing operations	$ 4,145	$ 1,544	$ 257	$ (3,156)	$ 2,790
Investments in unconsolidated entities	$ 154	$ 608	$ 2,176	$ —	$ 2,938
Property, plant and equipment additions [(e)]	$ 2,458	$ 316	$ 107	$ 50	$ 2,931
Depreciation, depletion and amortization	$ 7,741	$ 343	$ 325	$ 38	$ 8,447
Total assets	$ 56,132	$ 4,671	$ 11,132	$ 3,101	$ 75,036
Year ended December 31, 2020					
Net sales	$ 13,066	$ 3,733	$ 1,768	$ (758)	$ 17,809
Income (loss) from continuing operations before income taxes	$ (9,632) [(a)]	$ 664	$ (4,175) [(b)]	$ (2,562) [(c)]	$ (15,705)
Income tax expense	—	—	—	2,172 [(d)]	2,172
Income (loss) from continuing operations	$ (9,632)	$ 664	$ (4,175)	$ (390)	$ (13,533)
Investments in unconsolidated entities	$ 168	$ 645	$ 2,437	$ —	$ 3,250
Property, plant and equipment additions [(e)]	$ 2,279	$ 261	$ 50	$ 29	$ 2,619
Depreciation, depletion and amortization	$ 7,414	$ 356	$ 312	$ 15	$ 8,097
Total assets	$ 62,931	$ 4,326	$ 9,856	$ 2,951	$ 80,064

(a) The 2022 amount included $148 million of gains, primarily related to the sale of certain non-strategic assets in the Permian Basin. The 2022 amount included $55 million related to post-closing consideration earned from 2020 asset sales as a result of certain production and pricing targets being met as well as the closing of the sale of certain assets that were negotiated with the 2020 Colombia divestiture. The 2021 amount included $282 million of asset impairments and $280 million of net oil, gas and CO_2 derivative losses. The 2020 amount included $7.1 billion related to asset impairments and net asset sale losses of $1.6 billion, partially offset by a $1.1 billion gain on the oil and gas collars and calls and a loss on the sale of Occidental's Colombia assets of $353 million.

(b) The 2022 amount included $259 million of net derivative mark-to-market losses, $62 million relating to a gain on the sale of 10 million limited partner units in WES and a $36 million gain on the sale of a joint venture. The 2021 amount included $252 million in derivative mark-to-market losses and $124 million of gains on sales, primarily from the sale of 11.5 million limited partner units in WES. The 2020 amount included $2.7 billion of other-than-temporary impairment of WES equity investment and $1.4 billion of impairments related to the write-off of goodwill and a $236 million loss from an equity investment related to WES' write-off of its goodwill.

(c) The 2022 amount included a tax benefit of $2.7 billion in connection with Occidental's legal entity reorganization, which is further discussed in the Income Taxes section of the Management's Discussion and Analysis of Financial Condition and Results of Operations section under Part II, Item 7, of this Form 10-K and Note 10 - Income Taxes in the Notes to Consolidated Financial Statements in Part II Item 8 of this Form 10-K, as well as $317 million of net gains on interest rate swaps, $149 million of net gains on early debt extinguishment and $89 million of Anadarko acquisition-related costs. The 2021 amount included $153 million of Anadarko acquisition-related costs, $122 million net derivative mark-to-market gains on interest rate swaps and $118 million of early debt extinguishment expenses. The 2020 amount included $339 million in expenses related to Anadarko Acquisition-related costs and a $428 million loss on interest rate swaps.

(d) Included all foreign and domestic income taxes from continuing operations.

(e) Included capital expenditures and capitalized interest, but excluded acquisition and disposition of assets.

GEOGRAPHIC AREAS

millions	Property, plant and equipment, net		
For the years ended December 31,	**2022**	2021	2020
United States	**$ 51,706**	$ 53,197	$ 59,016
International			
UAE	**3,663**	3,645	3,737
Oman	**2,159**	2,055	1,901
Algeria	**350**	496	664
Qatar	**428**	468	510
Other International	**78**	69	61
Total International	**6,678**	6,733	6,873
Total	**$ 58,384**	$ 59,930	$ 65,889

Supplemental Oil and Gas Information

OIL AND GAS RESERVES

The following tables set forth Occidental's net interests in quantities of proved developed and undeveloped reserves of oil, NGL and natural gas and changes in such quantities. Proved oil, NGL and natural gas reserves were estimated using the unweighted arithmetic average of the first-day-of-the-month price for each month within the year, unless prices were defined by contractual arrangements. Oil, NGL and natural gas prices used for this purpose were based on posted benchmark prices and adjusted for price differentials including gravity, quality and transportation costs. The following table shows the pricing used in the reserve analysis for the periods presented:

	2022	2021	2020
Average WTI Oil ($/Bbl)	$ 93.67	$ 66.56	$ 39.57
Average Brent Oil ($/Bbl)	$ 97.77	$ 69.24	$ 43.41
Average Henry Hub Natural Gas ($/MMbtu)	$ 6.36	$ 3.60	$ 1.98
Average Mt. Belvieu NGL ($/Bbl)	$ 47.81	$ 44.22	$ 18.74

Reserves are stated net of applicable royalties. Estimated reserves include Occidental's economic interests under PSCs and other similar economic arrangements. In addition, discussions of oil and gas production or volumes, in general, refer to sales volumes unless the context requires or it is indicated otherwise.

Prices for oil, NGL and natural gas fluctuate widely. Historically, the markets for oil, NGL and natural gas and refined products have been volatile and may continue to be volatile in the future. Prolonged declines in oil, NGL and natural gas prices would reduce Occidental's operating results and cash flows and could impact its future rate of growth and the recoverability of the carrying value of its assets.

OIL RESERVES [a]

MMbbl	United States	International	Total
PROVED DEVELOPED AND UNDEVELOPED RESERVES			
Balance as of December 31, 2019	1,570	469	2,039
Revisions of previous estimates	(283)	(1)	(284)
Improved recovery	82	18	100
Extensions and discoveries	9	5	14
Purchases of proved reserves	2	—	2
Sales of proved reserves	(31)	(101)	(132)
Production	(205)	(59)	(264)
Balance as of December 31, 2020	1,144	331	1,475
Revisions of previous estimates	382	4	386
Improved recovery	6	13	19
Extensions and discoveries	88	1	89
Purchases of proved reserves	33	—	33
Sales of proved reserves	(5)	—	(5)
Production	(182)	(44)	(226)
Balance as of December 31, 2021	1,466	305	1,771
Revisions of previous estimates [b]	**215**	**(5)**	**210**
Improved recovery	**57**	**9**	**66**
Extensions and discoveries	**89**	**6**	**95**
Purchases of proved reserves	**7**	**—**	**7**
Sales of proved reserves	**(10)**	**—**	**(10)**
Production	**(185)**	**(41)**	**(226)**
Balance as of December 31, 2022	**1,639**	**274**	**1,913**
PROVED DEVELOPED RESERVES			
December 31, 2019	1,206	371	1,577
December 31, 2020	917	251	1,168
December 31, 2021	1,140	226	1,366
December 31, 2022	**1,208**	**200**	**1,408**
PROVED UNDEVELOPED RESERVES			
December 31, 2019	364	98	462
December 31, 2020	227	80	307
December 31, 2021	326	79	405
December 31, 2022	**431**	**74**	**505**

(a) Excluded reserve amounts related to discontinued operations and held for sale assets in 2020 and 2019. Proved reserves for held for sale assets as of December 31, 2021 were immaterial.

(b) Revisions of previous estimates in 2022 included the effects of new infill drilling, price revisions and other updates, including changes in reservoir performance, economic conditions, and development plans. Positive revisions of 164 MMbbl were related to additions associated with infill development projects, primarily in the Permian Basin (122 MMbbl) and the DJ Basin (33 MMbbl). Another 72 MMbbl of positive price revisions were primarily in the Permian Basin (83 MMbbl) and the Gulf of Mexico (6 MMbbl), partially offset by negative price revisions of 22 MMbbl related to PSCs. Further positive revisions of 34 MMbbl were associated with updates based on reservoir performance (30MMbbl) and changes in development plans (4 MMbbl). The positive revisions were offset by negative revisions associated with various other cost and interest related revisions (60 MMbbl).

NGL RESERVES [a]

MMbbl	United States	International	Total
PROVED DEVELOPED AND UNDEVELOPED RESERVES			
Balance as of December 31, 2019	540	208	748
Revisions of previous estimates	(90)	10	(80)
Improved recovery	32	10	42
Extensions and discoveries	2	—	2
Purchases of proved reserves	1	—	1
Sales of proved reserves	(20)	—	(20)
Production	(81)	(13)	(94)
Balance as of December 31, 2020	384	215	599
Revisions of previous estimates	227	(1)	226
Improved recovery	—	—	—
Extensions and discoveries	27	—	27
Purchases of proved reserves	7	—	7
Sales of proved reserves	(2)	—	(2)
Production	(79)	(12)	(91)
Balance as of December 31, 2021	564	202	766
Revisions of previous estimates [b]	**126**	**2**	**128**
Improved recovery	**13**	**—**	**13**
Extensions and discoveries	**36**	**—**	**36**
Purchases of proved reserves	**2**	**—**	**2**
Sales of proved reserves	**(4)**	**—**	**(4)**
Production	**(83)**	**(12)**	**(95)**
Balance as of December 31, 2022	**654**	**192**	**846**
PROVED DEVELOPED RESERVES			
December 31, 2019	406	147	553
December 31, 2020	314	138	452
December 31, 2021	433	125	558
December 31, 2022	**444**	**120**	**564**
PROVED UNDEVELOPED RESERVES			
December 31, 2019	134	61	195
December 31, 2020	70	77	147
December 31, 2021	131	77	208
December 31, 2022	**210**	**72**	**282**

[a] Excluded reserve amounts related to discontinued operations and held for sale assets in 2020 and 2019. Proved reserves for held for sale assets as of December 31, 2021 were immaterial.

[b] Revisions of previous estimates in 2022 included the effects of new infill drilling, price revisions and other updates, including changes in reservoir performance, economic conditions and development plans. Positive revisions of 80 MMbbl were related to additions associated with infill development projects, primarily in the Permian Basin (56 MMbbl) and the DJ Basin (24 MMbbl). Another 30 MMbbl of positive price revisions were primarily in the Permian Basin. Further positive revisions of 36 MMbbl were primarily associated with updates based on reservoir performance. The positive revisions were offset by negative revisions associated with various other cost and interest related revisions (18 MMbbl).

NATURAL GAS RESERVES [a]

Bcf	United States	International	Total
PROVED DEVELOPED AND UNDEVELOPED RESERVES			
Balance as of December 31, 2019	4,128	2,572	6,700
Revisions of previous estimates	(823)	102	(721)
Improved recovery	183	103	286
Extensions and discoveries	38	—	38
Purchases of proved reserves	4	—	4
Sales of proved reserves	(523)	(9)	(532)
Production	(561)	(195)	(756)
Balance as of December 31, 2020	2,446	2,573	5,019
Revisions of previous estimates	1,274	27	1,301
Improved recovery	3	3	6
Extensions and discoveries	176	—	176
Purchases of proved reserves	22	—	22
Sales of proved reserves	(25)	—	(25)
Production	(477)	(172)	(649)
Balance as of December 31, 2021	3,419	2,431	5,850
Revisions of previous estimates [b]	**841**	**(30)**	**811**
Improved recovery	**51**	**17**	**68**
Extensions and discoveries	**244**	**23**	**267**
Purchases of proved reserves	**8**	**—**	**8**
Sales of proved reserves	**(45)**	**—**	**(45)**
Production	**(445)**	**(164)**	**(609)**
Balance as of December 31, 2022	**4,073**	**2,277**	**6,350**
PROVED DEVELOPED RESERVES			
December 31, 2019	3,198	2,007	5,205
December 31, 2020	2,028	1,846	3,874
December 31, 2021	2,632	1,705	4,337
December 31, 2022	**2,761**	**1,597**	**4,358**
PROVED UNDEVELOPED RESERVES			
December 31, 2019	930	565	1,495
December 31, 2020	418	727	1,145
December 31, 2021	787	726	1,513
December 31, 2022	**1,312**	**680**	**1,992**

[a] Excluded reserve amounts related to discontinued operations and held for sale assets in 2020 and 2019. Proved reserves for held for sale assets as of December 31, 2021 were immaterial.

[b] Revisions of previous estimates in 2022 included the effects of new infill drilling, price revisions and other updates, including changes in reservoir performance, economic conditions and development plans. Positive revisions of 545 Bcf were related to additions associated with infill development projects, primarily in the Permian Basin (322 Bcf) and the DJ Basin (221 Bcf). Another 200 Bcf of positive price revisions were primarily in the Permian Basin (205 Bcf) and the DJ Basin (11 Bcf), partially offset by negative price revisions of 31 Bcf related to PSCs. Further positive revisions of 193 Bcf were associated with updates based on reservoir performance (163 Bcf), interest related revisions (21 Bcf) and changes in development plans (9 Bcf). The positive revisions were offset by negative revisions associated with various other cost related revisions (127 Bcf).

TOTAL RESERVES [a]

MMboe [b]	United States	International	Total
PROVED DEVELOPED AND UNDEVELOPED RESERVES			
Balance as of December 31, 2019	2,798	1,106	3,904
Revisions of previous estimates	(510)	26	(484)
Improved recovery	145	45	190
Extensions and discoveries	17	5	22
Purchases of proved reserves	4	—	4
Sales of proved reserves	(138)	(103)	(241)
Production	(380)	(104)	(484)
Balance as of December 31, 2020	1,936	975	2,911
Revisions of previous estimates	821	8	829
Improved recovery	7	13	20
Extensions and discoveries	144	1	145
Purchases of proved reserves	44	—	44
Sales of proved reserves	(11)	—	(11)
Production	(341)	(85)	(426)
Balance as of December 31, 2021	2,600	912	3,512
Revisions of previous estimates [c]	**481**	**(7)**	**474**
Improved recovery	**78**	**11**	**89**
Extensions and discoveries	**166**	**10**	**176**
Purchases of proved reserves	**10**	**—**	**10**
Sales of proved reserves	**(21)**	**—**	**(21)**
Production	**(342)**	**(81)**	**(423)**
Balance as of December 31, 2022	**2,972**	**845**	**3,817**
PROVED DEVELOPED RESERVES			
December 31, 2019	2,145	853	2,998
December 31, 2020	1,569	697	2,266
December 31, 2021	2,012	635	2,647
December 31, 2022	**2,112**	**586**	**2,698**
PROVED UNDEVELOPED RESERVES			
December 31, 2019	653	253	906
December 31, 2020	367	278	645
December 31, 2021	588	277	865
December 31, 2022	**860**	**259**	**1,119**

(a) Excluded reserve amounts related to discontinued operations and held for sale assets in 2020 and 2019. Proved reserves for held for sale assets as of December 31, 2021 were immaterial.

(b) Natural gas volumes have been converted to Boe based on an energy content of six Mcf of gas to one barrel of oil. Conversion to Boe does not necessarily result in price equivalency.

(c) Revisions of previous estimates in 2022 included the effects of new infill drilling, price revisions and other updates, including changes in reservoir performance, economic conditions and development plans. Positive revisions of 335 MMboe were related to additions associated with infill development projects, primarily in the Permian Basin (232 MMboe) and the DJ Basin (94 MMboe). Another 136 MMboe of positive price revisions were primarily in the Permian Basin (147 MMboe), the Gulf of Mexico (8 MMBoe) and the DJ Basin (4 MMboe), partially offset by negative price revisions of 29 MMboe related to PSCs. Further positive revisions of 98 MMboe were associated with updates based on reservoir performance (93 MMboe) and changes in development plans (5 MMboe). The positive revisions were offset by negative revisions associated with various other cost and interest related revisions (95 MMboe).

CAPITALIZED COSTS

Capitalized costs relating to oil and gas producing activities and related accumulated DD&A were as follows:

millions		United States		International		Total
December 31, 2022						
Proved properties	$	71,314	$	15,733	$	87,047
Unproved properties		17,251		189		17,440
Total capitalized costs [(a)]		88,565		15,922		104,487
Proved properties depreciation, depletion and amortization		(36,727)		(12,373)		(49,100)
Unproved properties valuation		(4,781)		(27)		(4,808)
Total Accumulated depreciation, depletion and amortization		(41,508)		(12,400)		(53,908)
Net capitalized costs	$	47,057	$	3,522	$	50,579
December 31, 2021						
Proved properties	$	66,443	$	15,232	$	81,675
Unproved properties		19,423		153		19,576
Total capitalized costs [(a)]		85,866		15,385		101,251
Proved properties depreciation, depletion and amortization		(32,355)		(11,821)		(44,176)
Unproved properties valuation		(4,789)		(27)		(4,816)
Total Accumulated depreciation, depletion and amortization		(37,144)		(11,848)		(48,992)
Net capitalized costs	$	48,722	$	3,537	$	52,259
December 31, 2020						
Proved properties	$	63,988	$	14,548	$	78,536
Unproved properties		23,713		205		23,918
Total capitalized costs [(a,b)]		87,701		14,753		102,454
Proved properties depreciation, depletion and amortization		(27,914)		(11,140)		(39,054)
Unproved properties valuation		(5,285)		(27)		(5,312)
Total Accumulated depreciation, depletion and amortization		(33,199)		(11,167)		(44,366)
Net capitalized costs	$	54,502	$	3,586	$	58,088

(a) Included acquisition costs, development costs, capitalized interest and AROs.
(b) Excluded capitalized costs related to Ghana, which was presented as held for sale as of December 31, 2020.

COSTS INCURRED

Costs incurred in oil and gas property acquisition, exploration and development activities, whether capitalized or expensed, were as follows:

millions	United States	International	Total
December 31, 2022			
Property acquisition costs [a]			
Proved properties	$ 496	$ 3	$ 499
Unproved properties	488	—	488
Exploration costs	279	175	454
Development costs	3,083	423	3,506
Costs incurred	$ 4,346	$ 601	$ 4,947
December 31, 2021 [b]			
Property acquisition costs			
Proved properties	$ 378	$ 1	$ 379
Unproved properties	51	—	51
Exploration costs	147	143	290
Development costs	1,749	366	2,115
Costs incurred	$ 2,325	$ 510	$ 2,835
December 31, 2020 [b]			
Property acquisition costs			
Proved properties	$ 7	$ 35	$ 42
Unproved properties	41	24	65
Exploration costs	117	95	212
Development costs	1,376	466	1,842
Costs incurred	$ 1,541	$ 620	$ 2,161

(a) Included $340 million in property acquisition costs related to non-monetary exchange transactions.
(b) Excluded costs incurred related to the South Africa (sold 2020) and Ghana (sold 2021) assets.

RESULTS OF OPERATIONS

Occidental's oil and gas producing activities for continuing operations, which exclude items such as asset divestitures, corporate overhead, interest and royalties, were as follows:

millions		United States		International [a]		Total
FOR THE YEAR ENDED DECEMBER 31, 2022						
Revenues [b]	$	22,487	$	4,671	$	27,158
Lease operating costs		3,050		978		4,028
Transportation costs		1,324		69		1,393
Other operating expenses		981		235		1,216
Depreciation, depletion and amortization		5,608		571		6,179
Taxes other than on income		1,236		299		1,535
Exploration expenses		113		103		216
Pretax income (loss)		10,175		2,416		12,591
Income tax expense (benefit) [c]		2,213		964		3,177
Results of operations	$	7,962	$	1,452	$	9,414
FOR THE YEAR ENDED DECEMBER 31, 2021						
Revenues [b]	$	15,817	$	3,462	$	19,279
Lease operating costs		2,341		883		3,224
Transportation costs		1,306		65		1,371
Other operating expenses		896		176		1,072
Depreciation, depletion and amortization		7,053		687		7,740
Taxes other than on income		785		209		994
Exploration expenses		158		94		252
Oil and gas mark-to-market - Collars and CO_2		280		—		280
Pretax income (loss) before impairments and other charges		2,998		1,348		4,346
Asset impairments and other charges		282		—		282
Pretax income (loss)		2,716		1,348		4,064
Income tax expense (benefit) [c]		508		656		1,164
Results of operations	$	2,208	$	692	$	2,900
FOR THE YEAR ENDED DECEMBER 31, 2020						
Revenues [b]	$	9,058	$	2,947	$	12,005
Lease operating costs		2,169		921		3,090
Transportation costs		1,425		72		1,497
Other operating expenses		960		221		1,181
Depreciation, depletion and amortization		6,611		803		7,414
Taxes other than on income		503		111		614
Exploration expenses		68		64		132
Oil and gas mark-to-market - Collars and CO_2		(1,089)		—		(1,089)
Pretax income (loss) before impairments and other charges		(1,589)		755		(834)
Asset impairments and other charges		5,973		1,208		7,181
Pretax income (loss)		(7,562)		(453)		(8,015)
Income tax expense (benefit) [c]		(1,663)		428		(1,235)
Results of operations	$	(5,899)	$	(881)	$	(6,780)

(a) Results of operations excluded discontinued operations related to South Africa (sold 2020) and Ghana (sold 2021) assets.
(b) Revenues are net of royalty payments.
(c) U.S. federal income taxes reflect certain expenses related to oil and gas activities allocated for U.S. income tax purposes. These amounts are computed using the statutory rate in effect during the period.

RESULTS PER UNIT OF PRODUCTION FOR CONTINUING OPERATIONS

$/Boe [a]	United States	International [b]	Total
FOR THE YEAR ENDED DECEMBER 31, 2022			
Revenues [c]	$ 65.77	$ 57.67	$ 64.22
Lease operating costs	8.92	12.07	9.52
Transportation costs	3.87	0.85	3.29
Other operating expenses	2.87	2.90	2.88
Depreciation, depletion and amortization	16.40	7.05	14.61
Taxes other than on income	3.61	3.69	3.63
Exploration expenses	0.33	1.27	0.51
Pretax income (loss)	29.77	29.84	29.78
Income tax expense [d]	6.47	11.90	7.51
Results of operations	$ 23.30	$ 17.94	$ 22.27
FOR THE YEAR ENDED DECEMBER 31, 2021			
Revenues [c]	$ 46.42	$ 40.82	$ 45.31
Lease operating costs	6.87	10.41	7.58
Transportation costs	3.83	0.76	3.22
Other operating expenses	2.63	2.08	2.52
Depreciation, depletion and amortization	20.70	8.10	18.19
Taxes other than on income	2.30	2.47	2.34
Exploration expenses	0.46	1.10	0.59
Oil and gas mark-to-market - Collars and CO_2	0.82	—	0.66
Pretax income (loss) before impairments and other charges	8.81	15.90	10.21
Asset impairments and other charges	0.83	—	0.66
Pretax income (loss)	7.98	15.90	9.55
Income tax expense [d]	1.49	7.73	2.73
Results of operations	$ 6.49	$ 8.17	$ 6.82
FOR THE YEAR ENDED DECEMBER 31, 2020			
Revenues [c]	$ 23.86	$ 28.15	$ 24.79
Lease operating costs	5.71	8.80	6.38
Transportation costs	3.75	0.69	3.09
Other operating expenses	2.53	2.11	2.44
Depreciation, depletion and amortization	17.41	7.67	15.31
Taxes other than on income	1.32	1.06	1.27
Exploration expenses	0.18	0.61	0.27
Oil and gas mark-to-market - CO_2	(2.87)	—	(2.25)
Pretax income (loss) before impairments and other charges	(4.17)	7.21	(1.72)
Asset impairments and other charges	15.73	11.54	14.83
Pretax income (loss)	(19.90)	(4.33)	(16.55)
Income tax expense (benefit) [d]	(4.38)	4.09	(2.55)
Results of operations	$ (15.52)	$ (8.42)	$ (14.00)

(a) Natural gas volumes have been converted to Boe based on energy content of six Mcf of gas to one barrel of oil.
(b) Results of operations excluded discontinued operations related to the South Africa (sold 2020) and Ghana (sold 2021) assets.
(c) Revenues are net of royalty payments.
(d) U.S. federal income taxes reflect certain expenses related to oil and gas activities allocated for U.S. income tax purposes. These amounts are computed using the statutory rate in effect during the period.

STANDARDIZED MEASURE, INCLUDING YEAR-TO-YEAR CHANGES THEREIN, OF DISCOUNTED FUTURE NET CASH FLOWS

For purposes of the following disclosures, future cash flows were computed by applying to Occidental's proved oil and gas reserves the unweighted arithmetic average of the first-day-of-the-month price for each month within the years ended December 31, 2022, 2021 and 2020, respectively, unless prices were defined by contractual arrangements, and exclude escalations based upon future conditions. The realized prices used to calculate future cash flows vary by producing area and market conditions. Future operating and capital costs were forecast using the current cost environment applied to expectations of future operating and development activities to develop and produce proved reserves at year end.

Future income tax expenses were computed by applying, generally, year-end statutory tax rates (adjusted for permanent differences, tax credits, allowances and foreign income repatriation considerations) to the estimated net future pre-tax cash flows. The discount was computed by application of a 10% discount factor. The calculations assumed the continuation of existing economic, operating and contractual conditions as of December 31, 2022, 2021 and 2020. Such assumptions, which are required by regulation, have not always proven accurate in the past. Other valid assumptions would give rise to substantially different results.

STANDARDIZED MEASURE OF DISCOUNTED FUTURE NET CASH FLOWS

millions	United States	International [(a)]	Total
Balance as of December 31, 2022			
Future cash inflows	$ 186,942	$ 34,514	$ 221,456
Future costs			
Production costs and other operating	(68,068)	(9,468)	(77,536)
Development costs [(b)]	(14,845)	(2,498)	(17,343)
Future income tax expense	(18,633)	(4,984)	(23,617)
Future net cash flows	85,396	17,564	102,960
10% discount factor	(37,340)	(7,468)	(44,808)
Standardized measure of discounted future net cash flows	$ 48,056	$ 10,096	$ 58,152
Balance as of December 31, 2021			
Future cash inflows	$ 116,014	$ 28,865	$ 144,879
Future costs			
Production costs and other operating	(47,803)	(9,284)	(57,087)
Development costs [(b)]	(12,186)	(3,004)	(15,190)
Future income tax expense	(9,875)	(3,544)	(13,419)
Future net cash flows	46,150	13,033	59,183
10% discount factor	(19,538)	(5,821)	(25,359)
Standardized measure of discounted future net cash flows	$ 26,612	$ 7,212	$ 33,824
Balance as of December 31, 2020			
Future cash inflows	$ 49,050	$ 21,270	$ 70,320
Future costs			
Production costs and other operating	(29,147)	(8,304)	(37,451)
Development costs [(b)]	(9,103)	(2,410)	(11,513)
Future income tax expense	(19)	(2,088)	(2,107)
Future net cash flows	10,781	8,468	19,249
10% discount factor	(3,827)	(4,071)	(7,898)
Standardized measure of discounted future net cash flows	$ 6,954	$ 4,397	$ 11,351

(a) Excluded discontinued operations related to Ghana (sold 2021).
(b) Included ARO costs.

CHANGES IN THE STANDARDIZED MEASURE OF DISCOUNTED FUTURE NET CASH FLOWS FROM PROVED RESERVE QUANTITIES [(a)]

millions	2022	2021	2020
Balance as of January 1	$ 33,824	$ 11,351	$ 29,229
Sales and transfers of oil and gas produced, net of production costs and other operating expenses	(20,547)	(13,983)	(6,483)
Net change in prices received per barrel, net of production costs and other operating expenses	29,798	32,464	(19,738)
Extensions, discoveries and improved recovery, net of future production and development costs	5,390	2,412	1,007
Change in estimated future development costs	(1,562)	(376)	1,686
Revisions of quantity estimates	10,481	10,296	(1,989)
Previously estimated development costs incurred during the period	1,813	1,277	1,680
Accretion of discount	3,492	1,009	2,541
Net change in income taxes	(5,961)	(6,249)	3,212
Purchases and sales of reserves in place, net	(158)	377	(651)
Changes in production rates and other	1,582	(4,754)	857
Net change	24,328	22,473	(17,878)
Balance as of December 31	$ 58,152	$ 33,824	$ 11,351

(a) Excluded results from discontinued operations.

NET PRODUCTIVE AND DRY— EXPLORATORY AND DEVELOPMENT WELLS COMPLETED

The following table sets forth, for each year in the three-year period ended December 31, 2022, Occidental's net productive and dry exploratory and development wells completed:

	United States	International	Total
2022			
Oil			
Exploratory	**9**	**10**	**19**
Development	**265**	**32**	**297**
Gas			
Exploratory	**—**	**—**	**—**
Development	**3**	**2**	**5**
Dry			
Exploratory	**—**	**5**	**5**
Development	**1**	**—**	**1**
2021			
Oil			
Exploratory	6	4	10
Development	292	42	334
Gas			
Exploratory	—	1	1
Development	4	—	4
Dry			
Exploratory	4	2	6
Development	1	—	1
2020			
Oil			
Exploratory	7	2	9
Development	240	81	321
Gas			
Exploratory	—	2	2
Development	6	1	7
Dry			
Exploratory	—	1	1
Development	—	—	—

PRODUCTIVE OIL AND GAS WELLS

The following table sets forth, as of December 31, 2022, Occidental's productive oil and gas wells (both producing and capable of production):

	United States		International		Total	
Oil [(a)]						
Gross [(b)]	17,944	(1,009)	2,894	—	20,838	(1,009)
Net [(c)]	15,437	(861)	1,392	—	16,829	(861)
Gas [(a)]						
Gross [(b)]	2,656	(1,453)	162	(2)	2,818	(1,455)
Net [(c)]	2,229	(1,165)	96	(2)	2,325	(1,167)

(a) The numbers in parentheses indicate the number of wells with multiple completions.
(b) The total number of wells in which interests are owned.
(c) The sum of fractional interests.

PARTICIPATION IN WELLS BEING DRILLED OR PENDING COMPLETION

The following table sets forth, as of December 31, 2022, Occidental's participation in exploratory and development wells being drilled:

	United States	International	Total
Exploratory and development wells being drilled			
Gross	27	16	43
Net	22	12	34
Exploratory and development wells pending completion [(a)]			
Gross	107	1	108
Net	79	1	80

(a) Wells suspended or waiting on completion include exploration and development wells where drilling has occurred, but the wells are awaiting the completion of hydraulic fracturing or other completion activities or the resumption of drilling in the future. There were 42 MMboe of PUD reserves primarily assigned to U.S. onshore development wells suspended or waiting on completion as of December 31, 2022. Occidental expects to convert all of these PUD reserves to developed status within five years of their initial disclosure.

As of December 31, 2022, Occidental was participating in 135 and 37 gross pressure-maintenance projects in the United States and Internationally, respectively. In the United States, these projects primarily consisted of waterfloods and CO_2 floods, and in the Middle East and North Africa, these projects consisted mostly of waterfloods.

OIL AND GAS ACREAGE

The following table sets forth, as of December 31, 2022, Occidental's holdings of developed and undeveloped oil and gas acreage:

thousands	United States	International	Total
Developed [(a)]			
Gross [(b)]	6,190	1,130	7,320
Net [(c)]	3,948	393	4,341
Undeveloped [(d)]			
Gross [(b)]	1,437	8,422	9,859
Net [(c)]	1,016	6,677	7,693
Fee Mineral Ownership [(e)]			
Gross [(b)]	8,040	—	8,040
Net [(c)]	4,567	—	4,567

(a) Acres spaced or assigned to productive wells.
(b) Total acres in which interests are held.
(c) Sum of the fractional interests owned based on working interests, or interests under PSCs and other economic arrangements.
(d) Acres on which wells have not been drilled or completed to a point that would permit the production of commercial quantities of oil and gas, regardless of whether the acreage contains proved reserves.
(e) Occidental's fee mineral acreage is primarily undeveloped.

Occidental's investment in developed and undeveloped acreage comprises numerous concessions, blocks and leases. Work programs are designed to ensure that the exploration potential of any property is fully evaluated before the contractual expiration date. In some instances, Occidental may elect to relinquish acreage in advance of the contractual expiration date if the evaluation process is complete and there is not a business basis for extension. In cases where additional time may be required to fully evaluate acreage, Occidental has generally been successful in obtaining extensions. Scheduled lease and concession expirations for undeveloped acreage over the next three years are not expected to have a material adverse impact on Occidental.

OIL, NGL AND NATURAL GAS SALES VOLUMES PER DAY

The following tables set forth the sales volumes from ongoing operations of oil, NGL and natural gas per day for each of the three years in the period ended December 31, 2022. The differences between the sales and production volumes per day are negligible and are generally due to the timing of shipments at Occidental's international locations where product is loaded onto tankers. Natural gas volumes have been converted to Boe based on energy content of six Mcf of gas to one barrel of oil.

Sales per Day from Ongoing Operations (Mboe/d)	**2022**	2021	2020
United States			
Permian	**513**	487	575
Rockies & Other Domestic	**277**	302	332
Gulf of Mexico	**147**	144	130
Total	**937**	933	1,037
International			
Algeria and Other International	**48**	43	46
Al Hosn Gas	**73**	76	78
Dolphin	**37**	40	45
Oman	**64**	74	85
Total	**222**	233	254
Total Sales from Ongoing Operations (Mboe/d)	**1,159**	1,166	1,291
Operations exited or exiting	**—**	18	60
Total Sales (Mboe/d)	**1,159**	1,184	1,351

Sales per Day by Products from Ongoing Operations	2022	2021	2020
United States			
Oil (Mbbl)			
Permian	303	286	343
Rockies & Other Domestic	82	93	109
Gulf of Mexico	122	119	109
Total	507	498	561
NGL (Mbbl)			
Permian	119	110	129
Rockies & Other Domestic	97	97	83
Gulf of Mexico	11	10	9
Total	227	217	221
Natural gas (MMcf)			
Permian	545	548	620
Rockies & Other Domestic	590	676	838
Gulf of Mexico	81	84	71
Total	1,216	1,308	1,529
International			
Oil (Mbbl)			
Algeria and Other International	42	39	42
Al Hosn Gas	12	13	14
Dolphin	6	7	7
Oman	53	61	65
Total	113	120	128
NGL (Mbbl)			
Algeria and Other International	4	3	3
Al Hosn Gas	23	23	25
Dolphin	7	8	9
Total	34	34	37
Natural gas (MMcf)			
Algeria and Other International	12	6	6
Al Hosn Gas	227	234	238
Dolphin	142	151	171
Oman	69	80	120
Total	450	471	535
Total Sales from Ongoing Operations (Mboe/d)	1,159	1,166	1,291

Schedule II – Valuation and Qualifying Accounts

millions		Balance at Beginning of Period	Additions: Charged to Costs and Expenses		Additions: Charged to Other Accounts		Deductions [(a)]		Balance at End of Period
2022									
Allowance for doubtful accounts	**$**	**867**	**$**	**37**	**$**	**—**	**$**	**—**	**$ 904** [(b)]
Environmental, litigation, tax and other reserves	**$**	**3,164**	**$**	**714**	**$**	**138**	**$**	**(304)**	**$ 3,712** [(c)]
2021									
Allowance for doubtful accounts	$	822	$	56	$	(11)	$	—	$ 867 [(b)]
Environmental, litigation, tax and other reserves	$	2,429	$	900	$	94	$	(259)	$ 3,164 [(c)]
2020									
Allowance for doubtful accounts	$	788	$	37	$	(3)	$	—	$ 822 [(b)]
Environmental, litigation, tax and other reserves	$	2,411	$	115	$	43	$	(140)	$ 2,429 [(c)]

(a) Primarily represents payments.
(b) Of these amounts, $44 million, $46 million and $42 million in 2022, 2021, and 2020, respectively, were classified as current.
(c) Of these amounts, $266 million, $790 million and $149 million in 2022, 2021, and 2020, respectively, were classified as current.

Note: The amounts presented represent continuing operations.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Occidental had no changes in, and no disagreements with, Occidental's accountants on accounting and financial disclosure.

ITEM 9A. CONTROLS AND PROCEDURES

MANAGEMENT'S ANNUAL ASSESSMENT OF AND REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

The management of Occidental Petroleum Corporation and its subsidiaries is responsible for establishing and maintaining adequate internal control over financial reporting. Occidental's system of internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of Consolidated Financial Statements for external purposes in accordance with GAAP. Occidental's internal control over financial reporting includes those policies and procedures that: (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and divestitures of Occidental's assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP and that Occidental's receipts and expenditures are being made only in accordance with authorizations of Occidental's management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of Occidental's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management has assessed the effectiveness of Occidental's internal control system as of December 31, 2022, based on the criteria for effective internal control over financial reporting described in Internal Control - Integrated Framework issued in 2013 by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, management believes that, as of December 31, 2022, Occidental's system of internal control over financial reporting is effective.

Occidental's independent auditors, KPMG LLP, have issued an audit report on Occidental's internal control over financial reporting.

DISCLOSURE CONTROLS AND PROCEDURES

Occidental's President and Chief Executive Officer and its Senior Vice President and Chief Financial Officer supervised and participated in Occidental's evaluation of its disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Based upon that evaluation, Occidental's President and Chief Executive Officer and Senior Vice President and Chief Financial Officer concluded that Occidental's disclosure controls and procedures were effective as of December 31, 2022.

ITEM 9B. OTHER INFORMATION

None.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

None.

Part III
ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Occidental's Code of Business Conduct applies to the President and Chief Executive Officer, Senior Vice President and Chief Financial Officer, Vice President, Chief Accounting Officer and Controller and persons performing similar functions. The Code of Business Conduct also applies to Occidental's directors, employees and the employees of entities which it controls. The Code of Business Conduct is posted on our website, www.oxy.com. Occidental will satisfy any disclosure requirement under Item 5.05 of Form 8-K regarding an amendment to, or waiver from, any provision of the Code of Business Conduct by disclosing the nature of that amendment or waiver on its website within four business days following the date of the amendment or waiver.

The list of Occidental's executive officers and related information under Information About Our Executive Officers set forth in Part I of this 10-K is incorporated by reference herein. The information required by this Item 10 is incorporated herein by reference from Occidental's definitive Proxy Statement to be filed with the SEC pursuant to Regulation 14A within 120 days of December 31, 2022.

ITEM 11. EXECUTIVE COMPENSATION

The information under the caption "Compensation Discussion and Analysis - Compensation Committee Report" shall not be deemed to be "soliciting material," or to be "filed" with the SEC, or subject to Regulation 14A or 14C under the Exchange Act or to the liabilities of Section 18 of the Exchange Act, nor shall it be deemed incorporated by reference into any filing under the Securities Act of 1933. The information required by this Item 11 is incorporated herein by reference from Occidental's definitive Proxy Statement to be filed with the SEC pursuant to Regulation 14A within 120 days of December 31, 2022.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

SECURITIES AUTHORIZED FOR ISSUANCE UNDER EQUITY COMPENSATION PLANS

All of Occidental's stock-based compensation plans for its employees and non-employee directors have been approved by the stockholders. The aggregate number of shares of Occidental common stock authorized for issuance under such plans is approximately 133 million, of which approximately 16.1 million had been reserved for issuance through December 31, 2022. The following is a summary of the securities available for issuance under such plans:

a) Number of securities to be issued upon exercise of outstanding options, warrants and rights	b) Weighted-average exercise price of outstanding options, warrants and rights	c) Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a))
16,053,787 (1)	38.04 (2)	56,980,559 (3)

(1) Includes shares reserved to be issued pursuant to RSUs, Options and performance-based awards. Shares for performance-based awards are included assuming maximum payout, but may be paid out at lesser amounts, or not at all, according to achievement of performance goals.

(2) Price applies only to the Options included in column (a). Exercise price is not applicable to the other awards included in column (a), nor warrants not issued under equity compensation plans.

(3) A plan provision requires each share covered by an award (other than stock appreciation rights and Options) to be counted as if three shares were issued in determining the number of shares that are available for future awards. Accordingly, the number of shares available for future awards may be less than the amount shown depending on the type of award granted. Additionally, under the plan, the amount shown may increase, depending on the award type, by the number of shares currently unvested or forfeitable, or three times that number as applicable, that are forfeited or canceled, or correspond to the portion of any stock-based awards settled in cash.

The information required by this Item 12 is incorporated herein by reference from Occidental's definitive Proxy Statement to be filed with the SEC pursuant to Regulation 14A within 120 days of December 31, 2022.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

The information required by this Item 13 is incorporated herein by reference from Occidental's definitive Proxy Statement to be filed with the SEC pursuant to Regulation 14A within 120 days of December 31, 2022.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

Our independent registered public accounting firm is KPMG LLP, Houston, TX, Auditor Firm ID: 185.

The information about our principal accountant, KPMG LLP, Houston, Texas (185) required by this Item 14 is incorporated herein by reference from Occidental's definitive Proxy Statement to be filed with the SEC pursuant to Regulation 14A within 120 days of December 31, 2022.

Part IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

The agreements included as exhibits to this report are included to provide information about their terms and not to provide any other factual or disclosure information about Occidental or the other parties to the agreements. The agreements contain representations and warranties by each of the parties to the applicable agreement that were made solely for the benefit of the other agreement parties and:

- Should not be treated as categorical statements of fact, but rather as a way of allocating the risk among the parties if those statements prove to be inaccurate;
- Have been qualified by disclosures that were made to the other party in connection with the negotiation of the applicable agreement, which disclosures are not necessarily reflected in the agreement;
- May apply standards of materiality in a way that is different from the way investors may view materiality; and
- Were made only as of the date of the applicable agreement or such other date or dates as may be specified in the agreement and are subject to more recent developments.

(a) (1) and (2). Financial Statements and Financial Statement Schedule

Reference is made to Item 8 of the Table of Contents of the Form 10-K, where these documents are listed.

(a) (3). Exhibits

3.(i)	Restated Certificate of Incorporation of Occidental, dated November 12, 1999, and Certificates of Amendment thereto dated May 5, 2006, May 1, 2009, May 2, 2014 and June 3, 2020 (filed as Exhibit 4.1 to the Registration Statement on Form S-8 of Occidental filed on June 17, 2020, File No. 333-239236).
3.(i)(a)	Certificate of Change of Location of Registered Office and of Registered Agent, dated July 6, 2001 (filed as Exhibit 3.1(i) to the Registration Statement on Form S-3 of Occidental dated February 6, 2002, File No. 333-82246).
3.(ii)	Amended and Restated By-laws of Occidental Petroleum Corporation as of March 25, 2020 (filed as Exhibit 3.1 to the Current Report on Form 8-K of Occidental filed on March 25, 2020, File No. 1-9210).
3.(ii)(a)	Certificate of Designations with respect to the Cumulative Perpetual Preferred Stock, Series A (filed as Exhibit 3.1 to the Current Report on Form 8-K of Occidental filed on August 8, 2019, File No. 1-9210).
3.(ii)(b)	Certificate of Designations with respect to the Junior Participating Preferred Stock, Series B (filed as Exhibit 3.1 to the Current Report on Form 8-K of Occidental filed on March 13, 2020, File No. 1-9210).
4.1	Description of Securities of Occidental Petroleum Corporation Registered under Section 12 of the Exchange Act (filed as Exhibit 4.1 to the Annual Report on Form 10-K of Occidental for the fiscal year ended December 31, 2020, File No. 1-9210).
4.2	Indenture, dated as of August 8, 2019, between Occidental Petroleum Corporation and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.1 to the Current Report on Form 8-K of Occidental filed on August 8, 2019, File No. 1-9210).
4.3	First Supplemental Indenture to that certain Indenture, dated as of August 8, 2019, by and between Occidental Petroleum Corporation and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.7 to the Current Report on Form 8-K of Occidental filed on July 13, 2020, File No. 1-9210).
4.4	Second Supplemental Indenture to that certain Indenture, dated as of August 8, 2019, by and between Occidental Petroleum Corporation and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.6 to the Current Report on Form 8-K of Occidental filed on December 22, 2020, File No. 1-9210).
4.5	Third Supplemental Indenture to that certain Indenture, dated as of August 8, 2019, by and between Occidental Petroleum Corporation and The Bank of New York Mellon Trust Company, N.A. (filed as Exhibit 4.2 to the Current Report on Form 8-K of Occidental filed on July 15, 2021, File No. 1-9210).

Other instruments defining the rights of holders of other long-term debt of Occidental and its subsidiaries are not being filed since the total amount of securities authorized under each of such instruments does not exceed 10% of the total assets of Occidental and its subsidiaries on a consolidated basis. Occidental agrees to furnish a copy of any such instrument to the Commission upon request.

All of the exhibits numbered 10.1 to 10.26 are management contracts and compensatory plans required to be identified specifically as responsive to Item 601(b)(10)(iii)(A) of Regulation S-K pursuant to Item 15(b) of Form 10-K.

10.1	Occidental Petroleum Corporation Savings Plan (Amended and Restated Effective as of January 1, 2023).
10.2	Occidental Petroleum Corporation 2015 Long-Term Incentive Plan Form of Notice of Grant of Restricted Stock Unit Incentive Award (filed as Exhibit 10.2 to the Annual Report on Form 10-K of Occidental for the fiscal year ended December 31, 2021, File No. 1-9210).
10.3	Occidental Petroleum Corporation Modified Deferred Compensation Plan (Effective December 31, 2006 and Amended and Restated Effective January 1, 2021) (filed as Exhibit 10.2 to the Annual Report on Form 10-K of Occidental for the fiscal year ended December 31, 2020, File No. 1-9210).
10.4	Occidental Petroleum Corporation Supplemental Retirement Plan II (Effective as of January 1, 2005 and Amended and Restated as of July 1, 2020) (filed as Exhibit 10.4 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended June 30, 2020, File No. 1-9210).
10.5	Occidental Petroleum Corporation Executive Incentive Compensation Plan (As Amended and Restated Effective January 1, 2023).
10.6	Form of Indemnification Agreement between Occidental and each of its directors and certain executive officers (filed as Exhibit B to the Proxy Statement of Occidental for its May 21, 1987, Annual Meeting of Stockholders, File No. 1-9210).
10.7	Form of Indemnification Agreement between Occidental and each of its directors and certain executive officers (filed as Exhibit 10.9 to the Annual Report on Form 10-K of Occidental for the fiscal year ended December 31, 2020, File No. 1-9210).
10.8	Amended and Restated Occidental Petroleum Corporation 2015 Long-Term Incentive Plan (filed as Exhibit 4.7 to the Registration Statement on Form S-8 of Occidental filed on June 17, 2020, File No. 333-239236).
10.9	Description of financial counseling program (filed as Exhibit 10.50 to the Annual Report on Form 10-K of Occidental for the fiscal year ended December 31, 2003, File No. 1-9210).
10.10	Description of group excess liability insurance program (filed as Exhibit 10.16 to the Annual Report on Form 10-K of Occidental for the fiscal year ended December 31, 2020, File No. 1-9210).
10.11	Form of Occidental Petroleum Corporation 2015 Long-Term Incentive Plan Common Stock Award For Non-Employee Directors Grant Agreement (filed as Exhibit 10.2 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended June 30, 2015, File No. 1-9210).
10.12	Anadarko Retirement Restoration Plan (As Amended and Restated Effective as of December 31, 2021) (filed as Exhibit 10.14 to the Annual Report on Form 10-K of Occidental for the fiscal year ended December 31, 2021, File No. 1-9210).
10.13	Anadarko Petroleum Corporation Savings Restoration Plan (As Amended and Restated Effective July 1, 2020) (filed as Exhibit 10.1 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended June 30, 2020, File No. 1-9210).
10.14	Form of Occidental Petroleum Corporation 2015 Long-Term Incentive Plan Cash Return on Capital Employed Incentive Award (filed as Exhibit 10.1 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended March 31, 2020, File No. 1-9210).
10.15	Form of 2020 Occidental Petroleum Corporation 2015 Long-Term Incentive Plan Total Shareholder Return Incentive Award (filed as Exhibit 10.2 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended March 31, 2020, File No. 1-9210).
10.16	Form of Occidental Petroleum Corporation 2015 Long-Term Incentive Plan Stock Option Award (filed as Exhibit 10.3 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended March 31, 2020, File No. 1-9210).
10.17	Form of Occidental Petroleum Corporation 2015 Long-Term Incentive Plan Stock Appreciation Right Award (filed as Exhibit 10.4 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended March 31, 2020, File No. 1-9210).
10.18	Occidental Petroleum Corporation Executive Severance Plan (filed as Exhibit 10.5 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended March 31, 2020, File No. 1-9210).
10.19	Form of 2020 Occidental Petroleum Corporation 2015 Long-Term Incentive Plan Special Restricted Stock Unit Incentive Award (filed as Exhibit 10.6 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended March 31, 2020, File No. 1-9210).
10.20	Occidental Petroleum Corporation Executive Change in Control Severance Plan (filed as Exhibit 10.5 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended June 30, 2020, File No. 1-9210).
10.21	Form of Employee Notice, Impact of August 2020 Warrant Distribution on Long-Term Incentive Awards (filed as Exhibit 10.7 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended September 30, 2020, File No. 1-9210).
10.22	Form of Occidental Petroleum Corporation 2015 Long-Term Incentive Plan Total Shareholder Return Incentive Award (applicable to annual grants made in 2021) (filed as Exhibit 10.1 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended March 31, 2021, File No. 1-9210).
10.23	Letter Agreement by and between Occidental Petroleum Corporation and Sylvia J. Kerrigan dated September 14, 2022 (filed as Exhibit 10.1 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended September 30, 2022).
10.24	Occidental Petroleum Corporation 2015 Long-Term Incentive Plan Form of Notice of Grant of Restricted Stock Unit Incentive Award (for awards to Chief Legal Officer) (filed as Exhibit 10.2 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended September 30, 2022).
10.25	Transition Services and Separation Agreement by and between Occidental Petroleum Corporation and Marcia E. Backus dated September 29, 2022 (filed as Exhibit 10.3 to the Quarterly Report on Form 10-Q of Occidental for the quarterly period ended September 30, 2022).

