CADES SCHUTTE LLP

DAVID SCHULMEISTER 2781-0
ELIJAH YIP 7325-0
1000 Bishop Street, Suite 1200
Honolulu, HI 96813-4212
Telephone: (808) 521-9200

Attorneys for HAWAIIAN COMMERCIAL & SUGAR COMPANY

COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII

PETITION TO AMEND INTERIM INSTREAM FLOW STANDARDS FOR HONOPOU, HUELO (PUOLUA), HANEHOI, WAIKAMOI, ALO, WAHINEPEE, PUOHOKAMOA, HAIPUAENA, PUNALAU/KOLEA, HONOMANU, NUAAILUA, PIINAAU, PALAUHULU, OHIA (WAIANU), WAIOKAMILO, KUALANI, WAILUANUI, WEST WAILUAIKI, EAST WAILUAIKI, KOPILIULA, PUAKAA, WAIOHUE, PAAKEA, WAIAAKA, KAPAULA, HANAWI, AND MAKAPIPI STREAMS

Case No. CCH-MA13-01

HAWAIIAN COMMERCIAL & SUGAR COMPANY'S SECOND AMENDED WITNESS LIST; CERTIFICATE OF SERVICE

HAWAIIAN COMMERCIAL & SUGAR COMPANY'S SECOND AMENDED WITNESS LIST

No.	Name/Organization/Position	To Be Qualified as an Expert in:	Subject Matter	Requested Length of Direct
1.	Garret Hew, East Maui Irrigation Co., Ltd., President		HC&S water use and collection; operations of EMI and HC&S	1 hour
2.	Rick W. Volner, Jr., HC&S, General Manager		HC&S water use and collection; operations of EMI and HC&S	1 hour

DATED: Honolulu, Hawaii, February 10, 2015.

CADES SCHUTTE LLP

DAVID SCHULMEISTER
ELIJAH YIP
Attorneys for HAWAIIAN COMMERCIAL & SUGAR COMPANY

COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII

PETITION TO AMEND INTERIM INSTREAM FLOW STANDARDS FOR HONOPOU, HUELO (PUOLUA), HANEHOI, WAIKAMOI, ALO, WAHINEPEE, PUOHOKAMOA, HAIPUAENA, PUNALAU/KOLEA, HONOMANU, NUAAILUA, PIINAAU, PALAUHULU, OHIA (WAIANU), WAIOKAMILO, KUALANI, WAILUANUI, WEST WAILUAIKI, EAST WAILUAIKI, KOPILIULA, PUAKAA, WAIOHUE, PAAKEA, WAIAAKA, KAPAULA, HANAWI, AND MAKAPIPI STREAMS	Case No. CCH-MA13-01 **REBUTTAL DECLARATION OF RICK W. VOLNER, JR.**

REBUTTAL DECLARATION OF RICK W. VOLNER, JR.

I, RICK W. VOLNER, JR., hereby declare:

1. I have reviewed the responsive submissions of the Petitioners and am submitting this testimony in response.

Average Daily Evapotranspiration

2. Nā Moku complains that HC&S has failed to provide average daily evapotranspiration data and that, without this, HC&S's actual usage rates are irrelevant because there is no breakdown between the amount of water needed and applied to the crop versus lost to seepape, evaporation and other system losses. Nā Moku also cites to a 2008 calculation of sugarcane water requirements performed by CWRM staff utilizing the Irrigation Water Requirement Estimation Decision Support System ("IWREDSS") which resulted in a requirement of from 1,400 to 6,000 gpad.

3. HC&S has, however, previously supplied evapotranspiration data and such data is contained and reflected in Exhibits C-71, C-72, C-73 and C-74. HC&S has also previously

explained its development and use of a modified Penman equation to calculate the water needs of its sugarcane, particularly in Exhibit C-73. HC&S's use of this method was recently validated in a study published online in the Journal of Water Resource and Protection in an article entitled, "Influence of Potential Evapotranspiration on the Water Balance of Sugarcane Fields in Maui, Hawaii." Exhibit C-136 is a copy of this article. As noted in the abstract on the first page, "The HC&S method was demonstrated to be the most accurate PET method compared to the other commonly used PET equations, with less than 10% error."

