DRAFT ENVIRONMENTAL ASSESSMENT

Kukuihaele Production Well And Supporting Facilities (State Well 6734-03)

TMK: (3rd) 4-8-008:026
Kukuihaele, Hāmākua District, Hawai‘i Island, State of Hawai‘i

August 2010

County of Hawai‘i
Department of Water Supply
345 Kekuanaoa Street, Suite 20
Hilo, Hawai‘i 96720

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PROPOSING/
APPROVING AGENCY:

County of Hawai‘i
Department of Water Supply
345 Kekuanaoa Street, Suite 20
Hilo, Hawai‘i 96720

CONSULTANT:

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Hilo HI 96721

CLASS OF ACTION:

Use of County Land
Use of County Funds

This document is prepared pursuant to:

The Hawai‘i Environmental Policy Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules (HAR).

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SUMMARY

The County of Hawaiʻi, Department of Water Supply (DWS), plans to convert the Kukuihaele Exploratory Well to a production well. The exploratory well is located on the site of an existing DWS reservoir on a 0.275-acre parcel of County-owned land on Mud Lane, mauka of State Highway 270 in Kukuihaele. Site improvements include a control building, chlorination facilities, well discharge piping, and drainage improvements. The Project will also include an on-site diesel generator with a double-walled fuel storage unit, along with a reverse-osmosis water treatment unit and associated seepage pits for brine. The improvements will promote public health and safety by improving a water source for this rural community.

The contractor will develop and implement a Storm Water Pollution Prevention Plan (SWPPP) to contain sediment and storm water runoff and effluent from dewatering during construction. Construction of the Project would have only a negligible effect on local traffic with no lane closures, and long-term traffic will benefit from a reduction of at least 10 water hauling trucks daily. No noise-sensitive uses are present on the large agricultural properties adjacent to the site and sound from the generator, which is designed to minimize noise levels, will not produce adverse effects. As the project site was previously disturbed for construction of the Kukuihaele Reservoir and drilling of the exploratory well, no significant biological, archaeological or cultural resources are present. If archaeological resources or human remains are encountered during land-altering activities, work in the immediate area of the discovery will be halted and the State Historic Preservation Division will be contacted.

PART 1: PROJECT DESCRIPTION, PURPOSE AND NEED AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Project Description, Location and Property Ownership

The County of Hawai‘i, Department of Water Supply (DWS), plans to convert the Kukuihaele Exploratory Well, which was the subject of a 2000 Environmental Assessment (EA), to a production well. The exploratory well was drilled in 2001 and 2002 on a 0.275-acre parcel of County-owned land formerly farmed in sugar cane and identified as TMK (3^{rd}.) 4-8-008:026. It is located on the site of the existing DWS Kukuihaele Reservoir on Mud Lane, approximately 0.1 miles *mauka* (uphill) of State Highway 240 in Kukuihaele, Hāmākua District (Figures 1-5). Other improvements specified in the 2000 EA include a control building, chlorination facilities, well discharge piping, and drainage improvements. The Project now also includes an on-site Tier 3 diesel generator, an above ground double-walled 3,000-gallon fuel storage tank on a concrete pad, and a reverse-osmosis (RO) water treatment unit and associated seepage pits.

The RO desalination system is required because elevated chloride levels have been found in the well water. The exploratory well was completed in July 2002. Initial tests indicated that the chloride levels were high, about 400-500 part per million (ppm). The U.S. Environmental Protection Agency (EPA) does not regulate chloride levels under the Primary Drinking Water Regulations of the Safe Drinking Water Act. However, EPA does recognize chlorides as a “Secondary Contaminant.” Secondary Contaminants focus on the aesthetics of the water (i.e., color, taste, smell). Chlorides are natural constituents of groundwater in the basal lens and are derived from mixing with salt water; if too high, they make the water taste slightly salty.

As salt is removed as part of the RO process, a brine concentrate is produced. It will be disposed of in onsite seepage pits. The generator and fuel storage unit have been added because of the high cost to extend 3-phase HELCO electrical service to the well site. The use of a generator provides for more flexibility for the disposition of the well in the future. The production well will be connected to the adjacent 100,000-gallon Kukuihaele Reservoir via a 3-inch diameter pipeline.

The well may eventually become the Kukuihaele system backup well if the Kapulena Well, which is currently under construction, is able to provide water of sufficient quality and quantity for the interconnected Kukuihaele/Kapulena water system. Since use of the Kukuihaele (Wai‘ulili) Spring source was discontinued in July 2007, the Kukuihaele water system has been dependent on the hauling of at least 10 truckloads of water per day from spigots at Honoka‘a District Park. Therefore, the new well and associated facilities will be more cost-effective and energy efficient and will reduce traffic on the highway.

The cost of converting the exploratory well to a production well and associated improvements is estimated at $1.3 million. If approvals and funding proceed as planned, design will be finished by late summer of 2010, approvals and bidding will be complete by late 2010, and construction will start in early 2011 and will finish within approximately nine months. These estimates will be refined as the Project proceeds.

1.2 Purpose and Need

The facility is needed to promote public health and safety by improving water service for the town of Kukuihaele (and the village of Kapulena, which it also serves), the historic and scenic westernmost settlement area in Hāmākua. The Kukuihaele water system serves a population of 455 and has 159 service connections (DWS 2006). The improvements are necessary because its former source of water, Waiʻulili Spring, was deemed in 2005 by the state Department of Health to be a groundwater source under the direct influence of surface water. To continue its use, the Surface Water Treatment Rules of the Safe Water Drinking Act required enhanced treatment systems and continuous monitoring of water quality parameters such as chlorine residual, temperature, pH, and peak flows in order to ensure that all potential pathogens were adequately inactivated. The production of the spring also dropped dramatically following the October 2006 earthquake that struck off the leeward coast of the Big Island, making its continued use and maintenance no longer feasible. By the summer of 2007, the production of the spring was essentially zero flow. Therefore, the DWS initiated water hauling from Honokaʻa to Kukuihaele in order to continue water service to the existing accounts. The Project is meant to improve reliability and dependability for the system, but it will not support expansion of the existing service area.

1.3 Environmental Assessment Process

This Environmental Assessment (EA) is being conducted in accordance with Chapter 343 of the Hawaiʻi Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawaiʻi Administrative Rules (HAR), is the basis for the environmental impact process in the State of Hawaiʻi. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria.

Part 4 of this document states the finding (anticipated, in the Draft EA) that no significant impacts are expected to occur; Part 5 lists each criterion and presents the findings for each made by the Hawaiʻi County Department of Water Supply, the proposing/approving agency. If, after considering comments to the Draft EA, the agency concludes that, as anticipated, no significant impacts would be expected to occur, then the agency will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to occur. If the agency concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) will be prepared. DWS may also seek U.S. Safe Drinking Water Act State Revolving Funds for the improvements, which require addressing federal “cross-cutter” authorities, as discussed in Section 3.7 of this EA.

Figure 1
Location Maps

Figure 2 TMK Map

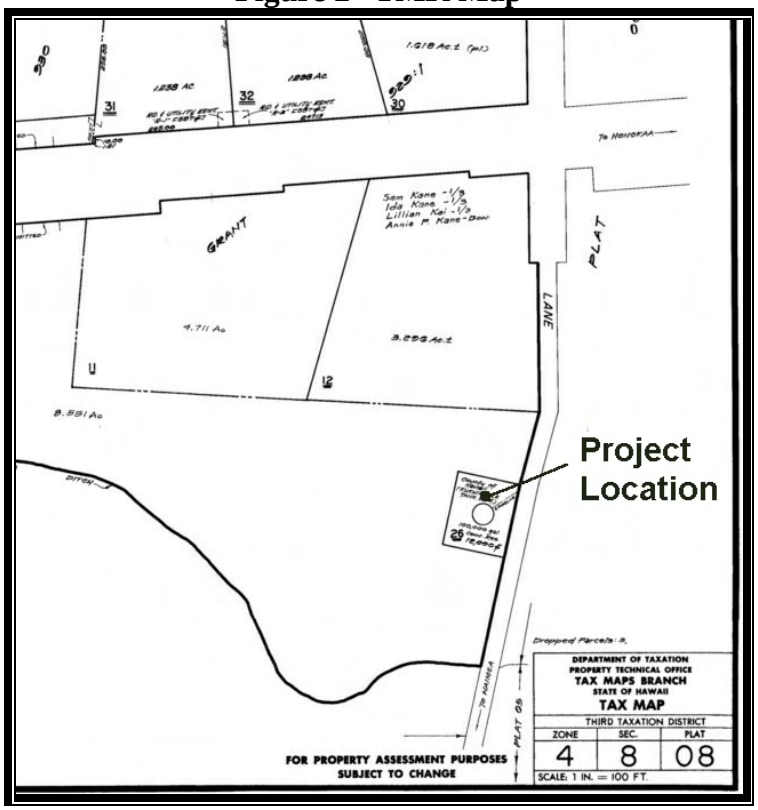


Figure 3 Airphoto

Figure 4 Site Plan

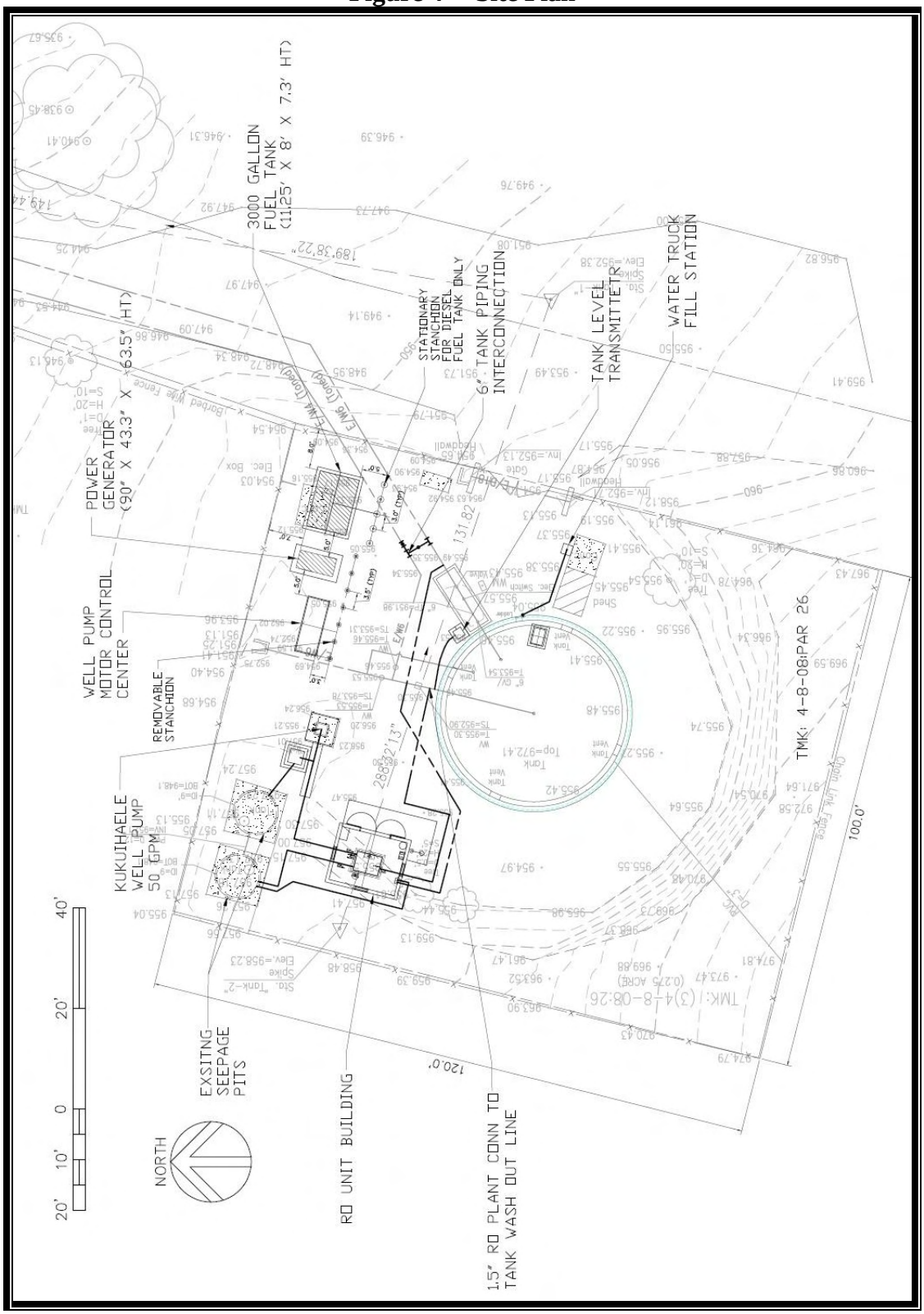


Figure 5 Project Site Photos

4a Existing Reservoir; well site makai (to right) 4b Well site (behind gate and papaya tree)

1.4 Public Involvement and Agency Coordination

The following agencies and organizations have been or are being consulted in development of the environmental assessment and/or supporting documents:

Federal:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- U.S. Natural Resources Conservation Service

State:

- State Historic Preservation Division
- Commission on Water Resource Management, DLNR
- Department of Health
- Department of Transportation
- Hawai‘i CZM Program
- Office of Hawaiian Affairs, Honolulu and Hilo offices

County:

- Department of Environmental Management
- Fire Department
- Planning Department
- Public Works Department
- Police Department
- County Councilman Dominic Yagong

Private:

- Hawai‘i Island Chamber of Commerce
- Sierra Club
- Kukuihaele Community Association

Copies of communications received during early consultation are contained in Appendix 1a.

PART 2: ALTERNATIVES

2.1 No Action

Under the No Action Alternative, the existing exploratory well would not be converted to a production well. Water for Kukuihaele would continue to be supplied by hauling by trucks over seven miles from Honokaʻa, which is costly and induces unnecessary traffic on the highway. If Kapulena Well is successfully brought on line as expected within two to three years, water would be delivered directly using the existing DWS system by gravity by constructing a by-pass system at the Kukuihaele Booster. The existing Kukuihele Well and Booster Station would be retained and used as a back-up system should the Kapulena Well pump malfunction or be removed from service due to a mechanical problem. It is highly desirable to have system redundancy in the form of two wells and a fully interconnected system, and therefore the Hawaiʻi County Department of Water Supply considers the No Action Alternative imprudent and inadvisable.

However, the No Action Alternative would also avoid temporary construction-related impacts to air quality, noise and traffic, and is thus an important baseline for evaluating environmental impacts of the proposed project.

2.2 Alternative Locations or Strategies

As the exploratory well is already present, the Kukuihaele Reservoir site is the most feasible location for the production well. The Kukuihaele Reservoir was one of three alternative sites for an exploratory well considered during an evaluation prior to the preparation of the 2000 EA, with the other possibilities being the Kapulena Reservoir site and an intermediate site between the two reservoirs. The Kukuihaele Reservoir site was ultimately chosen based on hydraulic evaluation and feasibility analysis. A primary factor was the high construction and operating costs of configuring either of the two other alternatives sites to allow the pumping of water simultaneously towards both the Kukuihaele and Kapulena reservoirs. Since the 2000 EA was prepared, DWS officials have determined that the elevated chloride levels at Kukuihaele make drilling of a second well near the Kapulena Reservoir site advisable. The exploratory well at Kapulena is currently under construction and is expected to be fully analyzed before the end of the year.

As there do not appear to be any environmental or other disadvantages associated with the specific proposed site, which has good access, existing facilities, and no apparent environmental issues, no alternative sites have been advanced in the Environmental Assessment. There is no other approach to water supply production that would accomplish the goals of the Project.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

The existing 100,000-gallon reservoir property on Mud Lane upon which the exploratory well is located is referred to throughout this EA as the *project site*. The term *project area* is used to describe the general environs of Kukuihaele and in some cases all of Hāmākua.

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

The project site is on former sugar cane field located at about 970 feet in elevation. The climate in the area is mild and moist, with an average annual rainfall of 80 inches (U.H. Hilo-Geography 1998:57). Geologically, this part of Hāmākua is located on the lower flank of Mauna Kea volcano. The surface consists of highly weathered basalt soils on Pleistocene-era lava flows from the Hāmākua Volcanics series from Mauna Kea (Wolfe and Morris 1996). The project site soil is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) as Kukaiau silty clay loam on slopes of 12 to 20 percent (KuD). Kukaiau series soils are well-drained, with slow to rapid runoff and moderate permeability (U.S. Soil Conservation Service 1973). Typically found at least 48 inches deep, they are formed from volcanic ash. They were once used extensively for sugar cane cultivation and now support diversified agriculture, secondary forest, or pasture.

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey in this area of Hāmākua is Zone 8, on a scale of ascending risk from 9 to 1 (Heliker 1990:23). The very low hazard risk is based on the fact that Mauna Kea is presently considered a dormant volcano. Only a few percent of Zone 8 areas have been covered by lava in the past 10,000 years and there is negligible risk of lava inundation over relatively short time scales in the project area.

In terms of seismic risk, the entire Island of Hawai‘i is rated Zone 4 Seismic Hazard (Uniform Building Code, 1997 Edition, Figure 16-2). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 15, 2006, demonstrated. The moderate slopes and relatively stable soils at the project site do not appear prone to subsidence or rockfall, landslides or other forms of mass wasting.

Impacts and Mitigation Measures

In general, climatic and geologic conditions impose no constraints on the proposed project, and the well and associated facilities are not imprudent to construct.

3.1.2 Drainage and Surface Water

Existing Environment

No perennial surface water bodies are located on or near the project site. The Lower Hāmākua Ditch passes 200 feet to the south, mauka of the water tank site. Originally built to service the Hāmākua Sugar Company's plantation, this system extends from several intake sites located mauka of Waipi'o Valley to the Paauilo Reservoir and consists of five scattered reservoirs, nine miles of tunnels and 14 miles of ditch. Only limited farming has taken place along the ditch since the closure of the sugar company and repairs for damage caused by the 2006 earthquake have not been completed. No known areas of local (non-stream related) flooding are present in the project area, although local ephemeral drainages may overflow after very heavy rains. The Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM) FM1551660200C (9/16/88) shows the project site to be located entirely within Zone X, areas not known to be within the 500-year flood plain.

Impacts and Mitigation Measure

Because of the limited scale of construction and the environmental setting in a small, already developed site, the risks for flooding or impacts to water quality at the project site are very minor. The Project includes the design of site drainage to retain normal runoff on the property. There will be no effects to the Lower Hāmākua Ditch.

In order to minimize the potential for sedimentation and erosion, the contractor shall perform all earthwork and grading in conformance with Chapter 10, Erosion and Sediment Control, Hawai'i County Code. The contractor will prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). In order to properly manage storm water runoff, the SWPPP will describe the emplacement of a number of best management practices (BMPs) for the Project. These BMPs may include, but may not be limited to, the following:

- Minimization of soil loss and erosion by revegetation and stabilization of slopes and disturbed areas of soil, possibly using hydromulch, geotextiles, or binding substances, as soon as possible after working;
- Minimization of sediment loss by emplacement of structural controls possibly including silt fences, gravel bags, sediment ponds, check dams, and other barriers in order to retard and prevent the loss of sediment from the site;
- Minimizing disturbance of soil during periods of heavy rain;
- Phasing of the Project to disturb the minimum area of soil at a particular time;
- Application of protective covers to soil and material stockpiles;
- Construction and use of a stabilized construction vehicle entrance, with designated vehicle wash area that discharges to a sediment pond;
- Washing of vehicles in the designated wash area before they egress the project site;
- Use of drip pans beneath vehicles not in use in order to trap vehicle fluids;

- Routine maintenance of BMPs by adequately trained personnel; and
- Proper cleanup and disposal at an approved site of material from significant leaks or spills, if they occur.

It should be noted that because the Project will not involve significant dewatering and will not disturb more than one acre of ground surface, a National Pollutant Discharge Elimination System (NPDES) permit is not required.

3.1.3 Groundwater Hydrology

Existing Environment

Hydrogeological Setting

The State Commission on Water Resource Management (CWRM) locates the Kukuihaele Well within the Honokaʻa Aquifer System (80201) of the East Mauna Kea Aquifer Sector. The surface boundary of this aquifer is shown in Figure 6. The sustainable yield is estimated at 31 million gallons per day (mgd).

Precipitation that is not lost through evapotranspiration or runoff into the ocean percolates into the ground to collect in the aquifers before slowly making its way to the sea. As streams in Hawaiʻi are generally flashy or even ephemeral, underground water is the most reliable source of water supply, because there is less daily or seasonal change in water tables. Most water is maintained in the basal freshwater lens that "floats" on the salt water-permeated rock below, but in some locations there are substantial quantities of "high-level" water.

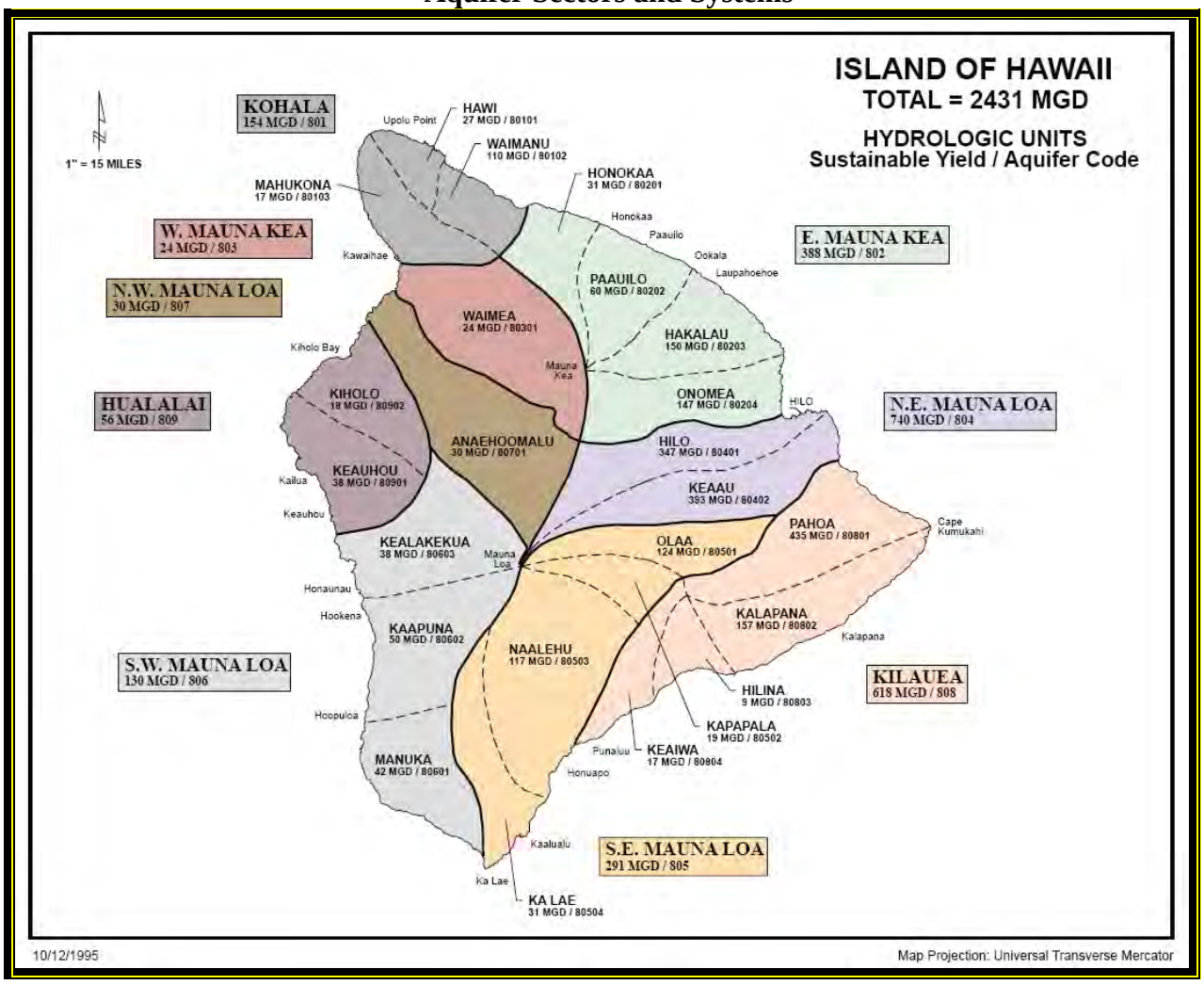
The recharge area for the Honokaʻa Aquifer System is assumed to consist of essentially the surface area contained within the boundaries of the aquifer system. Average annual rainfall varies within the Honokaʻa Aquifer System in a typical *mauka-makai* transect from about 60 inches along the shoreline, to about 100 inches at 3,000 feet in elevation, to less than 20 inches on the upper slopes of Mauna Kea (UH Hilo 1998:57). As computed by the CWRM, groundwater recharge is limited to precipitation. It does not include the contribution of fog drip, which in some foggy locations of the State, such as the elevations between 1,500 and 3,500 feet in Hāmākua, can be considerable.

As identified by the U.S. Environmental Protection Agency, Region IX groundwater Office (http://www.epa.gov/safewater/sourcewater/pubs/qrg_ssamap_reg9.pdf) (checked July 2010), there are only two sole source aquifers in Hawaiʻi. They are the Southern Oʻahu Basal Aquifer on the Island of Oʻahu and the Molokaʻi Aquifer on the island of Molokaʻi. There are no sole source aquifers on the Island of Hawaiʻi. There are also no State Wellhead Protection Plans in force at or near the well site.

Current Estimated Installed Capacity and Water Use

CWRM maintains a database of wells that provides information on aquifer identity, user name, installed capacity, chloride content, function, and other factors. The database does not provide information on current pumpage, which instead is logged in a separate database that is derived from reports by individual well operators. Because not all well operators report their use in a timely manner, pumpage data may not be complete or up to date. Owing to security concerns after September 11, 2001, these databases are no longer accessible to the public and data must be requested from CWRM. The information provided below is based on databases maintained by CWRM, by information contained in the Draft *Hawai'i County Water Use and Development Plan Update*, and information obtained from the Department of Water Supply and hydrology consultants.

Figure 6
Aquifer Sectors and Systems



Source: Hawaii State Commission on Water Resources Management
http://hawaii.gov/dlnr/cwrm/mapsillustrations/gwhawaii.pdf

The Honokaʻa Aquifer System currently contains over a dozen registered wells of various types, most of which are unused or being used as observation wells. Table 1 lists active and planned wells. DWS is currently operating one municipal well, the Haina Well. There are also two active industrial wells and one irrigation well in the Honokaʻa Aquifer System. In addition, DWS plans to bring Ahualoa Well into service within the next year, and a DWS well at Kapulena and a State Department of Land and Natural Resources well in Honokaʻa are also likely to begin production within several years.

According to information reported by well owners to the CWRM, total pumpage in the aquifer system has varied between 0.79 and 1.39 mgd (measured on a monthly basis) over the last four years. The average over a four year period as been about 1.13 mgd. This average is expected to rise substantially as a result of bringing online the new wells at Ahualoa, Kapulena, Honokaʻa Well B, and the Kukuihaele Well, as discussed in the section below on hydrologic impacts.

Table 1
Existing Water Wells in the Honokaʻa Aquifer System

Name	State Well No.	Distance to Project Site (miles)	Current Use	Installed Pump Capacity (mgd)
Active Wells				
Waimea Country Club	6235-01	5.6	Irrigation	0.720
Haina DWS	6528-01	7.1	Municipal	0.576
Enserch 1	6528-02	7.1	Industrial	1.008
Enserch 2	6528-03	7.1	Industrial	1.008
Future Wells				
Honokaʻa Well B (DLNR)*	6428-02	7.2	Municipal	0.504
Ahualoa DWS*	6331-02	5.8	Municipal	1.116
Kapulena Well*	6531-01	3.0	Municipal	0.288

Sources: CWRM Groundwater Index, CWRM *Water Resource Bulletin* (2010), Hawaiʻi County DWS pers. comm.
Notes: Only wells that are actively pumped or planned for pumping are listed. * Ahualoa Well and Honokaʻa Well B are expected to come into service in 2010 or early 2011; Kapulena is estimated to come into service in 2013.

Existing Drinking Water Quality

DWS regularly conducts microbiological analysis and contracts for extensive chemical testing in order to comply with U.S. Environmental Protection Agency and Hawaiʻi State standards. Table 2 depicts the contaminants tested for and the frequency of testing.

Table 2
Summary of Current Water Quality Monitoring Requirements

CONSTITUENT		
Bacteriological	Distribution system	Monthly; number of samples dependent on population served within distribution system
Carbamate, Nitrate, Metals, Inorganic, THM / HAA5 VOC, SOC8, Glyphosate EDB / DBCP / TCP	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Quarterly.
Asbestos	Source/distribution along AC pipe	First 3-year compliance period of 9-year cycle
Nitrate EDB / DBCP / TCP Metals, SOC8, VOC	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Annually
Lead and copper	Customer taps	For systems that have passed, once every three years. For systems that have failed, then once every six months until system passes, then once every three years thereafter.
Reduced Monitoring for Populations<=3300: Metals / VOC (ALL Groundwater sources; ALL Populations) SOC8, EDB / DBCP / TCP Glyphosate, Carbamate Herbicides	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Once every 3 years (R1/1)
Reduced Monitoring for Populations >3300: SOC8, EDB / DBCP / TCP Glyphosate, Carbamate Herbicides	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Twice every 3 years.
Radionuclides	Source	Once every 5 years.

Source: Hawai‘i County Department of Water Supply. SDWB = Hawai‘i State Department of Health, Safe Drinking Water Branch.

Annual Water Quality reports from the Haina Water System (current source of Kukuihaele Water System Water) for 2009, the latest full year available (see Appendix 5), indicate that the system was compliant with all current State of Hawai‘i and U.S. Environmental Protection Agency drinking water standards. Specifically, no violations were recorded for radioactive, inorganic, organic or lead and copper contaminants, with all contaminants far below Maximum Contaminant Levels (MCLs). Again, it should be noted that until recently the source of water for the Kukuihaele Water System was Wai‘ulili Spring. As of July 20, 2007, the use of Wai’ulili Spring was indefinitely halted

because the spring had very low production. Since July 20, 2007 to the present, DWS has been hauling treated groundwater from the Haina Water System to Kukuihaele Water System. In 2009, the Haina Water System supplied hauled water to Kukuihaele Water System for the entire year, and the water quality tests thus reflect water from that system.

There are few apparent sources of past or present potential contamination near Kukuihaele Well, other than agriculture and scattered residences. No landfills, wastewater treatment plants, and other major potential sources of contaminants are present with five miles. The nearest past or present commercial or industrial operations are located at a former sugar mill site and commercial premises in Kukuihaele, more than 1,500 feet away.

A review of hazardous material and toxic substance sites in Hāmākua was conducted in 2009 as part of the EA for the Kapulena Well and Reservoir (Hawai‘i County DWS 2009). Based on State Department of Health (DOH) Office of Hazard Evaluation and Emergency Response records, no identified site of concern to the DOH is located near Kukuihaele. The nearest listed site is a DOH medical facility in Honoka‘a, seven miles from the well site. That site does not present any health risks to the surrounding environment.

Several contaminants associated with sugar cane production, particularly atrazine, have been detected in water from both Haina Well and Kukuihaele Well, according to water quality sampling reports from DWS and records from DOH (Hawai‘i DOH 2005). Atrazine has been found consistently at levels generally less than 10 percent of the State and federally defined allowable levels for potable water sources (see Table 3).

The Underground Injection Control (UIC) line is not demarcated near Kukuihaele, meaning that the well site and its recharge area is *mauka* of the UIC line, where underlying aquifers are considered drinking water sources and injection wells may be prohibited and are subject to stringent permit requirements.

Other Planned Uses in Aquifers and Issues of Concern

Only one new well is reported to be in planning in the near future in the area. The last two years of the *Water Resource Bulletin*, issued monthly by CWRM, has consistently listed just two new planned wells in the Honoka‘a Aquifer System, which are the Ahualoa Well (5.8 miles southeast) and the Kapulena Well (3.3 miles east).

The *State Water Projects Plan, Volume 2, Island of Hawai‘i* (SWPP) (Hawai‘i State CWRM 2003) provides a framework for the planning and implementation of water development strategy for future State projects. The SWPP recognizes the need for only a very limited number of projects related to public schools in Honoka‘a. All told, the demand of new State projects to the year 2020 on sources within the Honoka‘a Aquifer System is anticipated to be 0.00881 mgd (Ibid, Appendix D).

Table 3
Measured Contamination in DWS Wells in the Honoka‘a Aquifer System

State Well No.	Contaminant	Detected Level (ppb)	Maximum Contaminant Level (MCL) (ppb)4	Detected Level as % of MCL	Year of Sample
6528-01 (Haina Well)	Atrazine1,2	0.25	3	8%	2009
6528-01	Atrazine1,2	0.32	3	11%	2008
6734-03 (Kukuihaele Well)	Atrazine1,2	0.05	3	2%	2008
6528-01	Atrazine1,2	0.24	3	8%	2007
6528-01	Atrazine1,2	0.17	3	6%	2006

Source: Hawai‘i State Department of Health and Hawai‘i County Department of Water Supply. Notes:
1 Atrazine is an herbicide used on row crops.
2 The value given here is the sum of separate determinations for the herbicide atrazine and for desethyl atrazine (a metabolite of atrazine) which have similar toxic effects (EPA 2002).

Impacts and Mitigation Measures

Hydrologic Impacts: Effects on Sustainable Yield

DWS completed drilling the Kukuihaele Exploratory Well in January 2002 and pump-tested the well on July 10, 2002. The elevation at the top of the 12-inch diameter casing was 957.5 feet above sea level, and the water table was found at 5.78 feet above sea level, or about 951.7 feet below ground at the well site. The well extended to 47.5 feet below sea level, a depth of 1,005 feet. Initial tests indicated that the chloride levels were high, about 400-500 part per million (ppm).

Chlorides are natural constituents of groundwater in the basal lens and are derived from mixing with salt water; if too high, they make the water taste slightly salty. Therefore, implementation of a production well was put on hold.

After the October 2006 earthquake apparently caused the Wai‘ulili Spring to dry up, the well was again considered for production and tested for water quality. The New Source Test results indicated

high levels of lead in the well water. Although the source was at first unknown, it was finally determined that the lead derived from the installed pump column installed and not the groundwater. This situation was remediated and further tests indicated no hazardous contaminants or pathogens. In an attempt to address the excess of chlorides, the bottom 25 feet of the well was grouted, yielding a new total well depth of 975.4 feet. New water samples showed chloride levels had only dropped to about 360 ppm. This problem can be remedied through reverse osmosis. Although somewhat costly, this appeared to be a better solution than continuing to haul water by truck, and so DWS determined to move forward with the well.

Testing of the modified well on July 21, 2008 indicated that a production well on this site is capable of a sustainable pumping rate of 50 gpm (gallons per minute), which could be sustained constantly if desired, for a rate of 0.072 mgd (see Appendix 4 for the 2008 Well Completion Report and 2008 Well Water Quality Laboratory Report). The Honokaʻa Aquifer has a CWRM-established sustainable yield of 31 mgd. At present, as discussed above, the only active wells are the DWS Haina Well (6528-01), the Waimea Country Club irrigation well (6235-01), and the two Hamakua Energy Partners (Enserch) wells (6528-02 and -03). Their combined pumpage averages less than 2.0 mgd. Foreseeable new wells include the DLNR Honokaʻa Well B (6428-01), the current well, Kukuihaele (6734-03), and two other DWS wells, Ahualoa Well (6331-02) and Kapulena Well (6531-01). If and when all of these are put into use, total pumpage in the aquifer is still expected to be less than 5.0 mgd, or less than 20 percent of the aquifer's sustainable yield. It should also be noted that the amount of water that will be pumped from Kukuihaele Well can essentially be deducted from the amount pumped from the Haina Well within the same aquifer, as this amount is currently trucked in from that well.

Considering the current scale of usage and the projected low growth in population in the area, it is unlikely that foreseeable additional withdrawals will approach the aquifer's estimated sustainable yield. The long-term records of salinity, pumpage and water levels that will be maintained by DWS will assist in protecting the long-term sustainability of the aquifer.

Hydrologic Impacts: Effects on Nearby Wells

The nearest well to Kukuihaele Well is the Kapulena Well, which is being constructed approximately 3.4 miles away. Results to date on the Kapulena Well indicate a piezometric head about 30 feet above sea level and groundwater of exceptional low salinity (chlorides less than 10 MGL). As such, no impact by use of the Kukuihaele Well on this or any other well is will occur.

Hydrologic Impacts: Streams

The local natural drainage network consists of subparallel, flashy streams. Waiʻulili Stream is located about 1,000 feet west, and Waikoekoe Stream is about 1,000 feet to the east. The *Hawaiʻi Stream Assessment* (Hawaiʻi CWRM: 1990) inventoried the perennial streams of the project area

and included limited data on Waiʻulili Stream, which was noted as having cultural resources on some portion of its length and a history of use by the sugar plantations. Neither stream was noted for having valuable native aquatic fauna.

There is a great elevational distance and no hydrologic connection between the essentially sea level aquifer tapped by the well and the local streambeds. The streams are perched roughly 1,000 feet above sea level near the well and discharge into the ocean through steep incisions in the seacliffs that begin 400 to 600 feet above sea level. Utilization of the aquifer that would be pumped by the Kukuihaele Well would not alter stream level flows in any way.

