29 August 2019

Mr. Allan Ota
Oceanographer
Water Division (WTR-2-4)
U.S. EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Subject: Application for Ocean Dumping Permit for Starkist Samoa Co., American Samoa

Dear Mr. Ota,

Pursuant to Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 (33 U.S.C. 1412), Starkist Samoa Co. ("Starkist") submits its application for an ocean dumping permit in accordance with the requirements presented in CFR §221.1. Supporting materials to this application are provided as attachments.

(a) Name and address of applicant;

Starkist Samoa Co., PO Box 368, Pago Pago, American Samoa 96799

(b) Name of the person or firm transporting the material for dumping, the name of the person(s) or firm(s) producing or processing all materials to be transported for dumping, and the name or other identification, and usual location, of the conveyance to be used in the transportation and dumping of the material to be dumped, including information on the transporting vessel's communications and navigation equipment;

Name of Producer: Starkist Samoa Co.

Name of Transporter: (Proposed) Aquatic Blue Environmental, PO Box 1861, Pago Pago, American Samoa, 96799.

Starkist proposes to contract with Aquatic Blue Environmental to operate an ocean dumping vessel. Specifications for this vessel are generally described within this application and in Attachment 1.

Aquatic Blue's vessel Master Captain will have experience captaining vessels performing open ocean operations and be a highly skilled vessel mechanic, proficient in fixing electrical systems, navigation systems, and issues with engines. The captain will be certified in operating vessels in both open ocean and near shore conditions. Aquatic Blue's Chief Engineer for the Starkist ocean dumping vessel will be an experienced mechanic, including experience with managing crew members and designing, maintaining, and monitoring pump systems.

Transporter Vessel Communications and Navigation Equipment: The transporting vessel, (name is to be determined) is equipped with a GPS receiver enabled with the Wide Area Augmentation System (WAAS) for horizontal position accuracy of +/-10 feet. The GPS receiver provides speed, course and the time and date information received from the satellite signals. The tracking unit is fitted with calibrated current sensors on up to two pumps to detect changes in pump amperage signifying use and is fitted with a flow meter to measure and record the flow rate at the point of discharge. The vessel is equipped with two VHF marine radios, radar, and one Single Sideband marine radios.

Starkist has contracted with Advanced Dredging & Industrial Solutions (ADISS, Inc.) to provide a vessel tracking and e-logging system to comply with the vessel monitoring requirements set forth by United States Environmental Protection Agency (USEPA) Region 9 for approval to dispose of fish waste within the USEPA designated American Samoa offshore disposal site. ADISS specializes in monitoring dredging projects and has provided tracking services to commercial dredging companies since 1997. About 800 monitoring projects have been completed, documenting more than 250,000 loads of dredged material to offshore and upland placement sites.

To accomplish the vessel monitoring requirements, a "Black Box" data logger configured and wired to receive and record vessel position, pump status and discharge flow rate information will be installed. The data logger will be housed in a watertight enclosure along with a back-up battery, power supply, Wi-Fi network adaptor and amber alert LED. The system will be powered by 110VAC supplied by the vessel.

Flow meter data will be interrogated by the logger software to confirm flow rates are within acceptable seasonal tolerances. If seasonal rate thresholds are exceeded, the system will provide a visual alert by flashing the amber alert LED until rates fall below the threshold limits. Control of the flow rate is discussed in Section g.

The data logger will be programmed to acquire position and sample the sensors at two different intervals. While inside a pre-determined geo-fence surrounding the designated disposal area, the system will log data at a 12-second rate. While outside the geo-fence and away from the disposal area, the system will log at a 5-minute rate. The "Black Box" logging system on the vessel will store and report the following data points at the designated intervals:

- GMT Date/Time (converted to Local when imported)
- Latitude/Longitude
- Speed
- Course
- System Voltage
- Pump Amperage
- Flow Rate (when discharging)

The position and sensor data will be logged and stored in the onboard data logging system. When possible, the logged data will be transmitted to a Fish Waste Disposal (FWD) website (created and operated by ADISS for Starkist) via a connection between the onboard Wi-Fi system and the island cellular data network (subject to communications connectivity with the mainland). This connection may be possible between the vessel and the island-based cellular data network during ocean dumping trips; however, the practical reach

of the cellular phone coverage system will need to be confirmed. At a minimum, the transfer of data to the FWD website is expected to occur as the vessel returns to Pago Pago Harbor (the Harbor) and the vessel's Wi-Fi returns to within coverage of the island data network system. In addition to the "Black Box" data logger, the vessel will also be equipped with an e-Logging laptop/netbook that ADISS will train the vessel crew to operate. This laptop/netbook will provide the crew with a software interface to enter and submit their daily trip logs.

In addition to the "Black Box" data logger, the vessel Captain/crew will maintain the laptop/netbook and enter trip specific details not recorded by the data logger including:

- Notification time/date with ASEPA/CGLO before each trip
- Onshore loading start/end times
- Volume loaded (in gallons)
- Wind direction (including every 30 minutes during discharge)
- Swell
- Dump site center conditions (coordinates, wind direction and observed surface water direction)
- Current direction (at center, end of discharge)
- Discharge pattern
- Presence of plume
- Time and position of any floating material
- Unusual occurrences
- Deviations from normal disposal pattern (with rationale for the deviation)

The data logging software will be capable of interfacing with the incoming GPS data to auto-populate several form fields to simplify data entry (i.e., discharge rate, total run time, average speed during discharge). The vessel Wi-Fi network will transmit the required vessel trip logs from the laptop/netbook to the FWD website via the same data connection as outlined above.

As a back up to the data upload system when Wi-Fi network coverage is not available, the software will be programmed to save and store logged and vessel data to a flash drive when inserted into the netbook/laptop. Once saved to the flash drive, the Captain/crew member can download and email the daily data files directly to the ADISS server when they return to the island, subject to accessible data connections between the island communication and the mainland. Once received by ADISS, the files will undergo a data validation Quality Assurance (QA) process. Upon completion of the QA process, the data will be made available on the website for viewing by authorized external parties on a biweekly basis. The FWD website will operate continuously in support of the vessel operations and will be monitored and supported by ADISS's team of Information Technology (IT) specialists.

The FWD website will host aerial and map views that will show shorelines as well as the designated EPA disposal site boundary. The website will also include other features, including the ability to display cursor coordinates and distance measurements from viewer selected map locations. Additionally, the website will provide access to the "trip plots" on a biweekly basis that will display the vessels geographical data (i.e., vessel navigational plot showing its course during discharge) and sensor status relative to the permitted

disposal site. This data will clearly show where disposal operations occurred by showing position and corresponding pump and flow status.

(c) Adequate physical and chemical description of material to be dumped, including results of tests necessary to apply the Criteria, and the number, size, and physical configuration of any containers to be dumped;

Fish processing waste from the dissolved air flotation (DAF) sludge, press liquor/water from the fishmeal sump, and pre-cooker wastewater as authorized in 40 CFR 228.15(m)(1)(vi).

Physical and chemical data characterizing the material to be dumped is provided as Attachment 2. Sampling of the three wastewater streams was conducted on five separate days between June 20 and 27, 2019 as outlined in the Ocean Disposal Waste Stream Characterization Sampling and Analysis Plan (SAP) dated June 14, 2019. During the sampling period, 24-hour composite samples were collected from each source which were then composited to generate one combined ocean disposal composite sample for each of the sample days. The composite sample was analyzed for a list of parameters as requested by USEPA Region 9, including volatile organic compounds (VOCs), metals, pyrethrins, formaldehyde, nitrogen compounds, phosphorus, and general chemistry (e.g., oil and grease, solids, volatile solids, etc.), among others. The full list of analytes and results are provided in Attachment 2 and were previously provided to USEPA on July 24, 2019.

The composite sample representing the combined waste streams proposed for ocean disposal was also subjected to bioassay testing as outlined in the Ocean Disposal Bioassay Testing SAP dated June 14, 2019. The purpose of the bioassay testing was to characterize the potential toxicity of the ocean disposal waste to three separate sensitive marine, water-column dwelling organisms. Suspended particulate phase bioassays were performed using six dilutions (2.0, 1.0, 0.5, 0.25, 0.125, and 0.06%) and a laboratory control. Bioassay testing was completed on the combined ocean disposal composite sample collected on June 27, 2019 (as outlined above) and the results are provided in Attachment 2.

To demonstrate that the current wastewater data is compatible with historical combined waste stream conditions, the 2019 dataset was compared to historical datasets for various measured parameters. As outlined in Attachment 2, the samples of the combined ocean disposal wastewater collected in June 2019 are generally consistent with wastewater that was previously permitted for ocean disposal. When average concentrations for parameters analyzed in previous years were compared against the average concentration data collected in 2019, the 2019 concentrations were generally lower or within the historical average concentrations.

Further, a limiting permissible concentration (LPC) concentration was calculated in accordance with 40 CFR section 227.27 (a) where the LPC is the concentration of waste in the receiving water that does not exceed an acute toxicity threshold of 0.01 of the lowest acutely toxic concentration (i.e., the EC50 or LC50 of the sensitive marine organisms tested). The LPC was then compared to estimated waste sample concentrations at the edge of the dumping zone, based on 1997 plume dilution modelling (CH2M Hill 1997). The 1997 plume dilution modelling was based on dumping flow rates from the vessel, which are not expected to change. Bioassay results indicate that no adverse effects are expected to be observed at the edge

of the boundary under the conditions. Validated results from both the bioassay testing and the analytical testing programs are provided in Attachment 2.

(d) Quantity of material to be dumped;

Up to four hundred thousand (400,000) U.S. gallons per day which is consistent with the combined fish waste volumes historically permitted from the two canneries. This volume assumes that more than one dumping run would be completed in a day.

(e) Proposed dates and times of disposal;

The fish processing waste is generated whenever the Starkist facility is in operation. Starkist requests 400,000 gallons per day in order to allow operational flexibility in the facility's ocean dumping schedule. Additionally, there may be a need for accumulation of wastes and daily dumping up to 400,000 gallons in the event of unplanned downtime of the vessel or other emergency conditions. As noted above, this volume assumes that more than one dumping run would be completed in a day.

(f) Proposed dump site, and in the event such proposed dump site is not a dump site designated in this subchapter H, detailed physical, chemical and biological information relating to the proposed dump site and sufficient to support its designation as a site according to the procedures of part 228 of this subchapter H;

The proposed dump site is the USEPA designated site in the Pacific Ocean confined to a circular area with a 1.5 nautical mile radius, centered at 14° 24.00' South latitude by 170° 38.30 West longitude.

(g) Proposed method of releasing the material at the dump site and means by which the disposal rate can be controlled and modified as required;

The proposed method of releasing the fish processing waste at the dump site is through a pump/pipe system connecting the vessel's six holding tanks to a single discharge port at the stern of the vessel. Disposal rate during dumping is controlled by a manifold system with valves that allows the vessel crew to manually[1] release the fish waste from the holding tanks at a controlled rate. The flowrate of the discharge is then measured at a point closer to the discharge port (i.e., after the manifold). This approach to disposal allows for vessel stability to be maintained during discharge. See Section (c) above for more details on the vessel instruments monitoring and reporting of disposal rates.

[1] The valve system is manual with crew opening and closing valves as needed. To maintain stability, the crew will release fish waste from two tanks simultaneously, the tanks on opposite sides of the vessel (port and starboard). The level of each tank will be measured with sounding tape and/or a float switch system that displays the tank level. Each tank will also have a low- and high-level alarm system. Additionally, the vessel is equipped with multiple inclinometers to determine and maintain stability.

(h) Identification of the specific process or activity giving rise to the production of the material;

The fish processing waste is produced from the tuna canning process at the Starkist facility. The DAF sludge originates from the DAF treatment system which is a physical/chemical separation process to remove suspended material from the combined wastewater streams generated in the production facility. This treatment is achieved by dissolving air in a wastewater stream and combining it with the DAF influent under pressure, then releasing the air at atmospheric pressure in the flotation tank. The DAF influent is treated with aluminum sulfate (alum) and anionic polymer to improve solids separation. Solids and Oil and Grease particles adhere to the dissolved air, and these materials float to the surface of the DAF where they are removed from the surface as DAF float. DAF bottoms are materials that are unable to float due to their relative weight and sink to the bottom of the DAF for collection and removal via the DAF bottoms pump system. DAF float and DAF bottoms comprise the DAF sludge discussed in this permit application.

Wastewater from the pre-cookers is generated from condensed steam used to cook the fish, and from the release of liquids as the fish is cooked. Vegetable broth is added to some of the fish before entering the pre-cookers and a portion of the broth drains from the fish during the cooking process, accumulating in the pre-cooker wastewater. The pre-cooker area wastewater is currently collected in the pre-cooker sump, from which it is pumped to the fishmeal area for treatment via the steam-fed evaporator (SFE). Starkist intends to ocean dispose all the pre-cooker wastewater and discontinue treatment via the SFE.

Press water/liquor (also referred to as stickwater) generated from the fishmeal process was historically discharged to the fishmeal sump, along with other wastewater side streams generated in the fishmeal process, and the contents of the fishmeal sump were ocean disposed. In November 2017, Starkist installed a waste heat evaporator (WFE) for the removal of solids from the stickwater into a concentrate for beneficial re-use into fishmeal product. The condensate portion of the stickwater from the WFE continues to be discharged into the fishmeal sump, along with the other wastewater side streams historically generated in the fishmeal process area. The combined wastewater stream, including the WFE condensate and wastewater sources collecting in the fishmeal sump, will be ocean disposed.

(i) Description of the manner in which the type of material proposed to be dumped has been previously disposed of by or on behalf of the person(s) or firm(s) producing such material;

Until 1975, Starkist disposed of liquid wastes through direct discharge into the Harbor. As a result of the deleterious effects of harbor dumping, Starkist installed sludge-generating DAF equipment between 1974 and 1975. From 1975 until 1980, sludge generated by the DAF equipment was disposed of on land at one of two terrestrial dumping sites, which included a pit near Tafunafou on Tafuna and a diked ravine near Futiga. After numerous concerns were raised regarding land dumping practices, including serious human health hazards, water contamination, land space limitations, cultural practices (e.g., communal land ownership) and aesthetics (e.g., odors and traffic congestion), the USEPA issued a permit for ocean disposal in 1980. Starkist and Van Camp Seafood (VCS), subsequently operated as Chicken of the Sea (COS), began ocean disposal of fish wastes off the south coast of Tutuila Island, American Samoa in December of 1980 (Permit Number: OD 79-01/02 Special). Both Starkist and VCS/COS historically applied for coordinated ocean dumping permits and shared the cost of the ocean dumping vessel and monitoring programs, disposal vessel navigation system, and monthly ocean disposal site monitoring.

Research Permits were issued on February 26, 1987 (OD 86-01), September 2, 1987 (OD-87-01), March 4, 1988, (OD 88-01), and September 12, 1988 (OD 88-02). In 1990, the disposal site was moved further offshore into deeper water based on an Environmental Impact Statement (EIS) conducted February 24, 1989 (USEPA 1989). Special Permits were issued in 1990 (OD 90-01) and 1993 (OD 93-01).

The permitted disposal volume of fish processing waste was a total of 400,000 gallons per day (200,00 gallons per day per cannery). A major Tsunami struck the island in September 2009, damaging the facility, disrupting operations, and leading to the suspension of operations at the VCS/COS facility. Starkist continued ocean dumping through to approximately May 2012 at which time it began treating the high strength wastewater through a new wastewater treatment system.

Between 2012 and 2017, the previously ocean dumped fish wastes were pre-treated by a high strength wastewater treatment system before being combined with the remaining wastewater streams. The combined wastewater stream was then treated by a DAF system and discharged to an outfall diffuser in the Harbor via the Joint Cannery Outfall (JCO).

In November 2017, Starkist installed two fishmeal evaporators to reduce the pollutant loading discharged to the Harbor from the press water/liquor and the pre-cooker wastewater streams. The evaporators are required by Starkist's Consent Decree, effective March 7, 2018. The evaporators generate a concentrate stream which can be processed with the fish solids through the fishmeal drying process; however, the capacity of the fishmeal drying process is limited and not all of the concentrate can be processed each day. Since May 2018, StarKist has disposed of a portion of the evaporator concentrate to the local landfill. Starkist regularly communicates with the American Samoa Power Authority (ASPA) and the American Samoa EPA (ASEPA) on this matter.

Through conversations with the ASEPA and ASPA, Starkist understands that the capacity of the landfill is limited, and the concentrate generates nuisance odor which limits the long term feasibility of this disposal method. A permit to ocean dispose the three fish waste streams outlined in this permit application will end the need for ongoing concentrate disposal at the landfill.

(j) A statement of the need for the proposed dumping and an evaluation of short and long term alternative means of disposal, treatment or recycle of the material. Means of disposal shall include without limitation, landfill, well injection, incineration, spread of material over open ground; biological, chemical or physical treatment; recovery and recycle of material within the plant or at other plants which may use the material, and storage. The statement shall also include an analysis of the availability and environmental impact of such alternatives;

Starkist historically dumped fish processing waste based on the need demonstrated in the 1989 (EIS) (USEPA 1989). As noted above in Section i, the USEPA permitted ocean dumping at a designated offshore site in 1980. The designated site, at the time, was approximately 2.25 nautical miles from the nearest fringing reef. From 1980 to 1986 DAF sludge was dumped by Special Permit OD 79-01 and OD 79-02 (each cannery had its own permit). Due to cannery production growth, it was decided in 1986 to increase the diameter of the ocean dumping site and move the location south southeast from its original location. The drawback of the original designated site was that it could not be expanded appreciably without the plume being carried toward shallow water habitats if larger quantities of waste were dumped.

The EIS considered three alternatives for fish waste dumping: No Action, Land-based dumping, and ocean-based dumping. Each alternative included a set of options that were evaluated to select the approach with the lowest potential for human health and ecological impacts.

The "No Action" alternatives included: dumping without a permit, dumping on land, discontinue the use of DAF equipment, and discontinue operations in American Samoa. The no action alternatives were considered to either cause violations with local and federal regulations or deprive American Samoa of its major industry. Land-based alternatives included: ponding, landfilling, percolation of saline cannery waste. For the land-based alternatives, the EIS concluded that "the cumulative effect of these attempts to carry out land dumping have illustrated well the fact that land dumping on island territories is not a feasible alternative to management of fish processing wastes."

Based on the issues associated with land-based dumping, ocean dumping was the most viable and protective alternative. Three ocean-based alternatives were evaluated; shallow water site, the original permitted site, and deep-water site. The deep-water alternative was selected because this site offered the most protection against possible surface slicks approaching shores, there was minimal possibility that the plume would encroach on environmentally sensitive areas at this site, and it provided a larger mixing zone and dilution zone. It was deemed safe for disposal for larger quantities of waste.

Since no new land-based disposal options are available and the status of the previously reviewed options have not changed since 1989, the findings of the EIS continue to reflect the options for alternative disposal options.

As discussed in Section i (above), Starkist discontinued ocean dumping in 2012. Since 2012, the fish waste has been discharged via the Joint Cannery Outfall, which increased pollutant loading to the Harbor. As a result, Starkist upgraded the wastewater treatment systems, beginning in 2017 through early 2018, and have significantly reduced loading rates for Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia, and Oil and Grease, in part by recovering material within the fishmeal operations from the evaporators. However, through ongoing optimization efforts, a portion of the concentrate generated by the evaporators could not be recovered through the fishmeal dryers and required landfill disposal. Starkist's desire to reduce the overall nutrient loading to the Harbor and discontinue landfilling of concentrate from the plant, results in a need to re-engage in ocean dumping of fish waste.

Chemical, biological and physical options to upgrade the existing wastewater treatment system to achieve the NPDES permit limits for discharges to the Harbor via the JCO have been evaluated by Starkist. Through this process, two key constraints have been identified: footprint and operational complexity in a remote setting.

Additional footprint at the Facility for upgraded wastewater treatment systems is highly constrained by the orientation of the site relative to the mountains, the highway, and the Harbor. The size of a treatment system required to treat up to 2.9 million gallons per day of wastewater and meet the current NPDES permit limits without the resumption of ocean dumping, would only be feasible through capital investments on the order of $65M.

To the extent a treatment system can even be designed and constructed to meet the draft NPDES Permit limits, given the very limited space available at the Facility, it is important to recognize that the operation

of a complex treatment system in a remote location with limited local operation and maintenance resources increases the risk of future non-compliance. Contracting skilled off-island treatment operators may be possible but at a significant premium, while the local mechanical, electrical, and instrumentation and control staff are less skilled than in other parts of the United States, requiring emergency off-island support in the event of equipment failure. For example, recent repairs to wastewater treatment equipment prompted a shutdown of the production facility due to the limited ability for off-island contractors to travel to the site on one of the twice-weekly flights between Hawaii and American Samoa, even on an emergency basis. The risk to effluent wastewater compliance associated with operational complexity are significant.

The anticipated costs to attempt to meet the NPDES effluent limits presents a serious challenge to the viability of the facility and have necessitated Starkist to evaluate its options to close the facility and transfer production elsewhere. Transferring production off the island would have a very negative impact on the American Samoa economy. Starkist is the largest private-sector employer in American Samoa, with approximately 2,400 direct employees approximately 16% of the American Samoa workforce; approximately the same number of people are employed indirectly in jobs that result from Starkist's operations in American Samoa. An estimated 90% of the shipping containers leaving the Port of Pago Pago are associated with Starkist's operations. Starkist is already operating at a significant cost disadvantage to its competition in the tuna canning industry as a result of the competition's exclusive use of foreign canneries in low-wage countries. According to a 2016 Government Accountability Office (GAO) report, Starkist could save at least $7.6 million annually - and as much as $22.3 million annually - by relocating its American Samoa operations to another tariff-free country with lower labor costs.[2] The cost savings associated with moving operations would grow significantly without an appropriate ocean dumping permit.

The ASEPA supports ocean dumping of fish waste. During an in-person meeting[3] between Starkist, USEPA, and the ASEPA to discuss ocean dumping, Director Fa'amao Asalele, Jr. (ASEPA) commented on the limited capacity of the landfill on the island of American Samoa to continue accepting concentrate from the Starkist facility and urged USEPA and Starkist to develop the information necessary to submit, review and approve an application for Ocean Disposal. Director Asalele stressed the impact of this permit on improving operations at the landfill, including issues with odors and community complaints.

(k) An assessment of the anticipated environmental impact of the proposed dumping, including without limitation, the relative duration of the effect of the proposed dumping on the marine environment, navigation, living and non-living marine resource exploitation, scientific study, recreation and other uses of the ocean.

The environmental impact of the proposed dumping in American Samoa has been demonstrated in the EIS conducted by the USEPA. With input from federal and local agencies and the public, USEPA designated the current deep-water dumping site. As noted above in Section j, the designation was based on the determination that ocean dumping of fish waste was the preferred alternative over other alternatives

[2] U.S. Government Accountability Office. *American Samoa: Alternatives for Raising Minimum Wages to Keep Pace with the Cost of Living and Reach the Federal Level.* December 2016.
[3] Meeting was conducted May 8, 2019 at the USEPA Region 9 office, San Francisco, CA.

proposed for disposing of fish waste. The EIS determined that "no cumulative effects of ocean disposal are expected under presently permitted quantities of dumping. The currents and winds effectively dissipate the wastes, and none are measurable after four hours, nor are they visible on the morning following the previous day's disposal to indicate a buildup of wastes. The assimilative capacity of the open ocean is enormous. There should be no buildup of any pollutants under existing disposal practices."

Starkist has historically dumped fish waste at the EPA designated disposal site, as recent as 2012. In compliance with EPA's ocean dumping criteria at 40 CFR Parts 227 and 228 and pursuant to MPRSA of 1972 (33 U.S.C. §1401 et seq.), Starkist collected monthly data at the dump site (receiving waters and vessel operations) and the onshore storage tank to document the impact to the ocean dumping operation. In compliance with Special Conditions outlined in the previous permit (OD 93-01), Starkist routinely (i.e., every three months during the permit period) provided USEPA with Ocean Disposal Site Monitoring Reports during historical ocean dumping activities. These reports included ocean dumping vessel operations information, dump site monitoring data, and fish waste processing data including analytical and bioassay testing results. Based on Starkist's demonstration of compliance with permit conditions submitted to USEPA in these reports, there have been no discernable permanent effects on the water quality of the ocean in or near the dump site. Starkist proposes to dispose of fish waste from the same waste streams historically permitted.

As described in Section c (above and in Attachment 2), current analytical and biological toxicity data show consistent results with historical data from the same permitted combined waste streams. Based on dilution levels expected at the designated ocean dumping site, the fish processing wastes are not expected to cause significant short- or long-term impacts to oceanic water quality, marine ecosystems or human health.

Closing

We appreciate the USEPA's prompt review of the Ocean Dumping permit application information summarized in this letter. Should you have any questions about this submission, please feel free to contact me at 684.622.2003.

Sincerely,

Jason Kim

Jason Kim
General Manager, Starkist Samoa Co.

Copies to: Ms. Elizabeth Sablad and Ms. Sara Goldsmith – USEPA
Ms. Ellen Blake – USEPA
Director Fa'amao Asalele – ASEPA
Archie Soliai, Edmund Kim and John Dearness – Starkist Samoa Co.
Jeff Roberts, Esq., Mike Schenk and Scott Meece – StarKist Co.
Janet Goodfellow, Keith Kroeger and Brandon Steets – Geosyntec Consultants
Scott Dismukes, Esq. and Dave Rockman, Esq. – Eckert Seamans

Literature Cited:

CH2M Hill. 1997. Revised Report for Joint Cannery Ocean Dumping Studies in American Samoa.

U.S. Environmental Protection agency (USEPA). 1989. Final Environmental Impact Statement for the Designation of an Ocean Disposal Site off Tutuila Island, American Samoa for Fish Processing Wastes. February.

Application Supporting Attachments:

Attachment 1: Aquatic Blue Vessel Specifications Sheet

Attachment 2: Ocean Dumping - Physical and Chemical Description of Material to be Dumped

Attachment 3: Ocean Dumping Monitoring Plan

ATTACHMENT 1
AQUATIC BLUE VESSEL SPECIFICATIONS

DP1 BEIERS - IVCS 200

REPOWERED IN 2003 V
3512 CATERPILLARS

Jump Rack Stern

DIMENSIONS

Length	197 Ft
Beam	40 Ft
Depth	14 Ft
Clear Deck	145 Ft x 33 Ft
Deck Cargo	775 LT
Gross Tonnage	151 GT

LIQUID CAPACITIES

Potable Water	197,000 Gals.
Fuel	85,000 Gals.
Liquid Mud	1,100 BBLS
Bulk Tanks	3,900 Cu Ft. (6 tanks)
Lube Oil	600 Gals.

DELIVERY RATES

Fuel	450 GPM @ 100 Ft
Water	530 GPM @ 100 Ft.
Liquid Mud	21 LBS PM @ 100 Ft.

MACHINERY

Main Engines	2 – 3512 Caterpillars
Max HP	2,600
Speed	12 Knots
Fuel Burn	124 GPH Cruising 12 GPH Standby
Generators	2 – 3306 Caterpillars - 175KW
Bow Thruster	8V-71-300HP
Dynamic Positioning	Beier - IVCS 2000 DP1

ELECTRONICS

2 VHF Marine Radios
SSB Radio
adars

Internet
SAT Phone
TV - Direct TV
DVD

OTHER FEATURES

Central A/C & Heat
Hull & Safety Equipment
Laundry
Ice Maker
Jump Rack

CERTIFICATIONS

USCG Licensed and Approved For Oc
USCG Licensed and Approved for 18 I

ATTACHMENT 2

Ocean Dumping - Physical and Chemical Description of Material to be Dumped

Geosyntec consultants

130 Stone Road West
Guelph, Ontario N1G 3Z2
PH 519.822.2230
FAX 888.635.3470
www.geosyntec.com

Attachment 2

Date: August 29, 2019

Subject: Application for Ocean Disposal Permit - Sampling Results

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Starkist Samoa Co., a wholly owned subsidiary of the StarKist Co. (collectively referred to as StarKist), is submitting an application to the United States Environmental Protection Agency (USEPA) for ocean dumping of fish waste. This attachment presents bioassay toxicity testing and chemical results to support the permit application [Section (c)] request for adequate physical and chemical description of material to be dumped.

The StarKist Facility historically operated under a Special Permit (OD93-01 Special) issued by the USEPA for ocean dumping of high strength wastewater streams. StarKist discontinued this program in approximately July 2012. StarKist has a need to resume ocean dumping of the same previously permitted high strength wastewater streams.

BACKGROUND

StarKist conducted sampling and analysis of the combined wastewater from streams designated for ocean disposal in 40 CFR 228, namely Dissolved Air Flotation (DAF) sludge, pre-cooker wastewater, and the treated discharge from presswater which collects in the fishmeal sump (fishmeal sump). The combined ocean disposal samples were analyzed for a suite of chemical analytes and for biological toxicity using a bioassay testing approach consistent with the historical ocean disposal bioassay testing.

In support of the sampling and analysis, two Sampling and Analysis Plans (SAPs) were developed and submitted to USEPA for review and approval; one for wastewater sampling and analytical testing (Analytical SAP, dated June 14, 2019), and the other for wastewater sampling and bioassay testing (Bioassay SAP, dated July 24, 2019).

Samples were collected in late June 2019. More specifically, 24-hour composite samples were collected of the historical ocean disposal streams (fishmeal sump wastewater, DAF sludge, and pre-cooker wastewater) over five days within a two-week period and these samples were submitted to the laboratory for analysis. On the final day of sampling, additional volume of the 24-hour composite was collected and submitted to the laboratory for bioassay testing.