10.26	Form of Occidental Petroleum Corporation 2015 Long-Term Inventive Plan Total Shareholder Return Incentive Award (applicable to annual grants made in 2022).
10.27	Warrant Agreement (including Form of Warrant), dated July 24, 2020, between the Company and Equiniti Trust Company, as Warrant Agent (filed as Exhibit 10.1 to the Current Report on Form 8-K of Occidental filed on July 27, 2020, File No. 1-9210).
10.28	Second Amended and Restated Credit Agreement, dated as of December 10, 2021, by and among Occidental Petroleum Corporation, the banks party thereto, as lenders, and JPMorgan Chase Bank, N.A., as administrative agent (filed as Exhibit 10.1 to the Current Report on Form 8-K of Occidental filed on December 13, 2021, File No. 1-9210).
21	List of subsidiaries of Occidental as of December 31, 2022.
23.1	Consent of Independent Registered Public Accounting Firm.
23.2	Consent of Ryder Scott, Independent Petroleum Engineers.
31.1	Certification of CEO Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of CFO Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certifications of CEO and CFO Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
99.1	Ryder Scott Company Process Review of the Estimated Future Proved Reserves and Income Attributable to Certain Leasehold and Royalty Interests and Certain Economic Interests Derived Through Production Sharing Contracts as of December 31, 2022.
101.INS	Inline XBRL Instance Document.
101.SCH	Inline XBRL Taxonomy Extension Schema Document.
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document.
104	Cover Page Interactive Data File - The cover page from Occidental Petroleum Corporation's Annual Report on Form 10-K for the year ended December 31, 2022 is formatted in Inline XBRL (included as Exhibit 101).

ITEM 16. FORM 10-K SUMMARY

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

OCCIDENTAL PETROLEUM CORPORATION

By: /s/ Vicki Hollub
Vicki Hollub
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

	Title	Date
/s/ Vicki Hollub Vicki Hollub	President, Chief Executive Officer and Director	February 27, 2023
/s/ Robert L. Peterson Robert L. Peterson	Senior Vice President and Chief Financial Officer	February 27, 2023
/s/ Christopher O. Champion Christopher O. Champion	Vice President, Chief Accounting Officer and Controller	February 27, 2023
/s/ Vicky A. Bailey Vicky A. Bailey	Director	February 27, 2023
/s/ Andrew F. Gould Andrew F. Gould	Director	February 27, 2023
/s/ Carlos M. Gutierrez Carlos M. Gutierrez	Director	February 27, 2023
/s/ William R. Klesse William R. Klesse	Director	February 27, 2023
/s/ Jack B. Moore Jack B. Moore	Director	February 27, 2023
/s/ Claire O'Neill Claire O'Neill	Director	February 27, 2023
/s/ Avedick B. Poladian Avedick B. Poladian	Director	February 27, 2023
/s/ Robert M. Shearer Robert M. Shearer	Director	February 27, 2023

Occidental Petroleum Corporation Savings Plan

Amended and Restated Effective as of January 1, 2023

Article 1. Introduction

1.1 Restatement of Plan

Effective as of January 1, 2023, Occidental Petroleum Corporation ("Company") hereby amends and restates the Occidental Petroleum Corporation Savings Plan ("Plan") to make amendments and changes as reflected herein. The provisions of this restatement shall be effective as of January 1, 2023, except as follows or as otherwise specifically provided in this document. Where a particular provision of this restatement has an effective date earlier than January 1, 2023, the relevant provision of this restatement shall supersede the corresponding provision of the prior version of the Plan as of the earlier effective date. Where a particular provision of this restatement has an effective date later than January 1, 2023, the relevant provision of the prior version of the Plan shall continue to apply prior to such effective date.

1.2 Purpose and Applicability of the Plan

This Plan is intended to encourage and assist Eligible Employees in adopting a regular program of savings to provide additional security for their retirement. Except as otherwise provided herein, the provisions of this Plan restatement are applicable only to Eligible Employees on or after January 1, 2023. Unless otherwise explicitly provided in this Plan restatement, the Plan provisions in effect prior to this restatement shall continue to govern the terms and conditions of the Plan prior to January 1, 2023.

Notwithstanding any contrary Plan provision, if any modification of ERISA or the Code (or regulations or rulings thereunder) requires that a conforming Plan amendment be adopted as of a stated effective date in order for the Plan to continue to be a qualified plan, this Plan shall be operated in accordance with such requirements until the date when a conforming Plan amendment is adopted.

1.3 Structure of the Plan

The Plan is intended to qualify as a stock bonus plan under Code section 401(a) that includes a qualified cash or deferred arrangement under Code section 401(k)(2).

Effective June 1, 2002, to enable the deduction on dividends paid on certain employer securities as permitted by Code section 404(k), the Matching Accounts, or portions thereof, invested in the Oxy Stock Fund under the Plan, at any point in time and in the aggregate, are intended to qualify, and are hereby designated, as an employee stock ownership plan ("ESOP"), within the meaning of Code section 4975(e)(7). Effective July 19, 2007, to expand the availability of the deduction on dividends paid on employer securities as permitted by Code section 404(k), the ESOP is expanded to include the Oxy Stock Fund and the portions of Matching Accounts not invested in the Oxy Stock Fund shall cease to constitute part of the ESOP. On or before July 18, 2007, the Matching Accounts, or portions thereof, invested in the Oxy Stock Fund under the Plan, at any point in time, taken together, and effective on or after July 19, 2007, all assets invested in the Oxy Stock Fund at any point in time, regardless of funding source, constitute an "eligible individual account plan," as defined in ERISA section 407(d)(3), which explicitly provides for the acquisition and holding of and investment primarily in shares of Oxy Stock which constitute "qualifying employer securities," as described in Code section 4975(e)(8), and "employer securities," as defined in Code section 409(l).

The Company intends that the Plan and the ESOP together shall constitute a single plan under ERISA and the Code. Accordingly, the provisions set forth in the other sections of the Plan shall apply to the ESOP in the same manner as those provisions apply to the remaining portions of the Plan, except to the extent that those provisions are by their terms inapplicable to the ESOP, or to the extent that they are inconsistent with the specific provisions set forth herein. Except as set forth in specific provisions herein that are related to the ESOP, including but not limited to Plan section 9.5, the designation of any portion of the Plan constituting part of the ESOP shall not affect any Beneficiary designations or any other applicable agreements, elections or consents that Participants, Spouses, Alternate Payees or Beneficiaries validly executed under the terms of the Plan before June 1, 2002, the effective date of the ESOP; and such designations, agreements, elections, and consents shall apply under the ESOP in the same manner as they apply under the Plan.

Article 2. Definitions and Construction

2.1 Definitions

Whenever used in the Plan, the following terms shall have the respective meanings set forth below, unless otherwise expressly provided; and when the defined meaning is intended, the term is capitalized.

(a) **"Account"** means the separate recordkeeping account maintained for each Participant which represents his or her total proportionate interest in the Trust Fund and which consists of the sum of following:

(1) After-Tax Account;

(2) After-Tax Rollover Account;

(3) In-Plan Roth Rollover Account;

(4) Matching Account;

(5) Pre-Tax Account;

(6) Rollover Account;

(7) Roth Account; and

(8) Roth Rollover Account.

The term "Account" shall also include any separate account established on behalf of an Alternate Payee pursuant to a Qualified Domestic Relations Order or a Beneficiary following the Participant's death.

(b) **"Accounting Date"** means any day on which trading occurs on the New York Stock Exchange.

(c) **"ACP Test"** means the average contribution percentage test performed in accordance with Plan section 6.4.

(d) **"Active Participant"** means any Eligible Employee who:

(1) Has met the requirements to become a Participant as set forth in Article 3,

(2) Continues to be employed as an Eligible Employee, and

(3) Has not become an Inactive Participant or Former Participant.

(e) **"Actual Deferral Percentage"** means, for each group of Participants for any period, the average of the ratios (calculated separately for each Participant in each group) of Pre-Tax Deferrals and/or Roth Contributions taken into account under the rules of this paragraph made on behalf of the Participant for the Plan Year to that Participant's Testing Compensation earned while a Participant for the Plan Year. Such ratios and the Actual Deferral Percentage for each group shall be calculated to the nearest one-hundredth of 1 percent of a Participant's Testing Compensation. If Pre-Tax Deferrals or Roth Contributions cannot be taken into account under the ADP Test because they do not meet the following rules, then such amount must satisfy the nondiscrimination requirements of Code section 401(a)(4) for the Plan Year for which they are made. The following rules shall apply in determining the Average Deferral Percentages:

(1) Pre-Tax Deferrals and Roth Contributions shall be taken into account for the Plan Year in determining a Participant's Actual Deferral Percentage only if all of the following requirements are met:

(A) The Pre-Tax Deferral and/or Roth Contribution is allocated as of a date in the Plan Year and the allocation is not contingent on the Participant's participation in the Plan or performance of services for an Employer after the allocation date.

(B) The Pre-Tax Deferral and/or Roth Contribution is contributed to the Trust Fund no more than 12 months after the last day of the Plan Year.

(C) The Pre-Tax Deferral and/or Roth Contribution is made on account of the Participant's election to reduce Earnings that would otherwise be paid within that Plan Year. Notwithstanding the foregoing, to the extent elected by the Administrative Committee on a uniform basis, Pre-Tax Deferrals and/or Roth Contributions may be taken into account for the Plan Year if they are attributable to services performed during the Plan Year and, but for the Participant's election to reduce Earnings, would have been received by the Participant after the last day of the Plan Year but within $2^1/2$ months after the last day of the Plan Year. If the Administrative Committee makes this election for a Plan Year, then the Pre-Tax Deferrals and/or Roth Contributions shall be taken into account only in the ADP Test (or the ACP Test) for that Plan Year and shall not be taken into account in the ADP Test (or the ACP Test) for any other Plan Year.

(2) If any Highly Compensated Employee is a participant under two or more qualified cash or deferred arrangements of the Company or any Affiliate (including this Plan), all such cash or deferred arrangements shall be treated as one such arrangement for purposes of determining the Actual Deferral Percentage of the Highly Compensated Employee, except as provided in Treasury Regulations section 1.401(k)-2(a)(3)(ii).

(3) Pre-Tax Deferrals and/or Roth Contributions of Highly Compensated Employees for the Plan Year shall include Excess Deferrals, whether or not such Excess Deferrals are distributed under Plan section 6.1.

(4) Pre-Tax Deferrals and/or Roth Contributions taken into account under the ACP Test of Plan section 6.4 for the Plan Year shall not be taken into account under the ADP Test of this Plan section for the same or any other Plan Year.

(5) Pre-Tax Deferrals and/or Roth Contributions made pursuant to Code section 414(u) shall not be taken into account for purposes of the ADP Test (or the ACP Test) for the Plan Year in which they are made or in any other Plan Year.

(f) **"ADP Test"** means the actual deferral percentage test performed in accordance with Plan section 6.2.

(g) **"Adjustment Contributions"** means Pre-Tax Deferrals and/or Roth Contributions which are recharacterized as After-Tax Contributions in order to comply with nondiscrimination tests of Code sections 401(k) and 401(m), as described in Plan sections 6.2 and 6.4. To the extent required by Treasury Regulations section 1.401(m)-2(b)(3), Adjustment Contributions after recharacterization shall be treated as:

(1) After-Tax Contributions for purposes of Code sections 72, 401(a)(4), and 401(m); and

(2) Pre-Tax Deferrals and/or Roth Contributions for purposes of Code sections 401(a) (other than Code sections 401(a)(4), 401(k), and 401(m)), 404, 409, 411, 415, 416, and 417.

(h) **"Administrative Committee"** means the committee whose members are appointed by the Fiduciary Appointment Officer to administer the Plan in accordance with the applicable provisions of this Plan, including Article 12.

(i) "**Affiliate**" means:

(1) Any business entity while it is controlled by or under common control with the Company within the meaning of Code sections 414 and 1563, or

(2) Any member of an affiliated service group, within the meaning of Code section 414(m), of which the Company or any Affiliate is a member; and

(3) Any entity which, pursuant to Code section 414(o) and related Treasury Regulations, must be aggregated with the Company or any Affiliate for plan qualification purposes.

For purposes of paragraph (1), the determination of control shall be made without reference to paragraphs (a)(4) and (e)(3)(C) of Code section 1563. For the purposes of applying the limitations of Plan sections 2.1(sss) and 6.6, the phrase "more than 50 percent" shall be substituted for the phrase "at least 80 percent" each place it appears in Code section 1563(a)(1).

(j) **"After-Tax Account"** means the recordkeeping account which evidences the value of After-Tax Contributions and any Adjustment Contributions, including related investment gains and losses of the Trust Fund.

(k) **"After-Tax Contributions"** means the voluntary contributions made by a Participant to the Plan on an after-tax basis, as described in Plan section 4.1.

(l) **"After-Tax Rollover Account"** means the recordkeeping account which evidences the value of After-Tax Rollover Contributions, including related investment gains **and** losses of the Trust Fund.

(m) **"After-Tax Rollover Contributions"** means the eligible after-tax contributions **made** at the direction of the Employee pursuant to Plan section 10.12 on or after January 1, 2020.

(n) **“Alternate Payee”** means, with respect to a Participant, any Spouse, former Spouse, child, or other dependent of that Participant, who is an alternate payee, within the meaning of Code section 414(p)(8), and who is recognized by a Qualified Domestic Relations Order as having the right to receive all or a portion of the benefits payable under the Plan with respect to the Participant.

(o) **“Annual Addition”** means the sum of the amounts described in Plan section 6.6(b).

(p) **“Annual Bonus”** means up to the first $100,000 of bonus paid from an Employer to an Active Participant, who is not a “named executive officer,” as that term is defined in Regulations S-K under the Securities Exchange Act of 1934 (17 CFR §229.402(a)(3)), during the Plan Year under a regular annual incentive compensation plan, such as the Company’s Variable Compensation Program or Incentive Compensation Program (but excluding without limitation a special individual or group bonus, a project bonus, and any other special bonus).

(q) **“Average Contribution Percentage”** means, for each group of Participants for any period, the average of the ratios (calculated separately for each Participant in each group) of the sum of Matching Contributions, After-Tax Contributions, and Adjustment Contributions made on behalf of the Participant for the Plan Year to that Participant’s Testing Compensation earned while a Participant for the Plan Year. Such ratios and Average Contribution Percentage for each group shall be calculated to the nearest one-hundredth of 1 percent of an Eligible Employee’s Testing Compensation. If Matching Contributions, After-Tax Contributions or Adjustment Contributions cannot be taken into account under the ACP Test because they do not meet the following rules, then such amount must satisfy the nondiscrimination requirements of Code section 401(a)(4) for the Plan Year for which they are made. The following rules shall apply in determining the Average Contribution Percentages:

(1) After-Tax Contributions shall be taken into account in determining a Participant’s Average Contribution Percentage for the Plan Year that the After-Tax Contributions are transferred to the Trust Fund. For this purpose, an After-Tax Contribution is treated as transferred to the Trust Fund at the time it would have been paid to the Participant if it is transferred to the Trust Fund within a reasonable time after the amount is withheld from the Participant’s Earnings.

(2) Adjustment Contributions are taken into account in determining a Participant’s Average Contribution Percentage for the Plan Year in which the Adjustment Contributions are includible in the gross income of the Participant.

(3) Matching Contributions are taken into account in determining a Participant’s Average Contribution Percentage for the Plan Year only if all of the following are met:

(A) The Matching Contribution is made on account of the Participant's Pre-Tax Deferrals, Roth Contributions or After-Tax Contributions for the Plan Year.

(B) The Matching Contribution is allocated to the Participant's Matching Account as of a date within the Plan Year.

(C) The Matching Contribution is transferred to the Trust Fund no more than 12 months after the last day of the Plan Year.

(4) Any Matching Contributions that are forfeited because the Pre-Tax Deferrals, Roth Contributions or After-Tax Contributions to which they relate are determined to be an Excess Deferral, an Excess Contribution, or an Excess Aggregate Contribution for the Plan Year are not taken into account in determining a Participant's Average Contribution Percentage for the Plan Year.

(5) If any Highly Compensated Employee is a participant under two or more Qualified Plans of the Company or any Affiliate (including this Plan) that provide for matching contributions or after-tax contributions, all such contributions made by or on behalf of the Highly Compensated Employee under such Qualified Plans during the 12- month period that coincides with the Plan Year shall be taken into account in determining the Average Contribution Percentage of the Highly Compensated Employee, except as provided in Treasury Regulations
section 1.401(m)-2(a)(3)(ii).

(6) Matching Contributions and After-Tax Contributions made pursuant to Code section 414(u) shall not be taken into account for purposes of the ACP Test for the Plan Year in which they are made or in any other Plan Year.

(7) Subject to the conditions prescribed and to the extent permitted by Treasury Regulations section 1.401(m)-2(a)(6)(ii), the Administrative Committee may elect to take into account Pre-Tax Deferrals and Roth Contributions in computing Average Contribution Percentages.

(r) **"Base Pay"** means the base salary and wages earned by an Active Participant from an Employer for services rendered, including amounts of Pre-Tax Deferrals, Roth Contributions and amounts contributed pursuant to the Pre-Tax Spending Program.

(1) Base Pay does not include:

(A) Bonuses, incentives, overtime, shift differential, and overseas differentials;

(B) Reimbursement for expenses or allowances, including automobile allowances and moving allowances;

(C) Any amount contributed by the Employer (other than Pre-Tax Deferrals, Roth Contributions and amounts contributed pursuant to the Pre-Tax Spending Program) to any pension plan or plan of deferred compensation;

(D) Any amount contributed by an Employer (in addition to Pre-Tax Deferrals, Roth Contributions and Catch-Up Contributions) to this Plan;

(E) Any amount paid by an Employer for other fringe benefits, such as health and hospitalization, and group life insurance benefits, or perquisites; and

(F) Allowances paid during furlough and, for purposes of paragraph (2)(F) below, such furloughs shall not be treated as paid leaves of absence.

(2) Base Pay is determined in accordance with the following rules:

(A) For Active Participants compensated by salary, Base Pay means the actual base salary of record paid to the Active Participant (subject to the exclusions listed above).

(B) For Active Participants compensated based on mileage driven (primarily truck drivers), Base Pay means the number of miles driven multiplied by the applicable mileage pay rate (subject to the exclusions listed above), plus the Active Participant's scheduled number of hours worked in the pay period multiplied by the Active Participant's base hourly rate (subject to the exclusions listed above).

(C) For Active Participants compensated at an hourly rate, Base Pay means the base hourly rate (subject to the exclusions listed above) multiplied by the number of regularly scheduled hours worked in a pay period. If the Active Participant's regularly scheduled work week is more than 40 hours, Base Pay shall include an additional amount equal to the base hourly rate (subject to the exclusions listed above) times one half the number of regularly scheduled hours worked in excess of 40 in the work week.

(D) For Active Participants compensated on an eight, ten, twelve, or some other assigned hour Shift Basis and whose annual Base Pay is pre-determined under the Company's payroll recordkeeping, Base Pay for each pay period shall be the Active Participant's pre-determined annual Base Pay (subject to the exclusions listed above) divided by the number of pay periods applicable to the Active Participant during the Plan Year. For the purpose of this subsection, the term "Shift Basis" means any arrangement whereby Active Participants work the assigned hour daily shifts which may result in alternating work weeks of more and less than 40 hours per week.

(E) Base Pay includes paid time off and vacation pay received in periodic payments and annual paid time off and vacation payments made to Employees paid by commission but does not include single sum paid time off and vacation payments to active or terminating Employees.

(F) Base Pay includes base salary or wages received during paid leaves of absence and periodic notice pay, but, effective July 1, 2006, Base Pay does not include single sum notice pay payments or any severance pay payments.

(G) Base Pay does not include long-term disability payments or payments made to any Participant pursuant to the Occidental Chemical Corporation Weekly Sickness and Accident Plan unless:

(i) Such payments are made to the Participant through the payroll accounting department of the Company or an Affiliate, and

(ii) The Participant is ineligible for participation in the Retirement Plan.

(H) Base Pay includes any payment to a Participant who does not currently perform services for an Employer by reason of qualified military service (within the meaning of Code section 414(u)(1)) to the extent that the payment does not exceed the amount that the Participant would have received if the Participant continued to perform services for the Employer rather than entering qualified military service.

(s) **"Beneficiary"** means the person or persons (who may be named contingently or successively) designated by a Participant, an Alternate Payee, or a Beneficiary of a deceased Participant or a deceased Alternate Payee to receive his or her Account in the event of death.

If no Beneficiary is designated at the time of the Participant's or Alternate Payee's death, or at the time of death of the Beneficiary of a deceased Participant or Alternate Payee, or if no person so designated shall survive the Participant, Alternate Payee, or Beneficiary of a deceased Participant or Alternate Payee, the Beneficiary shall be the deceased person's Spouse, or if the deceased individual has no surviving Spouse, his or her surviving children equally, or if there are no surviving children, his or her surviving parents equally, or if only one parent is living, his or her living parent, or if no parent is living, his or her surviving siblings equally, or if only one sibling is living, his or her surviving sibling, or if no sibling is living, his or her estate.

The designation by a married Participant of someone other than the Participant's Spouse as a Beneficiary shall be invalid unless:

(1) The Spouse consents in writing to the designation of any specific non-Spouse Beneficiary which may not be changed without the Spouse's consent (unless the Spouse's consent expressly permits the Participant to change Beneficiary designations without further consent by the Spouse);

(2) The consent acknowledges the effect of such designation; and

(3) The consent is notarized.

No spousal consent shall be required if it is established to the satisfaction of the Plan representative that such consent cannot be obtained because there is no Spouse or because the Spouse cannot be located.

Notwithstanding the foregoing, where an Employee becomes a Participant through merger of his or her account from another plan into this Plan, "Beneficiary" means the person or persons so designated under such other plan until a new Beneficiary designation is effected as described above by such Employee.

(t) **"Board"** means the Board of Directors of the Company.

(u) "**Catch-Up Contributions**" means the contributions made by the Employer, on or after June 30, 2002, on behalf of an Active Participant, who will have attained age 50 before the last day of the Plan Year, on a Pre-Tax and/or Roth basis as elected by the Participant pursuant to Plan section 4.2. Catch-Up Contributions for the Plan Year may not exceed the limit in effect for such Plan Year under Code section 414(v)(2)(B)(i), as adjusted pursuant to Code section 414(v)(2)(C).

(v) **"Code"** means the Internal Revenue Code of 1986, as amended. Each Code reference in this Plan shall be deemed to include reference to any comparable or succeeding statutory provision which supplements or replaces such Code reference.

(w) **"Company"** means Occidental Petroleum Corporation.

(x) "**Covered Employee**" means a Participant who is covered under the Plan's eligible automatic contribution arrangement under Section 4.6. Prior to October 8, 2019, a Covered Employee will include all Eligible Employees hired on or after August 5, 2016, excluding interns and temporary employees, and on and after October 8, 2019, a Covered Employee will include all Eligible Employees (including Eligible Employees hired prior to August 5, 2016).

(y) **"Disability"** means the disability of:

(1) Any Active Participant who is determined to be disabled under section 423 of Title 42 of the U. S. Code and who receives disability insurance benefits thereunder; or

(2) Any Active Participant who is a participant in the Occidental Petroleum Corporation Long-Term Disability Plan or, prior to March 1, 2002, the OxyVinyls, LP Long-Term Disability Plan and who is determined to be disabled therein under the definition of "disability" applicable to the period beginning 24 months after the commencement of disability and who receives benefits thereunder.

An Active Participant shall be considered to have incurred the Disability as of the time of the commencement of the disability benefits as described above while the Active Participant was an Employee.

A Former Participant shall be considered to have incurred the Disability and retroactively vest upon receipt of more than 18 months of benefits under the Occidental Petroleum Corporation Long-Term Disability Plan.

A Participant who claims to have incurred the Disability as a result of being determined to be disabled under section 423 of Title 42 of the U.S. Code must give written notice thereof to the Administrative Committee and submit, at the expense of the Participant, to the Administrative Committee such evidence of Disability as the Administrative Committee may require. Failure by a Participant to comply with the foregoing requirements shall be deemed conclusive evidence that such Participant has not incurred the asserted Disability. All rules with respect to the determination of Disability shall be uniformly and consistently applied to all Participants in similar circumstances.

(z) **"Earnings"** means the sum of Base Pay and Annual Bonus paid to an Active Participant by an Employer during the Plan Year. Effective for Plan Years beginning after 2001, the annual Earnings of each Participant taken into account in determining allocations for any Plan Year shall not exceed $200,000, as adjusted for cost-of-living increases in accordance with Code section 401(a)(17)(B).

(aa) **"Eligible Dividends"** means, as further described in Plan section 11.2:

(1) Between June 1, 2002 and July 18, 2007, dividends paid on Oxy Stock held in the Oxy Stock Fund attributable to the Participant's Matching Account constituting the ESOP portion of the Plan; and

(2) On or after July 19, 2007, dividends paid on Oxy Stock held in the Oxy Stock Fund constituting the ESOP portion of the Plan.

(3) Eligible Dividends paid on Oxy Stock held in the Oxy Stock Fund attributable the Participant's Matching Account shall be reflected in the Participant's Matching Account. Eligible Dividends paid on Oxy Stock held in the Oxy Stock Fund attributable to other than the Participant's Matching Account shall be reflected for recordkeeping purposes in the After-Tax Account, Pre-Tax Account, Rollover Account, Roth Account or Roth Rollover Account from which the Eligible Dividend is derived.

(bb) "**Eligible** Employee" means any Employee who is employed by an Employer, unless excluded under one or more of the following categories of Employees:

(1) Represented Employees where retirement benefits were the subject of good faith bargaining between the Employer and the union, unless the collective bargaining agreement covering the Represented Employees expressly provides participation in the Plan. Represented Employees covered by collective bargaining agreements providing for their participation in the Plan became Eligible Employees as of the dates noted in Appendix A.

(2) Employees who are nonresident aliens who receive no earned income from the Employer which constitutes U.S.-source income under Code section 861(a)(3), unless the Administrative Committee expressly makes the Plan available to such an Employee.

(3) Leased Employees.

(4) Employees of Occidental Oil and Gas Corporation who immediately before January 1, 2008 were eligible employees under the THUMS Long Beach Company Savings and Investment Plan (as defined in that plan) and who thus continue to participate under that plan. Notwithstanding the previous sentence, effective July 1, 2008, Employees of Occidental Oil and Gas Corporation who immediately before July 1, 2008 were eligible employees under the THUMS Long Beach Company Savings and Investment Plan (as defined in that plan) shall be Eligible Employees under this Plan.

(5) Effective August 8, 2019, any Employee of Anadarko Petroleum Corporation who is not a citizen or legal resident of the United States and is not regularly employed at a worksite of Employer within the United States.

(cc) **"Employee"** means any person employed by the Company or an Affiliate.

Notwithstanding any other provision of this subsection, no individual shall be an Employee if such individual is not classified as a common-law employee in the employment records of the Company or an Affiliate, without regard to whether the individual is subsequently determined to have been a common-law employee of the Company or an Affiliate. The persons excluded by this paragraph from being Employees are to be interpreted broadly to include and to have at all times included individuals engaged by the Company or an Affiliate to perform services for such entity in a relationship that the entity characterizes as other than an employment relationship, such as where the Company or the Affiliate engages the individual to perform services as an independent contractor or leases the individual's services from a third party. The exclusion of the individual from being an Employee shall apply even if a determination is subsequently made by the Internal Revenue Service, another governmental agency, a court or other tribunal, after the individual is engaged to perform such services, that the individual is an Employee of the Company or Affiliate for purposes of pertinent Code sections or for any other purpose.

(dd) **Employer"** means the Company and any Affiliate which is designated, in accordance Article 14, by the Board or, if authorized by the Board, the Administrative Committee and which adopts the Plan. Affiliates which are not corporations are not eligible to be Employers under the Plan.

(ee) **"ESOP" means**, as further described in Plan section 1.3:

(1) Between June 1, 2002 and July 18, 2007, the portion of the Plan comprised of the Matching Accounts, or portions thereof, invested in the Oxy Stock Fund under the Plan, at any point in time and in the aggregate, and

(2) On or after July 19, 2007, the Oxy Stock Fund, at any point in time and in the aggregate.

(ff) **"Excess Aggregate Contribution"** means the amount contributed by or on behalf of a Highly Compensated Employee in excess of the ACP Test limit, as specified in Plan section 6.5.

(gg) **"Excess Contribution"** means the amount deferred by a Highly Compensated Employee in excess of the ADP Test limit, as specified in Plan section 6.3.

(hh) **Excess Deferral”** means the amount deferred by a Participant on a Pre-Tax or Roth basis in excess of the dollar limit specified in Plan section 6.1.

(ii) "**ERISA”** means the Employee Retirement Income Security Act of 1974, as from time to time amended. Each ERISA reference in this Plan shall be deemed to include reference to any comparable or succeeding statutory provision which supplements or replaces such ERISA reference.

(jj) **“Fiduciary Appointment Officer”** means the Vice President of Human **Resources** of the Company (or the successor to such position) or his or her designee.

(kk) **“Former Participant”** means an Active Participant or Inactive Participant who has had a Separation from Service, but whose Account has not been fully distributed.

(ll) **“Highly Compensated Employee”** means an Employee described in Code section 414(q) and includes any Employee who:

(1) Was a 5-percent owner (as defined in Code section 416(i)(1)(B)(i)) at any time during the Plan Year or the preceding Plan Year; or

(2) For the preceding Plan Year, received Section 415 Compensation in excess of $80,000 (as adjusted by reference to Code section 414(q)(1)) and, with respect to Plan Years commencing on and after January 1, 2020, was a member of the top- paid group during the look back year.

Employees who are nonresident aliens and who receive no U.S.-source income shall not be counted as Employees when identifying Highly Compensated Employees. In determining Highly Compensated Employees, the Administrative Committee may make any of the elections permitted under Code section 414(q), IRS Notice 97-45 and any future guidance provided by the Internal Revenue Service.

A Former Participant shall be treated as a former Highly Compensated Employee if the Participant was a Highly Compensated Employee in a separation year, as defined in Treasury Regulations section 1.414(q)–1T, Q&A 5, or after the date on which the participant attained age 55.

The top-paid group consists of the top 20% of Employees ranked on the basis of Section 415 Compensation received during the look-back year. For purposes of determining the number of Employees in the top-paid group, the following shall be excluded: (A) any Employee who is a nonresident alien with respect to the United States who receives no income with a source within the United States from the Company or any Affiliate; (B) any Employee who has not completed at least six (6) months of service at the end of the year; (C) any Employee who normally works less than $17^1/2$ hours per week; (D) any Employee who normally works no more than six months during any year; and (E) any Employee who has not attained the age of twenty one (21) at the end of the year.

(mm) **“Inactive Participant**” means an Employee who was an active Participant but who is transferred to and is in a position of employment where he is no longer an Eligible Employee, as described in Plan section 3.3(b).

(nn) **“In-Plan Roth Rollover Account”** means the recordkeeping account which evidences the value of In-Plan Roth Rollover Contributions, including gains and losses of the Trust Fund.

(oo) **“In-Plan Roth Rollover Contributions”** means the eligible contributions made at the direction of the Employee in accordance with Code section 402A(c)(4) and Plan section 7.8.

(pp) **“Investment Committee”** means the committee whose members are appointed by the Fiduciary Appointment Officer to administer the investments of the Plan.

(qq) **“Investment Fund”** means funds that have been approved by the Investment Committee for investment in the Trust Fund and includes the Oxy Stock Fund. The Investment Committee may, from time to time in its discretion and in exercise of its fiduciary responsibilities, select different funds, add to the set of available funds, close funds to new investment, or remove one or more funds (except the Oxy Stock Fund).

(rr) **“Leased Employee”** means any person within the meaning of Code section 414(n)(2) who is not reported **on** the payroll records of the Company or any Affiliate as a common law employee and who provides services to the Company or an Affiliate, but only if the services are provided under an agreement between the Company or Affiliate and a leasing organization, the person has performed services for the Company and Affiliates on a substantially full time basis for a period of at least one year, and the services are performed under the primary direction or control of the Company or Affiliate that is the service recipient.

Contributions or benefits provided to a Leased Employee by the leasing organization which are attributable to services performed for the Company and Affiliates will be treated as provided by the Company or Affiliate. If a Leased Employee subsequently becomes an Eligible Employee, Service as a Leased Employee will be credited under the Plan to the extent required by Code section 414(n).

Notwithstanding the foregoing, an individual will not be a Leased Employee for a Plan Year for nondiscrimination testing or for any other purpose, if either paragraph
(1) or (2) is applicable to that individual for that Plan Year.

(1) The individual is covered by a money purchase pension plan meeting the requirements of Code section 414(n)(5)(B) and Leased Employees, determined without regard to the limitation in this paragraph, do not constitute more than 20% of all Non-highly Compensated Employees of the Company and all Affiliates.

(2) All requirements of this paragraph are satisfied for that Plan Year and each previous Plan Year with respect to which Code section 414(n) was effective with respect to the Company or any Affiliate.

(1) The Qualified Plans of the Company and all Affiliates exclude Leased Employees from participation and no such Qualified Plan is top-heavy (within the meaning of Code section 416);

(2) The number of leased persons, providing services to the Company and all Affiliates during the Plan Year, is less than 5% of the number of Employees (excluding such leased persons and Highly Compensated Employees) covered by any Qualified Plan maintained by the Company or any Affiliate at any time during such Plan Year. An individual is a leased person for this purpose if all of the following requirements are satisfied:

(i) During the Plan Year, the individual performs any services for the Company or any Affiliate, other than as an Employee, and the requirements of Code section 414(n)(2)(A) (relating to performing

services pursuant to an agreement with the Company or any Affiliate) and Code section 414(n)(2)(C) (relating to performing services under the primary direction or control of the Company or any Affiliate) are satisfied.

(ii) During the Plan Year, the individual is credited with at least 1,500 hours of service, including service performed as an Employee and in any other capacity. For purposes of this subparagraph, "hours of service" has the same meaning as the term "hour of service" provided by Department of Labor Regulations section 2530.200b-2. If one of the equivalencies set forth in Department of Labor Regulations section 2530.200b-3 is used, such equivalency shall be used on a reasonable and consistent basis and the 1,500-hour requirement must be adjusted accordingly. With respect to determining whether an individual has satisfied the 1,500-hour requirement, reasonable approximations may be made.

(iii) The individual either:

(I) Is not covered under a Qualified Plan as an Employee at any time during the Plan Year; or

(II) Performs at least 501 hours of service (reasonably adjusted if one of the equivalencies set forth in Department of Labor Regulations section 2530.200b–3 is used) for the Company or any Affiliate other than as an Employee.

(3) The Administrative Committee has not been notified by the leased person and provided satisfactory evidence by the leased person that he or she is a Leased Employee.

(ss) **Nonhighly Compensated Employee**" means an Employee who is not a Highly Compensated Employee.

(tt) **"Nonrepresented Employees"** means any Employee who is not a Represented Employee.

(uu) **"Matching Account"** means the recordkeeping account which evidences the value of **Matching** Contributions and the value of Eligible Dividends paid on

Oxy Stock held in the Participant's Matching Account, including related investment gains and losses of the Trust Fund.

(vv) **"Matching Contributions"** means the contributions made by the Employer pursuant to Plan section 5.2 on account of Pre-Tax Deferrals, Roth Contributions or After-Tax Contributions made on behalf of or by the Participant.

(ww) "**MidCon Corp. ESOP**" means the MidCon Corp. Employee Stock Ownership Plan as effective November 20, 1996.

(xx) **"Oxy Stock"** means the common stock of Occidental Petroleum Corporation, which is the class of stock having the greatest voting power and dividend rights. Oxy Stock is readily tradable on established securities market within the meaning of Treasury Regulation section 1.401(a)(35)-1(f)(5) for purposes of Code sections 401(a)(22), 401(a)(28)(C), 409(h)(1)(B), 409(l) and 1042(c)(1)(A).

(yy) **"Oxy Stock Fund"** means the Investment Fund that is invested primarily in Oxy Stock and such short-term interest-bearing securities as the Investment Committee or the Trustee considers advisable.

(zz) **"Participant"** means an Active Participant, Inactive Participant, or a Former Participant, as applicable.

(aaa) **"Plan Administrator"** for purposes of ERISA and the Code means the Administrative Committee.

(bbb) **"Plan Amendment Officer"** means the Senior Vice President, Business Support of the Company (or the successor to such position) or his or her designee. On and after July 30, 2020, the Plan Amendment Officer means Mark Grommesh.

(ccc) **"Plan Year"** means the calendar year.

(ddd) **"Pre-Tax Account"** means the recordkeeping account which evidences the value of Pre- Tax Deferrals, including related investment gains and losses of the Trust Fund.

(eee) **"Pre-Tax Deferrals"** means the contributions made by the Employer on behalf of the Participant on a Pre-Tax basis as elected by the Participant pursuant to Plan section 4.1.

(fff) **"Pre-Tax Spending Program"** means the Occidental Petroleum Corporation Flexible Spending Accounts Plan.

(ggg) **"Qualified Domestic Relations Order"** means a qualified domestic relations order, within the meaning of Code section 414(p), which creates or recognizes the existence of an Alternate Payee's right to, or assigns to an Alternate Payee the right to, receive all or a portion of the benefits payable to a Participant.

(hhh) "**Qualified Plan**" means a plan, other than this Plan, which is qualified under Code section 401(a).

(iii) **"Represented Employee"** means any Employee, whose employment is subject to a collective bargaining agreement.

(jjj) **"Retirement Plan"** means the Occidental Petroleum Corporation Retirement Plan.

(kkk) **“Rollover Account”** means the recordkeeping account which evidences the value of Rollover **Contributions**, including related investment gains and losses of the Trust Fund.

(lll) **“Rollover Contributions”** means the eligible pre-tax contributions made at the direction of the Employee pursuant to Plan section 10.12.

(mmm) (“**Roth Account**” means the recordkeeping account which evidences the value of Roth Contributions, including related **investment** gains and losses of the Trust Fund, but excluding any forfeitures.

(nnn) “**Roth Contributions**” means the contributions made by the Employer on behalf of the Participant on an after-tax basis as elected by the Participant pursuant to Plan section 4.1. A Participant’s Roth Contributions will be separately accounted for, as will gains and losses attributable thereto, in a separate account. Roth Contributions are not considered After-Tax Contributions for Plan purposes.

(ooo) “**Roth Rollover Account**” means the recordkeeping account which evidences the value of Roth Rollover Contributions, including related investment gains and losses of the Trust Fund.

(ppp) “**Roth Rollover Contributions**” means an eligible rollover contribution of any payment or distribution from another Roth rollover account of the Employee. A Participant’s Roth Rollover Contributions will be maintained in a separate account which includes any earnings properly allocable to such contributions and that will have separate recordkeeping.

(qqq) **“Separation from Service”** means any termination of the employment relationship between an Employee and the Company and all Affiliates. A Separation from Service shall be deemed to occur upon the earlier of:

(1) The date upon which the Employee quits, is discharged, is laid off, incurs a Disability, or dies; or

(2) The first anniversary of the first day of a period in which the Employee is (and remains) absent from the Service for any reason (such as paid time off, vacation, sickness, or approved leave of absence) not enumerated in
paragraph (1), provided that if an Employee is granted a leave of absence but fails to return to employment at the end of the leave period, Separation from Service will be deemed to have occurred upon the date the Employee was originally granted a leave of absence.

(3) Notwithstanding paragraph (2), the Separation from Service date of an Employee who is absent from Service beyond the first anniversary of the first day of absence by reason of a maternity or paternity leave is the second anniversary of the first day of such absence. The period between the first and second anniversaries of the first day of absence from work is neither a period of Service nor a period of severance. For purposes of this paragraph, an absence from work for maternity or paternity reasons means an absence:

(a) By reason of the pregnancy of the individual;

(b) By reason of the birth of a child of the individual;

(c) By reason of the placement of a child with the individual in connection with the adoption of such child by such individual; or

(d) For purposes of caring for such child for a period beginning immediately following such birth or placement.

Effective for distributions after December 31, 2001, a transaction constituting a severance of employment, within the meaning of Code section 401(k)(2)(B)(i)(I), with respect to an Employee shall also be deemed to be a Separation from Service.

An Employee of an Employer who transfers to an Affiliate that is not an Employer shall not be treated as having a Separation from Service. Moreover, an Employee's date of quit or discharge shall not be deemed to occur until any periodic notice payments, short-term disability payments, or weekly sickness and accident payments cease.

An Employee who is on leave of absence in order to serve the Armed Forces of the United States shall not have a Separation from Service unless the Employee fails to report for work at the end of such leave and prior to expiration of the period in which the Employee has reemployment rights under law. The absence of any Employee who fails to return to work within the allotted time shall be subject to the provisions of paragraph (2).

(rrr) **"Service"** means the periods of employment credited using the elapsed time method described to an Employee under Plan section 3.4.

(sss) **"Section 415 Compensation"** means, with respect to a Participant for the period specified, the total cash and non-cash remuneration paid to a Participant by the Employer or an Affiliate, determined as follows:

(1) Section 415 Compensation includes all amounts described in Treasury Regulations section 1.415–2(d)(2), including:

(1) All wages; bonuses; other amounts received (without regard to whether the amount is paid in cash) for personal services actually rendered in the course of employment with the Company or any Affiliate, to the extent that the amounts are includible in gross income for federal income tax purposes and for which the Company or Affiliate is required to furnish to the Participant a written statement under Code sections 6041(d), 6051(a)(3), and 6052;

(2) Amounts paid or reimbursed by the Company or Affiliate for moving expenses incurred by the Participant, but only to the extent that at the time of the payment it is reasonable to believe that these amounts are not deductible by the Participant under Code section 217; and

(3) The value of a nonqualified stock option granted to the Participant by the Company or Affiliate, but only to the extent that the value of the option is includible in the gross income of the Participant, for federal income tax purposes, for the taxable year in which granted.

(2) In addition, Section 415 Compensation includes all of the following:

(1) The Participant's Pre-Tax Deferrals, Roth Contributions and Catch-Up Contributions for the Plan Year;

(2) Elective contributions that are excluded from the Participant's gross income under a Code section 125 cafeteria plan maintained by the Participant's Employer, such as the Pre-Tax Spending Program; and

(3) Any elective deferral, as defined in Code section 402(g)(3), made under a plan maintained by the Company or any Affiliate, and any amount which is contributed to or deferred by the Company or any Affiliate at the election of the Participant and which is not includible in the gross income of the Participant by reason of Code sections 125, 132(f)(4), 408(k), or 457.

(4) Effective July 1, 2006, Section 415 Compensation includes remuneration paid by the later of $2^1/2$ months after an Employee's Separation from Service or the end of the Plan Year that includes the date of the Employee's Separation from Service with the Company or an Affiliate, if:

(i) The payment is regular compensation for services during the Employee's regular working hours, or compensation for services outside the employee's regular working hours (such as overtime or shift differential), commissions, bonuses, or other similar payments, and, absent a Separation from Service, the payments would have been paid to the Employee while the Employee continued in employment with the Company or an Affiliate;

(ii) The payment is for unused accrued bona fide sick, paid time off, vacation or other leave that the Employee would have been able to use if there had not been a Separation from Service;

(iii) The payment is to an individual who does not currently perform services for the Company or any Affiliate by reason of qualified military service (within the meaning of Code section 414(u)(1)) to the extent the payment does not exceed the amount the individual would have received if the individual had continued to perform services for the Company or an Affiliate rather than entering qualified military service; or

(iv) Compensation paid to a Participant who is permanently and totally disabled (as defined in Code section 22(e)(3)), provided that salary continuation applies to all Participants who are permanently and totally disabled for a fixed or determinable period.

Any payment not described above shall not be considered Section 415 Compensation if paid after a Separation from Service, even if paid by the later of 2½ months after the Separation from Service or the end of the Plan Year that includes the Separation from Service. Back pay shall be treated as Section 415 Compensation for the Plan Year to which the back pay relates to the extent the back pay represents wages and compensation that would otherwise be included under this definition.

(3) However, Section 415 Compensation excludes all amounts described in Treasury Regulations section 1.415–2(d)(3), including the following amounts:

(1) Any contributions made by the Company or any Affiliate to a plan of deferred compensation to the extent that, before the application of the limitations of Code section 415 to that plan, the contributions are not includible in the gross income of the employee for the taxable year in which contributed;

(2) Distributions from a plan of deferred compensation, regardless of whether such amounts are includible in the gross income of the employee when distributed; provided, however, that distributions from and any amounts received by the Participant pursuant to an unfunded nonqualified plan are included in Section 415 Compensation in the year the amounts are includible in the gross income of the Participant;

(3) Amounts realized from the exercise of a nonqualified stock option, or when restricted stock or property held by the Participant either becomes freely transferable or is no longer subject to a substantial risk of forfeiture;

(4) Amounts realized from the exercise of an incentive stock option, as defined in Code section 422, or the sale, exchange, or other disposition (including a disqualifying disposition) of stock acquired through the exercise of an incentive stock option;

(5) Amounts realized from the sale, exchange, or other disposition of stock acquired under an employee stock purchase plan, as defined in Code section 423; and

(6) Other amounts which receive special tax benefits, such as premiums for group- term life insurance, but only to the extent that the premiums are not includible in the gross income of the employee for federal income tax purposes.

(ttt) **"Spouse"** means the individual of the opposite sex and, effective as of June 26, 2013, also includes an individual of the same sex, to whom a Participant is married, where the marriage was valid at the time the marriage ceremony was performed, in a state or foreign jurisdiction (the "Jurisdiction") having legal authority to sanction such marriage, provided that such marriage has not subsequently been legally dissolved. For purposes of the Plan, such a marriage shall be treated as valid even if the couple is domiciled in a Jurisdiction that does not recognize the validity of the marriage. Notwithstanding the foregoing, for the period beginning June 26, 2013 and ending September 15, 2013, the Plan may be administered to recognize only those marriages between members of the same sex where the couple was domiciled in a Jurisdiction where the validity of the marriage was recognized during such period. For purposes of the Plan, the term "marriage" does not include a registered domestic partnership, civil union or other similar formal relationship recognized under the laws of a Jurisdiction but which is not recognized as a marriage under that Jurisdiction, even if state law provides that persons in these relationships have the same rights, protections, and benefits, under state law, as married persons.

(uuu) **"Stable Value Fund" means** the fund selected by the Investment Committee that is invested in stable value contracts which state a given interest rate to be paid on account balances.

(vvv) **"Supplemental Plan Participant" means** a Participant in this Plan who is or was also a participant in the Occidental Petroleum Corporation Supplemental Retirement Plan, effective through December 31, 2004, or the Occidental Petroleum Corporation Supplemental Retirement Plan II, effective as of January 1, 2005, as determined under Appendix F to this Plan.

(www) **"Testing Compensation"** means, for purposes of the ADP Test and ACP Test, compensation within the meaning of Code section 414(s)(1), except that the Administrative Committee may elect not to include in such compensation any amount which is contributed by the Employer pursuant to a salary reduction agreement and which is not includible in gross income of the Employee under Code section 125, 132(f)(4), 402(e)(3), 402(h), or 403(b).