Updated Breakdown of HC&S Water Usage

4. Exhibit C-137 is a spreadsheet that was prepared to reflect in as much detail as possible an accounting of HC&S's water needs and usage for the six year period from 2008 through 2013. Column J is the average irrigation requirement calculated by the HC&S water balance model utilizing the modified Penman equation that was validated in Exhibit C-136. Column K is the average usage per acre calculated by the HC&S water balance model utilizing run time and flow rates through the drip tubing used to irrigate the fields.

5. Column G represents the difference between the gross volume of water delivered by EMI and pumped by HC&S after accounting for all other uses. This reflects seepage, evaporation and miscellaneous other system losses that cannot be directly measured. For the six years in question, the annual average was 15,206 million gallons, which amounts to 41.66 mgd, or 22.7% of surface and well water combined.

6. The 22.7% rate of overall system losses reflected in Exhibit C-131 compares well with the expected range of seepage and evaporation losses estimated in Exhibit C-139, which is explained in the Rebuttal Declaration of Garret Hew. Most of this system loss consists of seepage from HC&S's reservoirs. But it must be remembered that this seepage is greatest during periods of high ditch flows. During low ditch flows, when streams are running near their base

flows, the reservoirs are not being heavily utilized, if at all. Due to the timing of when this seepage occurs, it cannot reasonably be considered to be "available" for restoration of base flows in the streams. When stream flows are higher, the seepage is greater but is correspondingly less "needed" for stream restoration. At that point, it becomes an important source of recharge to the aquifers serving HC&S's brackish water wells, which is the only available alternative to water collected by EMI from the East Maui streams. It would therefore be neither prudent nor economic for HC&S to expend the significant capital resources required to line all of these reservoirs. Apart from the obvious financial impact to HC&S, HC&S would be deprived of this valuable source of recharge of the underlying aquifers with no resulting benefit to the streams, since there is essentially no reservoir seepage to mitigate when stream and ditch flows are low and the reservoirs are mostly empty.

7. Column I of Exhibit C-137 is average irrigated acres. HC&S does not engage in a regular practice of leaving fields "fallow." To the extent fields are temporarily removed from cultivation, this is reflected in the irrigated acres in this column.

8. Nā Moku asserts that HC&S should have provided detailed usage and other data on a per field basis going back to 1986. This would be a monumental and tedious undertaking that would not yield useful information because HC&S's agronomic water management practices have changed over time. Data from 1986 would not be representative of current practices, the efficiency of which has markedly improved, particularly in the last few years.

HC&S' usage of well water

9. Nā Moku contends that HC&S has not adequately explained why 12,000 acres are not capable of being irrigated with well water, since infrastructure was in place at one time that could serve all but 5000 of these acres. The infrastructure to provide water to the additional 7,000 acres is a shared pipeline that serves as a penstock line for a hydroelectric unit for the

majority of the year. When this pump system was installed it was envisioned as an emergency source of water for high elevation fields in the event of extreme drought. It was never built or intended to be a primary source of water. The electrical requirements are extremely high and would displace pumping at lower elevations. The system is also just a booster pump system, meaning primary groundwater that is currently being used at the Lowrie Ditch level would be diverted to a higher elevation, reducing overall groundwater availability on a per acre basis for the plantation.

10. As to the 17,000 acres that HC&S does irrigate with well water, it would not be practicable to rely solely on well water to irrigate these fields because during periods of high evapotranspiration, the needs of all these fields could not be supplied with well water alone. Over the long term, moreover, there would be a persistent loss of recharge of the aquifers underlying these wells.

Water for hydropower generation and mill use

11. Surface water from EMI is not diverted or imported specifically for hydropower generation. Irrigation water from EMI is exploited for hydropower generation when it is dropped from a higher to a lower elevation before it is applied to the fields.