Water Quality

Considering the depth to groundwater and the lack of past or current potential sources of contamination, no contaminants above action levels were expected in the well water. As discussed above, the New Source Test results conducted some time after well drilling indicated high levels of lead in the well water. Although the source was at first unknown, it was finally determined that the lead derived from the pump column and not the groundwater. This situation was remediated and further tests indicated no hazardous contaminants or pathogens. Except for the trace amounts of atrazine discussed above, all organic and volatile compounds were non-detectable, and there were negative results for total and fecal coliform. With the exception of chlorides and sodium associated with the brackish nature of the water, the water quality met the potable water source requirements of the Hawaiʻi State Department of Health. As described in Section 1.1., the project involves a reverse osmosis unit to reduce the chloride and sodium content of the water to acceptable levels.

Given the setting with few apparent sources of past or present potential contamination, other than agriculture and scattered residences, water quality will likely remain acceptable, and no mitigation measures other than standard periodic testing are required. It is important to note that the well taps an aquifer that lies 950 feet under the surface, reducing the risk of potential contamination from minor sources of surface pollutants. The well site does not contain any hazardous materials, and none, except for the petroleum products used by the construction equipment and generator, will be used or generated during construction or operation. Fuel storage will occur in an above ground double-walled 3,000-gallon fuel storage tank on a concrete pad. The reverse osmosis desalination system will generate a concentrate of brine that will be disposed of in onsite seepage pits. This material is basically concentrated well water.

3.1.4 Flora, Fauna and Ecosystems

Existing Terrestrial Biota

The natural vegetation of this part of Hāmākua was most likely lowland rain forest dominated by *ʻōhiʻa* (*Metrosideros polymorpha*) and koa (*Acacia koa*) (Gagne and Cuddihy 1990). These original communities, however, were destroyed or heavily degraded by sugar cane cultivation, cattle grazing, and clearing for small farms and residences. Vegetation in Hāmākua is now mostly managed (i.e., farms, pasture or landscaped grounds) or adventive "communities" of various alien weeds, with only small areas of remnant forest, mainly present in the uplands or in limited spots within seacliffs and gulches.

The 0.275-acre project site has been completely disturbed and is enclosed by a fence (see Figures 5a-b). The site is landscaped with grass and planted or pre-existing trees and shrubs including olive (*Olea europea*), Christmas berry (*Schinus terebinthifolius*), guava (*Psidium guajava*), Formosan koa (*Acacia confusa*), and java plum (*Syzygium cumini*). Outside the fenced area are similar plants as well as sourbush (*Pluchea symphytifolia*), Guinea grass (*Panicum maximum*), and sugar cane (*Saccharum officinarum*). Within several hundred feet are groves of *Eucalyptus* spp. and ironwood (*Casuarina equisetifolia*), as well as scattered silver oak (*Grevillea robusta*) and trees of species mentioned previously. A wide variety of weeds in Asteraceae, Fabaceae, Euphorbiaceae, and other families are present within and on the margins of the site, which are periodically managed by mowing and herbicides. No members of the Solanaceae family, some of which have the potential to host the endangered Blackburn's Sphinx Moth, were found.

The only native species observed was the *ʻuhaloa* (*Waltheria indica*) a very common herb or subshrub typically found in disturbed areas around the island. A full list of species observed is contained in Table 4.

A large variety of alien birds makes up the avifauna of this area. Cats, dogs, mice, rats and mongooses probably all visit the site occasionally. Terrestrial vertebrates listed as threatened or endangered may be present in this part of Hāmākua and may overfly, roost, nest, or utilize resources here, including the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater (*Puffinus auricularis newelli*).

The Hawaiian Hawk and Hawaiian hoary bat are almost certainly present in the general area, as they are in most windward lowland areas of the island of Hawaiʻi, but would not find the small, fenced reservoir site dominated by water supply facilities and alien plants particularly suitable habitat.

Table 4
List Of Plant Species At/Near Project Site

Scientific Name	Family	Common Name	Life Form	Status*
Acacia confusa	Fabaceae	Formosan koa	Tree	A
Ageratum conyzoides	Asteraceae	Maile honohono	Herb	A
Bidens pilosa	Asteraceae	Beggar's tick	Herb	A
Buddleia asiatica	Buddlejaceae	Dog tail	Shrub	A
Carica papaya	Caricaceae	Papaya	Tree	A
Casuarina equisetifolia	Casuarinaceae	Ironwood	Tree	A
Chamaecrista nictitans	Fabaceae	Partridge pea	Herb	A
Chamaesyce hirta	Euphorbiaceae	Garden spurge	Herb	A
Conyza bonariensis	Asteraceae	Hairy horseweed	Herb	A
Crassocephalum crepidioides	Asteraceae	Crassocephalum	Herb	A
Crotalaria sp.	Fabaceae	Rattlepod	Herb	A
Cuphea carthaginensis	Lythraceae	Tarweed	Shrub	A
Cynodon dactylon	Poaceae	Bermuda grass	Grass	A
Cyperus halpan	Cyperaceae	Nut grass	Sedge	A
Desmodium incanum	Fabaceae	Desmodium	Herb	A
Emilia sonchifolia	Asteraceae	Pualele	Herb	A
Eucalyptus robusta	Myrtaceae	Swamp mahogany	Tree	A
Grevillea robusta	Proteaceae	Silk oak	Tree	A
Mimosa pudica	Fabaceae	Sensitive plant	Herb	A
Olea europea	Oleaceae	Olive	Tree	A
Panicum maximum	Poaceae	Panicum	Herb	A
Paspalum conjugatum	Poaceae	Hilo grass	Grass	A
Plantago lanceolata	Plantaginaceae	Narrow-leaved plantain	Herb	A
Pluchea carolinensis	Asteraceae	Sourbush	Shrub	A
Psidium guajava	Myrtaceae	Guava	Tree	A
Saccharum officinarum	Poaceae	Sugar cane	Grass	A
Sacciolepis indica	Poaceae	Glenwood grass	Grass	A
Schinus terebinthifolius	Anacardiaceae	Christmas berry	Tree	A
Setaria gracilis	Poaceae	Yellow foxtail	Herb	A
Sida rhombifolia	Malvaceae	Cuba jute	Herb	A
Sonchus oleraceus	Asteraceae	Sow thistle	Herb	A
Stachytarpheta jamaicensis	Verbenaceae	Jamaica vervain	Shrub	A
Syzygium cumini	Myrtaceae	Java plum	Tree	A
Taraxacum officinale	Asteraceae	Dandelion	Herb	A
Waltheria indica	Sterculiaceae	ʻUhaloa	Herb	I

* A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species. Not all weeds listed.

Impacts and Mitigation Measures to Terrestrial Biota

Because of the lack of native ecosystems or threatened or endangered plant species on the project site, no adverse impacts to botanical resources would occur as a result of converting the exploratory well to a production well and building the associated infrastructure.

The existing landscaping will remain except where plants are required to be removed to accommodate new facilities in order to mitigate any impact to the erosion control functions of the existing vegetation.

No temporary or permanent lighting or erect structures such as poles are planned, and therefore no impacts to listed seabirds are anticipated. The scattered low-statured trees at the project site do not appear to be conducive to providing nesting sites for Hawaiian Hawks, and nearby groves of ironwood and Eucalyptus do not appear particularly suitable for hawks.

However, it is conceivable that the shrubby vegetation may serve as roosts for Hawaiian hoary bats. Contract conditions will require that the contractor refrain from activities that disturb or remove the vegetation during critical pupping months for the Hawaiian hoary bat, from May 15 to August 15 of each year. Coordination with the U.S. Fish and Wildlife Service pursuant to the Endangered Species Act is discussed in Section 3.7.5, below.

Existing Aquatic Biota, Impacts and Mitigation Measures

As discussed in the previous section, Waiʻulili Stream is located about 1,000 feet west, and Waikoekoe Stream is about 1,000 feet to the east. The *Hawaiʻi Stream Assessment* (Hawai`i CWRM: 1990) noted that certain streams on the northeast coast of the Big Island contain native stream fauna, some of which are endangered. Several of the streams, notably Wailoa\Waipiʻo, Waimanu, Honoliʻi, Kolekole, and Hakalau, have been categorized as having "Outstanding Aquatic Resources" in the *Hawaiʻi Stream Assessment*, on the basis of having diverse native fauna or an abundance of certain native organisms. Neither of the nearby streams were noted for valuable native organisms.

Due to the great elevational difference and lack of hydrologic connection between the essentially sea level aquifer tapped by the well and the local streambeds, utilization of the aquifer that would be pumped by the Kukuihaele Well would not alter stream level flows or aquatic stream biology in any way.

Despite the high flux of fresh groundwater into the coastal waters of Hāmākua, steep bathymetry and rough seas induce almost instantaneous mixing of fresh and salt water. No effects on aquatic biology of coastal waters would be expected from the absence in this flux of the relatively minor quantity of water that would be withdrawn by the well.

3.1.5 Air Quality, Noise, and Scenic Resources

Environmental Setting

The strong and steady tradewinds of this part of Hāmākua contribute to excellent air quality by generally dispersing human-derived pollutants as well as volcano-induced vog. In areas with bare surfaces, however, occasional strong winds may also exacerbate dust problems caused by fugitive dust emissions from nearby agricultural and construction activities and vehicle traffic.

Noise on the project site is low and derived mainly from motor vehicles on the Honokaʻa-Waipiʻo Road and some agricultural and distant residential activities.

Other than the viewpoint from the lookout and various other places around Kukuihaele of Waipiʻo Valley, which is not visible from the project site on Mud Lane, the project area contains no sites considered significant for their scenic character in the Hawaiʻi County General Plan.

Impacts and Mitigation Measures

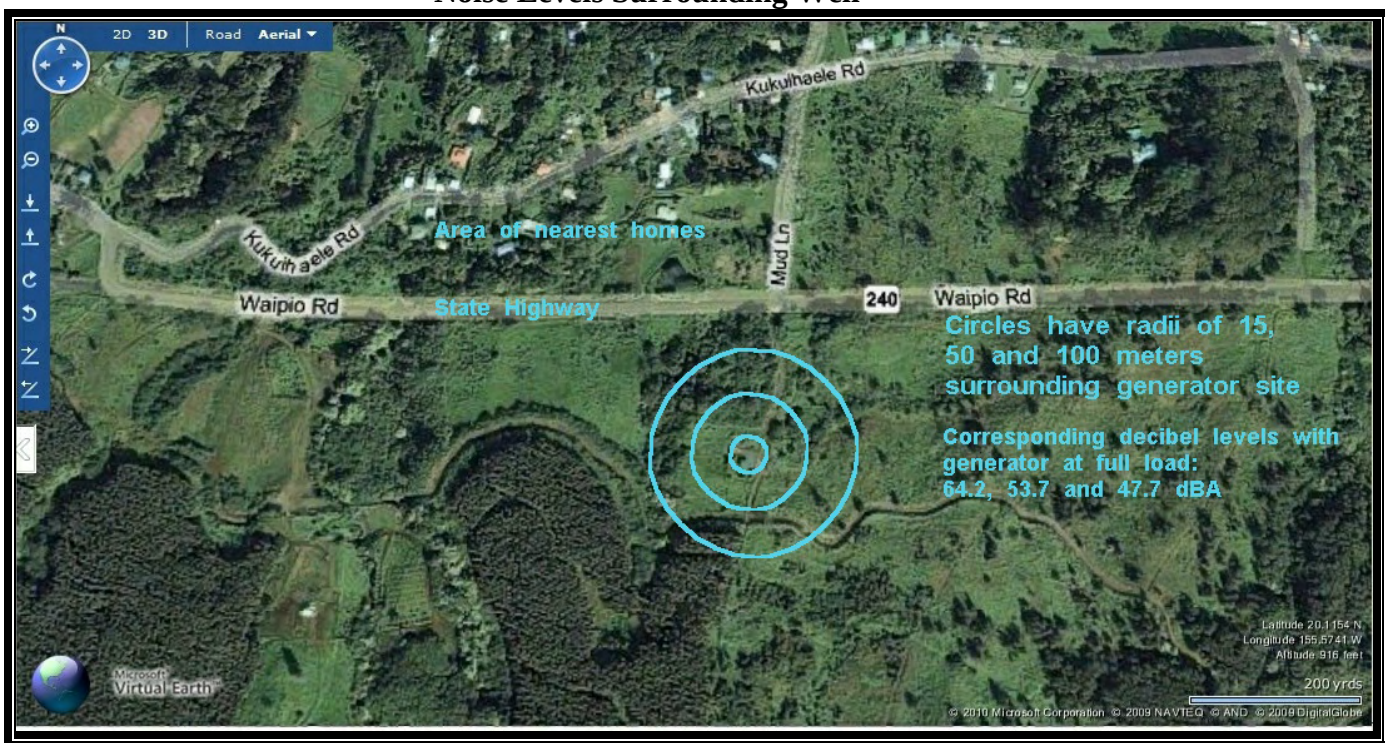
The proposed action would not measurably affect air quality or noise levels except minimally during construction. The U.S. Environmental Protection Agency requires that generators put into service in 2010 or 2011 be rated Tier 3 in order to minimize emission of air pollutants. The 45kW generator meets this rating. It will have a fuel consumption of 4.4 gallons per hour and a heat input of 0.6 million BTU/hr (British thermal units per hour). As this rated heat input is less than the threshold of 1 million BTU/hr, an air quality permit is not required.

Noise may be defined as unwanted sound. Evaluation of noise requires a consideration of loudness at various pitches. Loudness is measured in units called decibels (dB). Since the human ear does not perceive all pitches or frequencies equally, noise levels are adjusted (or weighted) to correspond to human hearing. This adjustment is known as the A-weighted scale, abbreviated dBA.

Sound levels over 70 dBA are considered unpleasant by most individuals; levels under 50 dBA are generally perceived as acceptably quiet. For purposes of comparison, a jet takeoff near the edge of an airport may be as loud as 120 dBA, while an ambulance siren from 100 feet away is about 94 dBA. A typical car passing by within 50 feet is about 64 dBA, and the background noise inside a department store may be about 55 dBA. The noise inside a home with no television, music or loud noises in surrounding areas is about 40 dBA.

Operationally, noise levels at the well site will increase slightly because of the generator. At 15 meters away, the generator at full load will produce noise at a level of 64.2 dBA. At 50 meters, this will decrease to 53.7 dBA, which is an acceptable level of outdoor noise for most uses, and at 100 meters, 47.7 dBA, which is considered quiet. There are no nearby sensitive receptors, as the nearest residences are located at least 400 meters (about 1,300 feet) away (Figure 7). At that distance, the generator, which is designed to minimize noise, may not be audible at all, and it will barely affect background sound levels.

Figure 7
Noise Levels Surrounding Well



Note: Noise levels are approximate and may be less due to topographic and vegetation obstacles.

Construction would entail limited excavation, grading, compressors, vehicle and equipment engine operation, and construction of new infrastructure. These activities may generate noise exceeding 95 decibels at times. In cases where construction noise is expected to exceed the Department of Health's (DOH) "maximum permissible" property-line noise levels, contractors would obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH would review the proposed activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers. These measures will not likely be necessary because of the distance of at least 1,500 feet from the nearest sensitive use, a residence mauka of the Old Government Main Road in Kukuihaele. In any case, in order to minimize noise impacts during the construction period, construction should be conducted only during daytime hours.

The views of listed in the General Plan of Waipi'o Valley from the lookout and other nearby areas will not be affected by the proposed action. No other scenic resources are present, and no scenic impacts are anticipated. Although the project site itself is not visible from any highways, public viewpoints, homes or businesses, and the site's visual appearance thus not of particular concern for scenic impacts, the existing landscaping will remain except where plants are required to be removed to accommodate new facilities.

3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions

Environmental Setting, Impacts and Mitigation Measures

To DWS officials' knowledge, there have been no spills or other incidents involving hazardous or toxic substances. No permanent or temporary land use that would tend to result in these conditions appears to have ever occurred on the project site, which is former sugar cane land. It appears that the project site does not appear to pose any unreasonable risk in terms of worker or public exposure to hazardous materials or toxic substances. If evidence of suspicious materials or conditions appears during excavation or other construction, DWS may undertake a systematic assessment of the area property in question to determine if remediation is required.

3.2 Socioeconomic and Cultural

3.2.1 Socioeconomic Characteristics

The Project occurs within the village of Kukuihaele in the Hāmākua District of the County of Hawai‘i. Table 5 provides information on the socioeconomic characteristics of Kukuihaele along with those of Hawai‘i County as a whole for comparison, from the United States 2000 Census of Population. Adjacent land use is primarily agricultural, with the closest residences located more than 1,500 feet *makai* in the village of Kukuihaele (see Figure 3).

Table 5 Selected Socioeconomic Characteristics

CHARACTERISTIC	Hawai‘i Island	Kukuihaele
Total Population	148,677 (1)	317
Percent White	31.5	22.4
Percent Asian	26.7	25.6
Percent Hawaiian or Pacific Islander	9.7	16.4
Percent Two or More Races	28.4	34.4
Median Age (Years)	38.6	35.3
Percent Under 18 Years	26.1	24.6
Percent 65 Years and Over	13.5	18.0
Percent Households with Children	37.5	31.1
Average Household Size	2.75	2.99
Percent Housing Vacant	15.5	14.5
Median Household Income	$39,805	$38,750
Individuals Below Poverty Level (Percent)	15.7	14.9

Source: U.S. Bureau of the Census. May 2001. *Profiles of General Demographic Characteristics, 2000 Census of Population and Housing, Hawai‘i.* (U.S. Census Bureau Web Page). (1). The U.S. Census Bureau estimated the County's population in 2009 at 177,835. Source: http://www.census.gov/popest/cities/files/SUB-EST2009_15.csv

Population projections conducted as part of the Hawai‘i County General Plan and published in the 2009 Hawai‘i County Data Book forecast a generally low growth rate of about 20 percent over 20 years for Hāmākua (Table 6). Even this low level of growth may not have occurred, partly because of the extended economic downturn. Relatively little new growth is expected near Kukuihaele, but construction of the well is required to service existing customers.

Table 6
Population Projections

Area	2000	2005	2010	2015	2020
Hawai‘i County	148,677	159,907	176,938	195,965	217,718
Hāmākua	6,108	6,196	6,561	6,933	7,328

Source: Hawai‘i County. County of Hawai`i General Plan 2005 (Amended December 2006 by Ord. No. 06-153). Website: http://www.co.hawaii.hi.us/la/gp/toc.html

The proposed project would benefit public health and welfare in Hāmākua through improvements in water supply, a basic and required public service for a community. No adverse socioeconomic impacts are expected.

3.2.2 Archaeology and Historic Sites

The general area has been cultivated, grazed or used for residences for more than a hundred years and has thus experienced intensive grubbing and grading. In addition, much of the surface of the project site was reworked as part of preparing the land for the existing reservoir and later for the exploratory well. No archaeological resources were observed on the site. Furthermore, there were no resources (landforms, vegetation, etc.) of a traditional cultural nature observed at the site. Based on this context, as part of the EA for the exploratory well, the State Historic Preservation Division (SHPD) was requested by letter to concur with the determination that no historic properties were present and that the Project would have no effect on historic properties. By letter of June 3, 1999 (see Appendix 2), SHPD provided this concurrence. As part of consultation for this EA, SHPD was informed again of the project (see letter to SHPD of June 1, 2010 in Appendix 2). As of August 1, 2010, no reply has been received. SHPD has been provided a copy of the Draft EA and is expected to confirm the determination of no historic properties present. The Final EA will include a letter from SHPD, if provided. In the unlikely event that historic resources, including artifacts, human skeletal remains, lava tubes, or similar features, are encountered during future development activities within the project site, work in the immediate area of the discovery will be halted and SHPD contacted as outlined in Hawai‘i Administrative Rules 13§13-275-12.

3.2.3 Cultural Resources

Existing Environment

The project site is located in the *ahupua‘a* of Kukuihaele, between the *ahupua‘a* of Lalakea to the west and Kanahonua to the east, in the district or *moku* of Hāmākua.

According to a model developed by Kirch (1985), the Settlement or Colonization period of Hawai‘i occurred between A.D. 300-600, with colonists possibly from the southern Marquesas Islands. Early Hawaiian farmers developed new subsistence strategies during this period, adapting familiar patterns and traditional tools for use in their new environment. Order was kept through adherence to their ancient and ingrained philosophy of life and through the principle of genealogical seniority. According to Fornander (1969), Hawaiians brought from their homeland a variety of Polynesian customs including the major gods of Kane, Ku and Lono; the *kapu* system of law and order; *pu‘uhonua* or places of refuge or asylum; the *‘aumakua* concept of a family or ancestral spirit; and the concept of *mana*, or spiritual power.

The Development Period, which lasted from A.D. 600-1100, brought changes that included an evolution of traditional tools as well as some distinctly Hawaiian inventions. The evolution of the adze was an example of the former, while the latter included the two-piece fishhook and the octopus-lure breadloaf sinker. Another invention was the *lei niho palaoa*, an item worn by those of high rank that represented a trend toward greater status differentiation.

The Expansion Period, from A.D. 1100 to 1650, saw major socioeconomic changes including an increase in social stratification. It also was a time of expansive settling, with the development of the most favorable windward areas as well as more marginal areas on the island’s leeward side. This was the time of the greatest population growth, as large irrigated field systems were developed and expanded into more arid areas. *Loko* or fishpond aquaculture also flourished during this period. The second major migration to Hawai‘i also occurred during the Expansion Period, with the settlers for this expansion coming from Tahiti in the Society Islands.

The concept of the *ahupua‘a* was established during the A.D. 1400s (Kirch 1985), adding another component to an already well-stratified society. This land unit became the equivalent of a local community, with its own social, economic, and political significance. *Ahupua‘a* were ruled by *ali‘i ‘ai ahupua‘a* or lesser chiefs; who, for the most part, had complete autonomy over this generally economically self-supporting piece of land, which was managed by a *konohiki*. *Ahupua‘a* were usually wedge or pie-shaped, incorporating all of the ecozones from the mountains to the sea and for several hundred yards beyond the shore, assuring a diverse subsistence resource base.

An increase in warfare marked the Proto-Historic Period (A.D. 1650-1795), both locally and between islands. Archaeological evidence and oral traditions indicate substantial changes to the political system during the Proto-Historic Period.

Cordy (1994) developed a settlement model for Hāmākua using a variety of early historic records and accounts, which probably applies to the Kukuihaele area as well. The model posited four basic zones: the seashore, seaward upland slopes, *‘ohi‘a-koa* forest, and gulches. The shoreline, which in most places is just a pile or rubble at the base of the cliff, was used to gather marine resources and fish. *Ahupua‘a* boundary markers in the form of *ahu* (stone cairns) were placed on the shore.

Kukuihaele was also the gateway to Waipi‘o Valley, which is associated with several of the most prominent of the Hawaiian *ali‘i*. According to Fornander (1969), Waipi‘o had associations with at

least nine successive rulers of Hawai‘i Island spanning the period from roughly AD 1460 to 1620. Prior to that, the valley was the base for powerful rulers dating back to at least the AD 1200s (Cartwright 1933). The front of the valley, inland of the sand dunes, was the royal residential area and also contained a variety of *heiau* (Kamakau 1961). Another *heiau* appears to have been located above the eastern rim of the valley in the neighboring Lalakea Ahupua‘a. Stokes and Dye (1991) described the Hokuwelowelo Heiau:

> Heiau of Hokuwelowelo, land of Lalakea, Waipi‘o, Hāmākua. Lalakea benchmark is at the north edge of the structure. The heiau is a small pen near the edge of the sea cliff, overlooking the mouth of Waipi‘o valley. Its elevation is 900 feet. It is about 150 feet from the road and the same distance from the edges of the sea cliff and Waipi‘o valley cliff.
>
> This heiau is said to have been “built by the gods” and was the place where the famous Kihapu was guarded until it was stolen by the thief-dog, Puapualenalena from Puako. The tradition of this affair is widely known (Stokes and Dye 1991:162).

Like all the area between Hilo and Kohala, the cliffs, steep valleys and streams in Hāmākua presented major obstacles to foot travel in traditional times. According to Cordy (1994), the *ahupua‘a* in Hāmākua were probably centered on the main drainages and the boundaries typically followed natural features such as ridges and drainages The many small *ahupua‘a* along the coast probably arose because land units became divided in the lower elevation areas where traditional agriculture and settlement were concentrated. Smaller units of land, the *ili*, which like *ahupua‘a* were oriented perpendicular to the shoreline and provided access to a diverse range of natural resources, were significant for their association with the *‘ohana* as the family land holding unit, an important social element in the traditional Hawaiian land use system. King David Kalakaua (1972) described the region between Hilo and Waipio as follows:

> “In the time of Līloa [c. 1400s], and later, this plateau was thickly populated, and requiring no irrigation, was cultivated from the sea to the line of frost. A few kalo patches are still seen, and bananas grow, as of old, in secluded spots and along the banks of the ravines; but the broad acres are green with cane, and the whistle of the sugar cane-mill is heard above the roar of the surf…(1972:284).”

Hawai‘i’s history took a sharp turn on January 18, 1778 with the arrival of British Capt. James Cook in the islands. On a return trip to Hawai‘i ten months later, Kamehameha visited Cook aboard his ship the *Resolution* off the east coast of Maui and helped Cook navigate his way to Hawai‘i Island. Cook exchanged gifts with Kalaniopu‘u at Kealakekua Bay the following January, and Cook left Kealakekua in February. However, Cook’s ship then sustained damage to a mast in a severe storm off Kohala and returned to Kealakekua, setting the stage for his death on the shores of the bay (Kuykendall and Day 1976).

Two American vessels visited Hawaiian waters in 1790. The crew of one of the ships, the *Eleanor*, massacred more than 100 Hawaiians at Olowalu on Maui before leaving crewmember John Young on land. The other vessel, the *Fair American*, was captured off the western coast of Hawai‘i and its

entire crew – with the exception of Isaac Davis – was killed. Kamehameha did not take part but kept the *Fair American* as part of his fleet. Young eventually made his way to Hawai‘i Island where he became governor, living at Kawaihae.

By 1796, Kamehameha had conquered every island kingdom except Kauai, but it wasn’t until 1810, after Kaumuali‘i of Kauai pledged his allegiance to Kamehameha, that all of the Hawaiian Islands were unified under a single ruler. During this period there was a continuation of the trend toward intensification of agriculture, *ali‘i*-controlled aquaculture, settling of upland areas and development of traditional of oral history. The Ku cult, *luakini heiau* and *kapu* system were at their peaks, but the influence of western civilization was being felt in the introduction of trade for profit and a market-system economy. By 1810, the sandalwood trade established by Europeans and Americans twenty years earlier was flourishing. That contributed to the breakdown of the traditional subsistence system, as farmers and fishermen were required to toil at logging which resulted in food shortages and a decline in population.

The earliest historical reference to the Waipi‘o area comes from the journals of Captain James Cook (Beaglehole 1967). The Journals described an exchange in 1778 of food for goods from Cook’s vessels moored a half-mile offshore. It wasn’t until 1823 that missionaries would first venture into the valley, where they counted 265 houses (Ellis 1963).

Following the death of Kamehameha I in 1819, the relaxing of customary *kapu* took place. But with the introduction of Christianity shortly thereafter, his successor, Kamehameha II, renounced the traditional religion and ordered that *heiau* structures either be destroyed or left to deteriorate. The family worship of *‘aumakua* images was allowed to continue.

The Protestant missionaries who arrived from Boston in 1820 soon were rewarded with land and government positions, as many of the *ali‘i* were eager to assimilate western-style dress and culture. But at the same time, the continuing sandalwood trade was becoming a heavier burden on commoners.

The rampant sandalwood trade resulted in the first Hawaiian national debt, as promissory notes and levies granted by American traders were enforced by American warships. The assimilation of Western ways continued with the short-lived whaling industry to the production of sugar cane, which was more lucrative but carried a heavy environmental price. Sugar cane had long been grown on all islands, and when Cook arrived he wrote of seeing sugar cane plantations. The Chinese on Lāna‘i are credited with producing the first commercial sugar, as early as 1802. However, it was not until 1835 that sugar became established commercially, replacing the waning sandalwood industry.

In 1848, the traditional Hawaiian land tenure system was changed by what is commonly known as the *Māhele,* or division The *Māhele* defined the land interests of Kamehameha III (the King), the high-ranking chiefs, and the *konohiki*. As a result of the *Māhele,* all land in the Kingdom of Hawai‘i came to be placed in one of three categories: a) Crown Lands (for the occupant of the throne); b) Government Lands; and c) *Konohiki* Lands. Laws enacted at the time of the *Māhele* record that ownership rights to all lands in the kingdom were “subject to the rights of the native tenants”; those

individuals who lived on the land and worked it for their subsistence and the welfare of the chiefs. By 1850 laws were enacted under which commoners could also own land (*kuleana*) if they could prove that they actually occupied those lands. The *Māhele* paved the way for land to be sold to foreigners. Kukuihaele was retained by Lunalilo; the project site is within a property that is a several-times subdivided portion of a former Royal Patent Grant (Grant No. 929:1). No Land Commission Award (LCA) for a *kuleana* was recorded in or adjacent to the project site.

Commercial cultivation of sugar in the project area began in 1876 when the Honokaʻa Sugar Plantation which planted 500 acres several miles to the east of the project site. Its mill was the first in the Hāmākua area. As elsewhere in Hāmākua, the steep slopes and numerous gulches posed significant challenges for growing and transporting sugar cane. The company was reorganized in 1878 as Honokaʻa Sugar Company under the guidance of F.A. Schaefer, who would serve as its president for 40 years. In 1879, Schaefer created the Pacific Sugar Mill in Kukuihaele, which ground its own cane until 1913, when financial difficulties resulted in the selling of its mill and the establishment of an agreement with Honokaʻa Sugar Company for the milling of its cane.

Pacific Sugar planted land that ranged from 300 to 1,900 feet in elevation and extended four miles along the coast from Honokaʻa to Waipio Valley. The mill was the site of the ill-fated introduction of the mongoose to Hawaiʻi; W.H. Purvis, who is listed by some published sources as one of the founders of Pacific Sugar, imported the animal from India and Africa in 1883 in an attempt to control rat populations. The mill also experimented with diversifying crops in areas unsuitable for cane production, importing in 1895 the seeds for *cañaigre* or tanners' dock, which is a source of tannin for the production of leather.

Like many plantations, Pacific Sugar kept a small herd of cattle; unlike the others it also had more than 600 head of sheep, which allowed it to provide free mutton for employees. Similar to other plantations, the initial work force consisted of Hawaiians and Chinese, with the later introduction of Japanese, Portuguese, Spaniards, Puerto Rican, Korean and Filipino employees both as day laborers and contract workers. Cane was delivered by flumes to a four-mile-long railroad traversing the plantation from its western end to Honokaʻa in the east. Pacific Sugar Mill also had a wire rope landing to load sugar bags onto steamers. Water for the flumes came from a diversion of Hiʻilawe Stream, and the mill also had water rights to Lalakea Stream and Kukuihaele Valley Stream. The Pacific Sugar Mill was formally dissolved when it became the Kukuihaele Division of Honokaʻa Sugar Company in 1928.

The traditional main trail in Hāmākua paralleling the coast between 0.3 and 1.3 miles inland would come to be known in historic times as the Alanui Aupuni or the Government Road. This became the path for much of the Old Māmalahoa Highway. The project site is located along Mud Lane, a *mauka-makai* roadway that formerly connected the town of Kukuihaele with State Highway 19, also known as the Hawaiʻi Belt Road, which straightened out but also includes portions of the Old Māmalahoa Highway .

The origins of Mud Lane are not clearly understood. One early account of trails in the area come from the journal of the Reverend William Ellis, an English missionary who visited Hawai‘i in the early 1820s. Ellis and three other missionaries traveled along the Hāmākua coast in 1823. As they reached Kapulena, which is located approximately three miles east of the project site, the group split up with Ellis and Asa Thurston continuing into Waipi‘o Valley and the Reverend Artemas Bishop and Joseph Goodrich heading inland to Waimea. According to Ellis, the *mauka* travelers "... passed over a pleasant country, gently undulated with hill and dale. The soil was fertile, the vegetation flourishing, and there was considerable cultivation, though but few inhabitants" (Ellis 1917:265). Other accounts refer to other trails that apparently traveled in the vicinity of the Mud Land corridor. What is known is that Mud Lane Road was maintained by Hāmākua Sugar Company, which closed in 1994 (Pacific Legacy 2007).

In 1978, Honoka‘a Sugar merged with Laupahoehoe Sugar Company, a T.H. Davies Company plantation, and was renamed Davis Hāmākua Plantation. It later was purchased by Francis Morgan and renamed Hāmākua Sugar Company, which filed for bankruptcy in 1994.

Cultural Resources and Practices on the Project Site

The small property that makes up the project site does not appear to have any significance in the cultural history of the area. It was probably part of land farmed by pre-Contact Hawaiians and then planted in sugar cane before being developed for water system infrastructure and completely cleared and fenced in. As discussed in the previous section, no archaeological remains are present. The context of the project site is an existing water supply reservoir and well pad on a small lot surrounded by private agriculturally-zoned property. The vegetation is managed landscaping within a fenced facility and does not contain the quality and quantity of plant resources that would be important for native gathering. Furthermore, no caves, springs, *pu‘u* (hills), native forest groves, other gathering resources or other natural features are present on or near the project site. The project site does not support any traditional resource uses, nor are there any Hawaiian customary and traditional rights or practices known to be associated with the property. In summary, it would appear that no known valuable natural, cultural or historical resources are present.

As part of the current study an effort was made to obtain information about any potential traditional cultural properties and associated practices that might be present or have taken place in this area of Hāmākua. The Office of Hawaiian Affairs was contacted by letter. To date, no one has provided any information on cultural sites or practices that would be affected by the Project.

Impacts and Mitigation Measures

Although there are no indications so far from field survey, literature review or consultation with State Historic Preservation Division or the Office of Hawaiian Affairs that there are any traditional cultural properties or practices on or near the project site, various parties are being supplied a copy of the EA in order to help finalize this finding.

As it currently appears that no resources or practices of a potential traditional cultural nature (i.e., landform, vegetation, etc.) appear to be present on or near the project site, and there is no evidence of any traditional gathering uses or other cultural practices, the proposed conversion of the exploratory well into a production well would not likely impact any culturally valued resources or cultural practices.

3.3 Infrastructure

3.3.1 Utilities

Existing Facilities and Services and Impacts

The Project will require single-phase electrical service from Hawai‘i Electric Light Company (HELCO) to power the well control systems and related support equipment. The generator is needed to power the well pump and RO plant, as they require 3-phase power, which is not available from HELCO. The facility will include Hawaiian Telcom service to provide connection for DWS’s alarm system. Service will be extended from the existing telephone system in the adjacent Kukuihaele Village. The Project would not have any affect on existing utilities in any way.

3.3.2 Roadways

Existing Facilities, Impacts and Mitigation Measures

Mud Lane, a two-lane unpaved road maintained by the County of Hawai‘i, will continue to provide access to the project site for maintenance of the reservoir and well (see Figures 1-5).

The proposed action would require construction vehicles to access the project site during a period of several months for hauling fill and materials and building the control building and other facilities. That may cause very temporary delays on State Highway 240 but the impact will be minimal. Operationally, removing the need for at least 10 water trucks daily will improve traffic on State Highway 240 and within Honoka‘a, where the water is currently supplied.

3.4 Secondary and Cumulative Impacts

The Project will not involve any secondary or cumulative impacts, such as population changes or effects on public facilities, because it simply fulfills the mandate of the Department of Water Supply to provide high-quality service to its customers in existing service areas. Although the Project would provide some short-term construction jobs, these would almost certainly be filled by local residents and would not induce in-migration.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. The adverse effects of the Project – very minor and temporary disturbance to air quality, noise, visual quality during construction – are very limited in severity, nature and geographic scale.

At the current time, according to review files at the Planning Department, review of projects in the OEQC *Environmental Notice*, and other sources, the following projects are occurring in this area of Hāmākua:

- *Kapulena Well Development – Phase 1.* As discussed previously, this well is currently being drilled at TMK 4-7-002:035, located at an elevation of 1,033 feet approximately 3.4 miles east of the project site, under the authority of the county Department of Water Supply. If it is proven to provide sufficient quantity and quality of water it is anticipated to be the primary source of water for the Kukuihaele/Kapulena water system. Current plans also call for construction of a 300,000-gallon reservoir at the Kapulena well site, in the vicinity of an existing 50,000-gallon reservoir that will remain in use as a component of the system.
- *County of Hawai‘i agriculture park.* The County in late 2009 proposed to create an agriculture park on 10 parcels totaling 1,739 acres in the Kapulena area. The property was acquired by the county along with other parcels in the early 1990s from the bankrupt Hāmākua Sugar Co. in lieu of back taxes. The agriculture park would likely be made available to prospective farmers through a permitting system as opposed to leases, and is anticipated to eventually be served by irrigation water from the Lower Hāmākua Ditch**}**
- *Mud Lane property acquisition and road improvement.* In 2005 Waimea 660, LLC acquired 660 acres of county-owned land along the eastern side of Mud Lane, approximately 1.5 miles mauka of the project site near Lalakea Reservoir. The company has improved a portion of Mud Lane between the property and Highway 19, which leads to Waimea. It is not currently clear what plans Waimea 660 has for the property, which carries Ag-40a (minimum lot size of 40 acres) and is *mauka* of and would not be served by the Kukuihaele/Kapulena water system. Access to this property is from Waimea and not past the well site.