(xxx) **"Total Excess Aggregate Contributions"** means the total amount of Excess Aggregate Contributions to be corrected to satisfy the ACP Test for the Plan Year as determined under Plan section 6.5(b).

(yyy) "**Total Excess Contributions**" means the total amount of Excess Contributions to be corrected to satisfy the ADP Test for the Plan Year as determined under Plan section 6.3(b).

(zzz) **"Treasury Regulations"** means the regulations promulgated by the United States Department of the Treasury under the Code.

(aaaa) **"Trust Agreement"** means any agreement in the nature of a trust established to form a part of the Plan to receive, hold, invest, and dispose of the Trust Fund.

(bbbb) **"Trust Fund"** means the assets of every kind and description held under any Trust Agreement forming a part of the Plan.

(cccc) **"Trustee"** means any person selected by the Company to act as Trustee under any Trust Agreement at any time of reference. On and after March 25, 2020, the Administrative Committee shall have the authority to select the Trustee in accordance with the applicable provisions of this Plan, including Article 12.

(dddd) **"Unit"** means the unit of measure into which each Investment Fund is divided for purposes of ascertaining the share of each such fund attributable to each Participant, Beneficiary and Alternate Payee.

2.2 Gender and Number

Except as otherwise indicated by the context, any masculine or feminine terminology shall also include the opposite gender, and the definition of any term in the singular or plural shall also include the opposite number.

2.3 Headings

The headings of this Plan are inserted for convenience or reference only, and they are not to be used in the construction of the Plan.

2.4 Requirement to Be in "Written Form"

Various notices provided by the Company, the Administrative Committee, or the Investment Committee and various elections made by a Participant, Spouses, Alternate Payees and Beneficiaries are required to be in written form. Notwithstanding anything to the contrary in this Plan, any notices and elections related to the Plan may be conveyed through an electronic system or any other system approved by the Administrative Committee unless otherwise provided under applicable law or regulatory guidance. Any such notices, forms, and elections provided or made through an electronic medium shall comply with the provisions of Treasury Regulations section 1.401(a)-21.

2.5 Severability

If a provision of this Plan shall be held illegal or invalid for any reason, the illegality or invalidity shall not affect the remaining parts of the Plan, and the Plan shall be construed and enforced as if the illegal or invalid provision had not been included in the Plan.

2.6 Applicable Law

To the extent not preempted by ERISA or other federal law, the Plan and all rights hereunder shall be governed, construed, and administered in accordance with the laws of the State of Texas with the exception that any Trust Agreement shall be construed and enforced in all respects under and by the laws of the state in which the Trustee thereunder is located.

Article 3. Participation, Service and Vesting

3.1 Date of Participation

Each Eligible Employee shall become an Active Participant as of the first day of the month in which the Employee becomes an Eligible Employee. Notwithstanding the foregoing, each Employee who becomes an Eligible Employee pursuant to a purchase or other agreement approved by the Board shall become an Active Participant as of the date, if any, specified in such agreement. A Covered Employee will be notified that he or she is eligible to participate in the Plan at the time he or she becomes an Eligible Employee. If the Covered Employee does not make an affirmative election not to participate in the Plan or return an alternative election pursuant to section 4.1 of the Plan, then Pre-Tax Deferrals will automatically begin to be made on such Covered Employee's behalf as described in section 4.6 of the Plan.

3.2 Duration

An Eligible Employee who becomes an Active Participant shall remain an Active Participant for as long as he remains an Eligible Employee or is entitled to receive any contributions or benefits hereunder.

3.3 Transfers

(a) **Transfers to Eligible Employee Status**. An Employee who transfers to employment as an Eligible Employee shall become an Active Participant on the first day of the month in which such transfer takes place.

(b) **Transfers from Eligible Employee Status**. A Participant who transfers to employment status where he or she no longer is an Eligible Employee shall become an Inactive Participant.

(3) An Inactive Participant is not eligible to make or receive Pre-Tax Deferrals, Roth Contributions, Catch-Up Contributions, After-Tax Contributions (including Adjustment Contributions) or Matching Contribution on Earnings paid after the date of transfer to an ineligible status.

(4) An Inactive Participant shall continue to accrue Service under this Plan. Upon Separation from Service, the Participant's vested interest shall be based on total Service with the Company and all Affiliates.

(5) An Inactive Participant remains eligible to receive in-service withdrawals, subject to the terms of Plan section 7.2, plan loans, subject to the terms of Article 8, and to transfer eligible amounts to his or her Rollover Account, Roth Rollover Account or After-Tax Rollover Account, subject to the terms of Plan section 10.12.

3.4 Service

Service is used to determine a Participant's vested percentage in his or her Matching Account.

(a) **General Rules**. An Employee shall be credited with Service on an elapsed time basis for the period during which the employment relationship exists between the Employee and the Company or any Affiliate, the length of which shall be determined, in completed years and months, during the following periods of time:

(1) Credit shall be given to an Employee for the period of time beginning on the first day of the month in which the individual first becomes an Employee and ending on the last day of the month in which occurs the Employee's Separation from Service.

(2) Credit shall be given to an Employee for each period beginning upon the date the individual has a Separation from Service and ending upon the first day of the month in which the individual first becomes an Employee thereafter but only if the Employee is reemployed within 12 months of the date of such Separation from Service.

(3) Credit shall be given to an Employee after a Separation from Service for any period beginning on the first day of the month in which the Employee first becomes an Employee after rehire and ending on the last day of the month the Employee has a Separation from Service thereafter.

(4) Whenever the total number of years of Service of an Employee must be ascertained under this Plan, all noncontinuous periods of Service which are credited to such Employee shall be aggregated, regardless of the length or any period of Service and regardless of the length of any period between a Separation from Service and rehire. For purposes of aggregating such years of Service, the completed years and months credited to an Employee during any period of Service shall be added to the number of completed years and months credited to the Employee during any other period of noncontinuous Service. This Plan does not disregard periods of Service, even though permitted to do so under Code section 411(a)(6).

(5) Service by any Leased Employee shall be credited under this section should the Leased Employee ever become an Eligible Employee under this Plan.

(b) **Special Rules**. For purposes of determining an Employee's Service under this Plan, the special Service counting rules set forth in Appendix B shall apply to increase, but not decrease, the Service of any Employee.

3.5 Vesting

(a) **Employee Accounts**. A Participant's interest in his or her Pre-Tax Account, Roth Account, After-Tax Account, Rollover Account, Roth Rollover Account, After-Tax Rollover Account and In-Plan Roth Rollover Account shall be fully vested at all times.

(b) **Matching Account**. A Participant's interest in his or her Matching Account shall become vested in accordance with this section, if not vested earlier under the special vesting rules of subsection (c).

(1) Unless vested earlier under the provisions of this section, a Participant shall vest in his or her Matching Account based on the Participant's completed years of Service.

(a) Effective January 1, 2007, a Participant who is first employed by a Company or any Affiliate after 2006, shall have no nonforfeitable right to his or her Matching Account until the Participant completes three years of Service and shall be 100 percent vested in his or her Matching Account when the Participant is credited with three or more years of Service.

(b) Effective January 1, 2007, a Participant who was first employed by the Company or any Affiliate before 2007, shall have the nonforfeitable percentage of his Matching Account determined based on the following table:

Years of Service	Percentage Vested
Less than 1	0%
1	20%
2	40%
3	100%

(C) Effective January 1, 2015, an Active Participant, irrespective of when he or she was first employed by the Company or an Affiliate, shall be 100 percent vested in his or her Matching Account.

(2) Furthermore, a Participant shall become fully vested in his or her Matching Account to the extent required under Code section 411(d)(3) and Plan section 13.2 upon a complete termination of the Plan, a partial termination of the Plan affecting the Participant, or upon a complete discontinuance of contributions to the Plan.

(c) Special Vesting Rules.

(1) Notwithstanding the foregoing, a Participant described in Appendix C shall vest in his or her Matching Account under the provisions of that Appendix C, rather than subsection (b).

(2) A Participant shall at all times be fully vested in any Eligible Dividends with respect to which the Participant is offered a dividend pass-through deduction to the extent required under Plan section 11.2(d)(3). These amounts will be held in either:

(A) The Participant's Matching Account, or

(B) The Participant's Pre-Tax Account, Roth Account, After-Tax Account, Rollover Account, Roth Rollover Account, After-Tax Rollover Account and In-Plan Roth Rollover Account, in which the Participant is always fully vested, based on the account from which the Eligible Dividend is derived.

(3) With respect to any frozen contributions under this Plan or any Qualified Plan that is merged into this Plan, if such contributions resume under this Plan or any Qualified Plan into which this Plan is merged, then for purposes of determining the Participant's nonforfeitable right to such contributions, a Participant shall receive credit for Service incurred both prior to and subsequent to the date such contributions were frozen.

(d) **Vesting and Benefit Payments**. Being vested does not mean that a Participant is entitled to immediate distribution benefits. Benefits under the Plan shall be paid only in accordance with Article 7.

3.6 Forfeiture of Contingent Interests

Any portion of a Participant's Account that is not vested under the provisions of Plan section 3.5 shall be forfeited upon the first to occur of the following forfeitable events:

(a) The Participant elects, in accordance with Plan section 7.3, to commence or receive a distribution of the value of the Participant's vested Account on account of a Separation from Service. For this purpose, if the percentage vested in the table under Plan section 3.5(b)) is zero, the Participant will be deemed to have elected such a distribution and the nonvested portion of the Account will be immediately forfeited.

(b) The Participant incurs five consecutive breaks in service. For this purpose, a break in service is a period of 12 months in which the Participant is absent from Service, except that if the absence is due to a maternity or paternity reason described in Plan section 2.1(qqq)(3), the period between the first and second anniversaries of such absence shall be neither a period of Service nor a period of severance.

If the Participant who has forfeited his non-vested Account resumes employment as an Eligible Employee, then the cash value (determined at the time of forfeiture) of the amount forfeited shall be restored to the Participant's Account. No buyback shall be required and the reinstatement will occur regardless of the length of the Participant's absence from Service.

Article 4. Active Participant Contributions

4.1 Pre-Tax Deferrals, Roth Contributions and After-Tax Contributions

(a) Covered Employees will be automatically enrolled in the Plan as described in Plan section 4.6 below.

(b) Except as otherwise provided in this Plan, each Active Participant may elect to contribute as After-Tax Contributions or to have the Employer contribute on the Participant's behalf as Pre-Tax Deferrals and Roth Contributions an amount of the Participant's Base Pay which together is from 1 percent to the contribution percentage limit specified for the Active Participant in Appendix D for the Plan Year. The Administrative Committee may adjust the contribution percentage limit specified in Appendix D at the beginning of each Plan Year without the need of a formal Plan amendment, provided that any such limitations shall be communicated to eligible Participants in advance of the pay periods to which such limitations will apply. The percentage elected of Pre-Tax Deferrals, Roth Contributions and/or After-Tax Contributions may be in increments of a tenth of a percent.

The Participant's elected Pre-Tax Deferral, Roth Contribution and After-Tax Contribution percentages shall apply, but not in excess of an aggregate of 5 percent, to the Active Participant's Annual Bonus. The Annual Bonus shall be counted for this purpose in the Plan Year it is paid even if it is received for services performed in a prior Plan Year. Effective January 1, 2017, unless the Participant affirmatively elects otherwise, with respect to any Participant hired prior to August 5, 2016, the election in effect as of August 5, 2016 will apply to any Annual Bonus paid in the 2017 Plan Year and any subsequent plan year until the Participant affirmatively elects otherwise.

(c) Notwithstanding anything in this Plan to the contrary, no Participant shall be permitted to have elective deferrals made under this Plan, or any other Qualified Plan maintained by the Company or Affiliates during any taxable year, in excess of the dollar limitation contained in Code section 402(g)(1) in effect for such taxable year, except to the extent permitted under Code section 414(v).

(d) No benefits other than Matching Contributions shall be conditioned on a Participant's election to make After-Tax Contributions or have Pre-Tax Deferrals and Roth Contributions made on the Participant's behalf under this Plan. Any portion of a contribution that is not designated as a Pre-Tax Deferral, Roth Contribution or Catch-Up Contribution shall be designated as an After-Tax Contribution.

(e) The Participant's election made under this section shall be made in accordance with the rules set forth in this Article and such other rules of nondiscriminatory application as the Administrative Committee may prescribe for the proper administration of the Plan.

4.2 Catch-Up Contributions

Each Active Participant who will have attained age 50 before the close of the Plan Year shall be eligible to make Catch-Up Contributions in accordance with and subject to the limitations of Code section 414(v) for pay periods ending after July 1, 2002. Each Participant must elect whether such Catch-Up Contributions will be in the form of Pre-Tax Deferrals or Roth Contributions.

(a) Catch-Up Contributions shall not be taken into account for purposes of the provisions of Plan sections 6.1 and 6.6, implementing the required limitations of Code sections 402(g) and 415, respectively.

(b) The Plan shall not be treated as failing to satisfy the provisions of the Plan sections 6.2, 6.4, or Article 15, implementing the requirements of Code section 401(k)(3), 401(k)(11), 401(k)(12), 410(b), or 416, as applicable, by reason of the making of Catch-Up Contributions.

(c) Elections to make Catch-Up Contributions shall be made separately from the Active Participant's election of Pre-Tax Deferrals or Roth Contributions under Plan section 4.1, shall not be subject to the contribution percentage limit on Pre-Tax Deferrals and Roth Contributions specified in Plan section 4.1, and shall be made in accordance with uniform procedures established by the Administrative Committee. Such election procedures will require the eligible Active Participant to elect Catch-Up Contributions as a fixed dollar amount per pay period.

(d) Under no circumstances will Catch-Up Contributions elected under this Plan section entitle the Participant to Matching Contribution, even if it is later determined that the contribution is not a Catch-Up Contribution because it is less than an applicable limit.

(e) For purposes of recordkeeping and communications with Participants, Catch-Up Contributions, Pre-Tax Deferrals and Roth Contributions may be aggregated and reported as held in the Participant's Pre-Tax Account or Roth Account, as applicable, without changing the character of any Catch-Up Contributions as such for purposes of Code section 414(v).

4.3 Election Procedures

(a) Each Active Participant shall be permitted to make the elections described in Plan section 4.1 and, if eligible, Plan section 4.2 in the manner prescribed by the Administrative Committee. If a Participant has elected to begin, stop, increase, or decrease Pre-Tax Deferrals, Roth Contributions, After-Tax Contributions or, if eligible, Catch-Up Contributions, the Active Participant may file a new election in the manner prescribed by the Administrative Committee to change Pre-Tax Deferrals, Roth Contributions, After-Tax Contributions or, if eligible, Catch-Up Contributions at any time and such election shall become effective on the first pay period following the date on which the election is properly received. The election shall remain in effect until changed by the Active Participant or until he or she ceases to be an Active Participant or goes on an unpaid leave of absence.

(b) If an Active Participant becomes an Inactive Participant or Former Participant, or goes on unpaid leave of absence, any Pre-Tax Deferrals, Roth Contributions, After-Tax Contributions and Catch-Up Contributions for the Participant shall cease. If the individual again becomes an Active Participant or returns from an unpaid leave of absence, he or she may make a new election under this section.

(c) All elections shall apply to Earnings paid in the first available payroll period following the date the election is processed and shall be irrevocable for such period. In addition, except for occasional, bona fide administrative considerations, Pre-Tax Deferrals, Roth Contributions and Catch-Up Contributions made pursuant to such elections cannot precede the earlier of the performance of services relating to the Pre-Tax Deferrals, Roth Contributions or Catch-Up Contributions and the date when the Earnings subject to the election would be currently available to the Participant in the absence of an election to defer.

4.4 Salary Reduction

Each Active Participant who makes a Pre-Tax Deferral or Roth Contribution election described in Plan section 4.1 or, if eligible, a Catch-Up Contribution election described in Plan section 4.2 shall, by the act of making such election or elections, have his or her Earnings reduced by an equivalent amount for so long as the election remains in effect.

4.5 Deposit and Crediting of Deferrals and Contributions

Pre-Tax Deferrals, Roth Contributions, After-Tax Contributions, and Catch-Up Contributions shall be transferred to the Trust Fund as soon as reasonably practicable after the payroll payment date at which a corresponding amount would have been paid to the Participant in the absence of the election of such contributions. Pre-Tax Deferrals shall be allocated to the Participant's Pre-Tax Account; Roth Contributions shall be allocated to the Participant's Roth Account; Catch-Up Contributions shall be allocated to the Participant's Pre-Tax Account and/or Roth Account, as applicable, and After-Tax Contributions shall be allocated to the Participant's After-Tax Contribution Account as of the payroll payment date on which the corresponding amount would have been paid in absence of the elections under Plan section 4.1 and, if applicable, Plan section 4.2, but shall share in any investment gains and losses only after they are received by the Trust Fund.

4.6 Eligible Automatic Enrollment Arrangement

(a) **Effective Date**. The following automatic enrollment procedures will apply with respect to all Covered Employees. All Covered Employees hired prior to October 8, 2019, who have not made an affirmative election under Plan section 4.1 to make deferrals or contributions to the Plan equal or greater than the Default Percentage (defined below) will be automatically enrolled in accordance with the following automatic enrollment procedures on November 15, 2019. For Plan Years beginning after December 31, 2019, the procedures set forth in this Plan section 4.6 are intended to constitute an eligible automatic contribution arrangement that satisfies Code section 414(w) and provides excise tax relief with respect to excess amounts distributed within 6 months after the end of the plan year under Code section 4979(f).

(b) **Default Percentage**. A Covered Employee will have a reasonable opportunity after receipt of the automatic enrollment notice to make an alternate election. If a Covered Employee fails to make an alternate election, Pre-Tax Deferrals will automatically begin being made on such Covered Employee's behalf, in an amount equal to 5% of his or her Base Pay (*i.e.*, the "**Default Percentage**") on the Covered Employee's date of hire.

(c) **Alternate Election**. In the event a Covered Employee does not desire to have Pre-Tax Deferrals made on his or her behalf at the Default Percentage, the Covered Employee may elect a different amount up to the contribution percentage limit specified for the Active Participant in Appendix D for the Plan

Year or elect to not participate in the Plan. Any alternate election is to be made in accordance with the election procedures set forth in Section 4.3 above.

(d) **Withdrawal**. No later than 30 days after default Pre-Tax Deferrals are first withheld from a Covered Employee's Base Pay, the Covered Employee may request a distribution of his or her default Pre-Tax Deferrals. The amount to be distributed from the Plan upon the Covered Employee's request is equal to the amount of default Pre-Tax Deferrals made through the earlier of (a) the pay date for the second payroll period that begins after the Covered Employee's withdrawal request and (b) the first pay date that occurs 30 days after the Eligible Employee's request, plus attributable earnings through the date of distribution. Unless the Covered Employee affirmatively elects otherwise, any withdrawal request will be treated as an affirmative election to cease default Pre-Tax Deferrals made on the Covered Employee's behalf. Default Pre-Tax Deferrals distributed pursuant to this Section 4.6(d) are not counted towards the Code section 402(g) limit. Matching Contributions that might otherwise be allocated to a Covered Employee's Account on behalf of default Pre-Tax Deferrals will not be allocated to the extent the Covered Employee withdraws such default Pre-Tax Deferrals pursuant to this Section 4.6(d) and any Matching Contributions already made on account of such default Pre-Tax Deferrals that are later withdrawn pursuant to this Section 4.6(d) will be forfeited and subject to allocation as a forfeiture.

(e) **Notices**. For Plan Years beginning after December 31, 2019, the Company will provide Covered Employees with the notice required under Code section 414(w)(4) describing the Plan's automatic enrollment procedures prior to the beginning of each Plan Year regardless of whether the Covered Employee has an affirmative election for Pre-Tax Deferrals in place.

Article 5. Employer Contributions

5.1 Employees Eligible for Matching Contributions

Subject to the other provisions of this Plan, the Employer shall contribute Matching Contributions to this Plan only for a Participant who was an Active Participant during the pay period for which the corresponding Pre-Tax Deferrals and/or Roth Contributions (including amounts recharacterized as Adjustment Contributions) or After-Tax Contributions were made. Notwithstanding any Plan provision to the contrary, any Matching Contribution (including any investment gain attributable thereto), which relates to an Excess Deferral under Plan section 6.1, Excess Contribution under Plan section 6.3 (unless recharacterized as Adjustment Contributions) or Excess Aggregate Contribution under Plan section 6.5 shall be forfeited and shall not be treated as a Matching Contribution with respect to the Participant for the Plan Year.

5.2 Amount of Matching Contributions

Matching Contributions shall be made on behalf of an Active Participant for each payroll period for which Pre-Tax Deferrals, Roth Contributions or After-Tax Contributions were made with respect to the Participant for the Plan Year. Matching Contributions may also be made on behalf of eligible Participants, as the Employer or Administrative Committee deems necessary or appropriate for administrative purposes, at such other times, but not later than 12 months after the end of the Plan Year. The amount of Matching Contributions allocated to the Participant’s Matching Contributions Account shall be equal to the matching percent shown in the table in Appendix E, based on the employment classification of the Participant on the last day of the payroll period, multiplied by the Pre-Tax Deferrals (including an Adjustment Contribution), Roth Contribution (including an Adjustment Contribution) or After-Tax Contribution made with respect to the Participant on the Participant’s first 5 percent of Base Pay and Annual Bonus for the pay period. With respect to United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union, Local 12773 represented employees, the amount of Matching Contributions allocated to the Participant’s Matching Contributions Account shall be equal to the matching percent shown in the table in Appendix E, based on the employment classification of the Participant on the last day of the payroll period, multiplied by the Pre-Tax Deferrals (including an Adjustment Contribution), Roth Contributions (including an Adjustment Contribution) or After-Tax Contribution made with respect to the Participant on the Participant’s first 4 percent of Base Pay and Annual Bonus for the pay period. Effective February 29, 2016, the Matching Contributions allocated with respect to United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union, Local 12773 represented employees will be the same as for other Active Participants. Effective January 1, 2016, the Matching Contributions allocated with respect to United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union, Local 2154-03 represented employees will be the same as for other Active Participants. The Administrative Committee may limit the amount of Matching Contributions made on behalf of a Participant to the extent that the Administrative Committee determines necessary to comply with the limits of Article 6.

5.3 Depositing and Crediting Matching Contributions

The Company shall make such contributions to the Trust Fund as are required by this Plan, subject to the right of the Company to discontinue the Plan. The Company shall contribute an amount which, when added to forfeitures under Plan section 11.3, is sufficient to provide the Matching Contribution allocations required by Plan section 5.2.

Matching Contributions shall be transferred to the Trust Fund as soon as reasonably practicable after the payroll payment date at which the corresponding Pre-Tax Deferrals, Roth Contributions or After-Tax Contributions would have been paid to the Participant in the absence of the election of such contributions. Matching Contributions shall be allocated to the Participant's Matching Account as of the payroll payment date on which the corresponding amount would have been paid in absence of the Participant's election, but shall share in any investment gains and losses only after they are received by the Trust Fund.

Article 6. Benefit Limitations

6.1 Elective Deferral Limit

(a) **Dollar Limit**. For any calendar year, the sum of the following items shall not exceed the elective deferral dollar limit of Code section 402(g)(1), as adjusted pursuant to Code section 402(g)(4):

(1) All Pre-Tax Deferrals and Roth Contributions (but not Catch-Up Contributions) made on behalf of an Active Participant for that calendar year; and

(2) Any other Pre-Tax or Roth contributions made for the calendar year to any Qualified Plan maintained by the Company or any Affiliate which are elective deferrals as defined in Code section 402(g)(3), but not including any such elective deferrals that are catch-up contributions under Code section 414(v).

Any amount deferred in excess of the dollar limit stated in this subsection is referred to as an Excess Deferral.

(b) **Calendar Year as Participant's Taxable Year**. A Pre-Tax Deferral and Roth Contribution made on behalf of an Active Participant shall be treated as made for a calendar year, for purposes of Plan section 6.1(a)(1) if it is made on account of the Active Participant's election to reduce Earnings that would otherwise be payable within that calendar year.

(c) **Preventing Excess Deferrals**. If before the end of a calendar year, the Administrative Committee determines (or the Active Participant notifies his or her Employer that he or she has determined) that Pre-Tax Deferrals and/or Roth Contributions to be made on behalf of an Active Participant for that calendar year would exceed the limits of this section or Code section 402(g), then the Administrative Committee shall take one or both of the following steps, to the extent necessary, to avoid exceeding the limits of this section or Code section 402(g):

(1) Permit an Active Participant to submit a revised election under Plan section 4.1; or

(2) Reduce Pre-Tax Deferrals and/or Roth Contributions that otherwise would be made, pursuant to the Participant's current election, for the rest of the calendar year (and adjust the corresponding reductions in Earnings) so that the limits are not exceeded.

(d) **Correcting Excess Deferrals**. If Excess Deferrals have been made on the Participant's behalf in excess of the limits of Code section 402(g), then the Excess Deferrals shall be corrected as follows:

(1) The Participant must notify the Administrative Committee, by such other means as the Administrative Committee shall prescribe, no later than March 1, immediately following the close of a calendar year, stating that the sum of the items described in subsection 6.1(a) are in excess of the limits of Code section 402(g). The notice provided by the Participant shall state the portion of such excess amount that has been allocated to this Plan as an Excess Deferral. The amount of the Excess Deferral allocated to this Plan shall not exceed the total amount of the

Pre-Tax Deferrals and/or Roth Contributions (excluding Catch-Up Contributions) made on behalf of the Participant for that calendar year. The Administrative Committee may require the Participant to certify to the amount of the Excess Deferral and to provide substantiating evidence satisfactory to the Administrative Committee.

(2) If the Active Participant does not provide the notice described in paragraph (1) by the following March 1, but it is determined that Pre-Tax Deferrals and/or Roth Contributions (excluding Catch-Up Contributions) made on behalf of an Active Participant for a calendar year inadvertently exceed the limits of subsection (a), then the Excess Deferral for the calendar year shall be distributed in accordance with this subsection.

(3) The Administrative Committee shall direct the Trustee to distribute, by April 15 following the close of the calendar year, the Excess Deferral for that calendar year allocated (or deemed allocated) to the Plan by the Participant. Any Excess Deferrals shall be treated as consisting first of any Pre-Tax Deferrals made by the Participant for such Plan Year, as applicable, and second any Roth Contributions which the Participant made for the Plan Year, as applicable, except as otherwise elected by the Participant. The distributed Excess Deferral shall be withdrawn from the Investment Funds in which the Pre-Tax Account and/or Roth Account, as applicable, is then invested on a pro rata basis. The Trustee shall also distribute the net income attributable to the Excess Deferrals, as determined by the Administrative Committee in accordance with one of the methods permitted under Treasury Regulations section 1.402(g)–1(e)(5) disregarding, effective January 1, 2007, any provision of prior regulations relating to the distribution of gap period earnings. Corrective distributions under this subsection shall be coordinated with distributions of Excess Contributions under Plan section 6.3 in accordance with Treasury Regulations sections 1.401(k)–1(f)(5) and 1.402(g)–1(e)(6). Any Matching Contributions that have been made with respect to Excess Deferrals that are distributed to a Highly Compensated Employee, in accordance with this subsection, shall be forfeited, as soon as is practicable after corrective distributions are made. Such Matching Contributions shall be forfeited, whether or not the Participant would otherwise have a vested interest in those Matching Contributions, pursuant to Plan section 3.5.

6.2 Discrimination Limits on Pre-Tax Deferrals and Roth Contributions

As of the last day of each Plan Year, the Administrative Committee shall require testing of Pre-Tax Deferrals and Roth Contributions made for the Plan Year to assure that the Actual Deferral Percentage (ADP) for the Plan Year of Participants who are Highly Compensated Employees does not exceed the ADP Test limits specified in this Plan section.

(a) **Aggregation, Disaggregation and Restructuring**. The rules of this section shall be administered so as to comply with the mandatory disaggregation requirements of Treasury Regulations section 1.410(b)-7(c) and, if the Administrative Committee chooses, the permissive aggregation rules of Treasury Regulations section 1.410(b)-7(d), provided that any aggregated plans shall use the same testing method under Treasury Regulations section

1.401(k)-2(a)(2)(ii) (*i.e.*, current year or prior year testing method) as is used by the Plan for the Plan Year. Notwithstanding the foregoing, effective January 1, 2004, the mandatory disaggregation rules relating to the ESOP and non-ESOP portions of the Plan shall not apply.

(1) To the extent required by the mandatory disaggregation rules, Represented Employees and Nonrepresented Employees shall be treated as comprising separate plans for purposes of applying the ADP Test. Notwithstanding the foregoing, the Administrative Committee may treat two or more separate collective bargaining units as a single collective bargaining unit for purposes of applying the ADP Test, provided that the combinations of units are determined on a basis that is reasonable and reasonably consistent from Plan Year to Plan Year.

(2) If, after application of the mandatory disaggregation rules, this Plan is permissively aggregated with one or more other plans that include qualified cash or deferred arrangements for purposes of Code section 401(a)(4) or 410(b), then the cash or deferred arrangements of this Plan and such other plans shall be treated as one arrangement for purposes of this Plan section.

(3) In determining whether the restrictions of this Plan section are met, the Administrative Committee may exclude from the ADP Test all Eligible Employees who are not Highly Compensated Employees and who have not met the minimum age and service requirements of Code section 410(a)(1)(A), if the Administrative Committee elects to apply Code section 410(b)(4)(B). Alternatively, the Administrative Committee may apply the ADP Test separately to all Eligible Employees who have not met the minimum age and service requirements of Code section 410(a)(1)(A).

(b) **ADP Test**. The Actual Deferral Percentage for the Plan Year of Participants who are Highly Compensated Employees shall not exceed the greater of:

(1) The product of 1.25 and the Actual Deferral Percentage for the current Plan Year for the Eligible Employees who are not Highly Compensated Employees for the current Plan Year; or

(2) The lesser of:

(a) The product of two and the Actual Deferral Percentage for the current Plan Year for the Eligible Employees who are not Highly Compensated Employees for the current Plan Year, or

(b) The Actual Deferral Percentage for the current Plan Year for the Eligible Employees who are not Highly Compensated Employees for the current Plan Year plus two percentage points.

By an amendment to the Plan, the Administrative Committee may elect to apply paragraphs (1) and (2) by using the Actual Deferral Percentage of Employees who are not Highly Compensated Employees for the prior Plan Year only if the current year testing method has been used for at least the last five Plan Years. If the Plan is aggregated with any other Qualified Plan, the Actual Deferral Percentage of Employees who are not Highly Compensated Employees for the prior Plan Year may be used only if the Plan is amended to so provide and each Qualified Plan that is aggregated with this Plan used the current year method for at least the last five years (or, if shorter, the period that such other Qualified Plan was in existence, including years in which the Qualified Plan was a portion of another Qualified Plan).

(c) The restrictions of this section shall be based on the Participant's actual Testing Compensation while an Active Participant and total Pre-Tax Deferrals and Roth Contributions allocated to the Participant's Account for the Plan Year. The Administrative Committee is authorized to restrict the Pre-Tax Deferrals and Roth Contributions of Highly Compensated Employees in a uniform manner if it determines, based on advance testing done during the Plan Year, that such restriction is necessary or appropriate to assure final Plan Year compliance with restrictions of this section.

6.3 Corrective Measures if ADP Test Failed

If, at the end of the Plan Year, the Administrative Committee determines that the Actual Deferral Percentage of Highly Compensated Employees exceeds the maximum permitted for the Plan Year under the ADP Test, then the Administrative Committee shall take the corrective steps described in this Plan section so that the requirements of Plan section 6.2 are met for the Plan Year. Pre-Tax Deferrals and Roth Contributions, along with any other elective deferrals made to other qualified cash or deferred arrangements that are included in the Actual Deferral Percentage of a Highly Compensated Employee, exceeding the ADP Test limits are referred to as Excess Contributions.

(a) **Correction Methods**. To the extent permitted under Treasury Regulations section 1.401(k)-2(b)(3) and this Plan section, the Administrative Committee shall first recharacterize Excess Contributions, along with allocable investment gains and losses, as Adjustment Contributions. To the extent Excess Contributions remain for the Plan Year, the Administrative Committee shall next distribute the Excess Contributions, along with allocable investment gains and losses, pursuant to Treasury Regulations section 1.401(k)-2(b)(2) and this Plan section. Regardless of whether recharacterized or distributed, all corrections of Excess Contributions shall be made in accordance with Treasury Regulations section 1.401(k)-2(b)(4) and this Plan section.

(b) **Determining Total Excess Contributions**. The amount of Excess Contributions attributable to each Highly Compensated Employees is the amount by which Pre-Tax Deferrals and Roth Contributions, along with any other elective deferrals made to other qualified cash or deferred arrangements that are included in the Actual Deferral Percentage of a Highly Compensated Employee, must be reduced so that the Actual Deferral Percentage for that Highly Compensated Employee is reduced to the maximum permissible Actual Deferral Percentage for Highly Compensated Employees. The maximum permissible Actual Deferral Percentage for Highly Compensated Employees is determined by reducing the Actual Deferral Percentage for the Highly Compensated Employee with the highest Actual Deferral Percentage for the Plan Year to the Actual Deferral Percentage for the Highly Compensated Employee with the next highest Actual Deferral Percentage. If a lesser reduction would enable the ADP Test to be satisfied, only the lesser reduction is used to determine the maximum permissible Actual Deferral Percentage. This procedure is repeated until the ADP Test would be satisfied. The total amount of Excess Contributions to be corrected is equal to the sum of the dollar amounts computed under this subsection for each Highly Compensated Employee and is to be referred to as the Total Excess Contributions.

(c) **Apportionment of Total Excess Contributions**. Total Excess Contributions for the Plan Year shall be apportioned among Highly Compensated Employees as provided in this subsection.

(1) Pre-Tax Deferrals and/or Roth Contributions allocated to the Highly Compensated Employee with the highest dollar amount of Pre-Tax Deferrals and/or Roth Contributions taken into account under the ADP Test for the Plan Year, including any other elective deferrals made to other qualified cash or deferred arrangements that are included in the Actual Deferral Percentage of a Highly Compensated Employee, shall be reduced by the amount required to cause that Highly Compensated Employee's remaining amount of Pre-Tax Deferrals and/or Roth Contributions for the Plan Year to be equal to the dollar amount of Pre-Tax Deferrals and/or Roth Contributions for the Highly Compensated Employee with the next highest dollar amount. This amount shall be allocated as the Excess Contribution for the Highly Compensated Employee, unless a smaller reduction, when added to the total dollar amount already allocated as Excess Contributions for other Highly Compensated Employees pursuant to this procedure equals the Total Excess Contributions for the Plan Year. Excess Contributions shall be treated as consisting first of any Pre-Tax Deferrals made by the Participant for such Plan Year, as applicable, and second any Roth Contributions which the Participant made for the Plan Year, as applicable, except as otherwise elected by the Participant.

(2) If a Highly Compensated Employee's Excess Contributions include elective deferrals made to other qualified cash or deferred arrangements that are included in the Actual Deferral Percentage of a Highly Compensated Employee, then the Excess Contribution of that to the Highly Compensated Employee shall not exceed the Pre- Tax Deferrals and/or Roth Contributions made under this Plan for the Plan Year. Any portion of the Total Excess Contributions which is apportioned to a Highly Compensated Employee pursuant to this subsection, but which cannot be corrected because of the preceding sentence, shall be apportioned to the Highly Compensated Employee with the next lowest total dollar amount of Pre-Tax Deferrals and/or Roth Contributions and that Highly Compensated Employee's Excess Contributions shall be reduced by an amount which includes the amount not corrected for the other Highly Compensated Employee.

(3) If the total amount corrected under this subsection is less than the Total Excess Contributions for the Plan Year, the procedure in this paragraph shall be repeated until the total amount corrected is equal to the Total Excess Contributions for the Plan Year.

(4) The investment gains and losses allocable to the Excess Contributions are equal to the sum of allocable investment gains and losses for the Plan Year and allocable gains and losses after the Plan Year for which the distribution is made. The allocable investment gain or loss attributable to the Excess Contributions may be determined in accordance with any of the methods permitted under Treasury Regulations section 1.401(k)-2(b)(2)(iv), disregarding any provisions

relating to the distribution of gap period earnings, and may be determined up to seven days before the date of the correction.

(5) Excess Contributions of the Highly Compensated Employee with respect to which Matching Contributions were not made shall be corrected to the extent necessary under this Plan section before Excess Contributions of that Highly Compensated Employee with respect to which Matching Contributions were made.

(6) The requirements of this Plan section shall be deemed to have been satisfied if the total dollar amount corrected equals the Total Excess Contributions with allocable investment gains and losses, even if:

(a) The ADP Test would not satisfy the requirements of Plan section 6.2, if the test were rerun including in the test only Pre-Tax Deferrals and/or Roth Contributions that were not corrected under this subsection; or

(b) The amount corrected with respect to each Highly Compensated Employee is different from the amount computed for purposes of calculating the Total Excess Contributions amount.

(d) **Rules Applicable to Adjustment Contributions**. Excess Contributions shall not be treated as corrected even if recharacterized under this subsection (d), unless the requirements of this subsection are met.

(1) Excess Contributions that are recharacterized as Adjustment Contributions must be reported to the Internal Revenue Service and the Highly Compensated Employee as included in gross income of the Highly Compensated Employees to the same extent they would have been included in gross income if distributed.

(2) Excess Contributions must be recharacterized as Adjustment Contributions no later than $2^1/2$ months after the close of the Plan Year (for Plan Years beginning after December 31, 2019, 6 months after the close of the Plan Year). For this purpose, recharacterization will be deemed to have occurred on the date on which the last Highly Compensated Employee is notified that his or her Pre-Tax Deferrals and/or Roth Contributions are being recharacterized as Adjustment Contributions.

(3) Excess Contributions may be recharacterized as Adjustment Contributions for a Plan Year only if the Plan allows After-Tax Contributions for that Plan Year and such Adjustment Contributions are included in the ACP Test for the Plan Year.

(4) Investment gains and losses allocable to Excess Contributions shall be allocated to the corresponding Adjustment Contributions after recharacterization.

(e) **Rules Applicable to Distributions**. Excess Contributions shall not be treated as corrected even if distributed under this subsection (e), unless the requirements of this subsection are met.

(1) Excess Contributions and allocable investment gains and losses must be distributed to the Highly Compensated Employee to whom it has been allocated within 12 months after the close of the Plan Year for which the Excess Contribution arose.

(2) The distributed Excess Contributions and allocable investment gains and losses shall be taken from the Investment Funds in which the Pre-Tax Account and/or Roth Account is then invested on a pro rata basis.

(3) Any Matching Contributions that have been made with respect to Excess Contributions that are distributed to a Highly Compensated Employee shall be forfeited, as soon as is practicable after corrective distributions are made. Such Matching Contributions shall be forfeited, whether or not the Participant would otherwise have a vested interest in those Matching Contributions, pursuant to Plan section 3.5.

(4) If the Highly Compensated Employee received a full distribution of his or her Account before Excess Contributions and allocable investment gains and losses are distributed to the Highly Compensated Employee, then the prior distribution shall be reported for taxation purposes as first a correction of Excess Contributions and allocable investment gains and losses to the extent required under this Plan section.

(5) A distribution of Excess Contributions and allocable investment gains and losses shall in no event be treated as satisfying a required minimum distribution for purposes of Code section 401(a)(9) and Plan section 7.6.

(6) The distribution required by this Plan section may be made notwithstanding any other Plan provision.

6.4 Discrimination Limits on Matching Contributions, After-Tax Contributions, and Adjustment Contributions

As of the last day of each Plan Year, the Administrative Committee shall require testing of Matching Contributions, After-Tax Contributions, and Adjustment Contributions made for the Plan Year for Participants, who were not Represented Employees for the period for which the contributions were made, to assure that the Average Contribution Percentage for the Plan Year of such Participants who are Highly Compensated Employees does not exceed the limits specified in the ACP Test. The rules of this section shall not apply at all to Matching Contributions, After-Tax Contributions, and Adjustment Contributions made for the Plan Year for Participants who are Represented Employees for the period for which the contributions are made.

(a) **Aggregation, Disaggregation and Restructuring.** The rules of this section shall be administered so as to comply with the mandatory disaggregation requirements of Treasury Regulations section 1.410(b)-7(c) and, if the Administrative Committee chooses, the permissive aggregation rules of Treasury Regulations section 1.410(b)-7(d), provided that any aggregated plans shall use the same testing method under Treasury Regulations section 1.401(k)-2(a)(2)(ii) (*i.e.*, current year or prior year testing method) as is used by the Plan for the Plan Year. Notwithstanding the foregoing, effective January 1, 2004, the mandatory disaggregation rules relating to the ESOP and non-ESOP portions of the Plan shall not apply.

(1) If, after application of the mandatory disaggregation rules, in the preceding paragraph, this Plan is permissively aggregated with one or more other plans that include matching or after-tax contributions subject to contribution testing under Code section 401(m) for purposes of Code section 401(a)(4) or 410(b), then this Plan and such other plans shall be treated as one arrangement for purposes of this Plan section.

(2) In determining whether the restrictions of this Plan section are met, the Administrative Committee may exclude from the ACP Test all Eligible Employees who are not Highly Compensated Employees and who have not met the minimum age and service requirements of Code section 410(a)(1)(A), if the Administrative Committee elects to apply Code section 410(b)(4)(B). Alternatively, the Administrative Committee may apply the ACP Test separately to all Eligible Employees who have not met the minimum age and service requirements of Code section 410(a)(1)(A).

(b) **ACP Test**. The Average Contribution Percentage for the Plan Year of Participants who are Highly Compensated Employees shall not exceed the greater of:

(1) The product of 1.25 and the Average Contribution Percentage for the current Plan Year for the Eligible Employees who are not Highly Compensated Employees for the current Plan Year; or

(2) The lesser of:

(a) The product of two and the Average Contribution Percentage for the current Plan Year for the Eligible Employees who are not Highly Compensated Employees for the current Plan Year, or

(b) The Average Contribution Percentage for the current Plan Year for the Eligible Employees who are not Highly Compensated Employees for the current Plan Year plus two percentage points.

By an amendment to the Plan, the Administrative Committee may elect to apply paragraphs (1) and (2) by using the Average Contribution Percentage of Employees who are not Highly Compensated Employees for the preceding Plan Year rather than the current Plan Year except that such election may not be changed unless permitted by the Internal Revenue Service.

(c) The restrictions of this section shall be based on the Participant’s actual Testing Compensation while an Active Participant and total Matching Contributions, After-Tax Contributions and Adjustment Contributions allocated to the Participant’s Account for the Plan Year. The Administrative Committee is authorized to restrict the After-Tax Contributions of Highly Compensated Employees in a uniform manner if it determines, based on advance testing done during the Plan Year, that such restriction is necessary or appropriate to assure final Plan Year compliance with restrictions of this section.

6.5 Corrective Measures if ACP Test Failed

If, at the end of the Plan Year, the Administrative Committee determines that the Average Contribution Percentage of Highly Compensated Employees exceeds the maximum permitted for the Plan Year under the ACP Test, then the Administrative Committee shall take the corrective steps described in this Plan section so that the requirements of Plan section 6.4 are met for the Plan Year. Matching Contributions, After-Tax Contributions, and Adjustment Contributions, along with any other matching contributions and after-tax contributions (including any recharacterized elective deferrals) made to other Qualified Plans that are included the Actual Deferral Percentage of a Highly Compensated Employee, exceeding the ACP Test limits are referred to as Excess Aggregate Contributions.

(a) **Correction Method**. The Administrative Committee shall distribute or forfeit Excess Aggregate Contributions, along with allocable investment gains and losses, pursuant to Treasury Regulations section 1.401(m)-2(b)(2) and this Plan section.

(b) **Determining Total Excess Aggregate Contributions**. The amount of Excess Aggregate Contributions attributable to each Highly Compensated Employee is the amount by which Matching Contributions, After-Tax Contributions and Adjustment Contributions, along with any other matching contributions and after-tax contributions (including any recharacterized elective deferrals) made to other Qualified Plans that are included the Average Contribution Percentage of a Highly Compensated Employee, must be reduced so that the Average Contribution Percentage for that Highly Compensated Employee is reduced to the maximum permissible Average Contribution Percentage for Highly Compensated Employees. The maximum permissible Average Contribution Percentage for Highly Compensated Employees is determined by reducing the Average Contribution Percentage for the Highly Compensated Employee with the highest Average Contribution Percentage for the Plan Year to the Average Contribution Percentage for the Highly Compensated Employee with the next highest Average Contribution Percentage. If a lesser reduction would enable the ACP Test to be satisfied, only the lesser reduction is used to determine the maximum permissible Average Contribution Percentage. This procedure is repeated until the ACP Test would be satisfied. The total amount of Excess Aggregate Contributions to be corrected is equal to the sum of the dollar amounts computed under this subsection for each Highly Compensated Employee and is be referred to as the Total Excess Aggregate Contributions.

(c) **Apportionment of Total Excess Aggregate Contributions**. Total Excess Aggregate Contributions for the Plan Year shall be apportioned as provided in this subsection.

  (1) Excess Aggregate Contributions allocated to the Highly Compensated Employee with the highest dollar amount of Matching Contributions, After-Tax Contributions and Adjustment Contributions taken into account under the ACP Test for the Plan Year shall be reduced by the amount required to cause that Highly Compensated Employee’s remaining amount of Matching Contributions, After-Tax Contributions and Adjustment Contributions for the Plan Year to be equal to the dollar amount of Matching Contributions, After-Tax Contributions and Adjustment Contributions for the Highly Compensated Employee with the next highest dollar amount. This amount shall be allocated as the Excess Aggregate Contribution for the Highly Compensated Employee, unless a smaller reduction, when added to the total dollar amount

already allocated as Excess Aggregate Contributions for other Highly Compensated Employees pursuant to this procedure equals the Total Excess Aggregate Contributions for the Plan Year.

(2) If a Highly Compensated Employee's Excess Aggregate Contributions include matching contributions and after-tax contributions (including any recharacterized elective deferrals) made to other Qualified Plans that are included the Average Contribution Percentage of a Highly Compensated Employee, then the Excess Aggregate Contribution of that to the Highly Compensated Employee shall not exceed the Matching Contributions, After-Tax Contributions and Adjustment Contributions made under this Plan for the Plan Year. Any portion of the Total Excess Aggregate Contributions which is apportioned to a Highly Compensated Employee pursuant to this subsection, but which cannot be corrected because of the preceding sentence, shall be apportioned to the Highly Compensated Employee with the next lowest total dollar amount of Pre-Tax Deferrals and/or Roth Contributions and that Highly Compensated Employee's Excess Aggregate Contributions shall be reduced by an amount which includes the amount not corrected for the other Highly Compensated Employee.

(3) If the total amount corrected under this subsection is less than the Total Excess Aggregate Contributions for the Plan Year, the procedure in this paragraph shall be repeated until the total amount corrected is equal to the Total Excess Aggregate Contributions for the Plan Year.

(4) The investment gains and losses allocable to the Excess Aggregate Contributions are equal only to the sum of allocable investment gains and losses for the Plan Year for which the distribution is made. The allocable investment gain or loss attributable to the Excess Aggregate Contributions may be determined in accordance with any of the methods permitted under Treasury Regulations section 1.401(m)–2(b)(2)(iv), disregarding any provisions relating to the distribution of gap period earnings, and may be determined up to seven days before the date of the correction.

(d) **Distribution or Forfeiture**. Excess Aggregate Contributions shall not be treated as corrected even if distributed under this subsection, unless the requirements of this subsection are met.

(1) Excess Aggregate Contributions and allocable investment gains and losses must be distributed to the Highly Compensated Employee to whom it has been allocated within 12 months after the close of the Plan Year for which the Excess Aggregate Contribution arose.

(2) Excess Aggregate Contributions and allocable investment gains and losses shall be distributed or, to the extent attributable to Matching Contributions in which the Highly Compensated Employee is not fully vested as of the end of the Plan Year, forfeited in the following order:

(a) After-Tax Contributions and allocable investment gains and losses on which Matching Contributions were not made;

(b) Adjustment Contributions and allocable investment gains and losses on which Matching Contributions were not made;

(c) After-Tax Contributions and allocable investment gains and losses along with the corresponding Matching Contributions and allocable investment gains and losses; and

(d) Adjustment Contributions and allocable investment gains and losses along with the corresponding Matching Contributions and allocable investment gains and losses.