12. Plant operation uses include: cooling water for bearings and pumps, heat exchange for the turbines and generators, boiler makeup water, herbicide mixing, cane washing, sugar drying, sanitation, fire protection, seed tank dipping, fertilizer solutionizing, etc. Much of this water is sourced from wells located near the Puunene mill rather than water delivered by EMI.

I, RICK W. VOLNER, JR., declare, verify, certify, and state under penalty of perjury that the foregoing is true and correct.

DATED: _____, 2015.

_____
RICK W. VOLNER, JR.

ImanageDB:3015732.1

COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII

PETITION TO AMEND INTERIM INSTREAM FLOW STANDARDS FOR HONOPOU, HUELO (PUOLUA), HANEHOI, WAIKAMOI, ALO, WAHINEPEE, PUOHOKAMOA, HAIPUAENA, PUNALAU/KOLEA, HONOMANU, NUAAILUA, PIINAAU, PALAUHULU, OHIA (WAIANU), WAIOKAMILO, KUALANI, WAILUANUI, WEST WAILUAIKI, EAST WAILUAIKI, KOPILIULA, PUAKAA, WAIOHUE, PAAKEA, WAIAAKA, KAPAULA, HANAWI, AND MAKAPIPI STREAMS	Case No. CCH-MA13-01 **REBUTTAL DECLARATION OF GARRET HEW**

REBUTTAL DECLARATION OF GARRET HEW

I, GARRET HEW, hereby declare:

1. I have reviewed the responsive submissions of the Petitioners and am submitting this testimony in response.

The 27 streams are not "dewatered" by EMI

2. EMI does not "dewater" the 27 streams that are the subject of Nā Moku's IIFS petitions. Waianu and Kualani have never been diverted by EMI. Waikani is just another name for Wailuanui. Waiokamilo has not been diverted since 2007. Palauhulu's low flows have not been diverted since 2010, with no effect on the stream where it crosses the Hana Highway because of the sinkholes between the Koolau Ditch and Store Spring. While EMI does operate diversions that affect the remaining 23 streams, resulting in temporarily dry reaches at times, many of these streams naturally have dry reaches during periods of low rainfall, and none are completely "dewatered." In fact, far more water is discharged from these streams into the sea than is diverted by EMI.

EMI's diversion of water has decreased since 1923

3. Exhibit C-124 is a chart that displays in graphical format the same historical data summarizing EMI deliveries to HC&S that is included Exhibit C-34. It shows that these deliveries have trended down over time, thus disproving the assertion by Nā Moku on page 26 of its Responsive Brief that "EMI has progressively taken more water from East Maui for decades." Exhibit C-125 is the same chart as C-34, but with another column added to reflect the annual totals in mgd.

4. The reference cited by Nā Moku to an increase in capacity of the Wailoa Ditch from 160 to 195 mgd sometime after 1923 is misunderstood and misapplied. As is evident from Exhibit C-125, it did not result in an increase in the total amount of water being diverted. Instead, it allowed EMI to retain more water at the elevation of the Wailoa Ditch, enhancing the flexibility of HC&S to distribute the water within the plantation as needed once it was received at Maliko Gulch.

5. As originally constructed, the Wailoa Ditch had a capacity of 200 mgd between Kolea Stream and Alo Stream, at which point water could be dropped to the New Hamakua Ditch below. It is my understanding that sometime after 1923, probably during the 1960's, a modification was made that increased the amount of water conveyed in the Wailoa Ditch across Maliko Gulch to 195 mgd. Previously, when more than 160 mgd was in the Wailoa Ditch, it had to be dropped to a lower ditch west of Honopou. The current capacities of each ditch section are all shown on Exhibit C-33.

6. In practical terms, this increased capacity of the westernmost section of the Wailoa Ditch has not affected the aggregate amount collected by EMI because it is used to maximize the elevation at which water is brought in, not to increase the total amount of water that is collected.

Since it can only come into play when Wailoa Ditch flows exceed 160 mgd, it has no effect whatsoever on the amount of water taken from the streams during low flows.