The following sections summarize the testing completed on these samples and the associated results. The bioassay and analytical testing laboratory's data packages are provided as appendices to this attachment.

BIOASSAY TESTING

Consistent with the historical permit for ocean disposal, bioassay testing was conducted to characterize the potential toxicity of high-strength waste to sensitive marine, water-column dwelling organisms. Sampling of the three wastewater streams was initiated on June 26, 2019 and completed on June 27, 2019, and the three samples were composited to generate a combined composite on June 27, 2019. Testing was initiated July 1, 2019.

The three test species used were the purple sea urchin (*Strongylocentrotus purpuratus*) larvae, mysid shrimp *(Americamysis bahia*), and inland silverside (*Menidia beryllina*). Consistent with historical bioassay tests, suspended particulate phase bioassays were performed using six dilutions (2.0, 1.0, 0.5, 0.25, 0.125, and 0.06% of the combined ocean disposal wastewater sample) and a laboratory control. The shrimp and silverside tests were run for 96-hours, ending July 5, 2019. The sea urchin test was run for 72-hours, ending July 4, 2019.

Bioassay Results

Results for the three bioassay tests were received from Enthalpy Analytical (formerly Nautilus Environmental) on July 24, 2019 and available laboratory reports are provided in Appendix A. All tests met the test acceptability criteria (i.e., the silversides and mysids showed less than 10% mortality in the controls and there was 80% normal shell development in the urchin control). Concurrent reference toxicant tests met all minimum test acceptability requirements and the Percent Minimum Statistical Difference (PMSD) value for the chronic urchin development test was within the acceptable range. The calculated median effect concentration values for all reference toxicant tests were within two standard deviations of the historical means, indicating typical organism sensitivity to copper.

Results of the three bioassay tests on diluted waste are presented in Table 1, along with a comparison of bioassay test results from historical testing in 1994/95. In 2019, the lab indicated one water quality deviation that was immediately addressed where possible; specifically, dissolved oxygen dropped to concentrations below 4 mg/L in the top two concentrations in the fish test and the top four concentrations in the urchin test. To address this issue, the fish and mysid shrimp tests were put on constant aeration; however,

the urchin test was not aerated due to the potential interference of aeration with the integrity of the urchin embryos in this test.

The samples were received slightly above the temperature range of 0-6 °C (6.8 °C at receipt). All tests were initiated within 98-hours of when the sample was collected. The laboratory controls met all minimum test acceptability requirements. Statistical analyses followed standard USEPA flowchart selections. The PMSD value for the urchin test was within the acceptable range. The data are deemed reliable for reporting purposes

Ammonia Results. The lab noted that ammonia levels in the sample were elevated. Subsamples were collected from each of the three bioassays upon initiation and at termination for each test, with the exception to the urchin development test at test termination due to technician error. Additional subsamples were collected for the mysid and inland silverside tests at 48 hours, prior to the test solution renewal. The subsamples were collected from the highest test concentration (2.0% sample) for each of the bioassays. If complete mortality in the highest concentration had occurred, then the concentration below was subsampled. Total ammonia in the 2.0% sample concentration ranged from 49.7 to 51.4 mg/L at the initiation of the bioassays.

Ammonia levels remained stable throughout the testing period. At the termination of the mysid test, subsamples were collected from two individual replicates in the 1% sample concentration (complete mortality had occurred in the 2.0% sample by 48 hours), one with complete survival, and one with no survival. Total ammonia measurements were within 10% of each other (23.5 mg/L in the replicate with no survival, 24.9 mg/L in the replicate with no mortality), suggesting that for this species, ammonia may not be the primary or sole driver of toxicity. However, ammonia may have contributed to the observed effects.

Test Replicate Variability. Relatively high variability in test replicate response was observed in some test concentrations. This was most apparent in the mysid and urchin tests. All test solutions were thoroughly homogenized prior to making test dilutions as well as prior to distribution to the individual test chambers. However, it was noted at sample receipt that the sample had a large portion of heavy particulate matter that settled quickly. In the higher concentrations (specifically the 0.5 and 1.0% sample) of the mysid test, some replicates had complete survival while others had complete mortality. In the urchin test, some replicates of the 0.06% concentration showed a partial response (i.e., some normally developed embryos), while other replicates showed no normally developed embryos. The inter-concentration variability combined with the bench

observations suggest that at least a portion of the toxicity may be associated with particulate matter in the sample.

Results for Inland Silverside

The inland silverside demonstrated no significant toxicity at sample concentrations below 0.5% and demonstrated 100% mortality in the 2% sample. The No Observed Effect Concentration (NOEC) and the LC50 were estimated as 1.0% and 1.41%, respectively. As shown in Table 1, NOEC and LC50 results for the silversides show less toxicity in 2019 than in tests conducted in 1994/95 with sand dabs, *Citharichthys stigmaeus*, in which the NOEC was reported to range from 0.2 to 0.25% and the LC50 ranged from 0.27 to 0.396%.

Results for Mysid Shrimp

The mysid shrimp demonstrated no significant toxicity at sample concentrations below 0.25% and demonstrated 100% mortality in the 2% sample. The NOEC and the LC50 were estimated as 0.25% and 0.49%, respectively. Variability among replicates in the myside shrimp test was observed in the 0.25, 0.5, and 1.0% samples. As shown in Table 1, NOEC and LC50 results are comparable to those of mysid shrimp tests conducted in 1994/95 in which the NOEC was reported to range from 0.05% to 0.5% and the LC50 ranged from 0.12 to 1.16%.

Results for Sea Urchin

The sea urchin test showed abnormal development in all sample dilutions ranging from 0.06 to 2.0%; however, some normal development also was observed in the 0.06% sample. As shown in Table 1, the EC50 result from 2019 is comparable to the urchin test conducted in 1994/95 in which the EC50 was < 0.08%. Similarly, the 2019 urchin EC50 is comparable to the estimated EC50 for mussels in the first of two bivalve larval development tests performed in 1994/95 in which the EC50 was also < 0.08%. The NOEC was reported as < 0.06% in the 2019 test and was not reported on in the 1994/95 tests but was at a minimum < 0.08%. Deviations in water quality, elevated ammonia, and particles in the sample are possible contributors to the observed toxicity. Historical bioassay reports suggest that elevated ammonia, also observed during 1994/95 bioassay testing, is a potential cause of the observed toxicity.

Limiting Permissible Concentration

The limiting permissible concentration (LPC) was calculated in accordance with 40 CFR section 227.27 (a) where the LPC is the concentration of waste in the receiving water that

does not exceed an acute toxicity threshold of 0.01 of the lowest acutely toxic concentration (i.e., the EC50 or LC50 of the sensitive marine organisms tested). The LPC was then compared to estimated waste sample concentrations at the edge of the disposal zone, based on the 1997 plume dilution modeling (CH2M Hill 1997).

The LPC was calculated using the lowest EC/LC50 result of 0.04% for the purple sea urchin sample and applying the 0.01 factor (40 CFR 227.27), resulting in an LPC of 0.0004% sample (i.e., or 1% of the lowest EC50 measured in bioassay tests [0.04%]). Based on the 1997 plume dilution modeling (CH2M Hill 1997), which is the most current ocean disposal modeling information available, the estimated combined ocean disposal wastewater concentration at the edge of the disposal zone is 0.00025% (i.e., assuming a minimum dilution of 1:400,000). The estimated edge of disposal zone waste concentration is lower than the LPC, indicating that toxicity would not be observed at this boundary under the conditions assumed in this model[1].

CHEMICAL ANALYSIS

The historical ocean disposal program required routine analysis of the combined wastewater streams for ocean disposal for ammonia, oil and grease, total nitrogen and total phosphorus, total solids and total volatile solids. The USEPA requested that StarKist analyze the combined ocean disposal wastewater stream for additional chemical parameters, including volatile organic compounds (VOCs), metals, pyrethrins, formaldehyde, nitrogen compounds, phosphorus, and general chemistry (e.g., oil and grease, solids, volatile solids, etc.), among others.

Sampling of the three wastewater streams was initiated on five separate days between June 20 and 27, 2019, and 24-hour composite samples were collected from each source and were then composited to generate one combined, 24 hour composite sample, for each of the sample days. The samples were shipped off-island to TestAmerica Laboratories in Irvine, California on the next available flight.

[1] The results of the 1997 model predict minimum dilutions of approximately 400,000:1 at the edge of the dumping zone (for summer conditions with an ocean current of 0.8 knots and a dumping rate of 1200 gallons per minute corresponding to a vessel speed of 10 knots). These dilutions are predicted under what the authors of this report consider to be conservative (under predicted dilutions) and worst case conditions. The time allowed for dispersion in this model is unclear; however, by dividing a given distance (e.g. 2.5 nautical miles to the edge of the dumping zone) by the current speed (0.4 knots and 0.8 knots), the time is estimated to be 6.25 hours and 3.125 hours, respectively.

Analytical Results

Final results for the chemical analysis of samples collected in June 2019 have been received from TestAmerica and available laboratory reports are provided in Appendix B.

The data has been reviewed and validated by Geosyntec and are provided in Table 2. Of particular note are the rejected data for VOCs and some nitrogen compounds based on hold time and temperature exceedances. As discussed with USEPA, these issues demonstrate the challenges with shipping samples off-island. In particular, the temperatures of the coolers measured by the laboratory upon receipt were much higher than were observed during previous sampling events. The cause for the higher than anticipated temperatures is under review for future sampling events.

To demonstrate that the current wastewater data is compatible with historical combined waste stream conditions, the 2019 dataset was compared to historical datasets for various measured parameters. Pyrethrins results are not presented in Table 3 as there is no historical data to compare 2019 results to at this time. No pyrethrins were detected for the samples collected in 2019 (Table 2). For comparison purposes, the average for a subset of the sample parameters from June 2019 is presented in Table 3 for parameters for which historical sampling data is available, including data from November 2018[2], historical ocean disposal data from the 2010[3] ocean disposal program (i.e., during the term of the 1998 Special Permit), and historical ocean disposal metals data from 1990 to 1993[4] (i.e., during the term of the 1990 Special Permit).

When average concentrations for parameters analyzed in 2010 are compared against the average data collected in June 2019, all concentrations, except for total phosphorus, are lower than the average data from 2010; total phosphorus is the same as historical data. Similarly, when the average metals data collected June 2019 are compared against the calculated average metals concentrations for a combined ocean disposal wastewater stream from 1990 to 1993, the metals concentrations in 2019 are generally lower, with the exception of aluminum. It is possible that the aluminum concentration is higher in

[2] In November 2018, StarKist completed a wastewater characterization study of the various wastewater streams, including DAF sludge, pre-cooker wastewater and the fishmeal sump. The wastewater quality of the combined ocean disposal wastewater stream was estimated by using the total loading contributed from each wastewater stream in proportion to each stream's daily flowrate.

[3] Data between January and December 2010 represents a period when the ocean disposal program was operating consistently.

[4] As summarized in the Fact Sheet for the 1993 Ocean Dumping Permit (OD 93-01 Special) dated July 31, 1993. Note that the data is provided for each of the individual streams and a combined ocean disposal wastewater concentration was estimated using the permitted volumes for each stream.

2019 due to increased alum requirements in the DAF associated with treating the high strength wastewater streams that were historically ocean disposed prior to 2012.

Since most of the parameters analyzed in June 2019 were not historically analyzed, the data in Table 2 should also be reviewed in the context of the bioassay testing results. The bioassay testing results are consistent with historical bioassay testing results which suggests that the wastewater quality is also consistent with historical wastewater quality.

Mercury, Copper, and Zinc Results

To provide insight into the wastewater analytical results for mercury, copper, and zinc, the Pollutant Minimization Plan (PMP) report prepared by gdc in December 2010 on StarKist's behalf as required by the 2008 National Pollutant Discharge Elimination System (NPDES) permit (Appendix C). At the time the PMP was completed, StarKist was ocean disposing the three wastewater streams discussed in this memorandum, therefore these streams were not included in the PMP investigation. However, as noted in the PMP report, the sources of these metals were identified to be the fish and equipment used to process the fish. Since these sources would also impact the pre-cooker wastewater, fishmeal sump, and the DAF sludge, a discussion of the information from the PMP is provided below.

More specifically, the findings of the report indicate that areas of the Facility where process wastewater is generated from water contact with raw and cooked tuna fish had elevated concentrations of all three metals. In addition, process wastewater that came into contact with galvanized fish bins (scows) at the site contained elevated concentrations of zinc. This type of scow has been in use at the Facility for many years.

Pre-cooker wastewater is generated from steam that comes into contact with steel racks and tuna in the pre-cooker area where all three metals may collect in the wastewater. Similarly, the fishmeal sump collects wastewater evaporated from stickwater generated from the processing of fish scraps. The DAF sludge is a mixture of solids that both float (DAF float) and sink (DAF bottoms) in the DAF treatment system which treats wastewater from all areas of the Facility, including thawing, spray cooling, butchering and packing processes. These are all areas where process wastewater comes into contact with tuna and galvanized steel.

The conclusions outlined in the PMP report also noted:

- There is no practicable way to reduce the source of mercury in the Facility other than maintaining good housekeeping practices that involve clean-up of fish scrap during washdown activities.

- The primary source of copper is from tuna. It was found that secondary sources of copper from plumbing fittings and piping appeared to be minor.

- The primary source of zinc is from tuna and scows. Scows are required in the marine environment to avoid excessive corrosion while transporting tuna and exposed to salt in ocean water used throughout the Facility.

Water Quality Criteria

Chemical concentrations in undiluted waste samples were compared to recommended acute water quality criteria (WQC) for the protection of aquatic life (USEPA 2016). Concentrations of metals and total cyanide in undiluted combined ocean disposal wastewater samples were elevated above the acute WQC. However, when the estimated dilution factor of 1:400,000 (i.e., based on CH2M Hill 1997 plume dilution model) was applied to the sample results, the diluted sample result was below all corresponding WQC.

Table 4 provides a comparison of preliminary chemistry results for the combined ocean disposal wastewater samples to toxicity effects concentrations (i.e., EC50s) in the literature or from the ECOTOX database (USEPA 2019). Concentrations of several metals and ammonia in undiluted combined ocean disposal wastewater samples exceeded the corresponding toxicity effects concentrations. The magnitude of exceedance of the toxicity effects concentrations from the literature (i.e., EC50s) was greatest for ammonia and zinc. When compared to toxicity effects concentrations from the literature, diluted wastewater samples (i.e., based on 1997 plume dilution model estimated concentrations at the edge of disposal zone) showed no exceedances for any constituents.

CONCLUSIONS

Based on the data summarized, the samples of the combined ocean disposal wastewater collected in June 2019 appear to be generally consistent with wastewater that was previously permitted for ocean disposal. Bioassay results indicate that no adverse effects are expected to be observed at the edge of the boundary under the conditions assumed the model.

REFERENCES

CH2M Hill, 1993. Draft Study Plan for Joint Cannery Ocean Dumping Studies in American Samoa.

CH2M Hill, 1997. Revised Report for Joint Cannery Ocean Dumping Studies in American Samoa.

CH2M Hill and gdc, 1997. Joint Cannery Ocean Dumping Studies in American Samoa. Revised Report. Submitted to U.S. EPA Region 9, American Samoa EPA. Prepared for StarKist Samoa and VCS Samoa Packing. June 1997.

USEPA. 1995. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine & Estuarine Organisms. EPA-600-R-95-136.

USEPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition (EPA/821/R-02/012). US EPA Office of Water, Washington, DC.

USEPA, 2016. National Recommended Water Quality Criteria - Aquatic Life Criteria Table. Updated Dec. 22, 2016. Available at: https://19january2017snapshot.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table_.html#table.

USEPA, 2019. **ECOTOX** Knowledgebase. Updated June 13, 2019. Available online at: https://cfpub.epa.gov/ecotox/

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Table 1. Bioassay Test Results with Comparison to 1994/1995 Samples

Test	Endpoint	2019 Samples	1994/95 Samples		
		7/2019	2/1994	10/1994	6/1995
Fish[1] 96 hr Survival Test	**NOEC**	1.0	0.2	0.25	0.25
	LC50	1.41	0.27	0.35	0.396
Mysid Shrimp 96 hr Survival Test	**NOEC**	0.25	0.05	0.5	0.5
	LC50	0.49	0.12	1.16	1.16
Blue Mussel 48 hr Larval Development Test	**EC50**	NT	<0.08	0.1	--[2]
	LC50	NT	>1.2	>2.0	--[2]
Sea Urchin 72 hr Embryo Development Test	**NOEC**	<0.06	NC	NC	NC
	EC50	0.04	<0.08	--[3]	--[3]
	LC50	NC	>1.2	--[3]	--[3]

Notes

1 Sand dab (*Citharichthys stigmaeus*) were tested in 1994/95 and inland silverside (*Menidia beryllina*) tested in 2019

2 Mussel larvae were not available for test, requirement waived by U. S. EPA

3 Sea Urchin not tested in 10/1994 and 6/1995 with concurrence from U. S. EPA.

4 Median sublethal concentrations were defined as IC50 (median inhibitory concentrations) in 1994/95 and median effective concentrations (EC50) in 2019; however, effects measured and procedures followed were the same.

NC = Not Calculated

NT = Not Tested. Mussel species not tested in 2019.

Table 2. Combined Ocean Disposal Wastewater Analytical Results

Parameter	Units	Combined Ocean Disposal Wastewater Samples - June 2019												Average Ocean Disposal Stream Sample Concentration (µg/L)	Diluted[1] Average Ocean Disposal Stream Sample at Edge of Disposal Zone (µg/L)	National Recommended Water Quality Criteria Saltwater CMC (acute) (µg/L)[2,4]
		6/20/2019		6/21/2019		6/25/2019		6/26/2019		6/27/2019		Average				
1,2-Dichloropropane	ug/L	2.5	R	2.5	R	1.3	R	1.3	R	1.3	R	--		--	—	—
Aluminum	mg/L	490		550		180		740		160		424		424,000	1.06	—
Ammonia (as N)	mg/L	1800	J	2200	J	1700	J	2400	J	2400	J	2100		2,100,000	5.25	—
Ammonia (as NH3)	mg/L	2200	J	2600	J	2100	J	2900	J	3000	J	2560		2,560,000	6.4	—
Arsenic	mg/L	0.78		0.74		0.27		1.3		0.32		0.6820		682	0.001705	69
Barium	mg/L	0.12		0.14		0.063		0.23		0.055		0.1216		121.6	0.000304	—
Benzene	ug/L	2.5	R	2.5	R	1.3	R	1.3	R	1.3	R	--		--	—	—
Bis(2-ethylhexyl) phthalate	ug/L	179	UJ	170	UJ	400	UJ	400	UJ	400	UJ	309.8 UJ		309.8	0.0007745	—
Boron	mg/L	0.81		0.71		0.32		1.20		0.57		0.7220		722	0.001805	—
Biological Oxygen Demand	mg/L	25685		25825		26250		23975		26357.5		25618.5		25,618,500	64.04625	—
Cadmium	mg/L	0.15		0.17		0.077		0.37		0.081		0.1696		169.6	0.000424	33
Chemical Oxygen Demand	mg/L	74000	J	65000	J	51000	J	42000	J	43000	J	55000		55,000,000	137.5	—
Chloroform	ug/L	2.5	R	2.5	R	1.3	R	1.3	R	1.3	R	--		--	—	—
Chromium	mg/L	0.18		0.19		0.08		0.27		0.083		0.1606		160.6	0.0004015	—
Copper	mg/L	0.36		0.42		0.22		0.86		0.21		0.4140		414	0.001035	4.8
Cyanide, Total	mg/L	0.045	J	0.037	J	0.018	J	0.021	J	0.032	J	0.0306		30.6	0.0000765	1
Ethylbenzene	ug/L	2.5	R	2.5	R	1.3	R	1.3	R	1.3	R	--		--	—	—
Formaldehyde	mg/L	0.08	J	0.069	J	0.096	J	0.11	J	0.15	J	0.1010		101	0.0002525	—
Oil and Grease (HEM)	mg/L	6370	J	7090	J	11.2	J	8.8	J	52	J	2706.4		2,706,400	6.766	—
m,p-Xylene	ug/L	5	R	5	R	2.5	R	2.5	R	2.5	R	--		--	—	—
Magnesium	mg/L	180		180		100		330		97		177.4		177,400	0.4435	—
Manganese	mg/L	0.16		0.14		0.15	U	0.30	U	0.15	U	0.1800		180	0.00045	—
Mercury	mg/L	0.0046		0.0044		0.0023		0.0045		0.0036		0.00388		3.9	0.0000097	—
Methylene Chloride	ug/L	11	R	11	R	5.5	R	5.5	R	5.5	R	--		--	—	—
Nickel	mg/L	0.064		0.062		0.054		0.14	J	0.05	U	0.0740		74	0.000185	74
Nitrate as N	mg/L	5.5	R	5.5	R	ND		5.5	R	5.5	R	--		--	—	—
Nitrate Nitrite as N (calc'ed)	mg/L	5.5	R	5.5	R	1.1	R	5.5	R	5.5	R	--		--	—	—
Nitrate Nitrite as N	mg/L	0.31	UJ	0.31	UJ	0.31	UJ	0.31	UJ	0.31	UJ	0.3100		--	--	
Nitrite as N	mg/L	2.5	R	2.5	R	0.5	R	2.5	R	2.5	R	--		--	—	—
Nitrogen, Total	mg/L	3700	J	4000	J	3700	J	4200	J	4200	J	3960		3,960,000	9.9	115[3]
o-Xylene	ug/L	2.5	R	2.5	R	1.3	R	1.3	R	1.3	R	--		--	—	—
Phenolics, Total Recoverable	mg/L	7.2	J	11	J	2.5	J	3.3	J	7.5	J	6.3		6,300	0.01575	—
Phosphorus, Total	mg/L	550	J	980	J	570	J	630	J	690	J	684		684,000	1.71	11[3]
Pyrethroids	ng/L	200	U	200	U	200	U	200	U	200	U			--	--	—
Selenium	mg/L	0.53		0.42		0.2		0.73		0.2		0.416		416	0.00104	290
Titanium	mg/L	0.4		0.45		0.18		0.58		0.15		0.352		352	0.00088	—
Toluene	ug/L	2.5	R	2.5	R	1.3	R	1.3	R	1.3	R	--		--	—	—
Total Kjeldahl Nitrogen	mg/L	3700	J	4000	J	3700	J	4200	J	4200	J	3960		3,960,000	9.9	—
Total Solids	mg/L	35000	J	31000	J	33000	J	33000	J	13000	J	29000		29,000,000	72.5	—
Total Volatile Solids	mg/L	21000	J	16000	J	15000	J	17000	J	15000	J	16800		16,800,000	42	—
Xylenes, Total	ug/L	2.5	R	2.5	R	1.3	R	1.3	R	1.3	R	--		--	—	—
Zinc	mg/L	24		29		11		43		10		23.4		23,400	0.0585	90

Notes:
B - compound was found in the blank and sample
CMC = criterion maximum concentration
F1 -MS and/or MSD Recovery is outside acceptance limits.
H - sample was prepped or analyzed beyond the specified holding time
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
mg/L - miligrams per liter
R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to “not detected at or above the reported result”.
ug/L - micrograms per liter
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
X - surrogate is outside the control limits
* - LCS or LCSD is outside acceptance limits or the RPD exceeds the control limits.
^ - instrument related QC is outside acceptance limits
-- - not applicable
1 Estimated dilution of waste based on CH2M Hill (1997) plume dilution model results which showed a 1:400,000 minmum dilution at the edge of the disposal zone.
2 Metals concentrations for criteria are based on dissolved metals concentrations; sample metals concentrations were total (particulate and dissolved) metals concentrations.
3 Total Nitrogen and Total Phosphorous WQC are based on the American Samoa Water Quality Standards 2013 Revision, Administrative Rule No. 001-2013
4 USEPA, 2016. National Recommended Water Quality Criteria - Aquatic Life Criteria Table. Updated Dec. 22, 2016. Available at: https://19january2017snapshot.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table_.html#table.

Table 3: Combined Ocean Disposal Wastewater Quality Comparison Table

Parameter	Units	June 2019 Sampling Event - Average	June 2019 Sampling Event - Maximum	November 2018 Sampling Event - Average	November 2018 Sampling Event - Maximum	2010 Ocean Disposal Data - Average	2010 Ocean Disposal Data - Maximum	1990 - 1993 Ocean Disposal Data - Average
Aluminum	mg/L	424	740	394	#REF!	-	-	#REF!
Ammonia (as N)	mg/L	2,100	2,400	1,140	#REF!	3,765	5,100	-
Ammonia (as NH_3)	mg/L	2,560	3,000	1,384	#REF!	-	-	-
Cadmium	mg/L	0.17	0.37	0.137	#REF!	-	-	#REF!
Chemical Oxygen Demand	mg/L	55,000	74,000	56,570	#REF!	-	-	-
Chromium	mg/L	0.161	0.270	0.096	#REF!	-	-	#REF!
Copper	mg/L	0.414	0.860	0.167	#REF!	-	-	#REF!
Oil and Grease (HEM)	mg/L	2,706	7,090	4,407	#REF!	4,787	5,530	-
Lead	mg/L	-	-	0.0273	#REF!	-	-	#REF!
Mercury	mg/L	0.00388	0.0046	0.0015	#REF!	-	-	#REF!
Nickel	mg/L	0.08	0.14	0.0449	#REF!	-	-	#REF!
Nitrogen, Total	mg/L	3,960	4,200	3,284	#REF!	4,549	5,100	-
Phosphorus, Total	mg/L	684	980	506	#REF!	705	850	-
Total Kjeldahl Nitrogen	mg/L	3,960	4,200	3,266	#REF!	-	-	-
Total Solids	mg/L	29,000	35,000	29,645	#REF!	38,071	48,136	-
Total Suspended Solids	mg/L	-		18,115	#REF!	-		-
Total Volatile Solids	mg/L	16,800	21,000	18,161	#REF!	21,437	35,367	-

Notes:
1990 - 1993 data is from reports submitted by StarKist Samoa to the US EPA on July 29, 1993 in response to Special Condition 3.3.5 in the 102 special permit
2010 Ocean Disposal data is taken from 12 ocean disposal wastewater samples collected once per month in 2010
HEM - hexane extractable method
June 2019 sampling data is from June 20, 21, 25, 26, and 27
mg/L - milligrams per liter
N - nitrogen
NH_3 - ammonia
November 2018 sampling data is from November 6 – 16

Table 4. Comparison of Average Ocean Disposal Stream Sample Chemistry (Undiluted and Diluted) to Toxicity Effects Concentrations in the Literature[1]

Parameter	Units	Average Ocean Disposal Stream Sample Concentration	Diluted[2] Average Ocean Disposal Stream Sample at Edge of Disposal Zone	Sea Urchin Spp.	Organism Life stage	Effect	Effect Measurement	Effects			Fraction (T/D) for Effects Measured	Units	Citation	Magnitude of Exceedance of Effects Concentration, Undiluted Average OD Sample	Magnitude of Exceedance of Effects Concentration, Diluted OD Sample
								NOEC Range	LOEC Range	EC50 Range					
Aluminum	mg/L	424	0.0106	*Paracentrotus lividus*	Embryo	Development	Deformation	0.269	3.48	--	T	mg/L	Caplat,C., R. Oral, M.L. Mahaut, A. Mao, D. Barillier, M. Guida, C. Della Rocca, and G. Pagano 2010 Ecotoxicol. Environ. Saf.73(6): 1138-1143	**122**	0.0003
Ammonia as NH3	mg/L	2560	0.064	*Strongylocentrotus purpuratus*	Embryo	Development	Deformation	4.5	--	7.2	T	mg/L	Green, D.J., Alzadjali, S., and Bay, S. Toxicity of Ammonia to Pacific Purple Sea Urchin (S. Purpuratus) Embryos.	**356**	0.0089
Estimated Unionized Ammonia	mg/L	22.05	0.00055125	*Strongylocentrotus purpuratus*	Embryo	Development	Deformation	0.012 - 0.06	--	0.07 - 0.098	--	mg/L	Inouye et al. 2015. DMMP Clarification Paper. Modifications to Ammonia and Sulfide Triggers for Purging and Reference Toxicant Testing for Marine Bioassays. April 17, 2015.	**315**	0.0008
Arsenic	mg/L	0.682	0.00001705	*Strongylocentrotus purpuratus*	Embryo	Development	Developmental changes, general	--	0.011	--	T	mg/L	Garman et al. 1997; Aquat. Toxicol.39(3/4): 247-265	**62**	0.0002
Barium	mg/L	0.1216	0.00000304	ND	ND	ND	ND	ND	ND	ND		ND	ND	NA	NA
Boron	mg/L	0.722	0.00001805	ND	ND	ND	ND	ND	ND	ND		ND	ND	NA	NA
Cadmium	mg/L	0.1696	0.00000424	*Strongylocentrotus purpuratus*	Embryo	Reproduction	Reproduction, general	--	--	0.5 - 0.51	T	mg/L	Bailey et al. 1995;. Environ. Toxicol. Chem.14(12): 2181-2186	0.3	0.0000008
Chromium	mg/L	0.1606	0.000004015	*Heliocidaris tuberculata*[3]	Zygote	Development	Normal	0.46	--	1	T	mg/L	Doyle,C.J., F. Pablo, R.P. Lim, and R.V. Hyne; 2003; Arch. Environ. Contam. Toxicol.44(3): 343-350	0.1606	0.0000004
Copper, Total	mg/L	0.414	0.00001035	*Strongylocentrotus purpuratus*	Embryo	Normal	Development	--	--	0.0148 - 0.046	D	mg/L	Various (Ecotox Database)	**28.0**	0.0001
	mg/L	0.414	0.00001035	*Strongylocentrotus purpuratus*	Embryo	Normal	Development	--	--	0.011 - 0.035	T	mg/L	Rivera-Duart et al. 2005; Environ. Sci. Technol.39(6): 1542-1546	**37.6**	0.0001
Cyanide, Total	mg/L	0.0306	0.000000765	ND	ND	ND	ND	ND	ND	ND		ND	ND	NA	NA
Formaldehyde	mg/L	0.101	0.000002525	ND	ND	ND	ND	ND	ND	ND		ND	ND	NA	NA
Magnesium	mg/L	177.4	0.004435	ND	ND	ND	ND	ND	ND	ND		ND	ND	NA	NA
Manganese	mg/L	0.18	0.0000045	ND	ND	ND	ND	ND	ND	ND		ND	ND	NA	NA
Mercury	mg/L	0.00388	0.000000097	*Paracentrotus lividus*	Egg/Embryo	Development	Developmental changes, general	0.0027	0.027	0.0078 - 0.017	T	mg/L	Various (Ecotox Database)	0.50	0.0000012
Nickel	mg/L	0.074	0.00000185	*Strongylocentrotus purpuratus*	Embryo	Development	Developmental changes, general	--	0.4	--	T	mg/L	Garman et al. 1997; Aquat. Toxicol.39(3/4): 247-265	0.185	0.0000005
	mg/L	0.074	0.00000185	*Glyptocidaris crenularis*	Embryo	Development	Developmental changes, general	--	--	0.806 - 2.90	T	mg/L	Various (Ecotox Database)	0.099	0.0000002
Phenolics, Total Recoverable	mg/L	6.3	0.0001575	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	NA	NA
Selenium	mg/L	0.416	0.0000104	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	NA	NA
Titanium	mg/L	0.352	0.0000088	ND	ND	ND	ND	ND	ND	ND	--	ND	ND	NA	NA
Zinc	mg/L	23.4	0.000585	*Strongylocentrotus purpuratus*	Embryo	Development	Developmental changes, general	--	--	0.023 - 0.14	T	mg/L	Various (Ecotox Database)	**1017**	0.003

Notes

1 Samples with detected concentrations shown.

2 Estimated dilution of waste based on CH2M Hill (1997) plume dilution model results which showed a 1:400,000 minmum dilution at the edge of the disposal zone.