(3) The distributed Excess Aggregate Contributions and allocable investment gains and losses shall be taken from the Investment Funds in which the subaccount is then invested on a pro rata basis.

(4) If the Highly Compensated Employee received a full distribution of his or her Account before Excess Aggregate Contributions and allocable investment gains and losses is distributed to the Highly Compensated Employee, then the prior distribution shall be reported for taxation purposes as first a correction of Excess Aggregate Contributions and allocable investment gains and losses to the extent required under this Plan section.

(5) A distribution of Excess Aggregate Contributions and allocable investment gains and losses shall in no event be treated as satisfying a required minimum distribution for purposes of Code section 401(a)(9) and Plan section 7.6.

(6) The distribution required by this Plan section may be made notwithstanding any other Plan provision.

6.6 Limitation on Annual Additions

(a) **General Rule**. Notwithstanding anything to the contrary contained in this Plan, the total Annual Additions under this Plan and any other defined contribution plan, as defined in Code section 414(i), maintained by the Company or any Affiliate, allocated to a Participant's Account for any Plan Year, which shall be the limitation year for purposes of Code section 415, shall not exceed the lesser of:

(1) $40,000, as adjusted for increases in the cost-of-living under Code section 415(d) for Plan Years beginning after 2002; or

(2) 100 percent of the Participant's Section 415 Compensation for the limitation year.

(b) **"Annual Addition" Defined**. The term "Annual Addition," with respect to any Participant for a Plan Year, shall mean the aggregate of:

(1) The amount of Employer contributions (including Matching Contributions and Pre- Tax Deferrals and Roth Contributions other than Catch-Up Contributions) allocated to the Participant's Account under this Plan and any other Employer contributions (other than Catch-Up Contributions under Code section 414(v)) allocated under any other

defined contribution plan, as defined in Code section 414(i), maintained by the Company or any Affiliate for the Plan Year;

(2) The amount of a Participant's After-Tax Contributions (including Adjustment Contributions, but excluding Rollover, Roth Rollover and After-Tax Rollover Contributions) allocated to the Participant's Account under this Plan and any other Employee contributions allocated under any other defined contribution plan maintained by the Company or any Affiliate for the Plan Year;

(3) Forfeitures allocated to the Participant's Account under this Plan or any other defined contribution plan maintained by the Company or any Affiliate for the Plan Year; and

(4) For the purpose of Plan section 6.6(a)(1) only, the amount of Employer contributions, if any, allocated to an account described in Code section 419A(d)(1) or an account described in Code section 415(1)(2).

For purposes of this subsection and to comply with the requirements of Code section 415(h), the term "Affiliate" includes, in addition to Affiliates defined in Plan section 2.1(i), any entity that would be an Affiliate under that definition if the phrase "more than 50 percent" were substituted for the phrase "at least 80 percent" each place it appears in Code 1563(a)(1).

(c) **Additional Rules.** In applying the limits of subsection (a), the following rules shall apply:

(1) Excess Deferrals shall not be included as an Annual Addition if they are distributed in a corrective distribution under the provisions of that section. However, any Excess Deferrals that are not distributed in a corrective distribution under Plan section 6.1 shall be included as an Annual Addition, even if they are in excess of the Code section 402(g)(1) limit.

(2) Pre-Tax Deferrals and Roth Contributions in excess of the ADP Test limits of Plan section 6.2 shall be included as an Annual Addition, even if they are correctively distributed or re-characterized as Adjustment Contributions under Plan section 6.3.

(3) Matching Contributions and After-Tax Contributions (including any Adjustment Contributions) in excess of the ACP Test limits of Plan section 6.4 shall be included as an Annual Addition, even if they are correctively forfeited or distributed under Plan section 6.5. Matching Contributions relating to distributions of Excess Deferrals under Plan section 6.1(d) are forfeited and shall not be included as an Annual Addition.

(4) If a short limitation year is created because of an amendment or other action changing the limitation year (or Plan Year) to a different 12-consecutive-month period, the dollar limitation of Plan section 6.6(a)(1) to be applied for that short limitation year shall be multiplied by a fraction, the numerator of which is the number of months in the short limitation year and the denominator of which is 12.

(5) The Annual Additions of a Participant who is also a Supplemental Plan Participant for the Plan Year shall be determined under this paragraph if doing so results in a larger amount of Annual Additions for that Participant for the Plan Year. Annual Additions under this paragraph shall be determined by assuming that, for the Plan Year, the Participant contributed the contribution percentage limit in effect for the Participant as determined under Appendix D and received the maximum allocation of Matching Contribution under Plan section 5.2.

(d) Disposition of Excess Annual Additions

(1) **Not a Supplemental Plan Participant**. If the Participant is not also a Supplemental Plan Participant for the Plan Year, then the Participant's Annual Additions shall be reduced under this Plan, if such reduction is required for purposes of reducing allocations on a combined basis, to the limits of subsection (a) and Code section 415(c), as follows:

(a) First, by distributing After-Tax Contributions (including any Adjustment Contributions) made for the Plan Year to the Participant, to the extent necessary; and

(b) Next, by distributing Pre-Tax Deferrals and/or Roth Contributions made for the Plan Year to the Participant, to the extent necessary; and

(c) Then, forfeiting Matching Contributions made for the Plan Year, to the extent necessary; and

(d) Finally, reducing any remaining excess Annual Additions under the terms of such other defined contribution plans maintained by the Company or any Affiliate as specified in those plans.

(2) **Supplemental Plan Participant**. If the Participant is also a Supplemental Plan Participant for the Plan Year, then the Participant's Annual Additions shall first be reduced under the terms of the Retirement Plan for the Plan Year by reducing the allocations made under the Retirement Plan to the extent necessary to assure compliance with the limits of subsection (a) and Code section 415(c). Only after reductions under the Retirement Plan have been made shall reductions of Annual Additions be made under the terms of this Plan and such other defined contribution plans maintained by the Company or any Affiliate, if such a reduction is required for purposes of reducing allocations on a combined basis, to the limit of subsection (a) and Code section 415(c), as follows:

(A) First, by distributing After-Tax Contributions (including any Adjustment Contributions) made for the Plan Year to the Participant, to the extent necessary; and

(B) Next, by distributing Pre-Tax Deferrals and/or Roth Contributions made for the Plan Year to the Participant, to the extent necessary; and

(C) Then, forfeiting Matching Contributions made for the Plan Year, to the extent necessary; and

(D) Finally, reducing any remaining excess Annual Additions under the terms of such other defined contribution plans (other than the Retirement Plan) maintained by the Company or any Affiliate as specified in those plans.

(e) **Adjustment of Allocations**. If an allocation to the Account of a Participant would exceed the limit of subsection (a) due to a reasonable mistake in estimating a Participant's Section 415 Compensation or due to forfeitures or a reasonable error in the estimation of salary deferrals, then any amount which cannot be allocated shall be held in a suspense account and shall be allocated to the Account of such Participant in the next following Plan Year. The suspense account shall not share in investment gains or losses of the Trust Fund. Effective for Plan Years beginning after July 1, 2007, this subsection shall no longer apply because this correction methodology is no longer permitted under the final Treasury Regulations under Code section 415.

6.7 Limitation on Pay Taken Into Account

(a) In determining the amount of Pre-Tax Deferrals and Roth Contributions that may be made on behalf of a Participant for a Plan Year, the total amount of Earnings to which the percentage reduction, elected by the Participant, is applied shall not be limited. Notwithstanding the foregoing, however, the total annual amount of Pre-Tax Deferrals and Roth Contributions made for a Plan Year on behalf of the Participant shall not exceed the product of the maximum deferral percentage allowed under the Plan for the Plan Year multiplied by the compensation limit in effect for the Plan Year under Code section 401(a)(17).

(b) In determining the amount of After-Tax Contributions that may be made on behalf of a Participant for a Plan Year, the total amount of Earnings to which the percentage reduction, elected by the Participant, is applied shall not be limited. Notwithstanding the foregoing, however, the total annual amount of After-Tax Contributions made for a Plan Year on behalf of the Participant shall not exceed the product of the maximum contribution percentage allowed under the Plan for the Plan Year multiplied by the compensation limit in effect for the Plan Year under Code section 401(a)(17).

(c) In determining the amount of Matching Contributions that may be made on behalf of a Participant for a Plan Year, the total amount of Earnings to which the Matching Contribution is applied shall not be limited. Notwithstanding the foregoing, however, the total annual amount of Matching Contributions made for a Plan Year on behalf of an Active Participant shall not exceed the product of the matching percentage determined under Appendix E multiplied by the maximum amount of Earnings for which Matching Contributions are determined multiplied by the compensation limit in effect for the Plan Year under Code section 401(a)(17).

6.8 Deductibility Limitation

Notwithstanding any provision of the Plan to the contrary, the dollar amount of Employer contributions to this Plan are conditioned on their deductibility under Code section 404 and, thus, shall always be limited to the amount deductible under Code section 404 for the taxable year for which such contributions are paid to the Trust Fund.

Article 7. Benefit Distributions

(1) Distributions Generally

Distribution of a Participant's vested Account may begin pursuant to Plan section 7.2, relating to in-service withdrawals, Plan section 7.3, relating to benefit payments on account of a Separation from Service, and Plan section 7.5, relating to death benefit distributions, as applicable under the terms of this Article, but not later than the date provided in Plan section 7.6, relating to required minimum distributions.

Notwithstanding the foregoing, a Participant's Pre-Tax Account and Roth Account may not be distributed earlier than upon one of the following events:

(a) The Participant's retirement, death, Disability, or Separation from Service;

(b) The termination of the Plan without the establishment of another defined contribution plan (other than an employee stock ownership plan within the meaning of Code section 4975(e)(7)), provided that distributions made under this paragraph may be made only in the form of a single lump sum that complies with Code section 401(k)(10)(B); or

(c) The Participant's attainment of age $59^1/2$ or, if the Plan is amended to so provide, a financial hardship of the Participant.

(1) In-Service Withdrawals

(a) An Active Participant or Inactive Participant may withdraw, prior to his or her Separation from Service, in the following order, any amount, up to 100 percent of the sum of the Participant's:

(1) After-Tax Rollover Account, if any;

(2) After-Tax Account, if any;

(3) Rollover Account, if any;

(4) Pre-Tax Account, but only if the Participant has attained age $59^1/2$; and then

(5) Matching Account, but only if the Participant has completed at least three years of Service.

(b) An Active Participant or Inactive Participant also may withdraw, prior to his or her Separation from Service, any amount, up to 100 percent of the sum of the Participant's, without regard to Plan section 7.2(e) below:

(1) Roth Account, but only if the Participant has attained age $59^1/2$;

(2) Roth Rollover Account; or

(3) In-Plan Roth Rollover Account, but only if the Participant has attained age $59^1/2$.

(c) No withdrawal may be requested in any processing period in which a plan loan, as described in Article 8, is being processed. Furthermore, no withdrawal request may be processed more often than once in any six-month period beginning with the date that the Participant's most recent withdrawal request was processed. Effective August 8, 2016, there will be no restriction on the timing of withdrawal requests or the coordination of withdrawal requests with the processing of loan or other requests under the Plan.

(d) Application for a withdrawal shall be made on such forms as the Administrative Committee prescribes and shall be effective as of the end of the processing period in which such application is received and approved by the Administrative Committee. The Administrative Committee shall direct the Trustee, in such cases, to pay the Participant or Inactive Participant the withdrawal amount in a single sum.

(e) Withdrawals shall be paid first out of the net cumulative pre-1987 contributions from the After-Tax Account. Withdrawals shall then be paid out of the net cumulative post-1986 contributions, together with earnings thereon, on a pro rata basis, from the After-Tax Account. Additional amounts shall be withdrawn, if needed, from earnings on pre-1987 contributions from the After-Tax Rollover Account, if any, then from the After-Tax Account, if any, then from the Rollover Account, if any, then from the Pre-Tax Account, if permissible, and then from the Matching Account, to the extent permissible. The amount withdrawn shall be taken from such Investment Funds in which the subaccount is invested on a pro rata basis.

(f) A withdrawal from a Participant's Account balances invested in Oxy Stock shall be in the form of full shares of Oxy Stock and cash representing any fractional share, except that cash shall be paid in lieu of full shares of Oxy Stock if the Participant specified in the written request for withdrawal that the withdrawal be in the form of cash. A withdrawal from Account balances invested in assets other than Oxy Stock shall be paid in cash. Notwithstanding the foregoing, a withdrawal consisting of pre-1987 contributions from the After-Tax Account only shall be in the form of cash.

(1) Except as provided below, if a Participant withdraws any amount from the Matching Account, the Participant (other than a Participant who has attained age $59^1/2$ at the time the withdrawal is requested and who withdraws the entire balance in his or her Account) shall not be permitted to make any Pre-Tax Deferrals, Catch-Up Contributions, Roth Contributions, After-Tax Contributions, or receive Matching Contributions for a period of six calendar months after the withdrawal is processed (except that such Participant will still be eligible to receive Matching Contributions on any Annual Bonus). Effective for withdrawals requested after August 8, 2016, if a Participant is suspended from making any Pre-Tax Deferrals, Roth Contributions, Catch-Up Contributions, and/or After-Tax Contributions in accordance with the sentence above, such contributions will be automatically reinstated upon expiration of the six-month suspension period at the Default Percentage, as applicable, or if the Participant was not subject to automatic enrollment or had opted out of automatic enrollment at the percentage in place prior to the suspension. Effective January 1, 2017, unless the Participant affirmatively elects otherwise, with respect to any Participant hired prior to August 5, 2016, upon re-instatement, the election in effect as of August 5, 2016 will apply to any Annual Bonus paid in the 2017 Plan Year and any subsequent plan year until the Participant affirmatively elects otherwise. Effective August 8, 2016, any Participant subject to automatic enrollment pursuant to Plan section 4.6, must make a separate election to make Pre-Tax Deferrals, Roth Contributions and After-Tax Contributions from Participant's Annual Bonus.

(2) The preceding subsection shall be inapplicable in the case of a withdrawal effected by a creditor of a Participant pursuant to any

insolvency proceeding initiated under federal or state law or pursuant to any tax levy.

(3) In addition, notwithstanding the foregoing and effective January 1, 2013, a Participant who has attained age 59 ½ and who withdraws less than the entire balance in his or her Account, shall not be suspended from making Pre-Tax Deferrals, Roth Contributions, Catch-Up Contributions, After-Tax Contributions, or receiving Matching Contributions, but pursuant to subsection (b) shall not be permitted to make another withdrawal for six months beginning with the date that the Participant's most recent withdrawal request was processed. Effective August 5, 2016, a Participant who has attained age 59 ½ and who withdraws less than the entire balance in his or her Account will no longer be subject to the one withdrawal per six-month period limitation.

(g) Pursuant to the procedures established by the Administrative Committee, during 2020, a Participant who is a "Qualified Individual" (as defined below) may request a Coronavirus-Related Distribution ("CRD") up to $100,000 from the individual's Account. A "Qualified Individual" is an individual who can certify that: (i) he or she has been diagnosed with the virus SARS-CoV-2 or with coronavirus 2019 ("COVID-19") by a test approved by the Centers for Disease Control and Prevention ("CDC"); (ii) his or her spouse or dependent is diagnosed with SARS-CoV-2 or with COVID-19 by a test approved by the CDC; (iii) he or she experiences adverse financial consequences due to SARS-CoV-2 or COVID-19 as a result of one or more of the following: (A) he or she is quarantined; (B) he or she is being furloughed or laid off; (C) his or her workings hours have been reduced; (D) he or she is unable to work due to a lack of child care; (E) he or she has to close or reduce hours of a business that he or she owns or operates. The Administrative Committee may rely on a Participant's certification that the Participant is a Qualified Individual.

(1) In accordance with the procedures established by the Administrative Committee, a Participant may recontribute to the Participant's Account the amount distributed as a CRD pursuant to this Section 7.2(g) in accordance with Section 2202 of the Coronavirus Aid, Relief, and Economic Security Act ("CARES Act") and IRS guidance thereunder during the 3-year period commencing after the date the distribution was received.

7.3 Benefits Upon Separation from Service

(a) Every Participant who incurs a Separation from Service for any reason other than death may elect to receive a distribution of the vested portion of his or her Account, in a payment form specified by Plan section 7.4. The failure of a Participant to elect a distribution of benefits upon his or her Separation from Service shall be deemed to be an election by the Participant to defer the commencement of benefits.

(b) Unless the Participant chooses to defer the commencement of benefits, either affirmatively or by failing to make a distribution election, and subject to Plan section 7.6, distribution of benefits to a Participant who incurs a Separation from Service shall begin no later than the 60th day after the close of the Plan Year in which occurs the later of:

(1) The Participant's Separation from Service; or

(2) The Participant's 65^{th} birthday.

If for any reason the amount which is required to be paid cannot be ascertained on the date payment would be due hereunder, payment or payments shall be made not later than 60 days after the earliest date on which the amount of such payment is ascertained.

7.4 Payment Rules

(a) **General Rules**. All distributions from this Plan shall be valued as provided in Article 10 and paid in cash or Oxy Stock as provided in this Plan section. The automatic form of benefit payment to a Participant who has incurred a Separation from Service and elected a distribution of his or her vested Account. Effective January 1, 2020, if at any time prior to the full repayment of a Participant's loan under the Plan, the Participant should transfer employment to a new employer by reason of a corporate transaction, the Participant may, to the extent permitted by the Administrative Committee, elect a direct rollover of his or her loan note to an eligible plan sponsored by the Participant's new employer, provided that the new employer's plan agrees to accept such rollover and the loan is not in default.

(b) **Election Procedures**. All Participant elections to commence benefits shall be made during an election period of not more than 90 days and, except as provided below, not less than 30 days ending on the day prior to the date as of which his benefits are scheduled to commence in accordance with the benefit payment election procedures prescribed by the Administrative Committee. Such procedures shall require the following:

(1) An election form shall be provided to the Participant in non-technical language which will contain a general description of the distribution options.

(2) A Participant may revoke an election of any benefit form described in this section and choose again to take any available benefit form at any time and any number of times within the above election period.

(3) A Participant, after having received the written description described in this subsection, may reject the automatic form of benefit and elect a different option under subsection (c), even though the written description was provided less than 30 days prior to the Participant's benefit commencement date, so long as the conditions contained in Treasury Regulations section 1.417(e)-1T(b)(3)(ii) have been met. If the Participant makes an untimely request for additional information, the Administrative Committee, at its discretion, may grant such request, but the granting of such request shall not result in the extension of the election period.

(c) **Optional Payment Forms**. A Participant who has incurred a Separation from Service for any reason other than death may elect to have his or her vested Account distributed to the Participant under one of the following distribution options, in lieu of the automatic lump sum, as selected by the Participant in the manner prescribed and approved by the Administrative Committee:

(1) **Partial Cash Distribution**. A request for a specified dollar portion of the Participant's vested Account. A Participant may request one partial cash distribution in any six-month period. If the Participant receives a

partial cash distribution, the Participant must wait until the next processing period before he or she may request a subsequent lump sum payment or total distribution. Effective August 8, 2016, there will be no timing limitation for partial cash distributions. A Participant may elect a partial cash distribution under one of the following options; Investment Fund balances will automatically be depleted on a pro rata basis in the following account depletion sequence:

(A) Option 1.

(i) After-Tax Rollover Account;

(ii) After-Tax Account;

(iii) Rollover Account; and

(iv) Pre-Tax Account;

(B) Option 2

(i) Matching Account;

(ii) Roth Rollover Account;

(iii) In-Plan Roth Rollover Account; and

(iv) Roth Account.

(C) Or under both (A) and (B) above.

Remaining balances in each account will continue to participate in Investment Fund earnings until valued for distributions as provided in Article 10.

(2) **Special Distribution**. The portion of Participant's vested Account, which is an Eligible Rollover Distribution (as determined under Plan section 7.7(b)(4)) and which is invested in Investment Funds other than the Oxy Stock Fund, is distributed as a Direct Rollover (within the meaning of Plan section 7.7(b)(1)), as directed by the Participant. The Oxy Stock Fund balance from the Participant's vested Account is distributed to the Participant as shares of Oxy Stock along with a cash distribution of any remaining portion of the Participant's vested Account.

(3) **Total Deferral**. Defers distribution of the Participant's vested Account, but not beyond the end of the year in which the Participant attains age 70 ½. Subject to Plan section 7.6, the Participant may revoke his or her deferral election at any time by submitting another distribution request.

(d) **Reserved.**

(e) **Payment Medium**. The provisions of this subsection are intended to comply with the stock distribution requirements of Code sections 409(h) and 409(o) applicable to the portion of this Plan constituting an employee stock ownership plan, as required by Code section 4975(e)(7). Notwithstanding any Plan provision to the contrary, the Administrative Committee shall take steps to ensure that this section is interpreted and administered so as to comply with such requirements. In the event of any conflict, the rules of the Code and Treasury Regulations shall control.

(1) **General Rule**. In the case of a Participant, Beneficiary or Alternate Payee receiving a distribution in the form of single lump sum payment, the value of the vested Account attributable to investments other than Oxy Stock shall be paid in cash and the value of the vested Account attributable to Oxy Stock shall be distributed in full shares of Oxy Stock plus cash representing the value of any fractional share, except as provided in Plan section 7.4(h)(3) for mandatory cashout distributions and Plan section 7.6(a) for required minimum distributions.

(2) **Alternative Elections.**

(A) By written notice to the Administrative Committee, the Participant, Beneficiary or Alternate Payee may elect to receive cash in lieu of and equal to the value of the Oxy Stock that would otherwise be distributed under the general rule.

(B) By written notice to the Administrative Committee, a Participant, Beneficiary or Alternate Payee may elect to receive all or a portion of the vested Account in the form of whole shares of Oxy Stock, plus cash for any fractional share. Any such election shall be implemented in accordance with procedures established by the Administrative Committee by transferring the investment of such Account or portion thereof, as applicable, (including without limitation amounts transferred from the MidCon Corp. ESOP) as soon as practicable to the Oxy Stock Fund and distributing such amounts as soon as practicable thereafter.

(3) **Put Option.**

(A) Oxy Stock is readily tradable on established securities market within the meaning of Treasury Regulation section 1.401(a)(35)-1(f)(5). Thus, the provisions of this paragraph (3) shall apply only in the event and to the extent that as of the date of distribution of Oxy Stock, the Oxy Stock is not readily tradable on established securities market or is subject to a trading limitation.

(B) If Oxy Stock is not readily tradable on established securities market or is subject to a trading limitation when distributed, the distributee shall have the option to sell (the “put option”) such Oxy Stock, in whole or in part, to the Company. The put option shall be granted in accordance with Code section 409(h) and all applicable Treasury Regulations. Specifically, the put option shall provide that for a period of at least 60 days following the date of distribution of the Oxy Stock and, if not exercised within such period of 60 days, during the first 60 days in the following Plan Year, the distributee shall have the right to have the Company purchase such shares at their fair market value, determined in accordance with Treasury Regulations section 54.4975- 11(d)(5), as of the Valuation Date coincident with or immediately preceding the date of exercise of such put option. The put option may be exercised by notifying the Employer in writing that the option is being exercised.

(C) Once the put option is exercised, the fair market value of such shares shall be paid in a lump sum as soon as practicable. Notwithstanding the foregoing, the Company reserves the right to adopt a different payment schedule at any time, but such payment schedule shall not be longer than in annual installments over a period of five years, with interest on the deferred balance at a reasonable rate as determined by the Administrative Committee; provided that any purchase of stock having a value of $1,000 or less shall be paid for in a lump sum.

(D) The provisions of this paragraph (3) shall continue to apply to Oxy Stock if the Oxy Stock Fund ceases to be an employee stock ownership plan within the meaning of Code section 4975(e)(7).

(E) Notwithstanding the foregoing, this paragraph (3) need not apply to that portion of an Account which the Participant has elected to invest under the diversification provisions of Plan section 9.5.

(f) **Payments to Alternate Payees**. To the extent permitted by the terms of a Qualified Domestic Relations Order, amounts assigned to an Alternate Payee may be paid as soon as possible in a lump sum, notwithstanding the age, employment status, or other factors affecting the ability of the Participant to make a withdrawal or otherwise to receive a distribution of amounts allocated to the Participant's Account, provided that the total amount assigned to an Alternate Payee does not exceed $5,000 at the time the amount is distributed or, if the amount assigned does exceed $5,000, the Alternate Payee consents in writing to the distribution. Only if required under the Qualified Domestic Relations Order, an Alternate Payee's Account may be distributed under one of the optional payment forms specified in subsection (c), if elected by the Alternate Payee in accordance with procedures established by the Administrative Committee. Notwithstanding the foregoing, the Alternate Payee shall be paid in no event no later than the dates specified in Plan section 7.6 (relating to required minimum distributions).

(g) **Special Rules for Former Laurel Plan Accounts.**

(1) In the case of a Participant for whom a direct plan-to-plan transfer was made to this Plan from the Laurel Industries Inc. Incentive Savings Plan (the "Laurel Plan"), distribution may be made, at the election of the Participant, in any form described in section 6.5(b)(2) of the Laurel Plan as in effect on December 31, 1996, provided that the amount subject to such election shall not exceed the amount of the Participant's Account attributable to such transfer.

(2) In the case of a Beneficiary of a Participant for whom a direct plan-to-plan transfer was made to this Plan from the Laurel Industries Inc. Incentive Savings Plan (the "Laurel Plan"), distribution may be made, at the election of the Beneficiary, in any form described in section 6.6(g)(1)(ii) of the Laurel Plan as in effect on December 31, 1996, provided that the amount subject to such election shall not exceed the amount of the Beneficiary's Account attributable to such transfer.

(h) **Mandatory Cashout Distribution**. Notwithstanding the election procedures set forth above in Plan section 7.4(b):

(1) Distribution Less Than or Equal to $1,000. With respect to a Participant who incurred a Separation from Service prior to 2021, if the vested Account of the terminated Participant is equal to or less than $1,000, the entire amount shall be distributed in a lump sum as promptly as possible.

(2) Distribution Less Than or Equal to $5,000. Effective January 1, 2021, if the vested Account of a terminated Participant is less than or equal to $5,000, and the Participant fails to elect to have his or her benefits paid directly or in the form of a Direct Rollover (within the meaning of Plan section 7.7(b)(1)) to an Eligible Retirement Plan (within the meaning of Plan section 7.7(b)(3)), the entire account shall be distributed as an automatic rollover to an individual retirement account designated by the Administrative Committee. The Participant will be notified in writing regarding the identity of the individual retirement account trustee or issuer and that his distribution may be transferred without cost or penalty to another individual retirement account.

(3) Distribution to Beneficiaries, Alternate Payees or Participants Over Age 62. Notwithstanding Plan section 7.4(h)(2) above, any distribution that is less than or equal to $5,000 and payable to a Beneficiary, Alternate Payee or Participant who is over age 62 will be distributed in a lump sum as promptly as possible and will not be distributed as an automatic rollover to an individual retirement account.

(4) Form of Distribution. All mandatory cashout distributions will be made in cash and there will be no requirement to issue any shares of Oxy Stock.

7.5 Death Benefits

(a) **Participant's Death After Benefit Commencement**. If the Participant dies after distribution of his or her vested Account has commenced, the remaining portion of such benefit, if any, will continue to be distributed at least as rapidly as under the method of distribution in effect prior to the Participant's death.

(b) **Participant's Death Before Benefit Commencement**. Upon the death of a Participant before benefit payments begin, the balance of the deceased Participant's Account shall be distributed to the Participant's Beneficiary as soon as practicable after the Participant's death. Notwithstanding the foregoing, a Beneficiary who is the Participant's Spouse may elect, before any benefit payments begin, in accordance with procedures established by the Administrative Committee, to defer receipt of payment of the deceased Participant's Account, until the year in which the Participant would have attained age 70 ½ in accordance with Plan section 7.6(c)(2).

(1) If the Participant's Beneficiary is a trust or estate, the distribution shall be paid in a single lump sum payment.

(2) If the Beneficiary is other than the Participant's Spouse and unless the Beneficiary elects otherwise, the distribution shall be paid in a single lump sum.

(3) If the Beneficiary is the Participant's Spouse, then in addition to the payment form described in paragraph (2), the Spouse may elect, in accordance with procedures established by the Administrative Committee, to have the distribution paid in the form of a partial cash distribution, as described in Plan section 7.4(c)(1).

(c) **Death of Alternate Payee or Beneficiary**. If an Alternate Payee or a Beneficiary of a deceased Participant or Alternate Payee dies prior to distribution of the separate Account established on behalf of the Alternate Payee or Beneficiary, the balance of the deceased individual's Account shall be distributed to his or her Beneficiary as soon as practicable after his death. Such distribution shall be made in the form of a lump sum payment.

7.6 Required Minimum Distributions

This section applies for purposes of determining required minimum distributions for distribution Plan Years beginning on or after January 1, 2003. In other words, this section provides the latest time for distributions to be made or commenced. Other Plan provisions may specify earlier dates for distributions and such provisions shall govern to the extent they are consistent with this section. This section, however, takes precedence over any inconsistent Plan provision. All distributions required under this section shall be determined and made in accordance with Code section 401(a)(9) and the Treasury Regulations thereunder, including the minimum distribution incidental benefit requirements, which are incorporated herein by this reference. For purposes of this Plan section, the required minimum distribution amount shall be determined based on the Account balance as of the last Accounting Date in the Plan Year immediately preceding the Distribution Calendar Year, increased by contributions made and allocated as of dates in the Plan Year after the last Accounting Date, if any, and reduced by distributions made in the Plan Year after the last Accounting Date, if any. The Account balance for the Plan Year immediately preceding the Distribution Calendar Year includes any amounts rolled over or transferred to the Plan in the Plan Year.

(a) **Form of Distribution**. Unless the Participant’s Account is distributed in a single sum on or before the Required Beginning Date, as of the first Distribution Calendar Year, distributions will be made in accordance with subsections (b) and (c). All required minimum distributions will be made in cash, and there will be no requirement to issue any shares of Oxy Stock.

(b) **Required Minimum Distributions During Participant’s Lifetime**. The Participant’s entire Account will be distributed, or begin to be distributed, to the Participant no later than the Participant’s Required Beginning Date. During the Participant’s lifetime, the minimum amount that will be distributed for each Distribution Calendar Year is the amount determined under the default rule of paragraph (1) or, if the Participant satisfies the conditions in a timely manner, under the alternative rule of (2):

(1) **Default Rule**. The quotient obtained by dividing the Participant’s Account balance by the distribution period in the Uniform Lifetime Table set forth in Treasury Regulations section 1.401(a)(9)-9, using the Participant’s age as of the Participant’s birthday in each Distribution Calendar Year.

(2) **Alternative Rule**. If the Participant’s sole Beneficiary for the Distribution Calendar Year is the Participant’s Spouse, the quotient obtained by dividing the Participant’s Account balance by the number in the Joint and Last Survivor Table set forth in Treasury Regulations section 1.401(a)(9)-9, using the Participant’s and Spouse’s attained ages as of the Participant’s and Spouse’s birthdays in the Distribution Calendar Year. For this alternative rule to apply, the Participant must request its application and provide such proof of marriage and the Spouse’s age, at such time and in such manner as the Administrative Committee may reasonably require, in advance of the Distribution Calendar Year.

Required minimum distributions will be determined under this subsection beginning with the first Distribution Calendar Year and redetermined for each subsequent Distribution Calendar Year up to and including the Distribution Calendar Year that includes the Participant’s date of death.

(c) Required Minimum Distributions After Participant's Death.

(1) Death of Participant On or After Date Distributions Begin.

(A) **Participant Survived by One Beneficiary**. If the Participant dies on or after the date distributions begin and there is a sole Beneficiary, the minimum amount that will be distributed for each Distribution Calendar Year after the year of the Participant's death is the quotient obtained by dividing the Participant's Account balance by the remaining Life Expectancy, determined as follows:

(i) If the Participant is not married or the sole Beneficiary is not the Participant's surviving Spouse, the remaining Life Expectancy is calculated using the age of the Participant in the year of death, reduced by one for each subsequent year.

(ii) If the Participant's surviving Spouse is the Participant's sole Beneficiary, the remaining Life Expectancy of the surviving Spouse is calculated for each Distribution Calendar Year after the year of the Participant's death using the surviving Spouse's age as of the Spouse's birthday in that year. For the Distribution Calendar Year after the year of the surviving Spouse's death, any remaining payment shall be made in a single sum to the Spouse's estate.

(B) **Participant Survived by More Than One Beneficiary**. If the Participant dies on or after the date distributions begin and there is more than one Beneficiary as of September 30 of the year after the year of the Participant's death, the Participant's remaining Account shall be paid in a single sum as required by Plan section 7.5.

(C) **No Beneficiary Survives the Participant**. If there is no Beneficiary as of September 30 of the year after the year of the Participant's death, the Participant's remaining Account will be paid in a single sum to the Participant's estate no later than the Distribution Calendar Year after the Participant's death.

(2) **Death of Participant Before Date Distributions Begin**. If the Participant dies before distributions begin, the Participant's Account balance will be distributed, or begin to be distributed no later than provided in this paragraph. The minimum amount that will be distributed or begin to be distributed for each Distribution Calendar Year after the year of the Participant's death is the amount determined in paragraph (1) above.

(A) If the Participant's surviving Spouse is the Participant's sole Beneficiary, then distributions to the surviving Spouse will begin no later than:

(i) December 31 of the calendar year immediately following the calendar year in which the Participant died; or

(ii) December 31 of the calendar year in which the Participant would have attained age 70 ½, if later.

(B) If the Participant's surviving Spouse is the Participant's sole Beneficiary and the surviving Spouse dies after the Participant but before distributions to the surviving Spouse begin, this subsection, other than subparagraph (A) immediately above, will apply as if the surviving Spouse were the Participant.

If the Participant's surviving Spouse is not the Participant's sole Beneficiary, then distributions to the Beneficiary will begin by December 31 of the calendar year immediately following the calendar year in which the Participant died.

(C) If there is no Beneficiary as of September 30 of the year following the year of the Participant's death, the Participant's Account balance will be distributed to the Participant's estate no later than by December 31 of the calendar year containing the fifth anniversary of the Participant's death.

(d) **Special Definitions**. In addition to the terms defined in Plan section 2.1 or elsewhere in this Plan, whenever used in this Plan section, the following terms shall have the respective meanings set forth below, unless expressly provided otherwise. When the defined meaning is intended, the term is capitalized.

(1) **"Distribution Calendar Year"** means a calendar year for which a minimum distribution is required. For distributions beginning before the Participant's death, the first Distribution Calendar Year is the later of (A) the calendar year during which the Participant attains age 70 ½, if the Participant is a "5-percent owner," as defined in Code section 416, or has incurred a Separation from Service or (B) December 31 of the calendar year in which the Participant has a Separation from Service. For distributions beginning after the Participant's death, the first Distribution Calendar Year is the calendar year in which distributions are required to begin. The required minimum distribution for the Participant's first Distribution Calendar Year will be made on or before the Participant's Required Beginning Date.

(2) **"Life Expectancy"** means the life expectancy determined under the Single Life Table in Treasury Regulations section 1.401(a)(9)-9.

(3) "**Required Beginning Date**" means the later of:

(A) The December 31 of the calendar year in which the Participant attains age $70^1/2$, if the Participant is a "5-percent owner," as defined in Code section 416, or has incurred a Separation from Service, and

(B) In all other cases, the December 31 of the calendar year in which the Participant has a Separation from Service.

(C) Effective August 8, 2016, "Required Beginning Date" means the later of:

(i) The April 1 of the calendar year following the calendar year in which the Participant attains age 70 ½, if the Participant is a "5-percent owner," as defined in Code section 416, or has incurred a Separation from Service, and

(ii) In all other cases, the April 1 of the calendar year following the calendar year in which the Participant has a Separation from Service.

Notwithstanding any provision of this Plan section to the contrary and consistent with Code section 401(a)(9)(I) and IRS Notice 2020-51, no 2020 RMD (as defined below) shall be required under this Plan section for the 2020 calendar year. The Required Beginning Date for any individual shall be determined without regard to the preceding sentence for purposes of applying this Plan section to required minimum distributions for any calendar year after 2020. A Direct Rollover will be offered only for distributions that would be Eligible Rollover Distributions without regard to Code section 401(a)(9)(I), as these terms are defined in Plan section 7.7(b). A “2020 RMD” includes a minimum distribution that would have been required in 2020 (or paid in 2021 for the 2020 calendar year for a Participant with a Required Beginning Date of April 1, 2021) but for the enactment of Code section 401(a)(9)(I).

7.7 Mandatory Tax Withholding and Direct Rollovers

(a) **General Rule**. Notwithstanding any Plan provision to the contrary, all withdrawals and other distributions under this Plan shall comply with the requirements of this section, Code section 401(a)(31), the Treasury Regulations thereunder, and related regulatory rules. Under this section, a Distributee entitled to a current withdrawal or distribution from the Plan may elect, at the time and in the manner prescribed by the Administrative Committee, to have any portion of an Eligible Rollover Distribution paid directly to an Eligible Retirement Plan. In prescribing the manner of making elections with respect to Eligible Rollover Distributions, the Administrative Committee may provide for a uniform, nondiscriminatory application of any restrictions permitted under applicable sections of the Code, Treasury Regulations, and related regulatory rules, including a requirement that a Distributee may not elect to make a Direct Rollover from a single Eligible Rollover Distribution to more than one Eligible Retirement Plan.

(b) **Special Definitions**. In addition to the terms defined in Plan section 2.1 or elsewhere in this Plan, whenever used in this Plan section, the following terms shall have the respective meanings set forth below, unless expressly provided otherwise. When the defined meaning is intended, the term is capitalized.

(1) **“Direct Rollover”** means an Eligible Rollover Distribution that is paid directly to an Eligible Retirement Plan at the direction and for the benefit of the Distributee.

(2) **“Distributee”** means a Participant, a Participant’s surviving Spouse or a Participant’s Spouse who is the Alternate Payee.

Effective for distributions made after December 31, 2009 on behalf of a deceased Participant to a Beneficiary who is neither the Participant’s surviving Spouse or the Participant’s former Spouse and Alternate Payee, the non-spouse Beneficiary shall be a Distributee and the distribution will be treated as an Eligible Rollover Distribution if the following requirements are met. The distribution must made on behalf of the non-spouse Beneficiary in a direct transfer to an individual retirement account, described in Code section 408(a), or an individual retirement annuity, described in Code section 408(b) that is treated as an inherited individual retirement account or annuity for purposes of Code section 408(d)(3)(C). In addition, Code section 401(a)(9)(B), other than clause (iv) thereof relating to required minimum distributions to the Beneficiary, shall apply to the inherited individual retirement account or annuity.

(3) **"Eligible Retirement Plan"** is an individual retirement account described in Code section 408(a), an individual retirement annuity described in Code section 408(b) (other than an endowment contract), an annuity plan described in Code section 403(a), a qualified trust described in Code section 401(a) that accepts the Distributee's Eligible Rollover Distribution, an annuity contract described in Code section 403(b); an eligible deferred compensation plan under Code section 457(b) which is maintained by a state, political subdivision of a state, or any agency or instrumentality of a state or political subdivision of a state and which agrees to separately account for amounts transferred into such plan from this Plan; and a Roth IRA described in Code section 408A(b).

(4) **"Eligible Rollover Distribution"** means any distribution of all or any portion of the balance to the credit of the Distributee, except that an Eligible Rollover Distribution does not include:

(A) Any distribution that is one of a series of substantially equal periodic payments (not less frequently than annually) made for the life (or life expectancy) of the Distributee and the Distributee's designated Beneficiary, or for a specified period of ten years or more;

(B) Any distribution to the extent the distribution is required under Code section 401(a)(9) and related Treasury Regulations;

(C) Any loan that is treated as a deemed distribution pursuant to Code section 72(p);

(D) Any dividends paid on employer securities and passed through to the Participant, Alternate Payee or Beneficiary, as described in Code section 404(k);

(E) A distribution that is a permissible withdrawal from an eligible automatic contribution arrangement within the meaning of section 414(w); and

(F) The portion of any distribution shall not fail to be an Eligible Rollover Distribution merely because such portion consists of After-Tax Contributions, which are not includable in gross income, if such portion is transferred to an individual retirement account or annuity described in Code section 408(a) or (b), to a qualified plan described in Code section 401(a) or 403(a), or to an annuity contract described in Code section 403(b) that agrees to separately account for amounts so transferred, including separately accounting for the portion of such distribution which is includable in gross income and the portion of such distribution which is not so includable. The portion of any distribution from a designated Roth account under the Plan shall not fail to be an Eligible Rollover Distribution if such portion is transferred to another Roth account under an applicable retirement plan described in Code section 402A(e)(1) or a Roth IRA described in Code section 408A.

Determinations of what constitutes an Eligible Rollover Distribution shall at all times be made in accordance with the current rules under Code section 402(c), which shall be controlling for this purpose.

(G) **"Conversion"** means a Direct Rollover of an Eligible Rollover Distribution from the Plan to the Roth IRA, within the meaning of Code section 408A. The amount rolled over is included in the gross income of the Distributee to the same extent that such amount would have been included in gross income if not rolled over. A Conversion is not subject to mandatory income tax withholding under Code section 3405. A Distributee may elect a Conversion of an Eligible Rollover Distribution made on or after January 1, 2008.

7.8 In-Plan Roth Rollovers

(a) **Participant Eligibility**. A Participant may elect to roll over a distribution to an In-Plan Roth Rollover Account in accordance with the provisions of this section 7.8. A Participant may elect to rollover amounts held in the accounts described below in Plan section 7.8(b) without regard to whether the Participant satisfies the requirements for distribution in accordance with this Article VII. In-Plan Roth Rollover Contributions shall be subject to the same Plan rules as Roth Contributions. The Plan Administrator will maintain such records as are necessary for the proper reporting of In-Plan Roth Rollover Contributions and will administer the In-Plan Roth Rollover Account in accordance with Code section 402A and the regulations promulgated thereunder.

(b) **Permitted Sources**. The following contributions are permitted for roll over to the In-Plan Roth Rollover Account:

(1) After-Tax Account,

(2) After-Tax Rollover Account,

(3) Matching Account,

(4) Pre-Tax Account,

(5) Rollover Account, and

(6) SIP Accounts noted in Appendix G.1.

(c) **Participant's Spouse**. Solely for the purposes of determining eligibility for an In-Plan Roth Rollover Contribution, the Plan will treat a Participant's surviving Spouse, former Spouse or Alternate Payee Spouse as a Participant. A non-spouse beneficiary may not make an In- Plan Roth Rollover Contribution to the Plan.

(d) **Form of Rollover**. An In-Plan Roth Rollover Contribution must be made by the Participant in the form of a direct rollover. An In-Plan Roth Rollover Contribution may not include Plan loans.

(e) **Distributions**. The distribution provisions in Plan section 7.1 will apply to In-Plan Roth Rollover Contributions.

(f) **Treatment of In-Plan Roth Rollover Contributions**. Notwithstanding any other provision of the Plan to the contrary, an In-Plan Roth Rollover Contribution is not a Rollover or Roth Rollover Contribution for purposes of the Plan. Except for amounts withheld pursuant to a voluntary withholding election, an In-Plan Roth Rollover Contribution will not be treated as a distribution for purposes of sections 72(p), 401(a)(11), or 411(d)(6)(B)(ii) of the Code. Amounts in a Participant's In-Plan Roth Rollover Account may only be withdrawn by a Participant when the Participant is eligible for a distribution from the Plan under Article VII.

Article 8. Participant Loans

8.1 Availability of Loans

The Administrative Committee, in accordance with the following, may make loans to Participants who are Active Participants or Inactive Participants (referred to for purposes of this section as “Participants”) from the vested portion of the Participant’s Account. Loans shall (a) be made available on a reasonably equivalent basis, (b) not be made available to Highly Compensated Employees in an amount equal to a greater percentage of their vested Account balance or the percent made available to other loan applicants, (c) bear a reasonable rate of interest, and (d) be adequately secured by the Participant’s vested Account balance.

8.2 Amount of Loan

No loan (when added to the outstanding balance of all other loans made by the Plan to the Participant) shall exceed the lesser of:

(a) Fifty percent of the Participant’s vested Account, or

(b) Fifty thousand dollars, reduced by the highest outstanding balance of his or her loans from the Plan during the one year period ending on the date the loan is made over the outstanding balance of all of his or her Plan loans on the date on which such loan was made.

For the purpose of this limitation, all loans from all plans of the Employer are aggregated.

In accordance with Section 2202 of the CARES Act, for any loan made to a Qualified Individual during the March 27, 2020 through September 23, 2020 period, the maximum amount of a loan was increased to the lesser of $100,000 and 100% of the Participant’s Account. In addition, for any Qualified Individual with a loan outstanding on or after March 27, 2020, the Qualified Individual may delay repayment in accordance with Section 2202(b)(2) of the CARES Act and Notice 2020-50.

8.3 Procedures for Loans

The Administrative Committee shall promulgate written loan procedures which shall form part of the Plan which may include, but need not be limited to, the following information:

(a) The identity of the persons or positions authorized to administer the loan program.

(b) The procedure for applying for loans.

(c) The basis on which loans will be approved or denied.

(d) The limitations, if any, on the types and amount of loans offered.

(e) The procedure under the program for determining a reasonable rate of interest.

(f) The types of collateral which may secure a Participant’s loan.

(g) The events constituting default and the steps that will be taken to preserve Plan assets in the event of such default.

In the event of any conflict between the loan procedures and the provisions of this section, the loan procedures shall control.

Article 9. Investment Elections

9.1 Investment of Contributions

All Pre-Tax Deferrals, Roth Contributions, After-Tax Contributions, Adjustment Contributions, Catch-Up Contributions, Rollover Contributions, Roth Rollover Contributions, After-Tax Rollover Contributions, In-Plan Roth Rollover Contributions and loan repayments (both principal and interest) made by and on behalf of a Participant each Plan Year and amounts merged into the Plan shall be invested as the Participant shall designate in the Investment Funds then available in increments of 1 percent of the aggregate amount of such contributions. Participants may invest up to 30% of future Pre-Tax Deferrals, Roth Contributions, Catch-Up Contributions, In-Plan Roth Rollover Contributions and After-Tax Contributions in the Oxy Stock Fund, but no new Rollover Contributions or Roth Rollover Contributions may be invested in the Oxy Stock Fund. Notwithstanding any provision to the contrary, a Participant may not transfer any investment into the Oxy Stock Fund if the amount a Participant holds under the Oxy Stock Fund exceeds 30% of the Participant’s total Plan balance.

Each Participant may make the designation described above by making an election in accordance with procedures established by the Administrative Committee upon becoming a Participant and may change such election at any time by making another election in accordance with procedures established by the Administrative Committee. Any such election shall take effect as of the first available pay period after the election was received by the Administrative Committee.

The selection of any Investment Fund is the sole and exclusive responsibility of each Participant, and it is intended that the selection of an Investment Fund by each Participant be within the parameters of section 404(c) of the Employee Retirement Income Security Act of 1974, as amended (“ERISA”) and the regulations thereunder. Neither the Employer, Administrative Committee, Investment Committee nor any of the directors, officers, agents or Employees of the Employer are empowered to or shall be permitted to advise a Participant as to the manner in which his Accounts shall be invested or changed. No liability whatsoever shall be imposed upon the Employer, the Trustees, any Committee member, or any director, officer, agent or Employee of the Employer for any loss resulting to a Participant’s account because of any sale or investment directed by a Participant under this section or because of the Participant’s failure to take any action regarding an investment acquired pursuant to such elective investment.

In the event that a Participant fails, or continues to fail, to designate the Investment Fund in which Pre-Tax Deferrals, Roth Contributions, After-Tax Contributions, Adjustment Contributions, Catch-Up Contributions, Rollover Contributions, Roth Rollover Contributions, After-Tax Rollover Contributions, In-Plan Roth Rollover Contributions, loan repayments, or amounts merged into the Plan that are to be invested, such amounts shall be invested in the default Investment Fund, which shall be the target date fund offered as an Investment Fund under the Plan that applies to the Participant based on the year the Participant will attain age 65, or such other Investment Fund designated by the Investment Committee as the default Investment Fund.

Any amount previously defaulted into a default Investment Fund due to a Participant’s failure to designate an Investment Fund shall not be re-designated or transferred, unless the Participant otherwise transfers such amount in accordance with Plan section 9.2(a). The default Investment Fund described above is the Plan’s qualified investment alternative, as this term is defined in Department of Labor Regulations section 2550.404c-5(e).