The Kapulena Well project is designed as a component of the Kukuihaele/Kapulena water system and as such is complementary to the Project. Because of their distance from the project site and their scale and nature, none of these projects has the type of impacts that would combine with those of the Kukuihaele Well project in such a way as to produce adverse cumulative effects.

3.5 Required Permits and Approvals

The following permits and approvals may be required:

- Hawai‘i County Building Division Approval and Building Permit
- Hawai‘i State Commission on Water Resources Management Well Construction Permit and Pump Installation Permit

All new public water system sources must be approved the Director of Health prior to their use. Approval is based primarily upon submission of a satisfactory engineering report that addresses the requirements in Hawai‘i Administrative Rules section 11-20-29. Approval authority for projects owned by DWS is generally delegated to them, but a reverse osmosis may require separate approval by the Director of Health. DWS will continue to coordinate with DOH regarding these approvals.

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai‘i State Plan

The Hawai‘i State Plan was adopted in 1978. It was revised in 1986 and again in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended). The Plan establishes a set of goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The three themes that express the basic purpose of the Hawai‘i State Plan are individual and family self-sufficiency, social and economic mobility and community or social well-being. The proposed project would promote these goals by modernizing and improving water service for the Hāmākua district.

The sections of the Hawai‘i State Plan most relevant to the proposed project are centered on the theme of facility systems. The following objectives and policies are taken from the section dealing with water development.

- Objective a): Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational and other needs within resource capacities.
- Objective b: To achieve the facility systems water objective, it shall be the policy of this State to:
    - (1) Coordinate development of land use activities with existing and potential water supply.
    - (2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.
    - (3) Reclaim and encourage the productive use of runoff water and wastewater discharges.
    - (4) Assist in improving the quality, efficiency, service and storage capabilities of water systems for domestic and agricultural use.
    - (5) Support water supply services to areas experiencing critical water problems.
    - (6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.

The proposed project supports all relevant objectives and policies of the Hawai‘i State Plan related to water facilities.

3.6.2 State and County Land Use Designations

State Land Use Districts. All land in the State of Hawai‘i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission, pursuant to Chapter 205, HRS. The project site is within the State Land Use Agricultural District.

Hawai‘i County General Plan Land Use Pattern Allocation Guide (LUPAG). The LUPAG map component of the General Plan is a graphic representation of the Plan’s goals, policies, and standards as well as of the physical relationship between land uses. It also establishes the basic urban and non-urban form for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors. The project site is classified as Important Agricultural Lands in the LUPAG.

Hawai‘i County Zoning. The parcel is zoned for Agriculture.

As the Project is a public purpose use, it would be consistent with all these designations. Because of constraints on the small lot, a property line setback variance will be required in order to accommodate the fuel tank. DWS will coordinate with the Planning Department concerning the variance.

3.6.3 Hawai‘i County General Plan

The General Plan for the County of Hawai‘i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The plan was adopted by ordinance in 1989 and revised in 2005 (Hawai‘i County Planning Department). The General Plan itself is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai‘i. Most relevant to the proposed project are the following Goal and Policies, and Courses of Action:

PUBLIC UTILITIES

Goals
(a) Ensure that properly regulated, adequate, efficient and dependable public and private utility services are available to users.
(b) Maximize efficiency and economy in the provision of public utility services.
(c) Design public utility facilities to fit into their surroundings or concealed from public view.

Policies
(a) Public utility facilities shall be designed to complement adjacent land uses and shall be operated to minimize pollution or disturbance.
(b) Provide utilities and service facilities that minimize total cost to the public and effectively service the needs of the community.
(c) Utility facilities shall be designed to minimize conflict with the natural environment and natural resources.
(d) Improvement of existing utility services shall be encouraged to meet the needs of users.
(f) Develop short and long-range capital improvement programs and plans for public utilities within its jurisdiction that are consistent with the General Plan.

PUBLIC UTILITIES – WATER

Policies
(a) Water system improvements shall correlate with the County's desired land use development system.
(b) All water systems shall be designed and built to Department of Water Supply standards.
(c) Improve and replace inadequate systems.
(e) Water system improvements should be first installed in areas that have established needs and characteristics, such as occupied dwellings, agricultural operations and other uses, or in areas adjacent to them if there is need for urban expansion.

Standards
(a) Public and private water systems shall meet the requirements of the Department of Water Supply and the Subdivision Control Code.

Courses of Action – Hāmākua
(a) Continue to coordinate programs with State and Federal agencies to develop a well at Kukuihaele and Honokaa Hospital to the standards of the Department of Water Supply.
(b) Replace old, sub-standard, or deteriorating lines and storage facilities.
(c) Investigate groundwater sources in the Honokaa and Kukuihaele areas.

Discussion: The proposed project satisfies relevant policies, standards and courses of action related to water systems in the Hāmākua District.

Note: A more specific and up-to-date guide for the ability of local infrastructure projects to conform with the desired location and character of development will be the Hāmākua Community Development Plan (CDP), which encompasses the judicial districts of Hāmākua and North Hilo, as well as Rural South Hilo, which extends from Pauka‘a northwards. Community Development Plans are intended to translate broad General Plan Goals, Policies, and Standards into implementation actions as they apply to specific geographical regions around the County. CDPs are also intended to serve as a forum for community input into land-use, delivery of government services and any other matters relating to the planning area. Hāmākua is currently undergoing the early, community readiness phase of the process.

3.6.4 Hawai‘i Water Plan

The *Hawai‘i Water Plan* includes plans dealing with water resource protection, water quality, and development plans related to each individual county, to State projects, and to agricultural water systems. The most relevant plans for this discussion are the *Hawai‘i State Water Resources Development Plan* (Hawai‘i DLNR 1980), the *Water Resources Protection Plan* (Hawai‘i State CWRM 1992), the *State Water Projects Plan, Volume 2, Island of Hawai‘i* (Hawai‘i State Commission on Water Resources Management 2003) and the individual water use and development plans prepared for each county.

The purpose of the *Hawai‘i State Water Resources Development Plan* is to set forth specific objectives, policies, programs and projects to guide State and county governments. In summary, this plan presents guidelines for development of water resources for municipal, agricultural and industrial requirements; preservation of ecological, recreational, and aesthetic values and quality; and regulation of the use of water to assure adequate supplies for the future. The Project would develop a municipal water source in a rational manner to improve drinking water quality, assure adequate water for planned growth and would not adversely affect ecological, recreational or aesthetic values. The Project is thus consistent with the basic guidelines of the plan.

In particular, the following objectives are noteworthy:

Objective A. Assure adequate municipal water supplies for planned urban growth.
Objective B. Support long-range municipal water supply planning by the counties.
Objective C. Promote municipal water conservation.
Objective D. Improve drinking water quality.
Objective E. Upgrade rural water systems.

The Project supports and/or is not inconsistent with each objective of the plan.

The *Water Resources Protection Plan* inventoried the water resources of the State, determined their sustainable yields based on available data, and recommended means of conserving and augmenting these resources. As discussed in Section 3.1.2, because there is no recognized current or foreseeable threat of exceeding sustainable levels of withdrawal from the Honoka‘a Aquifer System, it has not declared a Groundwater Management Area by the State Commission on Water Resources Management.

The primary objective of the *State Water Projects Plan, Volume 2, Island of Hawai‘i* (SWPP) is to provide a framework for the planning and implementation of water development strategy for future State projects. As discussed in Section 3.1.3, the SWPP recognizes the need for only a limited number of projects related to public schools in Honoka‘a. All told, the demand of new State projects to the year 2020 on sources within the Honoka‘a Aquifer System is anticipated to be 0.00881 mgd. The Project does not affect in any way the ability of these projects to be implemented.

3.6.5 Hawai‘i County Water Use and Development Plan

The *Hawai‘i County Water Use and Development Plan* (HCWUDP) (Hawai‘i County DWS 1989) is the most recent Hawai‘i County water plan to be formally adopted by DWS and CWRM. A draft update to the plan was prepared in 2006 and a final version of the update was prepared but has not been formally adopted. The Plan is meant to aid CWRM in granting permits for water use and designating water management areas, as well as serving as a reference document of current and future water resource conditions. The HCWUDP includes an inventory of existing water uses and developments by hydrologic units, addresses future land uses and water needs, and is consistent with State and County land and water policies. This plan also guides DWS in future operations

and in identifying the improvements and facilities required to continue to provide safe, affordable and reliable water service to the island of Hawai‘i in a sustainable and financially secure manner.

The draft *Hawai‘i County Water Use and Development Plan Update* provides scenarios of low, medium, and high growth rates and estimates the public water needs for all and portions of the island for various years in the future. Common to all scenarios in all areas is a steadily increasing demand for water. The plan calculated that if all land uses currently envisioned within the East Mauna Kea Aquifer Sector (which includes the Honoka‘a Aquifer System along with the Paauilo, Hakalau and Onomea Aquifer Systems) under the current zoning General Plan’s Land Use Pattern Allocation Guide Map were to be developed (a process which might take a century or more to occur), water demand would be 8.2 mgd for all urban uses, but 380.0 mgd at a minimum for agricultural uses. This is compared to a sustainable yield of only 388 mgd in the sector. Even tallying only currently zoned uses, about 378 mgd would be needed, depending on to what extent agriculture used water. A key assumption in these calculations is that all agriculture would be heavily irrigated, an assumption that is highly unlikely for Hāmākua both for reasons of water need and water availability.

A much more realistic calculation combines historical growth rates with the availability of zoned land. Under this method, in the nearer term (2025), demand in the East Mauna Kea Aquifer Sector under the medium growth scenario, including agricultural uses, would be between 15.3 and 16.6 mgd, depending on low, medium or high growth scenarios, less than five percent of sustainable yield.

The Project would be consistent with the HCWUDPU in that it provides a source of water for an existing community that is currently importing water via truck from Honoka‘a. It is important to note that the HCWUDPU serves as a guide for CWRM, DWS, the Hawai‘i County Planning Department, and other State and County agencies in the decision-making process regarding water resources and future land uses. It is not meant to be definitive in setting water allocations, or projecting the amount of future development. Instead, the plan serves to alert decision makers that in some instances current LUPAG designations and zoning classifications cannot be supported with existing water resources.

3.7 Federal “Cross-Cutter” Authorities

The following sub-sections address the proposed project’s relationship to other federal “crosscutting” environmental, economic, social, and miscellaneous federal authorities as required by the State of Hawai‘i’s Drinking Water State Revolving Fund (DWSRF) program.

3.7.1 Archeological and Historic Preservation Act (16 U.S.C. § 469a-1) and National Historic Preservation Act (16 U.S.C. § 470)

As discussed in Section 3.2.2, the general area has been cultivated, grazed or used for residences for over a hundred years and has thus experienced intensive grubbing and grading. The State Historic Preservation Division (SHPD) was requested by letter as part of EA for the exploration well to

concur with the determination that no historic properties are present and that the Project would have no effect on historic properties. By letter of June 3, 1999 (see Appendix 2), SHPD provided this concurrence. SHPD has again been provided the opportunity to review the action and is expected to repeat this concurrence. Consequently, the proposed action is in compliance with these regulations.

3.7.2 Clean Air Act As Amended (42 USC 7401, et seq.)

As discussed in Section 3.1.4, air quality at the project site is good. The site is within an air quality attainment area as defined by the State of Hawai‘i Department of Health in its EPA-approved Air Quality program. Minor grading and excavation will include plans to minimize fugitive dust through watering and planting as soon as feasible. Diesel-powered construction equipment will be used to grade the site. Emissions from the diesel will slightly degrade air quality for the short period of time they are in operation. However, all applicable emission and ambient air quality standards will continue to be met. Normal operation of the well will not produce on-site air emissions, will not alter air flow in the vicinity, and will have no other measurable effect on the area’s micro-climate. Consequently, the Project complies with the provision of the Clean Air Act.

3.7.3 Coastal Barriers Resource Act, 16 U.S.C. 3501

The Coastal Barrier Resources Act designated various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resources System. No coastal barriers are present in the State of Hawai‘i, and the Project is not inconsistent with the Coastal Barriers Resource Act.

3.7.4 Coastal Zone Management Act, 16 U.S.C.1456(c)(1)

The Hawai’i Coastal Zone Management (CZM) Program was established in 1977 through the adoption of the Coastal Zone Management Act, incorporated in Chapter 205A HRS. Projects with federal involvement significantly affecting areas under jurisdiction of the State CZM Agency may be required to undergo review for consistency with the State’s approved coastal program. The entire State of Hawai‘i is included in the coastal zone for such purposes. The CZM objectives are outlined as follows.

- Recreational Resources. Provide coastal recreational opportunities accessible to the public.
- Historic Resources. Protect, preserve, and, where desirable, restore those natural, man-made historic, and pre-historic resources in the CZM area that are significant in Hawaiian and American history and culture.
- Scenic and Open Space Resources. Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
- Coastal Ecosystems. Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.
- Economic Use. Provide public or private facilities and improvements important to the State’s economy in suitable locations.

- Coastal Hazards. Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.
- Managing Development. Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
- Public Participation. Stimulate public awareness, education, and participation in coastal management, and maintain a public advisory body to identify coastal management problems and provide policy advice and assistance to the CZM program.
- Beach Protection. Protect beaches for public use and recreation; locate new structures inland from the shoreline setback to conserve open space and minimize loss of improvements due to erosion.
- Marine Resources: Implement the state's ocean resources management plan.

The project site is a minimum of one-half mile from the shoreline and there are no streams connecting the project site to the sea. The DWS has evaluated the Project and believes that it does not impact coastal zone resources and is consistent with the objectives of the program. The Hawai'i CZM Program is not authorized to provide federal consistency reviews for Safe Drinking Water Act State Revolving Funds projects. However, in accordance with consultation with the Hawai'i CZM Program, this EA has been submitted by DWS to the Hawai'i CZM Program for general review.

3.7.5 Endangered Species Act, 16 U.S.C. 1536(a)(2) and (4)

The Endangered Species Act (16 U.S.C. §§ 1531-1544, December 28, 1973, as amended 1976-1982, 1984 and 1988) provides broad protection for species of plants and animals that are listed as threatened or endangered in the U.S. or elsewhere. The Act mandates that federal agencies seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species, and contains exceptions and exemptions.

Existing biota on and near the project site are discussed in Section 3.1.3 of this EA. There are no known rare or endangered plant species on or immediately around the project site. Terrestrial vertebrates listed as threatened or endangered may be present in this part of Hāmākua and may overfly, roost, nest, or utilize resources here, including the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater (*Puffinus auricularis newelli*). No temporary or permanent lighting or erect structures such as poles are planned, and therefore no impacts to listed seabirds are anticipated. The scattered low-statured trees in the area do not appear to be conducive to providing nesting sites for Hawaiian Hawks. However, it is conceivable that the shrubby vegetation may serve as roosts for Hawaiian hoary bats.

The U.S. Fish and Wildlife Service was consulted by letter on June 1, 2010, and replied on July 2, 2010 (see Appendix 3). The letter included proposed mitigation measures, including proposed

contract conditions that would require the contractor to refrain from activities that disturb or remove the vegetation during critical pupping months for the Hawaiian hoary bat, from May 15 to August 15 of each year. The Service noted that these measures were appropriate, but added the following:

> The only other species that should be addressed during your environmental review is the Blackburn's sphinx moth. As this area is within the historical range for Blackburn's sphinx moth and because the proposed project site likely has favorable conditions for its host plants, we recommend that you survey the site for the presence of Blackburn's sphinx moth and its host plants. Blackburn's sphinx moth non-native host plants include: *Nicotiana glauca* (tree tobacco), *Nicotiana tabacum* (commercial tobacco), *Solanum melongena* (eggplant), *Lycopersicon esculentum* (tomato), and possibly *Datura stramonium* (Jimson weed). The full range of the taxa that Blackburn's sphinx moth larvae may feed on is not known. However, larvae of a close relative of Blackburn's sphinx moth, *Manduca sexta*, feed on a wide variety of taxa in the Solanaceae family including: *Capsicum* (sweet and chili pepper), *Cestrum* (ornamental plants), *Cymphomandra* (tomatillo), *Datura* (Jimson weed, loco weed), *Lycium* (ornamental plants used for Chinese herbal medicines), *Lycopersicum* (tomato), *Petunia* (petunia), *Physalis* (tomatillo and ground cherry), *Solandra* (ornamental vines) and *Solanum* (potato, eggplant, Christmas cherry, nightshade). If Blackburn's sphinx moths or caterpillars, or their host plants are found on the site, we recommend that you contact our office for further assistance.

Inspection of the site determined that there were no members of the Solanaceae family, including any mentioned in the letter, on the site. The project will have no effect on threatened or endangered species or critical habitat for such, and it is in compliance with the Endangered Species Act.

3.7.6 Environmental Justice, Executive Order 12898

The Environmental Justice Executive Order was issued in 1994 for the purpose of protecting low income and minority residents of the United States from disproportionate exposure to environmental and health hazards. As discussed in Section 3.2.1, Hāmākua exhibits a median household income that is only slightly lower than the Countywide average and a poverty level that is somewhat lower. Minorities make up approximately 78 percent of the population, which is somewhat higher than that of the County as a whole. The purpose of the proposed well is to provide residents of Kukuihaele with an adequate water source that conforms to State and federal standards. The Project will not have adverse secondary environmental, economic, or social impacts, as discussed in Section 3.2.1. Moreover, the State and federal regulations regarding safe drinking water are applicable to all water systems in Hawai‘i, irrespective of the economic or demographic characteristics of their residents. Thus, the proposed Project complies with this Executive Order.

3.7.7 Farmland Policy Protection Act, 7 U.S.C. 4202(8)

The Farmland Protection Policy Act (FPPA) (Public Law 97-98, Sec. 1539-1549) requires identification of proposed actions that would affect any lands classified as prime and unique farmlands. Agencies must consider alternative actions that could reduce adverse effects and ensure that their programs, to the extent practicable, are compatible with State, local government and private programs and policies to protect farmland. The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) has national leadership for administering the FPPA.

"Farmland," as used in the FPPA and applied to the State of Hawai'i, includes Agricultural Lands of Importance in the State of Hawai'i (ALISH), a system in which the State Department of Agriculture classifies lands into three categories: 1) Prime Agricultural Land, (2) Unique Agricultural Land, and (3) Other Important Agricultural Land. The well site is classified as Prime Agricultural Land on ALISH maps. Because the well site involves the use of 0.275 acres of Prime Agricultural Land and might use funding assistance from a federal agency, the proposed action is subject to the FPPA.

The area that would be affected is a small fraction of the agricultural land in the area. There is currently no agricultural use of the land, which is one a small site that has been completely graded and fenced in for an existing reservoir and exploratory well pad. The Project will not impact continued agricultural use of surrounding properties. The Project is intended to serve residents of Hāmākua, many of whom are engaged in agriculture. The DWS has determined that the Project appears to be in compliance with the FPPA and has distributed the Draft EA to the U.S. NRCS for comment.

3.7.8 Floodplain Management Act, 42 U.S.C., 4321, and Executive Order 11988, Floodplain Management (24 May 1977)

The Floodplain Management Act deals with critical action inside designated floodplains, and Executive Order 11988 requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy of the floodplain, and to avoid direct and indirect support of floodplain development where there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains."

The project site is not within a designated floodplain and it is consistent with EO 11988 and the Floodplain Management Act.

3.7.9 Protection of Wetlands, Executive Order No. 11990 & Exec. Order No. 12608, and Clean Water Act, as Amended (33 USC 1251 et seq.)

It has been determined through fieldwork and confirmed through consultation with the U.S. Army Corps of Engineers and maps from the U.S. Fish and Wildlife Service that no wetlands or other waters of the U.S. are present on the site (see email of June 10, 2010, in Appendix 1a). Therefore, implementation of the Project would not involve the discharge of dredged or fill materials into waters of the United States. The Project would thus be in compliance with the Clean Water Act, Section 404(b)(1) Guidelines. None of the proposed construction materials would be expected to contain any contaminants.

As discussed in Section 3.1.2, because the Project does not involve significant dewatering and less than an acre of ground surface will be disturbed, no National Pollutant Discharge Elimination System (NPDES) permit pursuant to Section 402 of the Clean Water Act will be required. Nevertheless, as part of County regulations, the contractor will prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) that properly manage storm water runoff, the SWPPP through appropriate best management practices (BMPs).

3.7.10 Safe Drinking Water Act, 42 U.S.C., 300H-3(E)

The Safe Drinking Water Act (SDWA) is the principal federal law that ensures the quality of Americans' drinking water. Under the SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. The SWDA requires that all public water systems meet stringent water quality standards. These standards cover a long list of potential chemical, radiological and biological contaminants. The standards distinguish between surface water and groundwater sources, with the testing and monitoring requirements for surface water being far greater than those for groundwater sources.

The well improvements will assist DWS in maintaining the compliance of the Kukuihaele Water System with the standards mandated pursuant to the SDWA. Testing of the water from the well will be undertaken by the County of Hawai‘i before it is connected to the system to ensure that the water is consistent with all State of Hawai‘i and federal standards for potable water.

The Safe Drinking Water Act is also the authority for regulatory protection of principal or sole source aquifers. Specifically, once a sole source aquifer is designated, commitments for federal assistance must ensure that projects will not contaminate the aquifer through a recharge zone so as to create a significant hazard to public health.

As identified by the U.S. Environmental Protection Agency, Region IX groundwater Office (http://www.epa.gov/safewater/sourcewater/pubs/qrg_ssamap_reg9.pdf) (checked May 2010), there are only two sole source aquifers in Hawai‘i. They are the Southern O‘ahu Basal Aquifer on the Island of O‘ahu and the Moloka‘i Aquifer on the island of Moloka‘i. There are no sole source aquifers on the Island of Hawai‘i. The Project will therefore not affect sole source aquifers.

3.7.11 Wild and Scenic Rivers Act, 15 U.S.C. 1271-1287

The Act makes it the national policy that certain rivers of the U.S which, along with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition. There are no designated Wild and Scenic Rivers in the State of Hawai‘i at this time. Consequently, the Project is consistent with the provisions of the Wild and Scenic Rivers Act.

3.7.12 Demonstration Cities and Metropolitan Development Act of 1966, Pub.L. 89-754, as Amended (42 USC § 3331)

To demonstrate compliance with this Act, the Hawai‘i State Department of Health requires DWSRF assistance recipients to describe a proposed project’s effect on local development plans. Section 3.6 of this EA addresses this requirement by discussing the Project’s full consistency with the Hawai‘i State Plan and the County of Hawai‘i General Plan.

3.7.13 Administration of the Clean Air Act and the Water Pollution Control Act with Respect to Federal Contracts or Loans (Executive Order 11738)

Executive Order 11738, entitled “Administration of the Clean Air Act and the Water Pollution Control Act with respect to federal Contracts or Loans,” prohibits the provision of Federal assistance to facilities that are not in compliance with either the Clean Water Act or the Clean Air Act unless the purpose of the assistance is to remedy the cause of the violation. As discussed in Sections 4.2.1.2 and 3.2.2, the Kukuihaele Well project will comply with applicable provisions of the Clean Air Act and Clean Water Act. Consequently, it is consistent with the intent of this Executive Order.

3.7.14 Procurement Prohibitions (Executive Order 11738, Section 306 of the Clean Air Act)

This Executive Order requires recipients of federal assistance to certify that they will not procure goods, services or materials from suppliers who are on the EPA’s list of Clean Air Act violators. DWS will comply with this requirement in selecting contractors, construction materials, and other services for the Kukuihaele Well project.

3.7.15 Procurement Prohibitions (Section 508 of the Clean Water Act)

This Executive Order requires recipients of federal assistance to certify that they will not procure goods, services or materials from suppliers who are on the EPA’s list of Clean Water Act violators. DWS will comply with this requirement in selecting contractors, construction materials, and other services for the Kukuihaele Well project.

3.7.16 Social Policy Authorities

For any Drinking Water State Revolving Fund Loan, the applicant, in this case the County of Hawai‘i, is also required to certify that it has complied, or will comply with, the following federal social policy authorities. This information is required to be contained in an Environmental Assessment, if one is applicable for the Project.

- **Age Discrimination Act of 1975 (42 USC § 6102).** This Act stipulates that no person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. DWS will comply with this requirement in hiring contractors and other staff for the Project.
- **Civil Rights Act of 1964, Title VI (42 USC §2000(d)).** This Act stipulates that no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. DWS will comply with this requirement in hiring contractors and other staff for the Project.
- **Equal Employment Opportunity (Executive Order 11246, as amended).** This Executive Order requires all recipients of federal contracts to include certain non-discrimination and “affirmative action” provisions in all contracts. The provisions commit the contractor or subcontractor to maintain a policy of non-discrimination in the treatment of employees, to make this policy known to employees, and to recruit, hire and train employees without regard to race, color, sex, religion and national origin. DWS will include these provisions in all contracts for the Project.
- **Minority Business Enterprise Development, Executive Order 12432**. This executive order sets forth in more detail the responsibilities of federal agencies for the monitoring, maintaining of data and reporting of the use of minority enterprises. DWS will comply with all such requirements for all contracts for the Project.
- **National Program for Minority Business Enterprise, Executive Order 11625**. This Executive Order directs federal agencies to promote and encourage the use of minority business enterprises in projects utilizing federal funds. DWS will comply with all such requirements for all contracts for the Project.
- **National Women’s Business Enterprise Policy and National Program for Women's Business Enterprise, Executive Order 12138**. This Executive Order directs each department or agency empowered to extend federal financial assistance to any program or activity to issue regulations requiring the recipient of such assistance to take appropriate affirmative action in support of women’s business enterprises and to prohibit actions or policies which discriminate against women's business enterprises on the grounds of sex. DWS will comply with all the Executive Order for the Project.
- **Rehabilitation Act of 1973, 29 USC 794**. This Act mandates that no otherwise qualified handicapped individual in the United States shall, solely by reason of his handicap, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. DWS will comply with the Act for all contracts for the Project.

- **Small Business Administration Reauthorization and Amendment Act of 1998, Pub. L. 100-590, Section 129**. This Amendment directs federal agencies to promote and encourage the use of small business enterprises in projects utilizing federal funds. DWS will comply with the Act for all contracts for the Project.
- **Department of Veterans Affairs and Housing and Urban Development, and Agencies Appropriations Act, 1993, Pub. L. 102-389**. This Act requires the Administrator of the Environmental Protection Agency, to the fullest extent possible, ensure that at least 8 per cent of federal funding for prime and subcontracts awarded in support of authorized programs, including grants, loans and contracts for wastewater treatment and for leaking under ground storage tanks, be made available to businesses or other organizations owned or controlled by socially and economically disadvantaged individuals (within the meaning of Section 8(a)(5) and (6) of the Small Business Act (15 USC 637(a)(5) and (6)), including historically black colleges and universities. For purposes of this section, economically and socially disadvantaged individuals shall be deemed to include women..." DWS will comply with the Act for the Project.
- **Disadvantaged Business Enterprise Rule, 2008, 40 CFR Part 33**. This Rule sets forth in detail the responsibilities of entities receiving an identified loan under a financial assistance agreement capitalizing a revolving loan fund, for the monitoring, maintaining of data and reporting of the use of disadvantaged business enterprises (DBEs). The Applicant is required to comply with 40 CFR Part 33, entitled "Participation by Disadvantaged Business Enterprises in Procurement Under Environmental Protection Agency (EPA) Financial Assistance Agreements" and ensure that all contracts funded by a DWSRF loan include a term or condition requiring compliance with 40 CFR Part 33. The Applicant is required not to discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Applicant shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the Applicant to carry out these requirements is a material breach of this contract, which may result in the termination of the contract or other legally available remedies. DWS will comply with the Rule for all contracts for the Project.

PART 4: DETERMINATION

The County of Hawai‘i, Department of Water Supply, has preliminarily determined that the Project will not significantly alter the environment, as impacts will be minimal, and intends to issue a Finding of No Significant Impact (FONSI). This determination will be reviewed based on comments to the Draft EA, and the Final EA will present the final determination.

PART 5: FINDINGS AND REASONS

Chapter 11-200-12, Hawai‘i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources*. No valuable natural or cultural resources would be committed or lost. The surrounding area is largely agricultural, with residential areas that would directly benefit from the Project.
2. *The proposed project will not curtail the range of beneficial uses of the environment*. The Project expands and in no way curtails beneficial uses of the environment.
3. *The proposed project will not conflict with the State's long-term environmental policies*. The State’s long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The Project is minor, environmentally beneficial, and fulfills aspects of these policies calling for an improved social environment. It is thus consistent with all elements of the State’s long-term environmental policies.
4. *The proposed project will not substantially affect the economic or social welfare of the community or State*. The Project would not have any adverse effect on the economic or social welfare of the County or State, and would improve the water system infrastructure of Hāmākua.
5. *The proposed project does not substantially affect public health in any detrimental way*. The facility would promote public health and safety by improving a water source for Hāmākua, and would thereby enhance the quality of water service.
6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities*. No secondary effects are expected to result from the Project, which would simply improve water system facilities for an existing service area and would not induce in-migration or affect public facilities.
7. *The proposed project will not involve a substantial degradation of environmental quality*. The Project is minor and environmentally benign, and would thus not contribute to environmental degradation.
8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat*. The majority of the project site has been graded and contains a reservoir and well pad and otherwise supports overwhelmingly alien vegetation. Impacts to rare, threatened or endangered species of flora would not occur. Impacts to wide-ranging endangered fauna are being avoided through project design, in coordination with the U.S. Fish and Wildlife Service.

9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions*. The Project is not related to other activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions.

10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on these resources would occur. Mitigation of construction-phase impacts would preserve water quality. Ambient noise impacts due to construction will be temporary and restricted to daytime hours, and no noise-sensitive uses are within the limited area that would be affected by noise from the generator.

11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area*. Although the Project is located in an area with seismic risk, the entire Island of Hawai‘i shares this risk. The Project is not imprudent to construct and will employ design and construction standards appropriate to the seismic zone and soil setting.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies*. No scenic vistas or viewplanes would be adversely affected by the Project.

13. *The project will not require substantial energy consumption.* The construction and operation of the well would require minimal consumption of energy. No adverse effects would be expected.

REFERENCES

Beaglehole, J. *The Journals of Captain James Cook on His Voyages of Discovery*. London: The Hakluyt Society. (Edited from the original manuscripts by J. Beaglehole)

Cartwright, B. 1933. Some Aliis of the Migratory Period. *Bishop Museum Occasional Papers* 10(7). B.P. Honolulu: Bishop Museum Press.

Cordy, R. 1994. *A Regional Synthesis of Hāmākua District, Island of Hawaii*. Historic Preservation Division, Department of Land & Natural Resources, State of Hawai‘i, Honolulu.

Ellis. W. 1963. *The Journal of William Ellis, Narrative of a Tour of Hawai‘i, of Owhyee*. Honolulu: Advertiser Publishing Co.

Fornander, A. 1969. *An Account of the Polynesian Race: Its Origin and Migrations*. Rutland, VT: Charles E. Tuttle Company.

Gagne, W., and L. Cuddihy. 1990. “Vegetation,” pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds., *Manual of the Flowering Plants of Hawai‘i*. 2 vols. Honolulu: University of Hawai‘i Press.

Handy, E.S.C., and E. Handy (with M.K. Pukui). 1972. *Native Planters in Old Hawai‘i*. B.P. Bishop Museum Bulletin 233. Honolulu: Bishop Museum Press.

Hawai‘i County Planning Department. 2005. *The General Plan, County of Hawai‘i*. Hilo.

Hawai‘i County Department of Water Supply (DWS). 1989. *Hawai‘i County Water Use and Development Plan.*

_____. 2006. *Hawai‘i County Water Use and Development Plan Update (Draft).*

_____. 2009. *Final Environmental Assessment, Kapulena Well and Reservoir.* Prep. by Plan Pacific for DWS.

Hawai‘i State Commission on Water Resources Management (CWRM). 1990. *Draft Hawai‘i Stream Assessment: A Preliminary Appraisal of Hawai‘i’s Stream Resources*. Prep. for CWRM by Hawai‘i Cooperative Park Service Unit. Honolulu: National Park Service.

Heliker, C. 1990. *Volcanic and Seismic Hazards on the Island of Hawai‘i*. Washington: U.S. GPO.

Honoka‘a Sugar Company History. Hawaiian Sugar Planters’ Association Plantation Archives. 1989. University of Hawai‘i at Manoa Library Hawaiian Collection

Kalakaua, D. 1972. *The Legends and Myths of Hawaii.* Tokyo: Charles E. Tuttle Company, Inc.

Kamakau, S. 1961. *Ruling Chiefs of Hawai‘i*. Honolulu: The Kamehameha Schools Press.

Kirch, P. 1985. *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory*. Honolulu: University of Hawai‘i Press.

Kuykendall, R., and A. Day. 1976. *Hawaii: A History From Polynesian Kingdom to American Statehood*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Pacific Legacy. 2007. *Archaeological Inventory Survey of the Mud Lane Corridor, Ahupua‘a of Waiko‘eko‘e, District of Hāmākua, Island Of Hawai‘i*. Prep. for Waipio 660 LLC.

Pacific Sugar Mill History. Hawaiian Sugar Planters’ Association Plantation Archives. 1989. University of Hawai‘i at Manoa Library Hawaiian Collection

Pukui, M. 1983. ‘Olelo Noeau, Hawaiian Proverbs & Poetical Sayings. *B.P. Bishop Museum Special Publication* 71. Honolulu: Bishop Museum Press.

Stokes, J., and T. Dye. 1991. *Heiau of the Island of Hawai‘i: A Historic Survey of the Native Hawaiian Temple Sites.* Bishop Museum Bulletin in Anthropology 2. Honolulu: Bishop Museum Press.

U.S. Dept. of Commerce, Bureau of the Census. 2001. http://factfinder.census.gov/.

U.S. Soil Conservation Service. 1973. *Soil Survey of Island of Hawai‘i, State of Hawai‘i.* Washington: U.S.D.A. Soil Conservation Service.

University of Hawai‘i at Hilo, Dept. of Geography. 1998. *Atlas of Hawai‘i*. 3rd ed. Honolulu: University of Hawai‘i Press.

U.S. Fish and Wildlife Service (USFWS). 2010. USFWS Threatened and Endangered Species System (TESS). Washington: GPO. http://ecos.fws.gov/tess_public/StartTESS.do

Wolfe, E.W., and J. Morris. 1996. *Geologic Map of the Island of Hawai‘i.* USGS Misc. Investigations Series Map i-2524-A. Washington, D.C.: U.S. Geological Survey.

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ENVIRONMENTAL ASSESSMENT

Kukuihaele Production Well
And Supporting Facilities
(State Well 6734-03)

APPENDIX 1a
Comments in Response to Early Consultation

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William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-8865

June 2, 2010

Mr. Ron Terry
Geometrician Associates
P. O. Box 396
Hilo, HI 96721

Dear Mr. Terry:

Subject: Early Consultation on Environmental Assessment for Kukuihaele Production Well and Supporting Facilities, Hāmākua District, Island of Hawai'i; TMK (3rd) 4-8-008:026

Staff, upon reviewing the provided documents and visiting the proposed site, does not anticipate any significant impact to traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Captain Mitchell Kanehailua, Commander of the Hāmākua District, at 775-7533.

Sincerely,

DEREK D. PACHECO
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

lli

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EMD / CWB

06038PMT.10

June 14, 2010

Mr. Ron Terry
Principal
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessments for Kukuihaele Production Well and Supporting Facilities TMK (3rd.) 4-8-008:026 Hamakua District, Island of Hawaii, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), has reviewed the subject document dated May 28, 2010, and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for the discharge of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

a. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.

b. Hydrotesting water effluent.

c. Well Drilling Activities.

You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

3. For types of wastewater not listed in Item 2 above or wastewater discharging into Class 1 or Class AA waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

4. The operation of the fuel storage tank for the onsite diesel generator shall comply with the Spill Prevention, Control and Countermeasure (SPCC) Rule of 40 CFR 112.

5. Please note that all discharges related to the project construction or operation activities, whether or not a NPDES permit coverage is required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

MT:ml

c: DOH - EPO # I-3207 [via email only]

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

STP 8.0135

June 17, 2010

Mr. Ron Terry
Principal
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

Subject: Kukuihaele Production Well and Supporting Facilities
Early Consultation for Draft Environmental Assessment (DEA)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT understands that the Hawaii County, Department of Water Supply (DWS), plans to convert the Kukuihaele exploratory well to a production well. The well is located on the site of an existing DWS reservoir 3,000 feet mauka of Honokaa-Waipio Road (State Highway Route 240).

Given the project's location, DOT does not anticiapte any significant, adverse impacts to its transportation facilties.

DOT appreciates the opportunity to provide comments. If there are any other questions, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

Francis Paul Keeno

for BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

William P. Kenoi
Mayor

William T. Takaba
Managing Director

Lono A. Tyson
Director

Ivan M. Torigoe
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai'i 96720
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http://co.hawaii.hi.us/directory/dir_envmng.htm

June 21, 2010

Mr. Ron Terry
Principal
GEOMETRICIAN ASSOCIATES, LLC
P. O. Box 396
Hilo, HI 96721

RE: Early Consultation on Environmental Assessment for Kukuihaele Production Well and Supporting Facilities, TMK: 4-8-008:026, Hāmākua District, Island of Hawai'i

Dear Mr. Terry,

We have no comments to offer on the subject project.