3 Data from only the most sensitive urchin species (to chromium) in the Ecotox Database is shown.

D = Dissolved

Red text indicates that the magnitude of exceedance of the EC50 was greater than 1.

T = Total

USEPA 2019. **ECOTOX** Knowledgebase. Updated June 13, 2019. Available online at: https://cfpub.epa.gov/ecotox/

APPENDIX A
Enthalpy Environmental Final Toxicity Report July 2019

NAUTILUS ENVIRONMENTAL
TOXICITY LABORATORY & CONSULTING

Toxicity Testing Results StarKist Samoa

Ocean Disposal Streams Sample

Monitoring Period: June 2019

Prepared for: **Geosyntec Consultants**
920 SW Sixth Street, Suite 600
Portland, OR 97204

Project Manager: **Keith Kroeger**

Submitted: **July 24, 2019**

Data Quality Assurance:

- EA/Nautilus Environmental is accredited in accordance with NELAP by the State of Oregon Environmental Laboratory Accreditation Program (ORELAP ID 4053). It is also certified by the State of California Water Resources Control Board Environmental Laboratory Accreditation Program (Certificate No. 1802) and the State of Washington Department of Ecology (Lab ID C552).
- All data have been reviewed and verified.
- All test results have met minimum test acceptability criteria under their respective EPA protocols, unless otherwise noted in this report.
- All test results have met internal Quality Assurance Program requirements.

Results verified by: _____
Peter Arth, Laboratory Director

California
4340 Vandever Avenue
San Diego, California 92120
858.587.7333
fax: 858.587.3961

INTRODUCTION

A series of marine bioassay tests using a vertebrate (*Menidia beryllina*), a crustacean (*Americamysis bahia*), and an echinoderm larva (*Strongylocentrotus purpuratus*) was performed on a sample collected from the StarKist Samoa facility. Testing was conducted as part of a program to establish the toxicity thresholds of a waste stream for potential open ocean disposal. Tests were performed at the Enthalpy Analytical (formerly Nautilus Environmental) laboratory located in San Diego, California between July 1 and 5, 2019.

MATERIALS AND METHODS

Test Material

The sample used for test initiations was collected on June 28, 2019. Collection was conducted under the direction of Geosyntec Consultants, and the sample was shipped to Enthalpy via a transportation and delivery service. Upon arrival at Enthalpy, an aliquot was drawn from the sample to measure temperature, pH, dissolved oxygen (DO), salinity, alkalinity, and total ammonia. Testing was initiated the day the samples were received, and the remaining sample volume was stored in the dark at 4°C until used for renewals. A summary of the sample receipt information is provided in Table 1 below. Copies of the sample check in sheet and chain of custody (COC) form are presented in Appendices A and B, respectively.

Table 1. Sample Information

Sample ID	**Ocean Disposal (OD) Streams**
Nautilus Log-in No.	19-0711
Collection Date, Time	6/28/2019, 1022 (Pacific Time)
Receipt Date, Time	7/1/2019, 0835 (Pacific Time)
Receipt Temperature (°C)	6.8
Dissolved Oxygen (mg/L)	0.9
pH (units)	6.11
Salinity (ppt)	18.8
Alkalinity (mg/L $CaCO_3$)	2,420
Total Chlorine (mg/L)	NM[a]
Total Ammonia (mg/L)	2446
Unionized ammonia (mg/L)	0.42

[a] NM = Not Measured. Due to the dark color and turbidity of the sample, measurement for total chlorine could not be taken via standard colorimetric methods used in the laboratory.

Test Methods

Chronic toxicity testing was conducted according to USEPA (1995). Acute toxicity testing was conducted according to procedures presented by USEPA (2002).

Inland Silverside Acute Toxicity Test Specifications

Test Period:	7/1/2019, 1235 to 7/5/2019, 1330
Test Organism:	*Menidia beryllina* (inland silverside)
Test Organism Source; Age:	Aquatic Biosystems, Inc. (Fort Collins, CO); 12 days
Control Water:	Natural seawater (Scripps Institution of Oceanography intake)
Test Concentrations:	2, 1, 0.5, 0.25, 0.125, and 0.06 percent sample, and laboratory control
Test Acceptability Criteria:	Lab control mean survival ≥ 90 percent
Protocol Used:	USEPA/821/R-02/012, 2002 Acute Manual
Statistical Analysis Software:	CETIS™, version 1.8.7.20

Note: Due to poor fitness of available Pacific Topsmelt cultures, the Inland Silverside was used as the vertebrate for acute testing.

Mysid Shrimp Acute Toxicity Test Specifications

Test Period:	7/1/2019, 1215 to 7/5/2019, 1315
Test Organism:	*Americamysis bahia* (mysid shrimp)
Test Organism Source; Age:	Aquatic Biosystems, Inc. (Fort Collins, CO); 5 days
Control Water:	Natural seawater (Scripps Institution of Oceanography intake)
Test Concentrations:	2, 1, 0.5, 0.25, 0.125, and 0.06 percent sample, and laboratory control
Test Acceptability Criteria:	Lab control mean survival ≥ 90 percent
Protocol Used:	USEPA/821/R-02/012, 2002 Acute Manual
Statistical Analysis Software:	CETIS™, version 1.8.7.20

Urchin Development Chronic Toxicity Test Specifications

Test Period:	7/1/2019, 1015 to 7/4/2019, 1035
Test Organism:	*Strongylocentrotus purpuratus* (purple urchin)
Test Organism Source; Age:	Adult brood stock collected off Point Loma in San Diego, CA
Control Water:	Natural seawater (Scripps Institution of Oceanography intake)
Test Concentrations:	2, 1, 0.5, 0.25, 0.125, and 0.06 percent sample, and laboratory control
Test Acceptability Criteria:	Mean control normal development of ≥ 80 percent; Percent Minimum Statistical Difference (PMSD) for development rate ≤25
Protocol Used:	USEPA/600/R-95/136, 1995 West Coast Marine Chronic
Statistical Analysis Software:	CETIS™, version 1.8.7.20

All statistical endpoints reported were calculated using the Comprehensive Environmental Toxicity

Information System™ (CETIS) by Tidepool Scientific Software according to flowchart specifications provided in USEPA method guidance. Organism performance in the sample was compared to performance observed in the concurrent laboratory control exposures. A No Observed Effect Concentration (NOEC), Lowest Observed Effect Concentration (LOEC), and 50 percent effect concentrations (EC/LC_{50}), were calculated for all tests.

RESULTS AND DISCUSSION

There was complete mortality at 96 hours in the 2 percent concentration of the inland silverside test. None of the other concentration resulted in statistically significant reduction in fish survival, resulting in a NOEC of 1 percent sample.

Complete mortality was also observed in the 2 percent sample concentration of the mysid shrimp test. Reduced mean survival was also observed for mysids exposed to the 0.25, 0.5, and 1 percent sample concentrations; only the 0.5 percent sample concentration resulted in a statistically significant effect. However, there was a 42 percent effect from control in the 1 percent sample, and the lack of significance was due to the relatively high variability within the test concentrations. Based on the test data and guidance in USEPA 2000, the NOEC is reported as 0.25 percent sample. Additional discussion is provided below Tables 2 and 3.

The urchin test resulted in significant adverse effects to development in all concentrations tested, and the NOEC is reported as less than 0.06 percent sample. A summary of statistical results for the acute and chronic bioassays is presented in Table 2. Detailed test results for the bioassays are presented in Table 3. Raw data and statistical analyses are presented in full in Appendix C.

Table 2. Summary of Statistical Results

Species & Test Endpoint	NOEC (% sample)	LOEC (% sample)	LC_{50}/ EC_{50} (% sample)	Toxic Units (TU_a/TU_c)
Inland Silverside				
96-hr Acute Survival	1	2	1.41	70.9
Mysid Shrimp				
96-hr Acute Survival	0.25	0.5	0.49	204
Purple Urchin				
Chronic Development	<0.06	0.06	0.04	>1667

NOEC = The highest Concentration tested that caused No Observed Effect to the test organisms

LOEC = The Lowest Observed Effect Concentration

LC_{50}/EC_{50} value = the sample concentration that is estimated to cause a lethal or adverse effect to 50% of the test organisms

TU_a = Acute Toxic Units (TU_a): $100 \div LC_{50}$

TU_c = Chronic Toxic Units (TU_c): $100 \div$ NOEC

Table 3. Summary of Toxicity Test Results

Test Concentration (% sample)	Inland Silverside	Mysid Shrimp	Purple Urchin
	Mean Percent Survival	Mean Percent Survival	Mean Percent Normal Larval Development
Lab Control	100	95.0	98.8
0.06	100	100	15.4*
0.125	100	95.0	0.00*
0.25	100	80.0	0.00*
0.5	100	40.0*	0.00*
1	85.0	55.0	0.00*
2	0.00*	0.00*	0.00*

*An asterisk indicates a statistically significant decrease compared to the lab control

While a toxicity identification evaluation (TIE) would be necessary to determine the exact cause of the toxicity observed to the various species, it was noted that ammonia levels in the sample were elevated. Subsamples were collected from each of the three bioassays upon initiation and at termination for each test, with one exception (no ammonia subsample was collected for urchin development test at test termination due to technician error). Additional subsamples were collected for the mysid and inland silverside tests at 48 hours, prior to the test solution renewal. The subsamples were collected from the highest test concentration (2 percent sample) for each of the bioassays. If complete mortality in the highest concentration had occurred, then the concentration below was subsampled. Total ammonia in the 2 percent sample concentration ranged from 49.7 to 51.4 mg/L at the initiation of the bioassays.

Generally, the ammonia levels remained stable throughout the testing period. At the termination of the mysid test, subsamples were collected from two individual replicates in the 1 percent sample concentration (complete mortality had occurred in the 2 percent sample by 48 hours), one with complete survival, and one with no survival. Total ammonia measurements were within 10 percent of each other (23.5 mg/L in the replicate with no survival, 24.9 mg/L in the replicate with no mortality), suggesting that for this species, ammonia may not be the primary or sole driver of toxicity. However, ammonia may have contributed to the observed effects.

Relatively high variability in test replicate response was observed in some test concentrations. This was most apparent in the mysid and urchin tests. All test solutions were thoroughly homogenized prior to making test dilutions as well as prior to distribution to the individual test chambers. However, it was noted at sample receipt that the sample had a large portion of heavy particulate matter that settled quickly. In the higher concentrations (specifically the 0.5 and 1 percent sample) of the mysid test, some replicates had complete survival while others had complete mortality. In the urchin test, some replicates of the 0.06 percent concentration showed a partial response (i.e some normally developed embryos), while other replicates showed no normally developed embryos. The inter-concentration

variability combined with the bench observations suggest that at least a portion of the toxicity may be associated with particulate matter in the sample.

QUALITY ASSURANCE

The samples were received slightly above the temperature range of 0-6 °C (6.8 °C at receipt). All tests were initiated within 98-hours of when the sample was collected. The laboratory controls met all minimum test acceptability requirements. Statistical analyses followed standard USEPA flowchart selections. The PMSD value for the urchin test was within the acceptable range. The data are deemed reliable for reporting purposes.

Due to the heavy debris and dark coloration of the sample, some mortality observations were unable to be collected at 24 and 72 hours. During the 48-hour renewal for the acute tests and at termination, mortality was evaluated in all test replicates.

Due to aeration of the test replicates, salinity in the mysid test exceeded the recommended range of +/- 2ppt from the control salinity of 34 ppt. The salinity only slightly exceeded this threshold and did so in test concentrations which resulted in complete survival, suggesting that the increased salinity was unlikely to cause adverse effects to the test organisms.

The dissolved oxygen (DO) in the sample was below 1.0 mg/L at receipt. Due to the low sample concentrations tested, the sample was not aerated prior to addition to the control water to create the test solutions. When initial water quality measurements were collected prior to the addition of the test organisms, all DO levels were above 7.0 mg/L, well within the allowable range for the tests. Approximately 3 hours later, DO was measured in the highest test concentration of all three bioassays. The mysid and inland silverside test DO levels had fallen below 5 mg/L, indicating that overnight the DO levels would have fallen below the 4.0 mg/L warning level. Therefore, within 4 hours of test initiation all test replicates for the mysid and inland silverside bioassays were put on continuous, aeration for the duration of the test period. All concentrations of the mysid test stayed above 4.0 mg/L throughout the test.

Despite the constant aeration, water quality measurements at 24 hours into the test showed the DO concentrations in the inland silverside test fell to 0.7 and 1 mg/L in the 2 and 1 percent sample concentrations, respectively. The reason the DO fell in the inland silverside test and not the mysid test (despite having the same test temperature, test chamber size, and test solution volume) is likely due to the loading difference, with the fish having a higher mass and thus higher oxygen demand relative to the mysid. While it is not possible to make a definitive conclusion on the impact of the reduced DO concentrations with regard to the observed mortality in the fish test, the fact that the DO fell to 1.0 mg/L in the 1 percent sample concentration and still resulted in 85 percent mean survival suggests that DO was not likely to have a substantial contribution to the observed mortality in the 2 percent sample.

A drop in DO was also observed in the larval development test. This test was not aerated throughout the duration due to the possible interference it would create with the test organisms. The drop in DO for the larval development test was observed at 48 hours, as opposed to the fish and mysid test which

was noticed immediately. This is likely due to the larval development test being conducted at 15 °C as opposed to 25 °C for the fish and mysid. At 48 hours the DO in the larval development test fell below 4.0 mg/L in all but the 0.125 and 0.06 percent sample concentrations. However, toxicity was observed in both of those concentrations, suggesting that the effects observed in the higher test concentrations with the low dissolved oxygen were likely not associated with the low DO.

Reference Toxicant Testing

Concurrent reference toxicant tests met all minimum test acceptability requirements and the PMSD value for the chronic urchin development test was within the acceptable range. The calculated median effect concentration values for all reference toxicant tests were within two standard deviations of the historical means, indicating typical organism sensitivity to copper. Reference toxicant test results are summarized in Table 5 and are presented in full in Appendix D. A list of laboratory qualifier codes used for data recording can be found in Appendix E.

Table 5. Summary of Reference Toxicant Test Results

Species & Test Endpoint	EC_{50} (µg/L copper)	Historical mean ± 2 SD (µg/L copper)	CV (%)
Inland Silverside			
96-hr Acute Survival	224	198 ± 80.3	20.3
Mysid Shrimp			
96-hr Acute Survival	230	273 ± 140	25.6
Purple Urchin			
Larval Development	10.9	14.0 ± 7.00	25.0

EC_{50} = The concentration expected to cause an adverse effect to 50 percent of the test organisms

Historical Mean = The mean EC_{50} from the laboratory's previous 20 tests, plus or minus two standard deviations (SD)

CV = Coefficient of Variation

REFERENCES

Tidepool Scientific Software. 2000-2013. CETIS Comprehensive Environmental Toxicity Information System Software, Version 1.8.7.20.

USEPA. 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System. United States Environmental Protection Agency Office of Wastewater Management (EPA-833-R-00-003).

USEPA. 1995. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. EPA/600/R-95/136.

USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. EPA/821/R-02/012, October 2002.

Appendix A
Sample Information

Nautilus Environmental
4340 Vandever Avenue
San Diego, CA 92120

Client: ~~Geosyntec~~ TEC Geosyntec Consultants
Sample ID: Starlist Samoa Co - OD Streams
Test ID No(s).: 1907-5077 to 5083

Sample (A, B, C):	A			
Log-in No. (19-xxxx):	0721	6/28/19		
Sample Collection Date & Time:	~~6/27/19~~ 6/27/19 0622 (D)	1022 PDT		
Sample Receipt Date & Time:	7/1/19	0835		
Number of Containers & Container Type:	2 1L cubes			
Approx. Total Volume Received (L):	~2L			
Check-in Temperature (°C)	6.8			
Temperature OK? [1]	Y (N)	Y N	Y N	Y N
DO (mg/L)	0.9			
pH (units)	6.11			
Conductivity (µS/cm)	—			
Salinity (ppt)	18.8			
Alkalinity (mg/L) [2]	121 (C)			
Hardness (mg/L) [2, 3]	—			
Total Chlorine (mg/L)	(B)			
Technician Initials	ACS			

Test Performed: Acute Mysid and Menidia, Urchin Development — **Control/Dilution Water:** 8:2 / Lab SW / Lab ART Other: _____
Alkalinity: 112 Hardness or Salinity: 34 ppt
Additional Control? Y (N) = _____ Alkalinity: _____ Hardness or Salinity: _____

Test Performed: _____ **Control/Dilution Water:** 8:2 / Lab SW / Lab ART Other: _____
Alkalinity: _____ Hardness or Salinity: _____
Additional Control? Y N = _____ Alkalinity: _____ Hardness or Salinity: _____

Test Performed: _____ **Control/Dilution Water:** 8:2 / Lab SW / Lab ART Other: _____
Alkalinity: _____ Hardness or Salinity: _____
Additional Control? Y N = _____ Alkalinity: _____ Hardness or Salinity: _____

Notes: [1] Temperature of sample should be 0-6°C, if received more than 24 hours past collection time.
[2] mg/L as CaCO3, [3] Measured for freshwater samples only, NA = Not Applicable

Additional Comments: (A) QL6 ACS 7/1/19 (C) 1:19 dilution prior to analysis, measured value x20 = 2,420
(B) Unable to zero colorimeter due to dark color of sample, therefore analyte not measured
(D) EL 6 18 7/1/19 (E) QL6 8/15/19

Sample Check-In Information

Sample Description: Dark Brown, Opaque, Strong odor, Heavy debris

COC Complete (Y/N)?
A N B ___ C ___

Filtration? Y (N)
Pore Size: _____
Organisms or Debris

Salinity Adjustment? Y (N)
Test: Source: Target ppt:
Test: Source: Target ppt:
Test: Source: Target ppt:

pH Adjustment? Y (N)

	A	B	C
Initial pH:			
Amount of HCl added:			
Final pH:			

Cl_2 Adjustment? Y (N)

	A	B	C
Initial Free Cl_2:			
STS added:			
Final Free Cl_2:			

Sample Aeration? Y (N)

	A	B	C
Initial D.O.			
Duration & Rate			
Final D.O.			

Subsamples for Additional Chemistry Required? (Y) N
(NH3) Other _____
Tech Initials A ___ B ___ C ___

QC Check: EG 7/11/19
Final Review: KPP 7/12/19

Total Ammonia Analysis

Overlying Water

~~Freshwater~~ Q18 8

DC-001 7/24/19

Client: Geosyntec/ GSO

Project: Starkist-American Samoa

Test Type: ~~Acute Mysid~~, Acute Menidia, urchin Development

DI Blank: 0.0 **Analyst:** NM

Test Start Date: 7/1/19 **Analysis Date:** 7/24/19

Sample ID	Nautilus ID	Sub-Sample Date	Test Day	NH3-N (mg/L)	Ammonia (mg/L) N x 1.22	
Blank Spike (10 mg/L NH_3)		NA	~~23~~ NA	7.1	8.7	
Starkist- American Samoa		7/1/19	~~7/23~~ 7/1/19	40.1	48.9	x 50 = 2446.1
Spike Check (10 mg/L NH_3)		NA	NA	7.0	8.5	
Sample Duplicate[a]		NA	NA	38.9	47.5	x 50 = 2372.9
Sample Duplicate + Spike[a]		NA	NA	48.3	58.9	x 50 = 2946.3
Spike Check (10 mg/L NH_3)		NA	NA	7.0	8.5	

Relative Percent Difference (RPD) = [sample] (mg/L) - [sample duplicate] (mg/L) / [average ammonia] (mg/L) x 100 — **Acceptable Range: 0-20%**

Percent Recovery = [spiked sample] (mg/L) - [sample] (mg/L) / nominal [spike] (mg/L) x 100 — **Acceptable Range: 80-120%[b]**

QC Sample ID	[NH_3]	[Sample Dup]	Measured [Spike]	Nominal [Spike]	RPD	% Recovery
Blank	0.0	NA	8.7	10	NA	87
Starkist	48.9	47.5	58.9	10	@ ~~8~~ 2.9	100

Comments:

Notes: [a]Unless otherwise noted, the last sample listed on the datasheet is used for duplicate and duplicate + spike QC check.

[b] Acceptable range for % recovery applies only to the blank spike. Spike recoveries in samples may vary based on sample matrix and are for information only.

[c] Calculation not performed due to one or both values below the method detection limit.

Method Detection Limit = 0.5 mg/L

QC Check: 7/24/19 @KTP Q18 7/24/19 **Final Review:** KTP 7/24/19

Unionized Ammonia Calculation

Client:	Geosyntec
Test Type:	Sample receipt
Test ID:	1907-S077 to S079
Test Date:	7/1/2019

Sample ID	Test Day	Sample Type	Actual Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	I Rounded	pK	Unionized Ammonia (mg/L)
OD Streams	0	water	2446	6.8	18.8	6.11	279.96	4.31849	4	9.29	0.420
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000

Note: Water quality parameters reflect values at sample check-in.

Appendix B
Chain-of-Custody Information

4340 Vandever Avenue
San Diego, CA 92120
Phone 858.587.7333
infoSD@enthalpy.com

Chain of Custody

Date 6/27/19 Page 1 of 1

Sample Collection By:

Report to:

Company	Geosyntec Consultants, Inc.
Address	920 SW Sixth Street, Suite 600
City/State/Zip	Portland, OR 97204
Contact	Keith Kroeger
Phone	971-271-5901
Email	KKroeger@geosyntec.com

Invoice To: Same as Report to ☐

Company	
Address	
City/State/Zip	
Contact	
Phone	
Email	

	SAMPLE ID	SAMPLE Date	Time	Type (G or C)	MATRIX CODE (FW, SW, Sed, STRM, GW, WW, O)	Container Type	Qty	COMMENTS	ANALYSES REQUIRED: 96-Hour Survival (*A. affinis or M. beryllina*)	72-hr Purple Urchin Larval Development (*S. purpuratus*)	96-Hour Survival (*A. bahia*)					Receipt Temperature (°C)
1	OD Streams	6/25/19	06:22	GC	WW	cubitainer	2		x	x	x					6.8
2		6/26/19 (A)														
3																
4																
5																
6																
7																
8																
9																
10																

Nautilus Matrix Codes:
G = Grab
C = Composite
FW = Freshwater
SW = Seawater
Sed = Sediment
STRM = Stormwater
GW = Groundwater
WW = Wastewater
O = Other (specify)

PROJECT INFORMATION		SAMPLE RECEIPT	
Project Name:	StarKist	Total No. of Containers	2
PO No.:		Received Good Condition?	Y
Shipped Via:		Matches Test Schedule?	N

SPECIAL INSTRUCTIONS/COMMENTS:
(A) Sample collection date reflected as 6/26/19 per instructions from Geosyntec who performed the sampling. 8/15/19 (per email 8/15/19)

1) RELINQUISHED BY (CLIENT)
(Signature) (Time) 11:00
(Printed Name) (Date)
(Company)

2) RECEIVED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

3) RELINQUISHED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

4) RECEIVED BY (LABORATORY)
(Signature) (Time) 0835
(Printed Name) Amanda Sage (Date) 7/1/19
(Company) Nautilus (Log-in #s) 19-0711

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.
Shaded areas are for lab use only
Report turn-around-time varies depending on length of test; please inquire with your project manager.

http://enthalpy.com/environmental-toxicology-2/

Appendix C
Raw Data and Statistical Analysis

Acute Inland Silverside

CETIS Summary Report

Inland Silverside 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	14-3706-7634	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	01 Jul-19 12:35	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	05 Jul-19 13:30	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	4d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	12d

Sample ID:	02-7149-1510	**Code:**	19-0711	**Client:**	Geosyntec
Sample Date:	27 Jun-19 10:22	**Material:**	Effluent Sample	**Project:**	
Receive Date:	01 Jul-19 08:35	**Source:**	Starkist Samoa Co.		
Sample Age:	4d 2h (6.8 °C)	**Station:**	OD Streams		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
09-3285-1933	96h Survival Rate	1	2	1.414	19.3%	100	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
19-2340-3418	96h Survival Rate	EC25	1.118	0.5739	1.329	89.47	Linear Interpolation (ICPIN)
		EC50	1.412	0.8984	1.553	70.83	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
09-3285-1933	96h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria
19-2340-3418	96h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	4	1	1	1	1	1	0	0	0.0%	0.0%
0.06		4	1	1	1	1	1	0	0	0.0%	0.0%
0.125		4	1	1	1	1	1	0	0	0.0%	0.0%
0.25		4	1	1	1	1	1	0	0	0.0%	0.0%
0.5		4	1	1	1	1	1	0	0	0.0%	0.0%
1		4	0.85	0.3726	1	0.4	1	0.15	0.3	35.29%	15.0%
2		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	1	1	1	1
0.06		1	1	1	1
0.125		1	1	1	1
0.25		1	1	1	1
0.5		1	1	1	1
1		0.4	1	1	1
2		0	0	0	0

CETIS Analytical Report

Test Code: 1907-S077 | 20-2178-0152

Inland Silverside 96-h Acute Survival Test — Nautilus Environmental (CA)

Analysis ID: 09-3285-1933 Endpoint: 96h Survival Rate CETIS Version: CETISv1.8.7
Analyzed: 08 Jul-19 12:00 Analysis: Nonparametric-Control vs Treatments Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	19.3%	1	2	1.414	100

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		0.06	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		0.125	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		0.25	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		0.5	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		1	16	10	1	6	0.6105	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09090509	0.01818102	5	1	0.4457	Non-Significant Effect
Error	0.3272583	0.01818102	18			
Total	0.4181634		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	4.248	0.4457	Equal Variances
Variances	Levene Equality of Variance	9	4.248	0.0002	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.4634	0.884	<0.0001	Non-normal Distribution

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1	1	1	1	1	1	0	0.0%	0.0%
0.06		4	1	1	1	1	1	1	0	0.0%	0.0%
0.125		4	1	1	1	1	1	1	0	0.0%	0.0%
0.25		4	1	1	1	1	1	1	0	0.0%	0.0%
0.5		4	1	1	1	1	1	1	0	0.0%	0.0%
1		4	0.85	0.3726	1	1	0.4	1	0.15	35.29%	15.0%
2		4	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

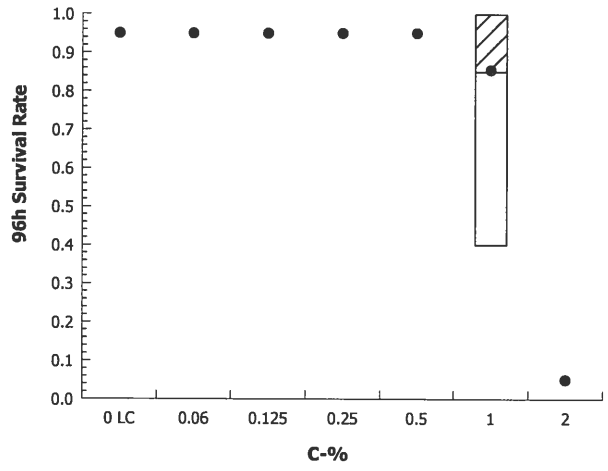
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
0.06		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
0.125		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
0.25		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
0.5		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
1		4	1.18	0.6546	1.706	1.345	0.6847	1.345	0.1651	27.99%	12.28%
2		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	83.24%