Matching Contributions made on behalf of a Participant shall be invested in the Oxy Stock Fund.

9.2 Transfers of Existing Balances

(a) **General Rules**. Subject to any investment limitation or restriction imposed by the Investment Fund and except as provided in Plan section 9.5, each Participant, including Inactive Participants and Former Participants, as well as each Alternate Payee or spousal Beneficiary with an Account under the Plan may elect to transfer, in accordance with procedures established by the Administrative Committee, amounts invested in any Investment Fund to one or more Investment Funds then available in increments of 1 percent of the amount being transferred. If the election is received by the Administrative Committee by 4 p.m. (Central Time) on an Accounting Date, the transfer will be processed on that Accounting Date. Each election made under this Plan section shall be effective as of the first Accounting Date after the date in which notice thereof is received by the Administrative Committee. If the election is received by the Administrative Committee after 4 p.m. (Central Time) or on a date other than an Accounting Date, the transfer will be processed on the next Accounting Date. The Administrative Committee may impose such Investment Fund transfer fees as it deems reasonable and appropriate to defray the administrative expenses of the Plan. Any transfer of existing balances made under this Plan section does not affect the investment of future contributions, including loan repayments and amounts merged into this Plan, which will be invested as provided under Plan section 9.1 and the last investment election of the Participant filed thereunder.

(b) **Oxy Stock Fund Transfers**. A vested Participant may not transfer any investment into the Oxy Stock Fund if the amount a Participant holds under the Oxy Stock Fund exceeds 30% of the Participant's total Plan balance.

(a) **Qualified Plan Transfers**. Nothing contained in this Plan section shall be construed as preventing a Participant, including Inactive Participants and Former Participants, from having amounts allocated to his or her Account in any Investment Fund transferred to one or more other Investment Funds for the purpose of facilitating an asset transfer to the trustee of a Qualified Plan sponsored by a purchaser or the subsidiary of a purchaser as a result of a transaction involving the sale by the Company or an Affiliate of either all or substantially all of the outstanding common stock of an Affiliate or all or substantially all of the assets of a facility, under circumstances where the Participant or Inactive Participant is employed by the Affiliate or at the facility that is the subject of the sale.

9.3 Transfer of Assets

The Administrative Committee shall direct the Trustee to transfer monies or other property between Investment Funds as soon as is practicable after each Accounting Date to the extent required to carry out the aggregate contribution and transfer transactions as of such Accounting Date after the necessary entries have been made in the Accounts and offsetting transfer elections have been reconciled, in accordance with uniform rules established by the Administrative Committee.

9.4 Reserved

9.5 Matching Account Diversification Rights After August 1, 2004

This section is effective August 2, 2004 and shall apply notwithstanding any contrary provision of this Plan.

(a) **Diversification Elections After August 1, 2004**. A Qualified Participant shall have the right to transfer to other available Investment Funds, in accordance with Plan section 9.2, up to 100 percent of the current market value of the number of Units in the Oxy Stock Fund credited to his Matching Account.

(b) **No Reinvestment**. For the period from July 1, 2006 through March 30, 2007, the number of Units in a Qualified Participant's Matching Account that have been transferred out of the Oxy Stock Fund as described in subsection (a) above may not be reinvested the Oxy Stock Fund.

(c) **Election Procedures**. Elections to transfer amounts from the Oxy Stock Fund among available Investment Funds shall be made pursuant to procedures established by the Administrative Committee. Each election made under this section shall be effective as of the first Accounting Date after the date on which the Administrative Committee properly receives the election.

(d) **Authority.** The Investment Committee shall have the authority to take any actions as may be appropriate or necessary to ensure the proper operation of the Plan and investment in the Oxy Stock Fund consistent with the provisions of this section.

(e) **Qualified Participant.** For purposes of this section, a "Qualified Participant" means:

(1) Effective August 2, 2004, a Participant, who has completed at least 10 years of Service under the Plan and has attained age 55;

(2) Effective January 1, 2005, a Participant, who has completed at least 10 years of Service under the Plan and has attained age 50;

(3) Effective March 1, 2005, a Participant, who has completed at least 5 years of Service under the Plan and has attained age 50;

(4) Effective July 1, 2006, a Participant, who has completed at least 5 years of Service under the Plan; and

(5) Effective January 1, 2007, a Participant, who has completed at least 3 years of Service under the Plan.

(6) Effective January 1, 2015, any Active Participant, regardless of the individual's years of Service under the Plan.

Until July 1, 2006, the Service requirement described in paragraphs (1) through (4) must be met on or before a Participant incurs a Separation from Service. As of July 1, 2006, a Qualified Participant includes a Former Participant who has incurred a Separation from Service but only with respect to the portion of the vested portion of the Participant's Matching Account as of his Separation from Service.

Article 10. Participant Accounts and Records of the Plan

10.1 Accounts and Records

The Participant’s Pre-Tax Account, Roth Account, Matching Account, After-Tax Account, Rollover Account, Roth Rollover Account, After-Tax Rollover Account and In-Plan Roth Rollover Account shall be assigned a subaccount for each Investment Fund in which the Account is invested. Each such subaccount shall be maintained and valued separately from all other subaccounts. The Administrative Committee shall maintain records relative to a Participant’s Accounts so that there may be determined as of any Accounting Date the current market value of his Accounts in the Trust Fund.

Each Participant, Alternate Payee and Beneficiary with an Account shall be advised from time to time, at least once each Plan Year, as to the value of his or her Account and the portions thereof attributable to his or her Matching Account and the sum of his or her Pre-Tax Account, Roth Account, Matching Account, After-Tax Account, Rollover Account, Roth Rollover Account, After- Tax Rollover Account and In-Plan Roth Rollover Account and to the various Investment Funds.

10.2 Account Value

As of any given date for which determination of the value of an Account is required, such value shall equal the sum of the value of Pre-Tax Account, Roth Account, Matching Account, After-Tax Account, Rollover Account, Roth Rollover Account, After-Tax Rollover Account and In-Plan Roth Rollover Account as of the preceding Accounting Date plus any additional contributions withheld or paid and less the amount of any withdrawals from such Account after the Accounting Date and prior to the date of determination.

10.3 Investment Funds

The Trust Fund shall consist of the Investment Funds, and each Account invested in an Investment Fund shall have an undivided proportionate interest in that Investment Fund. The Investment Committee shall have the right to determine the number of Investment Funds to be maintained by the Plan, and to increase or decrease that number from time to time as it deems appropriate. The Investment Committee shall establish additional Investment Funds or eliminate existing Investment Funds. In so doing, the Investment Committee shall implement and carry out investment objectives and policies which it shall establish and maintain.

10.4 Unit Value of Investment Funds

As of each Accounting Date, the Trustee shall determine the fair market value of the assets of each Investment Fund and shall notify the Administrative Committee of the value so determined. Assets for which there is a readily ascertainable market shall be valued by the Trustee at their fair market value, determined by the last known public sale on the Accounting Date as of which the market value is determined. In the absence of a sale on the Accounting Date, the fair market value of such assets, as well as other assets for which there is no readily ascertainable fair market value, shall be determined by the Trustee in such consistent manner as the Trustee shall consider appropriate.

10.5 Calculation of Unit Value

The Trustee shall divide the aggregate value of the assets of each Investment Fund, as so determined, by the total number of outstanding Units in such Investment Fund on the Accounting Date. The result obtained shall be the new value of each Unit, or “Unit value,” as of the Accounting Date. The Unit value for all Investment Funds shall be ten dollars on the first Accounting Date in 1999.

10.6 Valuation Adjustments

As of each Accounting Date, after the Units in each Investment Fund have been revalued, the Administrative Committee shall adjust the balances in the Accounts in the respective Investment Funds of the Trust Fund, upward or downward, in proportion to the Account balance in the Investment Fund as of the previous Accounting Date. As a result, the sum of such Account balances will equal the net value of each Investment Fund of the Trust Fund as of that Accounting Date. The subaccounts shall then, when appropriate, be credited with additional Units by dividing the dollar amount of contributions, fund transfers, loan repayments, and dividends paid with respect to Oxy Stock to be allocated to each subaccount on that Accounting Date by the newly calculated value of a Unit in the Investment Fund.

10.7 Debiting of Accounts upon Distribution, Withdrawal, Loan or Charge

Any Units distributed or withdrawn from an Account (including any Units debited as a result of an Investment Fund transfer fee or redemption fee imposed pursuant to Plan section 9.2) shall be charged to the respective subaccounts in each Investment Fund as of the date the benefit or charge is payable. The amount distributable or chargeable to the Account shall be equal to the number of Units distributed or charged from the Account multiplied by the Unit value determined as of the Accounting Date immediately preceding the date as of which the distribution or charge is payable.

10.8 Unit Value upon Transfer of Investment Funds

Participants, Alternate Payees and Beneficiaries electing to transfer from one Investment Fund to another under Plan section 9.2 shall, as of the Accounting Date of the transfer, have their Accounts in the Investment Fund from which the transfer is made charged and their Accounts in the Investment Fund to which the transfer is made credited, based upon the applicable Investment Fund Unit values in effect as of the Accounting Date.

10.9 Oxy Stock Fund Valuation

The balance of each Matching Account and, separately, any other portion of the Account invested in the Oxy Stock Fund shall be maintained in full and fractional Units.

All Oxy Stock acquired by the Oxy Stock Fund, including, but not by way of limitation,
Oxy Stock contributed directly by the Employer or purchased with the contributions, Oxy Stock purchased with cash dividends paid in respect of Oxy Stock, Oxy Stock acquired from stock dividends and stock splits, and Oxy Stock purchased with the proceeds of the sale or exchange of warrants, rights or dividends in kind distributed in respect of Oxy Stock, shall be allocated to the Accounts based on the portion of the Account invested in the Oxy Stock Fund as of the Accounting Date in which the Oxy Stock is acquired.

For the purpose of valuing an Account in connection with any withdrawal or loan under the provisions of the Plan or for the purpose of any distribution in kind or partly in kind, shares of Oxy Stock shall be valued as of the Accounting Date of the withdrawal, loan, or distribution based on the closing quotation on the New York Stock Exchange on the

Accounting Date in which such withdrawal, loan, or distribution is made; provided, however, that if shares of Oxy Stock are sold in connection with such a withdrawal, loan, or distribution, the shares sold shall be valued at the net proceeds received from such sale. If the closing price of such Oxy Stock shall not be so quoted or if so quoted shall not be available to the Administrative Committee, a composite index price or other price which shall be generally accepted for the establishment of fair market value shall be used for the purpose of so valuing the Account.

For the purpose of valuing an Account in connection with any transfer under the provisions of the Plan, shares of Oxy Stock shall be valued as of the effective date of the transfer based on the closing quotation on the New York Stock Exchange on the Accounting Date in which such transfer is made; provided, however, that if shares of Oxy Stock are sold in connection with such transfer, the shares sold shall be valued at the net proceeds received from such sale. If the closing price of such Oxy Stock shall not be so quoted or if so quoted shall not be available to the Administrative Committee, a composite index price or other price which shall be generally accepted for the establishment of fair market value shall be used for the purpose of so valuing the Account.

With respect to the warrants received by the Plan in August 2020, the Account of each Participant whose Account held an interest in the Oxy Stock Fund at the close of business on July 6, 2020 will be allocated a proportionate interest in all the warrants received by the Plan based on the Participant's Oxy Stock Fund units on July 6, 2020. Such proportionate interest will be allocated to each Participant in a separate warrant account established on behalf of each Participant. If the investment manager appointed by the Investment Committee with respect to the warrants sells the warrants for cash or exercises the warrants to purchase additional Oxy Stock, any proceeds from the sale or exercise will be allocated to the Participant's Account and invested in the Oxy Stock Fund.

10.10 Value of Accounts

The value of the balance of any Account as of any Accounting Date shall equal:

(a) The number of Units credited to the Account as of that date, including Units credited on that date pursuant to Plan section 10.6, multiplied by the Unit value determined as of the Accounting Date, plus

(b) Any uninvested cash in the Account.

10.11 Cost Account

The Trustee shall maintain records so that the cost or "basis" (for tax purposes) of the Oxy Stock allocated to an Account may be determined as of any Accounting Date. Whenever shares of Oxy Stock are distributed from the Account, such shares shall be assigned a cost equal to the average cost of all shares allocated at the same time in accordance with rules and procedures adopted for the purpose by the Administrative Committee.

10.12 Rollover and Roth and After-Tax Rollover Contributions

(a) Subject to the Administrative Committee's approval and in accordance with uniform and nondiscriminatory procedures adopted by the Administrative Committee, Active or Inactive Participants may contribute, under the conditions specified in this Plan section, to this Plan any of the amounts specified as Rollover Contributions, Roth Rollover Contributions or, on and after January 1, 2020, After-Tax Rollover Contributions. Rollover Contributions will be held in the Participant's Rollover Account. Roth Rollover Contributions will be held in the Participant's Roth Rollover Account. After-Tax Rollover Contributions will be held in the Participant's After-Tax Rollover Account.

(b) The amount must have been received by or on behalf of the Participant as an eligible rollover distribution, as defined in Code section 402(c)(4).

(1) In the case of direct rollovers, the distribution must be received directly from:

(A) A Qualified Plan;

(B) An annuity plan described in Code section 403(a);

(C) An annuity contract described in Code section 403(b);

(D) An eligible plan under Code section 457(b) which is maintained by a state, a political subdivision of a state, or any agency or instrumentality of a state or political subdivision of a state; or

(E) An individual retirement account described in Code section 408(a) consisting of amounts eligible as Rollover Contributions.

(2) In the case of a Rollover Contribution or Roth Rollover Contribution by the Participant, as opposed to a direct rollover, the contribution must meet the requirements established by the Administrative Committee and the requirements of Code section 402(c)(3); provided that any Roth amounts must be received as a direct rollover from another designated Roth account in a Qualified Plan.

(3) On a uniform and nondiscriminatory basis, the Administrative Committee or the Company may permit direct rollovers of promissory notes in connection with a loan under a Qualified Plan pursuant to Treasury Regulations section 1.401(a)(31)–1, Q&A–16. The Administrative Committee may establish such reasonable procedures as it deems necessary to facilitate the direct rollover of the promissory notes and to ensure that after the rollover, each loan under the Plan complies with Code section 72(p), ERISA section 408(b)(1), and the regulations thereunder. By way of illustration and not limitation, the Administrative Committee may reamortize directly rolled over loans to accommodate repayment of the loans in conjunction with the payroll schedules of an Employer so as to comply with the maximum permitted term of the loan, or may require a Participant to execute such modification to an existing loan that is rolled over, as the Administrative Committee deems, in its sole discretion, necessary to comply with Code section 72(p), ERISA section 408(b)(1), or the regulations thereunder.

(c) Before accepting an amount as a Rollover, Roth Rollover or After-Tax Rollover Contribution, the Administrative Committee may require such information and documents it deems necessary or appropriate to establish that the contribution will satisfy the requirements of this Plan section and that receipt of the contribution will not adversely affect the qualified status of this Plan. To the extent deemed necessary or appropriate by the Administrative Committee, such information may include copies of one or more of the following: IRS Form 1099, a distribution statement, the distribution check, certifications from the

Participant, and statements from the administrator of the transferor plan that such plan had received a favorable determination letter from the Internal Revenue Service.

(d) Rollover, Roth Rollover and After-Tax Rollover Contributions, other than a promissory note evidencing a Participant loan that is rolled over, shall be invested in such Investment Funds as the Participant shall select, in accordance with such rules as are provided in Article 9, or in accordance with other procedures approved by the Administrative Committee. Rollover, Roth Rollover and After-Tax Rollover Contributions to this Plan will not be accepted unless the Participant has made an affirmative investment election with respect to his or her Rollover, Roth Rollover or After-Tax Rollover Account under Article 9. Notwithstanding the foregoing, in no event shall Rollover, Roth Rollover or After-Tax Rollover Contributions be invested in the Oxy Stock Fund.

(e) If a Rollover, Roth Rollover or After-Tax Rollover Contribution is made to this Plan and the Administrative Committee later determines that the contribution did not satisfy the requirements of this Plan section, then the Rollover, Roth Rollover or After-Tax Rollover Contribution, plus any earnings attributable to the Rollover, Roth Rollover or After-Tax Rollover Contribution, shall be distributed to the Participant, within a reasonable time after the Administrative Committee's determination. The Administrative Committee may use any reasonable method to determine the amount of earnings attributable to the Rollover, Roth Rollover or After-Tax Rollover Contribution.

(f) The balance in a Participant's Rollover, Roth Rollover or After-Tax Rollover Account shall be distributed at the same time and in the same manner as other amounts in the Participant's Account. Any questions concerning entitlement to a distribution of a Rollover, Roth Rollover or After-Tax Rollover Account shall be resolved by adding the term "and Rollover, Roth Rollover or After-Tax Rollover Account" in each place where the term "Account" appears in Article 7.

10.13 Merger of the THUMS Long Beach Company Savings and Investment Plan

Effective as of October 31, 2011, the THUMS Long Beach Company Savings and Investment Plan is merged with and into this Plan. The entire interest of each individual, who was a participant in the THUMS Long Beach Company Savings and Investment Plan on October 28, 2011, shall be transferred to this Plan and Appendix G shall control the treatment of such interest as stated therein.

Article 11. Financing

11.1 Trust Fund

The Company shall maintain a trust to finance the benefits under the Plan, by entering into one or more Trust Agreements or insurance contracts approved by the Company, or by causing insurance contracts to be held under a Trust Agreement. Any Trust Agreement is designated as and shall constitute a part of this Plan, and all rights which may accrue to any person under this Plan shall be subject to all the terms and provisions of such Trust Agreement.

After March 25, 2020, the Administrative Committee shall have the sole authority to appoint, remove, or replace the Trustee with a successor Trustee or Trustees, to enter into one or more Trust Agreements, and to modify any Trust Agreement from time to time to accomplish the purposes of the Plan. By entering into such Trust Agreements, the Administrative Committee shall vest in the Trustee, or in one or more investment managers (as defined under ERISA) appointed under the terms of the Trust Agreement from time to time by action of the Investment Committee, responsibility for the management and control of the Trust Fund. In the event the Investment Committee appoints any such investment manager, the Trustee shall not be liable for the acts or omissions of the investment manager or have any responsibility to invest or otherwise manage any portion of the Trust Fund subject to the management and control of the investment manager. The Investment Committee from time to time shall establish a funding policy which is consistent with the objectives of the Plan and shall communicate it to the Trustee and each investment manager so that they may coordinate investment policies with such funding policy.

11.2 Oxy Stock Fund

(a) **General Rules**. The Oxy Stock Fund shall consist of shares of Oxy Stock and cash or cash equivalents that are held pending investment in Oxy Stock. Investment in such shares shall be made from time to time by a direct issue of Oxy Stock from the Company or by purchase from securities dealers or by private purchase at such prices and in such amounts as the Trustee may determine in its absolute and complete discretion. However, no private purchase of such shares shall be made at a total cost greater than the total cost (including brokers’ fees and other expenses of purchase) of purchasing such shares at the then prevailing price of such shares on the open market, such prevailing price to be determined by the Trustee as nearly as practicable based on the most recent public trading prices for the Oxy Stock. The Trustee may match purchases and sales to satisfy investment elections, withdrawals, loans and distributions of Participants.

The Trustee in its discretion may limit the daily volume of its purchases or sales of Oxy Stock to safeguard interest of Participants or comply with legal or exchange requirements. If the Trustee limits daily volume then the purchase prices or sale proceeds, as the case may be, during the period of volume limitations, shall be averaged, and the average per share price or sale proceeds shall be used in determining the cost or proceeds to be applied in satisfaction of any order of a Participant which requires the Trustee to purchase or sell Oxy Stock during such period.

All Oxy Stock purchased by the Trustee shall be registered in the name of the Trustee or its nominee, and legal title to such Oxy Stock shall remain in the

Trustee until the Participant shall become entitled to distribution thereof pursuant to this Plan.

The Trustee in its own discretion may invest funds awaiting investment in Oxy Stock in short-term obligations, including obligations of the United States of America or any agency or instrumentality thereof, trust and participation certificates, beneficial interests in any trust, and such other short-term obligations as the Trustee deems to be appropriate for such interim investment purposes.

In the event any option, right or warrant is received by the Trustee on Oxy Stock, the independent fiduciary designated by the Investment Committee shall sell the same at public or private sale and at such price and upon such other terms as it may determine, unless the independent fiduciary shall determine that such option, right or warrant should be exercised, in which case the independent fiduciary shall exercise the same upon such terms and conditions it may prescribe.

(b) **Election Restrictions for Officers**. Investment elections of Company officers shall be limited, if necessary, so that the beneficial interest in the Oxy Stock held by the Trust Fund for their Accounts shall not exceed, in the aggregate, 20 percent of the total value of all securities and other assets held by the Trust Fund in all Investment Funds. For purposes of this section, the term “officers” shall have the same meaning as set forth in Regulations section 240.3-b-2 promulgated pursuant to section 3(b) of the Securities Exchange Act of 1934.

(c) **Voting Rights**. Before each annual or special meeting of the shareholders of the Company, and at such other times when shareholder action is required, the Company or Trustee (as determined under the applicable Trust Agreement) shall send to each Participant, Beneficiary and Alternate Payee who has an investment in Oxy Stock through the Oxy Stock Fund, the proxy or consent solicitation materials that are sent to the Company’s shareholders of record. Each such Participant, Beneficiary and Alternate Payee shall have the right to instruct the Trustee confidentially as to the method of voting the shares of Oxy Stock allocated to the Account (through investment in the Oxy Stock Fund) as of the record date for determining the shares that are entitled to vote at the meeting of shareholders or that are entitled to give or withhold consent to corporate action. The Trustee in accordance with the instructions received from the Participant, Beneficiary, or Alternate Payee shall vote such full and fractional shares of Oxy Stock. The Administrative Committee shall instruct the Trustee as to the method of voting shares of Oxy Stock for which timely voting instructions are not received from Participants, Beneficiaries or Alternate Payees. The Trustee shall not vote shares of Oxy Stock for which it does not receive voting instructions from Participants, Beneficiaries, Alternate Payees or the Administrative Committee. The Company shall ensure that the requisite voting forms, together with all information distributed to shareholders regarding the exercise of voting rights, are furnished to the Trustee and by the Trustee to such Participants, Beneficiaries and Alternate Payees within a reasonable time before such voting rights are to be exercised with respect to Oxy Stock held in the Oxy Stock Fund.

(d) **Distribution or Reinvestment of Cash Dividends**. In accordance with procedures set forth in this subsection, as implemented by the Administrative

Committee, each Participant who is a Participant in the ESOP portion of this Plan may make the dividend pass-through election described in this subsection with respect to dividends paid on or after June 1, 2002 on Oxy Stock held in the Oxy Stock Fund attributable to the Participant's Matching Account and with respect to dividends paid on or after July 19, 2007 on all Oxy Stock held in the Oxy Stock Fund. The dividends on which the dividend pass-through election may be made are referred to as Eligible Dividends. Cash dividends that are not Eligible Dividends and cash proceeds from any other distribution received on Oxy Stock shall be invested in Oxy Stock.

(1) **Pass-Through Election**. With respect to Eligible Dividends, the Participant may elect between:

(A) Either:

(i) The cash payment of Eligible Dividends directly to the Participant; except effective August 8, 2016, if the amount of Eligible Dividends is less than $10.00, then the Eligible Dividends will be reinvested pursuant to Subsection (B) below; or

(ii) If permitted by the Administrative Committee, the payment of Eligible Dividends to the Participant's Matching Account, Pre-Tax Account, Roth Account, After-Tax Account, Rollover Account, Roth Rollover Account, After-Tax Rollover Account and In-Plan Roth Rollover Account (based on the subaccount from which the Eligible Dividend is derived) followed by the distribution of Eligible Dividends in cash to the Participant not later than 90 days after the close of the Plan Year in which the Eligible Dividends were paid by the Company; and

(B) The payment of Eligible Dividends to the Participant's Matching Account, Pre-Tax Account, Roth Account, After-Tax Account, Rollover Account, Roth Rollover Account, After-Tax Rollover Account and In-Plan Roth Rollover Account (based on the subaccount from which the Eligible Dividend is derived) and reinvestment in Oxy Stock through the Oxy Stock Fund.

If the Participant does not make an affirmative election, he shall be deemed to have elected the reinvestment of Eligible Dividends pursuant to subparagraph (B). Any earnings on Eligible Dividends shall not be distributed pursuant to subparagraph (A)(ii), but any losses on such Eligible Dividends shall reduce the amount that can be distributed to the Participant under such provision. The Participant's election in effect on the ex-dividend date for the Eligible Dividend shall control. A Participant may not split his election between subparagraph (A) and subparagraph (B) with respect to any single Eligible Dividend payment date.

(2) **Election Requirements**. The dividend pass-through election shall meet the following minimum requirements:

(A) A Participant must be given a reasonable opportunity before Eligible Dividends are paid or distributed in which to make the election.

(B) A Participant must have a reasonable opportunity to change a dividend election at least annually.

(C) If there is a change in the Plan terms governing the manner in which Eligible Dividends are paid or distributed, a Participant must be given a reasonable opportunity to make an election under the new Plan terms prior to the date on which the first Eligible Dividend subject to the new Plan terms is paid or distributed.

(D) No election shall be applied retroactively; elections shall apply only to future dividend allocations.

(3) **Treatment of Eligible Dividends**. Eligible Dividends shall be treated as follows for purposes of the Plan:

(A) A Participant shall at all times be fully vested in any Eligible Dividends with respect to which the Participant is offered a dividend pass-through election. The Participant shall be fully vested regardless of whether the Eligible Dividends are paid in cash or reinvested in Oxy Stock allocated to the Participant's Account and regardless of whether the Participant is vested or nonvested in other amounts held in his Matching Account.

(B) Eligible Dividends, whether paid in cash to the Participant or reinvested in the Plan, do not constitute an Annual Addition. In addition, reinvested Eligible Dividends do not constitute elective deferrals, within the meaning of Code section 402(g)(3), and shall not be treated as Pre-Tax Deferrals, Roth Contributions or other elective deferrals, under the ADP Test, or After-Tax Contributions, Adjustment Contributions or Matching Contributions under the ACP Test.

(C) Eligible Dividends that are reinvested in Oxy Stock pursuant to a Participant's election under this subsection are treated as earnings in the same manner as dividends with respect to which a Participant is not provided a dividend pass- through election.

(D) Eligible Dividends paid in cash pursuant to a Participant's election under this subsection:

(i) Are not subject to the consent requirements of Code section 411(a)(11) or the restrictions on the distributions of elective deferrals under Code section 401(k)(2)(B), notwithstanding any Plan provision to the contrary; and

(ii) Do not constitute an Eligible Rollover Distribution (as determined under Plan section 7.7(b)(4)), even if the dividends are distributed at the same time as amounts that do constitute an Eligible Rollover Distribution.

(4) **Alternate Payees and Beneficiaries**. Subject to such rules as the Administrative Committee may prescribe, Alternate Payees and Beneficiaries shall be treated as Participants for purposes of this subsection.

11.3 Forfeitures

The Administrative Committee may use forfeitures occurring in any processing period to pay the reasonable costs of administering the Plan to the maximum extent permitted by ERISA or to reduce Matching Contributions of all Employers without regard to whether the forfeitures are attributable to persons employed by any individual Employer for such processing period or future processing periods. If the amount of allocable forfeitures occurring in a processing period exceeds the amount of Employer contributions for such processing period, then the excess shall be deposited in a separate account. Effective December 1, 2016, or as soon as practicable thereafter but in no event later than December 31, 2016, such amounts will be deposited into a separate "Forfeiture Account," invested in the Stable Value Fund, or such other Investment Fund as determined within the discretion of the Administrative Committee, and such amounts will be considered Plan assets and allocated in lieu of Employer contributions in succeeding pay periods, used to pay the reasonable expenses of administering the Plan or allocated among Participants as additional contributions. If the Plan terminates while a balance in the Forfeiture Account exists, the balance shall be allocated to Participants per capita to the extent of the maximum amount permitted under Plan section 6.6. Forfeitures shall be used before the end of the Plan Year in which the forfeitures occurred to the extent administratively feasible.

11.4 Non-Reversion

Anything in this Plan to the contrary notwithstanding, it shall be impossible at any time for the contributions of the Employer or any part of the Trust Fund to revert to the Company or an Affiliate or to be used for or diverted to any purpose other than the exclusive benefit of Participants or their Beneficiaries, except that:

(a) If a contribution or portion thereof is made by the Employer by a mistake of fact, upon written request to the Administrative Committee, such contribution or such portion, reduced by losses but not increased by earnings, shall be returned to the Employer within one year after the date of payment; and

(b) In the event that a deduction for any contributions made by the Employer is disallowed by the Internal Revenue Service in any Plan Year, then that portion of the Employer contribution that is not deductible shall be returned to the Employer within one year from the date of receipt of notice by the Internal Revenue Service of the disallowance of the deduction.

11.5 Direct Transfer of Assets from Plans of Acquired Entities

The Trust Agreement shall permit the direct receipt of assets which are transferred directly to the Trust Fund from the trustees of any other Qualified Plan sponsored, at the time of the applicable transaction, by entities which are the subject of purchase transactions made by the Company or an Affiliate.

11.6 Pension Expense Reimbursement Account ("PERA")

The Administrative Committee in its discretion may decide to use revenue sharing payments (*i.e.*, float income earned on uninvested cash and all other revenue, if any, received from the investments in the Plan (other than operating expenses paid by mutual fund shareholders generally, whether via rebates or otherwise, that are reflected in the net asset values of such mutual fund shares)) for approved ERISA expenses. Such amounts as well as Participant-paid fees and Plan-imposed excessive trading fees will be deposited into a separate “ERISA Account,” invested in the Stable Value Fund, or such other fund as determined within the discretion of the Administrative Committee, and such amounts will be considered Plan assets. Amounts in the ERISA Account must be used for the direct benefit of Plan Participants, and any balances remaining in the ERISA Account at year end must be used by the end of the first quarter of the next Plan Year. Alternatively, the year-end balance must be allocated to Participant Accounts after this deadline. Approved ERISA expenses will include those reasonable, necessary and direct expenses incurred by the Plan for services provided by the Plan’s Trustee, recordkeeper or other service providers.

Article 12. Administration

12.1 The Administrative Committee

The Plan shall be administered by an Administrative Committee appointed by the Board; after March 25, 2020, the Administrative Committee shall be appointed by the Fiduciary Appointment Officer. The Administrative Committee shall be the Plan Administrator. The Administrative Committee shall be composed of as many members as the Board or, if after March 25, 2020, the Fiduciary Appointment Officer, may appoint from time to time, but not fewer than three members, and shall hold office at the discretion of the Fiduciary Appointment Officer.

Any member of the Administrative Committee may resign by delivering his or her written resignation to the Administrative Committee Secretary. Such resignation shall be effective no earlier than the date of the written notice.

Vacancies in the Administrative Committee arising by resignation, death, removal, or otherwise, shall be filled by the Fiduciary Appointment Officer. The Administrative Committee shall be a fiduciary under the Plan, in accordance with ERISA.

After March 25, 2020, the Fiduciary Appointment Officer shall have the sole authority to appoint, remove, replace, and monitor members of the Administrative Committee.

12.2 Chairperson, Secretary, and Employment of Specialists

The Fiduciary Appointment Officer shall appoint, from the members of each of the Investment Committee and Administrative Committee, a Chairperson and the members shall elect a Secretary who may, but need not, be a member of such Committee. In the event the Fiduciary Appointment Officer does not appoint a Chairperson, the members of each Committee shall select a Chairperson of their respective Committee. They may authorize one or more of their number or any agent to execute or deliver any instrument or instruments on their behalf, and may employ such counsel, auditors, and other specialists and such clerical, medical, actuarial, and other services as they may require in carrying out the provisions of the Plan.

12.3 Compensation and Expenses

The members of the Investment Committee and Administrative Committee who are Employees shall serve without compensation for services as a member of such Committee. Any member of a Committee may receive reimbursement by the Company of expenses properly and actually incurred.

All expenses of administration may be paid out of the Trust Fund, to the maximum extent permitted by ERISA, unless paid by the Company. Such expenses shall include any expenses incident to the functioning of the Administrative Committee and the Investment Committee, including but not limited to, fees of accountants, counsel, and other specialists and their agents, and other costs of administering the Plan. Until paid, the expenses shall constitute a liability of the Trust Fund. However, the Company may reimburse the Trust Fund for any administration expense incurred. The Company reserves the right to charge the Accounts for reasonable expenses incurred in the administration of their Accounts. Any such charges shall be used to pay the costs of administering this Plan in the manner described in Plan section 11.3. The Company will make full disclosure of the amount and nature of any such charge prior to its imposition.

12.4 Manner of Action

A majority of the members of the Investment Committee and Administrative Committee at the time in office shall constitute a quorum for the transaction of business. All resolutions adopted, and other actions taken by a Committee at any meeting shall be by the vote of a majority of those present at any such meeting. Upon obtaining the written consent of a majority of the members at the time in office, action of a Committee may be taken otherwise than at a meeting.

12.5 Subcommittees

Each of the Investment Committee and Administrative Committee may appoint one or more subcommittees and delegate such of its power and duties as it deems desirable to any such subcommittee, in which case every reference herein made to such Committee shall be deemed to mean or include the subcommittees as to matters within their jurisdiction. The members of any such subcommittee shall consist of such officers or other Employees of the Company and such other persons as such Committee may appoint.

12.6 Other Agents

Each of the Board, the Company, the Administrative Committee and the Investment Committee may also appoint one or more persons or agents to aid it in carrying out its duties as fiduciary or nonfiduciary, and delegate such of its powers and duties as it deems desirable to such person or agents.

12.7 Records

All resolutions, proceedings, acts, and determinations of each of the Administrative Committee and the Investment Committee shall be recorded by the Secretary thereof or under the Secretary's supervision, and all such records, together with such documents and instruments as may be necessary for the administration of the Plan, shall be preserved in the custody of the Secretary.

12.8 Rules

Subject to the limitations contained in the Plan, each of the Administrative Committee and the Investment Committee shall be empowered from time to time in its discretion to adopt by-laws and establish rules for the conduct of its affairs and the exercise of the duties imposed upon it under the Plan.

12.9 Administrative Committee's Powers and Duties

Except as otherwise provided in this Plan, the Company shall have responsibility for any settlor powers, functions or duties, including, without limitation, the right to amend or terminate the Plan as set forth in Plan section 13.1. The Administrative Committee shall have responsibility for the general administration of the Plan and for carrying out the Plan's provisions. The Administrative Committee shall have such powers and duties as may be necessary to discharge its functions hereunder, including, but not limited to, the following:

(a) To construe and interpret the Plan, to supply all omissions from, correct deficiencies in and resolve ambiguities in the language of the Plan and Trust; to decide all questions of eligibility and determine the amount, manner, and time of payment of any benefits hereunder;

(b) To make a determination as to the right of any person to an allocation, and the amount thereof;

(c) To obtain from the Employees such information as shall be necessary for the proper administration of the Plan and, when appropriate, to furnish such information promptly to the Trustee or other persons entitled thereto;

(d) To prepare and distribute, in such manner as the Company determines to be appropriate, information explaining the Plan;

(e) To establish and maintain such accounts in the name of each Participant as are necessary;

(f) To instruct the Trustee with respect to the payment of benefits hereunder;

(g) To provide for any required bonding of fiduciaries and other persons who may from time to time handle Plan assets;

(h) To prepare and file any reports required by ERISA;

(i) To engage an independent public accountant to conduct such examinations and to render such opinions as may be required by ERISA;

(j) To select, engage, monitor and terminate the performance of third-party administrators and other service providers and develop policies with respect to service provider contracts to ensure that fees paid are reasonable;

(k) To allocate contributions, loan repayments and Trust Fund gains or losses to the Accounts of Participants;

(l) To take all steps it deems reasonable to correct any references or omissions that may arise in the operation of the Plan, which include taking any and all steps permitted under the Employee Plans Compliance Resolution System, the Voluntary Fiduciary Correction Program, or any other program of correction;

(m) To designate Affiliates as Employers as described in Plan section 14.1;

(n) To serve as the Plan Administrator for the Plan;

(o) To have the authority, in coordination with the Investment Committee, to appoint, remove or replace, the recordkeeper for the Plan;

(p) To have the authority to monitor the Trustee in connection with payments from the Trust Fund, including the payment of benefits; and

(q) To have the authority to appoint, remove, or replace the Trustee.

12.10 Investment Responsibilities

The Investment Committee shall have the authority and responsibility to direct and monitor the Trustee with respect to the investment and management of the Trust Fund, to appoint an investment manager, as defined in ERISA section 3(38), for the Plan's Investment Funds, including the Oxy Stock Fund, and to establish a funding policy and method consistent with the objectives of the Plan and the requirements of ERISA. Except as otherwise provided in ERISA, the Investment Committee may delegate such authority and responsibility to direct and monitor the Trustee or any person who acknowledges in writing that it is a fiduciary with respect to the Plan and who provides the Investment Committee with a written affirmation that it is qualified to act as an investment manager within the meaning of ERISA. If the Investment Committee delegates to an investment manager the authority and responsibility to so direct and monitor the Trustee, such investment manager, and not the Investment Committee or the Trustee, shall have sole responsibility for the investment and management of so much of the Trust Fund as has been entrusted to his management and control, and, except to the extent otherwise required by ERISA, such delegation shall relieve the Investment Committee and the members thereof of all duties and responsibilities with respect to the authority and responsibility so delegated.

12.11 Administrative Committee's Decisions Conclusive

The Administrative Committee shall have the exclusive right and discretionary authority to interpret the terms and provisions of the Plan, apply the facts to the terms of the Plan, and resolve all questions arising hereunder, including the right to resolve and remedy ambiguities, inconsistencies, or omissions in the Plan, provided, however, that the construction necessary for the Plan to conform to the Code and ERISA shall in all cases control. The Administrative Committee also shall have discretionary authority to make any factual determinations under the Plan. Benefits under this Plan will be paid only if the Administrative Committee decides in its discretion that the applicant is entitled to them. The Administrative Committee shall endeavor to act in such a way as not to discriminate in favor of any class of Employees, Participants, or other persons. Any and all disputes with respect to the Plan that may arise involving Participants, Beneficiaries or Alternate Payees shall be referred to the Administrative Committee and its decisions shall be final, conclusive, and binding. All findings of fact, interpretations, determinations, and decisions of the Administrative Committee in respect of any matter or question arising under the Plan shall be final, conclusive, and binding upon all persons, including, without limitation, Employees, Participants, Beneficiaries, Alternate Payees, and any and all other persons having, or claiming to have, any interest in or under the Plan. The factual determinations and decisions of the Administrative Committee shall be given the maximum possible deference allowed by law.

12.12 Indemnity

(a) To the extent permitted by the Company’s bylaws and applicable law, the Company shall indemnify and hold harmless each of the following persons (“Indemnified Persons”) under the terms and conditions of subsection (b):

(1) Each Affiliate;

(2) Each member of the Administrative Committee

(3) Each member of the Investment Committee; and

(4) Each Employee or member of the Board who has responsibility (whether by delegation from another person, an allocation of responsibilities under the terms of this Plan document, or otherwise) for a fiduciary duty, a nonfiduciary settlor function (such as deciding whether to approve a plan amendment), or a nonfiduciary administrative task relating to the Plan.

(b) The Company shall indemnify and hold harmless each Indemnified Person against any and all claims, losses, damages, and expenses, including reasonable attorney’s fees and court costs, incurred by that person on account of his good faith actions or failures to act with respect to his responsibilities relating to the Plan. The Company’s indemnification shall include payment of any amounts due under a settlement of any lawsuit or investigation, but only if the Company agrees to the settlement.

(1) An Indemnified Person shall be indemnified under this section only if he notifies an Appropriate Person at the Company of any claim asserted against or any investigation of the Indemnified Person that relates to the Indemnified Person’s responsibilities with respect to the Plan.

(A) A person is an “Appropriate Person” to receive notice of the claim or investigation if a reasonable person would believe that the person notified would initiate action to protect the interests of the Company in response to the Indemnified Person's notice.

(B) The notice may be provided orally or in writing. The notice must be provided to the Appropriate Person promptly after the Indemnified Person becomes aware of the claim or investigation. No indemnification shall be provided under this section to the extent that the Plan or Company is materially prejudiced by the unreasonable delay of the Indemnified Person in notifying an Appropriate Person of the claim or investigation.

(2) An Indemnified Person shall be indemnified under this section with respect to attorneys' fees, court costs or other litigation expenses or any settlement of such litigation only if the Indemnified Person agrees to permit the Company to select counsel and to conduct the defense of the lawsuit and agrees not to take any action in the lawsuit that the Company believes would be prejudicial to the interests of the Company.

(3) No Indemnified Person, including an Indemnified Person who had a Separation from Service, shall be indemnified under this section unless he makes himself reasonably available to assist the Company with respect to the matters in issue and agrees to provide whatever documents, testimony, information, materials, or other forms of assistance that the Company shall reasonably request.

(4) No Indemnified Person shall be indemnified under this section with respect to any action or failure to act that is judicially determined to constitute or be attributable to the gross negligence or willful misconduct of the Indemnified Person.

(5) Payments of any indemnity under this section shall be made only from the assets of the Company and shall not be made directly or indirectly from assets of the Plan. The provisions of this section shall not preclude such further indemnities as may be available under insurance purchased by the Company or as may be provided by the Company under any by-law, agreement or otherwise, provided that no expense shall be indemnified under this section that is otherwise indemnified by an insurance contract purchased by the Company.

12.13 Fiduciaries

The fiduciaries named in this Article shall have only those specific powers, duties, responsibilities, and obligations as are specifically given them under this Plan or the Trust or otherwise delegated by the Board. The Employers shall have the sole responsibility for making the contributions required under Article 4 and Article 5, and the Company shall have the sole authority to appoint and remove the Trustee until March 25, 2020, and to amend or terminate, in whole or in part, this Plan or the Trust. After March 25, 2020, the Administrative Committee shall have the sole authority to appoint and remove the Trustee. The Administrative Committee shall have the sole responsibility for the administration of this Plan, which responsibility is specifically described in this Plan and the Trust Agreement or otherwise delegated by the Board. The officers and Employees of the Company shall have the responsibility of implementing the Plan and carrying out its provisions as the Administrative Committee shall direct. The Investment Committee, the Trustee, and any investment manager shall have the sole responsibility for the administration of the Trust Fund and the management of the assets held under the Trust Fund, to the extent provided in the Trust

Agreement. A fiduciary may rely upon any direction, information, or action of another fiduciary as being proper under this Plan or the Trust Agreement, and is not required under this Plan or the Trust Agreement to inquire into the propriety of any such direction, information, or action. It is intended under this Plan and the Trust Agreement that each fiduciary shall be responsible for the proper exercise of his or its own powers, duties, responsibilities, and obligations under this Plan and the Trust Agreement and shall not be responsible for any act or failure to act of another fiduciary. No fiduciary guarantees the Trust Fund in any manner against investment loss or depreciation in asset value. Any party may serve in more than one fiduciary capacity with respect to the Plan or Trust Agreement.

Whether or not a particular activity performed by the Fiduciary Appointment Officer, Administrative Committee, Investment Committee, a Committee member, or delegate is considered to rise to the level of a fiduciary duty shall depend on whether the person or entity is, when performing the activity, exercising the discretion with respect to the administration of the Plan, which under ERISA, if applicable, requires a fiduciary standard of conduct. In the absence of an activity involving such an exercise of discretion with respect to the Plan's administration, the activity shall be considered ministerial, rather than fiduciary, in nature. If and when a Committee member or delegate is performing a "settlor" activity, under ERISA, including, by way of example, the adoption of an amendment to or decision to establish or terminate a plan, then such activity shall be deemed to be an exercise of "settlor" or sponsor responsibility and shall be subject to ordinary business judgment and not an exercise of fiduciary duty. The Fiduciary Appointment Officer, Administrative Committee, and Investment Committee will not be subject to fiduciary liability or standards for any settlor or non-fiduciary responsibilities and/or duties delegated to it by the Board.

12.14 Notice of Address

Each person entitled to benefits from the Plan must file with the Administrative Committee or its agent, in writing, his post office address and each change of post office address. Any communication, statement, or notice addressed to such a person at his latest reported post office address will be binding upon him for all purposes of the Plan, and neither the Administrative Committee nor the Company or any Trustee shall be obliged to search for or ascertain his whereabouts.

12.15 Data

All persons entitled to benefits from the Plan must furnish to the Company such documents, evidence, or information, including information concerning marital status, as the Company considers necessary or desirable for the purpose of administering the Plan; and it shall be a condition of the Plan that each such person must furnish such information and sign such documents as the Company may require before any benefits become payable from the Plan. The Administrative Committee shall be entitled to distribute benefits to a non-Spouse beneficiary in reliance upon the signed statement of the Participant that he is unmarried without any further liability to a Spouse if such statement is false.

12.16 Benefit Claims Procedures

The provisions of this section shall be subject to, and shall apply to, the extent required under Department of Labor Regulations section 2560.503-1 (relating to the requirements of claims procedures). All decisions made under the procedures described in this section shall be final and there shall be no further right of appeal. No lawsuit may be initiated by any person before fully pursuing the procedures set out in this section, including the appeal permitted pursuant to subsection (d).

(a) The right of a Participant, Beneficiary, Alternate Payee, or any other person entitled to claim a benefit under the Plan shall be determined by the Administrative Committee, provided, however, that the Administrative Committee may delegate its responsibility to any person. All persons entitled to claim a benefit under the Plan shall be referred to as a "Claimant" for purpose of this section. The term "Claimant" shall also include, where appropriate to the context, any person authorized to represent the Claimant under procedures established by the Administrative Committee.

(1) The Claimant may file a claim for benefits by written notice to the Administrative Committee.

(2) Any claim for benefits under the Plan, pursuant to this section, shall be filed with the Administrative Committee no later than eighteen months after the date that a transaction occurred, or should have occurred, with respect to a Claimant's Account (*e.g.*, two years after benefits were credited, or should have been credited, to a Claimant's Account, or eighteen months after any withdrawal or distribution occurred or should have occurred). The Administrative Committee in its sole discretion shall determine whether this limitation period has been exceeded.

(3) Notwithstanding anything to the contrary in this Plan, the following shall not be a claim for purposes of this section:

(A) A request for determination of eligibility, enrollment, or participation under the Plan without an accompanying claim for benefits under the Plan. The determination of eligibility, enrollment, or participation under the Plan may be necessary to resolve a claim, in which case such determination shall be made in accordance with the claims procedures set forth in this section.

(B) Any casual inquiry relating to the Plan, including an inquiry about benefits or the circumstances under which benefits might be paid under the Plan.

(C) A claim that is defective or otherwise fails to follow the procedures of the Plan (*e.g.*, a claim that is addressed to a party, other than the Administrative Committee, or an oral claim).

(D) An application or request for benefits under the Plan.

(b) If a claim for benefits is wholly or partially denied, the Administrative Committee shall, within a reasonable period of time, but no later than 90 days after receipt of the claim (or 45 days after receipt of the claim in the case of a disability claim), notify the Claimant of the denial of benefits. In the case of a claim other than a disability claim, if special circumstances justify extending the period up to an additional 90 days, the Claimant shall be given written notice of this extension within the initial 90-day period, and such notice shall set forth the special circumstances and the date on which a decision is expected. In the case of a disability claim, the Administrative Committee may give the Claimant written notice before the end of the initial 45-period that it needs an additional 30 days to review the claim, provided that such notice shall set forth the circumstances beyond the control of the Administrative Committee justifying extending the period and the date on which a decision is expected. If special circumstances beyond the control of the Administrative Committee's control justify extending the claim review period for an additional 30 days, the Claimant shall be provided written notice of this extension within the first 30-day period.

(c) A notice of denial:

(1) Shall be written in a manner calculated to be understood by the Claimant; and

(2) Shall contain:

(A) The specific reasons for denial of the claim;

(B) Specific reference to the Plan provisions on which the denial is based;

(C) A description of any additional material or information necessary for the Claimant to perfect the claim, along with an explanation as to why such material or information is necessary; and

(D) An explanation of the Plan's claim review procedures and the time limits applicable to such procedures, including a statement of the Claimant's right to bring a civil action under ERISA section 502(a) following an adverse determination on review.