Thank you for allowing us to review and comment on this project.

Best Regards and Aloha,

Lono A. Tyson
DIRECTOR

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:
EPO-I-3207

July 14, 2010

Mr. Ron Terry, Principal
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessments for
Kukuihaele Production Well and Supporting Facilities
TMK: (3) 4-8-008:026
Hamakua District, Island of Hawaii, Hawaii

Thank you for allowing us to review and comment on the subject application. The application was routed to the various branches of the Environmental Health Administration. We have the following Solid & Hazardous Waste Branch and General comments.

Solid & Hazardous Waste Branch

The document mentions that a fuel storage tank will be installed in the project area. It is unclear whether the fuel tank storage is an underground or an aboveground tank.

The state regulations require a permit prior to the installation and operation of an underground storage tank (UST) and that the UST system must have secondary containment. Refer to Chapter 11-281, Subchapter 2-5 of the Hawaii Administrative Rules.

Copies of the state regulations are found on DOH's website at:
www.hawaii.gov/health/environmental/waste/ust

If you have any questions, please call Roxanne Kwan at 586-4226.

General

We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

The same website also features a Healthy Community Design Smart Growth Checklist (Checklist). The Hawaii State Department of Health, Built Environment Working Group, recommends that State and county planning departments, developers, planners, engineers and other interested parties apply the healthy built environment principles in the Checklist whenever they plan or review new developments or redevelopments projects. We also ask you to share this list with others to increase community awareness on healthy community design.

If there are any questions about these comments please contact the Environmental Planning Office at 586-4337.

Sincerley,

Genevieve Salmonson

GENEVIEVE SALMONSON, Acting Manager
Environmental Planning Office

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
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P.O.BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EMD/SDWB

July 15, 2010

Mr. Ron Terry, Principal
Geometrician Associates, LLC
P. O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

SUBJECT: PUBLIC WATER SYSTEM NO. 133, DWS KUKUIHAELE EARLY CONSULTATION REQUEST FOR ENVIRONMENTAL ASSESSMENT FOR KUKUIHAELE PRODUCTION WELL AND SUPPORTING FACILITIES, TMK (3rd) 4-8-008:026 HAMAKUA DISTRICT, ISLAND OF HAWAII

We are in receipt of the above referenced document and offer the following comments:

1. Projects that propose development of new sources of drinking water serving or proposed to serve a public water system must comply with the terms of the Hawaii Administrative Rules (HAR), section 11-20-29. This section requires that all new public water system sources be approved by the Director of Health prior to its use. Such approval is based primarily upon the submission of a satisfactory engineering report which addresses the requirements set in section 11-20-29.

   The engineering report must identify all potential sources of contamination and evaluate alternative control measures which could be implemented to reduce or eliminate the potential for contamination, including treatment of the water source. In addition, water quality analyses for all regulated contaminants, performed by a laboratory certified by the State Laboratories Division of the State of Hawaii, must be submitted as part of the report to demonstrate compliance with all drinking water standards. Additional parameters may be required by the Director for this submittal or additional tests required upon his or her review of the information submitted.

2. All new, proposed public water system sources must undergo a source water assessment which will delineate a source water protection area. This process is preliminary to the creation of a source water protection plan for that source and activities which will take place to protect the drinking water source.

3. Projects proposing to develop new public water systems or proposing substantial modifications to existing public water systems must receive approval by the Director of Health prior to construction of the proposed system or modification. These projects include treatment, storage and distribution systems of public water systems.

4. Although the approval authority for projects owned and operated by a County Board or Department of Water or Water Supply has been delegated to them, projects involving treatment technologies like reverse osmosis may require a separate pilot study and report approved by the Director of Health.

5. This environmental assessment must address the early-2007 water quality testing of this well that found lead concentrations above the regulatory action level.

Should you have any questions, please contact Michael Miyahira of the Safe Drinking Water Branch, Engineering Section, at 586-4258.

Sincerely,

STUART YAMADA, P.E., CHIEF
Safe Drinking Water Branch
Environmental Management Division

MM:cb

c: Theresa McGeehan-Takiue, EHS, East Hawaii

----- Original Message -----
From: "Klein, Amy S POH" <Amy.S.Klein@usace.army.mil>
To: <rterry@hawaii.rr.com>
Sent: Thursday, June 10, 2010 12:24 PM
Subject: POH-2010-00151 Kukuihaele Production Well

Dear Mr. Terry:

We have received your pre-application request regarding the Department of the Army to review and comment on the Kukuihaele Production Well and Supporting Facilities, draft Environmental Assessment and Section 404 Consultation, Hamakua District, Island of Hawaii, Hawaii. We have assigned the project the reference number POH-2010-00151. Please cite the reference number in any correspondence with us concerning this project. I have completed my review of the submitted document and have the following comments:

Section 10 of the Rivers and Harbors Act (Section 10) of 1899 requires that a Department of the Army (DA) permit be obtained from the U.S. Army Corps of Engineers (Corps) prior to undertaking any construction, dredging, and other activities occurring in, over, or under navigable waters of the U.S. Section 404 of the Clean Water Act (Section 404) of 1972 (33 U.S.C. 1344) requires that a DA permit be obtained for the discharge (placement) of dredge and/or fill material into waters of the U.S., including wetlands.

Based on our review of the information provided, it appears that no navigable waters of the U.S. are present within the project area. As such, authorization under Section 10 of the Rivers and Harbors Act does not appear to be required for the proposed project. According to the document submitted, there are no streams, wetlands, ponds, or other waterbodies present in the project area. You requested that the Corps concur with your determination. If you are confident that there are no potentially jurisdictional waterbodies present at the project site, concurrence from our office is not required. If you seek official concurrence with your statement that no fill in waters of the U.S. will occur, you will need to submit additional information for our review.

Please conduct an aquatic resource inventory and submit it to the Corps so we may determine if waters of the U.S. are present on the site. The inventory should record any drainage features, streams, ditches, gulches, wetlands, etc., since these features may be jurisdictional waterbodies subject to Section 404 regulations. Note that regulated waterbodies may be natural, human-altered, or human-made and have permanent, intermittent, or ephemeral flow. Wetland delineations must be conducted in accordance with the Corps of Engineers 1987 Wetland Delineation Manual and approved data sheets submitted to the Corps. Information regarding the physical, chemical, and biological characteristics of each aquatic resource should also be documented. The aquatic resource inventory should be conducted by a qualified biologist. Please include a map of the waterbodies, flow paths, and site photographs of areas proposed for impact.

Once an aquatic resource inventory is conducted and submitted to our office, we can then determine what, if any, regulations may apply to potential work.

Thank you for contacting us regarding this project. We look forward to working with you on this project as well as any future projects. Should you have any questions, please do not hesitate to call or e-mail me.

Best Regards,

Amy

Amy Klein
Project Manager
U.S. Army Corps of Engineers - Honolulu District
Regulatory Program, Building 230
Fort Shafter, Hawaii 96858
phone: (808) 438-7023
fax: (808) 438-4060

Please assist us in better serving you! Please complete the customer survey by clicking on the following link:
http://per2.nwp.usace.army.mil/survey.html

ENVIRONMENTAL ASSESSMENT

Kukuihaele Production Well
And Supporting Facilities
(State Well 6734-03)

APPENDIX 2
SHPD Correspondence

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geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 fax: (866) 316-6988 PO Box 396 Hilo Hawaii 96721
rterry@hawaii.rr.com

June 1, 2010

Nancy McMahon, Deputy SHPO
Kākuhihewa Building, Room 555
601 Kamokila Blvd
Kapolei, HI 96707

Dear Ms. McMahon:

Subject: Early Consultation for Environmental Assessment for Kukuihaele Production Well and Supporting Facilities, TMK (3rd.) 4-8-008:026, Hamakua District, Island of Hawai'i

I am in the process of preparing a Draft Environmental Assessment (DEA) for a proposed County of Hawai'i activity, in compliance with Chapter 343, Hawai'i Revised Statutes, and Title 11, Chapter 200, Hawai'i Administrative Rules. The County of Hawai'i, Department of Water Supply (DWS), plans to convert the Kukuihaele exploratory well, which was the subject of an Environmental Assessment (EA) in 2000, to a production well. The well is located on the site of an existing DWS reservoir mauka of State Highway 270 in Kukuihaele, Hamakua District (see map and photo below). DWS may seek Safe Drinking Water Act State Revolving Funds for the improvements, which involves addressing certain federal environmental laws and regulations in the EA.

Since the discontinuation of the former spring source in July 2007, the Kukuihaele water system has had to rely on hauling at least 10 water truckloads per day from Honoka'a District Park to the Kukuihaele Reservoir. The new well and associated facilities will be more cost-effective and energy efficient and will reduce traffic on the highway.

Site improvements will include a Tier 4 onsite diesel generator, fuel storage tank, control building, reverse-osmosis water treatment unit, chlorination facilities, well discharge piping, seepage pits, and drainage improvements. There have been several changes in the proposed project since 2000. The well water, which was found through testing to have elevated chloride levels, will be desalinated through a reverse-osmosis system, and the concentrate will be disposed of in onsite seepage pits. The Kukuihaele well may eventually become the system backup well if the Kapulena Well (currently in construction) is found to be able to provide water of sufficient quality and quantity for both Kapulena and Kukuihaele. Also, the electrical service from HELCO has been deleted and a generator has been added to reduce capital costs and provide for more flexibility for the disposition of the well in the future.

The potential for historic sites was reviewed once before as part of an EA for the exploratory well. At that time, in a letter of June 3, 1999 (copy attached), Marc Smith of your office reviewed the area and said:

> "We have no records of historic sites on the two parcels listed above [TMK 4-8-8:01 and 26]. It appears to us that the parcels are located on old sugarcane cropland, which would mean that there is a low probability of significant historic sites. We thus believe that the proposed well will have "no effect" on significant historic sites."

The area of disturbance for the project is confined within the existing fenced 12,000 square foot area and the adjacent road. This area was graded for use as a reservoir and well site. As shown in the photos, there are no rock features or other remains on the site that would appear to qualify as potential historic properties.

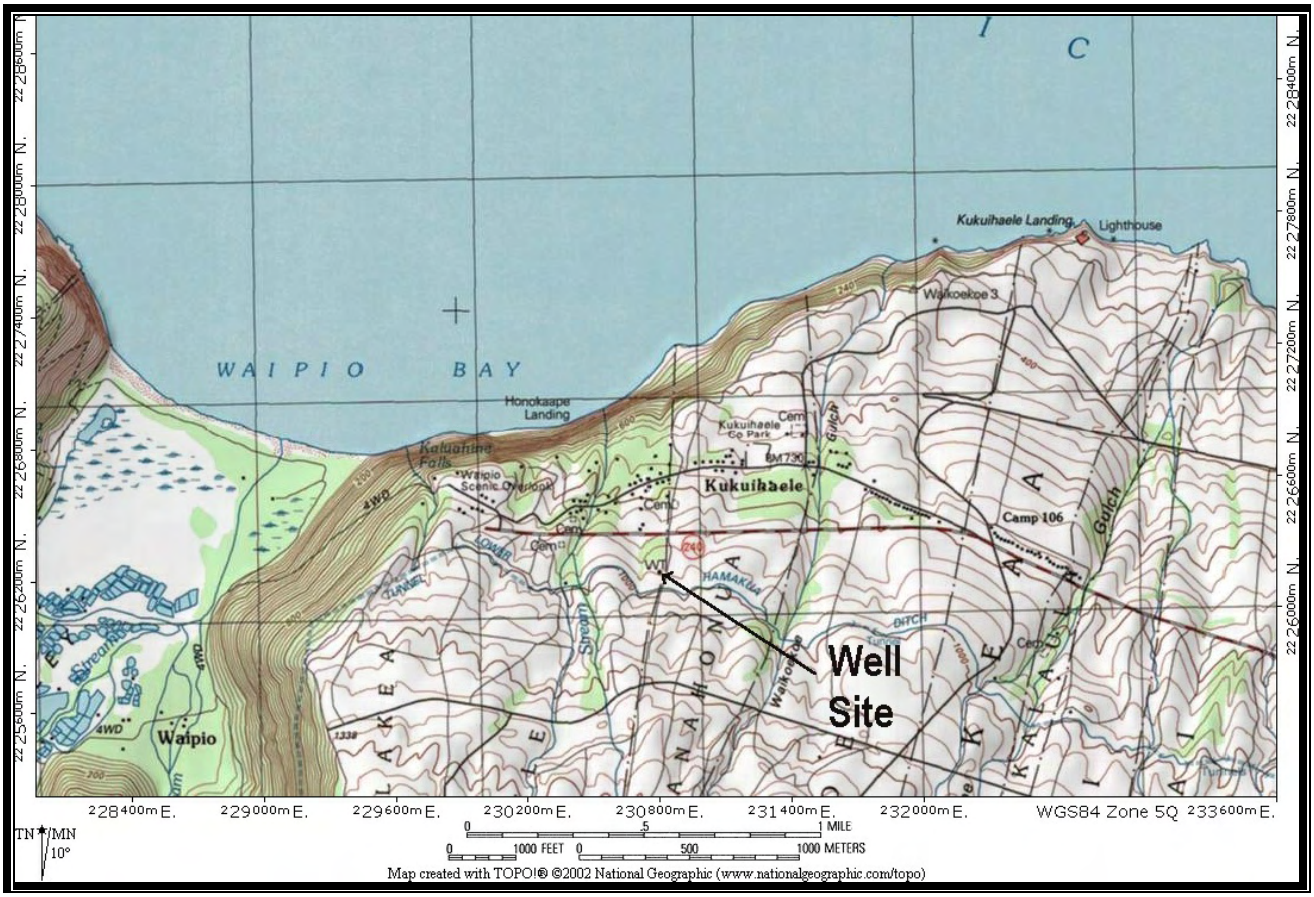
We seek your concurrence that the project would not affect historic properties, or, if you are unable to make that determination based on the information provided, your recommendation on additional information or reports needed to assess the effect on historic properties. We would be happy to provide any other additional information and/or accompany your personnel on an inspection of the site. Please contact me at 969-7090 if you have any questions or require clarification. Also, kindly indicate whether you wish to receive an EA when it is completed.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Attach: Map; photos; 6/3/99 SHPD letter
Cc: Kawika Uyehara, DWS


WAIPIO BAY
Kukuihaele Landing
Lighthouse
Waikoekoe 3
Honokaape Landing
Kukuihaele Co Park
Kukuihaele
Camp 106
Gulch
Kalualiine Falls
Waipio Scenic Overlook
TUNNEL
HAMAKUA
DITCH
Well Site
Waipio
4WD
Stream
228400m E.
229000m E.
229600m E.
230200m E.
230800m E.
231400m E.
232000m E.
WGS84 Zone 5Q
233600m E.
22 28600m N.
22 28000m N.
22 27400m N.
22 26800m N.
22 26200m N.
22 25600m N.
22 28400m N.
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TN
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0 1000 FEET 0 500 1000 METERS
Map created with TOPO!® ©2002 National Geographic (www.nationalgeographic.com/topo)

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWELO

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

June 3, 1999

Dr Marc M. Siah
Marc M. Siah & Associates, Inc.
810 Richards Street
Honolulu, Hawaii 96813

LOG NO: 23363
DOC NO: 9905PM07

Dear Dr. Siah:

SUBJECT: **Request for Information on Historic Sites**
Kukuihaele, Hamakua, Hawaii Island
TMK: 4-8-08:26 and 4-8-08:1

Thank you for your letter of April 20, 1999 and the opportunity to review and comment on the proposed exploratory well located at the above referenced location.

We have no records of historic sites on the two parcels listed above. It appears to us that the parcels are located on old sugarcane cropland, which would mean that there is a low probability of significant historic sites. We thus believe that the proposed well will have "no effect" on significant historic sites.

If you have any questions please contact Patrick McCoy (692-8029).

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

PM:amk

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ENVIRONMENTAL ASSESSMENT

Kukuihaele Production Well
And Supporting Facilities
(State Well 6734-03)

APPENDIX 3
U.S. Fish and Wildlife Service Correspondence

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geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 fax: (866) 316-6988 PO Box 396 Hilo Hawaii 96721
rterry@hawaii.rr.com

June 1, 2010

Loyal Mehrhoff, Ph.D., Supervisor
Pacific Island Ecoregion
U.S. Fish and Wildlife Service
300 Ala Moana Boulevard
Honolulu HI 96813

Dear Mr. Mehrhoff:

Subject: Early Consultation for Environmental Assessment and Request for USFWS Technical Assistance for Kukuihaele Production Well and Supporting Facilities, TMK (3rd.) 4-8-008:026, Hamakua District, Island of Hawai'i

I am in the process of preparing a Draft Environmental Assessment (DEA) for a proposed County of Hawai'i activity, in compliance with Chapter 343, Hawai'i Revised Statutes, and Title 11, Chapter 200, Hawai'i Administrative Rules. The County of Hawai'i, Department of Water Supply (DWS), plans to convert the Kukuihaele exploratory well, which was the subject of an Environmental Assessment (EA) in 2000, to a production well. The well is located on the site of an existing DWS reservoir mauka of State Highway 270 in Kukuihaele, Hamakua (see map and photo below). DWS may seek Safe Drinking Water Act State Revolving Funds for the improvements, which involves addressing certain federal environmental laws and regulations in the EA.

Since the discontinuation of the former spring source in July 2007, the Kukuihaele water system has had to rely on hauling at least 10 water truckloads per day from Honoka'a District Park to the Kukuihaele Reservoir. The new well and associated facilities will be more cost-effective and energy efficient and will reduce traffic on the highway. Site improvements will include a Tier 4 onsite diesel generator, fuel storage tank, control building, reverse-osmosis water treatment unit, chlorination facilities, well discharge piping, seepage pits, and drainage improvements. There have been several changes in the proposed project since 2000. The well water, which was found through testing to have elevated chloride levels, will be desalinated through a reverse-osmosis system, and the concentrate will be disposed of in onsite seepage pits. The Kukuihaele well may eventually become the system backup well if the Kapulena Well (currently in construction) is found to be able to provide water of sufficient quality and quantity for both Kapulena and Kukuihaele. Also, the electrical service from HELCO has been deleted and a generator has been added to reduce capital costs and provide for more flexibility for the disposition of the well in the future.

I inspected the proposed well site, which is a completely fenced, 12,000 square-foot property already in use as the site for a DWS reservoir, on May 31, 2010. The area of disturbance for the project is confined within the fenced area and the adjacent road. This area was graded for use as a reservoir and well site. The vegetation is managed and is composed of plant species used in landscaping and various weeds, as shown in the attached photos and in the table below. No streams, ponds, wetlands, native forest groves or other important habitat areas would be affected. Surrounding the site are weedy areas with the aforementioned trees as well as wild sugar cane, guava, and sourbush. Somewhat further back (a minimum of about 100 feet) are groves or scattered individuals of taller trees, especially Eucalpytus, silver oak, and ironwood.

It is recognized that listed terrestrial vertebrates may be present in this part of Hāmākua and may overfly, roost, nest, or utilize resources here, including the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater (*Puffinus auricularis newelli*). No temporary or permanent lighting or erect structures such as poles are planned, and therefore we do not anticipate any impacts to listed seabirds. As there do not appear to trees suitable for Hawaiian Hawk nesting on or immediately adjacent to the facility, and the area experiences regular disturbance from ongoing water hauling and agricultural activities in nearby properties, it would appear that impacts to Hawaiian Hawks would also not be likely.

The surface of the site is mostly covered with water supply facilities, grass, or gravel, but there are also some scattered olive trees, java plum trees, Christmas berry, and Formosan koa that were planted or left there for landscaping, as shown in the photos. It is conceivable that construction on the well site would require the removal of some of these landscaped trees. We recognize that there is at least some chance that some Hawaiian hoary bats may utilize the tall shrubs and medium-sized trees for roosts, although the reservoir site would not appear to be highly suitable habitat. If recommended by your agency, the project proponents are willing to commit to measures in order to avoid impacts to the bat, and will specifically refrain from activities that disturb or remove the vegetation during critical pupping months for the Hawaiian hoary bat, if, which we understand to be May 15 to August 15 of each year.

We would appreciate your comments on the information we have provided and input regarding any special environmental conditions or impacts related to the project, including a list of any threatened or endangered species or critical habitat that might be present and any further recommendations on mitigating for impacts. Please contact me at 969-7090 if you have any questions or require clarification. Kindly indicate whether you wish to receive an EA when it is completed.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Attach: Map; photos; species list table
Cc: Kawika Uyehara, DWS


WAIPIO BAY
Kukuihaele Landing
Lighthouse
Waikoekoe 3
Honokaope Landing
Kukuihaele
Camp 106
Gulch
Well Site
Waipio
4WD
TUNNEL
DITCH
Waikoekoe
HAMAKUA
228400m E.
229000m E.
229600m E.
230200m E.
230800m E.
231400m E.
232000m E.
WGS84 Zone 5Q
233600m E.
22 28600m N.
22 28000m N.
22 27400m N.
22 26800m N.
22 26200m N.
22 25600m N.
22 28400m N.
22 27800m N.
22 27200m N.
22 26600m N.
22 26000m N.
TN
MN
10°
0 .5 1 MILE
0 1000 FEET 0 500 1000 METERS
Map created with TOPO!® ©2002 National Geographic (www.nationalgeographic.com/topo)

List Of Plant Species At/Near Kukuihaele Well/Reservoir Enclosure

Scientific Name	Family	Common Name	Life Form	Status *
Acacia confusa	Fabaceae	Formosan koa	Tree	A
Ageratum conyzoides	Asteraceae	Maile honohono	Herb	A
Bidens pilosa	Asteraceae	Beggar's tick	Herb	A
Buddleja asiatica	Buddlejaceae	Dog tail	Shrub	A
Carica papaya	Caricaceae	Papaya	Tree	A
Casuarina equisetifolia	Casuarinaceae	Ironwood	Tree	A
Chamaecrista nictitans	Fabaceae	Partridge pea	Herb	A
Chamaesyce hirta	Euphorbiaceae	Garden spurge	Herb	A
Conyza bonariensis	Asteraceae	Hairy horseweed	Herb	A
Crassocephalum crepidoides	Asteraceae	Crassocephalum	Herb	A
Crotalaria sp.	Fabaceae	Rattlepod	Herb	A
Cuphea carthaginensis	Lythraceae	Tarweed	Shrub	A
Cynodon dactylon	Poaceae	Bermuda grass	Grass	A
Cyperus halpan	Cyperaceae	Nut grass	Sedge	A
Desmodium incanum	Fabaceae	Desmodium	Herb	A
Emilia sonchifolia	Asteraceae	Pualele	Herb	A
Eucalyptus robusta	Myrtaceae	Swamp mahogany	Tree	A
Grevillea robusta	Proteaceae	Silk oak	Tree	A
Mimosa pudica	Fabaceae	Sensitive plant	Herb	A
Olea europea	Oleaceae	Olive	Tree	A
Panicum maximum	Poaceae	Panicum	Herb	A
Paspalum conjugatum	Poaceae	Hilo grass	Grass	A
Plantago lanceolata	Plantaginaceae	Narrow-leaved plantain	Herb	A
Pluchea carolinensis	Asteraceae	Sourbush	Shrub	A
Psidium guajava	Myrtaceae	Guava	Tree	A
Saccharum officinarum	Poaceae	Sugar cane	Grass	A
Sacciolepis indica	Poaceae	Glenwood grass	Grass	A
Schinus terebinthifolius	Anacardiaceae	Christmas berry	Tree	A
Setaria gracilis	Poaceae	Yellow foxtail	Herb	A
Sida rhombifolia	Malvaceae	Cuba jute	Herb	A
Sonchus oleraceus	Asteraceae	Sow thistle	Herb	A
Stachytarpheta jamaicensis	Verbenaceae	Jamaica vervain	Shrub	A
Syzygium cumini	Myrtaceae	Java plum	Tree	A
Taraxacum officinale	Asteraceae	Dandelion	Herb	A
Waltheria indica	Sterculiaceae	ʻUhaloa	Herb	I

* A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2010-TA-0332

JUL 02 2010

Mr. Ron Terry
Geometritian Associates, LLC
P. O. Box 396
Hilo, Hawaii 96720

Subject: Early Coordination for a Draft Environmental Assessment for the Kukuihaele Production Well, Hawaii

Dear Mr. Terry:

We received your letter on June 4, 2010, requesting early coordination on a proposed production well located at Kukuihaele, on the island of Hawaii. The 12,000 square-foot site is completely fenced and had been previously graded; therefore, the site is now dominated by non-native vegetation. We concur with your assessment that the federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), Hawaiian petrel (*Pterodroma sandwichensis*), Hawaiian hawk (*Buteo solitarius*) and the threatened Newell's shearwater (*Puffinus aruicularis newelli*) may be found in the vicinity of the proposed project. In addition, according to data compiled by the Hawaii Biodiversity and Mapping Program, and the Hawaii GAP Program, Blackburn's sphinx moth (*Manduca blackburni*), may also be in the vicinity.

You state there will be no night lighting associated with this project and no trees suitable for Hawaiian hawk nests exist on the property; therefore, potential impacts to seabirds and hawks have been avoided. However, Hawaiian hoary bats roost in both exotic and native woody vegetation and leave their young unattended in "nursery" trees and shrubs when they forage. Tree removal during this critical period can result in harm to young bats. To minimize impacts to the Hawaiian hoary bat, you agreed to avoid removing or trimming woody plants greater than 15 feet in height during the bat birthing and pup rearing season (May 15 through August 15) and we thank you for including this measure in to your Draft Environmental Assessment.

The only other species that should be addressed during your environmental review is the Blackburn's sphinx moth. As this area is within the historical range for Blackburn's sphinx moth and because the proposed project site likely has favorable conditions for its host plants, we recommend that you survey the site for the presence of Blackburn's sphinx moth and its host plants. Blackburn's sphinx moth non-native host plants include: *Nicotiana glauca* (tree tobacco), *Nicotiana tabacum* (commercial tobacco), *Solanum melongena* (eggplant),

Lycopersicon esculentum (tomato), and possibly *Datura stramonium* (Jimson weed). The full range of the taxa that Blackburn's sphinx moth larvae may feed on is not known. However, larvae of a close relative of Blackburn's sphinx moth, *Manduca sexta,* feed on a wide variety of taxa in the Solanaceae family including: *Capsicum* (sweet and chili pepper), *Cestrum* (ornamental plants), *Cymphomandra* (tomatillo), *Datura* (jimson weed, loco weed), *Lycium* (ornamental plants used for Chinese herbal medicines), *Lycopersicum* (tomato), *Petunia* (petunia), *Physalis* (tomatillo and ground cherry), *Solandra* (ornamental vines) and *Solanum* (potato, eggplant, Christmas cherry, nightshade).

If Blackburn's sphinx moths or caterpillars, or their host plants are found on the site, we recommend that you contact our office for further assistance. If you have any questions regarding this letter, please contact Dr. Jeff Zimpfer, Fish and Wildlife Biologist, Consultation and Technical Assistance Program (phone: 808-792-9431; email: jeff_zimpfer@fws.gov).

Sincerely,

Loyal Mehrhoff
Field Supervisor

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ENVIRONMENTAL ASSESSMENT

Kukuihaele Production Well
And Supporting Facilities
(State Well 6734-03)

APPENDIX 4
Well Completion Report, 2008,
and Well Water Quality Laboratory Report, 2008

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BEYLIK DRILLING & PUMP SERVICE, INC.
91-259A OLAI STREET
KAPOLEI, HAWAII 96707
PH: (808) 682-5554 FAX: (808) 682-5866

LETTER OF TRANSMITTAL

DATE	JOB NO.
01/13/09	1526F
ATTENTION: RYAN IMATA	
RE: KUKUIHAELE WCR: PART I	
STATE WELL NO.: 6734-03	

TO
COMMISSION ON WATER RESOURCE MGMT
P.O. BOX 621
HONOLULU, HI 96809

WE ARE SENDING YOU XX Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			WELL COMPLETION REPORT: PART I-STATE WELL NO.: 6734-03

THESE ARE TRANSMITTED as checked below:

XX For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO C FILE/1526F

SIGNED: _____

If enclosures are not as noted, kindly notify us at once.

FRED G. CAMERO, JR.
PROJECT MANAGER

State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
WELL COMPLETION REPORT - PART I
Well Construction

For Official Use Only:

Instructions: Please print in ink or type and send completed report (with attachments, if applicable) to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. The Commission may not accept incomplete reports. This form shall be submitted within 60 days of the completion of work. For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the Regulation Branch at **587-0225**. For updates to this form or additional information, please visit our website at http://www.state.hi.us/dlnr/cwrm/

1. State Well No.: 6734-03 Well Name: Kukuihaele Deepwell Island: Hawaii
2. Address: 48-160 Mud Lane Road, Kukuihaele, HI 96727 Tax Map Key: 4-8-008:026
3. Drilling Company: Beylik Drilling & Pump Services, Inc.
4. Drilling method used during construction: ☐ Rotary ☐ Percussion ☐ Other (describe) N/A
5. Date Well Construction (drilled,cased,grouted) completed: N/A (month/day/year) **Attach Completed Driller's Log**
6. Was the subject well cored? ☐ Yes ☐ No N/A
7. Step-Drawdown Test completed? ☐ No ☒ Yes **Attach Step-Drawdown Test form (*12/17/97 SDPTD Form*)**
8. Constant Rate Aquifer Test completed? ☐ No ☒ Yes **Attach Constant Rate Aquifer Test form (*12/17/97 CRPTD Form*)**

Water Level Data: N/A	**Reference point elevation**	-	**Depth to water (feet)**	=	**Water Level ft. above mean sea level (see note below)**	**Date/time of measurement**
9. Initial encountered during drilling (this should also be filled in on the driller's log)	Ground = ft. msl					
10. Just prior to casing installation	Ground = ft. msl					
11. After casing installation (this information should be before any pump tests are performed with casing installed) Chloride: _____ ppm, Temperature: _____ °F	If this reference point is not the benchmark, the difference between the benchmark and this point is: _____ ft.					

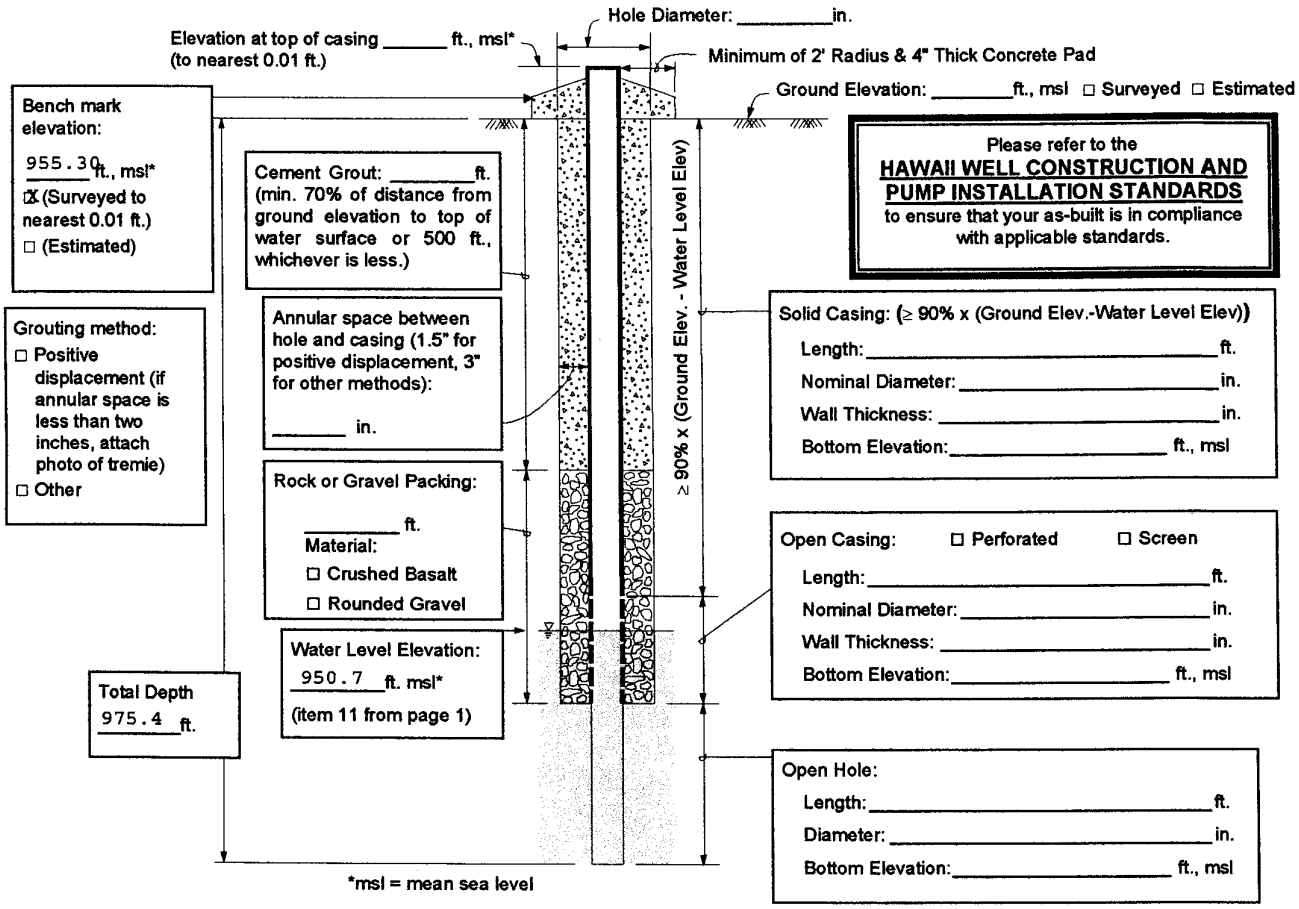
note: for all elevations referenced to mean sea level, take the ground elevation (surveyed or estimated if survey not required at this time) and subtract the depth to the water level.

12. **As-built section filled in completely** ☐ N/A
13. **Photograph of well and concrete pad showing benchmark on concrete pad attached** ☒
14. **GPS coordinates provided in degrees, minutes, seconds** ☐ N/A
15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)
16. Remarks: The proposed work was to modify the existing well. Beylik Drilling grout sealed the bottom 24.6' feet of the well. Well total depth is now 975.4' feet Completed Pump Test 7/25/08.

Licensed Driller (print) MURIS MITCHELL C-57 Lic. No. AC-21896

Signature [signature] Date 1-13-09

12. AS-BUILT WELL SECTION *(Please attach as-built if different from diagram provided below)*



Solid Casing Material:

Carbon Steel: compliant with (*check one or more*): ☐ ANSI/AWWA C200 ☐ API Spec. 5L ☐ ASTM A53 ☐ ASTM A139
And compliant with (*check one or more*): ☐ ASTM A242 or A606 ☐ Type E ☐ Type S ☐ Grade B ☐ Other
Stainless Steel: (*check one*): ☐ ASTM A409 (production wells) ☐ ASTM A312 (monitor wells)
ABS Plastic conforming to ASTM F480 and ASTM D1527: (*check one*) ☐ Schedule 40 ☐ Schedule 80
PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (*check one*): ☐ Schedule 40 ☐ Schedule 80 ☐ Schedule 120
Thermoset Plastic: (*check one*)
☐ Filament Wound Resin Pipe conforming to ASTM D2996
☐ Centrifugally Cast Resin Pipe conforming to ASTM D2997
☐ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
☐ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
☐ PTFE Fluorocarbon Tubing conforming to ASTM D3296
☐ FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:

Carbon Steel: compliant with (*check one or more*): ☐ ANSI/AWWA C200 ☐ API Spec. 5L ☐ ASTM A53 ☐ ASTM A139
And compliant with (*check one or more*): ☐ ASTM A242 or A606 ☐ Type E ☐ Type S ☐ Grade B ☐ Other
Stainless Steel: (*check one*): ☐ ASTM A409 (production wells) ☐ ASTM A312 (monitor wells)
ABS Plastic conforming to ASTM F480 and ASTM D1527: (*check one*) ☐ Schedule 40 ☐ Schedule 80
PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (*check one*): ☐ Schedule 40 ☐ Schedule 80 ☐ Schedule 120
Thermoset Plastic: (*check one*)
☐ Filament Wound Resin Pipe conforming to ASTM D2996
☐ Centrifugally Cast Resin Pipe conforming to ASTM D2997
☐ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
☐ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
☐ PTFE Fluorocarbon Tubing conforming to ASTM D3296
☐ FEP Fluorocarbon Tubing conforming to ASTM D3296

STEP-DRAWDOWN PUMP TEST DATA

Pumped Well No. 6734-03 Observation Well No. _____

Pumped Well Name Kukuihaele Dist. B/w Obs. & Pumped Well _____ ft.