EMI did not cause the decline in taro cultivation in Keanae and Wailua

7. When I began my employment with EMI in 1985, there were many more taro farmers and much more taro being cultivated in Wailua than there is today. This is evident in Exhibit C-126, which is a copy of Exhibit A-54 from the BLNR proceeding, which is an 1985 aerial photograph of the Wailua area upon which has been superimposed in yellow highlighting the areas that were in taro cultivation in 2005, as shown on Exhibits C-115 and 116. It is apparent from C-126 that a much larger area was being cultivated in 1985 that in 2005. This is also consistent with my personal observations of the gradual withdrawal of acreage from production over the course of the twenty years from 1985 to 2005 as taro farmers aged and retired without being replaced in equal numbers by younger family members.

8. As shown on Exhibits C-34, C-124 and C-125, however, there was no increase from 1985 to 2005 in the amount of water diverted by EMI. Further, as a result of EMI's cessation of its diversion of Waiokamilo Stream in 2007, and the USGS stream flow measurements taken below, it has now been demonstrated that Waiokamilo Stream, the source for most of this area, is dry between the Koolau Ditch and Akeke Springs during low flows. Historically, therefore, the water taken by EMI from Waiokamilo Stream since the completion of the Koolau Ditch, had little or no effect on the base flow of Waiokamilo Stream or the ability to cultivate taro in Wailua.

9. In Keanae, the decline in cultivation has been less dramatic. Since September of 2010, however, when EMI opened its sluice gate at the Koolau Ditch on Palauhulu Stream, it has been demonstrated that the base flow of Palauhulu Stream where it crosses the Hana Highway is

also not affected by EMI's diversion at the Koolau Ditch due to losing reaches between the Koolau Ditch and Store Spring. This explains why taro cultivation in Keanae, as well as in Wailua, was able to thrive for most of the last century, notwithstanding the 1904 completion of the Koolau Ditch.

Seepage and evaporation from HC&S's ditches and reservoirs

10. Nā Moku complains that HC&S has not provided adequate information regarding its system losses, including seepage and evaporation. Estimating seepage and evaporation losses from HC&S's ditches and reservoirs is challenging because the only way to conduct direct measurements is to close sections of ditches and reservoirs and let the water sit for a period of time in order to take before and after readings. This is impractical to do on a large scale because it interrupts plantation operations.

11. In an effort to evaluate the range of seepage and evaporation that can reasonably be expected, I have consulted the National Engineering Handbook published by the Soil Conservation Service of the United States Department of Agriculture to obtain seepage rate factors that can be applied to estimate rates of seepage from the various sections of the HC&S system. Exhibit C-138 is Figure 2-50 from the National Engineering Handbook, which graphs the relationship of different conveyance system materials to expected seepage loss rates.

12. In order to estimate expected seepage loss for the HC&S system, a table was prepared which summarizes, for all ditches and unlined reservoirs, the average surface area under water and the type of material that holds or conveys the water. To establish a range, a relatively low seepage factor was selected along with what I thought would be relatively a high seepage factor from Exhibit C-138, based on my knowledge of the system. An estimated potential range of seepage was then calculated. Exhibit C-139 is a copy of the resulting table.

This exercise produced a potential estimated range of seepage from a low of 30.75 mgd to a high of 65.06 mgd using these national standards. This equates to a potential range of loss of from 16.76% to 35.46% of the total water deliveries to HC&S from EMI and pumped from HC&S's wells serving the portion of the plantation irrigated with water from EMI.

13. Exhibit C-139 also contains a table estimating the average daily amount of evaporation from the surface of the water contained in the HC&S system serving the same portion of the plantation. This was calculated by multiplying the average daily evaporation rate of 0.40 acre-inches by the average daily surface area of the water in the system, which yielded an average daily evaporation loss of 2.64 mgd. Using the figures calculated above, the potential seepage losses from seepage and evaporation combined ranges from 33.40 mgd to 67.704 mgd. This corresponds to a percentage rate of loss of from 18.20% to 36.90% of total surface water deliveries and ground water pumped by HC&S for use on the eastern portion of the plantation.