(d) Within 60 days of the receipt by the Claimant of the written denial of his or her claim (or within 180 days of receipt in the case of a disability claim) or, if the claim has not been granted, within a reasonable period of time (which shall not be less than the applicable time period specified in subsection (b)), the Claimant may file a written request with the Administrative Committee that it conduct a full review of the denial of the claim. In connection with the Claimant's appeal, upon request, the Claimant may review and obtain copies of all documents, records and other information relevant to the Claimant's claim for benefits, but not including any document, record or information that is subject to any attorney-client or work-product privilege or whose disclosure would violate the privacy rights or expectations of any person other than the Claimant. The Claimant may submit issues and comments in writing and may submit written comments, documents, records, and other information relating to the claim for benefits. All comments, documents, records, and other information submitted by the Claimant shall be taken into account in the appeal without regard to whether such information was submitted or considered in the initial benefit determination.

(e) The Administrative Committee shall deliver to the Claimant a written decision on the claim promptly, but no later than 60 days (or 45 days in the case of a disability claim) after the receipt of the Claimant's request for such review, unless special circumstances exist that justify extending this period up to an additional 60 days (or 45 days in the case of a disability claim). If the period is extended, the Claimant shall be given written notice of this extension during the initial 60-day period (or 45-day period in the case of a disability claim) and such notice shall set forth the special circumstances and the date a decision is expected. The decision on review of the denial of the claim:

(1) Shall be written in a manner calculated to be understood by the Claimant;

(2) Shall include specific reasons for the decision;

(3) Shall contain specific references to the Plan provisions on which the decision is based;

(4) Shall contain a statement that the Claimant is entitled to receive, upon request and free of charge, reasonable access to, and other information relevant to the Claimant's claim for benefits; and

(5) Shall contain a statement of the Claimant's right to bring a civil action under ERISA section 502(a) following an adverse determination on review.

(f) No legal action may be commenced after the later of:

(1) 180 days after receiving the written response of the Administrative Committee to an appeal, or

(2) 365 days after the Claimant's original application for benefits.

(g) Any legal action in connection with the Plan must be filed in Harris County, Texas or the U.S. District Court for the Southern District of Texas. Notwithstanding the preceding sentence, in the event that the Administrative Committee exercises its right to initiate an interpleader action pursuant to Section 12.16(h), the Administrative Committee may in its discretion file such interpleader action in (i) a court in the state in which the Participant resides (or, in the event of the Participant's death, resided at the time of his death), (ii) a court in the state in which at least one claimant of the Participant's benefit resides or (iii) a court described in the first sentence of this Section 12.16(g).

(h) The Administrative Committee reserves the right, in its sole discretion, to initiate an interpleader action to resolve any competing claims for a benefit under the Plan or to determine the proper beneficiary of any benefit under the Plan.

12.17 Member's Own Participation

No member of the Administrative Committee or the Investment Committee may act, vote or otherwise influence a decision of the committee on which he or she serves specifically relating to his or her own participation under the Plan.

Article 13. Amendment and Termination

13.1 Amendment and Termination

The Company expects the Plan to be permanent and to continue indefinitely; however, this Plan is purely voluntary on the part of the Company and each Employer. The Company must necessarily and does hereby reserve the right to amend, modify, or terminate the Plan at any time by action of its Board. After March 25, 2020, the Plan Amendment Officer shall have the authority to amend or modify the Plan on behalf of the Company in its plan sponsor capacity as long as the amendment or modification (i) is necessary or appropriate to qualify or maintain the Plan's tax-qualified status or to comply with other legal requirements or (ii) does not significantly decrease benefits or significantly increase costs to the Company and its Affiliates.

13.2 Distribution on Termination

Upon termination of the Plan in whole or in part, or upon complete discontinuance of contributions to the Plan by the Company, the value of the proportionate interest in the Trust Fund of each Participant affected by such termination shall be determined by the Administrative Committee as of the date of such termination or discontinuance. The Accounts of such Participants shall be fully vested and nonforfeitable, and thereafter distribution shall be made to such Participants as directed by the Administrative Committee.

Upon the partial termination of the Plan, the Board may in its sole discretion determine the timing of a distribution of the balance of the affected Participants' Accounts.

13.3 Successors

In case of the merger, consolidation, liquidation, dissolution or reorganization of an Employer, or the sale by an Employer of all or substantially all of its assets, provision may be made by written agreement between the Company and any successor corporation acquiring or receiving a substantial part of the Employer's assets, whereby the Plan and the Trust Agreement will be continued by the successor. If the Plan is to be continued by the successor, then effective as of the date of the reorganization or transfer, the successor corporation shall be substituted for the Employer under the Plan and the Trust Agreement. The substitution of a successor corporation for an Employer will not in any way be considered a termination of the Plan.

13.4 Plan Merger or Transfer

This Plan shall not merge or consolidate with, or transfer assets and liabilities to, or accept a transfer from, any other employee benefit plan unless each Participant, Beneficiary, or Alternate Payee in this Plan will (if the Plan had then terminated) receive a benefit immediately after the merger, consolidation, or transfer which is not less than the benefit the Participant, Beneficiary, or Alternate Payee would have been entitled to receive immediately before the merger, consolidation, or transfer of assets (if this Plan had then terminated). Subject to these limitations, the Plan may transfer assets and liabilities to, or accept a transfer of assets and liabilities from, any other employee benefit plan which is qualified under Code section 401(a) where such a transfer has been authorized by agreement between the Company and the sponsor of the other employee benefit plan and is not prohibited by law.

Article 14. Participating Affiliates

14.1 Adoption of the Plan

The Board or, if authorized by the Board, the Administrative Committee may designate any Affiliate as an Employer under this Plan. The Affiliate shall become an Employer and a party to this Plan and the Trust Agreement upon acceptance of such designation effective as of the date specified by the Board or Administrative Committee.

14.2 Conditions of Participation

By accepting such designation or continuing as a party to the Plan and Trust, each Employer acknowledges that:

(a) It is bound by such terms and conditions relating to the Plan as the Company or the Administrative Committee may reasonably require;

(b) It must comply with all qualification requirements and employee benefit rules of the Code, ERISA and related regulations and hereby acknowledges the authority of the Company, the Administrative Committee, and the Investment Committee to review the Affiliate's compliance procedures and to require changes in such procedures to protect the Plan's qualification;

(c) It has authorized the Company, the Administrative Committee, and the Investment Committee to act on its behalf with respect to Employer matters pertaining to the Plan and the Trust Fund;

(d) It will cooperate fully with the Plan officials and their agents by providing such information and taking such other actions, as they deem appropriate for the efficient administration of the Plan and the Trust Fund; and

(e) Its status as an Employer under the Plan is expressly conditioned on its being and continuing to be an Affiliate of the Company.

14.3 Termination of Participation

(a) **Withdrawal by Affiliate**. Subject to the concurrence of the Board or Administrative Committee, any Affiliate may withdraw from the Plan and Trust, and end its status as an Employer hereunder, by communicating in writing to the Administrative Committee its desire to withdraw. The withdrawal shall be effective as of the date agreed to by the Board or Administrative Committee, as the case may be, and the Affiliate. Upon such withdrawal, the Plan shall not terminate.

(b) **Termination by Company**. The Company, acting through the Board or, if authorized by the Board, the Administrative Committee, reserves the right, in its sole discretion and at any time, to terminate the participation in this Plan of any Employer. Such termination shall be effective immediately, upon the notice of such termination from the Company to the Trustee and the Employer being terminated, whichever occurs first, or such later effective date agreed to by the Company. Upon such termination, this Plan shall not terminate.

14.4 Consequences of the Termination of an Employer

If an Employer ceases to participate in this Plan, for whatever reason, and the Plan is not terminated then, unless otherwise directed by the Board, the Administrative Committee shall elect, in its discretion, which of the following shall apply:

(a) The Administrative Committee may elect that the portion of the Plan attributable to the former Employer shall become a separate plan effective as of the date on which the Employer's participation in this Plan terminates. The Administrative Committee shall inform the Trustee of the portion of the Trust Fund that is attributable to the participation of the terminated Employer. As soon thereafter as is administratively feasible, the Trustee shall set apart that portion of the Trust Fund as a separate trust fund that shall be part of the separate plan of the terminated Employer. Thereafter, the administration, control, and operation of the separate plan, with respect to the terminated Employer, shall be on a separate basis, in accordance with the terms of this Plan except that:

(1) The terminated Employer, not the Company or the Administrative Committee, shall be the sponsor and administrator of the separate plan and shall have all duties, responsibilities, and powers that the Company, Administrative Committee and Investment Committee have under this Plan; and

(2) The terminated Employer, not the Company, shall have the power to amend and terminate the separate plan, in accordance with the provisions of Plan section 13.1.

(b) Alternatively, the Administrative Committee may elect to maintain the Accounts of Participants employed by the terminated Employer as follows:

(1) Except as provided in paragraph (5), all Participants employed by the terminated Employer on the date on which the entity ceases participation in this Plan shall become Inactive Participants or Former Participants, as applicable.

(2) The Pre-Tax Deferral, Roth Contribution, Catch-Up Contribution and After-Tax Contribution elections of an Active Participant under Article 4 shall only apply to Earnings for the portion of the Plan Year ending on the Employer's termination date.

(3) The terminated Employer shall transfer to the Trust Fund the Pre-Tax Deferrals, Roth Contributions, Catch-Up Contributions, Matching Contributions and After-Tax Contributions required under the Plan relating to Earnings through the effective date of the Employer's termination of participation in this Plan.

(4) For purposes of being eligible to receive a distribution of his or her Account, an Inactive Participant described in paragraph (1) shall not be treated as having a Separation from Service unless and until the Administrative Committee determines that the Participant is eligible to receive a distribution under the provisions of Code section 401(k)(2)(B)(i).

(5) If a Participant described in paragraph (1) becomes an Employee of another Employer immediately after the effective date of the prior Employer's termination of participation in this Plan, then the Participant shall be treated under the Plan as having transferred employment from one Employer to another.

(6) Should the Administrative Committee elect to take alternative action under this Section 14.4(b), the name of the terminated Employer and the effective date of such action will be set forth on Appendix H.

(c) With the consent of the Employer that is no longer participating in the Plan, the Company or Administrative Committee may take such other actions with respect to the Accounts of Participants employed by that Employer as are permitted under the Code and ERISA.

Article 15. Top-Heavy Provisions

15.1 Application of Top-Heavy Provisions

The provisions of this Article shall be interpreted and administered in accordance with the requirements of Code section 416 and related Treasury Regulations. The provisions of this Article shall apply for the Plan Year if, as of the Determination Date for that Plan Year, the Top-Heavy Ratio exceeds 60 percent.

15.2 Definitions Applicable to this Article

In addition to the terms defined in Plan section 2.1 or elsewhere in this Plan, whenever used in this Article, the following terms shall have the respective meanings set forth below, unless expressly provided otherwise. When the defined meaning is intended, the term is capitalized.

(a) **"Aggregation Group"** means each Qualified Plan of the Company or any Affiliate in which a Key Employee is a participant and any other Qualified Plan which enables a Qualified Plan of the Company or any Affiliate covering a Key Employee to meet the requirements of Code sections 401(a)(4) or 410. On behalf of the Company, the Administrative Committee may elect to include within the Aggregation Group any other Qualified Plan, together with the Qualified Plans referenced in the preceding sentence, provided that such expanded Aggregation Group continues to satisfy the requirements of Code sections 401(a)(4) and 410(b) for the Plan Year.

(b) **"Determination Date"** means the last day of the preceding Plan Year.

(c) **"Key Employee"** means, effective for Plan Years beginning after 2001, any Employee or a former Employee (including any deceased Employee) who, at any time during the Plan Year, is one of the following:

(1) An officer of the Company or any Affiliate whose Section 415 Compensation exceeds $130,000, as adjusted under Code section 416(i)(1) for Plan Years commencing after 2002, provided however, that the number of Employees included as Key Employees under this paragraph shall not exceed the lesser of:

(A) 50 Employees; or

(B) The greater of three Employees or 10 percent of all Employees of the Company and all Affiliates.

(2) A five-percent owner of the Company or any Affiliate.

(3) A one-percent owner of the Company or any Affiliate whose Section 415 Compensation exceeds $150,000.

Only Section 415 Compensation attributable to services performed during the Plan Year for the Company or an Affiliate shall be included. Ownership shall be determined in accordance with Code section 318 (as modified by Code section 416(i)(1)(B)(iii)). A Beneficiary or Alternate Payee whose rights under the Plan derive from a Key Employee shall also be treated as a Key Employee.

(d) **"Non-Key Employee"** means any Employee who is not a Key Employee.

(e) **"Top-Heavy Ratio"** means the ratio determined under Plan section 15.3.

15.3 Determination of Top-Heavy Ratio

The Top-Heavy Ratio for a Plan Year shall be determined as follows:

(a) **General Rule**. The numerator of the Top-Heavy Ratio is the sum of the amounts described in subsection (b) under all Qualified Plans in the Aggregation Group for each Key Employee. The denominator of the Top-Heavy Ratio is the sum of the amounts described in subsection (b) under all Qualified Plans in the Aggregation Group for all Employees.

(b) **Included Amounts**. When determining the Top-Heavy Ratio, the following amounts shall be included:

(1) The Employee's total Account balance as of the Determination Date under this Plan;

(2) The Employee's total account balance as of the Determination Date under all other Qualified Plans that are defined contribution plans included in the Aggregation Group;

(3) The present value as of the Determination Date of the Employee's accrued benefit under all Qualified Plans that are defined benefit plans included in the Aggregation Group.

(c) **Special Rules**. For purposes of computing the Top-Heavy Ratio and included amounts, the following rules shall apply:

(1) The present value of accrued benefits shall be determined using reasonable actuarial assumptions.

(2) In the case of a distribution made for a reason other than severance from employment, death, or Disability (*e.g.*, in-service withdrawals), this provision shall be applied by substituting "five-year period" for "one-year period."

(3) Any Rollover, Roth Rollover or After-Tax Rollover Contribution (or similar transfer) initiated by the Employee and made after December 31, 1983, to a Qualified Plan in the Aggregation Group shall be excluded when determining account balances with respect to the transferee plan.

(4) Account balances and accrued benefits shall be taken into account only to the extent attributable to contributions by the Company or Affiliate and contributions by the Employee while employed by the Company or an Affiliate.

(5) The present values of accrued benefits and account balances of any individual who has not performed services for the Company or any Affiliate during the one-year period ending on the Determination Date shall not be taken into account when determining the Top-Heavy Ratio.

(6) Account balances or accrued benefits of an Employee shall not be taken into account if the Employee is not a Key Employee for the Plan Year being tested but was a Key Employee in a prior Plan Year.

(7) To the extent required by Code section 416(e), contributions and benefits relating to Social Security or similar programs under federal or

state law shall not be taken into account in determining the Top-Heavy Ratio.

15.4 Required Minimum Allocations

If the provisions of this Article apply for the Plan Year because the Top-Heavy Ratio exceeds 60 percent, then with respect to the defined contribution minimum allocation required by Code section 416(c)(2) and related Treasury Regulations, the contributions shall be made under the Retirement Plan on behalf of each Non-Key Employee who is a Participant who has not incurred a Separation from Service as of the last day of the Plan Year (regardless of whether the Non-Key Employee has less than 1,000 hours of service (or the equivalent) and regardless of the Non-Key Employee's level of Section 415 Compensation), in an allocation for that Plan Year of not less than the lesser of:

(a) Three percent of the Participant's Section 415 Compensation, or

(b) The percentage equal to the largest contribution, expressed as a percentage of Section 415 Compensation, received by any Key Employee under all defined contribution plans in the Aggregation Group.

For purposes of satisfying the requirements of this section, Pre-Tax Deferrals and Roth Contributions shall not be included, for any Employee who is a Non-Key Employee, but shall be included for any Participant who is a Key Employee. Effective for Plan Years beginning after 2001, the allocation of Matching Contributions shall be included for all Employees. If any Qualified Plan in the Aggregation Group is a defined benefit plan, then any Participant who participates both in a defined benefit plan and would otherwise be entitled to a minimum contribution under this section shall receive the defined benefit minimum prescribed under Code section 416(c)(1) and related Treasury Regulations under the defined benefit plan and shall not receive the minimum allocation under this section.

15.5 Required Minimum Vesting

If the provisions of this Article apply for the Plan Year because the Top-Heavy Ratio exceeds 60 percent, then each Participant who has not incurred a Separation from Service as of the last day of the Plan Year shall continue to vest in his or her Matching Account and any defined contribution minimum allocation, as described in Plan section 15.4, for the Plan Year in accordance with the provisions of Plan section 3.5, which provides for vesting that is in all cases equal to or more rapid than required by Code section 416(b).

15.6 Employees Covered by Collective Bargaining Agreement

Notwithstanding any provision of this Article to the contrary, the provisions of Plan sections 15.4 and 15.5 shall not apply with respect to any Represented Employee covered by a collective bargaining agreement where retirement benefits were the subject of good faith bargaining between the Employer and the union.

Article 16. Miscellaneous Provisions

16.1 No Enlargement of Employment Rights

This Plan is strictly a voluntary undertaking on the part of the Company and the Employers and shall not be deemed to constitute a contract between the Employers and any Employee or Participant, Beneficiary, or Alternate Payee, or to be consideration for, or an inducement to, or a condition of, the employment of any Employee. Nothing contained in this Plan or any modification of the same or act done in pursuance hereof shall be construed as giving any person any legal or equitable right against the Employer, the Trustee, or the Trust Fund, unless specifically provided herein, or as giving any person a right to be retained in the employ of the Employer. All Participants shall remain subject to assignment, reassignment, promotion, transfer, layoff, reduction, suspension, and discharge to the same extent as if this Plan had never been established. No Participant, Beneficiary, or Alternate Payee, before satisfying all conditions for receiving benefits, shall have any right or interest in or to any portion of the Trust Fund. No one shall have any right to benefits, except to the extent provided in this Plan.

16.2 No Examination or Accounting

Neither this Plan nor any action taken thereunder shall be construed as giving any person the right to an accounting or to examine the books or affairs of the Company or any Affiliate.

16.3 Investment Risk

The Participants and their Beneficiaries shall assume all risks in connection with any decrease in the value of any assets or funds which may be invested or reinvested in the Trust Fund which supports this Plan.

16.4 Non-Alienation

(a) Except as otherwise permitted by the Plan, no benefit payable at any time under the Plan shall be subject to the debts or liabilities of a Participant or his or her Beneficiary. Any attempt to alienate, sell, transfer, assign, pledge, or otherwise encumber any such benefit, whether presently or thereafter payable, shall be void. Except as provided in this section, no benefit under the Plan shall be subject in any manner to attachment, garnishment, or encumbrance of any kind.

(b) Payment may be made from a Participant’s Account to an Alternate Payee, pursuant to a Qualified Domestic Relations Order.

  (1) The Administrative Committee shall establish reasonable written procedures for reviewing court orders made, pursuant to state domestic relations law (including a community property law), relating to child support, alimony payments, or marital property rights of a Spouse, former Spouse, child, or other dependent of a Participant and for notifying Participants and Alternate Payees of the receipt of such orders and of the Plan’s procedures for determining if the orders are Qualified Domestic Relations Orders and for administering distributions under Qualified Domestic Relations Orders.

  (2) Except as may otherwise be required by applicable law, such Qualified Domestic Relations Orders may not require a retroactive transfer of all or part of a Participant’s Account to or for the benefit of an Alternate Payee without permitting an appropriate adjustment for earnings and investment gains or losses that have occurred in the interim, nor shall such orders require the Plan to provide rights to Alternate Payees that are not available to Beneficiaries generally.

(3) In cases in which a full and prompt payment of amounts assigned to an Alternate Payee will not be made, pursuant to this subsection, the assigned amounts will be transferred, within a reasonable time after determination that the order is a Qualified Domestic Relations Order, to a separate Account for the benefit of the Alternate Payee and invested in accordance with the Alternate Payee's investment elections pursuant to Article 9.

(4) No amount that is segregated pending a determination of whether a domestic relations order is a Qualified Domestic Relations Order or transferred to a separate Account for the benefit of the Alternative Payee shall be taken into account when determining the amount that:

(A) A Participant may withdraw from his or her Account, pursuant to Plan section 7.2;

(B) A Participant may receive in a Plan loan, pursuant to Plan section 8.2; or

(C) A Participant (or his or her Beneficiary) may receive in a distribution, pursuant to Plan section 7.3 or 7.5.

(c) Payment may be made from an Account, to the extent required by a federal tax levy made pursuant to Code section 6331 or by the United States' collection of a judgment resulting from an unpaid federal tax assessment. Payment may be made at the time required by the tax levy or judgment collection order, even if payment would not otherwise be made at that time under the terms of the Plan and payment from the Plan would not otherwise be permitted at that time under Code section 401(a), 401(k), or 411(a)(11).

(d)

(e) Payments from an Account may be offset to the extent permitted under Code section 401(a)(13)(C) (relating to offsets regarding breaches of duty with respect to the Plan).

(f) A Participant or Beneficiary may disclaim his or her Account, or a portion thereof, subject to the rules which may be modified from time to time by the Administrative Committee.

16.5 Incompetency

Every person receiving or claiming benefits under the Plan shall be conclusively presumed to be mentally competent and of age until the date on which the Administrative Committee (or its delegee) receives a written notice, in a form and manner acceptable to the Administrative Committee (or its delegee), that such person is incompetent or a minor, for whom a guardian or other person legally vested with the care of his or her person or estate has been appointed; provided, however, that if the Administrative Committee (or its delegee) shall find that any person to whom a benefit is payable under the Plan is unable to care for his or her affairs because of incompetency, or is a minor, any payment due (unless a prior claim therefore shall have been made by a duly appointed legal representative) may be paid to the Spouse, a child, a parent, a brother or sister, or to any person or institution deemed by the Administrative Committee (or its delegee) to have incurred expenses for such person otherwise entitled to payment. To the extent permitted by law, any such payment so made shall be a complete discharge of liability therefore under the Plan. In the event that a guardian of the estate of any person receiving or claiming benefits under the Plan shall be appointed by a court of competent jurisdiction or a person shall otherwise qualify as a guardian within the sole discretion of the Administrative Committee (or its delegee) and such guardian provides proper proof of appointment, qualification, or continuing qualification, as applicable, in a form and manner acceptable to the Administrative Committee (or its delegee), then, to the extent permitted by law:

(a) Such guardian may act for the Participant, Beneficiary, or Alternate Payee and make any election required of or permitted by the Participant, Beneficiary, or Alternate Payee under this Plan, and such action or election shall be deemed to have been taken by the Participant, Beneficiary, or Alternate Payee; and

(b) Benefit payments may be made to such guardian, and any such payment so made shall be a complete discharge of any liability therefore under the Plan.

16.6 Records Conclusive

The records of the Company, Employers, the Administrative Committee, the Investment Committee and the Trustee shall be conclusive in respect to all matters involved in the administration of the Plan.

16.7 Counterparts

This Plan may be executed in any number of counterparts, each of which shall be deemed to be an original. All the counterparts shall constitute but one and the same instrument and may be sufficiently evidenced by any one counterpart.

16.8 Service of Legal Process

The Trustee, the members of the Administrative Committee, and the Secretary of the Company are hereby designated agents of the Plan for the purpose of receiving service of summons, subpoena, or other legal process.

16.9 Uncashed or Unclaimed Benefits

(a) Stale Checks. Effective on or after August 8, 2016 and through December 31, 2020, if a distribution check is issued under the Plan and such distribution check is not cashed within 6 months after issuance, the check will be characterized as stale, and the funds redeposited into a special account under the Plan. Such funds shall be characterized on an after-tax basis and effective December 1, 2016, or as soon as practicable thereafter but in no event later than December 31, 2016, such amounts will be invested in the Plan’s Stable Value Fund or such other fund as determined within the discretion of the Investment Committee. The check will be reissued upon request by the Participant pursuant to procedures established by the Administrative Committee. On and after January 1, 2021, distribution checks uncashed within 6 months after issuance shall be administered in accordance with procedures established by the Administrative Committee.

(b) Lost Participants. In the event that the Administrative Committee or its delegee, after having made a diligent search, is unable to locate a Participant, Beneficiary, or Alternate Payee who is entitled to benefits under this Plan, such benefits shall be treated as a forfeiture under Plan section 3.6. In the event that the Participant, Beneficiary, or Alternate Payee whose Account is subject to such forfeiture subsequently asserts a valid claim for benefits, the Account will be restored in the manner described in Plan section 3.6.

16.10 Qualified Military Service

Notwithstanding any provision of this Plan to the contrary, contributions, benefits and Service credit required with respect to qualified military service, within the meaning of Code section 414(u), will be provided in accordance with the mandatory provisions of Code section 414(u). In addition, in compliance with the Heroes Earnings Assistance and Relief Tax Act ("HEART), the following provisions shall apply notwithstanding any Plan provision to the contrary:

(a) Effective January 1, 2007, if the Participant dies while on qualified military service, the Participant's Beneficiary shall be entitled to any benefit under the Plan (other than additional allocations related to the period of qualified military service) to the same extent that the Participant would have been entitled to such benefit had the Participant resumed employment and then incurred a Separation from Service on account of death.

(b) Effective January 1, 2009, Differential Wages shall be treated as Base Pay, as provided in Plan section 2.1(r)(2)(H), and Section 415 Compensation, as provided in Plan section 2.1(sss)(2)(D), paid to an Active Participant by the Employer making the payment. For this purpose, Differential Wages means any payment made by an Employer with respect to any period during which the Employee is performing qualified military service and represents all or a portion of the wages the Employee would have received from the Employer if the Employee were performing service for the Employer.

(c) Effective January 1, 2009 and even if the Employee is receiving Differential Wages, a Participant performing qualified military service will be treated as having incurred a Separation from Service during the period of such qualified military service for purposes of Plan section 7.3, but only with respect to the Participant's Pre-Tax Account and Roth Account. If the Participant elects to receive a distribution under this deemed Separation from Service, then such Participant shall not be permitted to make Pre-Tax Deferrals, Roth Contributions, Catch-Up Contributions or After-Tax Contributions during the six-month period beginning on the date of the distribution. Effective for withdrawals requested after August 8, 2016, if a Participant is suspended from making any Pre-Tax Deferrals, Roth Contributions, Catch-Up Contributions and/or After Tax Contributions in accordance with the sentence above, such contributions will be automatically reinstated upon expiration of the six-month suspension period at the Default Percentage, as applicable, or if the Participant was not subject to automatic enrollment or had opted out of automatic enrollment at the percentage in place prior to the suspension.

* * *

IN WITNESS WHEREOF, the Plan Amendment Officer hereby executes this amended and restated Plan this 16th day of December, 2022.

Occidental Petroleum Corporation

/s/ Mark Grommesh

Mark Grommesh,
Vice President, Joint Ventures
Occidental Petroleum Corporation

OCCIDENTAL PETROLEUM CORPORATION
EXECUTIVE INCENTIVE COMPENSATION PLAN (EICP)
(As Amended and Restated Effective January 1, 2023)

PURPOSE

The Occidental Petroleum Corporation Executive Incentive Compensation Plan (the "***Plan***") is designed to provide selected executives with annual cash incentive opportunities. The Plan directly links incentive compensation with performance and promotes the Company's results-oriented management style. Awards are based on the achievement of performance objectives that reflect business success and generate stockholder value. Performance objectives may be tied to individual performance, the performance of the Company as a whole or the performance of the Division for which the executive has personal accountability. Capitalized terms used herein and not otherwise defined shall have the meanings set forth on Attachment A hereto.

ELIGIBILITY/PARTICIPATION

All Senior Management employees are eligible for participation in the Plan. A member of Senior Management who is selected by the Administrator (as defined below) to participate in the Plan with respect to a particular Performance Period is referred to herein as a "***Participant***." Senior Management who are selected by the Administrator for a particular Performance Period are not guaranteed to be selected for participation in a subsequent Performance Period.

PERFORMANCE PERIOD

The performance period shall be the period for which the performance objectives applicable to an Award are measured, which unless otherwise determined for an Award, shall be the one-year period beginning on January 1 of a given year and ending on December 31 of that same year (the "***Performance Period***").

PERFORMANCE MEASURES/OBJECTIVES

Each Award may consist of a combination of Business Objectives and/or Personal Objectives, any component of which may separately serve as a modifier to the amount of an Award otherwise earned.

The extent to which any Business Objectives have been achieved shall be determined by assessing performance for the applicable Performance Period with respect to the Business Objectives. For each Award, any Business Objectives to be used for the Performance Period, as well as the weighting, if applicable, of each Business Objective (e.g., 50% Segment Earnings and 50% Cash Flow) shall be established by the Administrator in its sole discretion prior to or following the commencement of the Performance Period (but, in any event, in advance of the end of the Performance Period).

Unless otherwise determined with respect to any Award, the extent to which any Personal Objectives have been achieved shall be determined by a subjective assessment of each Participant's performance for the applicable Performance Period with respect to the Personal Objectives.

For each Award, the Administrator shall determine the targeted performance goals with respect to the Business Objectives for the Performance Period. In addition, unless otherwise determined with respect to an Award, minimum and maximum levels of performance with respect to the Business Objectives shall also be established for each Participant for the Performance Period. Target, minimum and maximum performance levels may also be established with respect to Personal Objectives. The Business Objectives and/or Personal Objectives selected, and their weightings or use as a primary metric or a modifier, if applicable, may vary by Participant and may be changed from one Performance Period to the next Performance Period in response to changes in business priorities.

Participants shall be advised of the Business Objectives and/or Personal Objectives that will be used to determine their Awards for the Performance Period as well as any weighting allocation or modification impact of any such objectives.

AWARD LEVELS

A Target Award payment opportunity shall be established for each Award. Individual Target Award opportunities may reflect variations in job function and scope as well as the potential impact the Participant has on the Company's or a Division's business priorities, as applicable. If a Participant has a more senior position, a greater portion of total compensation may be placed "at risk." Award minimum and maximum opportunities may also be established for each Performance Period for performance levels below and above target performance. Award opportunities corresponding to the minimum, target and maximum levels of performance may vary by Participant.

PAYMENT OF AWARDS

The amount of an Award earned and payable under the Plan shall be determined by evaluating performance against Business Objectives and Personal Objectives for the applicable Performance Period. The actual amount paid with respect to an Award may be higher or lower than a Participant's Target Award opportunity, depending on whether the minimum, target or maximum performance level, if applicable, has been met. The Administrator shall evaluate satisfaction of Business Objectives and Personal Objectives and determine Award payment amounts, with final approval made by (i) the Committee, with respect to all Participants who are subject to Section 16, or (ii) the Chief Executive Officer ("***CEO***"), or such other member(s) of Senior Management as the CEO may designate from time to time, for all other Participants. Notwithstanding anything to the contrary contained herein, in determining the payment amount of each Award, the Administrator may reduce (including a reduction of the payment to $0) the amount that may otherwise be earned and payable with respect to such Award if, in its sole discretion, it determines that such reduction or elimination is appropriate.

Awards shall be paid no later than the fifteenth day of the third month following the end of the Performance Period. Awards shall be paid: (i) in a lump sum cash payment, (ii) through the issuance of Stock, (iii) through the grant of equity-based award(s) or (iv) through any combination of the foregoing. Any Stock issued or equity-based award(s) granted in payment of Awards shall not be issued under the Plan but shall instead be issued under the LTIP, subject to the terms thereof, and the number of shares of Stock issued (or the number of shares of Stock subject to the equity-based award granted) will generally be equal to the dollar value of the Award otherwise payable divided by the Fair Market Value (as defined in the LTIP) of a share of Stock on the date of final approval, unless otherwise determined by the Administrator. All applicable taxes and withholdings shall be deducted from Award payments in accordance with U.S. Federal, state and local laws, rules and regulations. Cash Awards may be deferred under the MDCP in accordance with the provisions of the MDCP.

PLAN CHANGES DUE TO CORPORATE CHANGES OR EVENTS

Acquisitions, divestitures, mergers, significant corporate changes and/or extraordinary events involving the Company or its business (including, but not limited to, extraordinary stock price changes, significant fluctuations in supply and demand, significant increases in operating costs, and employee displacement due to health, safety or environmental crises) may require changes, adjustments or amendments (including reduction, elimination or termination) to outstanding unearned Awards and/or applicable targets, minimums, maximums, Business Objectives, Personal Objectives and/or Award opportunities for the relevant Performance Period. The Committee shall have sole discretion to determine whether such change, adjustment or amendment is necessary or desirable and to determine the methodology of such change, adjustment or amendment, and the Committee's decision shall be final, conclusive and binding on the relevant Participant and all other persons having an interest in or under the Plan.

AWARD PAYMENT UNDER VARIOUS EMPLOYMENT CONDITIONS

The Administrator may determine in its sole discretion the eligibility for Awards and any payment of Awards to Participants who enter or exit employment, transfer between Divisions or affiliates, or who are promoted during a Performance Period.

PLAN ADMINISTRATION

The Plan shall be administered by the Committee, which has sole discretion over the Plan; provided, that, the Committee may delegate to one or more officers or employees of the Company some or all of its powers and responsibilities in connection with the administration of the Plan (including the authority to make Awards to eligible Participants and determinations related thereto) as it deems necessary, advisable or appropriate, except that, notwithstanding anything to the contrary herein, the Committee (i) shall take all actions and make all determinations hereunder related to Awards to Participants who are then subject to Section 16 and (ii) the Committee may not delegate its authority to the extent (A) it is expressly indicated herein as an action to be taken by the Committee alone, (B) such delegation would permit a person to grant an Award to himself or herself or take any action with respect to any Award previously granted to himself or herself or (C) such delegation would violate any applicable law. Any delegation hereunder shall be subject to the restrictions and limits that the Committee specifies at the time of such delegation, and the Committee may at any time rescind the authority so delegated. The Committee and/or any such person to whom administrative powers are so delegated in accordance with the foregoing shall be referred to herein as the "*Administrator*." There is no obligation under the Plan for uniformity of treatment with respect to Participants and any other holders or beneficiaries of Awards. The terms and conditions of Awards, and the decisions of the Administrator with respect to Awards, need not to be the same for Participants (whether or not they are similar situated).

The decisions of the Administrator with respect to the Plan (including, but not limited to, questions of construction, interpretation and administration) shall be final, conclusive and binding on the relevant Awards and all persons having an interest in or under the Plan. Any determination made by the Administrator shall be given the maximum deference permitted by law in the event it is subject to judicial review and shall be overturned by a court of law only if it is arbitrary and capricious.

PLAN CONTINUATION

The Company expects and intends to continue the Plan but does not guarantee any specific levels of Award payments or the continuation of any Award payments. The Company, through action of the Committee in its sole discretion, reserves the right to amend, alter, modify, suspend, change, discontinue or terminate this Plan and outstanding unearned Awards at any time, in any manner and for any Performance Period, without the consent of any Participant. Notwithstanding and in addition to the foregoing, the Company, through action of the CEO, or such other member(s) of Senior Management as the CEO may designate from time to time, shall also have the right, without the consent of any Participant, to amend, alter, modify, suspend or otherwise make changes to this Plan that do not materially increase the cost of the Plan to the Company and do not otherwise require the approval of the Committee.

RECOUPMENT OF AWARDS

Awards granted under the Plan and any amounts paid or realized with respect thereto shall be subject to compliance with the Company's Code of Business Conduct, as may be amended, or policies referenced therein ("CBC"). In the event of a breach or violation of the CBC, the Committee may take actions with respect to Awards under this Plan, including, without limitation, reduction, cancellation, forfeiture and/or recoupment of Awards as determined by the Committee. In addition, Awards granted under the Plan and any amounts paid or realized with respect thereto shall be subject to any written clawback policy that the Company, with the approval of the Company's Board of Directors, may adopt, including any policy adopted to conform to the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 and rules promulgated thereunder by the Securities and Exchange Commission and the New York Stock Exchange and that the Company determines should apply to the Plan. Awards shall also be subject to clawback, forfeiture or similar requirements to the extent required by applicable law (including, without limitation, Section 304 of the Sarbanes-Oxley Act and Section 954 of the Dodd-Frank Wall Street Reform and Consumer Protection Act) and/or the rules and regulations of the New York Stock Exchange, and such requirements shall be deemed incorporated by reference into all outstanding Awards. A Participant's acceptance of any Award issued under the Plan will constitute such Participant's agreement to subject the Award and any amounts paid or realized with respect thereto to such potential clawback, reduction, cancellation, forfeiture and/or recoupment in accordance with this paragraph.

MISCELLANEOUS

The Plan is subject to compliance with all applicable U.S. Federal, state and local laws, rules and regulations. The Plan and all related documents shall be governed by, and construed in accordance with the laws of the State of Texas. If any provision shall be held by a court of competent jurisdiction to be invalid and unenforceable, the remaining provisions of the Plan shall continue in effect.

Nothing contained in the Plan (or in any other documents relating to the Plan or to any Award) shall confer upon any Participant any right to continue in the employ or other service of any entity within the Company's controlled group or constitute any contract or agreement of employment or other service, nor shall interfere in any way with the right of the applicable entity within the Company's controlled group to change such Participant's compensation or other benefits or to terminate the employment of such Participant, with or without cause.

Unless otherwise determined by the Company, the Plan shall be unfunded and shall not create (or be construed to create) a trust or a separate fund or funds. The Plan shall not establish any fiduciary relationship between the Company, any Division or subsidiary and any Participant or other person. To the extent any person holds any rights by virtue of an Award under the Plan, such rights shall be no greater than the rights of an unsecured general creditor.

Awards from the Plan shall not be considered as compensation for the purposes of any benefit plans or programs of the Company or any Division, except as specifically set forth otherwise in a formal plan document.

It is intended that payments under the Plan will not constitute “deferred compensation” under Section 409A of the Code, including by qualifying as short-term deferrals exempt from the requirements of Section 409A of the Code. In the event that any Award constitutes deferred compensation and does not qualify for treatment as an exempt short-term deferral, it is intended that such amount will be paid in a manner that satisfies the requirements of Section 409A of the Code, taking into account for any “specified employee,” the six-month delay described in Treas. Reg. § 1.409A-3(i)(2)(i). The Plan shall be interpreted and construed accordingly.

Attachment A
DEFINITION OF TERMS

"*Award*" means an incentive award granted pursuant to the Plan, the payment of which shall be based on the achievement of Business Objectives and/or Personal Objectives for a designated Performance Period, unless otherwise determined with respect to a specific Award.

"*Business Objectives*" means one or more financial, operational, organizational, strategic or similar goals established for a Performance Period that reflect current business priorities and against which the Company's or a Division's performance will be measured. Such goals may relate to the Company on a consolidated basis, or to specified subsidiaries or business or geographical units of the Company, or a combination thereof, and may be determined on an absolute or relative basis, as a ratio with other business criteria, or as compared to the performance of a published or special index deemed applicable by the Administrator including the Standard & Poor's 500 Stock Index or a group of comparable companies, pre-tax or after-tax, before or after special charges, or any combination of the foregoing. Unless otherwise stated, such performance goals need not be based upon an increase or positive result under a particular business criterion set forth in this definition and could include, for example, maintaining the status quo or limiting economic losses (measured in each case by reference to specific business criteria set forth in this definition).

"*Code*" means the Internal Revenue Code of 1986, as amended.

"*Company*" means Occidental Petroleum Corporation.

"*Committee*" means the Executive Compensation Committee of the Company's Board of Directors (or its successor).

"*Division*" means any subsidiary of the Company or other entity controlled by the Company (either by voting power or management), or any line of business, facility or other division of the Company or any such subsidiary or entity, as determined by the Administrator.

"*LTIP*" means the Company's 2015 Long-Term Incentive Plan, as amended from time to time.

"*MDCP*" means the Company's Modified Deferred Compensation Plan, as amended from time to time.

"*Personal Objectives*" means, for any Participant, personal goals related to certain key performance areas within such Participant's area of responsibility or job scope used to assess individual performance, which may include, but are not limited to, goals such as: management of unanticipated, unpredictable or uncontrollable events; transactions such as mergers and acquisitions or divestitures; organizational development; succession planning; functional and operating accomplishments; governance and ethical conduct; health, safety and environmental responsibilities; encouragement of diversity and inclusion; and contributions to special projects.

“*Section 16*” means Section 16 of the Securities Exchange Act of 1934, as amended.

“*Senior Management*” means employees of the Company or any Division in executive grade level 90.

“*Stock*” means the Company’s common stock, par value $0.20 per share.

“*Target Award*” means the target award payable under the Plan to a Participant, expressed either as a dollar amount or a percentage of the Participant’s annualized base salary at the rate in effect on the last day of the Performance Period, which reflects or is contingent upon a specified level of performance.

OCCIDENTAL PETROLEUM CORPORATION
2015 LONG-TERM INCENTIVE PLAN as Amended and Restated

NOTICE OF GRANT
OF TOTAL SHAREHOLDER RETURN INCENTIVE AWARD
(Equity-based and Equity-settled Award)

Pursuant to the Occidental Petroleum Corporation 2015 Long-Term Incentive Plan, as the same may be amended from time to time (the "***Plan***"), Occidental Petroleum Corporation ("***Occidental***" and, with its Subsidiaries, the "***Company***"), grants you (the "***Grantee***") an award on the terms and conditions set forth herein (the "***Award***"). By accepting this Award, the Grantee agrees, to the extent not contrary to applicable law, to (i) the terms and conditions of the Plan and this Notice of Grant of Total Shareholder Return Incentive Award (the "***Notice of Grant***"), (ii) the Standard Award Terms and Conditions set out on Attachment 1 hereto, including the arbitration provisions thereof (the "***Terms and Conditions***"), and (iii) the General Terms of Employment set out on Attachment 2 hereto, which, in the case of (ii) and (iii), are incorporated in this Notice of Grant by reference. Capitalized terms used but not defined herein shall, unless otherwise indicated, have the meanings set forth in the Plan. This Notice of Grant (along with the Terms and Conditions and all other incorporated attachments and exhibits) and the Award evidenced hereby are collectively referred to as the "***Award Agreement***."

Date of Grant:	
Award Type and Description:	Restricted Stock Units granted pursuant to Section 6(e) of the Plan that have been designated as a Performance Award under Section 6(k) of the Plan (referred to herein as "***Performance Shares***"), which Award is a bookkeeping entry that represents the right to receive a number of shares of Stock up to 200% of the Target Performance Shares (defined below), subject to the terms and conditions of the Award Agreement. The Grantee's right to receive payment of this Award in an amount ranging from 0% to 200% of the number of Target Performance Shares, rounded up to the nearest whole share, shall vest and become earned and nonforfeitable upon (i) the Grantee's satisfaction of the continued service requirements described below under "*Vesting Schedule and Forfeiture*" and (ii) the Committee's certification of the level of achievement of the Performance Goal (defined below). The number of Performance Shares actually earned upon satisfaction of the foregoing requirements are referred to herein as the "***Earned Performance Shares***."
Target Number of Shares:	See Morgan Stanley "StockPlan Connect/Portfolio/Stock Options and Awards/PSUs Granted" for the target number of Performance Shares subject to the Award (the "***Target Performance Shares***").
Performance Period:	

Vesting Schedule and Forfeiture:

<u>Vesting Date</u>. The Grantee must remain in the continuous employ of the Company from the Date of Grant through the last day of the Performance Period (the "***Vesting Date***") to be eligible to receive payment of this Award, subject to the level of achievement of the Performance Goal. The continuous employment of the Grantee will not be deemed to have been interrupted by reason of the transfer of the Grantee's employment among the Company and its affiliates or an approved leave of absence.

<u>Termination of Employment</u>. Notwithstanding the foregoing, if, prior to the Vesting Date, the Grantee (i) dies, (ii) becomes permanently disabled while in the employ of the Company and the Company terminates the Grantee's employment as a result thereof, (iii) Retires (as defined below) less than 12 months after the Date of Grant or (iv) is terminated by the Company without Cause (each of the foregoing, a "***Forfeiture Event***"), then a *pro rata* portion of the Target Performance Shares (the "***Pro Rata Unvested Performance Shares***") shall remain eligible for payment following the date of the Forfeiture Event, subject to the level of achievement of the Performance Goal at the end of the Performance Period or the occurrence of a Change in Control, and all other Target Performance Shares shall be immediately forfeited. The number of Pro Rata Unvested Performance Shares shall be determined by multiplying the total number of Target Performance Shares granted hereunder by a fraction, the numerator of which is the number of days between the first day of the Performance Period and the Forfeiture Event and the denominator of which is the total number of days in the Performance Period. Following a Forfeiture Event, the number of Performance Shares that may become Earned Performance Shares may range from 0% to 200% of Pro Rata Unvested Performance Shares, as described below under "*Performance Goal*."

If the Grantee Retires 12 months or more after the Date of Grant but prior to the Vesting Date ("***Post-One Year Retirement***"), then none of the Target Performance Shares will be reduced or forfeited and the Grantee will remain eligible to receive payment with respect to all Target Performance Shares following the date of such Retirement, subject to the level of achievement of the Performance Goal at the end of the Performance Period or the occurrence of a Change in Control. Following the Grantee's Post-One Year Retirement, the number of Performance Shares that may become Earned Performance Shares may range from 0% to 200% of Target Performance Shares, as described below under "*Performance Goal*."

If the Grantee terminates employment voluntarily (other than due to Retirement) or is terminated for Cause before the Vesting Date, then the Award will terminate automatically on the date of such termination and the Grantee shall immediately forfeit all Target Performance Shares.

"***Retires***" or "***Retirement***" means the Grantee's voluntary resignation from employment with the Company under circumstances which the Company (or, if the Grantee is an officer for purposes of Section 16 of the Exchange Act (a "***Section 16 Officer***"), the Committee), in its sole discretion, determines at the time of such resignation to constitute "Retirement" for purposes of this Award. For the avoidance of doubt, the Company's (or, if the Grantee is a Section 16 Officer, the Committee's) determination of whether "Retirement" has occurred shall be made on an individual Award basis, and "Retirement" treatment for any one Award shall not require that all Awards held by the Grantee will receive "Retirement" treatment.

<u>Change in Control</u>. If a Change in Control occurs following a Forfeiture Event but prior to the Vesting Date, then 100% of the Pro Rata Unvested Performance Shares shall become immediately vested and nonforfeitable and deemed to be Earned Performance Shares as of the date of the Change in Control (without regard to the level of achievement of the Performance Goal). For the avoidance of doubt, Target Performance Shares previously forfeited as a result of the Forfeiture Event shall not become vested pursuant to this paragraph.

If a Change in Control occurs following the Grantee's Post-One Year Retirement but prior to the Vesting Date, then 100% of the Target Performance Shares shall become immediately vested and nonforfeitable and deemed to be Earned Performance Shares as of the date of the Change in Control (without regard to the level of achievement of the Performance Goal).

If a Forfeiture Event has not occurred and a Change in Control occurs prior to the Vesting Date, then 100% of the Target Performance Shares will be deemed to be Earned Performance Shares and will automatically convert into the same number of shares of Restricted Stock. The shares of Restricted Stock may not be transferred, assigned, sold, pledged, exchanged or otherwise encumbered or disposed of by the Grantee, except as provided for within the Plan, and are subject to a risk of forfeiture. In order for restrictions to lapse and the shares of Restricted Stock to become vested and nonforfeitable, the Grantee must remain in the continuous employ of the Company from the date of the Change in Control through the earliest to occur of (i) the Vesting Date, (ii) the date within 12 months following the date of the Change in Control on which the Grantee's employment is terminated by the Company without Cause or by the Grantee for Good Reason (the "***CIC Related Vesting Date***") or (iii) the Grantee's Post-One Year Retirement; <u>provided</u> that, if the Grantee experiences a Forfeiture Event after the Change in Control and prior to the Vesting Date (*i.e.*, if the Grantee dies, becomes permanently disabled while in the employ of the Company and the Company terminates the Grantee's employment as a result thereof, Retires less than 12 months after the Date of Grant, or is terminated by the Company without Cause after 12 months following the date of the Change in Control), then only a *pro rata* portion of the shares of Restricted Stock (determined by multiplying the total number of shares of Restricted Stock granted by a fraction, the numerator of which is the number of days between the first day of the Performance Period and the Forfeiture Event and the denominator of which is the total number of days in the Performance Period) shall become immediately vested and nonforfeitable, and all other shares of Restricted Stock shall be immediately forfeited. Notwithstanding the foregoing provisions of this paragraph, prior to the occurrence of the Change in Control, the Committee may determine in its sole discretion that a termination of employment by the Company without Cause or by the Grantee for Good Reason within 12 months following the date of the Change in Control shall not result in full acceleration of vesting as described above and shall instead result in (a) in the case of a termination without Cause within 12 months following the date of the Change in Control, *pro rata* vesting as described above for a Forfeiture Event occurring after the Change in Control and (b) in the case of a resignation for Good Reason within 12 months following the date of the Change in Control, the forfeiture of this Award. Any such determination by the Committee is binding on the Grantee.