Reference pt. for depth to water 958.77 ft. msl

Target Q 100 gpm Static Water Level @ start of test 5.27 ft. msl

Water Level Measurements by: x electrical sounder
pressure transducer
airline

START TEST Date 7/21/2008 Time of day: 10:00 AM

Flow Meter Reading Start: 5,174,100 gallon

Pre-Test Static Levels
7/21/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **S** (unadj. To nearest 0.1 ft)	Pumping rate **Q** at least 3 steps (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. x F or C	Data in this table is for: Pumped Well x Observation Well ___ Remarks
	-5	953.51						
	0	953.50						

STEP-DRAWDOWN PUMP TEST DATA								
Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **S** (unadj. To nearest 0.1 ft)	Pumping rate **Q** at least 3 steps (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. x F or C	Data in this table is for: Pumped Well x Observation Well ___ Remarks
	1	963.58	10.1	108				**Start Step 1**
	2	964.82	11.3	51				**at 10:00 am**
	3	964.65	11.2					
	4	963.6	10.1					
	5	961.7	8.2					
	6	960.44	6.9	34				
	7	959.64	6.1					
	8	959.06	5.6					
	9	958.65	5.1	35				
	10	958.35	4.9		2170	465		
	12	958.24	4.7	33				
	14	958.05	4.5					
	16	957.97	4.5	34				
	18	957.95	4.5					
	20	957.95	4.5	34				
	25	957.95	4.5					
	30	957.95	4.5	34	1307	330		

STEP-DRAWDOWN PUMP TEST DATA

7/21/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **s** (unadj. To nearest 0.1 ft)	Pumping rate **Q** at least 3 steps (gpm)	**EC (µS/cm)**	**Cl* (mg/l)**	Temp. _x_F or ___C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
								Start Step 2
	1	959.04	5.5					**at 10:30 am**
	2	959.05	5.5	40				
	3	959.1	5.6					
	4	959.69	6.2	58				
	5	960.42	6.9					
	6	960.65	7.1	56				
	7	960.81	7.3					
	8	961.01	7.5					
	9	961.07	7.6					
	10	961.07	7.6	55				
	12	961.09	7.6					
	14	961.12	7.6					
	16	961.12	7.6	55				
	18	961.15	7.6					
	20	961.15	7.6	55				
	25	961.15	7.6					
	30	961.16	7.7	55	1315	330		

STEP-DRAWDOWN PUMP TEST DATA

7/21/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **s** (unadj. To nearest 0.1 ft)	Pumping rate **Q** at least 3 steps (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. _x_F or ___C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
								Start Step 3
	1	963	9.5	80				**at 11:00 am**
	2	963.05	9.5	68				
	3	963.07	9.6					
	4	963.39	9.9	70				
	5	963.55	10.1					
	6	963.6	10.1					
	7	963.63	10.1					
	8	963.65	10.2	69				
	9	963.7	10.2					
	10	963.75	10.3	69				
	12	964.02	10.5					
	14	964.04	10.5					
	16	964.04	10.5	69				
	18	964.04	10.5					
	20	964.06	10.6	69				
	25	964.06	10.6					
	30	964.05	10.6	68	1337	335		

STEP-DRAWDOWN PUMP TEST DATA

7/21/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **s** (unadj. To nearest 0.1 ft)	Pumping rate **Q** at least 3 steps (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. _x_F or ___C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
								Start Step 4
	1	967.0	13.5	98				**at 11:30 am**
	2	967.15	13.7					
	3	967.15	13.7	88				
	4	967.15	13.7					
	5	967.25	13.8	86				
	6	967.45	14.0					
	7							
	8							
	9							
	10	973.22	19.7					
	12			86				
	14							
	16			86				
	18							
	20	973.6	20.1	86		**Sounder failed. Replaced sounder.**		
	25	972.96	19.5					
	30	974.25	20.8	86	1344	335	**Meter at end = 5,181,580**	

STEP-DRAWDOWN PUMP TEST DATA (Recovery)

7/21/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **s** (unadj. To nearest 0.1 ft)	Pumping rate **Q** at least 3 steps (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. _x_ F or ___ C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
								Start Step Test Recovery
	1	964.97	11.5					**at 12:00 pm**
	2	957.68	4.2					
	3	953.35	-0.1					
	4	953.35	-0.1					
	5							**Replace sounder battery**
	6							
	7	953.59	0.1					
	8	953.59	0.1					
	9	953.58	0.1					
	10	953.58	0.1					
	12	953.58	0.1					
	14	953.58	0.1					
	16	953.58	0.1					
	18	953.58	0.1					
	20	953.58	0.1					
	25	953.58	0.1					
Time	30	953.58	0.1					
12:40		953.58	0.1					
12:50		953.58	0.1					
12:55		953.58	0.1					

END TEST Date 7/21/2008 Time of Day 12:00 PM

ADDITIONAL REMARKS:

Person in charge of pump test (print): MURIS MITCHELL

Signature:

The signature above indiciates that the data reported on this form is accurate and true to the best of the person's knowledge who operated this pump test.

CONSTANT RATE PUMP TEST DATA

Pumped Well No. 6734-03 Observation Well No. _____

Pumped Well Name Kukuihaele Dist. B/w Obs. & Pumped Well _____ ft.

Reference pt. for depth to water 958.77 ft. msl

Target Q 60 gpm Static Water Level @ start of test 5.27 ft. msl

Water Level Measurements by: x electrical sounder
pressure transducer
airline

START TEST Date 7/21/2008 Time of day: 1:00 PM

Flow Meter Reading Start: 5,181,580 gallon

Constant Rate Test
7/21/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **s** (unadj. To nearest 0.1 ft)	Pumping rate **Q** (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. _x_ F or ___C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
1		963.6	10.1					**Start Pump**
2		963.9	10.4					**1:00 PM**
3		962.8	9.3	51				
4		962.6	9.1	62				
5		962.4	8.9	64				
6		962.3	8.8					
7		961.5	8.0	53				
8		961.1	7.6	53				
9		960.8	7.3					
10		960.7	7.1			334		Water Sample
12		962.2	8.6					
14		962.2	8.7	59				
16		961.9	8.4					
18		961.7	8.2					
20		961.5	8.0	59				
25		961.5	8.0	59				
Time of Day		961.5	8.0					
14:00		961.5	8.0	59.8	1395		77.3	
14:30		961.4	7.9	59.7	1401		77.3	
15:00		961.4	7.9	59.5	1408		77.1	
15:30		961.4	7.9	59.8	1409		77.1	
16:00		961.3	7.8	59.6	1413		77.3	
16:30		961.3	7.8	60.0	1412		77.3	
17:00		961.3	7.8	57.6	1418		77.1	
17:30		961.0	7.5	58.6	1415		77.3	
18:00		961.0	7.5	59.9	1417		77.3	
18:30		961.0	7.5	59.2	1420		77.3	
19:00		961.0	7.5	59.3	1421	352	77.3	Water Sample
19:30		960.9	7.4	59.1	1421		77.3	
20:00		960.9	7.4	59.1	1423		77.3	
21:00		960.8	7.3	60.0	1425		77.1	
22:00		960.5	7.0	59.1	1427		77.3	
23:00		960.4	6.9	56.8	1429		77.3	

Constant Rate Test
7/22/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **s** (unadj. To nearest 0.1 ft)	Pumping rate **Q** (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. _x_F or ___C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
12:00 AM		960.2	6.7	57.1	1435		77.3	
1:00		960.1	6.6	58.7	1433	355	77.3	Water Sample
2:00		960.2	6.7	58.2	1433		77.3	
3:00		960.2	6.7	58.0	1438		77.3	
4:00		960.2	6.7	57.5	1435		77.3	
5:00		960.2	6.7	57.6	1438		77.3	
6:00		960.2	6.7	59.1	1441		77.1	
7:00		960.2	6.7	59.1	1440	356	77.5	Water Sample
8:00		960.1	6.6	58.7	1446		77.5	
9:00		960.1	6.6	58.2	1448		77.3	
10:00		960.1	6.6	58.8	1448		77.5	
11:00		960.1	6.6	58.7	1449		77.5	
12:00		960.1	6.5	58.5	1454		77.1	
13:00		960.0	6.5	58.8	1448	358	77.5	Water Sample
14:00		960.0	6.5	58.8	1451		77.7	
15:00		959.9	6.4	58.2	1450		77.3	
16:00		959.9	6.4	57.8	1450		77.1	
17:00		959.9	6.4	57.9	1451		77.5	
18:00		959.9	6.4	58.0	1456		77.1	
19:00		959.9	6.4	58.5	1454		77.3	
20:00		959.8	6.3	57.7	1455		77.3	
21:00		959.8	6.3	57.9	1455		77.1	
22:00		959.8	6.3	57.6	1457		77.3	
23:00		959.8	6.3	57.4	1457		77.3	

Constant Rate Test
7/23/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **s** (unadj. To nearest 0.1 ft)	Pumping rate **Q** (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. _x_ F or ___C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
12:00 AM		959.8	6.3	58.0	1456		77.3	
1:00		959.8	6.3	58.2	1457	361	77.3	Water Sample
2:00		959.7	6.2	57.9	1457		77.3	
3:00		959.7	6.2	56.9	1460		77.3	
4:00		959.7	6.1	60.2	1458		77.5	
5:00		959.6	6.1	57.4	1457		77.5	
6:00		959.7	6.2	58.8	1459		77.5	
7:00		959.7	6.2	58.5	1460		77.5	
8:00		959.7	6.2	58.6	1458		77.5	
9:00		959.7	6.2	57.5	1456		77.5	
10:00		959.7	6.2	58.0	1459		77.3	
11:00		959.67	6.2	57.5	1458		77.5	
12:00		959.65	6.1	56.9	1464		77.3	
13:00		959.57	6.1	55.6	1458	360	77.7	Water Sample
14:00		959.49	6.0	56.3	1460		77.7	
15:00		959.49	6.0	56.2	1461		77.9	
16:00		959.49	6.0	57.3	1460		77.7	
17:00		959.45	6.0	56.1	1461		77.7	
18:00		959.45	6.0	57.5	1462		77.5	
19:00		959.44	5.9	57.1	1469		77.0	
20:00		959.44	5.9	57.2	1462		77.3	
21:00		959.44	5.9	56.4	1465		77.3	
22:00		959.43	5.9	56.8	1469		77.1	
23:00		959.43	5.9	57.3	1465		77.3	

Constant Rate Test
7/24/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **S** (unadj. To nearest 0.1 ft)	Pumping rate **Q** (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. _x_ F or ___C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
12:00 AM		959.28	5.8	56.7	1467		77.3	
1:00		959.05	5.5	57.6	1464	362	77.5	Water Sample
2:00		959.36	5.9	57.6	1464		77.3	
3:00		959.43	5.9	56.5	1460		77.3	
4:00		959.44	5.9	57.2	1464		77.3	
5:00		959.43	5.9	58.2	1465		77.5	
6:00		959.44	5.9	57.3	1462		77.3	
7:00		959.44	5.9	57.8	1462		77.5	
8:00		959.44	5.9	57.5	1464		77.5	
9:00		959.40	5.9	58.1	1463		77.5	
10:00		959.40	5.9	57.1	1461		77.7	
11:00		959.40	5.9	57.7	1464		77.7	
12:00		959.40	5.9	56.9	1464		77.7	
13:00		959.34	5.8	58.5	1475	364	77.1	Water Sample
14:00		959.34	5.8	57.1	1474		77.1	
15:00		959.30	5.8	57.2	1473		77.1	
16:00		959.30	5.8	57.1	1473		77.1	
17:00		959.3	5.8	57.7	1474		77.1	
18:00		959.3	5.8	57.6	1465		77.5	
19:00		959.2	5.7	56.7	1469		77.3	
20:00		959.2	5.7	56.5	1465		77.5	
21:00		959.2	5.7	57.3	1464		77.5	
22:00		959.2	5.7	56.8	1467		77.3	
23:00		959.2	5.7	57.5	1469		77.3	

Constant Rate Test
7/25/2008

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **s** (unadj. To nearest 0.1 ft)	Pumping rate **Q** (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. _x_ F or ___C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
12:00 AM		959.2	5.7	57.4	1469		77.3	
1:00		959.2	5.6	57.6	1468	364	77.5	Water Sample
2:00		959.2	5.6	57.0	1468		77.3	
3:00		959.1	5.6	57.2	1466		77.5	
4:00		959.1	5.6	57.3	1465		77.5	
5:00		959.2	5.7	57.2	1464		77.5	
6:00		959.20	5.7	57.5	1468		76.4	
7:00		959.2	5.7	58.2	1469		77.3	
8:00		959.2	5.7	58.0	1465		77.5	
9:00		959.2	5.7	57.3	1479		76.6	
10:00		959.2	5.7	57.4	1464		77.5	
11:00		959.2	5.7	56.4	1517		74.6	
12:00		959.2	5.6	58.1	1467		77.5	
13:00		959.2	5.7	58.2	1466	364	77.7	Water Sample
							Meter at end = 5,514,380	

Constant Rate Test
7/25/2008
RECOVERY

Suggested elapsed time (min)	Actual Elapsed time (min)	Depth to water (nearest 0.1ft.)	Drawdown **s** (unadj. To nearest 0.1 ft)	Pumping rate **Q** (gpm)	**EC** (µS/cm)	**Cl*** (mg/l)	Temp. _x_ F or ___C	Data in this table is for: Pumped Well _x_ Observation Well ___ Remarks
								Stop Pump
1		951.0	-2.5					**at 1:00 pm**
2		948.3	-5.3					
3		949.8	-3.8					
4		952.3	-1.2					
5		953.3	-0.3					
6		953.4	-0.1					
7		953.5	0.0					
8		953.5	0.0					
9		953.5	0.0					
10		953.5	0.0					
12		953.5	0.0					
14		953.5	0.0					
16		953.5	0.0					
18		953.5	0.0					
20		953.5	0.0					
25		953.5	0.0					
30		953.5	0.0					
45		953.5	0.0					
60		953.5	0.0					

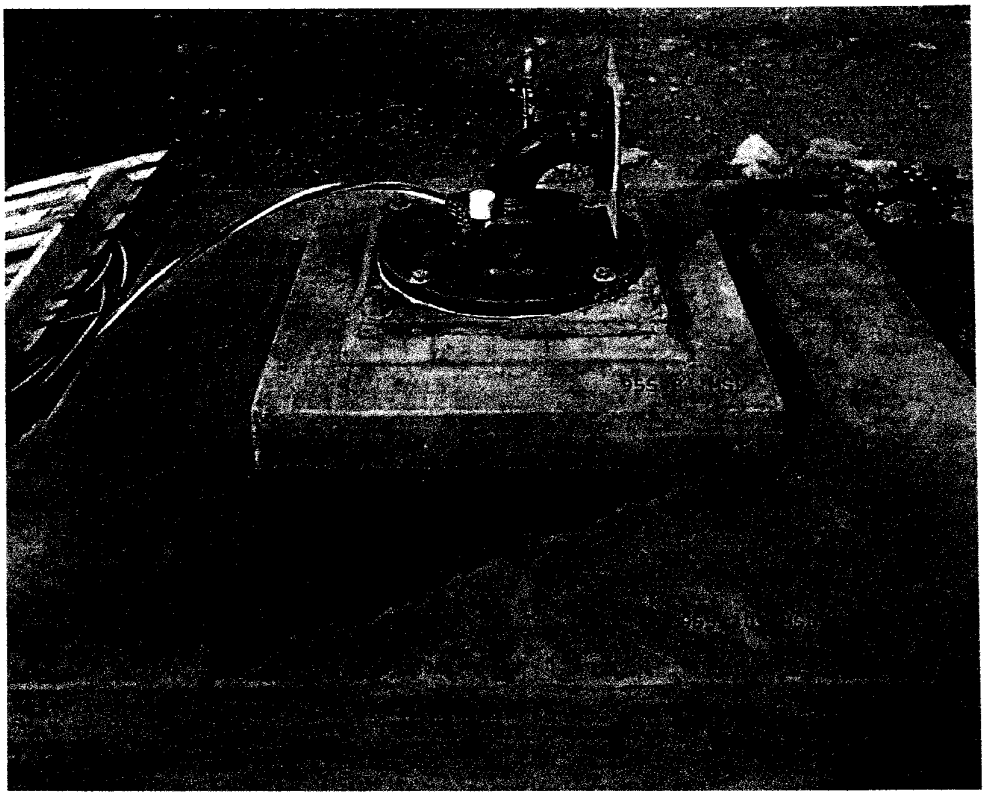
END TEST Date 7/25/2008 Time of Day 1:00 PM

ADDITIONAL REMARKS:

Person in charge of pump test (print): MURIS MITCHELL

Signature

The signature above indicates that the data reported on this form is accurate and true to the best of the person's knowledge who operated this pump test.




17/01/2007

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory Report

for

Hawaii Department of Water Supply (Hilo)
Micro Lab

889 Leilani Street

Hilo , HI 96720

Attention: Mae Kise
Fax: (808) 961-8759

DATE OF ISSUE
Oct 23 2008
MWH LABORATORIES

JCH Jim Hein
Project Manager

ACCREDITED IN ACCORDANCE WITH nelac 01114CA

Report#: 248846
Project: PHASEV
PO#: Contract 200

Revised to include Sodium results

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Comments,QC Report,QC Summary,Data Report,Hits Report, totaling 48 page[s].

MWH Laboratories
MONTGOMERY WATSON HARZA

750 Royal Oaks, Suite 100
Monrovia, California 91016
Phone: (626) 386-1100
(800) 566-5227
Fax: (626) 386-1101

CHAIN OF CUSTODY RECORD

248846

MWH LABS USE ONLY:

LOGIN COMMENTS: ______

SAMPLES CHECKED AGAINST COC BY: JS

SAMPLES LOGGED IN BY: JS

SAMPLE TEMP WHEN REC'D AT LAB: 5 (Compliance: 6°C or Below)

CONDITION OF BLUE ICE: FROZEN ✓ PARTIALLY FROZEN ___ THAWED ___

SAMPLES REC'D DAY OF COLLECTION? ☐ (check for yes)

TO BE COMPLETED BY SAMPLER

COMPANY, UTILITY or PROJECT:

SYSTEM #:

MWH LABS CLIENT CODE:

P.O.# / JOB # / PROJECT :

SAMPLER PRINTED NAME AND SIGNATURE:

TAT requested: rush by adv notice only
STD___ 1 week ___ 3 day ___ 2 day___ 1 day

COMPLIANCE SAMPLES ☐ (check for yes)
- Requires state forms

NON-COMPLIANCE SAMPLES ☐ (check for yes)
REGULATION INVOLVED:
(eg. SDWA, Phase V, NPDES, FDA,)

Type of samples (circle one): ROUTINE SPECIAL CONFIRMATION

SEE ATTACHED BOTTLE ORDER FOR ANALYSES ☐ (check for yes), OR

LIST ANALYSES REQUIRED BELOW (enter number of bottles sent for each test for each sample):

SAMPLE DATE	SAMPLE TIME	STATION # or LOCATION	SITE NAME OR SAMPLE I.D.	MATRIX *	GRAB	COMP	Fecal/TC	SAMPLER COMMENTS
		CLIENT: DEPT. OF WATER SUPPLY COUNTY OF HAWAII; PROJECT: NEW SOURCE TESTING; SITE NAME: KUKUIHAELE WELL STATE WELL NO. 6734-03; SAMPLE DATE: 7/23/08; SAMPLE TIME: 1345; SAMPLER(S): WS; SAMPLE TYPE: GRAB						Rcvd 1315 07/25/08 [illegible]

* MATRIX TYPES:

RSW = Raw Surface Water
RGW = Raw Ground Water
CFW = Chlor(am)inated Finished Water
FW = Other Finished Water
CWW = Chlorinated Waste Water
WW = Other Waste Water
BW = Bottled Water
SW = Storm Water
SO = Soil
SL = Sludge

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:	[illegible]	Warren Sako	DWS Hawaii Microb.	7/23/08	1430
RECEIVED BY:	[illegible]	Warren Sako	DWS Hawaii Microb.	7/24/08	1100
RELINQUISHED BY:	[illegible]	Warren Sako	DWS - Hawaii Microb.	7/24/08	1102
RECEIVED BY:	Joe Sanchez	JOE SANCHEZ	[illegible]	7/25/08	[illegible]
RELINQUISHED BY:					
RECEIVED BY:					

C-O-C# ______

MWH Laboratories, a Divsion of MWH Americas, Inc.
750 Royal Oaks Drive Suite 100
Monrovia CA 91016 (626) 386-1100 FAX (626) 386-1124

Bottle Order for Hawaii Dept. of Water Supply (Hilo)

Jim Hein — **Your MWL Project Manager**
(626) 386-1149 — **Direct Phone/Voice Mail**

Client Code HAWAII — HI New Source
Project Code PHASEV
PO# / Job#

ProjectName

Group #
Date Sampled
Date Received
1

BO# 43231

Sampler: please return this paper with your samples

Created by JCH

Order Date
10/12/07
Date Needed by Client
10/18/07
Date Samples to Arrive at MWL

Ship Sample Kits to
Hawaii Dept. of Water Supply
Micro Lab
889 Leilani St.
Hilo, HI 96720
ATTN: Mae Kise
PHONE: (808) 961-8670

Send Report to
Hawaii Dept. of Water Supply
25 Aupuni St
Hilo, HI 96720
ATTN: Mae Kise
PHONE: (808) 961-8670
FAX: (808) 961-8759

Billing Address
Hawaii Dept. of Water Supply
Micro Lab
889 Leilani St.
Hilo, HI 96720

# of Samples	Tests	Qteline#	Bottles-Qty for each sample, type & preservative if any	UN DOT #
2	@DIQUAT	264-01	1 1L amber poly/ no preservative	
2	@504MOD	264-02	4 40ml amber glass vials/ no preservative-Turquoise Caps	
2	@VOASDWA	264-04	4 40ml amber glass vials+4 drops of 1:1 HCL	UN 1789
2	@525REG	264-05	2 1L amber glass+ 2 ml of 6N HCl	UN 1789
2	@ML531.2	264-06	2-40 ml amber vials/ teflon lined screw + 0.38g KH2Citrate+1 drop 8% thio	UN 1750
2	@ML515.4	264-08	2 125ml amber glass+ 7 mg SULFITE xls	
2	@ML505	264-09	4 40ml amber vial + 3-4 mg thiosulfate XLS	
2	ENDOTHAL	264-20	1 250ml amber glass/no preservative	
2	GLYPHOS	264-22	1 125ml amber glass/no preservative	
2	D1613EDD	264-27	2 1L amber glass / no preservative	UN 1789
2	CNDW	264-16	1 125ml poly +1 ml NaOH (25%)+3 scoops Ascorbic Acid	UN 1824
2	#MET-HI, CA		1 250ml poly acid rinsed+2 ml HNO3 (18%)	UN2031
2	NO2-N, NO3, F, ALK, EC, PH		2 500 mL poly/ no preservative	
2	@VOASDWA TB		TRIP BLANK: 2 40ml amb glass+4 drops 1:1 HCL+DI Water	UN 1789
2	ASBTEM		1 1L poly sonicated/ no preservative-DO NOT FILL TO TOP **SHORT HOLDING**	

Comments

SHIPPING:

Label cooler:
NEW SOURCE - SDWA Sampling

Send in 2 coolers, 1 set per cooler.

Code	Status	Date Shipped	Via	Tracking #	# of Coolers	Prepared By

MWH Laboratories
750 Royal Oaks Drive, Monrovia, CA 91016
PHONE: 626-386-1100/FAX: 626-386-1101

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Hawaii Department of Water Supply (Hilo)
Micro Lab
889 Leilani Street
Hilo, HI 96720
Attn: Mae Kise
Phone: (808) 961-8670

Customer Code: HAWAII
PO#: Contract 2002-02
Group#: 248846
Project#: PHASEV
Proj Mgr: Jim Hein
Phone: (626) 386-1189

The following samples were received from you on **07/25/08**. They have been scheduled for the tests listed beside each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample#	Sample Id	Tests Scheduled	Matrix	Sample Date
2807250312	KUKUIHAELE WELL 6734-03		Water	23-jul-2008 13:45:00
		@504MOD @525REG @DIQUAT @ML505 @ML515.4 @ML531.2		
		@VOASDWA ALK AS-MS ASBTEM BA-MS BE-MS		
		CA CD-MS CNDW CR-MS CU-MS D1613EDD		
		EC ENDOTHAL F GLYPHOS HG NA		
		NI-MS NO2-N NO3 P PB-MS PH		
		SB-MS SE-MS T TL-MS		
2807250313	TRAVEL BLANK-ANALYZE		Water	23-jul-2008 00:00:00
		@VOASDWA		

Test Acronym Description

Test Acronym	Description
@504MOD	EPA Method 504.1
@525REG	525 Semivolatiles by GC/MS
@DIQUAT	Diquat and Paraquat
@ML505	Pesticides by EPA 505
@ML515.4	Herbicides by 515.4
@ML531.2	Aldicarbs by 531.2
@VOASDWA	Regulated VOCs plus Lists 1&3
ALK	Alkalinity in CaCO3 units
AS-MS	Arsenic, Total, ICAP/MS
ASBTEM	Asbestos by TEM - >10 microns
BA-MS	Barium, Total, ICAP/MS
BE-MS	Beryllium, Total, ICAP/MS
CA	Calcium, Total, ICAP
CD-MS	Cadmium, Total, ICAP/MS
CNDW	Cyanide
CR-MS	Chromium, Total, ICAP/MS
CU-MS	Copper, Total, ICAP/MS
D1613EDD	2,3,7,8-TCDD 1613 DW (subbed)
EC	Specific Conductance

Hawaii Department of Water Supply (Hilo)
Micro Lab
889 Leilani Street
Hilo, HI 96720
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Group#: 248846
Project#: PHASEV
Proj Mgr: Jim Hein
Phone: (626) 386-1189

Test Acronym Description

Test Acronym	Description
ENDOTHAL	Endothall
F	Fluoride
GLYPHOS	Glyphosate
HG	Mercury
NA	Sodium, Total, ICAP
NI-MS	Nickel, Total, ICAP/MS
NO2-N	Nitrite, Nitrogen by IC
NO3	Nitrate as Nitrogen by IC
P	Metals sample pH
PB-MS	Lead, Total, ICAP/MS
PH	PH (H3=past HT, not compliant)
SB-MS	Antimony, Total, ICAP/MS
SE-MS	Selenium, Total, ICAP/MS
T	Metals Turbidity
TL-MS	Thallium, Total, ICAP/MS

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Report
Comments
#248846

Group Comments

Analytical results for TCDD Dioxin by 1613B are submitted by Pace Analytical Services, Minneapolis, MN. NELAP01155CA (ASBTEM)No chrysotile or amphibole fibers >10 microns observed at an analytical sensitivity of 0.38 MFL.

(QC Ref#: 2807250312)

Test: Diquat and Paraquat (EPA 549.2)

LE - MRL Check recovery was above laboratory acceptance limits.

Test: Alkalinity in CaCO3 units (SM 2320B)

B7 - Target Analyte detected in method blank at or above method reporting limit. Concentration found in the sample was 10 times above the concentration found in the method blank.

Test: Fluorotrichloromethane-Freon11 (ML/EPA 524.2)

L3 - The associated blank spike recovery was above method acceptance limits.

(QC Ref#: 2807250313)

Test: Fluorotrichloromethane-Freon11 (ML/EPA 524.2)

L3 - The associated blank spike recovery was above method acceptance limits.

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Laboratory
Hits Report
#248846

Hawaii Department of Water Supply
(Hilo)
Mae Kise
Micro Lab
889 Leilani Street
Hilo , HI 96720

Samples Received

25-jul-2008 16:53:49

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2807250312	KUKUIHAELE WELL 6734-03				
08/07/08	Atrazine		0.05	3	ug/l	0.05
07/29/08	Alkalinity in CaCO3 units		88		mg/l	2.0
08/04/08	Barium, Total, ICAP/MS		34	2000	ug/l	2.0
07/26/08	Calcium, Total, ICAP		44		mg/l	1.0
08/04/08	Chromium, Total, ICAP/MS		7	100	ug/l	1.0
07/29/08	Fluoride		0.09	4	mg/l	0.050
07/25/08	Nitrate as Nitrogen by IC		0.78	10	mg/l	0.20
07/25/08	PH (H3=past HT, not compliant)		8.7	6.5-8.5	Units	0.010
07/26/08	Sodium, Total, ICAP		180		mg/l	1.0
07/29/08	Specific Conductance		1480		umho/cm	2.0
	2807250313	TRAVEL BLANK-ANALYZE				

SUMMARY OF POSITIVE DATA ONLY.

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Laboratory
Data Report
#248846

Hawaii Department of Water Supply
(Hilo)
Mae Kise
Micro Lab
889 Leilani Street
Hilo , HI 96720

Samples Received

07/25/08

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
KUKUIHAELE WELL 6734-03 (2807250312) Sampled on 07/23/08 13:45								
	07/29/08 00:00	440499	(SM 2320B)	Alkalinity in CaCO3 units	88(B7)	mg/l	2.0	1
	08/04/08 16:58	441844	(ML/EPA 200.8)	Arsenic, Total, ICAP/MS	ND	ug/l	1.0	1
	07/25/08 14:15		(EPA 100.2)	Asbestos by TEM - >10 microns	ND	MFL	0.4	1
	08/04/08 16:58	441864	(ML/EPA 200.8)	Barium, Total, ICAP/MS	34	ug/l	2.0	1
	08/04/08 16:58	441323	(ML/EPA 200.8)	Beryllium, Total, ICAP/MS	ND	ug/l	1.0	1
	07/26/08 04:21	440157	(ML/EPA 200.7)	Calcium, Total, ICAP	44	mg/l	1.0	1
	08/04/08 16:58	441858	(ML/EPA 200.8)	Cadmium, Total, ICAP/MS	ND	ug/l	0.50	1
	07/30/08 14:11	440926	(SM 4500CN-F)	Cyanide	ND	mg/l	0.025	1
	08/04/08 16:58	441825	(ML/EPA 200.8)	Chromium, Total, ICAP/MS	7	ug/l	1.0	1
	08/04/08 16:58	441838	(ML/EPA 200.8)	Copper, Total, ICAP/MS	ND	ug/l	2.0	1
08/07/08	08/09/08 00:00		(EPA 1613)	2,3,7,8-TCDD 1613 DW (subbed)	ND	pg/l	5.0	1
	07/29/08 12:44	440653	(SM 2510B)	Specific Conductance	1480	umho/cm	2.0	1
07/29/08	08/12/08 00:00	444466	(EPA 548.1)	Endothall	ND	ug/l	5.0	1
	07/29/08 08:28	440524	(SM 4500F-C)	Fluoride	0.09	mg/l	0.050	1
	07/30/08 00:00	440846	(EPA 547)	Glyphosate	ND	ug/l	6.0	1
	08/07/08 19:09	442553	(EPA 245.1)	Mercury	ND	ug/l	0.20	1
	07/26/08 04:21	456452	(ML/EPA 200.7)	Sodium, Total, ICAP	180	mg/l	1.0	1
	08/04/08 16:58	441834	(ML/EPA 200.8)	Nickel, Total, ICAP/MS	ND	ug/l	5.0	1
	07/25/08 15:58	440196	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.20	2
	07/25/08 15:58	440198	(ML/EPA 300.0)	Nitrate as Nitrogen by IC	0.78	mg/l	0.20	2
	08/04/08 16:58	441873	(ML/EPA 200.8)	Lead, Total, ICAP/MS	ND	ug/l	0.50	1
	07/25/08 00:00	440033	(SM 4500-HB)	PH (H3=past HT, not compliant)	8.7	Units	0.010	1
	08/04/08 16:58	441861	(ML/EPA 200.8)	Antimony, Total, ICAP/MS	ND	ug/l	1.0	1
	08/04/08 16:58	441848	(ML/EPA 200.8)	Selenium, Total, ICAP/MS	ND	ug/l	5.0	1
	08/04/08 16:58	441867	(ML/EPA 200.8)	Thallium, Total, ICAP/MS	ND	ug/l	1.0	1
525 Semivolatiles by GC/MS								
08/05/08	08/07/08 17:09	443251	(EPA 525.2)	Atrazine	0.05	ug/l	0.05	1
08/05/08	08/07/08 17:09	443251	(EPA 525.2)	Benzo(a)pyrene	ND	ug/l	0.02	1
08/05/08	08/07/08 17:09	443251	(EPA 525.2)	Di(2-Ethylhexyl)phthalate	ND	ug/l	0.6	1

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Laboratory
Data Report
#248846

Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
08/05/08	08/07/08 17:09	443251	(EPA 525.2)	Di-(2-Ethylhexyl)adipate	ND	ug/l	0.6	1
08/05/08	08/07/08 17:09	443251	(EPA 525.2)	Hexachlorobenzene	ND	ug/l	0.05	1
08/05/08	08/07/08 17:09	443251	(EPA 525.2)	Hexachlorocyclopentadiene	ND	ug/l	0.05	1
08/05/08	08/07/08 17:09	443251	(EPA 525.2)	Molinate	ND	ug/l	0.1	1
08/05/08	08/07/08 17:09	443251	(EPA 525.2)	Simazine	ND	ug/l	0.05	1
08/05/08	08/07/08 17:09	443251	(EPA 525.2)	Thiobencarb	ND	ug/l	0.2	1
			(EPA 525.2)	Perylene-d12(70-130)	99	% Rec		
			(EPA 525.2)	1,3-dimethyl-2-nbenz(70-130)	96	% Rec		
			(EPA 525.2)	Triphenylphosphate(70-130)	106	% Rec		
Aldicarbs by 531.2								
	07/30/08 18:05	441255	(EPA 531.2)	3-Hydroxycarbofuran	ND	ug/l	0.5	1
	07/30/08 18:05	441255	(EPA 531.2)	Aldicarb (Temik)	ND	ug/l	0.5	1
	07/30/08 18:05	441255	(EPA 531.2)	Aldicarb sulfone	ND	ug/l	0.5	1
	07/30/08 18:05	441255	(EPA 531.2)	Aldicarb sulfoxide	ND	ug/l	0.5	1
	07/30/08 18:05	441255	(EPA 531.2)	Baygon (Propoxur)	ND	ug/l	0.5	1
	07/30/08 18:05	441255	(EPA 531.2)	Carbofuran (Furadan)	ND	ug/l	0.5	1
	07/30/08 18:05	441255	(EPA 531.2)	Carbaryl	ND	ug/l	0.5	1
	07/30/08 18:05	441255	(EPA 531.2)	Methiocarb	ND	ug/l	0.5	1
	07/30/08 18:05	441255	(EPA 531.2)	Methomyl	ND	ug/l	0.5	1
	07/30/08 18:05	441255	(EPA 531.2)	Oxamyl (Vydate)	ND	ug/l	0.5	1
			(EPA 531.2)	BDMC(70-130)	107	% Rec		
Diquat and Paraquat								
07/29/08	07/30/08 00:00	441203	(EPA 549.2)	Diquat	ND(LE)	ug/l	0.4	1
07/29/08	07/30/08 00:00	441203	(EPA 549.2)	Paraquat	ND(LE)	ug/l	2.0	1
EPA Method 504.1								
08/05/08	08/06/08 00:07	442275	(EPA 504.1)	1,2-Dibromo-3-chloropropane	ND	ug/l	0.01	1
08/05/08	08/06/08 00:07	442275	(EPA 504.1)	1,2-Dibromoethane	ND	ug/l	0.01	1
08/05/08	08/06/08 00:07	442275	(EPA 504.1)	1,2,3-Trichloropropane	ND	ug/l	0.04	1
			(EPA 504.1)	1,2-dibromopropane(60-140)	87	% Rec		

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Laboratory
Data Report
#248846

Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
				Herbicides by 515.4				
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	2,4,5-T	ND	ug/l	0.2	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	2,4,5-TP (Silvex)	ND	ug/l	0.2	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	2,4-D	ND	ug/l	0.1	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	2,4-DB	ND	ug/l	2.0	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	Dichlorprop	ND	ug/l	0.5	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	Acifluorfen	ND	ug/l	0.2	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	Bentazon	ND	ug/l	0.5	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	Dalapon	ND	ug/l	1.0	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	3,5-Dichlorobenzoic acid	ND	ug/l	0.5	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	Tot DCPA Mono&Diacid Degradate	ND	ug/l	1.0	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	Dicamba	ND	ug/l	0.08	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	Dinoseb	ND	ug/l	0.2	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	Pentachlorophenol	ND	ug/l	0.04	1
08/04/08	08/11/08 00:00	445435	(EPA 515.4)	Picloram	ND	ug/l	0.1	1
			(EPA 515.4)	4,4-Dibromobiphenyl(60-140)	99	% Rec		
			(EPA 515.4)	2,4-DCPAA (70-130)	103	% Rec		
				Pesticides by EPA 505				
07/30/08	07/30/08 21:07	442347	(EPA 505)	PCB 1016 Aroclor	ND	ug/l	0.08	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	PCB 1221 Aroclor	ND	ug/l	0.1	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	PCB 1232 Aroclor	ND	ug/l	0.1	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	PCB 1242 Aroclor	ND	ug/l	0.1	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	PCB 1248 Aroclor	ND	ug/l	0.1	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	PCB 1254 Aroclor	ND	ug/l	0.1	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	PCB 1260 Aroclor	ND	ug/l	0.1	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Alachlor (Alanex)	ND	ug/l	0.1	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Aldrin	ND	ug/l	0.01	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Chlordane	ND	ug/l	0.1	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Dieldrin	ND	ug/l	0.01	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Endrin	ND	ug/l	0.01	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Heptachlor	ND	ug/l	0.01	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Heptachlor Epoxide	ND	ug/l	0.01	1