14. There are additional system losses, besides seepage and evaporation, than are reasonably to be expected but are difficult to measure or estimate. These include water lost during the backflushing of sand filters, during the startup and shutdown of irrigation rounds (when water pressure is established and the drip tubes are purged), and during the repair and water testing of the irrigation system prior to planting of the crop.

I, GARRET HEW, declare, verify, certify, and state under penalty of perjury that the foregoing is true and correct.

DATED: Maui, Hawaii, _____.

_____

GARRET HEW

ImanageDB:3015915.3

COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII

PETITION TO AMEND INTERIM INSTREAM FLOW STANDARDS FOR HONOPOU, HUELO (PUOLUA), HANEHOI, WAIKAMOI, ALO, WAHINEPEE, PUOHOKAMOA, HAIPUAENA, PUNALAU/KOLEA, HONOMANU, NUAAILUA, PIINAAU, PALAUHULU, OHIA (WAIANU), WAIOKAMILO, KUALANI, WAILUANUI, WEST WAILUAIKI, EAST WAILUAIKI, KOPILIULA, PUAKAA, WAIOHUE, PAAKEA, WAIAAKA, KAPAULA, HANAWI, AND MAKAPIPI STREAMS	Case No. CCH-MA13-01 **REBUTTAL DECLARATION OF ELIJAH YIP**

REBUTTAL DECLARATION OF ELIJAH YIP

I, ELIJAH YIP, hereby declare:

1. I am a partner with Cades Schutte LLP, counsel of record for Hawaiian Commercial & Sugar Company ("***HC&S***") in the above-captioned matter. I make this declaration based upon my personal knowledge, unless otherwise stated.

2. Attached hereto as Exhibit C-127 is a true and correct copy of a report entitled *Kalo Kanu O Ka `Aina, a Cultural Landscape Study of Ke`anae and Wailuanui, Island of Maui* dated July 1995 prepared for the County of Maui Planning Department and the Maui Cultural Resources Commission by Group 70 International, Inc., Davianna McGregor, Ph.D., and Cultural Surveys Hawaii, Inc.

3. Attached hereto as Exhibits C-128 to C-132 are true and correct copies of transcripts of the contested case hearing in BLNR proceeding DLNR File 01-05-MA held betwee October 10, 2005 and November 15, 2005.

4. Attached hereto as Exhibit C-133 is a true and correct copy of an article by

Richard W. Blob, et al. entitled *Morphological Selection and the Evaluation of Potential Tradeoffs Between Escape from Predators and the Climbing of Waterfalls in the Hawaiian Stream Goby* Sicyopterus stimpsoni published in volume 50 of Integrative and Comparative Biology in 2010.

5. Attached hereto as Exhibit C-134 is a true and correct copy of an article by J. Michael Fitzsimons & Mark G. McRae entitled *Behavioral Ecology of Indigenous Stream Fishes in Hawai'i* published in Biology of Hawaiian Streams and Estuaries in 2007.

6. Attached hereto as Exhibit C-135 is a true and correct copy of a Fact Sheet entitled "'O'opu 'akupa or Sandwich Island sleeper *Eleotris sandwicensis*" that I downloaded from the Department of Land and Natural Resources website (http://dlnr.hawaii.gov/wildlife/files/2013/Fact-Sheet-oopu-akupa.pdf).

7. Attached hereto as Exhibit C-140 is a true and correct copy of USGS Scientific Investigations Report 2014-5168 authored by Adam G. Johnson, et al., entitled "*Spatially Distributed Groundwater Recharge Estimated Using a Water-Budget Model for the Island of Maui, Hawai'i, 1978-2007*".

8. Attached hereto as Exhibit C-141 is a true and correct copy of the Proceedings of the Sixth Symposium of the International Society for Tropical Root Crops published in 1984 by the International Potato Center.