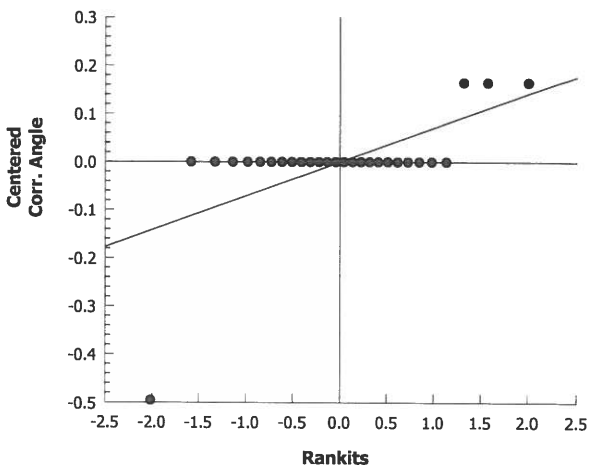
Analyst: JC QA: DFP 7/12/19

Inland Silverside 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	09-3285-1933	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jul-19 12:00	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Test Code: 1907-S077 | 20-2178-0152

Inland Silverside 96-h Acute Survival Test — Nautilus Environmental (CA)

Analysis ID:	19-2340-3418	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jul-19 12:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1382357	1000	Yes	Two-Point Interpolation

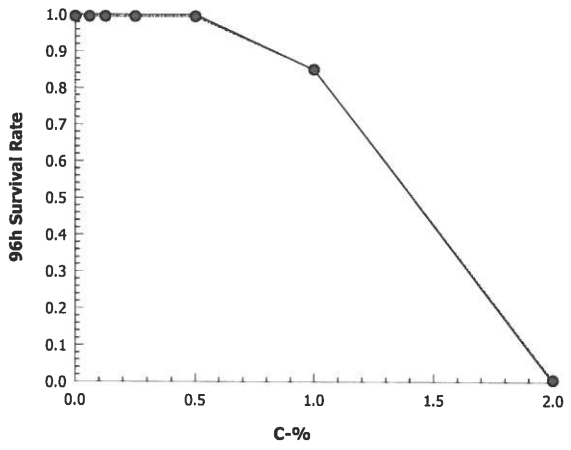
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	1.118	0.5739	1.329	89.47	75.22	174.3
EC50	1.412	0.8984	1.553	70.83	64.39	111.3

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	4	1	1	1	0	0	0.0%	0.0%	20	20
0.06		4	1	1	1	0	0	0.0%	0.0%	20	20
0.125		4	1	1	1	0	0	0.0%	0.0%	20	20
0.25		4	1	1	1	0	0	0.0%	0.0%	20	20
0.5		4	1	1	1	0	0	0.0%	0.0%	20	20
1		4	0.85	0.4	1	0.15	0.3	35.29%	15.0%	17	20
2		4	0	0	0	0	0		100.0%	0	20

Graphics



Analyst: JCL QA: KAP 7/12/19

Marine Acute Bioassay
Static-Renewal Conditions

Water Quality Measurements & Test Organism Survival

Client: Geosyntec/JCO (a)
Sample ID: Starkist Samoa Co. (a) streams
Sample Log-in No.: 19-0711
Test No.: 1907-077

Test Species: *M. beryllina*
Start Date/Time: 7/1/2019 1235
End Date/Time: 7/5/2019 1330

Tech Initials	0	24	48	72	96
Counts:	DM	JBS	TN	RT	RT
Readings:	DM	RT	TN	RT	RT
Dilutions made by:	DM		DM		

Concentration (%)	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0 (ABS)	24	48	72	96	0	24	48	72	96	0 (DS)	24	48	72	96	0	24	48	72	96
Lab Control	A	5	5	5	5	5	34.1	34.4	i 34.2	34.9	35.5	24.1	24.4	i 24.2	24.5	24.4	7.5	6.3	i 6.6	6.4	6.3	7.96	8.02	i 7.82	7.94	8.08
	B	5	5	5	5	5			f 34.9					f 24.3					f 6.0					f 7.96		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
0.06%	A	5	5	5	5	5	34.1	34.4	i 34.1	35.1	35.8	24.0	24.5	i 24.3	24.5	24.4	7.6	6.2	i 6.6	6.3	6.2	7.88	8.00	i 7.78	8.02	8.10
	B	5	5	5	5	5			f 35.2					f 24.9					f 6.1					f 7.79		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
0.125%	A	5	5	5	5	5	34.1	34.2	i 34.4	34.9	35.5	24.0	24.5	i 24.3	24.5	24.4	7.6	6.2	i 6.7	6.3	6.3	7.80	7.99	i 7.72	8.01	8.10
	B	5	5	5	5	5			f 34.8					f 24.5					f 6.1					f 8.01		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
0.25%	A	5	5	5	5	5	34.1	34.2	i 34.1	34.7	35.4	24.1	24.7	i 24.3 (2)	24.5	24.5	7.6	6.0	i 6.6	6.1	6.1	7.65	7.88	i 7.60	7.87	7.96
	B	5	5	5	5	5			f 34.8					f 24.5					f 6.6					f 7.79		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
0.5%	A	5	5	5	5	5	34.0	34.2	i 34.1	34.7	35.4	24.2	24.5	i 24.3	24.5	24.4	7.5	4.1	i 6.5	4.6	6.0	7.42	7.36	i 7.38	7.91	7.99
	B	5	5	5	5	5			f 34.7					f 24.7					f 5.1					f 7.83		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
1.0%	A	5	2	2	2	2	34.0	34.2	i 34.0	34.6	35.0	24.0	24.6	i 24.2	24.7	24.6	7.3	1.0 4.0 (B)	i 6.5	3.0	4.6	7.08	7.39	i 7.06	7.43	7.78
	B	5	5	5	5	5			f 34.5					f 24.9					f 4.8					f 7.63		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
2.0%	A	5	0	–			34.0	34.1	i 34.1	–	–	24.2	24.6	i 24.2	–	–	7.0	0.7	i 6.3	–	–	6.72	7.49	i 6.75	–	–
	B	5	0	–	ALL DEAD				f 35.4					f 24.6					f 5.0					f 7.58		
	C	5	2	0																						
	D	5	0	→																						

Initial Counts QC'd by: MS
Initiated by: DM

Animal Source/Date Received: ABS / 6/29/19
Age at Initiation: 12 days
Animal Acclimation Qualifiers (circle all that apply): Q22 / Q23 / Q24 / none

Feeding Times	0	24	48	72	96
AM:		0900	0850	1000	0900
PM:	1705				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal
Organisms fed prior to initiation, circle one (y) / n
(a) QA MS 7/1/19
(b) QA RT 7/2/19
QA RT 7/24/19

QC Check: KFP 7/12/19
QA MS 7/24/19
Final Review: MS 7/24/19

Acute Mysid Shrimp

CETIS Summary Report

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	13-1291-7689	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	01 Jul-19 12:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	05 Jul-19 13:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	4d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	5d

Sample ID:	17-2973-4607	**Code:**	19-0711	**Client:**	Geosyntec
Sample Date:	27 Jun-19 10:22	**Material:**	Effluent Sample	**Project:**	
Receive Date:	01 Jul-19 08:35	**Source:**	Starkist Samoa Co.		
Sample Age:	4d 2h (6.8 °C)	**Station:**	OD Streams		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-2384-4686	96h Survival Rate	0.25	0.5	0.3536	55.7%	400	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
09-6936-5347	96h Survival Rate	EC25	0.3029	0.09827	1.418	330.2	Linear Interpolation (ICPIN)
		EC50	0.4904	0.09014	1.839	203.9	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
00-2384-4686	96h Survival Rate	Control Resp	0.95	0.9 - NL	Yes	Passes Acceptability Criteria
09-6936-5347	96h Survival Rate	Control Resp	0.95	0.9 - NL	Yes	Passes Acceptability Criteria

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	4	0.95	0.7909	1	0.8	1	0.05	0.1	10.53%	0.0%
0.06		4	1	1	1	1	1	0	0	0.0%	-5.26%
0.125		4	0.95	0.7909	1	0.8	1	0.05	0.1	10.53%	0.0%
0.25		4	0.8	0.1635	1	0.2	1	0.2	0.4	50.0%	15.79%
0.5		4	0.4	0	0.9197	0	0.8	0.1633	0.3266	81.65%	57.89%
1		4	0.55	0	1	0	1	0.263	0.526	95.63%	42.11%
2		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	1	0.8	1	1
0.06		1	1	1	1
0.125		1	0.8	1	1
0.25		1	1	0.2	1
0.5		0.4	0.4	0.8	0
1		0	1	1	0.2
2		0	0	0	0

(A) 3 a 4 6 9/15/19

CETIS Analytical Report

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID: 00-2384-4686 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 12 Jul-19 10:43 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	55.7%	0.25	0.5	0.3536	400

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		0.06	-0.2473	2.407	0.58	6	0.8958	CDF	Non-Significant Effect
		0.125	0	2.407	0.58	6	0.8333	CDF	Non-Significant Effect
		0.25	0.6682	2.407	0.58	6	0.5725	CDF	Non-Significant Effect
		0.5*	2.535	2.407	0.58	6	0.0392	CDF	Significant Effect
		1	1.831	2.407	0.58	6	0.1381	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.49915	0.2998301	5	2.586	0.0623	Non-Significant Effect
Error	2.08676	0.1159311	18			
Total	3.585911		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	2.66	4.248	0.0571	Equal Variances
Variances	Levene Equality of Variance	6.494	4.248	0.0013	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9123	0.884	0.0395	Normal Distribution

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	0.0%
0.06		4	1	1	1	1	1	1	0	0.0%	-5.26%
0.125		4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	0.0%
0.25		4	0.8	0.1635	1	1	0.2	1	0.2	50.0%	15.79%
0.5		4	0.4	0	0.9197	0.4	0	0.8	0.1633	81.65%	57.89%
1		4	0.55	0	1	0.6	0	1	0.263	95.63%	42.11%
2		4	0	0	0	0	0	0	0		100.0%

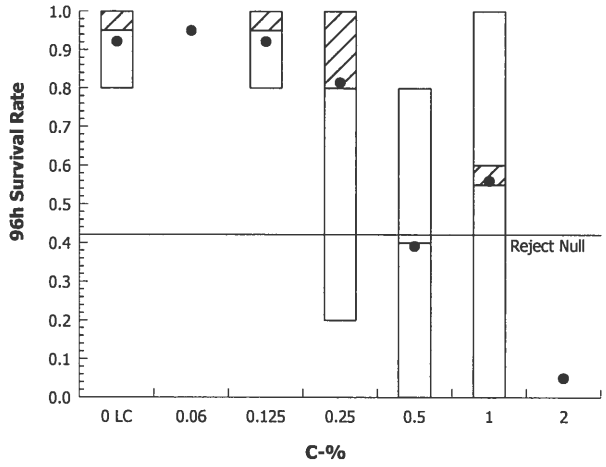
Angular (Corrected) Transformed Summary

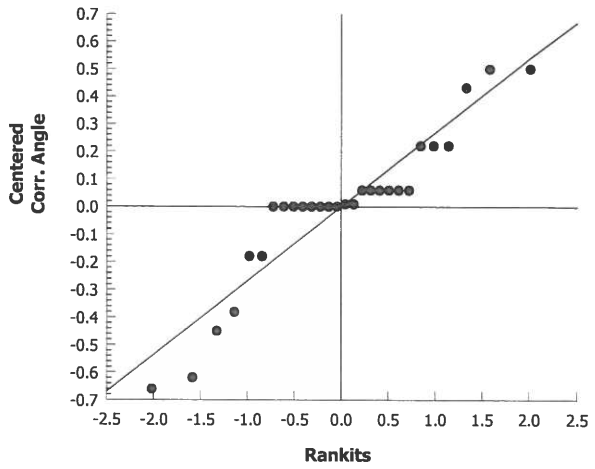
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	0.0%
0.06		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	-4.63%
0.125		4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	0.0%
0.25		4	1.125	0.4234	1.826	1.345	0.4636	1.345	0.2204	39.19%	12.51%
0.5		4	0.6755	0.1026	1.248	0.6847	0.2255	1.107	0.18	53.3%	47.46%
1		4	0.8449	-0.08733	1.777	0.9045	0.2255	1.345	0.2929	69.34%	34.28%
2		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	82.46%

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	00-2384-4686	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jul-19 10:43	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Test Code: 1907-S078 | 21-3010-3304

Mysid 96-h Acute Survival Test — Nautilus Environmental (CA)

Analysis ID:	09-6936-5347	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Jul-19 13:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	823603	1000	Yes	Two-Point Interpolation

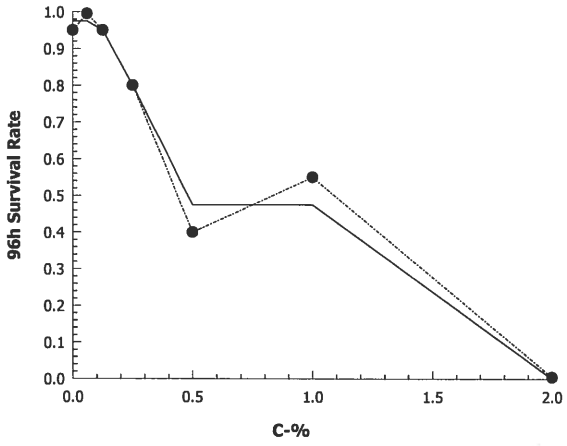
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	0.3029	0.09827	1.418	330.2	70.51	1018
EC50	0.4904	0.09014	1.839	203.9	54.37	1109

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	4	0.95	0.8	1	0.05	0.1	10.53%	0.0%	19	20
0.06		4	1	1	1	0	0	0.0%	-5.26%	20	20
0.125		4	0.95	0.8	1	0.05	0.1	10.53%	0.0%	19	20
0.25		4	0.8	0.2	1	0.2	0.4	50.0%	15.79%	16	20
0.5		4	0.4	0	0.8	0.1633	0.3266	81.65%	57.89%	8	20
1		4	0.55	0	1	0.263	0.526	95.63%	42.11%	11	20
2		4	0	0	0	0	0		100.0%	0	20

Graphics



Analyst: JU QA: KKP 7/12/19

Marine Acute Bioassay
Static-Renewal Conditions

Client: Geosynte~~UCO~~ ©
Sample ID: Starkist Samoa Co. OP STR
Sample Log-in No.: 19-0711
Test No.: 1907-5078

Tech Initials				
0	24	48	72	96
DM	JB	DM	RT	RT
DM	RT	TN	RT	RT
DM		DM		

Concentration (%)	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	A	5	5	5	5	5	34.1	34.6	i 34.2	34.9	35.7	24.2	24.2	i 24.6	24.6	24.5	7.5	6.2	i 6.7	6.3	6.4	7.96	8.11	i 7.82	7.95	8.04
	B	5	5	4	4	4			f 35.2					f 24.3					f 6.3					f 8.04		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
0.06%	A	5	5	5	5	5	34.1	34.5	i 34.4	35.2	36.2	24.1	24.6	i 24.3	24.5	24.4	7.5	6.1	i 6.8	6.4	6.2	7.88	8.09	i 7.78	8.06	8.05
	B	5	5	5	5	5			f 35.2					f 24.4					f 6.4					f 8.04		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
0.125%	A	5	5	5	5	5	34.1	34.8	i 34.0	35.4	36.4	24.1	24.1	i 24.2	24.4	24.2	7.5	6.3	i 6.8	6.3	6.2	7.80	8.09	i 7.82	7.99	8.04
	B	5	5	4	4	4			f 35.6					f 24.3					f 6.2					f 7.96		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
0.25%	A	5	5	5	5	5	34.1	34.5	i 34.2	35.0	35.9		24.1	i 24.3	24.6	24.4	7.5	6.0	i 6.8	6.0	6.1	7.66	7.94	i 7.60	7.85	8.02
	B	5	5	5	5	5			f 35.2					f 24.5					f 6.3					f 8.03		
	C	5	1	1	1	1																				
	D	5	5	5	5	5																				
0.5%	A	5	(B)	5	4	2	34.1	34.4	i 34.2		35.9	24.0	24.7	i 24.3	24.8	24.7	7.4	6.1	i 6.7	6.2	6.1	7.43	8.03	i 7.38	8.09	8.15
	B	5	5	5	2	2			f 35.0					f 24.7					f 6.3					f 8.06		
	C	5	5	5	5	4																				
	D	5	(B)	0	0	0																				
1.0%	A	5	(B)	2	(B)	0	34.0	34.5	i 34.1	35.1	36.1	24.0	24.8	i 24.2	24.8	24.8	7.2	5.8	i 6.5	6.0	6.0	7.12	7.94	i 7.10	7.99	8.14
	B	5	(B)	5	5	5			f 35.2					f 24.7					f 5.4					f 7.83		
	C	5	(B)	5	5	5																				
	D	5	(B)	4	(B)	1																				
2.0%	A	5	(B)	0			34.0	34.3	i 33.8	–	–	24.0	25.0	i 24.2	–	–	7.0	4.1	i 6.4	–	–	6.73	7.66	i 6.73	–	–
	B	5	(B)	0	AN				f 34.8					f 25.0					f 5.8					f 8.06		
	C	5	(B)	0																						
	D	5	(B)	0																						

Initial Counts QC'd by: DM 6/29 ACS
Initiated by: DM

Animal Source/Date Received: ABS / 6/29/19 Age at Initiation 5 days

Animal Acclimation Qualifiers (circle all that apply): Q22 / Q23 / Q24 / Q25

Comments: i = initial reading in fresh test solution st chambe
Organisms fed prior to initiation circ (B)Q ABS 7/1 (B)Q 7/1

QC Check: ~~KFP~~ 7/12/19 (2)Q (B)Q J 7/24/19

Chronic Urchin Development

CETIS Summary Report

Echinoid Embryo-Larval Development Test — **Nautilus Environmental (CA)**

Batch ID:	12-0176-2433	**Test Type:**	Development	**Analyst:**	
Start Date:	01 Jul-19 10:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater ~~Not Applicable~~ 8/15 & 7/23/19
Ending Date:	04 Jul-19 10:35	**Species:**	Strongylocentrotus purpuratus	**Brine:**	~~Tropic Marin~~ Not Applicable
Duration:	72h	**Source:**	Pt. Loma	**Age:**	

Sample ID:	18-0334-5456 (B)	**Code:**	19-0711	**Client:**	Geosyntec
Sample Date:	27 Jun-19 10:22 (B)	**Material:**	Effluent Sample	**Project:**	
Receive Date:	01 Jul-19 08:35 (B)	**Source:**	Starkist Samoa Co.		
Sample Age:	7d 6h (6.8 °C)	**Station:**	OD Streams		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-5095-6702	Development Rate	<0.06	0.06	NA	10.4%	>1667	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
10-7436-5405	Development Rate	EC25	0.01777	0.01413	0.02308	5628	Linear Interpolation (ICPIN)
		EC50	0.03554	0.02826	0.04616	2814	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
10-7436-5405	Development Rate	Control Resp	0.988	0.8 - NL	Yes	Passes Acceptability Criteria
17-5095-6702	Development Rate	Control Resp	0.988	0.8 - NL	Yes	Passes Acceptability Criteria
17-5095-6702	Development Rate	PMSD	0.1042	NL - 0.25	No	Passes Acceptability Criteria

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.988	0.9776	0.9984	0.98	1	0.003742	0.008367	0.85%	0.0%
0.06		5	0.154	0	0.3701	0	0.4	0.07782	0.174	113.0%	84.41%
0.125		5	0	0	0	0	0	0	0		100.0%
0.25		5	0	0	0	0	0	0	0		100.0%
0.5		5	0	0	0	0	0	0	0		100.0%
1		5	0	0	0	0	0	0	0		100.0%
2		5	0	0	0	0	0	0	0		100.0%

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.98	0.99	0.98	1	0.99
0.06		0	0.11	0.4	0.26	0
0.125		0	0	0	0	0
0.25		0	0	0	0	0
0.5		0	0	0	0	0
1		0	0	0	0	0
2		0	0	0	0	0

(A) QA 8/15/19

CETIS Analytical Report

Test Code: 1907-S079 | 10-8165-0406

Echinoid Embryo-Larval Development Test — Nautilus Environmental (CA)

Analysis ID:	17-5095-6702	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jul-19 10:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	10.4%	Fails development rate

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		0.06*	15	19	0	8	0.0045	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.205751	3.205751	1	77.6	<0.0001	Significant Effect
Error	0.3304844	0.04131055	8			
Total	3.536235		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	56.22	23.15	0.0018	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9104	0.7411	0.2839	Normal Distribution

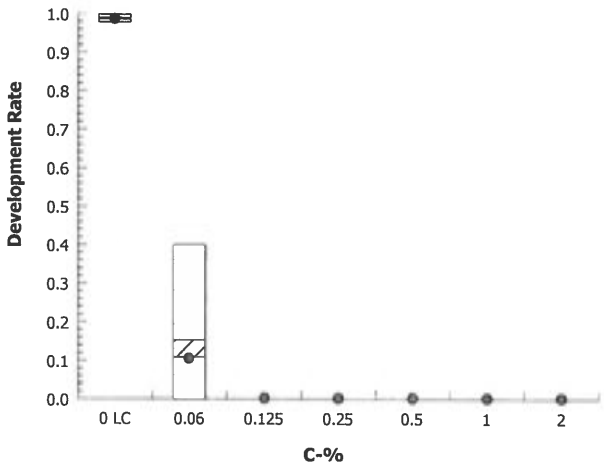
Development Rate Summary

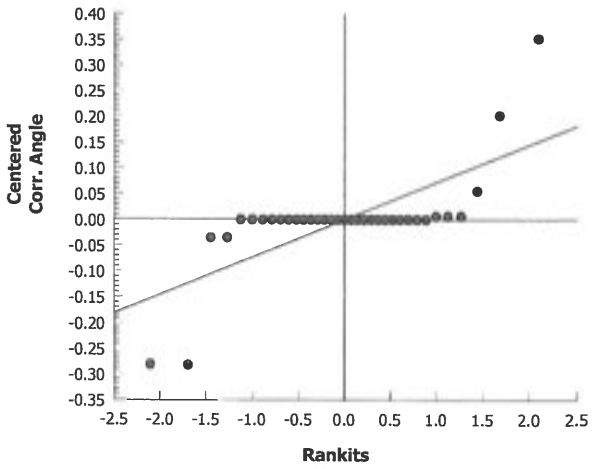
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.988	0.9776	0.9984	0.99	0.98	1	0.003742	0.85%	0.0%
0.06		5	0.154	0	0.3701	0.11	0	0.4	0.07782	113.0%	84.41%
0.125		5	0	0	0	0	0	0	0		100.0%
0.25		5	0	0	0	0	0	0	0		100.0%
0.5		5	0	0	0	0	0	0	0		100.0%
1		5	0	0	0	0	0	0	0		100.0%
2		5	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.464	1.417	1.511	1.471	1.429	1.521	0.01699	2.6%	0.0%
0.06		5	0.3316	-0.02219	0.6853	0.3381	0.05002	0.6847	0.1274	85.93%	77.35%
0.125		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.58%
0.25		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.58%
0.5		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.58%
1		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.58%
2		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.58%

Graphics





Analyst: JCL QA: KPP 7/12/19

CETIS Analytical Report

Test Code: 1907-S079 | 10-8165-0406

Echinoid Embryo-Larval Development Test — **Nautilus Environmental (CA)**

Analysis ID:	10-7436-5405	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jul-19 10:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	2093110	1000	Yes	Two-Point Interpolation

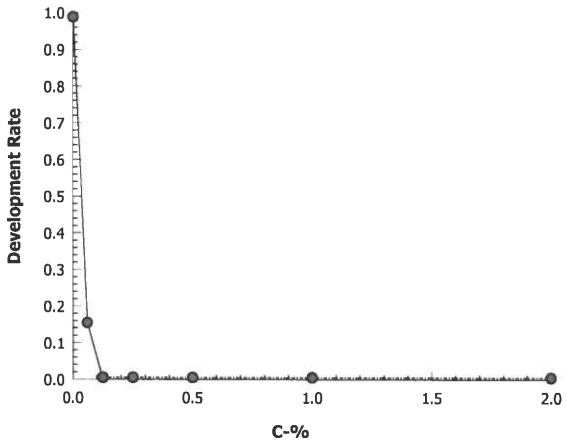
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	0.01777	0.01413	0.02308	5628	4332	7078
EC50	0.03554	0.02826	0.04616	2814	2166	3539

Development Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.988	0.98	1	0.003742	0.008367	0.85%	0.0%	494	500
0.06		5	0.154	0	0.4	0.07782	0.174	113.0%	84.41%	77	500
0.125		5	0	0	0	0	0		100.0%	0	500
0.25		5	0	0	0	0	0		100.0%	0	500
0.5		5	0	0	0	0	0		100.0%	0	500
1		5	0	0	0	0	0		100.0%	0	500
2		5	0	0	0	0	0		100.0%	0	500

Graphics



Analyst: JCL QA: PFP 7/12/19

CETIS Test Data Worksheet

Report Date: 29 Jun-19 13:41 (p 1 of 1)
Test Code: 1907-5079 10-8165-0406/4078ACE6

Echinoid Embryo-Larval Development Test — **Nautilus Environmental (CA)**

Start Date: 01 Jul-19
End Date: 04 Jul-19
Sample Date: 27 Jun-19

Species: Strongylocentrotus purpuratus
Protocol: EPA/600/R-95/136 (1995)
Material: ~~Groundwater~~ Effluent

Sample Code: 19- 0711
Sample Source: Geosyntec
Sample Station: JC0 - Starkist Samoa Co upstreams

C-%	Code	Rep	Pos	# Counted	# Normal	Notes
			36	100	26	
			37		0	
			38		0	
			39		0	
			40		0	
			41		0	
			42		0	
			43		0	
			44		99	
			45		100	
			46		0	
			47		0	
			48		11	
			49		0	
			50		0	
			51		0	
			52		99	
			53		0	
			54		0	
			55		0	
			56		98	
			57		0	
			58		0	
			59		0	
			60		0	
			61		0	
			62		0	
			63		0	
			64		98	
			65		0	
			66		0	
			67		40	
			68		0	
			69		0	
			70		0	

Ⓐ KFP 080 PA 7/12/19
Ⓑ KFP 018 7/24/19

Analyst: RT QA: KFP 7/12/19

CETIS Test Data Worksheet

Report Date: 29 Jun-19 13:41 (p 1 of 1)
Test Code: 1907-5079 10-8165-0406/4078ACE6

Echinoid Embryo-Larval Development Test — **Nautilus Environmental (CA)**

Start Date: 01 Jul-19
End Date: 04 Jul-19
Sample Date: 27 Jun-19

Species: Strongylocentrotus purpuratus
Protocol: EPA/600/R-95/136 (1995)
Material: ~~Groundwater~~ Ⓑ Effluent

Sample Code: 19- 0711
Sample Source: Geosyntec
Sample Station: ~~JC0~~ Ⓒ Stockist Simoa Ck ODStreams

C-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	LC	1	56	100	99	NORMAL EMBRYO DEVELOPMENT Ⓐ
0	LC	2	52			
0	LC	3	64			
0	LC	4	45			
0	LC	5	44			
0.06		1	40	100	0	SOME EMBRYO DEVELOPMENT
0.06		2	48			
0.06		3	67			
0.06		4	36			
0.06		5	37			
0.125		1	66	100	0	VERY LITTLE EMBRYO DEVELOPMENT
0.125		2	47			
0.125		3	53			
0.125		4	49			
0.125		5	68			
0.25		1	62	100	0	FERTILIZED EGGS
0.25		2	57			
0.25		3	39			
0.25		4	51			
0.25		5	69			
0.5		1	59	100	0	
0.5		2	54			
0.5		3	65			
0.5		4	46			
0.5		5	41			
1		1	70	100	0	
1		2	42			
1		3	63			
1		4	43			
1		5	38			
2		1	58	100	0	
2		2	55			
2		3	50			
2		4	60			
2		5	61			

QC=Ac

Ⓐ QLeTN 7/6/19
Ⓑ KFP QA18 7/12/19
Ⓒ KFPQA18 7/24/19

Marine Chronic Bioassay

Water Quality Measurements

Client: Geosyntec~~UCO~~ @

Sample ID: Starkist Samoa Co. ODStreams

Sample Log No.: 19- 0711

Test No.: 1907-5079

Test Species: *S. purpuratus*

Start Date/Time: 7/1/2019 1015

End Date/Time: 7/4/2019 1035

Concentration (% sample)	Salinity (ppt)				Temperature (°C)				Dissolved Oxygen (mg/L)				pH (pH units)			
	0	24	48	72	0	24	48	72	0	24	48	72	0	24	48	72
Lab Control	34.0	34.0	34.4	34.2	14.9	14.8	14.7	14.7	8.9	8.8	8.4	8.3	8.04	8.00	8.01	7.98
0.06	34.3	34.4	34.4	34.2	15.0	14.5	14.6	14.5	8.8	8.7	6.6	@ ~~8.6~~ 3	7.98	7.97	7.83	7.71
0.125	33.9	34.1	34.7	34.4	15.0	14.5	14.3	14.3	8.8	8.5	4.4	3.9	7.92	7.94	7.74	7.48
0.25	33.9	34.5	34.4	34.4	14.9	14.4	14.3	14.2	8,9	8.4	2.3	2.1	7.79	7.87	7.62	7.41
0.5	34.2	34.1	34.4	34.3	14.9	14.7	14.6	14.5	8.8	8.1	1.4	1.4	7.53	7.76	7.51	7.43
1.0	33.7	34.4	34.3	34.3	14.7	14.6	14.6	14.6	8,7	7.4	1.1	0.9	7.18	7.54	7.42	7.34
2.0	33.6	34.3	34.2	34.2	14.6	14.6	14.6	14.6	8.5	5.6	0.8	0.9	6.78	7.13	7.24	7.18

		0	24	48	72
Technician Initials:	**WQ Readings:**	AC	RT	BO	BO
	Dilutions made by:	EG			

Comments:

0 hrs:

24 hrs:

48 hrs: DO dropped below 4.0 mg/L, see report for additional details

72 hrs: @@18 BO 7/4/19

QC Check: KFP 7/12/19 @KFP@18 7/24/19

Final Review: ✓ 7/24/19

Marine Chronic Bioassay **Echinoderm Larval Development Worksheet**

Client: Geosyntec
Sample ID: Starkist Samoa Co. OD Streams
Test No.: 1907-5079

Start Date/Time: 7/1/2019 / 1015
End Date/Time: 7/4/2019 / 1035
Species: *S. purpuratus*
Date Collected: 5/3/19

Tech initials: EG
Injection Time: 5955

Sperm Absorbance at 400 nm: 1.056 (target range of 0.8 - 1.0 for density of $4x10^6$ sperm/ml)

Eggs Counted: 42, 46, 71, 62, 72

Mean: 58.6 X 50 = 2930 eggs/ml

(target counts of 20 eggs per vertical pass on Sedgwick-Rafter slide for a final density of 1000 eggs/ml)

Initial density: 2930 eggs/ml = 2.93 dilution factor
Final density: 1000 eggs/ml
-1.0 part egg stock
1.93 parts seawater

egg stock 50 ml
seawater 96.5 ml

Prepare the egg stock according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Add 100 µL sperm stock per 100mL of egg stock. For example, if you have 60mL of egg stock, add 60µL sperm stock.