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Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
07/30/08	07/30/08 21:07	442347	(EPA 505)	Lindane (gamma-BHC)	ND	ug/l	0.01	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Methoxychlor	ND	ug/l	0.05	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Total PCBs	ND	ug/l	0.08	1
07/30/08	07/30/08 21:07	442347	(EPA 505)	Toxaphene	ND	ug/l	0.5	1
				Regulated VOCs plus Lists 1&3				
	08/01/08 17:34	441809	(EPA 524.2)	1,1,1,2-Tetrachloroethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,1,1-Trichloroethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,1,2,2-Tetrachloroethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,1,2-Trichloroethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,1-Dichloroethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,1-Dichloroethylene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,1-Dichloropropene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,2,3-Trichlorobenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,2,3-Trichloropropane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,2,4-Trichlorobenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,2,4-Trimethylbenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,2-Dichloroethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,2-Dichloropropane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,3,5-Trimethylbenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	1,3-Dichloropropane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	p-Dichlorobenzene (1,4-DCB)	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	2,2-Dichloropropane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	2-Butanone (MEK)	ND	ug/l	5.0	1
	08/01/08 17:34	441809	(EPA 524.2)	o-Chlorotoluene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	p-Chlorotoluene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	4-Methyl-2-Pentanone (MIBK)	ND	ug/l	5.0	1
	08/01/08 17:34	441809	(EPA 524.2)	Benzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Bromobenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Bromomethane (Methyl Bromide)	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Bromoethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	cis-1,2-Dichloroethylene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Chlorobenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Carbon Tetrachloride	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	cis-1,3-Dichloropropene	ND	ug/l	0.5	1

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Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	08/01/08 17:34	441809	(EPA 524.2)	Bromoform	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Chloroform (Trichloromethane)	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Bromochloromethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Chloroethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Chloromethane(Methyl Chloride)	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Chlorodibromomethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Dibromomethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Bromodichloromethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Dichloromethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Di-isopropyl ether	ND	ug/l	3.0	1
	08/01/08 17:34	441809	(EPA 524.2)	Ethyl benzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Dichlorodifluoromethane	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Fluorotrichloromethane-Freon11	ND(L3)	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Hexachlorobutadiene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Isopropylbenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	m-Dichlorobenzene (1,3-DCB)	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	m,p-Xylenes	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Methyl Tert-butyl ether (MTBE)	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Naphthalene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	n-Butylbenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	n-Propylbenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	o-Xylene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	o-Dichlorobenzene (1,2-DCB)	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Tetrachloroethylene (PCE)	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	p-Isopropyltoluene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	sec-Butylbenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Styrene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	trans-1,2-Dichloroethylene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	tert-amyl Methyl Ether	ND	ug/l	3.0	1
	08/01/08 17:34	441809	(EPA 524.2)	tert-Butyl Ethyl Ether	ND	ug/l	3.0	1
	08/01/08 17:34	441809	(EPA 524.2)	tert-Butylbenzene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Trichloroethylene (TCE)	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Trichlorotrifluoroethane(Freon	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	trans-1,3-Dichloropropene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Toluene	ND	ug/l	0.5	1

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Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	08/01/08 17:34	441809	(EPA 524.2)	Total 1,3-Dichloropropene	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Total THM	ND	ug/l	0.5	1
	08/01/08 17:34	441809	(EPA 524.2)	Total xylenes	ND	ug/l	1.0	1
	08/01/08 17:34	441809	(EPA 524.2)	Vinyl chloride (VC)	ND	ug/l	0.3	1
			(EPA 524.2)	4-Bromofluorobenzene(70-130)	101	% Rec		
			(EPA 524.2)	1,2-Dichloroethane-d4(70-130)	114	% Rec		
			(EPA 524.2)	Toluene-d8(70-130)	95	% Rec		

TRAVEL BLANK-ANALYZE (2807250313) Sampled on 07/23/08 00:00

Regulated VOCs plus Lists 1&3

	08/01/08 17:06	441809	(EPA 524.2)	1,1,1,2-Tetrachloroethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,1,1-Trichloroethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,1,2,2-Tetrachloroethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,1,2-Trichloroethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,1-Dichloroethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,1-Dichloroethylene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,1-Dichloropropene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,2,3-Trichlorobenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,2,3-Trichloropropane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,2,4-Trichlorobenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,2,4-Trimethylbenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,2-Dichloroethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,2-Dichloropropane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,3,5-Trimethylbenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	1,3-Dichloropropane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	p-Dichlorobenzene (1,4-DCB)	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	2,2-Dichloropropane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	2-Butanone (MEK)	ND	ug/l	5.0	1
	08/01/08 17:06	441809	(EPA 524.2)	o-Chlorotoluene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	p-Chlorotoluene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	4-Methyl-2-Pentanone (MIBK)	ND	ug/l	5.0	1
	08/01/08 17:06	441809	(EPA 524.2)	Benzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Bromobenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Bromomethane (Methyl Bromide)	ND	ug/l	0.5	1

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Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	08/01/08 17:06	441809	(EPA 524.2)	Bromoethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	cis-1,2-Dichloroethylene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Chlorobenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Carbon Tetrachloride	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	cis-1,3-Dichloropropene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Bromoform	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Chloroform (Trichloromethane)	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Bromochloromethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Chloroethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Chloromethane(Methyl Chloride)	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Chlorodibromomethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Dibromomethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Bromodichloromethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Dichloromethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Di-isopropyl ether	ND	ug/l	3.0	1
	08/01/08 17:06	441809	(EPA 524.2)	Ethyl benzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Dichlorodifluoromethane	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Fluorotrichloromethane-Freon11	ND(L3)	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Hexachlorobutadiene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Isopropylbenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	m-Dichlorobenzene (1,3-DCB)	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	m,p-Xylenes	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Methyl Tert-butyl ether (MTBE)	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Naphthalene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	n-Butylbenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	n-Propylbenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	o-Xylene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	o-Dichlorobenzene (1,2-DCB)	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Tetrachloroethylene (PCE)	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	p-Isopropyltoluene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	sec-Butylbenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Styrene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	trans-1,2-Dichloroethylene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	tert-amyl Methyl Ether	ND	ug/l	3.0	1
	08/01/08 17:06	441809	(EPA 524.2)	tert-Butyl Ethyl Ether	ND	ug/l	3.0	1

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Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	08/01/08 17:06	441809	(EPA 524.2)	tert-Butylbenzene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Trichloroethylene (TCE)	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Trichlorotrifluoroethane(Freon	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	trans-1,3-Dichloropropene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Toluene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Total 1,3-Dichloropropene	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Total THM	ND	ug/l	0.5	1
	08/01/08 17:06	441809	(EPA 524.2)	Total xylenes	ND	ug/l	1.0	1
	08/01/08 17:06	441809	(EPA 524.2)	Vinyl chloride (VC)	ND	ug/l	0.3	1
			(EPA 524.2)	4-Bromofluorobenzene(70-130)	102	% Rec		
			(EPA 524.2)	1,2-Dichloroethane-d4(70-130)	113	% Rec		
			(EPA 524.2)	Toluene-d8(70-130)	96	% Rec		

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QC Summary
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QC Ref #0 - Metals sample pH **Analysis Date: 07/25/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: jrf
2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: jrf

QC Ref #440033 - PH (H3=past HT, not compliant) **Analysis Date: 07/25/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: sar

QC Ref #440157 - Calcium, Total, ICAP **Analysis Date: 07/26/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: csk

QC Ref #440196 - Nitrite, Nitrogen by IC **Analysis Date: 07/25/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: sxk

QC Ref #440198 - Nitrate as Nitrogen by IC **Analysis Date: 07/25/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: sxk

QC Ref #440499 - Alkalinity in CaCO3 units **Analysis Date: 07/29/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: anh

QC Ref #440524 - Fluoride **Analysis Date: 07/29/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: yvette

QC Ref #440653 - Specific Conductance **Analysis Date: 07/29/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: sar

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Hawaii Department of Water Supply
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QC Ref #440846 - Glyphosate **Analysis Date: 07/30/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: szz

QC Ref #440926 - Cyanide **Analysis Date: 07/30/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: axd

QC Ref #441203 - Diquat and Paraquat **Analysis Date: 07/30/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: szz

QC Ref #441255 - Aldicarbs by 531.2 **Analysis Date: 07/30/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: xwo

QC Ref #441323 - Beryllium, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

QC Ref #441809 - Regulated VOCs plus Lists 1&3 **Analysis Date: 08/01/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: kcp
2807250313 TRAVEL BLANK-ANALYZE Analyzed by: kcp

QC Ref #441825 - Chromium, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

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QC Ref #441834 - Nickel, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

QC Ref #441838 - Copper, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

QC Ref #441844 - Arsenic, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

QC Ref #441848 - Selenium, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

QC Ref #441858 - Cadmium, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

QC Ref #441861 - Antimony, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

QC Ref #441864 - Barium, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

QC Ref #441867 - Thallium, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

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(continued)

QC Ref #441873 - Lead, Total, ICAP/MS **Analysis Date: 08/04/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: dyh

QC Ref #442275 - EPA Method 504.1 **Analysis Date: 08/06/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: mcp

QC Ref #442347 - Pesticides by EPA 505 **Analysis Date: 07/30/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: cww

QC Ref #442553 - Mercury **Analysis Date: 08/07/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: azs

QC Ref #443251 - 525 Semivolatiles by GC/MS **Analysis Date: 08/07/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: jwc

QC Ref #444466 - Endothall **Analysis Date: 08/12/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: crw

QC Ref #445435 - Herbicides by 515.4 **Analysis Date: 08/11/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: lrl

QC Ref #456452 - Sodium, Total, ICAP **Analysis Date: 07/26/2008**

2807250312 KUKUIHAELE WELL 6734-03 Analyzed by: csk

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QC Report
#248846

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QC Ref #440033 PH (H3=past HT, not compliant)

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07250110	UNIT		(0-0)	
DUP	PH (H3=past HT, not compliant)	6.70	6.68	UNIT		(0-20)	0.3

QC Ref #440157 Calcium, Total, ICAP

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS1	Calcium, Total, ICAP	50	49.1	MGL	98.2	(85-115)	
LCS2	Calcium, Total, ICAP	50	49.8	MGL	99.6	(85-115)	
MBLK	Calcium, Total, ICAP	ND	<1.0	MGL			
MRL_CHK	Calcium, Total, ICAP	1.000	0.982	MGL	98.2	(50-150)	
MS	Calcium, Total, ICAP	50	45.8	MGL	91.6	(70-130)	
MSD	Calcium, Total, ICAP	50	47.2	MGL	94.4	(70-130)	
RPD_LCS	Calcium, Total, ICAP	98.200	99.600	MGL	1.4	(0-20)	
RPD_MS	Calcium, Total, ICAP	91.600	94.400	MGL	3.0	(0-20)	

QC Ref #440196 Nitrite, Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	0582_1/5	MGL		(0-0)	
LCS1	Nitrite, Nitrogen by IC	1.0	1.04	MGL	104.0	(90-110)	
LCS2	Nitrite, Nitrogen by IC	1.0	1.03	MGL	103.0	(90-110)	
MBLK	Nitrite, Nitrogen by IC	ND	<0.10	MGL			
MRL_CHK	Nitrite, Nitrogen by IC	0.050	0.0512	MGL	102.4	(50-150)	
MS	Nitrite, Nitrogen by IC	0.500	0.501	MGL	100.2	(78-135)	
MSD	Nitrite, Nitrogen by IC	0.500	0.522	MGL	104.4	(78-135)	
RPD_LCS	Nitrite, Nitrogen by IC	104.000	103.000	MGL	1.0	(0-20)	
RPD_MS	Nitrite, Nitrogen by IC	100.200	104.400	MGL	4.1	(0-20)	

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QC Ref #440198 Nitrate as Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	0582_1/5	MGL		(0-0)	
LCS1	Nitrate as Nitrogen by IC	2.5	2.57	MGL	102.8	(90-110)	
LCS2	Nitrate as Nitrogen by IC	2.5	2.56	MGL	102.4	(90-110)	
MBLK	Nitrate as Nitrogen by IC	ND	<0.10	MGL			
MRL_CHK	Nitrate as Nitrogen by IC	0.050	0.0544	MGL	108.8	(50-150)	
MS	Nitrate as Nitrogen by IC	1.25	1.29	MGL	103.2	(80-112)	
MSD	Nitrate as Nitrogen by IC	1.25	1.35	MGL	108.0	(80-112)	
RPD_LCS	Nitrate as Nitrogen by IC	102.800	102.400	MGL	0.4	(0-20)	
RPD_MS	Nitrate as Nitrogen by IC	103.200	108.000	MGL	4.5	(0-20)	

QC Ref #440499 Alkalinity in CaCO3 units

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 28	07250346	MGL		(0-0)	
LCS1	Alkalinity in CaCO3 units	100	98	MGL	98.0	(90-110)	
LCS2	Alkalinity in CaCO3 units	100	99	MGL	99.0	(90-110)	
MBLK	Alkalinity in CaCO3 units	ND	2.75	MGL	_		
MRL_CHK	Alkalinity in CaCO3 units	2.00	2.56	MGL	128.0	(50-150)	
MS	Alkalinity in CaCO3 units	100	100	MGL	100.0	(80-120)	
MS2	Alkalinity in CaCO3 units	100	102	MGL	102.0	(80-120)	
MSD	Alkalinity in CaCO3 units	100	99	MGL	99.0	(80-120)	
MSD2	Alkalinity in CaCO3 units	100	99	MGL	99.0	(80-120)	
RPD_LCS	Alkalinity in CaCO3 units	98.000	99.000	MGL	1.0	(0-10)	
RPD_MS	Alkalinity in CaCO3 units	100.000	99.000	MGL	1.0	(0-20)	

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QC Ref #440524 Fluoride

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 28	07250258	MGL		(0-0)	
CCC3	Fluoride	10.0	10.2	MGL	102.0	(81-116)	
CCCH	Fluoride	10.0	10.5	MGL	105.0	(81-116)	
CCCL	Fluoride	0.5	0.504	MGL	100.8	(81-116)	
CCCM	Fluoride	0.5	0.511	MGL	102.2	(81-116)	
CCCS	Fluoride	0.05	0.0472	MGL	94.4	(50-150)	
LCS1	Fluoride	1.00	1.02	MGL	102.0	(81-116)	
LCS2	Fluoride	1.00	1.01	MGL	101.0	(81-116)	
MBLK	Fluoride	ND	<0.050	MGL			
MRL_CHK	Fluoride	0.05	0.0472	MGL	94.4	(50-150)	
MS	Fluoride	1.00	1.03	MGL	103.0	(73-124)	
MS2	Fluoride	1.00	1.03	MGL	103.0	(73-124)	
MSD	Fluoride	1.00	1.02	MGL	102.0	(73-124)	
MSD2	Fluoride	1.00	1.08	MGL	108.0	(73-124)	
RPD_LCS	Fluoride	102.000	101.000	MGL	1.0	(0-20)	
RPD_MS	Fluoride	103.000	102.000	MGL	1.0	(0-20)	

QC Ref #440653 Specific Conductance

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
DUP	Specific Conductance	588	581	UMHO		(0-20)	1.2
DUP2	Specific Conductance	14	14	UMHO		(0-20)	0.0
LCS1	Specific Conductance	1000	1000	UMHO	100.0	(90-110)	
LCS2	Specific Conductance	1000	998	UMHO	99.8	(90-110)	
MBLK	Specific Conductance	ND	<2.0	UMHO			
MRL_CHK	Specific Conductance	2.00	1.68	UMHO	84.0	(50-150)	

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QC Ref #440846 Glyphosate

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 28	07250299	UGL		(0-0)	
LCS1	Glyphosate	10	10.1	UGL	101.0	(77-119)	
MBLK	Glyphosate	ND	<6.0	UGL			
MRL_CHK	Glyphosate	6.00	6.00	UGL	100.0	(50-150)	
MS	Glyphosate	10	10.1	UGL	101.0	(74-126)	
MSD	Glyphosate	10	10.1	UGL	101.0	(74-126)	
RPD_MS	Glyphosate	101.000	101.000	UGL	0.0	(0-20)	

QC Ref #440926 Cyanide

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 28	07250312	MGL		(0-0)	
LCS1	Cyanide	0.10	0.105	MGL	105.0	(80-120)	
LCS2	Cyanide	0.10	0.108	MGL	108.0	(80-120)	
MBLK	Cyanide	ND	<0.025	MGL			
MRL_CHK	Cyanide	0.025	0.0285	MGL	114.0	(50-150)	
MS	Cyanide	0.10	0.105	MGL	105.0	(80-120)	
MSD	Cyanide	0.10	0.106	MGL	106.0	(80-120)	
RPD_LCS	Cyanide	105.000	108.000	MGL	2.8	(0-20)	
RPD_MS	Cyanide	105.000	106.000	MGL	0.9	(0-20)	

QC Ref #441203 Diquat and Paraquat

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS2	Spiked sample	Lab # 28	07250216	NONE		(0-0)	
MS_2ND	Spiked sample	Lab # 28	07250216	NONE		(0-0)	
MS	Spiked sample	Lab # 28	07250037	NONE		(0-0)	
LCS1	Diquat	5.0	3.77	UGL	75.4	(70-130)	

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LCS2	Diquat	5.0	3.96	UGL	79.2	(70-130)
MBLK	Diquat	ND	<0.4	UGL		
MRL_CHK	Diquat	0.400	0.674	UGL	168.5	(50-150)
MS	Diquat	5.0	3.50	UGL	70.0	(70-130)
MS2	Diquat	5.0	3.06	UGL	61.2	(70-130)
MSD	Diquat	5.0	3.90	UGL	78.0	(70-130)
MS_2ND	Diquat	5.0	3.23	UGL	64.6	(70-130)
RPD_LCS	Diquat	75.400	79.200	UGL	4.9	(0-20)
RPD_MS	Diquat	70.000	78.000	UGL	10.8	(0-20)
LCS1	Paraquat	5.0	3.78	UGL	75.6	(70-130)
LCS2	Paraquat	5.0	3.58	UGL	71.6	(70-130)
MBLK	Paraquat	ND	<2.0	UGL		
MRL_CHK	Paraquat	2.00	1.86	UGL	93.0	(50-150)
MS	Paraquat	5.0	3.84	UGL	76.8	(70-130)
MS2	Paraquat	5.0	3.29	UGL	65.8	(70-130)
MSD	Paraquat	5.0	4.12	UGL	82.4	(70-130)
MS_2ND	Paraquat	5.0	3.47	UGL	69.4	(70-130)
RPD_LCS	Paraquat	75.600	71.600	UGL	5.4	(0-20)
RPD_MS	Paraquat	76.800	82.400	UGL	7.0	(0-20)

QC Ref #441255 Aldicarbs by 531.2

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS2	3-Hydroxycarbofuran	10.0	10.2	UGL	102.0	(70-130)	
MBLK	3-Hydroxycarbofuran	ND	<0.5	UGL			
MRL_CHK	3-Hydroxycarbofuran	0.50	0.515	UGL	103.0	(50-150)	
MS	3-Hydroxycarbofuran	10.0	9.43	UGL	94.3	(70-130)	
MSD	3-Hydroxycarbofuran	10.0	9.40	UGL	94.0	(70-130)	
RPD_MS	3-Hydroxycarbofuran	94.300	94.000	UGL	0.3	(0-20)	
MS	Spiked sample	Lab # 28	07250216	NONE		(0-0)	
LCS2	Aldicarb (Temik)	10.0	9.31	UGL	93.1	(70-130)	
MBLK	Aldicarb (Temik)	ND	<0.5	UGL			
MRL_CHK	Aldicarb (Temik)	0.50	0.541	UGL	108.2	(50-150)	
MS	Aldicarb (Temik)	10.0	11.0	UGL	110.0	(70-130)	

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MSD	Aldicarb (Temik)	10.0	11.0	UGL	110.0	(70-130)
RPD_MS	Aldicarb (Temik)	110.000	110.000	UGL	0.0	(0-20)
LCS2	Aldicarb sulfone	10.0	9.66	UGL	96.6	(70-130)
MBLK	Aldicarb sulfone	ND	<0.5	UGL		
MRL_CHK	Aldicarb sulfone	0.50	0.442	UGL	88.4	(50-150)
MS	Aldicarb sulfone	10.0	9.57	UGL	95.7	(70-130)
MSD	Aldicarb sulfone	10.0	9.59	UGL	95.9	(70-130)
RPD_MS	Aldicarb sulfone	95.700	95.900	UGL	0.2	(0-20)
LCS2	Aldicarb sulfoxide	10.0	9.43	UGL	94.3	(70-130)
MBLK	Aldicarb sulfoxide	ND	<0.5	UGL		
MRL_CHK	Aldicarb sulfoxide	0.50	0.519	UGL	103.8	(50-150)
MS	Aldicarb sulfoxide	10.0	9.54	UGL	95.4	(70-130)
MSD	Aldicarb sulfoxide	10.0	9.63	UGL	96.3	(70-130)
RPD_MS	Aldicarb sulfoxide	95.400	96.300	UGL	0.9	(0-20)
LCS2	Baygon (Propoxur)	10.0	9.75	UGL	97.5	(70-130)
MBLK	Baygon (Propoxur)	ND	<0.5	UGL		
MRL_CHK	Baygon (Propoxur)	0.50	0.413	UGL	82.6	(50-150)
MS	Baygon (Propoxur)	10.0	9.55	UGL	95.5	(70-130)
MSD	Baygon (Propoxur)	10.0	9.61	UGL	96.1	(70-130)
RPD_MS	Baygon (Propoxur)	95.500	96.100	UGL	0.6	(0-20)
LCS2	Carbofuran (Furadan)	10.0	9.62	UGL	96.2	(70-130)
MBLK	Carbofuran (Furadan)	ND	<0.5	UGL		
MRL_CHK	Carbofuran (Furadan)	0.50	0.454	UGL	90.8	(50-150)
MS	Carbofuran (Furadan)	10.0	9.44	UGL	94.4	(70-130)
MSD	Carbofuran (Furadan)	10.0	9.52	UGL	95.2	(70-130)
RPD_MS	Carbofuran (Furadan)	94.400	95.200	UGL	0.8	(0-20)
LCS2	Carbaryl	10.0	10.6	UGL	106.0	(70-130)
MBLK	Carbaryl	ND	<0.5	UGL		
MRL_CHK	Carbaryl	0.50	0.455	UGL	91.0	(50-150)
MS	Carbaryl	10.0	9.07	UGL	90.7	(70-130)
MSD	Carbaryl	10.0	9.22	UGL	92.2	(70-130)
RPD_MS	Carbaryl	90.700	92.200	UGL	1.6	(0-20)
LCS2	Methiocarb	10.0	8.02	UGL	80.2	(70-130)
MBLK	Methiocarb	ND	<0.5	UGL		
MRL_CHK	Methiocarb	0.50	0.402	UGL	80.4	(50-150)

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MS	Methiocarb	10.0	8.66	UGL	86.6	(70-130)
MSD	Methiocarb	10.0	8.93	UGL	89.3	(70-130)
RPD_MS	Methiocarb	86.600	89.300	UGL	3.1	(0-20)
LCS2	Methomyl	10.0	9.81	UGL	98.1	(70-130)
MBLK	Methomyl	ND	<0.5	UGL		
MRL_CHK	Methomyl	0.50	0.413	UGL	82.6	(50-150)
MS	Methomyl	10.0	9.58	UGL	95.8	(70-130)
MSD	Methomyl	10.0	9.65	UGL	96.5	(70-130)
RPD_MS	Methomyl	95.800	96.500	UGL	0.7	(0-20)
LCS2	Oxamyl (Vydate)	10.0	9.94	UGL	99.4	(70-130)
MBLK	Oxamyl (Vydate)	ND	<0.5	UGL		
MRL_CHK	Oxamyl (Vydate)	0.50	0.558	UGL	111.6	(50-150)
MS	Oxamyl (Vydate)	10.0	9.50	UGL	95.0	(70-130)
MSD	Oxamyl (Vydate)	10.0	9.56	UGL	95.6	(70-130)
RPD_MS	Oxamyl (Vydate)	95.000	95.600	UGL	0.6	(0-20)
LCS2	BDMC	100	81	%R	81.0	(70-130)
MBLK	BDMC	100	101	%R	101.0	
MRL_CHK	BDMC	100	99	%R	99.0	(70-130)
MS	BDMC	100	87	%R	87.0	(70-130)
MSD	BDMC	100	93	%R	93.0	(70-130)
RPD_MS	BDMC	87.000	93.000	%R	6.7	(0-20)

QC Ref #441323 Arsenic, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07290076	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	07300203	UGL		(0-0)	
LCS1	Arsenic, Total, ICAP/MS	20	21.8	UGL	109.0	(85-115)	
LCS2	Arsenic, Total, ICAP/MS	20	21.5	UGL	107.5	(85-115)	
MBLK	Arsenic, Total, ICAP/MS	ND	<1.0	UGL			
MRL_CHK	Arsenic, Total, ICAP/MS	1.000	1.08	UGL	108.0	(50-150)	
MS	Arsenic, Total, ICAP/MS	20	20.8	UGL	104.0	(70-130)	
MS2	Arsenic, Total, ICAP/MS	20	16.5	UGL	82.5	(70-130)	
MSD	Arsenic, Total, ICAP/MS	20	21.5	UGL	107.5	(70-130)	

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MSD2	Arsenic, Total, ICAP/MS	20	16.7	UGL	83.5	(70-130)
RPD_LCS	Arsenic, Total, ICAP/MS	109.000	107.500	UGL	1.4	(0-20)
RPD_MS	Arsenic, Total, ICAP/MS	104.000	107.500	UGL	3.3	(0-20)

QC Ref #441809 Regulated VOCs plus Lists 1&3

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS1	1,1,1,2-Tetrachloroethane	5	4.69	UGL	93.8	(70-130)	
LCS2	1,1,1,2-Tetrachloroethane	5	4.79	UGL	95.8	(70-130)	
MBLK	1,1,1,2-Tetrachloroethane	ND	<0.5	UGL			
MRL_CHK	1,1,1,2-Tetrachloroethane	0.500	0.48	UGL	96.0	(50-150)	
RPD_LCS	1,1,1,2-Tetrachloroethane	93.800	95.800	UGL	2.1	(0-20)	
LCS1	1,1,1-Trichloroethane	5	5.47	UGL	109.4	(70-130)	
LCS2	1,1,1-Trichloroethane	5	5.42	UGL	108.4	(70-130)	
MBLK	1,1,1-Trichloroethane	ND	<0.5	UGL			
MRL_CHK	1,1,1-Trichloroethane	0.500	0.63	UGL	126.0	(50-150)	
RPD_LCS	1,1,1-Trichloroethane	109.400	108.400	UGL	0.9	(0-20)	
LCS1	1,1,2,2-Tetrachloroethane	5	5.19	UGL	103.8	(70-130)	
LCS2	1,1,2,2-Tetrachloroethane	5	5.07	UGL	101.4	(70-130)	
MBLK	1,1,2,2-Tetrachloroethane	ND	<0.5	UGL			
MRL_CHK	1,1,2,2-Tetrachloroethane	0.500	0.59	UGL	118.0	(50-150)	
RPD_LCS	1,1,2,2-Tetrachloroethane	103.800	101.400	UGL	2.3	(0-20)	
LCS1	1,1,2-Trichloroethane	5	4.61	UGL	92.2	(70-130)	
LCS2	1,1,2-Trichloroethane	5	4.54	UGL	90.8	(70-130)	
MBLK	1,1,2-Trichloroethane	ND	<0.5	UGL			
MRL_CHK	1,1,2-Trichloroethane	0.500	0.51	UGL	102.0	(50-150)	
RPD_LCS	1,1,2-Trichloroethane	92.200	90.800	UGL	1.5	(0-20)	
LCS1	1,1-Dichloroethane	5	5.39	UGL	107.8	(70-130)	
LCS2	1,1-Dichloroethane	5	5.23	UGL	104.6	(70-130)	
MBLK	1,1-Dichloroethane	ND	<0.5	UGL			
MRL_CHK	1,1-Dichloroethane	0.500	0.61	UGL	122.0	(50-150)	
RPD_LCS	1,1-Dichloroethane	107.800	104.600	UGL	3.0	(0-20)	
LCS1	1,1-Dichloroethylene	5	5.34	UGL	106.8	(70-130)	
LCS2	1,1-Dichloroethylene	5	5.22	UGL	104.4	(70-130)	

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Hawaii Department of Water Supply
(Hilo)
(continued)

MBLK	1,1-Dichloroethylene	ND	<0.5	UGL		
MRL_CHK	1,1-Dichloroethylene	0.500	0.60	UGL	120.0	(50-150)
RPD_LCS	1,1-Dichloroethylene	106.800	104.400	UGL	2.3	(0-20)
LCS1	1,1-Dichloropropene	5	5.40	UGL	108.0	(70-130)
LCS2	1,1-Dichloropropene	5	5.25	UGL	105.0	(70-130)
MBLK	1,1-Dichloropropene	ND	<0.5	UGL		
MRL_CHK	1,1-Dichloropropene	0.500	0.56	UGL	112.0	(50-150)
RPD_LCS	1,1-Dichloropropene	108.000	105.000	UGL	2.8	(0-20)
LCS1	1,2,3-Trichlorobenzene	5	4.97	UGL	99.4	(70-130)
LCS2	1,2,3-Trichlorobenzene	5	5.35	UGL	107.0	(70-130)
MBLK	1,2,3-Trichlorobenzene	ND	<0.5	UGL		
MRL_CHK	1,2,3-Trichlorobenzene	0.500	0.40	UGL	80.0	(50-150)
RPD_LCS	1,2,3-Trichlorobenzene	99.400	107.000	UGL	7.4	(0-20)
LCS1	1,2,3-Trichloropropane	5	4.37	UGL	87.4	(70-130)
LCS2	1,2,3-Trichloropropane	5	4.31	UGL	86.2	(70-130)
MBLK	1,2,3-Trichloropropane	ND	<0.5	UGL		
MRL_CHK	1,2,3-Trichloropropane	0.500	0.60	UGL	120.0	(50-150)
RPD_LCS	1,2,3-Trichloropropane	87.400	86.200	UGL	1.4	(0-20)
LCS1	1,2,4-Trichlorobenzene	5	4.84	UGL	96.8	(70-130)
LCS2	1,2,4-Trichlorobenzene	5	4.82	UGL	96.4	(70-130)
MBLK	1,2,4-Trichlorobenzene	ND	<0.5	UGL		
MRL_CHK	1,2,4-Trichlorobenzene	0.500	0.40	UGL	80.0	(50-150)
RPD_LCS	1,2,4-Trichlorobenzene	96.800	96.400	UGL	0.4	(0-20)
LCS1	1,2,4-Trimethylbenzene	5	5.26	UGL	105.2	(70-130)
LCS2	1,2,4-Trimethylbenzene	5	5.15	UGL	103.0	(70-130)
MBLK	1,2,4-Trimethylbenzene	ND	<0.5	UGL		
MRL_CHK	1,2,4-Trimethylbenzene	0.500	0.58	UGL	116.0	(50-150)
RPD_LCS	1,2,4-Trimethylbenzene	105.200	103.000	UGL	2.1	(0-20)
LCS1	1,2-Dichloroethane	5	5.45	UGL	109.0	(70-130)
LCS2	1,2-Dichloroethane	5	5.25	UGL	105.0	(70-130)
MBLK	1,2-Dichloroethane	ND	<0.5	UGL		
MRL_CHK	1,2-Dichloroethane	0.500	0.54	UGL	108.0	(50-150)
RPD_LCS	1,2-Dichloroethane	109.000	105.000	UGL	3.7	(0-20)
LCS1	1,2-Dichloropropane	5	4.73	UGL	94.6	(70-130)
LCS2	1,2-Dichloropropane	5	4.79	UGL	95.8	(70-130)

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Hawaii Department of Water Supply
(Hilo)
(continued)

MBLK	1,2-Dichloropropane	ND	<0.5	UGL		
MRL_CHK	1,2-Dichloropropane	0.500	0.53	UGL	106.0	(50-150)
RPD_LCS	1,2-Dichloropropane	94.600	95.800	UGL	1.3	(0-20)
LCS1	1,3,5-Trimethylbenzene	5	5.29	UGL	105.8	(70-130)
LCS2	1,3,5-Trimethylbenzene	5	5.09	UGL	101.8	(70-130)
MBLK	1,3,5-Trimethylbenzene	ND	<0.5	UGL		
MRL_CHK	1,3,5-Trimethylbenzene	0.500	0.53	UGL	106.0	(50-150)
RPD_LCS	1,3,5-Trimethylbenzene	105.800	101.800	UGL	3.9	(0-20)
LCS1	1,3-Dichloropropane	5	4.62	UGL	92.4	(70-130)
LCS2	1,3-Dichloropropane	5	4.59	UGL	91.8	(70-130)
MBLK	1,3-Dichloropropane	ND	<0.5	UGL		
MRL_CHK	1,3-Dichloropropane	0.500	0.50	UGL	100.0	(50-150)
RPD_LCS	1,3-Dichloropropane	92.400	91.800	UGL	0.7	(0-20)
LCS1	p-Dichlorobenzene (1,4-DCB)	5	5.51	UGL	110.2	(70-130)
LCS2	p-Dichlorobenzene (1,4-DCB)	5	5.23	UGL	104.6	(70-130)
MBLK	p-Dichlorobenzene (1,4-DCB)	ND	<0.5	UGL		
MRL_CHK	p-Dichlorobenzene (1,4-DCB)	0.500	0.52	UGL	104.0	(50-150)
RPD_LCS	p-Dichlorobenzene (1,4-DCB)	110.200	104.600	UGL	5.2	(0-20)
LCS1	2,2-Dichloropropane	5	5.53	UGL	110.6	(70-130)
LCS2	2,2-Dichloropropane	5	5.11	UGL	102.2	(70-130)
MBLK	2,2-Dichloropropane	ND	<0.5	UGL		
MRL_CHK	2,2-Dichloropropane	0.500	0.63	UGL	126.0	(50-150)
RPD_LCS	2,2-Dichloropropane	110.600	102.200	UGL	7.9	(0-20)
LCS1	2-Butanone (MEK)	50	51.8	UGL	103.6	(70-130)
LCS2	2-Butanone (MEK)	50	50.4	UGL	100.8	(70-130)
MBLK	2-Butanone (MEK)	ND	<5.0	UGL		
MRL_CHK	2-Butanone (MEK)	5.00	2.51	UGL	50.2	(50-150)
RPD_LCS	2-Butanone (MEK)	103.600	100.800	UGL	2.7	(0-20)
LCS1	o-Chlorotoluene	5	5.80	UGL	116.0	(70-130)
LCS2	o-Chlorotoluene	5	5.29	UGL	105.8	(70-130)
MBLK	o-Chlorotoluene	ND	<0.5	UGL		
MRL_CHK	o-Chlorotoluene	0.500	0.60	UGL	120.0	(50-150)
RPD_LCS	o-Chlorotoluene	116.000	105.800	UGL	9.2	(0-20)
LCS1	p-Chlorotoluene	5	5.41	UGL	108.2	(70-130)
LCS2	p-Chlorotoluene	5	5.37	UGL	107.4	(70-130)

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Hawaii Department of Water Supply
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(continued)

MBLK	p-Chlorotoluene	ND	<0.5	UGL		
MRL_CHK	p-Chlorotoluene	0.500	0.63	UGL	126.0	(50-150)
RPD_LCS	p-Chlorotoluene	108.200	107.400	UGL	0.7	(0-20)
LCS1	4-Methyl-2-Pentanone (MIBK)	50	38.6	UGL	77.2	(70-130)
LCS2	4-Methyl-2-Pentanone (MIBK)	50	38.2	UGL	76.4	(70-130)
MBLK	4-Methyl-2-Pentanone (MIBK)	ND	<5.0	UGL		
MRL_CHK	4-Methyl-2-Pentanone (MIBK)	5.00	4.28	UGL	85.6	(50-150)
RPD_LCS	4-Methyl-2-Pentanone (MIBK)	77.200	76.400	UGL	1.0	(0-20)
LCS1	Benzene	5	4.93	UGL	98.6	(70-130)
LCS2	Benzene	5	4.80	UGL	96.0	(70-130)
MBLK	Benzene	ND	<0.5	UGL		
MRL_CHK	Benzene	0.500	0.53	UGL	106.0	(50-150)
RPD_LCS	Benzene	98.600	96.000	UGL	2.7	(0-20)
LCS1	Bromobenzene	5	5.29	UGL	105.8	(70-130)
LCS2	Bromobenzene	5	4.88	UGL	97.6	(70-130)
MBLK	Bromobenzene	ND	<0.5	UGL		
MRL_CHK	Bromobenzene	0.500	0.54	UGL	108.0	(50-150)
RPD_LCS	Bromobenzene	105.800	97.600	UGL	8.1	(0-20)
LCS1	Bromomethane (Methyl Bromide)	5	5.35	UGL	107.0	(70-130)
LCS2	Bromomethane (Methyl Bromide)	5	5.01	UGL	100.2	(70-130)
MBLK	Bromomethane (Methyl Bromide)	ND	<0.5	UGL		
MRL_CHK	Bromomethane (Methyl Bromide)	0.500	0.69	UGL	138.0	(50-150)
RPD_LCS	Bromomethane (Methyl Bromide)	107.000	100.200	UGL	6.6	(0-20)
LCS1	Bromoethane	5	5.98	UGL	119.6	(70-130)
LCS2	Bromoethane	5	5.86	UGL	117.2	(70-130)
MBLK	Bromoethane	ND	<0.5	UGL		
MRL_CHK	Bromoethane	0.500	0.69	UGL	138.0	(50-150)
RPD_LCS	Bromoethane	119.600	117.200	UGL	2.0	(0-20)
LCS1	cis-1,2-Dichloroethylene	5	4.86	UGL	97.2	(70-130)
LCS2	cis-1,2-Dichloroethylene	5	4.62	UGL	92.4	(70-130)
MBLK	cis-1,2-Dichloroethylene	ND	<0.5	UGL		
MRL_CHK	cis-1,2-Dichloroethylene	0.500	0.54	UGL	108.0	(50-150)
RPD_LCS	cis-1,2-Dichloroethylene	97.200	92.400	UGL	5.1	(0-20)
LCS1	Chlorobenzene	5	4.73	UGL	94.6	(70-130)
LCS2	Chlorobenzene	5	4.51	UGL	90.2	(70-130)