Except as otherwise provided in the Award Agreement, the Grantee shall have all of the rights of a stockholder with respect to the shares of Restricted Stock received upon conversion of Earned Performance Shares pursuant to this paragraph, including the right to vote such shares and, subject to the terms and conditions described below under "*Dividends, Voting and Other Rights*," to receive any dividends that may be paid thereon; provided, that any and all such dividends shall be subject to the same restrictions as the underlying shares of Restricted Stock.

Performance Goal: The "***Performance Goal***" for the Performance Period is based on relative total shareholder return (referred to as "total stockholder return" in the Plan) ("***TSR***") of the Peer Companies (defined below), as described herein. The Committee may adjust the Performance Goal as permitted by the Plan.

Peer Companies. In addition to Occidental, the "***Peer Companies***" are BP p.l.c., Chevron Corporation, ConocoPhillips, EOG Resources, Inc., ExxonMobil Corporation, Shell plc, and TotalEnergies, plus the S&P 500 Index. If, at any time during the Performance Period, a Peer Company is acquired, ceases to exist, ceases to be a publicly-traded company, files for bankruptcy, spins off 25% or more of its assets, or sells all or substantially all of its assets, then such company will be removed and treated as if it had never been a Peer Company and the achievement of the Performance Goal will be determined with respect to the remaining Peer Companies.

Calculation of TSR. TSR shall be calculated for each Peer Company using (i) the average of its last reported sale price per share of common stock on the New York Stock Exchange ("***NYSE***")—Composite Transactions for each trading day during the 30 calendar days beginning with the first day of the Performance Period and, in the case of the S&P 500 Index, the last reported index price, and (ii) the average of its last reported sale price per share of common stock on the NYSE-Composite Transactions for each trading day during the 30 calendar days ending with the last day of the Performance Period and, in the case of the S&P 500 Index, the last reported index price. At the end of the Performance Period, the TSR of each Peer Company shall be calculated by the Committee in its good faith discretion, and the ranking of Occidental's TSR compared to the TSR of each other Peer Company shall determine the percentage of the Target Performance Shares that may become Earned Performance Shares as follows:

If Occidental's TSR is negative for the Performance Period, the number of Earned Performance Shares will be limited to the Target Performance Shares. At the end of the Performance Period, the TSR of Occidental shall be calculated by the Committee in its good faith discretion using (i) the average of Occidental's last reported sale price per share of Stock on the NYSE—Composite Transactions for each trading day during the 30 calendar days beginning with the first day of the Performance Period and (ii) the average of Occidental's last reported sale price per share of Stock on the NYSE-Composite Transactions for each trading day during the 30 calendar days ending with the last day of the Performance Period.

Payment of Award: Payment for Earned Performance Shares will be made solely in shares of Stock (in shares of Restricted Stock, in the case of the occurrence of a Change in Control), which will be issued to the Grantee as promptly as practicable after the Committee's certification of attainment of the Performance Goal (which such payment and certification shall occur no later than 70 days following the end of the Performance Period) or the occurrence of a Change in Control (which such payment shall occur no later than 70 days following the date of the Change in Control), as applicable (the "***Payment Trigger Date***"), and in any event no later than the 15th day of the third month following the end of the first taxable year in which the Performance Shares are no longer subject to a substantial risk of forfeiture.

Dividends, Voting and Other Rights: Performance Shares are not shares of Stock and have no voting rights or, except as described in this paragraph, dividend rights. With respect to each Performance Share subject to this Award, the Grantee is also awarded Dividend Equivalents with respect to one share of Stock, which means that, in the event that Occidental declares and pays a cash dividend on its outstanding Stock and, on the record date for such dividend, the Grantee holds Performance Shares that have not been settled (including settlement through conversion into Restricted Stock) or forfeited pursuant to the terms of the Award Agreement, then the Grantee will be credited on the books and records of Occidental with an amount equal to the amount per share of any such cash dividend for each outstanding Performance Share. The Grantee will be credited with such Dividend Equivalents for the period beginning on the Date of Grant and ending on the applicable Payment Trigger Date or, if earlier, the date the Grantee forfeits his rights with respect to the Performance Shares. Occidental will pay in cash to the Grantee an amount equal to (i) the Dividend Equivalents credited to such Grantee, adjusted as necessary to reflect the number of Earned Performance Shares, plus (ii) if applicable, the amount of any cash dividends accumulated with respect to any shares of Restricted Stock received as described above under "*Vesting Schedule and Forfeiture—Change in Control*," as promptly as may be practicable after (A) the Committee certifies the attainment of the Performance Goal, or (B) if a Change in Control has occurred, the earliest to occur of (1) the Vesting Date, (2) the CIC Related Vesting Date, (3) the Grantee's Post-One Year Retirement and (4) a Forfeiture Event occurring after a Change in Control, as applicable, and in any event no later than the 15th day of the third month following the end of the taxable year in which the Dividend Equivalents or dividends, as applicable, are no longer subject to a substantial risk of forfeiture. For purposes of clarity, if Performance Shares or shares of Restricted Stock are forfeited by the Grantee, then the Grantee shall also forfeit the Dividend Equivalents and/or dividends, if any, accrued with respect to such Performance Shares and/or shares of Restricted Stock.

ATTACHMENT 1

OCCIDENTAL PETROLEUM CORPORATION
2015 LONG-TERM INCENTIVE PLAN as Amended and Restated
STANDARD AWARD TERMS AND CONDITIONS

The following Standard Award Terms and Conditions (these "***Terms and Conditions***") are set forth as of the Date of Grant specified in the Notice of Grant to which these Terms and Conditions are attached (the "***Notice of Grant***"), by and between Occidental Petroleum Corporation ("***Occidental***" and, with its Subsidiaries, the "***Company***"), and the eligible individual (the "***Grantee***") receiving the award described in the Notice of Grant (the "***Award***"). The Award is granted in accordance with the Occidental Petroleum Corporation 2015 Long Term Incentive Plan, as may be amended from time to time (the "***Plan***"). Capitalized terms used but not defined herein shall, unless otherwise indicated, have the meanings set forth in the Plan. These Terms and Conditions, the Notice of Grant (along with all incorporated attachments and exhibits) and the Award evidenced thereby are collectively referred to herein as the "***Award Agreement***."

1. **<u>Acceptance of Award.</u>** If the Grantee fails to accept the Award on or before the 45th day following the Date of Grant, then, notwithstanding any other provision of the Award Agreement, the Grantee shall forfeit all rights under the Award (including all shares of Occidental common stock, $0.20 par value ("***Stock***"), and any dividend equivalents with respect thereto) and the Award will become null and void. For purposes of the Award Agreement, acceptance of the Award shall occur on the date the Grantee accepts the Award through Morgan Stanley StockPlan Connect or any replacement online system designated by the Company.

2. **<u>No Employment Contract.</u>** Nothing in the Award Agreement confers upon the Grantee any right with respect to continued employment by the Company, nor limits in any manner the right of the Company to terminate the employment or adjust the compensation of the Grantee. Unless otherwise agreed in a writing signed by the Grantee and an authorized representative of the Company, the Grantee's employment with the Company is at will and may be terminated at any time by the Grantee or the Company.

3. **<u>Restrictions on Transfer.</u>** Neither the Award Agreement nor any right to receive shares of Stock or cash pursuant to the Award Agreement may be transferred or assigned by the Grantee other than in accordance with the transfer restrictions set forth in the Plan.

4. **<u>Taxes and Withholding.</u>**

(a) Regardless of any action the Company takes with respect to any or all income tax (including U.S. Federal, state and local tax and non-U.S. tax), social insurance, payroll tax, payment on account or other tax-related items related to the Grantee's participation in the Plan and legally applicable to the Grantee ("***Tax-Related Items***"), the Grantee acknowledges that the ultimate liability for all Tax-Related Items is and remains the Grantee's responsibility and may exceed the amount, if any, actually withheld by the Company. The Grantee further acknowledges that the Company (i) makes no representations or undertakings regarding the treatment of any Tax-Related Items in connection with any aspect of the Award, including, as applicable, the grant, vesting or settlement of the Award and the receipt of any dividends or Dividend Equivalents thereon; and (ii) does not commit to and is under no obligation to structure the terms of the grant or any other aspect of the Award to reduce or eliminate the Grantee's liability for Tax-Related Items or achieve any particular tax result. Further, if the Grantee has become subject to tax in more than one jurisdiction between the Date of Grant and the date of any relevant taxable event, the Grantee acknowledges that the Company may be required to withhold or account for Tax-Related Items in more than one jurisdiction.

(b) Prior to the relevant taxable event, the Grantee shall pay or make adequate arrangements satisfactory to the Company to satisfy all Tax-Related Items. In this regard, the Grantee authorizes the Company to withhold all applicable Tax-Related Items legally payable by the Grantee in connection with the grant, vesting or settlement of the Award and/or the issuance of any shares of Stock or the payment of any cash or other consideration pursuant to the Award in accordance with the Notice of Grant, from any cash and shares of Stock that are to be paid or issued to the Grantee pursuant to the Award (including any dividends or Dividend Equivalents), in any combination as determined by the Committee, and, if not sufficient, from the Grantee's wages or other cash compensation. The Grantee shall pay to the Company any amount of Tax-Related Items that the Company may be required to withhold as a result of the Grantee's receipt of the Award that cannot be satisfied by the means previously described.

5. Compliance with Law. The Company will make reasonable efforts to comply with all applicable U.S. Federal, state and local laws and non-U.S. laws, and the Company will not issue any shares of Stock or other securities pursuant to the Award Agreement if such issuance would result in a violation of any such law. Further, if it is not feasible for the Company to comply with these laws with respect to the grant, vesting or settlement of the Award, then the Award may be cancelled without any compensation or additional benefits provided to the Grantee as a result of the cancellation.

6. Relation to Other Benefits. The benefits received by the Grantee under the Award Agreement will not be taken into account in determining any benefits to which the Grantee may be entitled under any profit sharing, retirement or other benefit or compensation plan maintained by the Company, including the amount of any life insurance coverage available to any beneficiary of the Grantee under any life insurance plan covering employees of the Company. Additionally, the Award is not part of normal or expected compensation or salary for any purposes, including, but not limited to, calculation of any severance, resignation, termination, redundancy, end of service payments, bonuses or long-service awards. The grant of the Award does not create any contractual or other right to receive future grants of, or benefits in lieu of, awards under the Plan, even if the Grantee has a history of receiving awards under the Plan or other cash or stock awards.

7. Beneficial Ownership Requirements. If the Grantee (a) was a Named Executive Officer (as defined in Item 402 of Regulation S-K under the Exchange Act) for the last completed fiscal year prior to vesting of the Award, and (b) is, as of the date of vesting of the Award, subject to Occidental's Executive Stock Ownership Guidelines, as in effect from time to time (the "***Ownership Guidelines***"), and the Grantee's Stock holdings fail as of such date to satisfy the applicable requirements of the Ownership Guidelines, then the Grantee shall retain Beneficial Ownership (as defined in Rule 16a-1(a)(2) under the Exchange Act) of shares of Stock equal to not less than 50% of the net after-tax shares of Stock, if any, received under the Award until the Grantee satisfies the applicable requirements of the Ownership Guidelines (the "***Beneficial Ownership Period***"). Compliance with the foregoing requirement shall be determined by reference to the reports filed by the Grantee on Forms 3, 4 and 5, as applicable, pursuant to Section 16(a) of the Exchange Act, and the aggregate number of shares of Stock reported as Beneficially Owned during the Beneficial Ownership Period shall not be less than the sum of the number of shares of Stock then required to be so owned pursuant to the Award Agreement and the terms and conditions of any other grant containing this or a similar requirement.

8. Golden Parachute Policy. Notwithstanding any provision in the Award Agreement to the contrary, no payment shall be made with respect to the Award that would cause the total payments made to the Grantee to exceed the limits in Occidental's Golden Parachute Policy, as in effect from time to time.

9. **Adjustments.** The number and kind of securities covered by the Award are subject to adjustment as provided under the Plan, such as in order to prevent dilution or expansion of the Grantee's rights under the Award as a result of events such as stock dividends, stock splits or other changes in the capital structure of Occidental, or any merger, consolidation, spin-off, liquidation or other corporate transaction or event having a similar effect. If any such adjustment occurs, the Company will give the Grantee written notice of the adjustment.

10. **Amendments.** The Plan may be amended, altered, suspended, discontinued or terminated by the Board at any time, as provided in the Plan. Any amendment to the Plan will be deemed to be an amendment to the Award Agreement to the extent it is applicable to the Award; however, no amendment may materially and adversely affect the rights of the Grantee under the Award Agreement without the Grantee's consent. In addition, the Committee may waive any conditions or rights under, or amend, alter, suspend, discontinue or terminate the Award Agreement, except as otherwise provided in the Plan; provided, that, without the Grantee's consent, no such Committee action may materially and adversely affect the rights of the Grantee under the Award.

11. **Severability.** If one or more of the provisions of the Award Agreement is invalidated for any reason by a court of competent jurisdiction, the invalidated provisions shall be deemed to be separable from the other provisions of the Award Agreement, and the remaining provisions of the Award Agreement will continue to be valid and fully enforceable.

12. **Entire Agreement; Relation to Plan; Interpretation.** Except as specifically provided in this Section 12, the Award Agreement (including these Terms and Conditions, the Notice of Grant and all incorporated attachments and exhibits) and the Plan constitute the entire agreement between the Company and the Grantee with respect to the Award. The Award Agreement is subject to the terms and conditions of the Plan. In the event of any inconsistent provisions between the Award Agreement and the Plan, the provisions of the Plan control. References to Sections and Attachments are to Sections of, and Attachments incorporated in, the Award Agreement unless otherwise noted. In the event of any inconsistent provisions between the Award Agreement and any employment agreement between the Grantee and the Company, the provisions of the Award Agreement control (except that, in the case of any inconsistency between any provisions regarding dispute resolution set forth in the employment agreement and the arbitration provisions of Section 22 below, the dispute resolution provisions of the employment agreement will control).

13. **Successors and Assigns.** Subject to any transfer or forfeiture restrictions set forth in the Notice of Grant, the provisions of the Award Agreement shall be for the benefit of, and be binding upon, the successors, administrators, heirs, legal representatives and assigns of the Grantee, and the successors and assigns of the Company.

14. **Beneficiaries.**

(a) The Grantee shall have the option of designating a beneficiary ("***Beneficiary***") to receive settlement of the Grantee's Award upon the Grantee's death.

(b) If no Beneficiary is designated at the time of the Grantee's death, or if no Beneficiary survives the Grantee, the Beneficiary shall be the Grantee's surviving spouse, or if the Grantee has no surviving spouse, the Grantee's surviving children equally, or if there are no surviving children, the Grantee's surviving parents equally, or if there is no surviving parent, the Grantee's surviving siblings equally, or if there is no sibling living, the Grantee's estate.

(c) In order to designate a Beneficiary or change a previous designation, the Grantee must complete a Long-Term Incentive Beneficiary Designation Form (the "***Form***").

Beneficiary designations submitted on other forms or in any other format will not be accepted. The Grantee should read the Form carefully, follow the instructions and complete the Form in its entirety according to the instructions, obtain any necessary signatures according to the Form, sign and date the Form, and return the Form to the Executive Compensation Department, c/o Occidental Petroleum Corporation, 5 Greenway Plaza, Suite 110, Houston, Texas, 77046. The Grantee should also keep a copy of the Form for the Grantee's records. Upon acceptance, the Grantee's designation will cancel any previous designations. The Grantee's Beneficiary designation shall not affect any designation by the Grantee under any other benefit plan.

(d) The Grantee should consider submitting a new Form if: (1) the Grantee's marital status changes, (2) one of the Grantee's previously designated Beneficiaries dies before the Grantee, or (3) the Grantee acquires or loses dependents. To determine the tax consequences associated with the Grantee's designation, it is recommended that the Grantee consult with a qualified tax advisor or estate planner.

15. Governing Law. The laws of the State of Delaware govern the interpretation, performance, and enforcement of the Award Agreement (including these Terms and Conditions, the Notice of Grant and all incorporated attachments and exhibits).

16. Privacy Rights. By accepting the Award, the Grantee explicitly and unambiguously consents to the collection, use and transfer, in electronic or other form, of the Grantee's personal data as described in the Award Agreement by and among, as applicable, the Company and its Affiliates for the exclusive purpose of implementing, administering and managing the Grantee's participation in the Plan. The Grantee understands that the Company holds, or may receive from any agent designated by the Company, certain personal information about the Grantee, including, but not limited to, the Grantee's name, home address, telephone number, date of birth, social insurance number or other identification number, salary, nationality, job title, any shares of Stock held by the Grantee, directorships held in the Company, details of the Award or any other entitlement to cash or shares of Stock awarded, canceled, exercised, vested, unvested or outstanding in the Grantee's favor, for the purpose of implementing, administering and managing the Plan, including complying with applicable tax and securities laws ("***Data***"). Data may be transferred to any third parties assisting in the implementation, administration and management of the Plan. These recipients may be located in the Grantee's country or elsewhere, and may have different data privacy laws and protections than the Grantee's country. By accepting the Award, the Grantee authorizes the recipients to receive, possess, use, retain and transfer the Data, in electronic or other form, for the purposes described above. The Grantee may, at any time, view Data, request additional information about the storage and processing of Data, require any necessary amendments to Data or refuse or withdraw the consents herein, in any case without cost, by contacting the Committee in writing. Refusing or withdrawing consent may affect the Grantee's ability to participate in the Plan.

17. Electronic Delivery and Acceptance. The Company may, in its sole discretion, decide to deliver any documents related to the Award or future awards that may be granted under the Plan, if any, by electronic means or to request the Grantee's consent to participate in the Plan by electronic means. The Grantee hereby consents to receive such documents by electronic delivery and, if requested, to participate in the Plan through an online or electronic system established and maintained by the Company or another third party designated by the Company.

18. Grantee's Representations and Releases.

(a) By accepting the Award, the Grantee acknowledges that the Grantee has read the Award Agreement (including these Terms and Conditions, the Notice of Grant and all incorporated attachments and exhibits) and understands that (i) the grant of the Award is made voluntarily by Occidental in its discretion with no liability on the part of any of its direct or indirect Subsidiaries and that, if the Grantee is an employee of a Subsidiary and not Occidental, then the Grantee will be considered a third party of Occidental to whom the Award is granted; (ii) all decisions with respect to future awards, if any, will be at the sole discretion of Occidental; (iii) the Grantee's participation in the Plan is voluntary; (iv) the Award is an extraordinary item that does not constitute a regular and recurring item of base compensation; (v) the future value of any shares of Stock issued and/or the future amount of cash, if any, payable pursuant to the Award cannot be predicted, and Occidental does not assume liability in the event the value of the Award or any such shares of Stock depreciates or has no value in the future; (vi) subject to the terms of any tax equalization agreement between the Grantee and the entity employing the Grantee, the Grantee will be solely responsible for the payment or nonpayment of taxes imposed or threatened to be imposed by any authority of any jurisdiction; and (vii) Occidental is not providing any tax, legal or financial advice with respect to the Award or the Grantee's participation in the Plan.

(b) In consideration of the grant of the Award, no claim or entitlement to compensation or damages shall arise from termination of the Award or diminution in value of the Award or the shares of Stock issued pursuant to the Award resulting from termination of the Grantee's employment by the Company (for any reason whatsoever) and, to the extent permitted by law, the Grantee irrevocably releases the Company from any such claim that may arise; if, notwithstanding the foregoing, any such claim is found by a court of competent jurisdiction to have arisen, then, by accepting the Award, the Grantee shall be deemed irrevocably to have waived his or her entitlement to pursue such claim.

19. <u>Imposition of Other Requirements.</u> Occidental reserves the right to impose other requirements on the Grantee's participation in the Plan and on the Award, to the extent Occidental determines it is necessary or advisable in order to comply with local law or facilitate the administration of the Plan, and to require the Grantee to sign any additional agreements or undertakings that may be necessary to accomplish the foregoing.

20. <u>Compliance with Section 409A of the Code</u>. Unless specified otherwise in the Notice of Grant, the Award is intended to be exempt from the Nonqualified Deferred Compensation Rules. Notwithstanding the foregoing, to the extent that it is determined that the Plan or the Award is subject to the Nonqualified Deferred Compensation Rules, the Award Agreement shall be interpreted and administered in such a way as to comply with the applicable provisions of the Nonqualified Deferred Compensation Rules to the maximum extent possible. In addition, if the Award is subject to the Nonqualified Deferred Compensation Rules, then (i) the settlement of the Award or some portion of the Award may be delayed in accordance with the applicable terms of Section 9(n) of the Plan; (ii) any payment on a Change in Control event will be made only if the Change in Control also qualifies as a change of control event within the meaning of the Nonqualified Deferred Compensation Rules; and (iii) any determination by the Committee not to accelerate the Award on a Change in Control shall be made only to the extent such determination is consistent with the Nonqualified Deferred Compensation Rules. To the extent that the Board determines that the Plan or the Award is subject to the Nonqualified Deferred Compensation Rules and fails to comply with the requirements of the Nonqualified Deferred Compensation Rules, the Board reserves the right (without any obligation to do so) to amend or terminate the Plan and/or amend, restructure, terminate or replace the Award in order to cause the Award to either not be subject to the Nonqualified Deferred Compensation Rules or to comply with the applicable provisions of such rule.

21. <u>Clawback.</u> The award shall be subject to the clawback provisions set forth in Section 9(m) of the Plan.

22. <u>Arbitration.</u> Except as otherwise provided in the Award Agreement, the Grantee and the Company agree to resolve any and all disputes between the Grantee and the Company (and any affiliate of the Company that may employ the Grantee), past, present or future, arising out of or in any way related to the Award Agreement or the Grantee's employment relationship with the Company (or any affiliate of the Company) through a final and binding arbitration administered by the American Arbitration Association (AAA) or another mutually agreed upon arbitration provider; provided, however, that the only claims subject to arbitration shall be those that, in the absence of the Award Agreement, could be brought in a court of law. Nothing herein shall be construed to reduce or eliminate the deference to the Plan Administrator that would otherwise be required prior to, or as part of a claim in court, procedurally or substantively. Subject to the foregoing, the arbitrator shall have the exclusive authority to resolve any dispute relating to the interpretation, applicability, or enforceability of the Award Agreement that would otherwise be subject to resolution in a court of law. However, the arbitrator's authority to resolve disputes shall not apply to the "***Class Action Waiver***" described below. Regardless of anything else in the Award Agreement and/or AAA rules or procedures, any dispute relating to the interpretation, applicability, or enforceability of the Class Action Waiver, or any dispute otherwise relating to whether the Award Agreement precludes a class or collective action proceeding, may only be determined by a court and not an arbitrator. In addition, provisional remedies such as a temporary restraining order or preliminary injunction may be pursued and secured in a court to prevent irreparable harm by either party without waiving or otherwise eliminating the requirement that all matters of final relief be decided through arbitration. In addition, any arbitration conducted pursuant to the Award Agreement shall be subject to the following additional terms and conditions:

(a) Exceptions. The arbitration obligation does not apply to claims for worker's compensation, state disability insurance and unemployment insurance benefits; however, it does apply to retaliation claims based upon seeking such benefits. It does not apply to claims for employee benefits under any benefit plan covered by the Employee Retirement Income Security Act of 1974 or funded by insurance unless the claim can otherwise be brought in a court of law (after the exhaustion of an administrative or alternative remedies otherwise applicable to the claim). It does not apply to any claim that an applicable federal statute or applicable federal Executive Order expressly states cannot be arbitrated or subject to a pre-dispute arbitration agreement. Nothing in the Award Agreement prevents the making of a report to or filing a claim or charge with a government agency, including the Equal Employment Opportunity Commission, U.S. Department of Labor, Securities and Exchange Commission, Occupational Health and Safety Administration, or National Labor Relations Board. Nothing in the Award Agreement prevents the investigation by a government agency of any report, claim or charge otherwise covered by the Award Agreement. And, nothing in this agreement to arbitrate prevents or excuses a party from satisfying any conditions precedent and/or exhausting administrative remedies under applicable law before bringing a claim in arbitration.

(b) Controlling Law and Procedure. The Federal Arbitration Act ("***FAA***") shall govern the Award Agreement to arbitrate between the parties, including its interpretation, applicability, enforcement and all arbitration proceedings. A party who wishes to arbitrate a claim or dispute covered by the Award Agreement must make a written request for arbitration and deliver it to the other party by hand or mail no later than the expiration of the statute of limitations (the deadline for filing the claim) that applicable law prescribes for the claim. The request for arbitration shall identify the claims asserted, the factual basis for the claim(s), and the relief and/or remedy sought. The arbitrator shall resolve all disputes regarding the timeliness or propriety of the request for arbitration and apply the statute of limitations that would have applied if the claim(s) had been brought in court. In no event shall the request for arbitration be made after the date when institution of legal or equitable proceedings based on such claims would be barred by the applicable statute of limitations.

(c) Class Waiver. The Grantee and Company agree to bring any claim or dispute in arbitration on an individual basis only, and not as a class or collective action; the Grantee and Company waive any right for a dispute or claim to be brought, heard, or decided as a class or collective action, and the arbitrator has no power or authority to preside over a class or collective action ("***Class Action Waiver***"). In the event a final judicial determination is made that the Class Action Waiver is unenforceable and that a class or collective action may proceed despite this arbitration agreement, the arbitrator is nevertheless without authority to preside over a class or collective action and any class or collective action must be brought in a court of competent jurisdiction. Additionally, unless otherwise agreed to by the parties, claims may not be combined or consolidated with that of any other person or entity.

(d) Arbitration Procedure. Except as otherwise provided for herein, the arbitration will be conducted in accordance with the AAA Employment Arbitration Rules (the "***AAA Rules***"), in effect on the date the written notice of claims request for arbitration is made. The AAA rules are available on-line at www.adr.org. To the extent that any of the AAA Rules conflicts with the FAA or the Award Agreement, the FAA and the Award Agreement shall control. The arbitrator shall entertain and address any motion to dismiss and/or a motion for summary judgment consistent with the standards for such motions under the Federal Rules of Civil Procedure. The arbitrator may award any remedy available under applicable law, but remedies shall be limited to those that would be available to a party in their individual capacity for the claims presented to the arbitrator. The arbitrator shall apply the substantive U.S. Federal, state or local law applicable to the claims asserted. The arbitrator is without authority to apply any different substantive law. The award shall be issued in writing and state the essential findings and conclusions on which such award is based. The parties agree to abide by and perform any valid award rendered by the arbitrator, and judgment on the award may be entered in any court having jurisdiction thereof.

(e) Right to Opt-Out. This arbitration agreement is not a mandatory condition of employment. If the Grantee does not wish to be bound by the arbitration obligations created by the Award Agreement, the Grantee can elect not to accept the Award.

(f) Enforcement and Severability. This arbitration agreement survives after the employment relationship terminates. Subject to the Class Action Waiver in Section 22(c) above, if any portion of this arbitration agreement is deemed unenforceable, the unenforceable provision or language shall be severed from the Award Agreement and the remainder will be enforceable.

23. **<u>Status of Stock.</u>** Occidental intends to register for issuance under the Securities Act of 1933, as amended (the "***Act***"), the shares of Stock acquirable upon settlement of the Award. In the absence of such effective registration or an available exemption from registration under the Act, issuance of shares of Stock acquirable upon settlement of the Award will be delayed until registration of such shares is effective or an exemption from registration under the Act is available. Occidental intends to use its reasonable efforts to ensure that no such delay will occur. In the event exemption from registration under the Act is available upon settlement of the Award, the Grantee, if requested by the Company to do so, will execute and deliver to the Company in writing an agreement containing such provisions as the Company may require to assure compliance with applicable securities laws.

The Grantee agrees that the shares of Stock which the Grantee may acquire in settlement of the Award will not be sold or otherwise disposed of in any manner which would constitute a violation of any applicable U.S. Federal, state or local securities or exchange laws or non-U.S. securities or exchange laws. The Grantee also agrees that (i) any certificates representing the shares of Stock to be delivered in settlement of the Award may bear such legend or legends as the Committee deems appropriate in order to assure compliance with applicable securities laws, (ii) Occidental may refuse to register the transfer of the shares of Stock to be delivered in settlement of the Award on the stock transfer records of Occidental if such proposed transfer would, in the opinion of counsel satisfactory to Occidental, constitute a violation of any applicable securities law and (iii) Occidental may give related instructions to its transfer agent, if any, to stop registration of the transfer of the shares of Stock to be delivered in settlement of the Award.

24. **<u>Notices.</u>** Any notices or other communications provided for in these Terms and Conditions shall be sufficient if in writing. In the case of the Grantee, such notices or communications shall be effectively delivered if hand delivered to the Grantee at the Grantee's principal place of employment or if sent by certified mail, return receipt requested, to the Grantee at the last address the Grantee has filed with the Company. In the case of the Company, such notices or communications shall be effectively delivered if sent by certified mail, return receipt requested, to Occidental at its principal executive offices.

25. Binding Effect. These Terms and Conditions shall be binding upon and inure to the benefit of any successors to the Company and all persons lawfully claiming under the Grantee.

26. Construction. Headings are given to the Sections and subsections of the Award Agreement solely as a convenience to facilitate reference. Such headings shall not be deemed in any way material or relevant to the construction or interpretation of the Award Agreement or any provision thereof. Further, under the Award Agreement, (a) pronouns and other words of gender shall be read as gender-neutral, (b) words importing the singular only shall include the plural and vice versa and (c) the words "include", "includes" or "including" shall be deemed to be followed by the words "without limitation". The Award Agreement may be signed in counterparts, each of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument.

ATTACHMENT 2

OCCIDENTAL PETROLEUM CORPORATION
2015 LONG-TERM INCENTIVE PLAN as Amended and Restated
GENERAL TERMS OF EMPLOYMENT

The following General Terms of Employment are set forth as of the "Date of Grant" specified in the Notice of Grant to which this Attachment 2 is attached (the "***Notice of Grant***"), by and between Occidental Petroleum Corporation ("***Occidental***") and the eligible individual (the "***Grantee***") receiving the award described in the Notice of Grant (the "***Award***"). These General Terms of Employment, the Notice of Grant (along with all incorporated attachments and exhibits) and the Award evidenced thereby are collectively referred to herein as the "***Award Agreement***".

For and in consideration of the premises and the mutual covenants of the parties contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Grantee hereby agrees as follows, in each case to the fullest extent permitted by law and subject to the limitations provided for in Sections F and G:

A. The Grantee will not publish or divulge to any person, firm, corporation or institution and will not use to the detriment of Occidental, or any of its subsidiaries or other affiliates (the "***Company Group***"), any Confidential Information of any of them (whether generated by them or as a result of any of their business relationships), without first obtaining the written permission of an officer of the Company. As used herein, "***Confidential Information***" means an item of information or compilation of information in any form (tangible or intangible) related to the business of the Company Group that the Grantee acquires during employment and that the Company Group has not made public or authorized public disclosure of, provided that the item or compilation is not readily available to persons outside the Company Group through proper means who would benefit from its use or disclosure and is not obligated to maintain its confidentiality. Confidential Information is also understood to cover the information protected under Company's Confidential Company Information Policy 10:20:80, as it may be amended from time to time.

B. At the time of leaving employment with the Company, the Grantee will deliver to the Company, and not keep or deliver to anyone else, any and all credit cards, drawings, blueprints, specifications, devices, notes, notebooks, documents, memoranda, reports, studies, correspondence and other documents, and, in general, any and all materials (including keys, access cards, FOBs, computers, thumb drives or other electronic storage devices) relating to the Company Group (whether generated by them or as a result of their business relationships), including any copies (whether in paper or electronic form), that the Grantee has in the Grantee's possession or control.

C. The Grantee will, during the Grantee's employment by the Company or any member of the Company Group, comply with the provisions of Occidental's Code of Business Conduct.

D. The Grantee will not interfere with or disrupt any of the operations of the Company Group or otherwise take actions intended directly to harm any entity in the Company Group. The Grantee will not make defamatory or derogatory statements about the Company Group, or its owners, officers or directors ("***Occidental Parties***"), or intentionally publicize information about Occidental Parties to the public or the investment community (through the press, electronic media, or any other mass media or communication outlet) without permission of an officer of the Company; provided, however, that the foregoing shall not prohibit conduct that is protected by law as described in Sections F and G below.

E. In the event that the Grantee is subject to an "Intellectual Property Assignment and Nondisclosure Agreement" ("***IPANA***") with the Company or a member of the Company Group, the IPANA shall control the rights of the Grantee with respect to intellectual property conceived or created by the Grantee in accordance with the IPANA's terms, and the Grantee will comply with such agreement as a mandatory term of the General Terms of Employment provided herein. In the event the Grantee is not subject to a controlling IPANA, all inventions, developments, designs, improvements, discoveries and ideas that the Grantee makes or conceives in the course of employment by a member of the Company Group, whether or not during regular working hours, relating to any design, article of manufacture, machine, apparatus, process, method, composition of matter, product or any improvement or component thereof, that are manufactured, sold, leased, used or under development by, or pertain to the present or possible future business of a member of the Company Group (collectively "***Proprietary Works***") shall be a work-for-hire and become and remain the property of the Company (or other member of the Company Group that employs the Grantee), its successors and assigns. The Grantee hereby fully and finally, assigns and transfers to the Company (or other member of the Company Group that employs the Grantee), all of the Grantee's right, title and interest in the Proprietary Works. This assignment covers all rights of every kind and character, including all rights necessary to provide Company with all of the benefits of exclusive ownership and control over the Proprietary Works to the fullest extent allowed by law throughout the world, including the right to sue, counterclaim and recover for all past, present and future infringement, misappropriation or dilution thereof.

F. The Grantee acknowledges that through the Company's Speak-Up and Non-Retaliation Policy (Policy No. 91:80:00), the Grantee has been notified of his or her immunity rights related to the use of trade secret information of the Company Group in the reporting illegal conduct or in a claim of retaliation for reporting illegal conduct as provided for under the Defend Trade Secrets Act of 2016 (18 U.S.C. §1833(b) ("***DTSA***"), and the Grantee has been provided the Company's reporting policy regarding the reporting of suspected illegal conduct.

G. The Grantee understands that the purpose of this statement of General Terms of Employment is to reinforce the protection of the trade secrets, Confidential Information and other intellectual property interests of the Company and Company Group, and not to prohibit any conduct by the Grantee that is compelled by law or protected by law. The Grantee recognizes that nothing in these General Terms of Employment prohibits the Grantee from reporting an event that the Grantee reasonably and in good faith believe is a violation of law to the relevant law-enforcement agency (such as the Securities and Exchange Commission ("***SEC***")), and that no prior approval from or notice to the Company is required before doing so. In addition, nothing in these General Terms of Employment shall be construed to prohibit the Grantee from cooperating in an investigation conducted by a duly authorized government agency, and in the course of such conduct disclosing trade secrets or Confidential Information in a manner that complies with the DTSA (described in the Company's Speak-Up and Non-Retaliation Policy). Without limiting the foregoing, the Grantee acknowledges and understands that nothing in or about the Award Agreement prohibits the Grantee from: (i) filing and, as provided for under Section 21F of the Exchange Act, maintaining the confidentiality of a claim with the SEC; (ii) providing confidential information to the SEC, or providing the SEC with information that would otherwise violate this Attachment 2, to the extent permitted by Section 21F of the Exchange Act; (iii) cooperating, participating or assisting in an SEC investigation or proceeding without notifying Occidental or (iv) receiving a monetary award as set forth in Section 21F of the Exchange Act.

H. The foregoing General Terms of Employment are not intended to be an exclusive list of the employment terms and conditions that apply to the Grantee. The Company, in its sole discretion, may at any time amend or supplement the foregoing terms. The Grantee's breach of the foregoing General Terms of Employment will entitle the Company to take appropriate disciplinary action, including reduction or forfeiture of the Award granted pursuant to the Award Agreement and termination of employment.

Exhibit 21

LIST OF SUBSIDIARIES

The following is a list of the Registrant’s subsidiaries at December 31, 2022.

Name	Jurisdiction of Formation
1PointFive International, LLC	Delaware
1PointFive P1, LLC	Delaware
1PointFive P2, LLC	Delaware
1PointFive USA, LLC	Delaware
1PointFive, LLC	Delaware
4374607 Nova Scotia Company	Nova Scotia
Amarok Gathering, LLC	Delaware
Anadarko 20-25 Company	Cayman Islands
Anadarko 20-36 Company	Cayman Islands
Anadarko 20-47 Company	Cayman Islands
Anadarko 20-48 Company	Cayman Islands
Anadarko 20-49 Company	Cayman Islands
Anadarko Algeria Block 403 c/e Company	Cayman Islands
Anadarko Algeria Block 406B Company	Cayman Islands
Anadarko Algeria Oil & Gas Company	Cayman Islands
Anadarko Brazil Investment I LLC	Delaware
Anadarko Brazil Investment II LLC	Delaware
Anadarko Canada E&P Ltd.	British Columbia
Anadarko China Holdings 2 Company	Cayman Islands
Anadarko Colombia Company	Cayman Islands
Anadarko Consolidated Holdings LLC	Delaware
Anadarko Cote d'Ivoire Block 103 Company	Cayman Islands
Anadarko Cote d'Ivoire Company	Cayman Islands
Anadarko DBMOS Operator, LLC	Delaware
Anadarko Development Company	Cayman Islands
Anadarko Development Holding Limited	Gibraltar
Anadarko E&P Onshore LLC	Delaware
Anadarko Egypt Holdings Company	Delaware
Anadarko Energy Holding Limited	Gibraltar
Anadarko Energy Services Company	Delaware
Anadarko Exploracao e Producao de Petroleo e Gas Natural Ltda.	Brazil
Anadarko Finance Company	Nova Scotia
Anadarko Gabon Company	Cayman Islands
Anadarko Ghana Mahogany-1 Company	Cayman Islands
Anadarko Global Energy S.a.r.l	Luxembourg
Anadarko Global Funding 1 Company	Cayman Islands
Anadarko Global Funding II Ltd.	Bahamas
Anadarko Guyana Company	Cayman Islands
Anadarko Holding Company	Utah
Anadarko International Development S.a.r.l	Luxembourg
Anadarko International Energy Company	Delaware
Anadarko International O&G Company	Cayman Islands
Anadarko International Trading Corporation	Delaware
Anadarko Jordan Company	Delaware
Anadarko Kenya Company	Cayman Islands
Anadarko Land Corp.	Nebraska
Anadarko LMM, S.a.r.l	Luxembourg
Anadarko Mexico B.V.	Netherlands

Name	Jurisdiction of Formation
Anadarko Mexico S.a.r.l	Luxembourg
Anadarko Midkiff/Chaney Dell BR Corp.	Delaware
Anadarko Midkiff/Chaney Dell LLC	Delaware
Anadarko Natural Gas Company LLC	Delaware
Anadarko Offshore Holding Company, LLC	Delaware
Anadarko Offshore Well Containment Company LLC	Delaware
Anadarko OGC Company	Delaware
Anadarko Oil & Gas 5, LLC	Delaware
Anadarko Peru B.V.	Netherlands
Anadarko Petroleum Corporation	Delaware
Anadarko Realty, LLC	Texas
Anadarko Rockies LLC	Delaware
Anadarko Royalty Holdings Company	Delaware
Anadarko US Offshore LLC	Delaware
Anadarko US Offshore Receivables, LLC	Delaware
Anadarko USH1 Corporation	Delaware
Anadarko Venezuela Company	Cayman Islands
Anadarko Venezuela LLC	Delaware
Anadarko Venezuela, Srl	Venezuela
Anadarko West Texas BR Corp.	Delaware
Anadarko West Texas LLC	Delaware
Anadarko Worldwide Holdings C.V.	Netherlands
APC Aviation, Inc.	Delaware
APC International Holdings LLC	Delaware
APC Midstream Holdings, LLC	Delaware
APC Venezuela, Srl	Venezuela
Aventine LLC	New Mexico
Baseball Merger Sub 2, Inc.	Delaware
Bear Branch Exploration, LLC	Delaware
Big Island Trona Company	Delaware
Bitter Creek Coal Company	Utah
Bluebonnet Sequestration Hub, LLC	Delaware
Bravo Pipeline Company	Delaware
Cain Chemical Inc.	Delaware
Carbon Finance Labs, LLC	Delaware
Concord Petroleum Corporation	Panama
Conn Creek Shale Company	Delaware
D.S. Ventures, LLC	Texas
Deerwood Exploration, LLC	Delaware
DMM Financial LLC	Delaware
Downtown Plaza II	Oklahoma
FLAG Development, LLC	Delaware
Fosters Mill Exploration, LLC	Delaware
FP Westport GmbH [in liquidation]	Switzerland
FP Westport LLC	Delaware
FP Westport Services LLC	Delaware
FP Westport Trading LLC	Delaware
Glenn Springs Holdings, Inc.	Delaware
Globrep Representaciones S.A.	Ecuador
Grand Bassa Tankers, Inc.	Delaware
Granite Springs Properties, LLC	Delaware
Grupo OxyChem de Mexico, S.A. de C.V.	Mexico
Hereford Carbon Solutions, LLC	Delaware
Houndstooth Resources, LLC	Texas

Name	Jurisdiction of Formation
INDSPEC Chemical Corporation	Delaware
INDSPEC Chemical Export Sales, LLC	Delaware
INDSPEC Holding Corporation	Delaware
Ingleside Cogeneration GP, LLC	Delaware
Ingleside Cogeneration Limited Partnership	Delaware
Interore Trading Ltd.	Liberia
Joslyn Partnership	Alberta
Kerr-McGee Corporation	Delaware
Kerr-McGee Natural Gas Company, Inc.	Delaware
Kerr-McGee of Canada Northwest Ltd.	Alberta
Kerr-McGee Oil & Gas Onshore LP	Delaware
Kerr-McGee Shared Services Company LLC	Delaware
Kerr-McGee Stored Power Corporation	Nevada
Kerr-McGee U.K. Energy Corporation	Delaware
Kerr-McGee Worldwide Corporation	Delaware
KM BM-C-Seven Ltd.	Cayman Islands
Laguna Petroleum, LLC	Texas
Liwa Oil & Gas Ltd.	Bermuda
Magnolia Sequestration Hub, LLC	Delaware
Mariana Properties, Inc.	Delaware
Marico Exploration, Inc.	New Mexico
MC2 Technologies LLC	Delaware
Miller Springs Remediation Management, Inc.	Delaware
Natural Gas Odorizing, Inc.	Oklahoma
New OPL, LLC	Delaware
NGL Ventures LLC	Delaware
Oakwood Exploration, LLC	Delaware
Occidental (Bermuda) Ltd.	Bermuda
Occidental (East Shabwa), LLC	Nevis
Occidental Advance Sale Finance, Inc.	California
Occidental Al Hosn Holding Limited	Bermuda
Occidental Al Hosn, LLC	Delaware
Occidental Angola Holdings Ltd.	Bermuda
Occidental Canada Holdings ULC	Nova Scotia
Occidental Chemical Asia, Limited	Japan
Occidental Chemical Belgium B.V.B.A.	Belgium
Occidental Chemical Chile Limitada	Chile
Occidental Chemical Corporation	New York
Occidental Chemical de Mexico, S.A. de C.V.	Mexico
Occidental Chemical Export Sales, LLC	Delaware
Occidental Chemical Far East Limited	Hong Kong
Occidental Chemical Holding Corporation	California
Occidental Chemical International, LLC	California
Occidental Chemical Investment (Canada) 1, Inc.	Delaware
Occidental Chemical Receivables, LLC	Delaware
Occidental Chile Investments, LLC	Delaware
Occidental Chile Minority Holder, LLC	Delaware
Occidental CIS Services, Inc.	Delaware
Occidental Colombia (Series G) Ltd.	Bermuda
Occidental Colombia (Series J) Ltd.	Bermuda
Occidental Colombia (Series K) Ltd.	Bermuda
Occidental Colombia (Series L) Ltd.	Bermuda
Occidental Colombia (Series M) Ltd.	Bermuda
Occidental Colombia (Series N) Ltd.	Bermuda

Name	Jurisdiction of Formation
Occidental Colombia (Series O) Ltd.	Bermuda
Occidental Crude Sales, Inc. (Canada)	Delaware
Occidental Crude Sales, Inc. (International)	Delaware
Occidental Dolphin Holdings Ltd.	Bermuda
Occidental Economic Opportunity Zone Investments, LLC	Delaware
Occidental Energy Marketing, Inc.	Delaware
Occidental Energy Ventures LLC	Delaware
Occidental Exploradora del Peru Ltd.	Bermuda
Occidental Exploration and Production Company	California
Occidental Hafar, LLC	Delaware
Occidental International (Libya), Inc.	Delaware
Occidental International Corporation	Delaware
Occidental International Exploration and Production Company	California
Occidental International Holdings Ltd.	Bermuda
Occidental International Oil and Gas Ltd.	Bermuda
Occidental International Services, Inc.	Delaware
Occidental Joslyn GP 2 Co.	Nova Scotia
Occidental Latin America Holdings, LLC	Delaware
Occidental Libya Oil & Gas B.V.	Netherlands
Occidental LNG (Malaysia) Ltd.	Bermuda
Occidental MENA Manager Ltd.	Bermuda
Occidental Middle East Development Company	Delaware
Occidental Midland Basin, LLC	Delaware
Occidental Mukhaizna, LLC	Delaware
Occidental of Abu Dhabi (Bab) Ltd.	Bermuda
Occidental of Abu Dhabi (Shah) Ltd.	Bermuda
Occidental of Abu Dhabi Holdings Ltd.	Bermuda
Occidental of Abu Dhabi Ltd.	Bermuda
Occidental of Abu Dhabi, LLC	Delaware
Occidental of Algeria LLC	Delaware
Occidental of Bahrain Ltd.	Bermuda
Occidental of Bangladesh, Inc.	Delaware
Occidental of Colombia (Chipiron), Inc.	Nevis
Occidental of Colombia (Cosecha), Inc.	Nevis
Occidental of Colombia (Medina), Inc.	Nevis
Occidental of Colombia (Putumayo) Ltd.	Bermuda
Occidental of Colombia (Teca) Ltd.	Bermuda
Occidental of Dubai, Inc.	Nevis
Occidental of Iraq Holdings Ltd.	Bermuda
Occidental of Iraq, LLC	Delaware
Occidental of Oman, Inc.	Nevis
Occidental of Russia Ltd.	Bermuda
Occidental of South Africa (Offshore), Inc.	Nevis
Occidental of Yemen (Block 75), LLC	Delaware
Occidental Oil and Gas (Oman) Ltd.	Nevis
Occidental Oil and Gas Corporation	Texas
Occidental Oil and Gas International Inc.	Delaware
Occidental Oil and Gas International, LLC	Delaware
Occidental Oil and Gas of Peru, LLC	Delaware
Occidental Oil and Gas Pakistan LLC	Nevis
Occidental Oil Asia Pte. Ltd.	Singapore
Occidental Oil Shale, Inc.	California
Occidental Oman (Block 27) Holdings Ltd.	Bermuda
Occidental Oman Block 51 Holding Ltd.	Bermuda