Embryo Stock Fertilization Checks (Initiate test only when fertilization is ≥90%):

Fertilization Time: 1005

	Time	No. Fert.	No. Unfert.	%
5 minutes (1st fert.) check	1010	99	1	99
10 minutes (2nd fert. if needed)				

Test Initiation Time: 1015 Embryo Stock Added: 0.25 ml
Test initiation must be within 1 hour of fertilization time.

Test Termination:

	No. Normal	No. Abnormal	% Normal
72-hour QC check 1[a]	100	0	100
QC check 2			

Comments: [a] If the embryo development does not meet the mean test acceptability criterion of 80% normally developed, continue the test to 96-hrs (ASTM 1999).

QC Check: KFP 7/12/19 Final Review: 7/29/19

Ammonia Data

Total Ammonia Analysis
Marine

Overlying Water

DC-001

Client: Geosyntec / Starkist
Project: ~~OD~~ Streams OD (4)
Test Type: Urchin Development, Acute Menidia and Mysid

DI Blank: 0.0
SW Blank: 0.0

Test Start Date: 7/1/2019

Analyst: KL
Analysis Date: 7/9/19

Sample ID	Nautilus ID	Sub-Sample Date	Test Day	NH3-N (mg/L)	N x 1.22 Ammonia (mg/L)
Blank Spike (10 mg/L NH_3)		NA	NA	6.8	8.3
Urchin 2%	2	7/1/2019	0	40.7	49.7
Urchin 2%	3	7/4/2019	3	*	–
Mysid 2%	4	7/1/2019	0	41.2	50.3
Mysid 2%	5	7/3/2019	2	34.4	42.0
Mysid 1% A rep	6	7/4/2019	4	19.3	23.5
Mysid 1% B rep	–	7/5/2019	4	20.4	24.9
Menidia 2%	7	7/1/2019	0	42.1	51.4
Menidia 2%	8	7/3/2019	2	39.9	48.7
Menidia 1%	9	7/4/2019	4	23.1	28.2
Spike Check (10 mg/L NH_3)		NA	NA		
Batch QA Sample	19-3578	7/2/19	N/A	8.0	9.8
Sample Duplicate[a]	19-3578	NA	NA	8.0	9.8
Sample Duplicate + Spike[a]		NA	NA	15.3	18.7
Spike Check (10 mg/L NH_3)		NA	NA	6.8	8.3

Relative Percent Difference (RPD) = [sample] (mg/L) - [sample duplicate] (mg/L) x 100
[average ammonia] (mg/L)

Acceptable Range: 0-20%

Percent Recovery = [spiked sample] (mg/L) - [sample] (mg/L) x 100
nominal [spike] (mg/L)

Acceptable Range: 80-120%[b]

QC Sample ID	[NH_3]	[Sample Dup]	Measured [Spike]	Nominal [Spike]	RPD	% Recovery
Blank	0.0	NA	8.3	10	NA	83
Batch QA	9.8	9.8	18.7	10	0	89

Comments: *Subsample not collected; tech error @18 AC 7/24/19

Notes: [a] Unless otherwise noted, the last sample listed on the datasheet is used for duplicate and duplicate + spike QC check.

[b] Acceptable range for % recovery applies only to the blank spike. Spike recoveries in samples may vary based on sample matrix and are for information only.

[c] Calculation not performed due to one or both values below the method detection limit.

Method Detection Limit (MDL) = 0.5 mg/L

QC Check: AC 7/24/19

Final Review: 7/24/19

Unionized Ammonia Calculation

Client:	Geosyntec
Test Type:	Acute Inland Silverside, Acute Mysid, Chronic Urchin Development
Test ID:	1907-S077 to S079
Test Date:	7/1/2019 - 7/4/2019

Sample ID	Test Day	Sample Type	Actual Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	I Rounded	pK	Unionized Ammonia (mg/L)
Urchin 2%	0	Initial test solution	49.7	14.6	33.6	6.78	287.76	7.42962	7	9.33	0.065
Mysid 2%	0	Initial test solution	50.3	24	34.0	6.73	297.16	7.51503	8	9.34	0.116
Mysid 2%	2	Final solution prior to renewal	42.0	24.2	34.8	8.06	297.36	7.68607	8	9.34	2.001
Mysid 1% (A)	4	Final solution prior to termination	23.5	24.8	36.1	8.14	297.96	7.96463	8	9.34	1.390
Mysid 1% (B)	4	Final solution prior to termination	24.9	24.8	36.1	8.14	297.96	7.96463	8	9.34	1.473
Menidia 2%	0	Initial test dilution	51.4	24.2	34.0	6.72	297.36	7.51503	8	9.34	0.117
Menidia 2%	2	Final solution prior to renewal	48.7	24.6	35.4	7.88	297.76	7.81454	8	9.34	1.604
Menidia 1%	4	Final solution prior to termination	28.2	24.6	35.0	7.78	297.76	7.72888	8	9.34	0.743
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000
							273.16	0.5	1	9.26	0.000

Note: water quality parameters used for calculation taken from bench sheets

Appendix D
Reference Toxicant Test Data

Acute Inland Silverside

CETIS Summary Report

Inland Silverside 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	00-9967-0265	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	01 Jul-19 15:55	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Diluted Natural Seawater
Ending Date:	05 Jul-19 13:55	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	94h	**Source:**	(A) ~~Aquatic Biosystems, CO~~ Aquatic Research organisms, NH	**Age:**	12d

Sample ID:	17-7071-2795	**Code:**	190701mbra	**Client:**	Internal
Sample Date:	01 Jul-19	**Material:**	Copper chloride	**Project:**	
Receive Date:	05 Jul-19	**Source:**	Reference Toxicant		
Sample Age:	16h	**Station:**	Copper Chloride		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-7834-6127	96h Survival Rate	200	400	282.8	28.6%		Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
17-4098-1084	96h Survival Rate	EC50	223.6	193.1	259		Spearman-Kärber

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
01-7834-6127	96h Survival Rate	Control Resp	0.95	0.9 - NL	Yes	Passes Acceptability Criteria
17-4098-1084	96h Survival Rate	Control Resp	0.95	0.9 - NL	Yes	Passes Acceptability Criteria

96h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	4	0.95	0.7909	1	0.8	1	0.05	0.1	10.53%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	-5.26%
100		4	1	1	1	1	1	0	0	0.0%	-5.26%
200		4	0.65	0.1065	1	0.2	1	0.1708	0.3416	52.55%	31.58%
400		4	0	0	0	0	0	0	0		100.0%
800		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	1	1	1	0.8
50		1	1	1	1
100		1	1	1	1
200		0.6	0.2	1	0.8
400		0	0	0	0
800		0	0	0	0

(A) EG QIB 7/11/19

Inland Silverside 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID: 01-7834-6127 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 09 Jul-19 13:20 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	28.6%	200	400	282.8	

Steel Many-One Rank Sum Test

Control	vs	C-µg/L	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		50	20	10	1	6	0.9096	Asymp	Non-Significant Effect
		100	20	10	1	6	0.9096	Asymp	Non-Significant Effect
		200	13	10	2	6	0.1689	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.4310998	0.1436999	3	3.716	0.0424	Significant Effect
Error	0.4640988	0.03867491	12			
Total	0.8951986		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	4.883	5.953	0.0191	Equal Variances
Variances	Levene Equality of Variance	6.323	5.953	0.0081	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.7953	0.8408	0.0024	Non-normal Distribution

96h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	0.0%
50		4	1	1	1	1	1	1	0	0.0%	-5.26%
100		4	1	1	1	1	1	1	0	0.0%	-5.26%
200		4	0.65	0.1065	1	0.7	0.2	1	0.1708	52.55%	31.58%
400		4	0	0	0	0	0	0	0		100.0%
800		4	0	0	0	0	0	0	0		100.0%

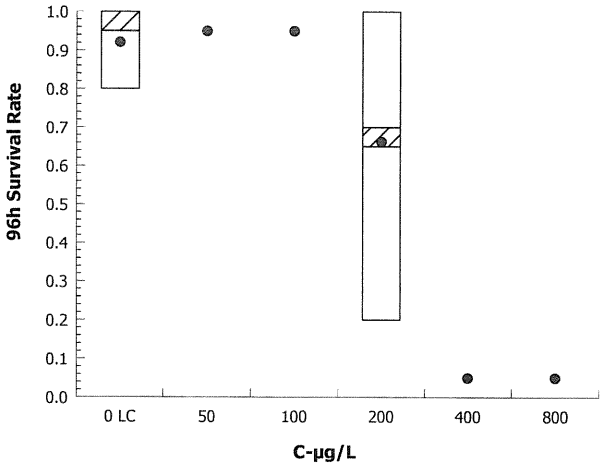
Angular (Corrected) Transformed Summary

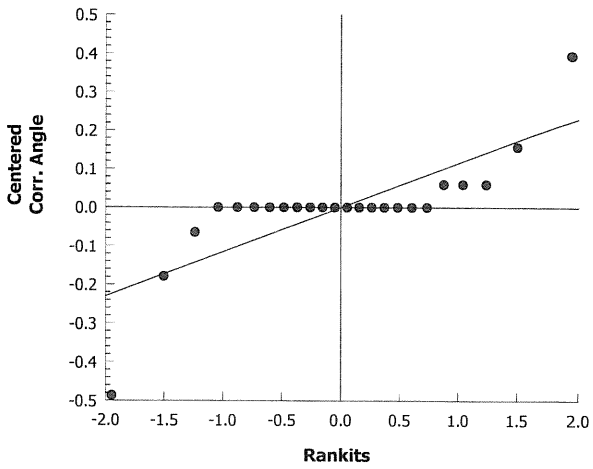
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	0.0%
50		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	-4.63%
100		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	-4.63%
200		4	0.9505	0.354	1.547	0.9966	0.4636	1.345	0.1874	39.44%	26.07%
400		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	82.46%
800		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	82.46%

Inland Silverside 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	01-7834-6127	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Jul-19 13:20	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Test Code: 190701mbra | 04-4319-5710

Inland Silverside 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	17-4098-1084	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Jul-19 13:21	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

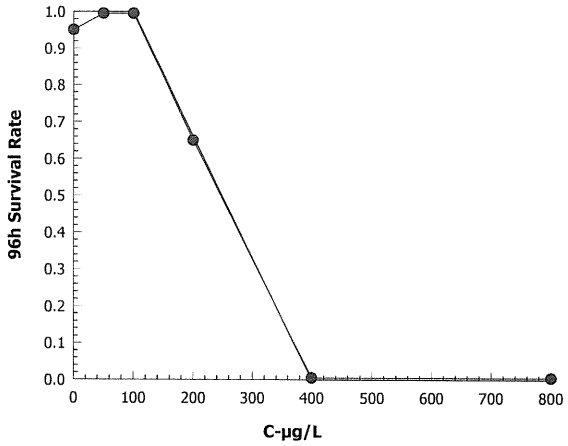
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.05	0.00%	2.35	0.03186	223.6	193.1	259

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	4	0.95	0.8	1	0.05	0.1	10.53%	0.0%	19	20
50		4	1	1	1	0	0	0.0%	-5.26%	20	20
100		4	1	1	1	0	0	0.0%	-5.26%	20	20
200		4	0.65	0.2	1	0.1708	0.3416	52.55%	31.58%	13	20
400		4	0	0	0	0	0		100.0%	0	20
800		4	0	0	0	0	0		100.0%	0	20

Graphics

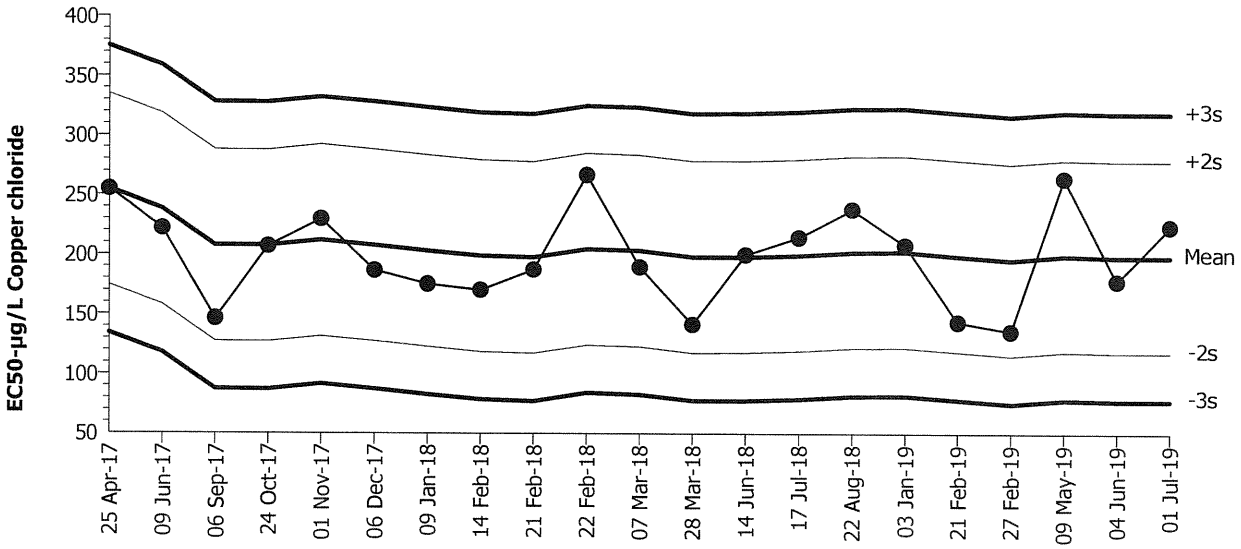


Analyst: JCL QA: KTP 7/10/19

Inland Silverside 96-h Acute Survival Test **Nautilus Environmental (CA)**

Test Type: Survival (96h) **Organism:** Menidia beryllina (Inland Silverside) **Material:** Copper chloride
Protocol: EPA/821/R-02-012 (2002) **Endpoint:** 96h Survival Rate **Source:** Reference Toxicant-REF

Inland Silverside 96-h Acute Survival Test



Mean:	197.9	**Count:**	20	**-2s Warning Limit:**	117.6	**-3s Action Limit:**	77.41
Sigma:	40.16	**CV:**	20.30%	**+2s Warning Limit:**	278.2	**+3s Action Limit:**	318.4

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Apr	25	17:00	254.9	57.01	1.42			20-8848-5762	06-2422-4286
2		Jun	9	17:15	221.9	24.01	0.598			04-5405-2533	13-3732-1084
3		Sep	6	15:50	146.4	-51.49	-1.282			01-8301-6131	10-0799-2130
4		Oct	24	16:10	207.1	9.153	0.2279			10-0714-4627	19-6697-7894
5		Nov	1	10:15	229.7	31.84	0.7928			14-0848-4500	09-3507-0741
6		Dec	6	15:25	186.6	-11.29	-0.2812			17-2716-0280	10-6923-1723
7	2018	Jan	9	16:05	175.2	-22.7	-0.5652			15-9782-4320	14-5127-3080
8		Feb	14	14:50	170.3	-27.63	-0.6879			14-7429-6310	14-6416-7425
9			21	12:25	187.2	-10.72	-0.267			20-0148-6736	18-8740-2809
10			22	17:20	266.7	68.81	1.713			21-2244-9573	15-2512-9013
11		Mar	7	16:25	189.3	-8.55	-0.2129			06-3891-7579	03-5981-6406
12			28	17:15	141.4	-56.48	-1.406			18-3798-9831	05-5342-2351
13		Jun	14	14:35	200	2.1	0.05229			01-9952-0614	00-3575-1747
14		Jul	17	14:30	214.4	16.45	0.4097			11-1445-3115	12-3693-5336
15		Aug	22	16:25	237.8	39.94	0.9946			08-6172-7555	12-4329-0617
16	2019	Jan	3	16:50	207.9	9.952	0.2478			16-0506-4055	11-1190-1934
17		Feb	21	16:05	143.5	-54.42	-1.355			10-4228-2556	08-7111-9529
18			27	16:25	135.8	-62.13	-1.547			14-0947-0420	00-4247-8099
19		May	9	19:10	263.9	66	1.643			03-9779-6453	09-3747-7536
20		Jun	4	14:50	177.8	-20.15	-0.5016			00-2136-1210	01-4264-5145
21		Jul	1	15:55	223.6	25.72	0.6403			04-4319-5710	17-4098-1084

Marine Acute Bioassay
Static-Renewal Conditions

Water Quality Measurements & Test Organism Survival

Client: Internal
Sample ID: $CuCl_2$
Test No.: 190701mbra

Test Species: *M. beryllina*
Start Date/Time: 7/1/2019 1555
End Date/Time: 7/5/2019 1355

Cu stock concentration (µg/L): 93,000

	Tech Initials				
	0	24	48	72	96
Counts:	DM	JBS	DM	BO	RT
Readings:	DM	RT	TN	BO	RT
Dilutions made by:	DM		BO		
High conc. made (µg/L):	800	--	200	--	--
Vol. Cu stock added (mL):	17.2	--	4.3	--	--
Final Volume (mL):	2000	--	2000	--	--

Concentration (µg/L)	Rand #	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	19	5	5	5	5	5	29.8	29.5	i 29.9	29.4	30.0	24.2	25.3	i 24.2	25.4	25.6	7.0	5.1	i 6.6	5.6	5.0	8.04	7.73	i 7.86	7.78	7.72
	14	5	5	5	5	5			f 29.5					f 25.6					f 5.4					f 7.64		
	6	5	5	5	5	5																				
	24	5	4	4	4	4																				
50	11	5	5	5	5	5	29.8	29.7	i 30.0	29.7	30.1	24.1	25.6	i 24.2	25.5	25.6	6.8	4.9	i 6.7	5.6	5.2	8.00	7.74	i 7.88	7.76	7.73
	20	5	5	5	5	5			f 29.9					f 25.3					f 5.6					f 7.70		
	1	5	5	5	5	5																				
	7	5	5	5	5	5																				
100	5	5	5	5	5	5	29.3	29.4	i 29.9	30.1	30.7	24.2	25.6	i 24.2	25.2	25.4	6.8	5.1	i 6.7	5.4	5.2	8.01	7.76	i 7.91	7.72	7.73
	9	5	5	5	5	5			f 29.9					f 25.0					f 5.5					f 7.70		
	18	5	5	5	5	5																				
	2	5	5	5	5	5																				
200	21	5	3	3	3	3	29.3	29.7	i 29.9	29.7	30.1	24.2	25.5	i 24.2	25.3	25.7	6.8	5.4	i 6.8	5.3	5.2	7.99	7.80	i 7.91	7.74	7.78
	4	5	1	1	1	1			f 29.9					f 25.4					f 5.5					f 7.73		
	17	5	5	5	5	5																				
	22	5	4	4	4	4																				
400	10	5	0				29.2	29.3	i -	-	-	24.1	25.5	i -	-	-	6.8	4.9	i -	-	-	7.98	7.73	i -	-	-
	23	5	0						f -					f ~~25~~					f -					f -		
	12	5	0											Q18 DM 7/11/19												
	8	5	0																							
800	16	5	0				29.2	29.3	i -	-	-	24.0	25.4	i -	-	-	6.8	5.3	i -	-	-	7.95	7.74	i -	-	-
	13	5	0						f -					f -					f -					f -		
	3	5	0																							
	15	5	0																							

all dead

Rand # QC: DM
Initial Counts QC'd by: DM 0 to RT
Initiated by: DM

Animal Source/Date Received: (B) ABS 6/29/19 ARO
Age at Initiation: 12 days

Animal Acclimation Qualifiers (circle all that apply): Q22 / Q23 / Q24 / none

Feeding Times					
	0	24	48	72	96
AM:		0900	0850	1000	0900
PM:	1705				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal
Organisms fed prior to initiation, circle one (y) / n) (A) Q18 ARS 7/1/19 (B) EG Q18 7/11/19

QC Check: KEP 7/10/19
Final Review: EG 7/11/19

Acute Mysid Shrimp

CETIS Summary Report

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	14-9760-7969	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	01 Jul-19 15:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Diluted Natural Seawater
Ending Date:	05 Jul-19 13:50	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	5d

Sample ID:	18-6400-7568	**Code:**	190701myra	**Client:**	Internal
Sample Date:	01 Jul-19	**Material:**	Copper chloride	**Project:**	
Receive Date:	01 Jul-19	**Source:**	Reference Toxicant		
Sample Age:	15h	**Station:**	Copper Chloride		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
06-8016-8631	48h Survival Rate	200	400	282.8	25.0%		Dunnett Multiple Comparison Test
04-9395-4031	96h Survival Rate	100	200	141.4	18.0%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
12-7174-3681	48h Survival Rate	EC50	282.8	232.8	343.7		Spearman-Kärber
13-1376-7861	96h Survival Rate	EC50	229.7	192.5	274.1		Spearman-Kärber

48h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	4	1	1	1	1	1	0	0	0.0%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	0.95	0.7909	1	0.8	1	0.05	0.1	10.53%	5.0%
200		4	0.8	0.4325	1	0.6	1	0.1155	0.2309	28.87%	20.0%
400		4	0.25	0	0.6504	0	0.6	0.1258	0.2517	100.7%	75.0%
800		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	4	1	1	1	1	1	0	0	0.0%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	0.9	0.7163	1	0.8	1	0.05774	0.1155	12.83%	10.0%
200		4	0.75	0.4453	1	0.6	1	0.09574	0.1915	25.53%	25.0%
400		4	0.05	0	0.2091	0	0.2	0.05	0.1	200.0%	95.0%
800		4	0	0	0	0	0	0	0		100.0%

48h Survival Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	1	1	1	1
50		1	1	1	1
100		1	1	1	0.8
200		1	1	0.6	0.6
400		0.2	0.6	0	0.2
800		0	0	0	0

96h Survival Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	1	1	1	1
50		1	1	1	1
100		0.8	1	1	0.8
200		1	0.8	0.6	0.6
400		0	0.2	0	0
800		0	0	0	0

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID: 06-8016-8631 **Endpoint:** 48h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 09 Jul-19 13:31 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	25.0%	200	400	282.8	

Dunnett Multiple Comparison Test

Control	vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		50	0	2.356	0.298	6	0.8000	CDF	Non-Significant Effect
		100	0.4706	2.356	0.298	6	0.6174	CDF	Non-Significant Effect
		200	1.815	2.356	0.298	6	0.1264	CDF	Non-Significant Effect
		400*	6.605	2.356	0.298	6	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.005743	0.5014356	4	15.67	<0.0001	Significant Effect
Error	0.4800643	0.03200429	15			
Total	2.485807		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	3.76	4.893	0.0260	Equal Variances
Variances	Levene Equality of Variance	7.006	4.893	0.0022	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9056	0.866	0.0526	Normal Distribution

48h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1	1	1	1	1	1	0	0.0%	0.0%
50		4	1	1	1	1	1	1	0	0.0%	0.0%
100		4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	5.0%
200		4	0.8	0.4325	1	0.8	0.6	1	0.1155	28.87%	20.0%
400		4	0.25	0	0.6504	0.2	0	0.6	0.1258	100.7%	75.0%
800		4	0	0	0	0	0	0	0		100.0%

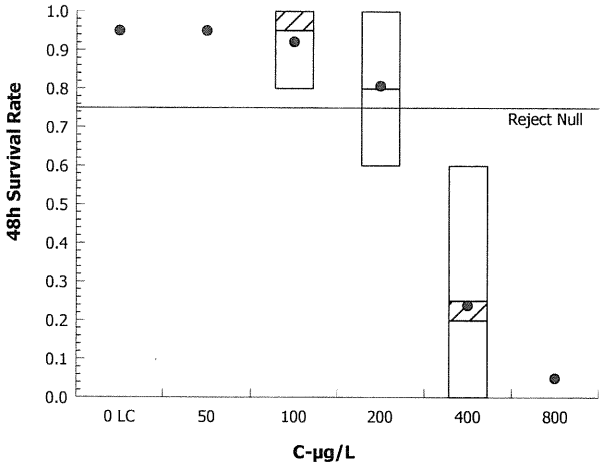
Angular (Corrected) Transformed Summary

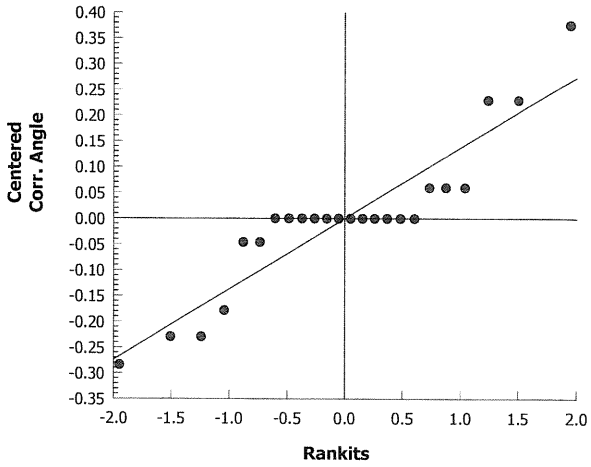
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
50		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
100		4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	4.43%
200		4	1.116	0.6938	1.538	1.116	0.8861	1.345	0.1326	23.76%	17.07%
400		4	0.5097	0.07234	0.9471	0.4636	0.2255	0.8861	0.1374	53.93%	62.11%
800		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	83.24%

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	06-8016-8631	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Jul-19 13:31	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID: 04-9395-4031 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 09 Jul-19 13:31 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	18.0%	100	200	141.4	

Dunnett Multiple Comparison Test

Control	vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		50	0	2.356	0.212	6	0.8000	CDF	Non-Significant Effect
		100	1.322	2.356	0.212	6	0.2599	CDF	Non-Significant Effect
		200*	3.211	2.356	0.212	6	0.0098	CDF	Significant Effect
		400*	11.77	2.356	0.212	6	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.162457	0.7906142	4	48.75	<0.0001	Significant Effect
Error	0.2432871	0.01621914	15			
Total	3.405744		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	3.938	4.893	0.0222	Equal Variances
Variances	Levene Equality of Variance	8.631	4.893	0.0008	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9183	0.866	0.0921	Normal Distribution

96h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1	1	1	1	1	1	0	0.0%	0.0%
50		4	1	1	1	1	1	1	0	0.0%	0.0%
100		4	0.9	0.7163	1	0.9	0.8	1	0.05774	12.83%	10.0%
200		4	0.75	0.4453	1	0.7	0.6	1	0.09574	25.53%	25.0%
400		4	0.05	0	0.2091	0	0	0.2	0.05	200.0%	95.0%
800		4	0	0	0	0	0	0	0		100.0%

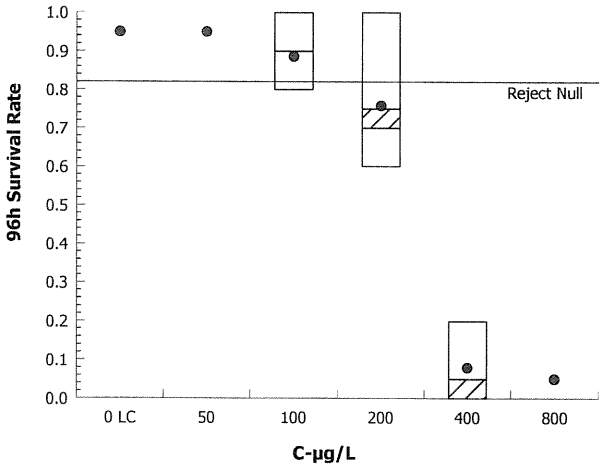
Angular (Corrected) Transformed Summary

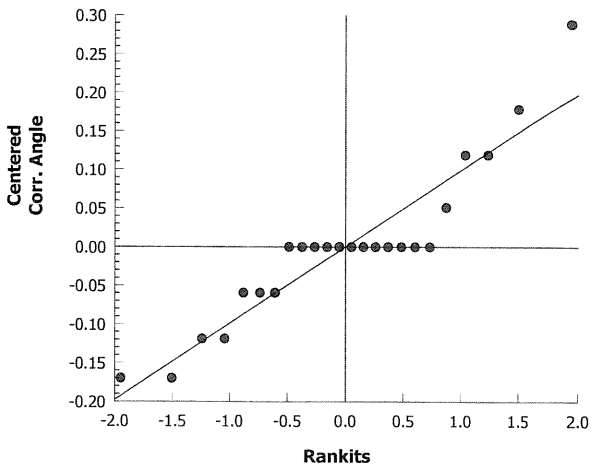
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
50		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
100		4	1.226	1.007	1.445	1.226	1.107	1.345	0.06874	11.21%	8.85%
200		4	1.056	0.7075	1.405	0.9966	0.8861	1.345	0.1096	20.75%	21.49%
400		4	0.285	0.09558	0.4745	0.2255	0.2255	0.4636	0.05953	41.77%	78.81%
800		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	83.24%