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Hawaii Department of Water Supply
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(continued)

MBLK	Chlorobenzene	ND	<0.5	UGL		
MRL_CHK	Chlorobenzene	0.500	0.46	UGL	92.0	(50-150)
RPD_LCS	Chlorobenzene	94.600	90.200	UGL	4.8	(0-20)
LCS1	Carbon Tetrachloride	5	6.16	UGL	123.2	(70-130)
LCS2	Carbon Tetrachloride	5	5.78	UGL	115.6	(70-130)
MBLK	Carbon Tetrachloride	ND	<0.5	UGL		
MRL_CHK	Carbon Tetrachloride	0.500	0.63	UGL	126.0	(50-150)
RPD_LCS	Carbon Tetrachloride	123.200	115.600	UGL	6.4	(0-20)
LCS1	cis-1,3-Dichloropropene	5	4.63	UGL	92.6	(70-130)
LCS2	cis-1,3-Dichloropropene	5	4.63	UGL	92.6	(70-130)
MBLK	cis-1,3-Dichloropropene	ND	<0.5	UGL		
MRL_CHK	cis-1,3-Dichloropropene	0.500	0.51	UGL	102.0	(50-150)
RPD_LCS	cis-1,3-Dichloropropene	92.600	92.600	UGL	0.0	(0-20)
LCS1	Bromoform	5	5.24	UGL	104.8	(70-130)
LCS2	Bromoform	5	4.87	UGL	97.4	(70-130)
MBLK	Bromoform	ND	<0.5	UGL		
MRL_CHK	Bromoform	0.500	0.57	UGL	114.0	(50-150)
RPD_LCS	Bromoform	104.800	97.400	UGL	7.3	(0-20)
LCS1	Chloroform (Trichloromethane)	5	5.30	UGL	106.0	(70-130)
LCS2	Chloroform (Trichloromethane)	5	5.09	UGL	101.8	(70-130)
MBLK	Chloroform (Trichloromethane)	ND	<0.5	UGL		
MRL_CHK	Chloroform (Trichloromethane)	0.500	0.58	UGL	116.0	(50-150)
RPD_LCS	Chloroform (Trichloromethane)	106.000	101.800	UGL	4.0	(0-20)
LCS1	Bromochloromethane	5	5.60	UGL	112.0	(70-130)
LCS2	Bromochloromethane	5	5.54	UGL	110.8	(70-130)
MBLK	Bromochloromethane	ND	<0.5	UGL		
MRL_CHK	Bromochloromethane	0.500	0.55	UGL	110.0	(50-150)
RPD_LCS	Bromochloromethane	112.000	110.800	UGL	1.1	(0-20)
LCS1	Chloroethane	5	5.06	UGL	101.2	(70-130)
LCS2	Chloroethane	5	4.85	UGL	97.0	(70-130)
MBLK	Chloroethane	ND	<0.5	UGL		
MRL_CHK	Chloroethane	0.500	0.72	UGL	144.0	(50-150)
RPD_LCS	Chloroethane	101.200	97.000	UGL	4.2	(0-20)
LCS1	Chloromethane(Methyl Chloride)	5	5.74	UGL	114.8	(70-130)
LCS2	Chloromethane(Methyl Chloride)	5	5.53	UGL	110.6	(70-130)

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Hawaii Department of Water Supply
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MBLK	Chloromethane(Methyl Chloride)	ND	<0.5	UGL		
MRL_CHK	Chloromethane(Methyl Chloride)	0.500	0.70	UGL	140.0	(50-150)
RPD_LCS	Chloromethane(Methyl Chloride)	114.800	110.600	UGL	3.7	(0-20)
LCS1	Chlorodibromomethane	5	4.72	UGL	94.4	(70-130)
LCS2	Chlorodibromomethane	5	4.75	UGL	95.0	(70-130)
MBLK	Chlorodibromomethane	ND	<0.5	UGL		
MRL_CHK	Chlorodibromomethane	0.500	0.55	UGL	110.0	(50-150)
RPD_LCS	Chlorodibromomethane	94.400	95.000	UGL	0.6	(0-20)
LCS1	Dibromomethane	5	5.05	UGL	101.0	(70-130)
LCS2	Dibromomethane	5	5.04	UGL	100.8	(70-130)
MBLK	Dibromomethane	ND	<0.5	UGL		
MRL_CHK	Dibromomethane	0.500	0.53	UGL	106.0	(50-150)
RPD_LCS	Dibromomethane	101.000	100.800	UGL	0.2	(0-20)
LCS1	Bromodichloromethane	5	4.73	UGL	94.6	(70-130)
LCS2	Bromodichloromethane	5	4.59	UGL	91.8	(70-130)
MBLK	Bromodichloromethane	ND	<0.5	UGL		
MRL_CHK	Bromodichloromethane	0.500	0.51	UGL	102.0	(50-150)
RPD_LCS	Bromodichloromethane	94.600	91.800	UGL	3.0	(0-20)
LCS1	Dichloromethane	5	5.44	UGL	108.8	(70-130)
LCS2	Dichloromethane	5	5.14	UGL	102.8	(70-130)
MBLK	Dichloromethane	ND	<0.5	UGL		
MRL_CHK	Dichloromethane	0.500	0.61	UGL	122.0	(50-150)
RPD_LCS	Dichloromethane	108.800	102.800	UGL	5.7	(0-20)
LCS1	Di-isopropyl ether	5	3.81	UGL	76.2	(70-130)
LCS2	Di-isopropyl ether	5	3.75	UGL	75.0	(70-130)
MBLK	Di-isopropyl ether	ND	<0.5	UGL		
MRL_CHK	Di-isopropyl ether	0.500	0.44	UGL	88.0	(50-150)
RPD_LCS	Di-isopropyl ether	76.200	75.000	UGL	1.6	(0-20)
LCS1	Ethyl benzene	5	4.44	UGL	88.8	(70-130)
LCS2	Ethyl benzene	5	4.35	UGL	87.0	(70-130)
MBLK	Ethyl benzene	ND	<0.5	UGL		
MRL_CHK	Ethyl benzene	0.500	0.50	UGL	100.0	(50-150)
RPD_LCS	Ethyl benzene	88.800	87.000	UGL	2.0	(0-20)
LCS1	Dichlorodifluoromethane	5	5.42	UGL	108.4	(70-130)
LCS2	Dichlorodifluoromethane	5	4.99	UGL	99.8	(70-130)

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Laboratory
QC Report
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Hawaii Department of Water Supply
(Hilo)
(continued)

MBLK	Dichlorodifluoromethane	ND	<0.5	UGL		
MRL_CHK	Dichlorodifluoromethane	0.500	0.63	UGL	126.0	(50-150)
RPD_LCS	Dichlorodifluoromethane	108.400	99.800	UGL	8.3	(0-20)
LCS1	Fluorotrichloromethane-Freon11	5	6.85	UGL	137.0	(70-130)
LCS2	Fluorotrichloromethane-Freon11	5	6.60	UGL	132.0	(70-130)
MBLK	Fluorotrichloromethane-Freon11	ND	<0.5	UGL		
MRL_CHK	Fluorotrichloromethane-Freon11	0.500	0.66	UGL	132.0	(50-150)
RPD_LCS	Fluorotrichloromethane-Freon11	137.000	132.000	UGL	3.7	(0-20)
LCS1	Hexachlorobutadiene	5	6.50	UGL	130.0	(70-130)
LCS2	Hexachlorobutadiene	5	6.49	UGL	129.8	(70-130)
MBLK	Hexachlorobutadiene	ND	<0.5	UGL		
MRL_CHK	Hexachlorobutadiene	0.500	0.58	UGL	116.0	(50-150)
RPD_LCS	Hexachlorobutadiene	130.000	129.800	UGL	0.2	(0-20)
LCS1	Isopropylbenzene	5	5.55	UGL	111.0	(70-130)
LCS2	Isopropylbenzene	5	5.11	UGL	102.2	(70-130)
MBLK	Isopropylbenzene	ND	<0.5	UGL		
MRL_CHK	Isopropylbenzene	0.500	0.59	UGL	118.0	(50-150)
RPD_LCS	Isopropylbenzene	111.000	102.200	UGL	8.3	(0-20)
LCS1	m-Dichlorobenzene (1,3-DCB)	5	5.35	UGL	107.0	(70-130)
LCS2	m-Dichlorobenzene (1,3-DCB)	5	5.19	UGL	103.8	(70-130)
MBLK	m-Dichlorobenzene (1,3-DCB)	ND	<0.5	UGL		
MRL_CHK	m-Dichlorobenzene (1,3-DCB)	0.500	0.55	UGL	110.0	(50-150)
RPD_LCS	m-Dichlorobenzene (1,3-DCB)	107.000	103.800	UGL	3.0	(0-20)
LCS1	m,p-Xylenes	10	9.29	UGL	92.9	(70-130)
LCS2	m,p-Xylenes	10	8.92	UGL	89.2	(70-130)
MBLK	m,p-Xylenes	ND	<0.5	UGL		
MRL_CHK	m,p-Xylenes	1.00	0.97	UGL	97.0	(50-150)
RPD_LCS	m,p-Xylenes	92.900	89.200	UGL	4.1	(0-20)
LCS1	Methyl Tert-butyl ether (MTBE)	5	4.20	UGL	84.0	(70-130)
LCS2	Methyl Tert-butyl ether (MTBE)	5	4.31	UGL	86.2	(70-130)
MBLK	Methyl Tert-butyl ether (MTBE)	ND	<0.5	UGL		
MRL_CHK	Methyl Tert-butyl ether (MTBE)	0.500	0.49	UGL	98.0	(50-150)
RPD_LCS	Methyl Tert-butyl ether (MTBE)	84.000	86.200	UGL	2.6	(0-20)
LCS1	Naphthalene	5	4.48	UGL	89.6	(70-130)
LCS2	Naphthalene	5	4.63	UGL	92.6	(70-130)

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MBLK	Naphthalene	ND	<0.5	UGL		
MRL_CHK	Naphthalene	0.500	0.53	UGL	106.0	(50-150)
RPD_LCS	Naphthalene	89.600	92.600	UGL	3.3	(0-20)
LCS1	n-Butylbenzene	5	5.06	UGL	101.2	(70-130)
LCS2	n-Butylbenzene	5	5.48	UGL	109.6	(70-130)
MBLK	n-Butylbenzene	ND	<0.5	UGL		
MRL_CHK	n-Butylbenzene	0.500	0.50	UGL	100.0	(50-150)
RPD_LCS	n-Butylbenzene	101.200	109.600	UGL	8.0	(0-20)
LCS1	n-Propylbenzene	5	6.04	UGL	120.8	(70-130)
LCS2	n-Propylbenzene	5	5.52	UGL	110.4	(70-130)
MBLK	n-Propylbenzene	ND	<0.5	UGL		
MRL_CHK	n-Propylbenzene	0.500	0.58	UGL	116.0	(50-150)
RPD_LCS	n-Propylbenzene	120.800	110.400	UGL	9.0	(0-20)
LCS1	o-Xylene	5	4.63	UGL	92.6	(70-130)
LCS2	o-Xylene	5	4.38	UGL	87.6	(70-130)
MBLK	o-Xylene	ND	<0.5	UGL		
MRL_CHK	o-Xylene	0.500	0.47	UGL	94.0	(50-150)
RPD_LCS	o-Xylene	92.600	87.600	UGL	5.5	(0-20)
LCS1	o-Dichlorobenzene (1,2-DCB)	5	4.95	UGL	99.0	(70-130)
LCS2	o-Dichlorobenzene (1,2-DCB)	5	4.99	UGL	99.8	(70-130)
MBLK	o-Dichlorobenzene (1,2-DCB)	ND	<0.5	UGL		
MRL_CHK	o-Dichlorobenzene (1,2-DCB)	0.500	0.51	UGL	102.0	(50-150)
RPD_LCS	o-Dichlorobenzene (1,2-DCB)	99.000	99.800	UGL	0.8	(0-20)
LCS1	Tetrachloroethylene (PCE)	5	5.41	UGL	108.2	(70-130)
LCS2	Tetrachloroethylene (PCE)	5	5.30	UGL	106.0	(70-130)
MBLK	Tetrachloroethylene (PCE)	ND	<0.5	UGL		
MRL_CHK	Tetrachloroethylene (PCE)	0.500	0.52	UGL	104.0	(50-150)
RPD_LCS	Tetrachloroethylene (PCE)	108.200	106.000	UGL	2.1	(0-20)
LCS1	p-Isopropyltoluene	5	5.38	UGL	107.6	(70-130)
LCS2	p-Isopropyltoluene	5	5.10	UGL	102.0	(70-130)
MBLK	p-Isopropyltoluene	ND	<0.5	UGL		
MRL_CHK	p-Isopropyltoluene	0.500	0.55	UGL	110.0	(50-150)
RPD_LCS	p-Isopropyltoluene	107.600	102.000	UGL	5.3	(0-20)
LCS1	sec-Butylbenzene	5	5.74	UGL	114.8	(70-130)
LCS2	sec-Butylbenzene	5	5.50	UGL	110.0	(70-130)

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MBLK	sec-Butylbenzene	ND	<0.5	UGL		
MRL_CHK	sec-Butylbenzene	0.500	0.56	UGL	112.0	(50-150)
RPD_LCS	sec-Butylbenzene	114.800	110.000	UGL	4.3	(0-20)
LCS1	Styrene	5	4.23	UGL	84.6	(70-130)
LCS2	Styrene	5	4.03	UGL	80.6	(70-130)
MBLK	Styrene	ND	<0.5	UGL		
MRL_CHK	Styrene	0.500	0.43	UGL	86.0	(50-150)
RPD_LCS	Styrene	84.600	80.600	UGL	4.8	(0-20)
LCS1	1,2-dichloroethane-d4	100	115	%R	115.0	(70-130)
LCS2	1,2-dichloroethane-d4	100	116	%R	116.0	(70-130)
MBLK	1,2-dichloroethane-d4	100	117	%R	117.0	
MRL_CHK	1,2-dichloroethane-d4	100	110	%R	110.0	(50-150)
RPD_LCS	1,2-dichloroethane-d4	115.000	116.000	%R	0.9	(0-20)
LCS1	Toluene-d8	100	93	%R	93.0	(70-130)
LCS2	Toluene-d8	100	96	%R	96.0	(70-130)
MBLK	Toluene-d8	100	96	%R	96.0	
MRL_CHK	Toluene-d8	100	94	%R	94.0	(50-150)
RPD_LCS	Toluene-d8	93.000	96.000	%R	3.2	(0-20)
LCS1	4-Bromofluorobenzene	100	103	%R	103.0	(70-130)
LCS2	4-Bromofluorobenzene	100	101	%R	101.0	(70-130)
MBLK	4-Bromofluorobenzene	100	99	%R	99.0	
MRL_CHK	4-Bromofluorobenzene	100	104	%R	104.0	(50-150)
RPD_LCS	4-Bromofluorobenzene	103.000	101.000	%R	2.0	(0-20)
LCS1	trans-1,2-Dichloroethylene	5	5.38	UGL	107.6	(70-130)
LCS2	trans-1,2-Dichloroethylene	5	5.27	UGL	105.4	(70-130)
MBLK	trans-1,2-Dichloroethylene	ND	<0.5	UGL		
MRL_CHK	trans-1,2-Dichloroethylene	0.500	0.62	UGL	124.0	(50-150)
RPD_LCS	trans-1,2-Dichloroethylene	107.600	105.400	UGL	2.1	(0-20)
LCS1	tert-amyl Methyl Ether	5	3.87	UGL	77.4	(70-130)
LCS2	tert-amyl Methyl Ether	5	3.67	UGL	73.4	(70-130)
MBLK	tert-amyl Methyl Ether	ND	<3.0	UGL		
MRL_CHK	tert-amyl Methyl Ether	0.500	0.44	UGL	88.0	(50-150)
RPD_LCS	tert-amyl Methyl Ether	77.400	73.400	UGL	5.3	(0-20)
LCS1	tert-Butyl Ethyl Ether	5	3.78	UGL	75.6	(70-130)
LCS2	tert-Butyl Ethyl Ether	5	3.89	UGL	77.8	(70-130)

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MBLK	tert-Butyl Ethyl Ether	ND	<3.0	UGL		
MRL_CHK	tert-Butyl Ethyl Ether	0.500	0.44	UGL	88.0	(50-150)
RPD_LCS	tert-Butyl Ethyl Ether	75.600	77.800	UGL	2.9	(0-20)
LCS1	tert-Butylbenzene	5	5.50	UGL	110.0	(70-130)
LCS2	tert-Butylbenzene	5	5.14	UGL	102.8	(70-130)
MBLK	tert-Butylbenzene	ND	<0.5	UGL		
MRL_CHK	tert-Butylbenzene	0.500	0.52	UGL	104.0	(50-150)
RPD_LCS	tert-Butylbenzene	110.000	102.800	UGL	6.8	(0-20)
LCS1	Trichloroethylene (TCE)	5	5.21	UGL	104.2	(70-130)
LCS2	Trichloroethylene (TCE)	5	5.22	UGL	104.4	(70-130)
MBLK	Trichloroethylene (TCE)	ND	<0.5	UGL		
MRL_CHK	Trichloroethylene (TCE)	0.500	0.52	UGL	104.0	(50-150)
RPD_LCS	Trichloroethylene (TCE)	104.200	104.400	UGL	0.2	(0-20)
LCS1	Trichlorotrifluoroethane(Freon	5	5.75	UGL	115.0	(70-130)
LCS2	Trichlorotrifluoroethane(Freon	5	5.30	UGL	106.0	(70-130)
MBLK	Trichlorotrifluoroethane(Freon	ND	<0.5	UGL		
MRL_CHK	Trichlorotrifluoroethane(Freon	0.500	0.56	UGL	112.0	(50-150)
RPD_LCS	Trichlorotrifluoroethane(Freon	115.000	106.000	UGL	8.1	(0-20)
LCS1	trans-1,3-Dichloropropene	5	4.53	UGL	90.6	(70-130)
LCS2	trans-1,3-Dichloropropene	5	4.43	UGL	88.6	(70-130)
MBLK	trans-1,3-Dichloropropene	ND	<0.5	UGL		
MRL_CHK	trans-1,3-Dichloropropene	0.500	0.49	UGL	98.0	(50-150)
RPD_LCS	trans-1,3-Dichloropropene	90.600	88.600	UGL	2.2	(0-20)
LCS1	Toluene	5	4.76	UGL	95.2	(70-130)
LCS2	Toluene	5	4.63	UGL	92.6	(70-130)
MBLK	Toluene	ND	<0.5	UGL		
MRL_CHK	Toluene	0.500	0.53	UGL	106.0	(50-150)
RPD_LCS	Toluene	95.200	92.600	UGL	2.8	(0-20)
LCS1	Vinyl chloride (VC)	5	5.52	UGL	110.4	(70-130)
LCS2	Vinyl chloride (VC)	5	5.25	UGL	105.0	(70-130)
MBLK	Vinyl chloride (VC)	ND	<0.3	UGL		
MRL_CHK	Vinyl chloride (VC)	0.500	0.63	UGL	126.0	(50-150)
RPD_LCS	Vinyl chloride (VC)	110.400	105.000	UGL	5.0	(0-20)

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QC Ref #441825 Chromium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Chromium, Total, ICAP/MS	100	99.3	UGL	99.3	(85-115)	
LCS2	Chromium, Total, ICAP/MS	100	97.3	UGL	97.3	(85-115)	
MBLK	Chromium, Total, ICAP/MS	ND	<1.0	UGL			
MRL_CHK	Chromium, Total, ICAP/MS	1.000	1.04	UGL	104.0	(50-150)	
MS	Chromium, Total, ICAP/MS	100	96.1	UGL	96.1	(70-130)	
MS2	Chromium, Total, ICAP/MS	100	96.2	UGL	96.2	(70-130)	
MSD	Chromium, Total, ICAP/MS	100	96.6	UGL	96.6	(70-130)	
MSD2	Chromium, Total, ICAP/MS	100	97.5	UGL	97.5	(70-130)	
RPD_LCS	Chromium, Total, ICAP/MS	99.300	97.300	UGL	2.0	(0-20)	
RPD_MS	Chromium, Total, ICAP/MS	96.100	96.600	UGL	0.5	(0-20)	

QC Ref #441834 Nickel, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Nickel, Total, ICAP/MS	50	51.8	UGL	103.6	(85-115)	
LCS2	Nickel, Total, ICAP/MS	50	50.5	UGL	101.0	(85-115)	
MBLK	Nickel, Total, ICAP/MS	ND	<5.0	UGL			
MRL_CHK	Nickel, Total, ICAP/MS	5.000	5.37	UGL	107.4	(50-150)	
MS	Nickel, Total, ICAP/MS	50	47.5	UGL	95.0	(70-130)	
MS2	Nickel, Total, ICAP/MS	50	48.7	UGL	97.4	(70-130)	
MSD	Nickel, Total, ICAP/MS	50	47.9	UGL	95.8	(70-130)	
MSD2	Nickel, Total, ICAP/MS	50	49.9	UGL	99.8	(70-130)	
RPD_LCS	Nickel, Total, ICAP/MS	103.600	101.000	UGL	2.5	(0-20)	
RPD_MS	Nickel, Total, ICAP/MS	95.000	95.800	UGL	0.8	(0-20)	

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QC Ref #441838 Copper, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Copper, Total, ICAP/MS	100	106	UGL	106.0	(85-115)	
LCS2	Copper, Total, ICAP/MS	100	103	UGL	103.0	(85-115)	
MBLK	Copper, Total, ICAP/MS	ND	<2.0	UGL			
MRL_CHK	Copper, Total, ICAP/MS	2.000	2.19	UGL	109.5	(50-150)	
MS	Copper, Total, ICAP/MS	100	97.1	UGL	97.1	(70-130)	
MS2	Copper, Total, ICAP/MS	100	101	UGL	101.0	(70-130)	
MSD	Copper, Total, ICAP/MS	100	98.2	UGL	98.2	(70-130)	
MSD2	Copper, Total, ICAP/MS	100	102	UGL	102.0	(70-130)	
RPD_LCS	Copper, Total, ICAP/MS	106.000	103.000	UGL	2.9	(0-20)	
RPD_MS	Copper, Total, ICAP/MS	97.100	98.200	UGL	1.1	(0-20)	

QC Ref #441844 Arsenic, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Arsenic, Total, ICAP/MS	20	20.2	UGL	101.0	(85-115)	
LCS2	Arsenic, Total, ICAP/MS	20	19.9	UGL	99.5	(85-115)	
MBLK	Arsenic, Total, ICAP/MS	ND	<1.0	UGL			
MRL_CHK	Arsenic, Total, ICAP/MS	1.000	1.03	UGL	103.0	(50-150)	
MS	Arsenic, Total, ICAP/MS	20	21.5	UGL	107.5	(70-130)	
MS2	Arsenic, Total, ICAP/MS	20	21.1	UGL	105.5	(70-130)	
MSD	Arsenic, Total, ICAP/MS	20	21.7	UGL	108.5	(70-130)	
MSD2	Arsenic, Total, ICAP/MS	20	21.3	UGL	106.5	(70-130)	
RPD_LCS	Arsenic, Total, ICAP/MS	101.000	99.500	UGL	1.5	(0-20)	
RPD_MS	Arsenic, Total, ICAP/MS	107.500	108.500	UGL	0.9	(0-20)	

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QC Ref #441848 Selenium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Selenium, Total, ICAP/MS	20	20.1	UGL	100.5	(85-115)	
LCS2	Selenium, Total, ICAP/MS	20	19.6	UGL	98.0	(85-115)	
MBLK	Selenium, Total, ICAP/MS	ND	<5.0	UGL			
MRL_CHK	Selenium, Total, ICAP/MS	5.000	5.09	UGL	101.8	(50-150)	
MS	Selenium, Total, ICAP/MS	20	23.1	UGL	115.5	(70-130)	
MS2	Selenium, Total, ICAP/MS	20	22	UGL	110.0	(70-130)	
MSD	Selenium, Total, ICAP/MS	20	23.8	UGL	119.0	(70-130)	
MSD2	Selenium, Total, ICAP/MS	20	22.6	UGL	113.0	(70-130)	
RPD_LCS	Selenium, Total, ICAP/MS	100.500	98.000	UGL	2.5	(0-20)	
RPD_MS	Selenium, Total, ICAP/MS	115.500	119.000	UGL	3.0	(0-20)	

QC Ref #441858 Cadmium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Cadmium, Total, ICAP/MS	20	21	UGL	105.0	(85-115)	
LCS2	Cadmium, Total, ICAP/MS	20	21	UGL	105.0	(85-115)	
MBLK	Cadmium, Total, ICAP/MS	ND	<0.50	UGL			
MRL_CHK	Cadmium, Total, ICAP/MS	0.500	0.53	UGL	106.0	(50-150)	
MS	Cadmium, Total, ICAP/MS	20	21.3	UGL	106.5	(70-130)	
MS2	Cadmium, Total, ICAP/MS	20	21.6	UGL	108.0	(70-130)	
MSD	Cadmium, Total, ICAP/MS	20	21.4	UGL	107.0	(70-130)	
MSD2	Cadmium, Total, ICAP/MS	20	21.7	UGL	108.5	(70-130)	
RPD_LCS	Cadmium, Total, ICAP/MS	105.000	105.000	UGL	0.0	(0-20)	
RPD_MS	Cadmium, Total, ICAP/MS	106.500	107.000	UGL	0.5	(0-20)	

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QC Ref #441861 Antimony, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Antimony, Total, ICAP/MS	50	48.7	UGL	97.4	(85-115)	
LCS2	Antimony, Total, ICAP/MS	50	48.6	UGL	97.2	(85-115)	
MBLK	Antimony, Total, ICAP/MS	ND	<1.0	UGL			
MRL_CHK	Antimony, Total, ICAP/MS	1.000	1.10	UGL	110.0	(50-150)	
MS	Antimony, Total, ICAP/MS	50	51.4	UGL	102.8	(70-130)	
MS2	Antimony, Total, ICAP/MS	50	51.5	UGL	103.0	(70-130)	
MSD	Antimony, Total, ICAP/MS	50	53.5	UGL	107.0	(70-130)	
MSD2	Antimony, Total, ICAP/MS	50	51.5	UGL	103.0	(70-130)	
RPD_LCS	Antimony, Total, ICAP/MS	97.400	97.200	UGL	0.2	(0-20)	
RPD_MS	Antimony, Total, ICAP/MS	102.800	107.000	UGL	4.0	(0-20)	

QC Ref #441864 Barium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Barium, Total, ICAP/MS	100	103	UGL	103.0	(85-115)	
LCS2	Barium, Total, ICAP/MS	100	103	UGL	103.0	(85-115)	
MBLK	Barium, Total, ICAP/MS	ND	<2.0	UGL			
MRL_CHK	Barium, Total, ICAP/MS	2.000	2.10	UGL	105.0	(50-150)	
MS	Barium, Total, ICAP/MS	100	92.7	UGL	92.7	(70-130)	
MS2	Barium, Total, ICAP/MS	100	107	UGL	107.0	(70-130)	
MSD	Barium, Total, ICAP/MS	100	94.4	UGL	94.4	(70-130)	
MSD2	Barium, Total, ICAP/MS	100	107	UGL	107.0	(70-130)	
RPD_LCS	Barium, Total, ICAP/MS	103.000	103.000	UGL	0.0	(0-20)	
RPD_MS	Barium, Total, ICAP/MS	92.700	94.400	UGL	1.8	(0-20)	

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QC Ref #441867 Thallium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Thallium, Total, ICAP/MS	20.0	20.2	UGL	101.0	(85-115)	
LCS2	Thallium, Total, ICAP/MS	20.0	20.2	UGL	101.0	(85-115)	
MBLK	Thallium, Total, ICAP/MS	ND	<1.0	UGL			
MRL_CHK	Thallium, Total, ICAP/MS	1.000	1.17	UGL	117.0	(50-150)	
MS	Thallium, Total, ICAP/MS	20.0	20	UGL	100.0	(70-130)	
MS2	Thallium, Total, ICAP/MS	20.0	20	UGL	100.0	(70-130)	
MSD	Thallium, Total, ICAP/MS	20.0	20.2	UGL	101.0	(70-130)	
MSD2	Thallium, Total, ICAP/MS	20.0	20	UGL	100.0	(70-130)	
RPD_LCS	Thallium, Total, ICAP/MS	101.000	101.000	UGL	0.0	(0-20)	
RPD_MS	Thallium, Total, ICAP/MS	100.000	101.000	UGL	1.0	(0-20)	

QC Ref #441873 Lead, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 28	07300237	UGL		(0-0)	
AASPKSMP	Spiked sample	Lab # 28	08020007	UGL		(0-0)	
LCS1	Lead, Total, ICAP/MS	20	21	UGL	105.0	(85-115)	
LCS2	Lead, Total, ICAP/MS	20	21.1	UGL	105.5	(85-115)	
MBLK	Lead, Total, ICAP/MS	ND	<0.50	UGL			
MRL_CHK	Lead, Total, ICAP/MS	0.500	0.56	UGL	112.0	(50-150)	
MS	Lead, Total, ICAP/MS	20	20.9	UGL	104.5	(70-130)	
MS2	Lead, Total, ICAP/MS	20	21	UGL	105.0	(70-130)	
MSD	Lead, Total, ICAP/MS	20	21	UGL	105.0	(70-130)	
MSD2	Lead, Total, ICAP/MS	20	21	UGL	105.0	(70-130)	
RPD_LCS	Lead, Total, ICAP/MS	105.000	105.500	UGL	0.5	(0-20)	
RPD_MS	Lead, Total, ICAP/MS	104.500	105.000	UGL	0.5	(0-20)	

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QC Report
#248846

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(continued)

QC Ref #442275 EPA Method 504.1

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS2	1,2-Dibromo-3-chloropropane	0.25	0.274	UGL	109.6	(70-130)	
MBLK	1,2-Dibromo-3-chloropropane	ND	<0.01	UGL			
MRL_CHK	1,2-Dibromo-3-chloropropane	0.008	0.0081	UGL	101.2	(60-140)	
MS	1,2-Dibromo-3-chloropropane	0.25	0.259	UGL	103.6	(65-135)	
MSD	1,2-Dibromo-3-chloropropane	0.25	0.226	UGL	90.4	(65-135)	
RPD_MS	1,2-Dibromo-3-chloropropane	103.600	90.400	UGL	13.6	(0-20)	
LCS2	1,2-Dibromoethane	0.25	0.272	UGL	108.8	(70-130)	
MBLK	1,2-Dibromoethane	ND	<0.01	UGL			
MRL_CHK	1,2-Dibromoethane	0.008	0.0093	UGL	116.2	(60-140)	
MS	1,2-Dibromoethane	0.25	0.263	UGL	105.2	(65-135)	
MSD	1,2-Dibromoethane	0.25	0.242	UGL	96.8	(65-135)	
RPD_MS	1,2-Dibromoethane	105.200	96.800	UGL	8.3	(0-20)	
LCS2	1,2,3-Trichloropropane	1.25	1.46	UGL	116.8	(70-130)	
MBLK	1,2,3-Trichloropropane	ND	<0.04	UGL			
MRL_CHK	1,2,3-Trichloropropane	0.040	0.0477	UGL	119.2	(60-140)	
MS	1,2,3-Trichloropropane	1.25	1.41	UGL	112.8	(65-135)	
MSD	1,2,3-Trichloropropane	1.25	1.29	UGL	103.2	(65-135)	
RPD_MS	1,2,3-Trichloropropane	112.800	103.200	UGL	8.9	(0-20)	
MS	Spiked sample	Lab # 28	07250312	NONE		(0-0)	
LCS2	1,2-dibromopropane (surr)	100	93	%R	93.0	(60-140)	
MBLK	1,2-dibromopropane (surr)	100	92	%R	92.0		
MS	1,2-dibromopropane (surr)	100	90	%R	90.0	(60-140)	
MSD	1,2-dibromopropane (surr)	100	78	%R	78.0	(60-140)	

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QC Ref #442347 Pesticides by EPA 505

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MBLK	PCB 1016 Aroclor	ND	<0.08	UGL			
MBLK	PCB 1221 Aroclor	ND	<0.1	UGL			
MBLK	PCB 1232 Aroclor	ND	<0.1	UGL			
LCS2	PCB 1242 Aroclor	0.5	0.603	UGL	120.6	(70-130)	
MBLK	PCB 1242 Aroclor	ND	<0.1	UGL			
MRL_CHK	PCB 1242 Aroclor	0.100	0.133	UGL	133.0	(50-150)	
MS	PCB 1242 Aroclor	0.5	0.577	UGL	115.4	(65-135)	
MS2	PCB 1242 Aroclor	0.5	0.592	UGL	118.4	(65-135)	
RPD_LCS	PCB 1242 Aroclor		120.600	UGL		(0-20)	
MBLK	PCB 1248 Aroclor	ND	<0.1	UGL			
MBLK	PCB 1254 Aroclor	ND	<0.1	UGL			
MBLK	PCB 1260 Aroclor	ND	<0.1	UGL			
MS	Spiked sample	Lab # 28	07250299	NONE		(0-0)	
MS2	Spiked sample	Lab # 28	07250300	NONE		(0-0)	
LCS1	Alachlor (Alanex)	1.0	1.23	UGL	123.0	(70-130)	
LCS2	Alachlor (Alanex)	1.0	1.19	UGL	119.0	(70-130)	
MBLK	Alachlor (Alanex)	ND	<0.1	UGL			
MRL_CHK	Alachlor (Alanex)	0.100	0.0832	UGL	83.2	(50-150)	
MS	Alachlor (Alanex)	0.1	0.0928	UGL	92.8	(65-135)	
MS2	Alachlor (Alanex)	1.0	1.07	UGL	107.0	(65-135)	
RPD_LCS	Alachlor (Alanex)	123.000	119.000	UGL	3.3	(0-20)	
LCS1	Aldrin	0.10	0.120	UGL	120.0	(70-130)	
LCS2	Aldrin	0.10	0.102	UGL	102.0	(70-130)	
MBLK	Aldrin	ND	<0.01	UGL			
MRL_CHK	Aldrin	0.010	0.0093	UGL	93.0	(50-150)	
MS	Aldrin	0.01	0.0169	UGL	169.0	(65-135)	
MS2	Aldrin	0.1	0.187	UGL	187.0	(65-135)	
RPD_LCS	Aldrin	120.000	102.000	UGL	16.2	(0-20)	
MBLK	Chlordane	ND	<0.1	UGL			
LCS1	Dieldrin	0.10	0.119	UGL	119.0	(70-130)	

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LCS2	Dieldrin	0.10	0.114	UGL	114.0	(70-130)
MBLK	Dieldrin	ND	<0.01	UGL		
MRL_CHK	Dieldrin	0.010	0.0094	UGL	94.0	(50-150)
MS	Dieldrin	0.01	0.0095	UGL	95.0	(65-135)
MS2	Dieldrin	0.1	0.108	UGL	108.0	(65-135)
RPD_LCS	Dieldrin	119.000	114.000	UGL	4.3	(0-20)
LCS1	Endrin	0.10	0.121	UGL	121.0	(70-130)
LCS2	Endrin	0.10	0.118	UGL	118.0	(70-130)
MBLK	Endrin	ND	<0.01	UGL		
MRL_CHK	Endrin	0.010	0.0108	UGL	108.0	(50-150)
MS	Endrin	0.01	0.0127	UGL	127.0	(65-135)
MS2	Endrin	0.1	0.112	UGL	112.0	(65-135)
RPD_LCS	Endrin	121.000	118.000	UGL	2.5	(0-20)
LCS1	Heptachlor	0.10	0.120	UGL	120.0	(70-130)
LCS2	Heptachlor	0.10	0.107	UGL	107.0	(70-130)
MBLK	Heptachlor	ND	<0.01	UGL		
MRL_CHK	Heptachlor	0.010	0.0098	UGL	98.0	(50-150)
MS	Heptachlor	0.01	0.0154	UGL	154.0	(65-135)
MS2	Heptachlor	0.1	0.151	UGL	151.0	(65-135)
RPD_LCS	Heptachlor	120.000	107.000	UGL	11.5	(0-20)
LCS1	Heptachlor Epoxide	0.10	0.118	UGL	118.0	(70-130)
LCS2	Heptachlor Epoxide	0.10	0.114	UGL	114.0	(70-130)
MBLK	Heptachlor Epoxide	ND	<0.01	UGL		
MRL_CHK	Heptachlor Epoxide	0.010	0.0094	UGL	94.0	(50-150)
MS	Heptachlor Epoxide	0.01	0.0127	UGL	127.0	(65-135)
MS2	Heptachlor Epoxide	0.1	0.112	UGL	112.0	(65-135)
RPD_LCS	Heptachlor Epoxide	118.000	114.000	UGL	3.4	(0-20)
LCS1	Lindane (gamma-BHC)	0.10	0.117	UGL	117.0	(70-130)
LCS2	Lindane (gamma-BHC)	0.10	0.113	UGL	113.0	(70-130)
MBLK	Lindane (gamma-BHC)	ND	<0.01	UGL		
MRL_CHK	Lindane (gamma-BHC)	0.010	0.0103	UGL	103.0	(50-150)
MS	Lindane (gamma-BHC)	0.01	0.0104	UGL	104.0	(65-135)
MS2	Lindane (gamma-BHC)	0.1	0.103	UGL	103.0	(65-135)
RPD_LCS	Lindane (gamma-BHC)	117.000	113.000	UGL	3.5	(0-20)
LCS1	Methoxychlor	0.5	0.552	UGL	110.4	(70-130)