I, ELIJAH YIP, declare, verify, certify, and state under penalty of perjury that the foregoing is true and correct.

DATED: Honolulu, Hawai'i, February 10, 2015.

ELIJAH YIP

COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII

PETITION TO AMEND INTERIM INSTREAM FLOW STANDARDS FOR HONOPOU, HUELO (PUOLUA), HANEHOI, WAIKAMOI, ALO, WAHINEPEE, PUOHOKAMOA, HAIPUAENA, PUNALAU/KOLEA, HONOMANU, NUAAILUA, PIINAAU, PALAUHULU, OHIA (WAIANU), WAIOKAMILO, KUALANI, WAILUANUI, WEST WAILUAIKI, EAST WAILUAIKI, KOPILIULA, PUAKAA, WAIOHUE, PAAKEA, WAIAAKA, KAPAULA, HANAWI, AND MAKAPIPI STREAMS	Case No. CCH-MA13-01 **CERTIFICATE OF SERVICE**

CERTIFICATE OF SERVICE

The undersigned hereby certifies that, on this date, a true and correct copy of the foregoing document was duly served on the following parties as stated below:

Commission on Water Resource Management
1151 Punchbowl Street
Honolulu, Hawaii 96813

VIA EMAIL (kathy.s.yoda@hawaii.gov) and HAND DELIVERY

Dr. Lawrence H. Miike
Hearings Officer
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
1151 Punchbowl Street
Honolulu, Hawaii 96813

VIA EMAIL (lhmiike@hawaii.rr.com) and HAND DELIVERY

Linda L.W. Chow, Esq.
Department of the Attorney General
465 South King Street, Room 300
Honolulu, Hawaii 96813

Attorney for the Tribunal

VIA EMAIL (linda.l.chow@hawaii.gov)

Alan T. Murakami, Esq.
Camille K. Kalama, Esq.
Ashley K. Obrey, Esq.
Summer L.H. Sylva, Esq.
Native Hawaiian Legal Corporation
1164 Bishop Street, Suite 1205
Honolulu, Hawaii 96813
Attorneys for Petitioners
Na Moku Aupuni Koolau Hui

VIA EMAIL
(alan.murakami@nhlchi.org)
(camille.kalama@nhlchi.org)
(ashley.obrey@nhlchi.org)
(summer.sylva@nhlchi.org) and

Isaac Hall, Esq.
2087 Wells Street
Wailuku, Hawaii 96793
Attorney for Maui Tomorrow

VIA EMAIL (idhall@maui.net)

Patrick K. Wong, Esq.
Caleb P. Rowe, Esq.
Kristin K. Tarnstrom, Esq.
Department of the Corporation Counsel
County of Maui
200 South High Street
Wailuku, Hawaii 96793
Attorneys for County of Maui,
Department of Water Supply

VIA EMAIL
(pat.wong@co.maui.hi.us)
(caleb.rowe@co.maui.hi.us)
(kristin.tarnstrom@co.maui.hi.us) and

Robert H. Thomas, Esq.
Damon Key Leong Kupchak Hastert
Suite 1600, Pauahi Tower
1003 Bishop Street
Honolulu, Hawaii 96813
Attorney for Hawaii Farm Bureau
Federation

VIA EMAIL (rht@hawaiilawyer.com)

Jeffrey C. Paisner
403 West 49th Street, #2
New York, New York 10019

Pro Se

VIA EMAIL (jeffreypaisner@mac.com) and

John Blumer-Buell
P.O. Box 787
Hana, Hawaii 96713

Witness

VIA EMAIL (blubu@hawaii.rr.com)

Nikhilananda
P.O. Box 1704
Makawao, Hawaii 96767-1704

Witness

VIA EMAIL (nikhilananda@hawaiiantel.net)

DATED: Honolulu, Hawaii, February 10, 2015.

CADES SCHUTTE LLP

DAVID SCHULMEISTER
ELIJAH YIP
Attorneys for HAWAIIAN COMMERCIAL & SUGAR COMPANY

ImanageDB:3018851.1