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	04-9395-4031	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Jul-19 13:31	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Test Code: 190701myra | 00-3054-5973

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	12-7174-3681	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Jul-19 13:31	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

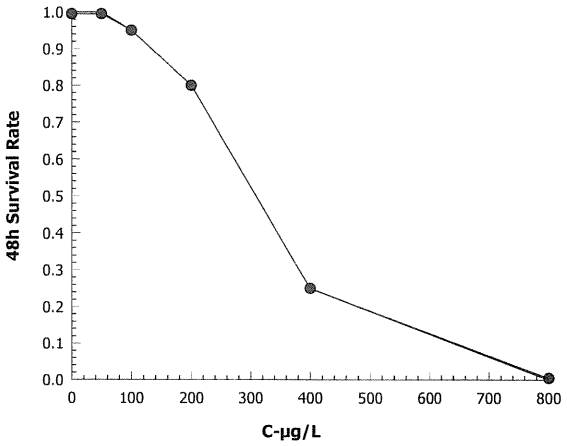
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	0.00%	2.452	0.04231	282.8	232.8	343.7

48h Survival Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	4	1	1	1	0	0	0.0%	0.0%	20	20
50		4	1	1	1	0	0	0.0%	0.0%	20	20
100		4	0.95	0.8	1	0.05	0.1	10.53%	5.0%	19	20
200		4	0.8	0.6	1	0.1155	0.2309	28.87%	20.0%	16	20
400		4	0.25	0	0.6	0.1258	0.2517	100.7%	75.0%	5	20
800		4	0	0	0	0	0		100.0%	0	20

Graphics



Analyst: JCL QA: EG 7/11/19

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID: 13-1376-7861 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 09 Jul-19 13:31 **Analysis:** Untrimmed Spearman-Kärber **Official Results:** Yes

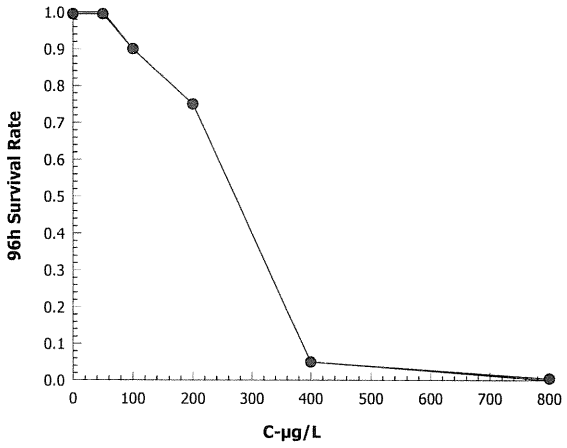
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	0.00%	2.361	0.03837	229.7	192.5	274.1

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	4	1	1	1	0	0	0.0%	0.0%	20	20
50		4	1	1	1	0	0	0.0%	0.0%	20	20
100		4	0.9	0.8	1	0.05774	0.1155	12.83%	10.0%	18	20
200		4	0.75	0.6	1	0.09574	0.1915	25.53%	25.0%	15	20
400		4	0.05	0	0.2	0.05	0.1	200.0%	95.0%	1	20
800		4	0	0	0	0	0		100.0%	0	20

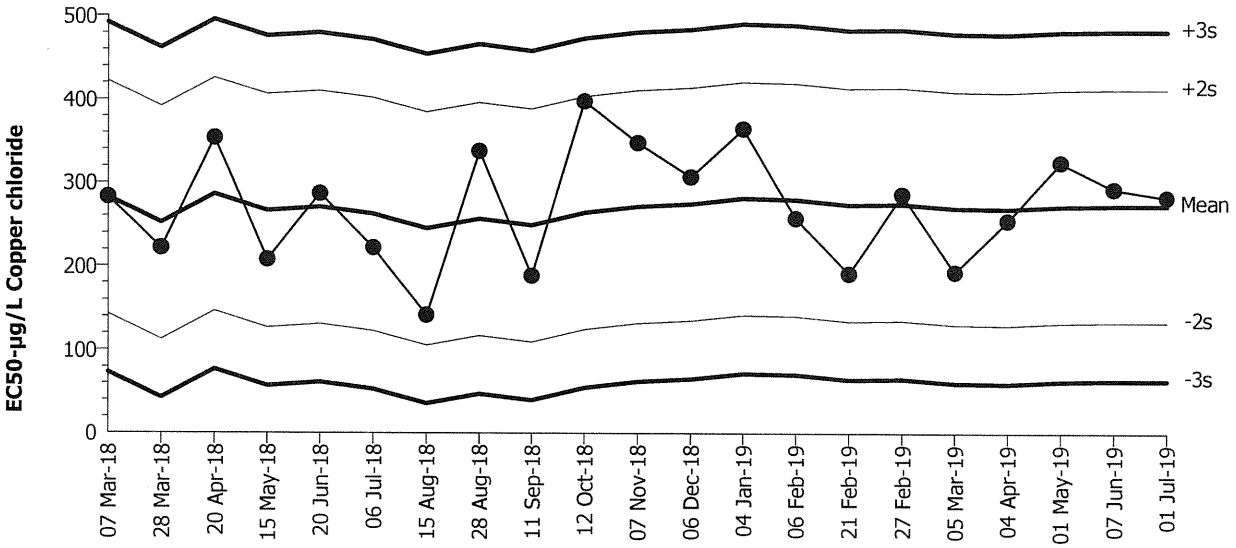
Graphics



Mysid 96-h Acute Survival Test **Nautilus Environmental (CA)**

Test Type:	Survival (96h)	**Organism:**	Americamysis bahia (Opossum Shri	**Material:**	Copper chloride
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	48h Survival Rate	**Source:**	Reference Toxicant-REF

Mysid 96-h Acute Survival Test



Mean:	273.1	**Count:**	20	**-2s Warning Limit:**	133.4	**-3s Action Limit:**	63.53
Sigma:	69.86	**CV:**	25.60%	**+2s Warning Limit:**	412.8	**+3s Action Limit:**	482.7

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Mar	7	16:25	282.8	9.743	0.1395			10-8646-9178	05-6049-9266
2			28	16:10	221.9	-51.19	-0.7327			15-4374-6741	11-5664-4039
3		Apr	20	15:45	353.6	80.48	1.152			10-4473-7155	03-6870-9073
4		May	15	13:50	207.9	-65.25	-0.934			14-4944-1297	06-5339-6371
5		Jun	20	15:30	287	13.86	0.1984			04-4231-0903	07-3012-3160
6		Jul	6	14:55	221.9	-51.19	-0.7327			20-2728-1377	06-2839-1792
7		Aug	15	14:00	141.4	-131.7	-1.885			14-8303-0655	09-9519-6980
8			28	16:10	337.9	64.76	0.9269			21-2933-4468	08-9274-2637
9		Sep	11	16:35	188.5	-84.61	-1.211			16-0699-3926	11-2760-5538
10		Oct	12	15:40	398	124.9	1.788			04-3284-8017	01-9110-2945
11		Nov	7	15:15	348.2	75.12	1.075			05-2361-5235	05-6677-0931
12		Dec	6	15:45	307.1	33.99	0.4865			02-8370-7066	03-1957-0006
13	2019	Jan	4	16:20	365.1	92.03	1.317			15-2358-5025	00-6334-9175
14		Feb	6	15:15	257.5	-15.63	-0.2237			02-9902-9095	09-9328-1865
15			21	15:50	191.3	-81.79	-1.171			08-2049-6233	08-1016-4407
16			27	15:45	286.4	13.27	0.1899			18-0439-0628	11-4083-2551
17		Mar	5	16:25	193.2	-79.91	-1.144			07-2443-9002	20-8635-9036
18		Apr	4	15:45	254.9	-18.19	-0.2603			12-5149-9007	10-6064-9109
19		May	1	14:45	324.9	51.8	0.7415			03-8402-7514	02-0135-9111
20		Jun	7	17:40	292.8	19.72	0.2822			15-0477-0993	04-0710-1520
21		Jul	1	15:20	282.8	9.743	0.1395			00-3054-5973	12-7174-3681

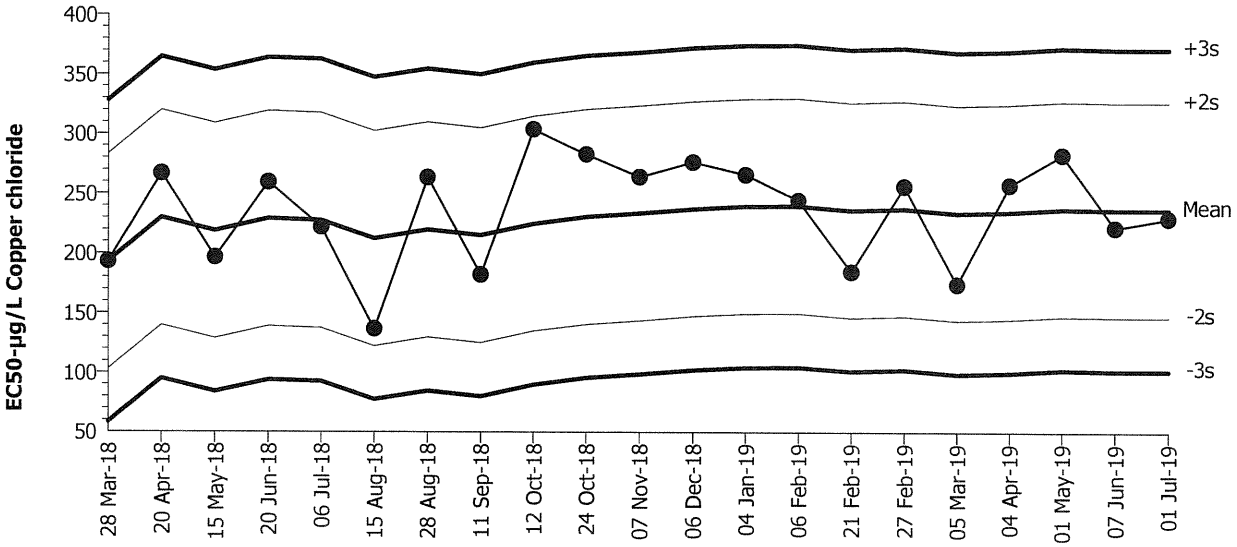
CETIS QC Plot

Report Date: 09 Jul-19 13:31 (1 of 1)

Mysid 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Test Type:	Survival (96h)	**Organism:**	Americamysis bahia (Opossum Shri	**Material:**	Copper chloride
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF

Mysid 96-h Acute Survival Test



Mean:	236.7	**Count:**	20	**-2s Warning Limit:**	146.7	**-3s Action Limit:**	101.7
Sigma:	45	**CV:**	19.00%	**+2s Warning Limit:**	326.7	**+3s Action Limit:**	371.7

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Mar	28	16:10	193.2	-43.51	-0.9669			15-4374-6741	15-6199-7890
2		Apr	20	15:45	266.7	30.01	0.6668			10-4473-7155	05-7699-1337
3		May	15	13:50	196.6	-40.14	-0.8919			14-4944-1297	02-2365-6992
4		Jun	20	15:30	259.4	22.67	0.5037			04-4231-0903	16-8168-7125
5		Jul	6	14:55	221.9	-14.79	-0.3286			20-2728-1377	02-5699-0099
6		Aug	15	14:00	136.6	-100.1	-2.224	(-)		14-8303-0655	01-5941-7563
7			28	16:10	263.4	26.73	0.5941			21-2933-4468	03-8009-1017
8		Sep	11	16:35	182.1	-54.62	-1.214			16-0699-3926	16-7253-9506
9		Oct	12	15:40	303.7	66.98	1.489			04-3284-8017	12-8637-0903
10			24	15:15	282.8	46.14	1.025			13-1692-3940	19-7279-9581
11		Nov	7	15:15	263.9	27.2	0.6045			05-2361-5235	10-0369-9874
12		Dec	6	15:45	276.3	39.57	0.8794			02-8370-7066	14-9907-2370
13	2019	Jan	4	16:20	265.9	29.17	0.6482			15-2358-5025	06-4259-8181
14		Feb	6	15:15	244.4	7.739	0.172			02-9902-9095	01-2344-0730
15			21	15:50	184.6	-52.07	-1.157			08-2049-6233	21-2714-8308
16			27	15:45	256.2	19.48	0.4328			18-0439-0628	14-6353-1021
17		Mar	5	16:25	174.1	-62.59	-1.391			07-2443-9002	17-5549-2926
18		Apr	4	15:45	257.5	20.77	0.4616			12-5149-9007	02-2336-7586
19		May	1	14:45	282.8	46.14	1.025			03-8402-7514	10-4449-6498
20		Jun	7	17:40	221.9	-14.79	-0.3286			15-0477-0993	15-5135-1118
21		Jul	1	15:20	229.7	-6.96	-0.1547			00-3054-5973	13-1376-7861

Marine Acute Bioassay
Static-Renewal Conditions

Water Quality Measurements
& Test Organism Survival

Client: Internal
Sample ID: $CuCl_2$
Test No.: 190701myra

Test Species: *A. bahia*
Start Date/Time: 7/1/2019 1520
Renewal Date/Time: 7/3/2019 1350
End Date/Time: 7/5/2019 1350

Cu stock concentration (µg/L): 93,000

Tech Initials	0	24	48	72	96
Counts:	DM	JBS	TN	BO	RT
Readings:	DM	RT	TN	BO	RT RT (3)
Dilutions made by:	DM		BO		
High conc. made (µg/L):	800	--	800	--	--
Vol. Cu stock added (mL):	17.2	--	17.2	--	--
Final Volume (mL):	2000	--	2000	--	--

Concentration (µg/L)	Rand #	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	8	5	5	5	5	5	29.4	29.9	i 29.2	29.7	29.9	24.2	~~24.2~~ (4)	i 24.3	25.1	25.7	7.0	~~6.0~~ (5)	i 6.9	5.8	5.4	7.77	~~8.11~~ (6)	i 7.84	7.76	7.73
	7	5	5	5	5	5		(1)	f 29.2				25.0	f 25.2				5.5	f 6.0				7.89	f 7.75		
	15	5	5	5	5	5			29.8																	
	4	5	5	5	5	5																				
50	11	5	5	5	5	5	29.5	29.5	i 30.0	30.0	30.3	24.2	25.5	i 24.2	25.2	25.7	6.9	5.4	i 7.3	5.8	6.1	7.98	7.90	i 7.89	7.78	7.74
	12	5	5	5	5	5			f 29.9					f 24.9					f 6.0					f 7.77		
	2	5	5	5	5	5																				
	21	5	5	5	5	5																				
100	10	5	5	5	5	4	29.5	29.5	i 29.9	30.2	30.8	24.2	25.6	i 24.2	25.3	25.9	6.8	5.7	i 7.3	5.6	5.2	7.99	7.90	i 7.90	7.78	7.76
	13	5	5	5	5	5			f 29.9					f 24.9					f 6.0					f 7.81		
	1	5	5	5	5	5																				
	23	5	5	4	4	4																				
200	20	5	5	5	5	5	29.5	29.5	i 29.9	30.1	30.3	24.1	25.6	i 24.3	25.5	25.5	6.8	5.8	i 7.4	5.4	5.2	7.98	7.87	i 7.91	7.75	7.70
	14	5	5	5	5	4			f 29.9					f 25.2					f 6.0					f 7.82		
	6	5	4	3	3	3																				
	22	5	5	3	3	3																				
400	3	5	4	1	1	0	29.3	29.4	i 30.0	30.2	30.5	24.0	25.6	i 24.4	25.4	25.5	6.8	5.7	i 7.3	5.8	5.5	7.97	7.88	i 7.90	7.85	7.86
	19	5	4	3	2	1			f 29.9					f 25.1					f 5.9					f 7.80		
	16	5	3	0	—	—																				
	9	5	5	1	1	0																				
800	5	5	3	0			29.2	29.2	i 29.8	—	—	24.2	25.6	i 24.7	—	—	6.8	5.9	i 7.3	—	—	7.95	7.90	i 7.88	—	—
	24	5	0	—	ALL				f 29.4					f 25.5					f 5.9					f 7.82		
	18	5	4	0	DEAD																					
	17	5	4	0																						

Rand # QC: DM
Initial Counts QC'd by: DM aba ACS
Initiated by: DM

Animal Source/Date Received: ABS / 6/29/19 **Age at Initiation:** 5 days

Animal Acclimation Qualifiers (circle all that apply): Q22 / Q23 / Q24 / (none)

Feeding Times	0	24	48	72	96
AM:	—	0900	0850	1000	0900
PM:	1705	1650	1600	1700	—

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one (y / n) (4) Q18 KT 7/2/19

(1) QA KTN 7/3/19 (3) Q18 RT 7/4/19

QC Check: KFP 7/10/19 **Final Review:** EG 7/11/19

Chronic Urchin Development

CETIS Summary Report

Echinoid Embryo-Larval Development Test — **Nautilus Environmental (CA)**

Batch ID:	13-9115-8417	**Test Type:**	Development	**Analyst:**	
Start Date:	01 Jul-19 1015	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	04 Jul-19 1035	**Species:**	Strongylocentrotus purpuratus	**Brine:**	Not Applicable
Duration:	72h	**Source:**	Pt. Loma	**Age:**	

Sample ID:	14-8889-5540	**Code:**	190701spdv	**Client:**	Internal
Sample Date:	01 Jul-19	**Material:**	Copper chloride	**Project:**	
Receive Date:	01 Jul-19	**Source:**	Reference Toxicant		
Sample Age:	NA	**Station:**	Copper Chloride		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
02-9881-1623	Development Rate	2.5	5	3.536	2.78%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
20-3014-2815	Development Rate	EC50	10.92	10.55	11.32		Trimmed Spearman-Kärber

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
02-9881-1623	Development Rate	Control Resp	0.978	0.8 - NL	Yes	Passes Acceptability Criteria
20-3014-2815	Development Rate	Control Resp	0.978	0.8 - NL	Yes	Passes Acceptability Criteria
02-9881-1623	Development Rate	PMSD	0.02777	NL - 0.25	No	Passes Acceptability Criteria

Development Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.978	0.9558	1	0.95	0.99	0.008	0.01789	1.83%	0.0%
2.5		5	0.95	0.9098	0.9902	0.91	0.98	0.01449	0.0324	3.41%	2.86%
5		5	0.914	0.8742	0.9538	0.89	0.97	0.01435	0.03209	3.51%	6.54%
10		5	0.656	0.6225	0.6895	0.62	0.69	0.01208	0.02702	4.12%	32.92%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%
80		5	0	0	0	0	0	0	0		100.0%

Development Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.99	0.95	0.99	0.99	0.97
2.5		0.92	0.98	0.97	0.91	0.97
5		0.91	0.9	0.97	0.9	0.89
10		0.66	0.62	0.67	0.69	0.64
20		0	0	0	0	0
40		0	0	0	0	0
80		0	0	0	0	0

CETIS Analytical Report

Test Code: 190701spdv | 15-6318-2369

Echinoid Embryo-Larval Development Test — Nautilus Environmental (CA)

Analysis ID:	02-9881-1623	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Jul-19 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	2.78%	2.5	5	3.536	

Dunnett Multiple Comparison Test

Control	vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		2.5	2.033	2.227	0.084	8	0.0709	CDF	Non-Significant Effect
		5*	4.053	2.227	0.084	8	0.0013	CDF	Significant Effect
		10*	12.97	2.227	0.084	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6894265	0.2298088	3	65.3	<0.0001	Significant Effect
Error	0.05630473	0.003519045	16			
Total	0.7457313		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.07	11.34	0.3809	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9607	0.866	0.5583	Normal Distribution

Development Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.978	0.9558	1	0.99	0.95	0.99	0.008	1.83%	0.0%
2.5		5	0.95	0.9098	0.9902	0.97	0.91	0.98	0.01449	3.41%	2.86%
5		5	0.914	0.8742	0.9538	0.9	0.89	0.97	0.01435	3.51%	6.54%
10		5	0.656	0.6225	0.6895	0.66	0.62	0.69	0.01208	4.12%	32.92%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%
80		5	0	0	0	0	0	0	0		100.0%

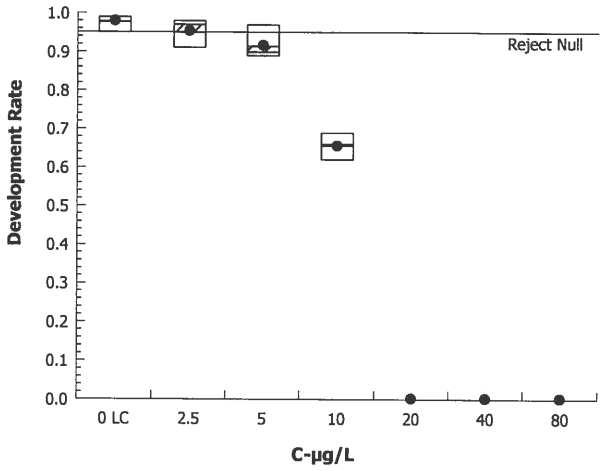
Angular (Corrected) Transformed Summary

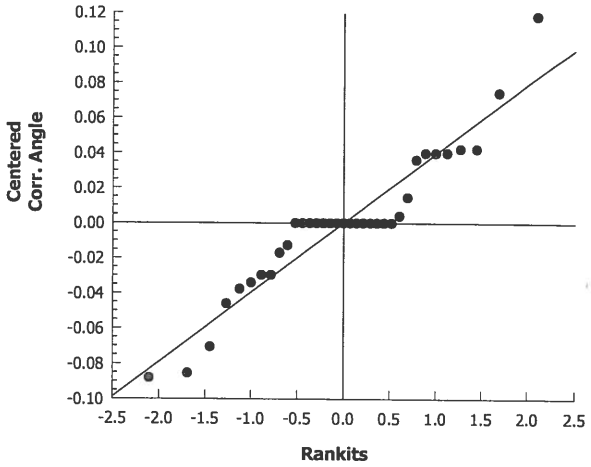
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.431	1.359	1.502	1.471	1.345	1.471	0.02572	4.02%	0.0%
2.5		5	1.354	1.263	1.446	1.397	1.266	1.429	0.03307	5.46%	5.33%
5		5	1.279	1.196	1.362	1.249	1.233	1.397	0.02996	5.24%	10.63%
10		5	0.9443	0.9089	0.9796	0.9483	0.9066	0.9803	0.01272	3.01%	34.0%
20		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.5%
40		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.5%
80		5	0.05002	0.05001	0.05003	0.05002	0.05002	0.05002	0	0.0%	96.5%

Analyst: JCL QA: KTP 7/24/19

Echinoid Embryo-Larval Development Test				Nautilus Environmental (CA)	
Analysis ID:	02-9881-1623	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Jul-19 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Test Code: 190701spdv | 15-6318-2369

Echinoid Embryo-Larval Development Test — Nautilus Environmental (CA)

Analysis ID:	20-3014-2815	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Jul-19 10:52	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

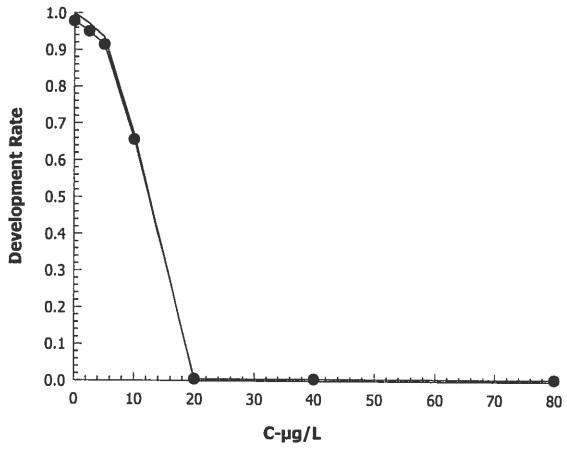
Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.022	2.86%	1.038	0.007671	10.92	10.55	11.32

Development Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.978	0.95	0.99	0.008	0.01789	1.83%	0.0%	489	500
2.5		5	0.95	0.91	0.98	0.01449	0.0324	3.41%	2.86%	475	500
5		5	0.914	0.89	0.97	0.01435	0.03209	3.51%	6.54%	457	500
10		5	0.656	0.62	0.69	0.01208	0.02702	4.12%	32.92%	328	500
20		5	0	0	0	0	0		100.0%	0	500
40		5	0	0	0	0	0		100.0%	0	500
80		5	0	0	0	0	0		100.0%	0	500

Graphics

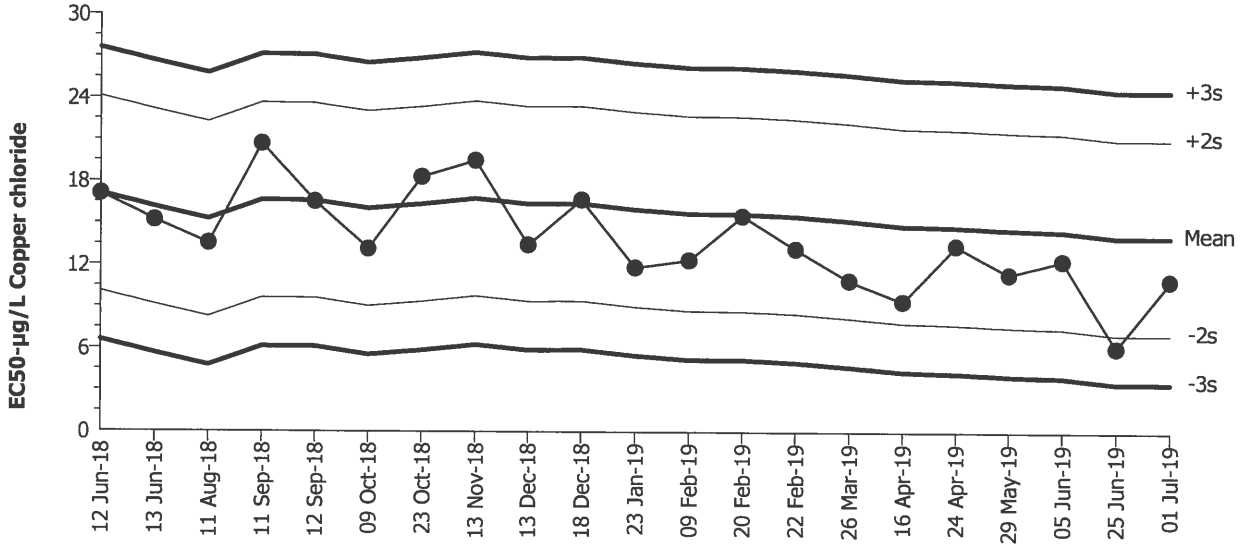


Analyst: JCL QA: KFP 7/24/19

Echinoid Embryo-Larval Development Test — **Nautilus Environmental (CA)**

Test Type:	Development	**Organism:**	Strongylocentrotus purpuratus (Purpl	**Material:**	Copper chloride
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Development Rate	**Source:**	Reference Toxicant-REF

Echinoid Embryo-Larval Development Test



Mean:	14.02	**Count:**	20	**-2s Warning Limit:**	7.024	**-3s Action Limit:**	3.525
Sigma:	3.499	**CV:**	25.00%	**+2s Warning Limit:**	21.02	**+3s Action Limit:**	24.52

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Jun	12	11:45	17.1	3.076	0.8791			14-1059-1899	15-2642-9423
2			13	14:50	15.19	1.173	0.3352			18-0381-5742	02-7081-5629
3		Aug	11	18:45	13.53	-0.4944	-0.1413			20-1611-7935	16-4659-9025
4		Sep	11	10:30	20.68	6.66	1.903			16-0634-0120	05-0604-6072
5			12	16:00	16.53	2.506	0.7163			15-4225-8606	10-5374-9889
6		Oct	9	15:15	13.13	-0.8881	-0.2538			03-2545-6769	13-7536-3945
7			23	14:41	18.31	4.291	1.226			07-8982-8813	00-2035-0705
8		Nov	13	15:35	19.48	5.459	1.56			12-1068-1198	13-8500-6380
9		Dec	13	15:40	13.43	-0.5872	-0.1678			18-0887-5478	08-5675-7260
10			18	16:10	16.68	2.66	0.7602			09-1125-6696	11-5924-9340
11	2019	Jan	23	16:45	11.82	-2.203	-0.6295			16-9627-7772	06-9753-3662
12		Feb	9	15:00	12.35	-1.672	-0.4778			03-4551-9020	18-2299-3422
13			20	16:25	15.52	1.5	0.4287			04-5763-2087	07-2228-2240
14			22	10:05	13.16	-0.8551	-0.2444			14-0040-4511	07-9343-7429
15		Mar	26	11:45	10.9	-3.119	-0.8913			11-5844-3421	04-1285-3925
16		Apr	16	16:02	9.409	-4.611	-1.318			10-9005-2409	20-3984-7468
17			24	10:35	13.41	-0.6114	-0.1747			08-2953-1939	18-4850-8813
18		May	29	10:50	11.37	-2.649	-0.7572			01-6601-4847	13-7584-3720
19		Jun	5	16:15	12.34	-1.676	-0.479			03-2581-8812	14-5424-8434
20			25	12:20	6.107	-7.913	-2.261	(-)		13-8876-0205	08-8241-5491
21		Jul	1	0:00	10.92	-3.096	-0.8847			15-6318-2369	20-3014-2815