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LCS2	Methoxychlor	0.50	0.524	UGL	104.8	(70-130)
MBLK	Methoxychlor	ND	<0.05	UGL		
MRL_CHK	Methoxychlor	0.050	0.0547	UGL	109.4	(50-150)
MS	Methoxychlor	0.05	0.0484	UGL	96.8	(65-135)
MS2	Methoxychlor	0.5	0.493	UGL	98.6	(65-135)
RPD_LCS	Methoxychlor	110.400	104.800	UGL	5.2	(0-20)
MBLK	Toxaphene	ND	<0.5	UGL		

QC Ref #442553 Mercury

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 28	07280229	UGL		(0-0)	
LCS1	Mercury	1.50	1.60	UGL	106.7	(85-115)	
LCS2	Mercury	1.50	1.58	UGL	105.3	(85-115)	
MBLK	Mercury	ND	<0.20	UGL			
MRL_CHK	Mercury	0.200	0.208	UGL	104.0	(50-150)	
MS	Mercury	1.50	1.63	UGL	108.7	(70-130)	
MSD	Mercury	1.50	1.60	UGL	106.7	(70-130)	
RPD_LCS	Mercury	106.667	105.333	UGL	1.3	(0-20)	
RPD_MS	Mercury	108.667	106.667	UGL	1.9	(0-20)	

QC Ref #443251 525 Semivolatiles by GC/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 28	07290216	NONE		(0-0)	
LCS1	Atrazine	2	2.17	UGL	108.5	(70-130)	
LCS2	Atrazine	2	2.09	UGL	104.5	(70-130)	
MBLK	Atrazine	ND	<0.05	UGL			
MS	Atrazine	2	2.00	UGL	100.0	(70-130)	
RPD_LCS	Atrazine	108.500	104.500	UGL	3.8	(0-20)	
LCS1	Benzo(a)pyrene	2	2.03	UGL	101.5	(70-130)	
LCS2	Benzo(a)pyrene	2	2.00	UGL	100.0	(70-130)	
MBLK	Benzo(a)pyrene	ND	<0.02	UGL			

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MRLLW	Benzo(a)pyrene	0.02	0.020	UGL	100.0	(50-150)
MS	Benzo(a)pyrene	2	2.08	UGL	104.0	(70-130)
RPD_LCS	Benzo(a)pyrene	101.500	100.000	UGL	1.5	(0-20)
LCS1	Di(2-Ethylhexyl)phthalate	2	2.10	UGL	105.0	(70-130)
LCS2	Di(2-Ethylhexyl)phthalate	2	2.14	UGL	107.0	(70-130)
MBLK	Di(2-Ethylhexyl)phthalate	ND	<0.6	UGL		
MS	Di(2-Ethylhexyl)phthalate	2	2.07	UGL	103.5	(70-130)
RPD_LCS	Di(2-Ethylhexyl)phthalate	105.000	107.000	UGL	1.9	(0-20)
LCS1	Di-(2-Ethylhexyl)adipate	2	2.06	UGL	103.0	(70-130)
LCS2	Di-(2-Ethylhexyl)adipate	2	2.08	UGL	104.0	(70-130)
MBLK	Di-(2-Ethylhexyl)adipate	ND	<0.6	UGL		
MS	Di-(2-Ethylhexyl)adipate	2	2.10	UGL	105.0	(70-130)
RPD_LCS	Di-(2-Ethylhexyl)adipate	103.000	104.000	UGL	1.0	(0-20)
LCS1	Hexachlorobenzene	2	1.93	UGL	96.5	(70-130)
LCS2	Hexachlorobenzene	2	1.94	UGL	97.0	(70-130)
MBLK	Hexachlorobenzene	ND	<0.05	UGL		
MS	Hexachlorobenzene	2	1.99	UGL	99.5	(70-130)
RPD_LCS	Hexachlorobenzene	96.500	97.000	UGL	0.5	(0-20)
LCS1	Hexachlorocyclopentadiene	2	1.69	UGL	84.5	(70-130)
LCS2	Hexachlorocyclopentadiene	2	1.84	UGL	92.0	(70-130)
MBLK	Hexachlorocyclopentadiene	ND	<0.05	UGL		
MS	Hexachlorocyclopentadiene	2	2.00	UGL	100.0	(70-130)
RPD_LCS	Hexachlorocyclopentadiene	84.500	92.000	UGL	8.5	(0-20)
LCS1	Molinate	2	2.13	UGL	106.5	(70-130)
LCS2	Molinate	2	2.15	UGL	107.5	(70-130)
MBLK	Molinate	ND	<0.1	UGL		
MS	Molinate	2	2.16	UGL	108.0	(70-130)
RPD_LCS	Molinate	106.500	107.500	UGL	0.9	(0-20)
LCS1	Simazine	2	1.98	UGL	99.0	(70-130)
LCS2	Simazine	2	1.98	UGL	99.0	(70-130)
MBLK	Simazine	ND	<0.05	UGL		
MS	Simazine	2	1.85	UGL	92.5	(70-130)
RPD_LCS	Simazine	99.000	99.000	UGL	0.0	(0-20)
LCS1	Perylene-d12	100	103	%R	103.0	(70-130)
LCS2	Perylene-d12	100	101	%R	101.0	(70-130)

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MBLK	Perylene-d12	100	97	%R	97.0	
MRLLW	Perylene-d12	100	93	%R	93.0	(70-130)
MS	Perylene-d12	100	98	%R	98.0	(70-130)
LCS1	1,3-dimethyl-2-nitrobenzene	100	98	%R	98.0	(70-130)
LCS2	1,3-dimethyl-2-nitrobenzene	100	97	%R	97.0	(70-130)
MBLK	1,3-dimethyl-2-nitrobenzene	100	96	%R	96.0	
MRLLW	1,3-dimethyl-2-nitrobenzene	100	96	%R	96.0	(70-130)
MS	1,3-dimethyl-2-nitrobenzene	100	96	%R	96.0	(70-130)
LCS1	Triphenylphosphate	100	108	%R	108.0	(70-130)
LCS2	Triphenylphosphate	100	107	%R	107.0	(70-130)
MBLK	Triphenylphosphate	100	103	%R	103.0	
MRLLW	Triphenylphosphate	100	102	%R	102.0	(70-130)
MS	Triphenylphosphate	100	104	%R	104.0	(70-130)
LCS1	Thiobencarb	2	2.12	UGL	106.0	(70-130)
LCS2	Thiobencarb	2	2.12	UGL	106.0	(70-130)
MBLK	Thiobencarb	ND	<0.2	UGL		
MS	Thiobencarb	2	2.13	UGL	106.5	(70-130)
RPD_LCS	Thiobencarb	106.000	106.000	UGL	0.0	(0-20)

QC Ref #444466 Endothall

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 28	07250037	UGL		(0-0)	
LCS1	Endothall	25	24.0	UGL	96.0	(63-144)	
MBLK	Endothall	ND	<5.0	UGL			
MRL_CHK	Endothall	5.00	6.42	UGL	128.4	(50-150)	
MS	Endothall	25	29.9	UGL	119.6	(38-157)	
MSD	Endothall	25	29.0	UGL	116.0	(38-157)	
MS_2ND	Endothall	25	27.5	UGL	110.0	(38-157)	
RPD_MS	Endothall	119.600	116.000	UGL	3.1	(0-30)	

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QC Ref #445435 Herbicides by 515.4

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
CCCH	2,4,5-T	4.0	4.01	UGL	100.2	(70-130)	
CCCM	2,4,5-T	1.0	1.06	UGL	106.0	(70-130)	
LCS1	2,4,5-T	3	3.10	UGL	103.3	(70-130)	
LCS2	2,4,5-T	3.0	3.21	UGL	107.0	(70-130)	
MBLK	2,4,5-T	ND	<0.2	UGL			
MRL_CHK	2,4,5-T	0.200	0.220	UGL	110.0	(50-150)	
MS	2,4,5-T	0.75	0.782	UGL	104.3	(70-130)	
MSD	2,4,5-T	0.75	0.778	UGL	103.7	(70-130)	
RPD_LCS	2,4,5-T	103.333	107.000	UGL	3.5	(0-30)	
RPD_MS	2,4,5-T	104.267	103.733	UGL	0.5	(0-30)	
CCCH	2,4,5-TP (Silvex)	4.0	4.06	UGL	101.5	(70-130)	
CCCM	2,4,5-TP (Silvex)	1.0	1.01	UGL	101.0	(70-130)	
LCS1	2,4,5-TP (Silvex)	3	3.21	UGL	107.0	(70-130)	
LCS2	2,4,5-TP (Silvex)	3.0	3.33	UGL	111.0	(70-130)	
MBLK	2,4,5-TP (Silvex)	ND	<0.2	UGL			
MRL_CHK	2,4,5-TP (Silvex)	0.200	0.207	UGL	103.5	(50-150)	
MS	2,4,5-TP (Silvex)	0.75	0.758	UGL	101.1	(70-130)	
MSD	2,4,5-TP (Silvex)	0.75	0.765	UGL	102.0	(70-130)	
RPD_LCS	2,4,5-TP (Silvex)	107.000	111.000	UGL	3.7	(0-30)	
RPD_MS	2,4,5-TP (Silvex)	101.067	102.000	UGL	0.9	(0-30)	
CCCH	2,4-D	2.0	2.08	UGL	104.0	(70-130)	
CCCM	2,4-D	0.50	0.532	UGL	106.4	(70-130)	
LCS1	2,4-D	1.5	1.59	UGL	106.0	(70-130)	
LCS2	2,4-D	1.5	1.66	UGL	110.7	(70-130)	
MBLK	2,4-D	ND	<0.1	UGL			
MRL_CHK	2,4-D	0.100	0.107	UGL	107.0	(50-150)	
MS	2,4-D	0.375	0.404	UGL	107.7	(70-130)	
MSD	2,4-D	0.375	0.399	UGL	106.4	(70-130)	
RPD_LCS	2,4-D	106.000	110.667	UGL	4.3	(0-30)	
RPD_MS	2,4-D	107.733	106.400	UGL	1.2	(0-30)	

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Hawaii Department of Water Supply
(Hilo)
(continued)

CCCH	2,4-DB	40.0	40.3	UGL	100.7	(70-130)
CCCM	2,4-DB	10.0	10.5	UGL	105.0	(70-130)
LCS1	2,4-DB	30	29.7	UGL	99.0	(70-130)
LCS2	2,4-DB	30.0	30.8	UGL	102.7	(70-130)
MBLK	2,4-DB	ND	<2.0	UGL		
MRL_CHK	2,4-DB	2.000	1.96	UGL	98.0	(50-150)
MS	2,4-DB	7.5	7.74	UGL	103.2	(70-130)
MSD	2,4-DB	7.5	7.81	UGL	104.1	(70-130)
RPD_LCS	2,4-DB	99.000	102.667	UGL	3.6	(0-30)
RPD_MS	2,4-DB	103.200	104.133	UGL	0.9	(0-30)
CCCH	Dichlorprop	10.0	10.2	UGL	102.0	(70-130)
CCCM	Dichlorprop	2.50	2.64	UGL	105.6	(70-130)
LCS1	Dichlorprop	7.5	8.27	UGL	110.3	(70-130)
LCS2	Dichlorprop	7.5	8.56	UGL	114.1	(70-130)
MBLK	Dichlorprop	ND	<0.5	UGL		
MRL_CHK	Dichlorprop	0.500	0.602	UGL	120.4	(50-150)
MS	Dichlorprop	1.875	2.00	UGL	106.7	(70-130)
MSD	Dichlorprop	1.875	2.02	UGL	107.7	(70-130)
RPD_LCS	Dichlorprop	110.267	114.133	UGL	3.4	(0-30)
RPD_MS	Dichlorprop	106.667	107.733	UGL	1.0	(0-30)
MS	Spiked sample	Lab # 28	07250185	NONE		(0-0)
CCCH	Acifluorfen	4.0	3.95	UGL	98.8	(70-130)
CCCM	Acifluorfen	1.0	0.979	UGL	97.9	(70-130)
LCS1	Acifluorfen	3	3.11	UGL	103.7	(70-130)
LCS2	Acifluorfen	3.0	3.21	UGL	107.0	(70-130)
MBLK	Acifluorfen	ND	<0.2	UGL		
MRL_CHK	Acifluorfen	0.200	0.217	UGL	108.5	(50-150)
MS	Acifluorfen	0.75	0.742	UGL	98.9	(70-130)
MSD	Acifluorfen	0.75	0.746	UGL	99.5	(70-130)
RPD_LCS	Acifluorfen	103.667	107.000	UGL	3.2	(0-30)
RPD_MS	Acifluorfen	98.933	99.467	UGL	0.5	(0-30)
CCCH	Bentazon	10.0	9.79	UGL	97.9	(70-130)
CCCM	Bentazon	2.50	2.67	UGL	106.8	(70-130)
LCS1	Bentazon	7.5	7.69	UGL	102.5	(70-130)
LCS2	Bentazon	7.5	7.94	UGL	105.9	(70-130)

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(continued)

MBLK	Bentazon	ND	<0.5	UGL		
MRL_CHK	Bentazon	0.500	0.569	UGL	113.8	(50-150)
MS	Bentazon	1.875	1.98	UGL	105.6	(70-130)
MSD	Bentazon	1.875	2.03	UGL	108.3	(70-130)
RPD_LCS	Bentazon	102.533	105.867	UGL	3.2	(0-30)
RPD_MS	Bentazon	105.600	108.267	UGL	2.5	(0-30)
CCCH	Dalapon	20.0	19.8	UGL	99.0	(70-130)
CCCM	Dalapon	5.0	4.89	UGL	97.8	(70-130)
LCS1	Dalapon	15	15.2	UGL	101.3	(70-130)
LCS2	Dalapon	15.0	15.6	UGL	104.0	(70-130)
MBLK	Dalapon	ND	<1.0	UGL		
MRL_CHK	Dalapon	1.000	0.872	UGL	87.2	(50-150)
MS	Dalapon	3.75	3.62	UGL	96.5	(70-130)
MSD	Dalapon	3.75	3.62	UGL	96.5	(70-130)
RPD_LCS	Dalapon	101.333	104.000	UGL	2.6	(0-30)
RPD_MS	Dalapon	96.533	96.533	UGL	0.0	(0-30)
CCCH	3,5-Dichlorobenzoic acid	10.0	10.2	UGL	102.0	(70-130)
CCCM	3,5-Dichlorobenzoic acid	2.50	2.70	UGL	108.0	(70-130)
LCS1	3,5-Dichlorobenzoic acid	7.5	8.00	UGL	106.7	(70-130)
LCS2	3,5-Dichlorobenzoic acid	7.5	8.30	UGL	110.7	(70-130)
MBLK	3,5-Dichlorobenzoic acid	ND	<0.5	UGL		
MRL_CHK	3,5-Dichlorobenzoic acid	0.500	0.598	UGL	119.6	(50-150)
MS	3,5-Dichlorobenzoic acid	1.875	2.04	UGL	108.8	(70-130)
MSD	3,5-Dichlorobenzoic acid	1.875	2.07	UGL	110.4	(70-130)
RPD_LCS	3,5-Dichlorobenzoic acid	106.667	110.667	UGL	3.7	(0-30)
RPD_MS	3,5-Dichlorobenzoic acid	108.800	110.400	UGL	1.5	(0-30)
CCCH	Tot DCPA Mono&Diacid Degradate	2.0	1.90	UGL	95.0	(70-130)
CCCM	Tot DCPA Mono&Diacid Degradate	0.50	0.545	UGL	109.0	(70-130)
LCS1	Tot DCPA Mono&Diacid Degradate	1.5	1.27	UGL	84.7	(70-130)
LCS2	Tot DCPA Mono&Diacid Degradate	1.5	1.31	UGL	87.3	(70-130)
MBLK	Tot DCPA Mono&Diacid Degradate	ND	<1.0	UGL		
MRL_CHK	Tot DCPA Mono&Diacid Degradate	0.100	0.0904	UGL	90.4	(50-150)
MS	Tot DCPA Mono&Diacid Degradate	0.375	0.486	UGL	129.6	(70-130)
MSD	Tot DCPA Mono&Diacid Degradate	0.375	0.457	UGL	121.9	(70-130)
RPD_LCS	Tot DCPA Mono&Diacid Degradate	84.667	87.333	UGL	3.1	(0-30)

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RPD_MS	Tot DCPA Mono&Diacid Degradate	129.600	121.867	UGL	6.2	(0-30)
CCCH	Dicamba	2.0	2.00	UGL	100.0	(70-130)
CCCM	Dicamba	0.50	0.499	UGL	99.8	(70-130)
LCS1	Dicamba	1.5	1.77	UGL	118.0	(70-130)
LCS2	Dicamba	1.5	1.83	UGL	122.0	(70-130)
MBLK	Dicamba	ND	<0.08	UGL		
MRL_CHK	Dicamba	0.100	0.129	UGL	129.0	(50-150)
MS	Dicamba	0.375	0.375	UGL	100.0	(70-130)
MSD	Dicamba	0.375	0.384	UGL	102.4	(70-130)
RPD_LCS	Dicamba	118.000	122.000	UGL	3.3	(0-30)
RPD_MS	Dicamba	100.000	102.400	UGL	2.4	(0-30)
CCCH	Dinoseb	4.0	3.90	UGL	97.5	(70-130)
CCCM	Dinoseb	1.0	1.04	UGL	104.0	(70-130)
LCS1	Dinoseb	3	3.13	UGL	104.3	(70-130)
LCS2	Dinoseb	3.0	3.23	UGL	107.7	(70-130)
MBLK	Dinoseb	ND	<0.2	UGL		
MRL_CHK	Dinoseb	0.200	0.235	UGL	117.5	(50-150)
MS	Dinoseb	0.75	0.794	UGL	105.9	(70-130)
MSD	Dinoseb	0.75	0.797	UGL	106.3	(70-130)
RPD_LCS	Dinoseb	104.333	107.667	UGL	3.1	(0-30)
RPD_MS	Dinoseb	105.867	106.267	UGL	0.4	(0-30)
CCCH	Pentachlorophenol	0.8	0.831	UGL	103.9	(70-130)
CCCM	Pentachlorophenol	0.20	0.197	UGL	98.5	(70-130)
LCS1	Pentachlorophenol	0.6	0.642	UGL	107.0	(70-130)
LCS2	Pentachlorophenol	0.60	0.674	UGL	112.3	(70-130)
MBLK	Pentachlorophenol	ND	<0.04	UGL		
MRL_CHK	Pentachlorophenol	0.040	0.0367	UGL	91.8	(50-150)
MS	Pentachlorophenol	0.15	0.153	UGL	102.0	(70-130)
MSD	Pentachlorophenol	0.15	0.150	UGL	100.0	(70-130)
RPD_LCS	Pentachlorophenol	107.000	112.333	UGL	4.9	(0-30)
RPD_MS	Pentachlorophenol	102.000	100.000	UGL	2.0	(0-30)
CCCH	Picloram	2.0	1.88	UGL	94.0	(70-130)
CCCM	Picloram	0.50	0.422	UGL	84.4	(70-130)
LCS1	Picloram	1.5	1.44	UGL	96.0	(70-130)
LCS2	Picloram	1.5	1.48	UGL	98.7	(70-130)

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(Hilo)
(continued)

MBLK	Picloram	ND	<0.1	UGL		
MRL_CHK	Picloram	0.100	0.0748	UGL	74.8	(50-150)
MS	Picloram	0.375	0.318	UGL	84.8	(70-130)
MSD	Picloram	0.375	0.320	UGL	85.3	(70-130)
RPD_LCS	Picloram	96.000	98.667	UGL	2.7	(0-30)
RPD_MS	Picloram	84.800	85.333	UGL	0.6	(0-30)
CCCH	2,4-Dichlorophenylacetic acid	100	98	%R	98.0	(70-130)
CCCM	2,4-Dichlorophenylacetic acid	100	98	%R	98.0	(70-130)
LCS1	2,4-Dichlorophenylacetic acid	100	95	%R	95.0	(70-130)
LCS2	2,4-Dichlorophenylacetic acid	100	98	%R	98.0	(70-130)
MBLK	2,4-Dichlorophenylacetic acid	100	101	%R	101.0	
MRL_CHK	2,4-Dichlorophenylacetic acid	100	100	%R	100.0	(70-130)
MS	2,4-Dichlorophenylacetic acid	100	100	%R	100.0	(70-130)
MSD	2,4-Dichlorophenylacetic acid	100	101	%R	101.0	(70-130)
RPD_LCS	2,4-Dichlorophenylacetic acid	95.000	98.000	%R	3.1	(0-30)
RPD_MS	2,4-Dichlorophenylacetic acid	100.000	101.000	%R	1.0	(0-30)
CCCH	4,4'-Dibromooctafluorobiphenyl	100	103	%R	103.0	(50-150)
CCCM	4,4'-Dibromooctafluorobiphenyl	100	102	%R	102.0	(50-150)
LCS1	4,4'-Dibromooctafluorobiphenyl	100	99	%R	99.0	(50-150)
LCS2	4,4'-Dibromooctafluorobiphenyl	100	98	%R	98.0	(70-130)
MBLK	4,4'-Dibromooctafluorobiphenyl	100	98	%R	98.0	
MRL_CHK	4,4'-Dibromooctafluorobiphenyl	100	100	%R	100.0	(50-150)
MS	4,4'-Dibromooctafluorobiphenyl	100	100	%R	100.0	(50-150)
MSD	4,4'-Dibromooctafluorobiphenyl	100	99	%R	99.0	(50-150)
RPD_LCS	4,4'-Dibromooctafluorobiphenyl	99.000	98.000	%R	1.0	(0-30)
RPD_MS	4,4'-Dibromooctafluorobiphenyl	100.000	99.000	%R	1.0	(0-30)

QC Ref #456452 Sodium, Total, ICAP

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 28	07250222	MGL		(0-0)	
LCS1	Sodium, Total, ICAP	50	48.2	MGL	96.4	(85-115)	
LCS2	Sodium, Total, ICAP	50	48.4	MGL	96.8	(85-115)	
MBLK	Sodium, Total, ICAP	ND	<1.0	MGL			

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MRL_CHK	Sodium, Total, ICAP	1.000	0.977	MGL	97.7	(50-150)
MS	Sodium, Total, ICAP	50	46.5	MGL	93.0	(70-130)
MS2	Sodium, Total, ICAP	50	44.5	MGL	89.0	(70-130)
MSD	Sodium, Total, ICAP	50	47.8	MGL	95.6	(70-130)
MSD2	Sodium, Total, ICAP	50	45.8	MGL	91.6	(70-130)
RPD_LCS	Sodium, Total, ICAP	96.400	96.800	MGL	0.4	(0-20)
RPD_MS	Sodium, Total, ICAP	93.000	95.600	MGL	2.8	(0-20)

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Laboratory
Report
248846

Hawaii Department of Water Supply (Hilo)
Mae Kise
Micro Lab
889 Leilani Street
Hilo , HI 96720

Sample Received
25-jul-2008 16:53:49
2807250312

SAFE DRINKING WATER BRANCH
PHASE II AND PHASE V CONTAMINANTS
SUMMARY FORM

Water System Name: _____ PWS ID No. _____

Sample Location: KUKUIHAELE WELL 6734-03

Sample Date: 07/23/08

Laboratory Name: Montgomery Laboratories Lab Report No. 2807250312

Contaminant	EPA Method	Detection Limit	Concentration
2,4-D (ug/L)	515.4	0.1	ND
2,4,5-TP (ug/L)	515.4	0.2	ND
Pentachlorophenol (ug/L)	515.4	0.04	ND
Pichloram (ug/L)	515.4	0.1	ND
Dalapon (ug/L)	515.4	1	ND
Dinoseb (ug/L)	515.4	0.2	ND
Benzo(a)pyrene (ug/L)	525.2	0.02	ND
Di(2-ethylhexyl)adipate (ug/L)	525.2	0.6	ND
Diethylhexylphthalate (ug/L)	525.2	0.6	ND
Dioxin (Picograms/L)	1613	5	ND
Diquat (ug/L)	549.2	0.4	ND
Endothall (ug/L)		5	ND
Cyanide (Milligrams/L)		0.025	ND

Group A,B,C -- Note: Surface water systems must take annual samples for cynanide

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1700 Elm Street
Minneapolis, MN 55414
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Fax: 612.607.6444

Pace Analytical™

www.pacelabs.com

Report Prepared for:

Julie Lee
Montgomery Watson Laboratories
750 Royal Oaks Drive
Monrovia CA 91016-3629

Report Information:

MWL Project #: 248846
MWL Sub PO #: 99-34443
Pace Project #: 1077821
State Cert #: Hawaii
Expiration Date: 30-Jun-2008

REPORT OF LABORATORY ANALYSIS FOR 2,3,7,8-TCDD

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 Drinking Water Report. If an upgrade of this report package is requested, an additional charge may be applied.

Report Summary:

Enclosed are analytical results of one drinking water sample analyzed for 2,3,7,8-TCDD content. This sample was analyzed according to Method 1613B by High Resolution Gas Chromatography/High Resolution Mass Spectrometry.

The results reported for this sample and the associated quality control samples were all within the criteria described in Method 1613B. If you have any questions or concerns regarding these results, please contact Nate Habte, your Pace Project Manager.

This report has been reviewed and prepared by:

For Nate Habte
Nate Habte, Project Manager
(612) 607-6407
(612) 607-6444 (fax)
natnael.habte@pacelabs.com

ACCREDITED IN ACCORDANCE WITH nelac

Report Prepared Date:

August 12, 2008

Report of Laboratory Analysis

The results relate only to the samples included in this report.

MWH Laboratories
A Division of MWH Americas,Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016-3629
Ph (626) 386-1100 Fax (626) 386-1095

1271

Date 07/28/08

Submittal Form & Purchase Order 99-34443

REPORTING REQUIREMENTS:** ***Do Not Combine Report with any other samples submitted under different MWH project numbers!
Report & Invoice must have the MWH Project Number **248846** Sub PO# **99-34443** and Job # **1000023**

Report all quality control data according to Method. Include dates analyzed, date extracted (if extracted) and Method reference on the report.
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Ship To **Nate Habte**
Pace Analytical

1700 Elm Street SE Suite 200
Minneapolis, Minnesota 55414

Bill Recipient FedEx Acct:1797-5692-7

(612) 607-6407 Fax (612) 607-6444

Reports: Elena Montanez / Christine Lewis Sub-contracting Administrator
EMAIL TO: mwhlabs-subcontractreports@mwhglobal.com
MWH Laboratories 750 Royal Oaks Dr. Ste. 100, Monrovia, CA 91016
Phone (626) 386-1118 / 1137 Fax (626) 386-1122
Invoices to: MWH LABORATORIES
Accounts Payable PO BOX 6610, Broomfield, CO 80021

Provide in each Report
the Specified State
Certification # & Exp Date for
requested tests + matrix

Hawaii DW

1077821

MWH Project #	Report Due:	Sub PO#
248846	08/12/08	99-34443

Use MWH Lab # for ID | *Client Sample ID for reference only* | Analysis Requested | Sample Date & Time | Matrix | Container

2 of 4

D1613EDD | 2807250312 | KUKUIHAELE WELL 6734-03 | 2,3,7,8-Tcdd Dioxin in drinking water 1613b | 07/23/08 1345 | dw | 2 1L amber glass / no preservative [7day HT for NJ NY UT] 1613B-DW

001

Report No.....1077821_1613DW

Relinquished by: Sample Control Date 07/28/08 Time MUST HAVE NOTIFICAION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS

Received by: T=5.7°C Date 7-29-08 Time 923

An Acknowledgement of Receipt is requested to attn: Christine Lewis

Sample Condition Upon Receipt

Pace Analytical

Client Name: MWH Project # 1077821

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 9489 9091 5596

Optional: Proj. Due Date: Proj. Name:

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other _____ Temp Blank: Yes ____ No ☑

Thermometer Used: 80344042, 179425 Type of Ice: Wet (Blue) None ☐ Samples on ice, cooling process has begun

Cooler Temperature: 5.7° Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: ck 7-25-08

Temp should be above freezing to 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: WT		
All containers needing acid/base preservation have been checked. Noncompliance are noted in 13.	☐Yes ☐No ☑N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	
Per method, VOA preservation is checked after analysis		Initial when completed / Lot # of added preservative
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	15.
Trip Blank Present:	☐Yes ☐No ☑N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: VAH **Date:** 7/29/08

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Pace AnalyticalServices, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612-607-6444

Drinking Water Analysis Results
2,3,7,8-TCDD -- USEPA Method 1613B
Montgomery Watson Laboratories

Sample ID.....2807250312
Project #.....248846
Sub PO #.....99-34443
Lab Sample ID.....1077821001

Source ID.....KUKUIHAELE WELL 6734-03
Date Collected.....07/23/2008
Date Received.....07/29/2008
Date Extracted.....08/07/2008

Spike.....200 pg
IS Spike.....2000 pg
CS Spike.....200 pg

	Sample 2807250312	Method Blank	Lab Spike	Lab Spike Dup
[2,3,7,8-TCDD]	**ND**	ND	--	--
RL	5 pg/L	5 pg/L	--	--
2,3,7,8-TCDD Recovery	--	--	94%	95%
Spike Recovery Limit	--	--	73-146%	73-146%
RPD			1.0%	
IS Recovery	**82%**	66%	77%	82%
IS Recovery Limits	31-137%	31-137%	25-141%	25-141%
CS Recovery	**90%**	84%	86%	88%
CS Recovery Limits	42-164%	42-164%	37-158%	37-158%
Filename	F80809A_12	F80809A_07	F80809A_04	F80809A_05
Analysis Date	08/09/2008	08/09/2008	08/09/2008	08/09/2008
Analysis Time	20:40	18:21	16:57	17:25
Analyst	BAL	BAL	BAL	BAL
Volume	1.000L	0.997L	1.003L	1.002L
Dilution	NA	NA	NA	NA
ICAL Date	07/31/2008	07/31/2008	07/31/2008	07/31/2008
CCAL Filename	F80809A_03	F80809A_03	F80809A_03	F80809A_03

! = Outside the Control Limits
ND = Not Detected
RL = Reporting Limit
Limits = Control Limits from Method 1613 (10/94 Revision), Tables 6A and 7A
RPD = Relative Percent Difference of Lab Spike Recoveries
IS = Internal Standard [2,3,7,8-TCDD-$^{13}C_{12}$]
CS = Cleanup Standard [2,3,7,8-TCDD-$^{37}Cl_4$]

Analyst: Barn A Lark

Project No.....1077821

Report No.....1077821_1613DW

ENVIRONMENTAL ASSESSMENT

Kukuihaele Production Well
And Supporting Facilities
(State Well 6734-03)

APPENDIX 5
Water Quality Report Haina System 2009

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Sources of drinking water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

•Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

•Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

•Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

•Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

•Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Source Water Assessment Program

In 2004, the preliminary source water assessment report was released. The purpose of the source water assessment report is to enable the public and decision-makers to make well-founded decisions for the protection and preservation of our drinking water. The source water assessment report identifies the potential contaminating activities for each source of water.

In the report, Haina Water System sources are potentially vulnerable to contaminants associated with the following activities: sugarcane, roads, septic tanks, cesspools, injection wells, cemetaries, residential parcel, auto body and repair shops, auto junk yards, utility stations, waste transfer stations, hospitals and clinics, cultivated agricuture, and diversified agriculture. Atrazine has been detected in this system which is attibuted to runoff from herbicide used on row crops. For more information, please contact Keith Okamoto, P.E., at 961-8670.

Is my water safe?

Yes it is. Last year, as in years past, your tap water met all U.S. Environmental Protection Agency (EPA) and State drinking water health standards. The Department of Water Supply vigilantly safeguards its water supplies and once again we are proud to report that your system has complied with all drinking water standards.

Why are there contaminants in my drinking water?

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline 1-(800) 426-4791. If you have any questions regarding this Water Quality Report, please call Keith Okamoto, P.E., at 961-8670.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-(800) 426-4791 .

How can I get involved?

The Water Board meets the fourth Tuesday of every month. Call for the time and location of the meeting.

You Can Contact Us at the Following Numbers:

Administration/Finance/General	**(808) 961-8050**
Billing/Customer Service	**(808) 961-8060**
Engineering	**(808) 961-8070**
Emergencies & Field Operations	**(808) 961-8790**
Water Quality	**(808) 961-8670**

Department of Water Supply
345 Kekūanaōʻa Street, Suite #20
Hilo, Hawaiʻi 96720

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2009 Haina Water System Annual Water Quality Report

County of Hawai'i

Department of Water Supply

Haina System Water Quality Data Tables

The table below lists the drinking water contaminants that we detected during the calendar year of this report. The presence of contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done in the calendar year of the report. The EPA or the State requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

Regulated Contaminants

			Haina Well				
Contaminants	**MCL**	**MCLG**	**Level Found**	**Range of Detections**	**Sample Date**	**Violation**	**Typical Source of Contaminant**
Inorganic Contaminants							
Nitrate (ppm)	10	10	0.72	n/a	2009	No	Runoff from fertilizer use. Leaching from septic tanks, sewage. Erosion of natural deposits.
Organic Contaminants							
Atrazine (ppb)	3	3	0.25	0.24 - 0.26	2009	No	Runoff from herbicide used on row crops.
Disinfection By-Products							
Haloacetic acids (HAA5) (ppb)	60	n/a	1.5	n/a	2009	No	Byproduct of drinking water disinfection.
Total Trihalomethanes (TTHMs) (ppb)	80	n/a	11.3	n/a	2009	No	Byproduct of drinking water disinfection.

Haloacetic Acids or "HAA5" means the sum of the concentration of the haloacetic acids (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid).
Total Trihalomethanes or "TTHM" means the sum of the concentration of the trihalomethane compounds [trichloromethane (chloroform), dibromochloromethane, bromodichloromethane, and tribromomethane (bromoform)].

Sodium (Not Regulated by State or Federal Government)

			Haina Well				
Contaminants (units)	**MCL**	**MCLG**	**Level Found**	**Range of Detections**	**Sample Date**	**Violation**	**Typical Source of Contaminant**
Inorganic Contaminants							
Sodium (ppm)	n/a	none	0.48	n/a	2008	No	Erosion of naturally occurring deposits; saltwater intrusion.

Lead and Copper Rule Compliance

			Haina Water System				
Contaminant	AL	MCLG	Level Found	# of Sites > AL	Sample Date	Violation	Typical Source of Contaminant
Copper (ppm)	1.3	1.3	0.068	0/22	2007	No	Corrosion of household plumbing systems; erosion of natural deposits.

Key definitions of terms used in this report

- **MCLG** = Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk for health. MCLGs allow for a margin of safety.
- **MCL** = Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology
- **ppm** = Parts per million. One ppm corresponds to a single penny in $10,000 or about one minute in two years.
- **ppb** = Parts per billion. One ppb corresponds to a single penny in $10,000,000 or about one minute in two thousand years.
- **AL** = Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
- **n/a** = Not applicable

Sodium in drinking water

There is no State or Federal maximum contaminant level for sodium. Although required, monitoring for sodium is performed primarily to gather information for the consumers, the Safe Drinking Water Branch, and the Department of Water Supply.

The EPA Drinking Water Advisory recommends that the sodium concentration in drinking water not exceed a range of 30 to 60 ppm because of the possible adverse effects on taste at higher concentrations. For persons on a sodium-restricted diet, sodium concentrations greater than 120 ppm could be problematic.

If you are on a sodium-restricted diet, you should consult your physician about the level of sodium in the drinking water.

Lead and drinking water

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing and not usually from the source water. The Department of Water Supply is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may choose to have your water tested by contacting private laboratories that are certified by the State for doing drinking water analyses. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Where does my water come from?

The normal source of water for the Haina Water System is the Haina Well, which is a groundwater source. The source(s) of supply may change depending on the supply and demand. As of July 20, 2007, Haina Water System has also been providing water to Kukuihaele Water System.