Name	Jurisdiction of Formation
Occidental Oman Block 51, LLC	Delaware
Occidental Oman Block 65 Holding Ltd.	Bermuda
Occidental Oman Block 65, LLC	Delaware
Occidental Oman Block 72 Holding Ltd.	Bermuda
Occidental Oman Block 72, LLC	Delaware
Occidental Oman Gas Company LLC	Delaware
Occidental Oman Gas Holdings Ltd.	Bermuda
Occidental Oman North Holdings, Ltd.	Bermuda
Occidental Oriente Exploration and Production Ltd.	Cayman Islands
Occidental Overseas Holdings B.V.	Netherlands
Occidental Peninsula II, Inc.	Nevis
Occidental Peninsula, LLC	Delaware
Occidental Permian Ltd.	Texas
Occidental Permian Manager LLC	Delaware
Occidental Permian Services, Inc.	Delaware
Occidental Peruana, Inc.	California
Occidental Petrolera del Peru (Block 101), Inc.	Nevis
Occidental Petrolera del Peru (Block 103), Inc.	Nevis
Occidental Petroleum (Pakistan), Inc.	Delaware
Occidental Petroleum Corporation Political Action Committee	California
Occidental Petroleum de Venezuela, S.A.	Venezuela
Occidental Petroleum of Nigeria Ltd.	Nigeria
Occidental Petroleum of Oman Ltd.	Nevis
Occidental Petroleum of Qatar Ltd.	Bermuda
Occidental Power Marketing, L.P.	Delaware
Occidental Power Services, Inc.	Delaware
Occidental PVC, LLC	Texas
Occidental Qatar Energy Company LLC	Delaware
Occidental Red Sea Development, LLC	Nevis
Occidental Research Corporation	California
Occidental Resource Recovery Systems, Inc.	California
Occidental Resources Company	Cayman Islands
Occidental Shah Gas Holdings Ltd.	Bermuda
Occidental South America Finance, LLC	Delaware
Occidental Specialty Marketing, Inc.	Delaware
Occidental Tower Corporation	Delaware
Occidental Transportation Holding Corporation	Delaware
Occidental West Texas Overthrust, Inc.	Texas
Occidental Yemen Ltd.	Bermuda
Occidental Yemen Sabatain, Inc.	Nevis
Oceanic Marine Transport Ltd.	Bermuda
OEVC Energy, LLC	Texas
OEVC Midstream Projects, LLC	Delaware
OIH, LLC	Delaware
OLCV Canada Holdings, LLC	Delaware
OLCV Canada Investment Holdings, Inc.	Delaware
OLCV CE Holdings, ULC	British Columbia
OLCV CE US Holdings, Inc.	Delaware
OLCV Land Holdings, LLC	Delaware
OLCV Net Power, LLC	Texas
OLCV Services LLC	Delaware
OOG Partner LLC	Delaware
OOOI Chem Holdings, LLC	Delaware
OOOI Chem Sub, LLC	Delaware

Name	Jurisdiction of Formation
OOOI Chemical International, LLC	Delaware
OOOI Chile Holder, LLC	Delaware
OOOI Ecuador Management, LLC	Delaware
OOOI Oil and Gas Sub, LLC	Delaware
OOOI South America Management, LLC	Delaware
Opcal Insurance, Inc.	Hawaii
OPM GP, Inc.	Delaware
OPM Holdco, LLC	Delaware
Oryx Crude Trading & Transportation, Inc.	Delaware
OTCF, LLC	Delaware
OTH, LLC	Delaware
Oxy Barilla Draw Gathering, LLC	Delaware
Oxy BridgeTex Limited Partnership	Texas
Oxy C & I Bulk Sales, LLC	Delaware
OXY Campus, LLC	Delaware
Oxy Canada Sales, Inc.	Delaware
Oxy Carbon Solutions, LLC	Texas
Oxy Carbon Storage, LLC	Delaware
Oxy Climate Ventures, Inc.	Delaware
Oxy Cogeneration Holding Company, LLC	Delaware
Oxy Colombia Holdings, LLC	Delaware
Oxy Colombia TopCo Ltd.	Bermuda
OXY CV Pipeline LLC	Delaware
Oxy Delaware Basin Plant, LLC	Delaware
Oxy Delaware Basin, LLC	Texas
Oxy Dolphin E&P, LLC	Nevis
Oxy Dolphin Pipeline, LLC	Nevis
Oxy Energy Canada, Inc.	Delaware
Oxy Energy Services, LLC	Delaware
Oxy Expatriate Services, Inc.	Delaware
Oxy FFT Holdings, Inc.	Delaware
Oxy Holding Company (Pipeline), Inc.	Delaware
OXY Inc.	California
Oxy International Ventures Ltd.	Bermuda
Oxy Levelland Pipeline Company, LLC	Delaware
Oxy Levelland Terminal Company, LLC	Delaware
OXY Libya E&P Area 103 BR4 B.V.	Netherlands
OXY Libya E&P Area 35 Ltd.	Bermuda
OXY Libya E&P Concession 103 Ltd.	Bermuda
OXY Libya E&P EPSA 102 B.V.	Netherlands
OXY Libya E&P EPSA 1981 Ltd.	Bermuda
OXY Libya E&P EPSA 1985 Ltd.	Bermuda
OXY Libya E&P NC 143, 144, 145, 150 B.V.	Netherlands
OXY Libya Exploration, SPC	Cayman Islands
OXY Libya, LLC	Delaware
OXY Little Knife, LLC	Delaware
Oxy Low Carbon Ventures Canada, ULC	British Columbia
Oxy Low Carbon Ventures, LLC	Delaware
OXY LPG LLC	Delaware
Oxy LPG Terminal, LLC	Delaware
OXY Mexico Holdings I, LLC	Delaware
OXY Mexico Holdings II, LLC	Delaware
OXY Middle East Holdings Ltd.	Bermuda
Oxy Midstream Strategic Development, LLC	Delaware

Name	Jurisdiction of Formation
OXY of Saudi Arabia Ltd.	Cayman Islands
OXY Oil Partners, Inc.	Delaware
Oxy Oleoducto SOP, LLC	Delaware
Oxy Overseas Services Ltd.	Bermuda
OXY PBLP Manager, LLC	Delaware
Oxy Permian Gathering, LLC	Delaware
Oxy Permian Plaza, LLC	Delaware
Oxy Petroleum de Mexico, S. de R.L. de C.V.	Mexico
Oxy Renewable Energy LLC	Texas
Oxy Salt Creek Pipeline LLC	Delaware
OXY Support Services, LLC	Delaware
Oxy Taft Hub, LLC	Texas
Oxy Technology Ventures, Inc.	Delaware
Oxy TL, LLC	Delaware
Oxy Transport I Company, LLC	Delaware
OXY Tulsa Inc.	Delaware
OXY USA Inc.	Delaware
OXY USA WTP LP	Delaware
Oxy Vinyls Canada Co.	Nova Scotia
Oxy Vinyls Export Sales, LLC	Delaware
Oxy Vinyls, LP	Delaware
OXY VPP Investments, LLC	Delaware
OXY West, LLC	Texas
Oxy Westwood Corporation	California
Oxy Y-1 Company	New Mexico
OXYCHEM (CANADA), INC.	Alberta
OxyChem do Brasil Ltda.	Brazil
OxyChem Ingleside Ethylene Holdings, Inc.	Delaware
OxyChile Investments, LLC	Delaware
OXYMAR	Texas
Pelican Sequestration Hub, LLC	Delaware
Permian Basin JV Tax Matters Member LLC	Delaware
Permian Basin Limited Partnership	Delaware
Permian VPP Holder, LP	Delaware
Permian VPP Manager, LLC	Delaware
Placid Oil, LLC	Delaware
Ramlat Oxy Ltd.	Bermuda
Rio de Viento, Inc.	Wyoming
Rodeo Midland Basin, LLC	Delaware
San Patricio Pipeline LLC	Delaware
Scanports Shipping, LLC	Delaware
SequestCo, LLC	Delaware
Stetson Exploration, LLC	Delaware
Sun Offshore Gathering Company	Delaware
Swiflite Aircraft Corporation	New Jersey
Taft Carbon Capture, LLC	Delaware
TerraLithium LLC	Delaware
Transok Properties, LLC	Delaware
Troy Potter, Inc.	Texas
Tuscaloosa Holdings, Inc.	Delaware
UP Petroleo III Ltd.	Bermuda
Upland Industries Corporation	Nebraska
Venezuela US SRL	Barbados
Vintage Gas, Inc.	Oklahoma

Name	Jurisdiction of Formation
Vintage Petroleum Argentina Ltd.	Cayman Islands
Vintage Petroleum Boliviana, Ltd.	Bermuda
Vintage Petroleum International Finance B.V.	Netherlands
Vintage Petroleum International Holdings, LLC	Delaware
Vintage Petroleum International Ventures, Inc.	Cayman Islands
Vintage Petroleum International, LLC	Delaware
Vintage Petroleum Italy, Inc.	Oklahoma
Vintage Petroleum South America Holdings, Inc.	Cayman Islands
Vintage Petroleum South America, LLC	Oklahoma
Vintage Petroleum Turkey, Inc.	Cayman Islands
Vintage Petroleum Uruguay Ltd.	Cayman Islands
Wardner Ranch, Inc.	Delaware
Western Gas Resources, Inc.	Delaware
Western Gas Resources-Westana, Inc.	Delaware
Western Midstream Holdings, LLC	Delaware
WGR Asset Holding Company LLC	Delaware
WGR Canada, Inc.	New Brunswick
Woodlands International Insurance Ltd.	Bermuda
YT Ranch LLC	Colorado

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the registration statements (Nos. 333-83124, 333-142705, 333-203801, 333-207413, 333-224691, 333-237414 and 333-239236) on Form S-8 and the registration statements (Nos. 333-55404, 333-266420 and 333-235445) on Form S-3 of our report dated February 27, 2023, with respect to the consolidated financial statements and financial statement schedule II - valuation and qualifying accounts of Occidental Petroleum Corporation and the effectiveness of internal control over financial reporting.

/s/ KPMG LLP

Houston, Texas
February 27, 2023

Exhibit 23.2

RYDER SCOTT COMPANY
PETROLEUM CONSULTANTS

TBPELS REGISTERED ENGINEERING FIRM F-1580 FAX (713) 651-0849
1100 LOUISIANA SUITE 4600 HOUSTON, TEXAS 77002-5294 TELEPHONE (713) 651-9191

CONSENT OF INDEPENDENT PETROLEUM ENGINEERS

To the Board of Directors
Occidental Petroleum Corporation:

We consent to the (i) inclusion in the Occidental Petroleum Corporation ("Occidental") Form 10-K for the year ended December 31, 2022, ("Form 10-K"), and the incorporation by reference in Occidental's registration statements (No. 333-55404, 333-83124, 333-142705, 333-203801, 333-207413, 333-224691, 333-266420, 333-235445, 333-237414 and 333-239236) (the "Registration Statements"), of references to our name and to our letter dated February 13, 2023, relating to our review of the methods and procedures used by Occidental for estimating its oil and gas proved reserves (our "Letter"), (ii) filing of our Letter with the Securities and Exchange Commission as Exhibit 99.1 to the Form 10-K and (iii) incorporation by reference of our Letter in the Registration Statements.

/s/ Ryder Scott Company, L.P.

RYDER SCOTT COMPANY, L.P.
TBPELS Firm Registration No. F-1580

Houston, Texas
February 27, 2023

Exhibit 31.1

RULE 13a – 14(a) / 15d – 14(a)
CERTIFICATION
PURSUANT TO §302 OF THE SARBANES-OXLEY ACT OF 2002

I, Vicki Hollub, certify that:

1. I have reviewed this annual report on Form 10-K of Occidental Petroleum Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

    (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

    (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

    (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 27, 2023

/s/ Vicki Hollub
Vicki Hollub
President and Chief Executive Officer

Exhibit 31.2

RULE 13a – 14(a) / 15d – 14(a)
CERTIFICATION
PURSUANT TO §302 OF THE SARBANES-OXLEY ACT OF 2002

I, Robert L. Peterson, certify that:

1. I have reviewed this annual report on Form 10-K of Occidental Petroleum Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 27, 2023

/s/ Robert L. Peterson
Robert L. Peterson
Senior Vice President and
Chief Financial Officer

Exhibit 32.1

CERTIFICATION OF CEO AND CFO PURSUANT TO
18 U.S.C. § 1350,
AS ADOPTED PURSUANT TO
§ 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of Occidental Petroleum Corporation (the “Company”) for the fiscal period ended December 31, 2022, as filed with the Securities and Exchange Commission on February 27, 2023 (the “Report”), Vicki Hollub, as Chief Executive Officer of the Company, and Robert L. Peterson, as Chief Financial Officer of the Company, each hereby certifies, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that, to the best of her or his knowledge:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Vicki Hollub

Name:	Vicki Hollub
Title:	President and Chief Executive Officer
Date:	February 27, 2023

/s/ Robert L. Peterson

Name:	Robert L. Peterson
Title:	Senior Vice President and Chief Financial Officer
Date:	February 27, 2023

A signed original of this written statement required by Section 906 has been provided to Occidental Petroleum Corporation and will be retained by Occidental Petroleum Corporation and furnished to the Securities and Exchange Commission or its staff upon request.

This certification accompanies the Report pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 and shall not, except to the extent required by the Sarbanes-Oxley Act of 2002, be deemed filed by the Company for purposes of Section 18 of the Securities Exchange Act of 1934, as amended.

Exhibit 99.1

OCCIDENTAL PETROLEUM CORPORATION

Process Review

of the

Estimated

Future Proved Reserves and Income

Attributable to Certain

Leasehold and Royalty Interests

and

Certain Economic Interests

Derived Through Production Sharing Agreement

OXY PROPERTIES

SEC Parameters

As of

December 31, 2022

/s/ Guale Ramirez

Guale Ramirez, P.E.
TBPELS License No. 48318
President

[SEAL]

RYDER SCOTT COMPANY, L.P.
TBPELS Firm Registration No. F-1580

RYDER SCOTT COMPANY
PETROLEUM CONSULTANTS

TBPELS REGISTERED ENGINEERING FIRM F-1580 FAX (713) 651-0849
1100 LOUISIANA SUITE 4600 HOUSTON, TEXAS 77002-5294 TELEPHONE (713) 651-9191

February 13, 2023

Occidental Petroleum Corporation
5 Greenway Plaza, Suite 110
Houston, Texas 77046

Ladies and Gentlemen:

At your request, Ryder Scott Company, L.P. (Ryder Scott) has conducted a process review of the methods and analytical procedures utilized by the engineering and geological staff of Occidental Petroleum Corporation (Occidental) for estimating the proved reserves volumes, preparing the economic evaluations and determining the reserves classifications for the reviewed properties as of December 31, 2022, based on the definitions and disclosure guidelines of the United States Securities and Exchange Commission (SEC) Title 17, Code of Federal Regulations, “Modernization of Oil and Gas Reporting, Final Rule” released January 14, 2009 in the Federal Register (SEC regulations). The results of our third party reserves process review, completed on February 13, 2022 and presented herein, were prepared for public disclosure by Occidental in filings made with the SEC in accordance with the disclosure requirements set forth under Section 229.1202(a)(8) of the SEC regulations.

Based on our review, including the data, technical processes and interpretations presented by Occidental, it is our opinion that the overall procedures and methodologies utilized by Occidental in estimating the proved reserves volumes, documenting the changes in reserves from prior estimates, preparing the economic evaluations and determining the reserves classifications for the reviewed properties are appropriate for the purpose thereof, and comply with the SEC regulations as of December 31, 2022. Ryder Scott has not been engaged to render an opinion as to the reasonableness of the proved reserves quantities reported by Occidental.

Properties Reviewed

The proved reserves reviewed herein are attributable to the leasehold and royalty interests of Occidental in certain properties located in the United States offshore Gulf of Mexico federal waters, in the states of Colorado and Texas, and derived through Occidental’s economic interests as defined in contractual arrangements for certain properties located in the Middle East.

The properties reviewed herein were selected by Occidental. Ryder Scott and Occidental concur that these properties are a valid representation of Occidental’s total net proved reserves portfolio as of December 31, 2022. Based on the estimates prepared by Occidental, the portion of total company net liquid and net gas reserves reviewed by us are expressed as a percentage and presented in summary form on the following page. At Occidental’s request and as provided by Occidental, we have also presented the portion of the total company net proved reserves reviewed by us on a barrel of oil equivalent (BOE) basis.

Percentage of Total Company Estimated Net Reserves
Reviewed by Ryder Scott
SEC Parameters
Occidental Petroleum Corporation
As of December 31, 2022

	Oil/Condensate	NGL	Total Liquid Hydrocarbons	Gas	Equivalent BOE
Total Proved Developed	32.5%	48.0%	36.9%	49.4%	40.3%
Total Proved Undeveloped	45.2%	45.5%	45.3%	44.6%	45.1%
Total Company Proved	35.8%	47.2%	39.3%	47.9%	41.7%

The net liquid hydrocarbons reviewed are comprised of oil, condensate and natural gas liquids (NGL) and are based on standard 42 gallon barrels. All net gas volumes reviewed are based on an “as sold” basis expressed in millions of cubic feet (MMCF) at the official temperature and pressure bases of the areas in which the gas reserves are located. Reserves reviewed and noted herein on a BOE basis are based on converting natural gas on the basis of relative energy content using a factor of 6,000 cubic feet of natural gas per one BOE. It should be noted that barrel of oil equivalence does not necessarily result in price equivalence as the equivalent price of natural gas on a BOE basis is, and has been substantially lower than the corresponding price for crude oil currently and for a number of years.

Reserves Process Review Discussion

A process review, according to Paragraph 2.2(i) contained in the Society of Petroleum Engineers (SPE) “Standards Pertaining to the Estimating and Auditing of Oil and Gas Reserves Information” (SPE auditing standards), is “the result of an investigation by a person who is qualified by experience and training equivalent to that of a QRA [Qualified Reserves Auditor] to address the adequacy and effectiveness of an entity’s internal processes and controls relative to Reserves estimation.”

In order to arrive at our conclusions and to substantiate our opinion relative to Occidental’s internal reserves estimation process and controls, we conducted our investigation in a manner that closely conforms to the SPE auditing standards for a reserves audit. Under Paragraph 2.2(g) of the SPE auditing standards, a reserves audit includes “the process of reviewing certain of the pertinent facts interpreted and assumptions made that have resulted in an estimate of Reserves and/or Reserves information prepared by others and the rendering of an opinion about the appropriateness of the methodologies used, the adequacy and quality of the data relied upon, the depth and thoroughness of the Reserves estimation process, the categorization of Reserves appropriate to the relevant definitions used, and the reasonableness of the estimated Reserves quantities and/or the Reserves information.”

Our process review, however, differs from an SPE reserves audit in that we have not conducted our investigation with sufficient rigor to express an opinion as to “the reasonableness of the estimated Reserves quantities and/or the Reserves information” as required under Paragraph 2.2(g) of the SPE auditing standards for a reserves audit. Our review should not be construed to be a complete and comprehensive appraisal of the subject properties or deemed to convey the same level of information contained in a third party reserves audit or reserves evaluation report.

Applicable Petroleum Reserves Definitions

The determination of the proved reserves classifications as discussed herein are based on the definitions as set forth in the SEC's Regulations Part 210.4-10(a) released January 14, 2009 in the Federal Register, Volume 74, pages 2158 through 2197.

Reserves and Uncertainty

The SEC defines reserves as the "estimated remaining quantities of oil and gas and related substances anticipated to be economically producible, as of a given date, by application of development projects to known accumulations." All reserve estimates involve an assessment of the uncertainty relating to the likelihood that the actual remaining quantities recovered will be greater or less than the estimated quantities determined as of the date the estimate is made. The uncertainty depends chiefly on the amount of reliable geologic and engineering data available at the time of the estimate and the interpretation of this data. The relative degree of uncertainty may be conveyed by placing reserves into one of two principal classifications, either proved or unproved. Unproved reserves are less certain to be recovered than proved reserves and may be further sub-classified as probable and possible reserves to denote progressively increasing uncertainty as to their recoverability.

In many cases, the analysis of the available geoscience and engineering data and the subsequent interpretation of this data may indicate a range of possible outcomes in an estimate, irrespective of the method selected by the evaluator. When a range in the quantity of reserves is identified, the evaluator must determine the uncertainty associated with the incremental quantities of the reserves. If the reserves quantities are estimated using the deterministic incremental approach, the uncertainty for each discrete incremental quantity of the reserves is addressed by the reserves category assigned by the evaluator. Therefore, it is the categorization of reserve quantities as proved, probable or possible that addresses the inherent uncertainty in the estimated quantities reported. For proved reserves, uncertainty is defined by the SEC as reasonable certainty that the estimates of the quantities actually recovered are "much more likely to be achieved than not." The SEC defines probable reserves as "those additional reserves that are less certain to be recovered than proved reserves but which, together with proved reserves, are as likely as not to be recovered." The SEC defines possible reserves as "those additional reserves that are less certain to be recovered than probable reserves." All quantities of reserves within the same reserves category must meet the SEC definitions as noted above.

The reserves for the properties reviewed by us were estimated by Occidental using deterministic methods and presented as incremental quantities. Under the deterministic incremental approach, discrete quantities of reserves are estimated and assigned separately as proved, probable or possible based on their individual level of uncertainty. At Occidental's request, this reserves process review addresses only the proved reserves attributable to the properties reviewed herein.

Reserves estimates will generally be revised only as additional geologic or engineering data become available or as economic conditions change. For proved reserves, the SEC states that "as changes due to increased availability of geoscience (geological, geophysical, and geochemical), engineering, and economic data are made to the estimated ultimate recovery (EUR) with time, reasonably certain EUR is much more likely to increase or remain constant than to decrease." Moreover, estimates of proved, probable and possible reserves quantities and their associated reserves categories may be revised due to other factors such as the results of future operations, effects of regulation by governmental agencies or geopolitical or economic risks.

Reserves Process Review Procedure

Certain technical personnel responsible for the preparation of Occidental's proved reserves estimates presented the data, methods and procedures used in 1) estimating the reserves volumes as of December 31, 2022; 2) documenting the changes in reserves from prior estimates; 3) preparing the economic evaluations associated with the estimated December 31, 2022 reserves; and 4) determining the reserves classifications for each of the subject properties reviewed. We consulted with these technical personnel and had access to their workpapers and supporting data in the course of our review. Furthermore, if in the course of our examination something came to our attention which brought into question the appropriateness of the methodologies employed, the adequacy of the data relied upon or the documentation of the reserves estimation process, additional clarification was requested from Occidental until we had satisfactorily resolved our questions relating thereto.

Methodology and Procedure Employed by Occidental for Estimating Reserves

The estimation of reserves involves two distinct determinations. The first determination results in the estimation of the quantities of recoverable oil and gas and the second determination results in the estimation of the uncertainty associated with those estimated quantities in accordance with the definitions set forth by the SEC's Regulations Part 210.4-10(a). The process of estimating the quantities of recoverable oil and gas reserves relies on the use of certain analytical procedures. These analytical procedures fall into three broad categories or methods: (1) performance-based methods; (2) volumetric-based methods; and (3) analogy. These methods may be used individually or in combination by the reserves evaluator in the process of estimating the quantities of reserves. Reserves evaluators must select the method or combination of methods which in their professional judgment is most appropriate given the nature and amount of reliable geoscience and engineering data available at the time of the estimate, the established or anticipated performance characteristics of the reservoir being evaluated and the stage of development or producing maturity of the property.

The proved reserves for the properties that we reviewed were estimated by performance-based methods, analogy or a combination of methods. Approximately 78 percent of the proved developed producing reserves (attributable to producing wells or reservoirs) for the properties reviewed were estimated by performance-based methods including decline curve analysis and reservoir modeling, which utilized extrapolations of historical production and pressure data in those cases where such data were considered to be definitive. The remaining 22 percent of the proved developed producing reserves (attributable to the producing wells or reservoirs) for the properties reviewed were estimated by dimensionless type curves supported by analogs to 1) estimate those reserves where there were inadequate historical performance data to establish a definitive producing trend and 2) estimate the incremental reserves attributable to enhanced/improved oil recovery. The data used by Occidental in their analysis of the proved producing reserves for the properties reviewed by us were considered sufficient for the purpose thereof.

Approximately 87 percent of the proved developed non-producing reserves were estimated by analogs. The remaining 13 percent of the proved developed non-producing reserves were estimated by decline curve analyses using previously established decline trends. Approximately 88 percent of the proved undeveloped reserves were estimated by type well profiles. The remaining 12 percent of the proved undeveloped reserves were estimated by analogy (6%) or reservoir modeling (6%). The data used by Occidental in their analysis of the non-producing and undeveloped proved reserves for the properties reviewed by us was considered sufficient for the purpose thereof.

Occidental uses the latest available production, new well and seismic data in its reserves estimation process. Typically, the production and new well data is from the third quarter of the year for which reserves are estimated, though material data is considered whenever it becomes available prior to finalization of reserves estimates. The data used by Occidental in their analysis of the proved reserves for the properties reviewed by us was considered sufficient for the purpose thereof.

Primary Economic Assumptions Employed by Occidental for Estimating Reserves

To estimate economically recoverable proved reserves and related future net cash flows, Occidental considered many factors and assumptions including, but not limited to, the use of reservoir parameters derived from geological, geophysical and engineering data which cannot be measured directly, economic criteria based on current costs and SEC pricing requirements, and forecasts of future production rates. Under the SEC Regulations 210.4-10(a)(22)(v) and (26), proved reserves must be anticipated to be economically producible from a given date forward based on existing economic conditions including the prices and costs at which economic producibility from a reservoir is to be determined. To confirm that the proved reserves reviewed by us meet the SEC requirements to be economically producible, we have reviewed certain primary economic data utilized by Occidental relating to hydrocarbon prices and costs as noted herein.

The hydrocarbon prices in effect on December 31, 2022 for the properties reviewed were determined by Occidental using the unweighted 12-month average first-day-of-the-month benchmark prices appropriate to the geographic area where the hydrocarbons are sold and adjustments for differentials as described herein. In certain geographic areas, the price reference and benchmark prices may be defined by contractual arrangements. For hydrocarbon products sold under contract, the contract prices including fixed and determinable escalations, exclusive of inflation adjustments, were used until expiration of the contract.

The table below summarizes Occidental’s net volume weighted benchmark prices adjusted for differentials for the properties reviewed by us and referred to herein as Occidental’s “average realized prices.” The average realized prices shown in the table below were determined from Occidental’s estimate of the total future gross revenue before production taxes for the properties reviewed by us and Occidental’s estimate of the total net reserves for the properties reviewed by us for the geographic area. A summary of average realized prices is not included for properties located in the Middle East because of host governments’ limitations on the disclosure of commercially sensitive information. The data shown in the table below is presented in accordance with SEC disclosure requirements for the North America geographic area reviewed by us.

Geographic Area	Product	Price Reference	Average Benchmark Prices	Average Realized Prices
North America				
United States	Oil/Condensate	WTI Cushing	$93.67/bbl	$94.11/bbl
	NGLs	Mt. Belvieu	$47.81/bbl	$31.80/bbl
	Gas	Henry Hub	$6.36/Mmbtu	$5.45/Mmbtu

As indicated above, the product prices that were used by Occidental to determine the future gross revenue for each property reviewed by us reflect adjustments to the benchmark prices for gravity, quality, local conditions, gathering and transportation fees and distance from market, referred to herein as “differentials.” The differentials used by Occidental were accepted as factual data. We have not conducted an independent verification of the differentials used by Occidental.

While it may reasonably be anticipated that the future prices received for the sale of production and the operating costs and other costs relating to such production may also increase or decrease from existing levels, such changes were, in accordance with rules adopted by the SEC, omitted from consideration by Occidental in this process and omitted by us in conducting this review.

Accumulated gas production imbalances, if any, were not taken into account in the proved reserves estimates of gas reviewed. The proved gas volumes estimated by Occidental attribute gas consumed in operations as reserves for those fields where the inclusion of such volumes was appropriate.

Occidental operates most of the properties reviewed by us; however, certain properties located in the DJ and Delaware basins and the property in the Middle East are not operated by Occidental. Operating costs used by Occidental are based on the operating expense reports of Occidental and include only those costs directly applicable to the leases, contract areas and wells for the properties reviewed by us. The operating costs include a portion of general and administrative costs allocated directly to the leases, contract areas and wells. The operating costs include an appropriate level of corporate general administrative and overhead costs. The operating costs used by Occidental were accepted as factual data and reviewed by us for their reasonableness; however, we have not conducted an independent verification of the operating costs used by Occidental.

Development costs used by Occidental are based on authorizations for expenditure (AFE) for the proposed work or actual costs for similar projects. The development costs used by Occidental were accepted as factual data and reviewed by us for their reasonableness; however, we have not conducted an independent verification of the development costs used by Occidental.

The proved developed non-producing and undeveloped reserves for the properties reviewed by us were incorporated by Occidental in accordance with Occidental's plans to develop these reserves as of December 31, 2022. The implementation of Occidental's development plans as presented to us is subject to the approval process adopted by Occidental's management. As a result of our inquiries during the course of our review, Occidental has informed us that the development activities for the properties reviewed by us have been subjected to and received the internal approvals required by Occidental's management at the appropriate local, regional and corporate level. In addition to the internal approvals as noted, certain development activities may still be subject to partner AFE processes, Joint Operating Agreement requirements or other administrative approvals external to Occidental. Additionally, Occidental has informed us that they are not aware of any existing laws or regulations that would require the company to significantly alter their current development plans. While these plans could change from those under existing economic conditions as of December 31, 2022, such changes were, in accordance with rules adopted by the SEC, omitted from consideration in making this evaluation.

Future Production Rate Assumptions Employed by Occidental for Estimating Reserves

Occidental's forecasts of future production rates are based on historical performance from wells currently on production. If no production decline trend has been established, future production rates were held constant, or adjusted for the effects of curtailment where appropriate, until a decline in ability to produce was anticipated. An estimated rate of decline was then applied until depletion of the reserves. If a decline trend has been established, this trend was used as the basis for estimating future production rates.

Test data and other related information were used by Occidental to estimate the anticipated initial production rates for those wells or locations that are not currently producing. For reserves not yet on production, sales were estimated to commence at an anticipated date determined by Occidental. Wells or locations that are not currently producing may start producing earlier or later than anticipated in Occidental's estimates due to unforeseen factors causing a change in the timing to initiate production.

Such factors may include delays due to weather, the availability of rigs, the sequence of drilling, completing or recompleting wells and constraints set by regulatory bodies.

The future production rates from wells currently on production or wells or locations that are not currently producing may be more or less than estimated by Occidental because of changes including, but not limited to, reservoir performance, operating conditions related to surface facilities, compression and artificial lift, pipeline capacity or other operating conditions, market demand and allowables or other constraints set by regulatory bodies.

Reserves Derived by Occidental Through Certain Production Sharing Agreement

The reserves for certain properties located in the Middle East reviewed by Ryder Scott are limited to the period prior to the expiration of current production sharing agreement providing the legal right to produce or an economic interest in such production. Furthermore, properties in different countries may be subjected to significantly varying agreement fiscal terms that affect the net revenue to Occidental for the production of such volumes. The prices and economic return received for these net volumes can vary significantly based on the terms of the applicable agreement. Occidental's net hydrocarbon volumes for the fields reviewed in the Middle East include certain amounts corresponding to in-country income taxes where the terms of the relevant production sharing agreement include provisions for an in-kind settlement process, where production is immediately taken and sold to pay the local income tax for and on behalf of the contractor (in this case Occidental). Ryder Scott has not conducted an exhaustive audit or verification of such contractual agreement information. Neither our review of such agreement information nor our acceptance of Occidental's representations regarding such agreement information should be construed as a legal opinion on this matter.

Possible Effects of Regulation on Occidental's Estimate of Reserves

Ryder Scott did not evaluate the country and geopolitical risks in the countries where Occidental operates or has interests. Occidental's operations may be subject to various levels of governmental controls and regulations. These controls and regulations may include, but may not be limited to, matters relating to land tenure and leasing, the legal rights to produce hydrocarbons including the granting, extension or termination of production sharing contracts, the fiscal terms of various production sharing contracts, drilling and production practices, environmental protection, marketing and pricing policies, royalties, various taxes and levies including income tax and are subject to change from time to time. Such changes in governmental regulations and policies may cause volumes of proved reserves actually recovered and amounts of proved income actually received to differ significantly from the quantities estimated by Occidental as reviewed herein.

We have not made any field examination of the properties. No consideration was given in this review to potential environmental liabilities that may exist nor to any costs for potential liabilities to restore and clean up damages, if any, caused by past operating practices.

Occidental has informed us that they are not aware of any existing laws or regulations that would materially impact their ability to recover the estimated proved reserves for the properties reviewed by us.

Data Reviewed in Conducting the Third Party Reserves Process Review

Occidental has informed us that they have furnished or otherwise made available to us all of the material accounts, records, geological and engineering data, and reports and other data required for this review. In conducting our process review of Occidental's estimates of proved reserves and forecasts of future production and income, we have reviewed data used by Occidental with respect to property interests owned or otherwise held, production and well tests from examined wells, normal direct costs of operating the wells, leases and contract areas, other costs such as transportation and processing fees, ad valorem and production taxes, recompletion and development costs, development plans, product prices based on the SEC regulations, adjustments or differentials to product prices, geological structural and isochore maps, well logs, core analyses, and pressure measurements. Ryder Scott reviewed such factual data for its reasonableness; however, we have not conducted an independent verification of the data utilized by Occidental. We consider the factual data utilized by Occidental to be appropriate and sufficient for the purpose of our review of the methods and analytical procedures utilized by the engineering and geological staff of Occidental for estimating the proved reserves volumes and preparing the economic evaluations.

Reserves Process Review Opinion

We found no bias in the utilization and analysis of data in proved reserves estimates for these properties. Furthermore, we found the estimation process incorporated all pertinent data, utilized a thorough and detailed analytical approach and was supported by a well documented audit trail.

We consider the assumptions, data, methods and analytical procedures used by Occidental and as reviewed by us appropriate for the purpose thereof, and we have used all such methods and procedures that we consider necessary and appropriate under the circumstances to render the conclusions set forth herein.

Based on our review, including the data, technical processes and interpretations presented by Occidental, it is our opinion that the overall procedures and methodologies utilized by Occidental in estimating the proved reserves volumes, documenting the changes in reserves from prior estimates, preparing the economic evaluations and determining the reserves classifications for the reviewed properties comply with the SEC regulations as of December 31, 2022. Ryder Scott has not been engaged to render an opinion as to the reasonableness of the proved reserves quantities reported by Occidental.

Standards of Independence and Professional Qualification

Ryder Scott is an employee-owned independent petroleum engineering consulting firm. We do not serve as officers or directors of any privately-owned or publicly-traded oil and gas company and are separate and independent from the operating and investment decision-making process of our clients. No single client or job represents a material portion of our annual revenue. These factors allow us to maintain our independence and objectivity in the performance of our services.

Ryder Scott requires that staff engineers and geoscientists receive professional accreditation in the form of a registered or certified professional engineer’s license or a registered or certified professional geoscientist’s license, or the equivalent thereof, from an appropriate governmental authority or a recognized self-regulating professional organization.

We are independent petroleum engineers with respect to Occidental. Neither we nor any of our employees have any financial interest in the subject properties and neither the employment to do this work nor the compensation is contingent on the results of our review.

The results of the reserves process review, presented herein, are based on technical analyses conducted by teams of geoscientists and engineers from Ryder Scott. The professional qualifications of the undersigned, the technical person primarily responsible for overseeing the review of the reserves information discussed in this report, are included as an attachment to this letter.

Terms of Usage

The results of our third party reserves process review, presented in report form herein, were prepared in accordance with the disclosure requirements set forth in the SEC regulations and are intended for public disclosure as an exhibit in filings made with the SEC by Occidental.

Occidental makes periodic filings on Form 10-K with the SEC under the 1934 Exchange Act. Furthermore, Occidental has certain registration statements filed with the SEC under the 1933 Securities Act into which any subsequently filed Form 10-K is incorporated by reference. We have consented to the incorporation by reference in the registration statements on Form S-3 and Form S-8 of Occidental of the references to our name as well as to the references to our third party report for Occidental, which will appear in the December 31, 2022 annual report on Form 10-K of Occidental, the inclusion in that Form 10-K of such references and the filing of such report as an exhibit to such Form 10-K. Our written consent for such use is included as a separate exhibit to the filings made with the SEC by Occidental.

We have provided Occidental with a digital version of the original signed copy of this report letter. In the event there are any differences between the digital version included in filings made by Occidental and the original signed report letter, the original signed report letter shall control and supersede the digital version.

The data and work papers used in the preparation of this report are available for examination by authorized parties in our offices. Please contact us if we can be of further service.

Very truly yours,

RYDER SCOTT COMPANY, L.P.
TBPELS Firm Registration No. F-1580

/s/ Guale Ramirez______

Guale Ramirez, P.E.
TBPELS License No. 48318
GR/pl President

[SEAL]

Professional Qualifications of Primary Technical Person

The conclusions presented in this report are the result of technical analysis conducted by teams of geoscientists and engineers from Ryder Scott Company, L.P. Guale Ramirez was the primary technical person responsible for overseeing the estimate of the reserves, future production and income.

Mr. Ramirez, an employee of Ryder Scott Company, L.P. (Ryder Scott) since 1981, is the President and also serves as a member of the Board of Directors. He is responsible for executive management and supervising staff and client relations of the company. Before joining Ryder Scott, Mr. Ramirez served in a number of engineering positions with Sun Oil Company and Natomas North America. For more information regarding Mr. Ramirez's geographic and job specific experience, please refer to the Ryder Scott Company website at www.ryderscott.com/Employees.

Mr. Ramirez earned a Bachelor of Science Degree in Mechanical Engineering with honors from Texas A&M University in 1976 and is a licensed Professional Engineer in the State of Texas. He is also a member of the Society of Petroleum Engineers and Society of Petroleum Evaluation Engineers.

In addition to gaining experience and competency through prior work experience, the Texas Board of Professional Engineers requires a minimum of fifteen hours of continuing education annually, including at least one hour in the area of professional ethics, which Mr. Ramirez fulfills. As part of his 2022 continuing education hours, Mr. Ramirez attended and internally received 18 hours of formalized training as well as a one day public forum, the 2022 RSC Reserves Conference relating to the definitions and disclosure guidelines contained in the United States Securities and Exchange Commission Title 17, Code of Federal Regulations, Modernization of Oil and Gas Reporting, Final Rule released January 14, 2009 in the Federal Register. Mr. Ramirez has also presented courses on the SEC and SPE-PRMS reserves definitions on various occasions during 2011, 2012, 2013, 2015, 2017, 2018, 2020, 2021 and 2022.

Based on his educational background, professional training and more than 45 years of practical experience in the estimation and evaluation of petroleum reserves, Mr. Ramirez has attained the professional qualifications as a Reserves Evaluator and Reserves Auditor set forth in Article III of the "Standards Pertaining to the Estimating and Auditing of Oil and Gas Reserves Information" promulgated by the Society of Petroleum Engineers as of June 2019.

PETROLEUM RESERVES DEFINITIONS

As Adapted From:
RULE 4-10(a) of REGULATION S-X PART 210
UNITED STATES SECURITIES AND EXCHANGE COMMISSION (SEC)

PREAMBLE

On January 14, 2009, the United States Securities and Exchange Commission (SEC) published the “Modernization of Oil and Gas Reporting; Final Rule” in the Federal Register of National Archives and Records Administration (NARA). The “Modernization of Oil and Gas Reporting; Final Rule” includes revisions and additions to the definition section in Rule 4-10 of Regulation S-X, revisions and additions to the oil and gas reporting requirements in Regulation S-K, and amends and codifies Industry Guide 2 in Regulation S-K. The “Modernization of Oil and Gas Reporting; Final Rule”, including all references to Regulation S-X and Regulation S-K, shall be referred to herein collectively as the “SEC regulations”. The SEC regulations took effect for all filings made with the United States Securities and Exchange Commission as of December 31, 2009, or after January 1, 2010. Reference should be made to the full text under Title 17, Code of Federal Regulations, Regulation S-X Part 210, Rule 4-10(a) for the complete definitions (direct passages excerpted in part or wholly from the aforementioned SEC document are denoted in italics herein).

Reserves are estimated remaining quantities of oil and gas and related substances anticipated to be economically producible, as of a given date, by application of development projects to known accumulations. All reserve estimates involve an assessment of the uncertainty relating to the likelihood that the actual remaining quantities recovered will be greater or less than the estimated quantities determined as of the date the estimate is made. The uncertainty depends chiefly on the amount of reliable geologic and engineering data available at the time of the estimate and the interpretation of these data. The relative degree of uncertainty may be conveyed by placing reserves into one of two principal classifications, either proved or unproved. Unproved reserves are less certain to be recovered than proved reserves and may be further sub-classified as probable and possible reserves to denote progressively increasing uncertainty in their recoverability. Under the SEC regulations as of December 31, 2009, or after January 1, 2010, a company may optionally disclose estimated quantities of probable or possible oil and gas reserves in documents publicly filed with the SEC. The SEC regulations continue to prohibit disclosure of estimates of oil and gas resources other than reserves and any estimated values of such resources in any document publicly filed with the SEC unless such information is required to be disclosed in the document by foreign or state law as noted in §229.1202 Instruction to Item 1202.

Reserves estimates will generally be revised only as additional geologic or engineering data become available or as economic conditions change.

Reserves may be attributed to either natural energy or improved recovery methods. Improved recovery methods include all methods for supplementing natural energy or altering natural forces in the reservoir to increase ultimate recovery. Examples of such methods are pressure maintenance, natural gas cycling, waterflooding, thermal methods, chemical flooding, and the use of miscible and immiscible displacement fluids. Other improved recovery methods may be developed in the future as petroleum technology continues to evolve.

Reserves may be attributed to either conventional or unconventional petroleum accumulations. Petroleum accumulations are considered as either conventional or unconventional based on the nature of their in-place characteristics, extraction method applied, or degree of processing prior to sale. Examples of unconventional petroleum accumulations include coalbed or coalseam methane (CBM/CSM), basin-centered gas, shale gas, gas hydrates, natural bitumen and oil shale deposits. These unconventional accumulations may require specialized extraction technology and/or significant processing prior to sale.

Reserves do not include quantities of petroleum being held in inventory.

Because of the differences in uncertainty, caution should be exercised when aggregating quantities of petroleum from different reserves categories.

RESERVES (SEC DEFINITIONS)

Securities and Exchange Commission Regulation S-X §210.4-10(a)(26) defines reserves as follows:

Reserves. *Reserves are estimated remaining quantities of oil and gas and related substances anticipated to be economically producible, as of a given date, by application of development projects to known accumulations. In addition, there must exist, or there must be a reasonable expectation that there will exist, the legal right to produce or a revenue interest in the production, installed means of delivering oil and gas or related substances to market, and all permits and financing required to implement the project.*

Note to paragraph (a)(26): Reserves should not be assigned to adjacent reservoirs isolated by major, potentially sealing, faults until those reservoirs are penetrated and evaluated as economically producible. Reserves should not be assigned to areas that are clearly separated from a known accumulation by a non-productive reservoir (i.e., absence of reservoir, structurally low reservoir, or negative test results). Such areas may contain prospective resources (i.e., potentially recoverable resources from undiscovered accumulations).

PROVED RESERVES (SEC DEFINITIONS)

Securities and Exchange Commission Regulation S-X §210.4-10(a)(22) defines proved oil and gas reserves as follows:

Proved oil and gas reserves. *Proved oil and gas reserves are those quantities of oil and gas, which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible—from a given date forward, from known reservoirs, and under existing economic conditions, operating methods, and government regulations—prior to the time at which contracts providing the right to operate expire, unless evidence indicates that renewal is reasonably certain, regardless of whether deterministic or probabilistic methods are used for the estimation. The project to extract the hydrocarbons must have commenced or the operator must be reasonably certain that it will commence the project within a reasonable time.*

(i) The area of the reservoir considered as proved includes:

(A) The area identified by drilling and limited by fluid contacts, if any, and

(B) Adjacent undrilled portions of the reservoir that can, with reasonable certainty, be judged to be continuous with it and to contain economically producible oil or gas on the basis of available geoscience and engineering data.

(ii) In the absence of data on fluid contacts, proved quantities in a reservoir are limited by the lowest known hydrocarbons (LKH) as seen in a well penetration unless geoscience, engineering, or performance data and reliable technology establishes a lower contact with reasonable certainty.

(iii) Where direct observation from well penetrations has defined a highest known oil (HKO) elevation and the potential exists for an associated gas cap, proved oil reserves may be assigned in the structurally higher portions of the reservoir only if geoscience, engineering, or performance data and reliable technology establish the higher contact with reasonable certainty.

(iv) Reserves which can be produced economically through application of improved recovery techniques (including, but not limited to, fluid injection) are included in the proved classification when:

(A) Successful testing by a pilot project in an area of the reservoir with properties no more favorable than in the reservoir as a whole, the operation of an installed program in the reservoir or an analogous reservoir, or other evidence using reliable technology establishes the reasonable certainty of the engineering analysis on which the project or program was based; and

(B) The project has been approved for development by all necessary parties and entities, including governmental entities.

(v) Existing economic conditions include prices and costs at which economic producibility from a reservoir is to be determined. The price shall be the average price during the 12-month period prior to the ending date of the period covered by the report, determined as an unweighted arithmetic average of the first-day-of-the-month price for each month within such period, unless prices are defined by contractual arrangements, excluding escalations based upon future conditions.

PETROLEUM RESERVES STATUS DEFINITIONS AND GUIDELINES

As Adapted From:
RULE 4-10(a) of REGULATION S-X PART 210
UNITED STATES SECURITIES AND EXCHANGE COMMISSION (SEC)

and

2018 PETROLEUM RESOURCES MANAGEMENT SYSTEM (SPE-PRMS)
Sponsored and Approved by:
SOCIETY OF PETROLEUM ENGINEERS (SPE)
WORLD PETROLEUM COUNCIL (WPC)
AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (AAPG)
SOCIETY OF PETROLEUM EVALUATION ENGINEERS (SPEE)
SOCIETY OF EXPLORATION GEOPHYSICISTS (SEG)
SOCIETY OF PETROPHYSICISTS AND WELL LOG ANALYSTS (SPWLA)
EUROPEAN ASSOCIATION OF GEOSCIENTISTS & ENGINEERS (EAGE)

Reserves status categories define the development and producing status of wells and reservoirs. Reference should be made to Title 17, Code of Federal Regulations, Regulation S-X Part 210, Rule 4-10(a) and the SPE-PRMS as the following reserves status definitions are based on excerpts from the original documents (direct passages excerpted from the aforementioned SEC and SPE-PRMS documents are denoted in italics herein).

DEVELOPED RESERVES (SEC DEFINITIONS)

Securities and Exchange Commission Regulation S-X §210.4-10(a)(6) defines developed oil and gas reserves as follows:

Developed oil and gas reserves are reserves of any category that can be expected to be recovered:

(i) Through existing wells with existing equipment and operating methods or in which the cost of the required equipment is relatively minor compared to the cost of a new well; and

(ii) Through installed extraction equipment and infrastructure operational at the time of the reserves estimate if the extraction is by means not involving a well.

Developed Producing (SPE-PRMS Definitions)

While not a requirement for disclosure under the SEC regulations, developed oil and gas reserves may be further sub-classified according to the guidance contained in the SPE-PRMS as Producing or Non-Producing.

Developed Producing Reserves
Developed Producing Reserves are expected quantities to be recovered from completion intervals that are open and producing at the effective date of the estimate.

Improved recovery reserves are considered producing only after the improved recovery project is in operation.

Developed Non-Producing

Developed Non-Producing Reserves include shut-in and behind-pipe Reserves.

<u>Shut-In</u>
Shut-in Reserves are expected to be recovered from:
(1) completion intervals that are open at the time of the estimate but which have not yet started producing;
(2) wells which were shut-in for market conditions or pipeline connections; or
(3) wells not capable of production for mechanical reasons.

<u>Behind-Pipe</u>
Behind-pipe Reserves are expected to be recovered from zones in existing wells that will require additional completion work or future re-completion before start of production with minor cost to access these reserves.

In all cases, production can be initiated or restored with relatively low expenditure compared to the cost of drilling a new well.

<u>UNDEVELOPED RESERVES (SEC DEFINITIONS)</u>

Securities and Exchange Commission Regulation S-X §210.4-10(a)(31) defines undeveloped oil and gas reserves as follows:

Undeveloped oil and gas reserves are reserves of any category that are expected to be recovered from new wells on undrilled acreage, or from existing wells where a relatively major expenditure is required for recompletion.

(i) Reserves on undrilled acreage shall be limited to those directly offsetting development spacing areas that are reasonably certain of production when drilled, unless evidence using reliable technology exists that establishes reasonable certainty of economic producibility at greater distances.

(ii) Undrilled locations can be classified as having undeveloped reserves only if a development plan has been adopted indicating that they are scheduled to be drilled within five years, unless the specific circumstances, justify a longer time.

(iii) Under no circumstances shall estimates for undeveloped reserves be attributable to any acreage for which an application of fluid injection or other improved recovery technique is contemplated, unless such techniques have been proved effective by actual projects in the same reservoir or an analogous reservoir, as defined in paragraph (a)(2) of this section, or by other evidence using reliable technology establishing reasonable certainty.