Analyst: JCL QA: KFP 7/24/19

CETIS Test Data Worksheet

Report Date: 29 Jun-19 13:40 (p 1 of 1)
Test Code: 15-6318-2369/190701spdv

Echinoid Embryo-Larval Development Test — **Nautilus Environmental (CA)**

Start Date: 01 Jul-19
End Date: 04 Jul-19
Sample Date: 01 Jul-19
Species: Strongylocentrotus purpuratus
Protocol: EPA/600/R-95/136 (1995)
Material: Copper chloride
Sample Code: 190701spdv
Sample Source: Reference Toxicant
Sample Station: Copper Chloride

C-µg/L	Code	Rep	Pos	# Counted	# Normal	Notes
			1	100	0	RT 7/24/19
			2		97	
			3		62	
			4		97	
			5		95	
			6		0	
			7		97	
			8		0	
			9		92	
			10		99	
			11		89	
			12		99	
			13		90	
			14		98	
			15		0	
			16		0	
			17		90	
			18		0	
			19		0	
			20		0	
			21		0	
			22		64	
			23		0	
			24		0	
			25		66	
			26		0	
			27		97	
			28		0	
			29		0	
			30		91	
			31		69	
			32		91	
			33		99	
			34		67	
			35		0	

CETIS Test Data Worksheet

Echinoid Embryo-Larval Development Test — **Nautilus Environmental (CA)**

Start Date: 01 Jul-19
End Date: 04 Jul-19
Sample Date: 01 Jul-19
Species: Strongylocentrotus purpuratus
Protocol: EPA/600/R-95/136 (1995)
Material: Copper chloride
Sample Code: 190701spdv
Sample Source: Reference Toxicant
Sample Station: Copper Chloride

C-µg/L	Code	Rep	Pos	# Counted	# Normal	Notes
0	LC	1	12			
0	LC	2	5			
0	LC	3	33	100	97	TN 7/6/19
0	LC	4	10			
0	LC	5	2			
2.5		1	9			
2.5		2	14			
2.5		3	27	100	98	TN 7/6/19
2.5		4	30			
2.5		5	4			
5		1	32			
5		2	17			
5		3	7	100	96	TN 7/6/19
5		4	13			
5		5	11			
10		1	25			
10		2	3			
10		3	34	100	59	TN 7/6/19
10		4	31			
10		5	22			
20		1	6			
20		2	20			
20		3	16	100	0	TN 7/6/19
20		4	8			
20		5	28			
40		1	24			
40		2	29			
40		3	35	100	0	TN 7/6/19
40		4	21			
40		5	15			
80		1	23			
80		2	18			
80		3	1	100	0	TN 7/6/19
80		4	26			
80		5	19			

⑤C=AC

Marine Chronic Bioassay

Water Quality Measurements

Client: Internal

Sample ID: $CuCl_2$

Test No.: 190701spdv

Test Species: *S. purpuratus*

Start Date/Time: 7/1/2019 1015

End Date/Time: 7/4/2019 1035

Concentration (___µg/L___)	Salinity (ppt)				Temperature (°C)				Dissolved Oxygen (mg/L)				pH (pH units)			
	0	24	48	72	0	24	48	72	0	24	48	72	0	24	48	72
Lab Control	33.7	33.8	34.1	34.1	14.7	15.1	14.9	14.7	8.9	8.4	8.4	8.3	7.99	8.00	8.00	7.98
2.5	33.7	34.4	34.3	34.2	14.6	14.6	14.6	14.6	8.8	8.5	8.4	8.3	8.00	8.00	8.01	7.95
5	33.8	34.4	34.4	34.3	14.5	14.8	14.5	14.6	8.8	8.5	8.5	8.2	8.00	8.01	8.01	7.95
10	33.8	34.4	34.4	34.2	14.5	14.8	14.3	14.7	8.9	8.4	8.5	8.2	8.01	8.01	8.01	7.95
20	33.8	34.4	34.4	34.3	14.6	15.1	14.7	14.8	8.8	8.4	8.4	8.2	8.01	8.01	8.01	7.95
40	33.7	34.3	34.3	34.1	14.5	14.9	14.6	14.8	8.8	8.4	8.4	8.1	8.02	8.02	8.01	7.95
80	33.8	33.9	34.2	34.2	14.3	14.9	14.6	14.7	8.8	8.4	8.4	8.2	8.03	8.02	8.01	7.95

	0	24	48	72
WQ Readings:	AC	RT	BO	BO
Dilutions made by:	EG	--	--	--

Technician Initials:

High conc. made (µg/L):	80
Vol. Cu stock added (mL):	4.5
Final Volume (mL):	500
Cu stock concentration (µg/L):	9000

Comments:

0 hrs:

24 hrs:

48 hrs:

72 hrs:

QC Check: KTP 7/24/19

Final Review: 7/24/19

Marine Chronic Bioassay **Echinoderm Larval Development Worksheet**

Client: Internal
Sample ID: CuCl2
Test No.: 190701spdv

Start Date/Time: 7/1/2019 / 1015
End Date/Time: 7/4/2019 / 1035
Species: *S. purpuratus*
Date Collected: 5/3/19

Tech initials: EG
Injection Time: 0955

Sperm Absorbance at 400 nm: 1.056 (target range of 0.8 - 1.0 for density of $4x10^6$ sperm/ml)

Eggs Counted: 42, 46, 71, 62, 72

Mean: 58.6 X 50 = 2930 eggs/ml

(target counts of 20 eggs per vertical pass on Sedgwick-Rafter slide for a final density of 1000 eggs/ml)

Initial density: 2930 eggs/ml
Final density: 1000 eggs/ml
= 2.93 dilution factor
-1.0 part egg stock
1.93 parts seawater

egg stock 50 ml
seawater 96.5 ml

Prepare the egg stock according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Add 100 µL sperm stock per 100mL of egg stock. For example, if you have 60mL of egg stock, add 60µL sperm stock.

Embryo Stock Fertilization Checks (Initiate test only when fertilization is ≥90%):

Fertilization Time: 1005

	Time	No. Fert.	No. Unfert.	%
5 minutes (1st fert.) check	1010	99	1	99
10 minutes (2nd fert. If needed)				

Test Initiation Time: 1015 Embryo Stock Added: 0.25 ml
Test initiation must be within 1 hour of fertilization time.

Test Termination:

	No. Normal	No. Abnormal	% Normal
72-hour QC check 1[a]	100	0	100
QC check 2			

Comments: [a] If the embryo development does not meet the mean test acceptability criterion of 80% normally developed, continue the test to 96-hrs (ASTM 1999).

QC Check: KFP 7/24/19 Final Review: 7/29/19

Appendix E
Laboratory Qualifier Codes

Nautilus Environmental

Glossary of Qualifier Codes:

Q1 - Temperatures out of recommended range; corrective action taken and recorded in Test Temperature Correction Log

Q2 - Temperatures out of recommended range; no action taken, test terminated same day

Q3 - Sample aerated prior to initiation or renewal due to dissolved oxygen (D.O.) levels below 6.0 mg/L

Q4 - Test aerated; D.O. levels dropped below 4.0 mg/L

Q5 - Test initiated with aeration due to an anticipated drop in D.O.

Q6 - Airline obstructed or fell out of replicate and replaced; drop in D.O. occurred

Q7 - Salinity out of recommended range

Q8 - Spilled test chamber/ Unable to recover test organism(s)

Q9 - Inadequate sample volume remaining, 50% renewal performed

Q10 - Inadequate sample volume remaining, no renewal performed

Q11 - Sample out of holding time; refer to QA section of report

Q12 - Replicate(s) not initiated; excluded from data analysis

Q13 - Survival counts not recorded due to poor visibility or heavy debris

Q14 - D.O. percent saturation was checked and was ≤ 110%

Q15 - Did not meet minimum test acceptability criteria. Refer to QA section of report.

Q16 - Percent minimum significant difference (PMSD) was below the lower bound limit for acceptability. This indicates that statistics may be over-sensitive in detecting a difference from the control due to low variability in the data set.

Q17 - Percent minimum significant difference (PMSD) was above the upper bound limit for acceptability. This indicates that statistics may be under-sensitive in detecting a difference from the control due to high variability in the data set.

Q18 - Incorrect Entry

Q19 - Illegible Entry

Q20 - Miscalculation

Q21 - Other (provide reason in comments section)

Q22 - Greater than 10% mortality observed upon receipt and/or in holding prior to test initiation. Organisms acclimated to test conditions at Nautilus and ultimately deemed fit to use for testing.

Q23 - Test organisms received at a temperature greater than 3°C outside the recommended test temperature range. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate tests upon the day of arrival. Organisms were acclimated to the appropriate test conditions upon receipt and prior to test initiation.

Q24 - Test organisms received at salinity greater than 3 ppt outside of the recommended test salinity range. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate tests upon the day of arrival. Organisms were acclimated to the appropriate test conditions upon receipt and prior to test initiation.

APPENDIX B
TestAmerica Laboratory Reports and Data Validation Reports

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-244608-1
Client Project/Site: Ocean Disposal WW Sample
Revision: 1

For:
Geosyntec Consultants, Inc.
295 Hagey Blvd.
Suite 290
Waterloo, Ontario N2L 6R5

Attn: Nick Butson

Authorized for release by:
7/25/2019 4:57:35 PM

Lena Davidkova, Project Manager II
(949)260-3229
lena.davidkova@testamericainc.com

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Sample Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-244608-1	0620 BUTCHER	Water	06/20/19 06:11	06/26/19 10:30	
440-244608-2	0620 OD STREAMS	Water	06/20/19 06:33	06/26/19 10:30	
440-244608-3	0621 BUTCHER	Water	06/21/19 06:01	06/26/19 10:30	
440-244608-4	0621 OD STREAMS	Water	06/21/19 06:20	06/26/19 10:30	

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Job ID: 440-244608-1

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative
440-244608-1

Comments
This it final report. Pyrethrins results were included under this cover

Receipt
The samples were received on 6/26/2019 10:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 11.5º C, 11.9º C, 12.1º C and 16.5º C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: 0620 BUTCHER (440-244608-1), 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4). Received samples on thawed blue ice. The temperatures recorded were:16.8/16.5, 12.2/11.9, 12.4/12.1, 11.8/11.5 IR 94 outside the required temperature criteria.

GC/MS VOA
Method(s) 8260B: The continuing calibration verification (CCV) associated with batch 440-555513 recovered above the upper control limit for Ethylbenzene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: 0620 OD STREAMS (440-244608-2), 0621 OD STREAMS (440-244608-4) and (CCVIS 440-555513/2).

Method(s) 8260B: The following samples were diluted due to the abundance of non-target analytes: 0620 OD STREAMS (440-244608-2) and 0621 OD STREAMS (440-244608-4). Elevated reporting limits (RLs) are provided.

Method(s) 8260B: The samples were collected in properly preserved vials for analysis of volatile organic compounds (VOCs). However, when verified by the laboratory, the pH was 6 and the following samples were analyzed after 7 days from sampling: 0620 OD STREAMS (440-244608-2) and 0621 OD STREAMS (440-244608-4).

Method(s) 8260B: The following volatile samples were analyzed with significant headspace in the sample container(s): 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4). Significant headspace is defined as a bubble greater than 6 mm in diameter.

Method(s) 8260B: The following volatile samples were received and analyzed with significant headspace in the sample vials: 0620 BUTCHER (440-244608-1) and 0621 BUTCHER (440-244608-3). Significant headspace is defined as a bubble greater than 6 mm in diameter.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method(s) 625: Surrogate recovery for the following samples were outside control limits: 0620 BUTCHER (440-244608-1), 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method(s) 625: The following samples were diluted due to the nature of the sample matrix: 0620 BUTCHER (440-244608-1), 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4). Elevated reporting limits (RLs) are provided. Samples could not be run at a lower dilution without risking instrument damage.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

HPLC/IC
Method(s) 300.0: The following samples were received outside of holding time: 0620 BUTCHER (440-244608-1), 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Job ID: 440-244608-1 (Continued)

Laboratory: Eurofins TestAmerica, Irvine (Continued)

Metals

Method(s) 6010B: The following samples were diluted due to the nature of the sample matrix: 0620 BUTCHER (440-244608-1) and 0621 BUTCHER (440-244608-3). Elevated reporting limits (RLs) are provided.

Method(s) 6010B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries and precision of Aluminum for preparation batch 440-554883 and analytical batch 440-555055 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) precision was within acceptance limits.

The following samples were diluted due to the nature of the sample matrix: 0620 OD STREAMS (440-244608-2) and 0621 OD STREAMS (440-244608-4). Elevated reporting limits (RLs) are provided.

Method(s) 200.7 Rev 4.4, 6010B: The following samples were diluted due to the nature of the sample matrix: 0620 OD STREAMS (440-244608-2) and 0621 OD STREAMS (440-244608-4). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Method(s) 353.2: The following samples were diluted in analytical batch 320-306826 due to the nature of the sample matrix: 0620 BUTCHER (440-244608-1), 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4). Samples were a dark brown color, had high sediment, and were extremely difficult to filter Elevated reporting limits (RLs) are provided. Data is being reported with this narration.

Method(s) 365.3: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 440-555362 and analytical batch 440-555384 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 410.4, SM 5220D: The reference method requires samples to be preserved to a pH of <2. The following sample was received with insufficient preservation at a pH of 7: 0621 OD STREAMS (440-244608-4). The sample(s) was preserved to the appropriate pH in the laboratory.

Method(s) 351.2: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 440-555267 and analytical batch 440-555602 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

Method(s) 8315_W_Prep: Sample received was cloudy olive green murky strong odor with a pH of 7. Adjusted pH of 3, after I added DNPH to make the color change. Initial reaction was murky yellow. Heavy emulsion. Method 8315
0621 OD STREAMS (440-244608-4), (440-244608-P-4 MS) and (440-244608-P-4 MSD)

Method(s) 8315_W_Prep: Sample received was cloudy green strong odor with residue, a pH of 7. Adjusted pH of 3, after I added DNPH to make the color change. Initial reaction was murky yellow. Heavy emulsion. Method 8315
0620 OD STREAMS (440-244608-2)

Method(s) 8315_W_Prep: Sample received was cloudy red strong odor with residue, a pH of 7. Adjusted pH of 3, after I added DNPH to make the color change. Initial reaction was murky brown. Heavy emulsion. Method 8315
0620 BUTCHER (440-244608-1)

Method(s) 8315_W_Prep: Sample received was cloudy pink brown murky strong odor with residue, a pH of 7. Adjusted pH of 3, after I added DNPH to make the color change. Initial reaction was murky yellow light brown. Heavy emulsion. Method 8315
0621 BUTCHER (440-244608-3)

Method(s) 8315_W_Prep: The following samples were received outside of holding time: 0620 BUTCHER (440-244608-1), 0620 OD

Job ID: 440-244608-1 (Continued)

Laboratory: Eurofins TestAmerica, Irvine (Continued)

STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4).

Method(s) 625: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 440-555027. 625-REG. LCS was performed in duplicate to provide precision of data.

Method(s) 625: Sample has heavy emulsion and precipitate. Possible low surrogate recovery.
0620 BUTCHER (440-244608-1), 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4)

Method(s) 1664A: The reference method requires samples to be preserved to a pH of <2. The following samples were received with insufficient preservation at a pH of >2: 0620 OD STREAMS (440-244608-2) and 0621 OD STREAMS (440-244608-4). The samples were preserved to the appropriate pH in the laboratory. Method 1664A.

Method(s) 1664A: The following samples were diluted due to the nature of the sample matrix: 0620 BUTCHER (440-244608-1) and 0621 BUTCHER (440-244608-3) were diluted 5x (200ml sample diluted to 1L). Elevated reporting limits (RLs) are provided. Method 1664A.

Method(s) 1664A: The following samples were diluted due to the nature of the sample matrix: 0620 OD STREAMS (440-244608-2) and 0621 OD STREAMS (440-244608-4) were diluted 10x (100ml sample diluted to 1L). Elevated reporting limits (RLs) are provided. Method 1664A.

Method(s) 1664A, 1664B: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 440-555282 and analytical batch 440-555325. The Laboratory Control Sample (LCS) was performed in duplicate to provide precise data for this batch. Method 1664.

Method(s) 8315_W_Prep: The following samples were diluted due to the nature of the sample matrix: 0620 BUTCHER (440-244608-1), 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4). Elevated reporting limits (RLs) are provided.

Method(s) 8315_W_Prep: Sample was cloudy light green with residue strong odor. Adjust pH of 3. Heavy emulsion.
0620 OD STREAMS (440-244608-2)

Method(s) 8315_W_Prep: Sample was cloudy green color, strong odor. Adjust pH of 3. Heavy emulsion
0621 OD STREAMS (440-244608-4)

Method(s) 625: Due to the matrix, the following samples could not be concentrated to the final method required volume: 0620 BUTCHER (440-244608-1), 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4). The reporting limits (RLs) are elevated proportionately. Method 625-REG.

Method(s) 8315_W_Prep: The following samples were received outside of holding time: 0620 BUTCHER (440-244608-1), 0620 OD STREAMS (440-244608-2), 0621 BUTCHER (440-244608-3) and 0621 OD STREAMS (440-244608-4).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: 0620 BUTCHER

Date Collected: 06/20/19 06:11
Date Received: 06/26/19 10:30

Lab Sample ID: 440-244608-1

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/02/19 11:30	1
Benzene	**0.83**	**J**	2.0	0.25	ug/L			07/02/19 11:30	1
Chloroform	ND		2.0	0.25	ug/L			07/02/19 11:30	1
Ethylbenzene	**1.6**	**J**	2.0	0.25	ug/L			07/02/19 11:30	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/02/19 11:30	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/02/19 11:30	1
o-Xylene	ND		2.0	0.25	ug/L			07/02/19 11:30	1
Toluene	**0.50**	**J**	2.0	0.25	ug/L			07/02/19 11:30	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/02/19 11:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*		*07/02/19 11:30*	*1*
Dibromofluoromethane (Surr)	*104*		*76 - 132*		*07/02/19 11:30*	*1*
Toluene-d8 (Surr)	*107*		*80 - 128*		*07/02/19 11:30*	*1*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		200	40	ug/L		06/27/19 12:00	07/01/19 07:00	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*46*	*X*	*50 - 120*	*06/27/19 12:00*	*07/01/19 07:00*	*5*
2-Fluorophenol	*54*		*30 - 120*	*06/27/19 12:00*	*07/01/19 07:00*	*5*
2,4,6-Tribromophenol	*30*	*X*	*40 - 120*	*06/27/19 12:00*	*07/01/19 07:00*	*5*
Nitrobenzene-d5	*81*		*45 - 120*	*06/27/19 12:00*	*07/01/19 07:00*	*5*
Terphenyl-d14	*20*		*10 - 150*	*06/27/19 12:00*	*07/01/19 07:00*	*5*
Phenol-d6	*106*		*35 - 120*	*06/27/19 12:00*	*07/01/19 07:00*	*5*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.052**	**H**	0.050	0.025	mg/L		06/29/19 05:05	07/01/19 12:41	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	2.2	1.1	mg/L			07/01/19 15:00	1
Nitrite as N	ND	H	3.0	0.50	mg/L			07/01/19 15:00	1
Nitrate Nitrite as N	ND	H	3.0	1.1	mg/L			07/01/19 15:00	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0	0.50	mg/L		06/26/19 17:58	06/27/19 13:29	10
Arsenic	**0.23**		0.10	0.089	mg/L		06/26/19 17:58	06/27/19 13:29	10
Barium	ND		0.10	0.050	mg/L		06/26/19 17:58	06/27/19 13:29	10
Boron	ND		0.50	0.25	mg/L		06/26/19 17:58	06/27/19 13:29	10
Cadmium	**0.050**		0.050	0.025	mg/L		06/26/19 17:58	06/27/19 13:29	10
Chromium	ND		0.050	0.025	mg/L		06/26/19 17:58	06/27/19 13:29	10
Copper	**0.074**	**J**	0.10	0.050	mg/L		06/26/19 17:58	06/27/19 13:29	10
Magnesium	**33**		0.20	0.10	mg/L		06/26/19 17:58	06/27/19 13:29	10
Manganese	ND		0.20	0.15	mg/L		06/26/19 17:58	06/27/19 13:29	10
Nickel	ND		0.10	0.050	mg/L		06/26/19 17:58	06/27/19 13:29	10
Selenium	**0.16**		0.10	0.087	mg/L		06/26/19 17:58	06/27/19 13:29	10
Titanium	ND		0.050	0.025	mg/L		06/26/19 17:58	06/27/19 13:29	10

Client Sample ID: 0620 BUTCHER

Lab Sample ID: 440-244608-1
Date Collected: 06/20/19 06:11
Matrix: Water
Date Received: 06/26/19 10:30

Method: 6010B - Metals (ICP) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	1.3		0.20	0.12	mg/L		06/26/19 17:58	06/27/19 13:29	10

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0043		0.0010	0.00050	mg/L		07/01/19 16:27	07/02/19 12:25	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	330		25.0	7.0	mg/L		06/28/19 15:07	06/28/19 18:55	1
Total Kjeldahl Nitrogen	1000		50	25	mg/L		06/28/19 14:14	06/28/19 21:47	5
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 10:57	100
Phosphorus, Total	100		50	25	mg/L		06/29/19 08:17	06/29/19 10:49	1
Phenolics, Total Recoverable	0.10		0.050	0.025	mg/L		07/01/19 10:02	07/02/19 10:49	1
Cyanide, Total	ND		0.025	0.013	mg/L		06/27/19 14:53	06/27/19 20:43	1
Ammonia (as N)	62		13	2.5	mg/L		07/02/19 04:00	07/02/19 07:00	1
Ammonia as NH3	75		15	3.0	mg/L		07/02/19 04:00	07/02/19 07:00	1
Chemical Oxygen Demand	12000		1000	500	mg/L			07/01/19 18:37	50

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	12000		200	200	mg/L			06/26/19 19:05	1
Specific Gravity	0.97		0.010	0.010	No Unit			07/10/19 15:27	1
Total Solids	17000		200	200	mg/L			06/26/19 17:46	1
Nitrogen, Total	1000		0.11	0.11	mg/L			07/03/19 14:08	1

Client Sample ID: 0620 OD STREAMS

Lab Sample ID: 440-244608-2
Date Collected: 06/20/19 06:33
Matrix: Water
Date Received: 06/26/19 10:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		20	2.5	ug/L			07/01/19 15:55	10
Benzene	ND		20	2.5	ug/L			07/01/19 15:55	10
Chloroform	ND		20	2.5	ug/L			07/01/19 15:55	10
Ethylbenzene	ND		20	2.5	ug/L			07/01/19 15:55	10
m,p-Xylene	ND		20	5.0	ug/L			07/01/19 15:55	10
Methylene Chloride	ND		50	11	ug/L			07/01/19 15:55	10
o-Xylene	ND		20	2.5	ug/L			07/01/19 15:55	10
Toluene	ND		20	2.5	ug/L			07/01/19 15:55	10
Xylenes, Total	ND		20	2.5	ug/L			07/01/19 15:55	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*07/01/19 15:55*	*10*
Dibromofluoromethane (Surr)	*92*		*76 - 132*		*07/01/19 15:55*	*10*
Toluene-d8 (Surr)	*106*		*80 - 128*		*07/01/19 15:55*	*10*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		830	170	ug/L		06/27/19 12:00	07/01/19 08:14	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*0*	*X*	*50 - 120*	*06/27/19 12:00*	*07/01/19 08:14*	*20*
2-Fluorophenol	*20*	*X*	*30 - 120*	*06/27/19 12:00*	*07/01/19 08:14*	*20*

Client Sample ID: 0620 OD STREAMS

Lab Sample ID: 440-244608-2

Date Collected: 06/20/19 06:33

Matrix: Water

Date Received: 06/26/19 10:30

Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol	*0*	*X*	*40 - 120*	*06/27/19 12:00*	*07/01/19 08:14*	*20*
Nitrobenzene-d5	*0*	*X*	*45 - 120*	*06/27/19 12:00*	*07/01/19 08:14*	*20*
Terphenyl-d14	*0*	*X*	*10 - 150*	*06/27/19 12:00*	*07/01/19 08:14*	*20*
Phenol-d6	*0*	*X*	*35 - 120*	*06/27/19 12:00*	*07/01/19 08:14*	*20*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.080**	**H**	0.050	0.025	mg/L		06/29/19 05:05	07/01/19 13:02	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	11	5.5	mg/L			07/01/19 15:00	1
Nitrite as N	ND	H	15	2.5	mg/L			07/01/19 15:00	1
Nitrate Nitrite as N	ND	H	15	5.5	mg/L			07/01/19 15:00	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**490**		0.50	0.25	mg/L		07/05/19 09:49	07/05/19 19:57	5
Arsenic	**0.78**		0.050	0.045	mg/L		07/05/19 09:49	07/05/19 19:57	5
Barium	**0.12**		0.050	0.025	mg/L		07/05/19 09:49	07/05/19 19:57	5
Boron	**0.81**		0.25	0.13	mg/L		07/05/19 09:49	07/05/19 19:57	5
Cadmium	**0.15**		0.025	0.013	mg/L		07/05/19 09:49	07/05/19 19:57	5
Chromium	**0.18**		0.025	0.013	mg/L		07/05/19 09:49	07/05/19 19:57	5
Copper	**0.36**		0.050	0.025	mg/L		07/05/19 09:49	07/05/19 19:57	5
Magnesium	**180**		0.10	0.050	mg/L		07/05/19 09:49	07/05/19 19:57	5
Manganese	**0.16**		0.10	0.075	mg/L		07/05/19 09:49	07/05/19 19:57	5
Nickel	**0.064**		0.050	0.025	mg/L		07/05/19 09:49	07/05/19 19:57	5
Selenium	**0.53**		0.050	0.044	mg/L		07/05/19 09:49	07/05/19 19:57	5
Titanium	**0.40**		0.025	0.013	mg/L		07/05/19 09:49	07/05/19 19:57	5
Zinc	**24**		0.10	0.060	mg/L		07/05/19 09:49	07/05/19 19:57	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0046**		0.0010	0.00050	mg/L		07/01/19 16:27	07/02/19 12:28	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	**6370**		50.0	14.0	mg/L		06/28/19 15:07	06/28/19 18:55	1
Total Kjeldahl Nitrogen	**3700**		100	50	mg/L		06/28/19 14:14	06/28/19 21:50	10
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 11:01	100
Phosphorus, Total	**550**		100	50	mg/L		06/29/19 08:17	06/29/19 10:49	1
Phenolics, Total Recoverable	**7.2**		1.0	0.50	mg/L		07/01/19 10:02	07/02/19 10:54	20
Cyanide, Total	**0.045**		0.025	0.013	mg/L		06/27/19 14:53	06/27/19 20:43	1
Ammonia (as N)	**1800**		250	50	mg/L		07/02/19 04:00	07/02/19 07:00	1
Ammonia as NH3	**2200**		300	60	mg/L		07/02/19 04:00	07/02/19 07:00	1
Chemical Oxygen Demand	**74000**		5000	2500	mg/L			07/01/19 18:37	250

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	**21000**		500	500	mg/L			06/26/19 19:05	1
Specific Gravity	**1.1**		0.010	0.010	No Unit			07/10/19 15:25	1
Total Solids	**35000**		500	500	mg/L			06/26/19 17:46	1

Client Sample ID: 0620 OD STREAMS

Lab Sample ID: 440-244608-2
Date Collected: 06/20/19 06:33
Matrix: Water
Date Received: 06/26/19 10:30

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	**3700**		0.11	0.11	mg/L			07/03/19 14:08	1

Client Sample ID: 0621 BUTCHER

Lab Sample ID: 440-244608-3
Date Collected: 06/21/19 06:01
Matrix: Water
Date Received: 06/26/19 10:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/01/19 16:23	1
Benzene	**1.2**	**J**	2.0	0.25	ug/L			07/01/19 16:23	1
Chloroform	ND		2.0	0.25	ug/L			07/01/19 16:23	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/01/19 16:23	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/01/19 16:23	1
o-Xylene	ND		2.0	0.25	ug/L			07/01/19 16:23	1
Toluene	**1.1**	**J**	2.0	0.25	ug/L			07/01/19 16:23	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/01/19 16:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*114*		*80 - 120*		*07/01/19 16:23*	*1*
Dibromofluoromethane (Surr)	*88*		*76 - 132*		*07/01/19 16:23*	*1*
Toluene-d8 (Surr)	*110*		*80 - 128*		*07/01/19 16:23*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**3.4**		2.0	0.25	ug/L			07/02/19 11:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*115*		*80 - 120*		*07/02/19 11:58*	*1*
Dibromofluoromethane (Surr)	*101*		*76 - 132*		*07/02/19 11:58*	*1*
Toluene-d8 (Surr)	*110*		*80 - 128*		*07/02/19 11:58*	*1*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		410	82	ug/L		06/27/19 12:00	07/01/19 07:25	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*0*	*X*	*50 - 120*	*06/27/19 12:00*	*07/01/19 07:25*	*10*
2-Fluorophenol	*38*		*30 - 120*	*06/27/19 12:00*	*07/01/19 07:25*	*10*
2,4,6-Tribromophenol	*0*	*X*	*40 - 120*	*06/27/19 12:00*	*07/01/19 07:25*	*10*
Nitrobenzene-d5	*63*		*45 - 120*	*06/27/19 12:00*	*07/01/19 07:25*	*10*
Terphenyl-d14	*0*	*X*	*10 - 150*	*06/27/19 12:00*	*07/01/19 07:25*	*10*
Phenol-d6	*48*		*35 - 120*	*06/27/19 12:00*	*07/01/19 07:25*	*10*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.051**	**H**	0.050	0.025	mg/L		06/29/19 05:05	07/01/19 13:23	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	2.2	1.1	mg/L			07/01/19 15:00	1
Nitrite as N	ND	H	3.0	0.50	mg/L			07/01/19 15:00	1
Nitrate Nitrite as N	ND	H	3.0	1.1	mg/L			07/01/19 15:00	1

Client Sample ID: 0621 BUTCHER

Lab Sample ID: 440-244608-3
Matrix: Water
Date Collected: 06/21/19 06:01
Date Received: 06/26/19 10:30

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0	0.50	mg/L		06/26/19 17:58	06/27/19 13:33	10
Arsenic	**0.092**	**J**	0.10	0.089	mg/L		06/26/19 17:58	06/27/19 13:33	10
Barium	ND		0.10	0.050	mg/L		06/26/19 17:58	06/27/19 13:33	10
Boron	ND		0.50	0.25	mg/L		06/26/19 17:58	06/27/19 13:33	10
Cadmium	**0.033**	**J**	0.050	0.025	mg/L		06/26/19 17:58	06/27/19 13:33	10
Chromium	ND		0.050	0.025	mg/L		06/26/19 17:58	06/27/19 13:33	10
Copper	**0.064**	**J**	0.10	0.050	mg/L		06/26/19 17:58	06/27/19 13:33	10
Magnesium	**28**		0.20	0.10	mg/L		06/26/19 17:58	06/27/19 13:33	10
Manganese	ND		0.20	0.15	mg/L		06/26/19 17:58	06/27/19 13:33	10
Nickel	ND		0.10	0.050	mg/L		06/26/19 17:58	06/27/19 13:33	10
Selenium	ND		0.10	0.087	mg/L		06/26/19 17:58	06/27/19 13:33	10
Titanium	ND		0.050	0.025	mg/L		06/26/19 17:58	06/27/19 13:33	10
Zinc	**1.1**		0.20	0.12	mg/L		06/26/19 17:58	06/27/19 13:33	10

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0027**		0.0010	0.00050	mg/L		07/01/19 16:27	07/02/19 12:30	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	**633**		25.0	7.0	mg/L		06/28/19 15:07	06/28/19 18:55	1
Total Kjeldahl Nitrogen	**570**		20	10	mg/L		06/28/19 14:14	06/28/19 21:50	2
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 11:05	100
Phosphorus, Total	**130**		100	50	mg/L		06/29/19 08:17	06/29/19 10:49	1
Phenolics, Total Recoverable	**0.087**		0.050	0.025	mg/L		07/01/19 10:02	07/02/19 10:49	1
Cyanide, Total	ND		0.025	0.013	mg/L		06/27/19 14:53	06/27/19 20:43	1
Ammonia (as N)	**120**		25	5.0	mg/L		07/02/19 04:00	07/02/19 07:00	1
Ammonia as NH3	**140**		30	6.0	mg/L		07/02/19 04:00	07/02/19 07:00	1
Chemical Oxygen Demand	**11000**		4000	2000	mg/L			07/01/19 18:37	200

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	**7700**		200	200	mg/L			06/26/19 19:05	1
Specific Gravity	**1.0**		0.010	0.010	No Unit			07/10/19 15:24	1
Total Solids	**11000**		200	200	mg/L			06/26/19 17:46	1
Nitrogen, Total	**570**		0.11	0.11	mg/L			07/03/19 14:08	1

Client Sample ID: 0621 OD STREAMS

Lab Sample ID: 440-244608-4
Matrix: Water
Date Collected: 06/21/19 06:20
Date Received: 06/26/19 10:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		20	2.5	ug/L			07/01/19 16:51	10
Benzene	ND		20	2.5	ug/L			07/01/19 16:51	10
Chloroform	ND		20	2.5	ug/L			07/01/19 16:51	10
Ethylbenzene	ND		20	2.5	ug/L			07/01/19 16:51	10
m,p-Xylene	ND		20	5.0	ug/L			07/01/19 16:51	10
Methylene Chloride	ND		50	11	ug/L			07/01/19 16:51	10
o-Xylene	ND		20	2.5	ug/L			07/01/19 16:51	10
Toluene	ND		20	2.5	ug/L			07/01/19 16:51	10
Xylenes, Total	ND		20	2.5	ug/L			07/01/19 16:51	10

Client Sample ID: 0621 OD STREAMS

Date Collected: 06/21/19 06:20
Date Received: 06/26/19 10:30

Lab Sample ID: 440-244608-4

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*07/01/19 16:51*	*10*
Dibromofluoromethane (Surr)	*93*		*76 - 132*		*07/01/19 16:51*	*10*
Toluene-d8 (Surr)	*104*		*80 - 128*		*07/01/19 16:51*	*10*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		840	170	ug/L		06/27/19 12:00	07/01/19 07:49	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*0*	*X*	*50 - 120*	*06/27/19 12:00*	*07/01/19 07:49*	*20*
2-Fluorophenol	*0*	*X*	*30 - 120*	*06/27/19 12:00*	*07/01/19 07:49*	*20*
2,4,6-Tribromophenol	*0*	*X*	*40 - 120*	*06/27/19 12:00*	*07/01/19 07:49*	*20*
Nitrobenzene-d5	*33*	*X*	*45 - 120*	*06/27/19 12:00*	*07/01/19 07:49*	*20*
Terphenyl-d14	*0*	*X*	*10 - 150*	*06/27/19 12:00*	*07/01/19 07:49*	*20*
Phenol-d6	*0*	*X*	*35 - 120*	*06/27/19 12:00*	*07/01/19 07:49*	*20*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.069**	**H**	0.050	0.025	mg/L		06/29/19 05:05	07/01/19 13:44	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	11	5.5	mg/L			07/01/19 15:00	1
Nitrite as N	ND	H	15	2.5	mg/L			07/01/19 15:00	1
Nitrate Nitrite as N	ND	H	15	5.5	mg/L			07/01/19 15:00	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**550**		0.50	0.25	mg/L		07/05/19 09:49	07/05/19 19:59	5
Arsenic	**0.74**		0.050	0.045	mg/L		07/05/19 09:49	07/05/19 19:59	5
Barium	**0.14**		0.050	0.025	mg/L		07/05/19 09:49	07/05/19 19:59	5
Boron	**0.71**		0.25	0.13	mg/L		07/05/19 09:49	07/05/19 19:59	5
Cadmium	**0.17**		0.025	0.013	mg/L		07/05/19 09:49	07/05/19 19:59	5
Chromium	**0.19**		0.025	0.013	mg/L		07/05/19 09:49	07/05/19 19:59	5
Copper	**0.42**		0.050	0.025	mg/L		07/05/19 09:49	07/05/19 19:59	5
Magnesium	**180**		0.10	0.050	mg/L		07/05/19 09:49	07/05/19 19:59	5
Manganese	**0.14**		0.10	0.075	mg/L		07/05/19 09:49	07/05/19 19:59	5
Nickel	**0.062**		0.050	0.025	mg/L		07/05/19 09:49	07/05/19 19:59	5
Selenium	**0.42**		0.050	0.044	mg/L		07/05/19 09:49	07/05/19 19:59	5
Titanium	**0.45**		0.025	0.013	mg/L		07/05/19 09:49	07/05/19 19:59	5
Zinc	**29**		0.10	0.060	mg/L		07/05/19 09:49	07/05/19 19:59	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0044**		0.0010	0.00050	mg/L		07/01/19 16:27	07/02/19 12:32	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	**7090**		50.0	14.0	mg/L		06/28/19 15:07	06/28/19 18:55	1
Total Kjeldahl Nitrogen	**4000**		100	50	mg/L		06/28/19 14:14	06/28/19 21:50	10
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 11:09	100
Phosphorus, Total	**980**		100	50	mg/L		06/29/19 08:17	06/29/19 10:50	1

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Client Sample ID: 0621 OD STREAMS
Date Collected: 06/21/19 06:20
Date Received: 06/26/19 10:30

Lab Sample ID: 440-244608-4
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	11		2.5	1.3	mg/L		07/01/19 10:02	07/02/19 10:54	50
Cyanide, Total	0.037		0.025	0.013	mg/L		06/27/19 14:53	06/27/19 20:43	1
Ammonia (as N)	2200		250	50	mg/L		07/02/19 04:00	07/02/19 07:00	1
Ammonia as NH3	2600		300	60	mg/L		07/02/19 04:00	07/02/19 07:00	1
Chemical Oxygen Demand	65000		4000	2000	mg/L			07/01/19 18:37	200

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	16000		500	500	mg/L			06/26/19 19:05	1
Specific Gravity	1.1		0.010	0.010	No Unit			07/10/19 15:22	1
Total Solids	31000		500	500	mg/L			06/26/19 17:46	1
Nitrogen, Total	4000		0.11	0.11	mg/L			07/03/19 14:08	1

Method Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL IRV
625	Semivolatile Organic Compounds (GC/MS)	40CFR136A	TAL IRV
8315A	Carbonyl Compounds (HPLC)	SW846	TAL IRV
NO3NO2 Calc	Nitrogen, Nitrate-Nitrite	EPA	TAL IRV
6010B	Metals (ICP)	SW846	TAL IRV
7470A	Mercury (CVAA)	SW846	TAL IRV
1664A	HEM and SGT-HEM	1664A	TAL IRV
2540E	Solids, Volatile and Fixed (VS)	SM	TAL IRV
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL IRV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL SAC
365.3	Phosphorus, Total	EPA	TAL IRV
420.1	Phenolics, Total Recoverable	MCAWW	TAL SAV
ASTM D5057-90	Specific Gravity and Bulk Density (Screening)	ASTM	TAL PIT
SM 2540B	Solids, Total	SM	TAL IRV
SM 4500 CN E	Cyanide, Total	SM	TAL IRV
SM 4500 NH3 D	Ammonia	SM	TAL IRV
SM 5220D	COD	SM	TAL IRV
Total Nitrogen	Nitrogen, Total	EPA	TAL IRV
1664A	HEM and SGT-HEM (Aqueous)	1664A	TAL IRV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL IRV
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL IRV
365.2/365.3/365	Phosphorus, Total	MCAWW	TAL IRV
5030B	Purge and Trap	SW846	TAL IRV
625	Liquid-Liquid Extraction	40CFR136A	TAL IRV
7470A	Preparation, Mercury	SW846	TAL IRV
8315_W_Prep	Liquid-Liquid Extraction (Carbonyl Compounds)	SW846	TAL IRV
Distill/CN	Distillation, Cyanide	None	TAL IRV
Distill/Phenol	Distillation, Phenolics	None	TAL SAV
SM 4500 NH3 B	Distillation, Ammonia	SM	TAL IRV

Protocol References:

1664A = EPA-821-98-002

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

ASTM = ASTM International

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Client Sample ID: 0620 BUTCHER

Lab Sample ID: 440-244608-1

Date Collected: 06/20/19 06:11

Matrix: Water

Date Received: 06/26/19 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	10 mL	10 mL	555721	07/02/19 11:30	DCI	TAL IRV
Total/NA	Prep	625			1005 mL	4.0 mL	555027	06/27/19 12:00	HCK	TAL IRV
Total/NA	Analysis	625		5			555490	07/01/19 07:00	P1R	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555345	06/29/19 05:05	FTD	TAL IRV
Total/NA	Analysis	8315A		1			555542	07/01/19 12:41	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			555628	07/01/19 15:00	NN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	554883	06/26/19 17:58	BV	TAL IRV
Total Recoverable	Analysis	6010B		10			555055	06/27/19 13:29	TQN	TAL IRV
Total/NA	Prep	7470A			20 mL	20 mL	555647	07/01/19 16:27	DB	TAL IRV
Total/NA	Analysis	7470A		5			555834	07/02/19 12:25	DB	TAL IRV
Total/NA	Prep	1664A			200 mL	1000 mL	555282	06/28/19 15:07	AJH	TAL IRV
Total/NA	Analysis	1664A		1			555325	06/28/19 18:55	AJH	TAL IRV
Total/NA	Analysis	2540E		1	5 mL	100 mL	554894	06/26/19 19:05	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	555267	06/28/19 14:14	HTL	TAL IRV
Total/NA	Analysis	351.2		5			555602	06/28/19 21:47	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 10:57	TCS	TAL SAC
Total/NA	Prep	365.2/365.3/365			0.050 mL	50 mL	555362	06/29/19 08:17	MMP	TAL IRV
Total/NA	Analysis	365.3		1			555384	06/29/19 10:49	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	576470	07/01/19 10:02	NVF	TAL SAV
Total/NA	Analysis	420.1		1	6 mL	6 mL	576857	07/02/19 10:49	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:27	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	5 mL	100 mL	554877	06/26/19 17:46	HTL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	555064	06/27/19 14:53	QTN	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			555114	06/27/19 20:43	QTN	TAL IRV
Total/NA	Prep	SM 4500 NH3 B			2.0 mL	50 mL	555710	07/02/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			555735	07/02/19 07:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		50	2.5 mL	2.5 mL	555681	07/01/19 18:37	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			556060	07/03/19 14:08	NN	TAL IRV

Client Sample ID: 0620 OD STREAMS

Lab Sample ID: 440-244608-2

Date Collected: 06/20/19 06:33

Matrix: Water

Date Received: 06/26/19 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	10 mL	10 mL	555513	07/01/19 15:55	MML	TAL IRV
Total/NA	Prep	625			965 mL	4.0 mL	555027	06/27/19 12:00	HCK	TAL IRV
Total/NA	Analysis	625		20			555490	07/01/19 08:14	P1R	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555345	06/29/19 05:05	FTD	TAL IRV
Total/NA	Analysis	8315A		1			555542	07/01/19 13:02	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			555628	07/01/19 15:00	NN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	556202	07/05/19 09:49	EP	TAL IRV
Total Recoverable	Analysis	6010B		5			556398	07/05/19 19:57	VS	TAL IRV

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Client Sample ID: 0620 OD STREAMS

Lab Sample ID: 440-244608-2

Date Collected: 06/20/19 06:33
Matrix: Water
Date Received: 06/26/19 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			20 mL	20 mL	555647	07/01/19 16:27	DB	TAL IRV
Total/NA	Analysis	7470A		5			555834	07/02/19 12:28	DB	TAL IRV
Total/NA	Prep	1664A			100 mL	1000 mL	555282	06/28/19 15:07	AJH	TAL IRV
Total/NA	Analysis	1664A		1			555325	06/28/19 18:55	AJH	TAL IRV
Total/NA	Analysis	2540E		1	2 mL	100 mL	554894	06/26/19 19:05	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	555267	06/28/19 14:14	HTL	TAL IRV
Total/NA	Analysis	351.2		10			555602	06/28/19 21:50	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:01	TCS	TAL SAC
Total/NA	Prep	365.2/365.3/365			0.025 mL	50 mL	555362	06/29/19 08:17	MMP	TAL IRV
Total/NA	Analysis	365.3		1			555384	06/29/19 10:49	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	576470	07/01/19 10:02	NVF	TAL SAV
Total/NA	Analysis	420.1		20	6 mL	6 mL	576857	07/02/19 10:54	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:25	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	2 mL	100 mL	554877	06/26/19 17:46	HTL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	555064	06/27/19 14:53	QTN	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			555114	06/27/19 20:43	QTN	TAL IRV
Total/NA	Prep	SM 4500 NH3 B			0.1 mL	50 mL	555710	07/02/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			555735	07/02/19 07:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		250	2.5 mL	2.5 mL	555681	07/01/19 18:37	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			556060	07/03/19 14:08	NN	TAL IRV

Client Sample ID: 0621 BUTCHER

Lab Sample ID: 440-244608-3

Date Collected: 06/21/19 06:01
Matrix: Water
Date Received: 06/26/19 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	RA	1	10 mL	10 mL	555721	07/02/19 11:58	DCI	TAL IRV
Total/NA	Analysis	8260B		1	10 mL	10 mL	555513	07/01/19 16:23	MML	TAL IRV
Total/NA	Prep	625			975 mL	4.0 mL	555027	06/27/19 12:00	HCK	TAL IRV
Total/NA	Analysis	625		10			555490	07/01/19 07:25	P1R	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555345	06/29/19 05:05	FTD	TAL IRV
Total/NA	Analysis	8315A		1			555542	07/01/19 13:23	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			555628	07/01/19 15:00	NN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	554883	06/26/19 17:58	BV	TAL IRV
Total Recoverable	Analysis	6010B		10			555055	06/27/19 13:33	TQN	TAL IRV
Total/NA	Prep	7470A			20 mL	20 mL	555647	07/01/19 16:27	DB	TAL IRV
Total/NA	Analysis	7470A		5			555834	07/02/19 12:30	DB	TAL IRV
Total/NA	Prep	1664A			200 mL	1000 mL	555282	06/28/19 15:07	AJH	TAL IRV
Total/NA	Analysis	1664A		1			555325	06/28/19 18:55	AJH	TAL IRV
Total/NA	Analysis	2540E		1	5 mL	100 mL	554894	06/26/19 19:05	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	555267	06/28/19 14:14	HTL	TAL IRV
Total/NA	Analysis	351.2		2			555602	06/28/19 21:50	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:05	TCS	TAL SAC

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Client Sample ID: 0621 BUTCHER

Lab Sample ID: 440-244608-3

Date Collected: 06/21/19 06:01
Date Received: 06/26/19 10:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			0.025 mL	50 mL	555362	06/29/19 08:17	MMP	TAL IRV
Total/NA	Analysis	365.3		1			555384	06/29/19 10:49	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	576470	07/01/19 10:02	NVF	TAL SAV
Total/NA	Analysis	420.1		1	6 mL	6 mL	576857	07/02/19 10:49	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:24	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	5 mL	100 mL	554877	06/26/19 17:46	HTL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	555064	06/27/19 14:53	QTN	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			555114	06/27/19 20:43	QTN	TAL IRV
Total/NA	Prep	SM 4500 NH3 B			1.0 mL	50 mL	555710	07/02/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			555735	07/02/19 07:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		200	2.5 mL	2.5 mL	555681	07/01/19 18:37	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			556060	07/03/19 14:08	NN	TAL IRV

Client Sample ID: 0621 OD STREAMS

Lab Sample ID: 440-244608-4

Date Collected: 06/21/19 06:20
Date Received: 06/26/19 10:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	10 mL	10 mL	555513	07/01/19 16:51	MML	TAL IRV
Total/NA	Prep	625			955 mL	4.0 mL	555027	06/27/19 12:00	HCK	TAL IRV
Total/NA	Analysis	625		20			555490	07/01/19 07:49	P1R	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555345	06/29/19 05:05	FTD	TAL IRV
Total/NA	Analysis	8315A		1			555542	07/01/19 13:44	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			555628	07/01/19 15:00	NN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	556202	07/05/19 09:49	EP	TAL IRV
Total Recoverable	Analysis	6010B		5			556398	07/05/19 19:59	VS	TAL IRV
Total/NA	Prep	7470A			20 mL	20 mL	555647	07/01/19 16:27	DB	TAL IRV
Total/NA	Analysis	7470A		5			555834	07/02/19 12:32	DB	TAL IRV
Total/NA	Prep	1664A			100 mL	1000 mL	555282	06/28/19 15:07	AJH	TAL IRV
Total/NA	Analysis	1664A		1			555325	06/28/19 18:55	AJH	TAL IRV
Total/NA	Analysis	2540E		1	2 mL	100 mL	554894	06/26/19 19:05	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	555267	06/28/19 14:14	HTL	TAL IRV
Total/NA	Analysis	351.2		10			555602	06/28/19 21:50	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:09	TCS	TAL SAC
Total/NA	Prep	365.2/365.3/365			0.025 mL	50 mL	555362	06/29/19 08:17	MMP	TAL IRV
Total/NA	Analysis	365.3		1			555384	06/29/19 10:50	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	576470	07/01/19 10:02	NVF	TAL SAV
Total/NA	Analysis	420.1		50	6 mL	6 mL	576857	07/02/19 10:54	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:22	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	2 mL	100 mL	554877	06/26/19 17:46	HTL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	555064	06/27/19 14:53	QTN	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			555114	06/27/19 20:43	QTN	TAL IRV

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Client Sample ID: 0621 OD STREAMS

Date Collected: 06/21/19 06:20
Date Received: 06/26/19 10:30

Lab Sample ID: 440-244608-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SM 4500 NH3 B			0.1 mL	50 mL	555710	07/02/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			555735	07/02/19 07:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		200	2.5 mL	2.5 mL	555681	07/01/19 18:37	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			556060	07/03/19 14:08	NN	TAL IRV

Laboratory References:

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-555513/4
Matrix: Water
Analysis Batch: 555513

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/01/19 08:48	1
Benzene	ND		2.0	0.25	ug/L			07/01/19 08:48	1
Chloroform	ND		2.0	0.25	ug/L			07/01/19 08:48	1
Ethylbenzene	ND		2.0	0.25	ug/L			07/01/19 08:48	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/01/19 08:48	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/01/19 08:48	1
o-Xylene	ND		2.0	0.25	ug/L			07/01/19 08:48	1
Toluene	ND		2.0	0.25	ug/L			07/01/19 08:48	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/01/19 08:48	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*07/01/19 08:48*	*1*
Dibromofluoromethane (Surr)	*92*		*76 - 132*		*07/01/19 08:48*	*1*
Toluene-d8 (Surr)	*105*		*80 - 128*		*07/01/19 08:48*	*1*

Lab Sample ID: LCS 440-555513/5
Matrix: Water
Analysis Batch: 555513

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	10.0	9.86		ug/L		99	67 - 130
Benzene	10.0	10.3		ug/L		103	68 - 130
Chloroform	10.0	10.3		ug/L		103	70 - 130
Ethylbenzene	10.0	11.5		ug/L		115	70 - 130
m,p-Xylene	10.0	11.3		ug/L		113	70 - 130
Methylene Chloride	10.0	8.32		ug/L		83	52 - 130
o-Xylene	10.0	11.1		ug/L		111	70 - 130
Toluene	10.0	11.4		ug/L		114	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*
Dibromofluoromethane (Surr)	*92*		*76 - 132*
Toluene-d8 (Surr)	*100*		*80 - 128*

Lab Sample ID: LCSD 440-555513/7
Matrix: Water
Analysis Batch: 555513

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane	10.0	9.86		ug/L		99	67 - 130	0	20
Benzene	10.0	10.5		ug/L		105	68 - 130	1	20
Chloroform	10.0	10.6		ug/L		106	70 - 130	3	20
Ethylbenzene	10.0	11.4		ug/L		114	70 - 130	1	20
m,p-Xylene	10.0	11.2		ug/L		112	70 - 130	0	20
Methylene Chloride	10.0	8.64		ug/L		86	52 - 130	4	20
o-Xylene	10.0	10.8		ug/L		108	70 - 130	2	20
Toluene	10.0	11.3		ug/L		113	70 - 130	1	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 440-555513/7
Matrix: Water
Analysis Batch: 555513

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*
Dibromofluoromethane (Surr)	*94*		*76 - 132*
Toluene-d8 (Surr)	*99*		*80 - 128*

Lab Sample ID: 550-124860-N-1 MS
Matrix: Water
Analysis Batch: 555513

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	ND		10.0	8.42		ug/L		84	69 - 130
Benzene	ND		10.0	9.45		ug/L		94	66 - 130
Chloroform	1.9	J	10.0	11.2		ug/L		93	70 - 130
Ethylbenzene	ND		10.0	11.5		ug/L		115	70 - 130
m,p-Xylene	ND		10.0	11.1		ug/L		111	70 - 133
Methylene Chloride	ND		10.0	7.08		ug/L		71	52 - 130
o-Xylene	ND		10.0	10.4		ug/L		104	70 - 133
Toluene	ND		10.0	11.4		ug/L		114	70 - 130

Surrogate	MS %Recovery	MS Qualifier	Limits
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*85*		*76 - 132*
Toluene-d8 (Surr)	*107*		*80 - 128*

Lab Sample ID: 550-124860-N-1 MSD
Matrix: Water
Analysis Batch: 555513

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane	ND		10.0	9.02		ug/L		90	69 - 130	7	20
Benzene	ND		10.0	10.3		ug/L		103	66 - 130	9	20
Chloroform	1.9	J	10.0	11.9		ug/L		100	70 - 130	7	20
Ethylbenzene	ND		10.0	12.0		ug/L		120	70 - 130	4	20
m,p-Xylene	ND		10.0	11.9		ug/L		119	70 - 133	7	25
Methylene Chloride	ND		10.0	7.70		ug/L		77	52 - 130	8	20
o-Xylene	ND		10.0	11.1		ug/L		111	70 - 133	6	20
Toluene	ND		10.0	12.1		ug/L		121	70 - 130	6	20

Surrogate	MSD %Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*
Dibromofluoromethane (Surr)	*86*		*76 - 132*
Toluene-d8 (Surr)	*106*		*80 - 128*

Lab Sample ID: MB 440-555721/4
Matrix: Water
Analysis Batch: 555721

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/02/19 08:23	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 440-555721/4
Matrix: Water
Analysis Batch: 555721

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.25	ug/L			07/02/19 08:23	1
Chloroform	ND		2.0	0.25	ug/L			07/02/19 08:23	1
Ethylbenzene	ND		2.0	0.25	ug/L			07/02/19 08:23	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/02/19 08:23	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/02/19 08:23	1
o-Xylene	ND		2.0	0.25	ug/L			07/02/19 08:23	1
Toluene	ND		2.0	0.25	ug/L			07/02/19 08:23	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/02/19 08:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*07/02/19 08:23*	*1*
Dibromofluoromethane (Surr)	*104*		*76 - 132*		*07/02/19 08:23*	*1*
Toluene-d8 (Surr)	*107*		*80 - 128*		*07/02/19 08:23*	*1*

Lab Sample ID: LCS 440-555721/5
Matrix: Water
Analysis Batch: 555721

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	10.0	9.20		ug/L		92	67 - 130
Benzene	10.0	9.62		ug/L		96	68 - 130
Chloroform	10.0	10.3		ug/L		103	70 - 130
Ethylbenzene	10.0	9.47		ug/L		95	70 - 130
m,p-Xylene	10.0	9.61		ug/L		96	70 - 130
Methylene Chloride	10.0	10.6		ug/L		106	52 - 130
o-Xylene	10.0	10.2		ug/L		102	70 - 130
Toluene	10.0	9.37		ug/L		94	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*
Dibromofluoromethane (Surr)	*105*		*76 - 132*
Toluene-d8 (Surr)	*104*		*80 - 128*

Lab Sample ID: 440-244488-B-3 MS
Matrix: Water
Analysis Batch: 555721

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	ND		10.0	8.65		ug/L		86	69 - 130
Benzene	ND		10.0	9.62		ug/L		96	66 - 130
Chloroform	ND		10.0	10.6		ug/L		106	70 - 130
Ethylbenzene	ND		10.0	8.85		ug/L		89	70 - 130
m,p-Xylene	ND		10.0	9.38		ug/L		94	70 - 133
Methylene Chloride	ND		10.0	10.6		ug/L		106	52 - 130
o-Xylene	ND		10.0	10.1		ug/L		101	70 - 133
Toluene	ND		10.0	9.06		ug/L		91	70 - 130

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 440-244488-B-3 MS
Matrix: Water
Analysis Batch: 555721

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*76 - 132*
Toluene-d8 (Surr)	*101*		*80 - 128*

Lab Sample ID: 440-244488-B-3 MSD
Matrix: Water
Analysis Batch: 555721

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane	ND		10.0	9.40		ug/L		94	69 - 130	8	20
Benzene	ND		10.0	10.4		ug/L		104	66 - 130	7	20
Chloroform	ND		10.0	11.5		ug/L		115	70 - 130	8	20
Ethylbenzene	ND		10.0	9.85		ug/L		99	70 - 130	11	20
m,p-Xylene	ND		10.0	9.97		ug/L		100	70 - 133	6	25
Methylene Chloride	ND		10.0	12.2		ug/L		122	52 - 130	14	20
o-Xylene	ND		10.0	10.9		ug/L		109	70 - 133	7	20
Toluene	ND		10.0	10.0		ug/L		100	70 - 130	10	20

Surrogate	MSD %Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*
Dibromofluoromethane (Surr)	*109*		*76 - 132*
Toluene-d8 (Surr)	*101*		*80 - 128*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-555027/1-A
Matrix: Water
Analysis Batch: 555490

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 555027

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		20	4.0	ug/L		06/27/19 12:00	06/30/19 19:08	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	*71*		*50 - 120*	*06/27/19 12:00*	*06/30/19 19:08*	*1*
2-Fluorophenol	*63*		*30 - 120*	*06/27/19 12:00*	*06/30/19 19:08*	*1*
2,4,6-Tribromophenol	*76*		*40 - 120*	*06/27/19 12:00*	*06/30/19 19:08*	*1*
Nitrobenzene-d5	*71*		*45 - 120*	*06/27/19 12:00*	*06/30/19 19:08*	*1*
Terphenyl-d14	*77*		*10 - 150*	*06/27/19 12:00*	*06/30/19 19:08*	*1*
Phenol-d6	*66*		*35 - 120*	*06/27/19 12:00*	*06/30/19 19:08*	*1*

Lab Sample ID: LCS 440-555027/2-A
Matrix: Water
Analysis Batch: 555490

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555027

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Bis(2-ethylhexyl) phthalate			100	100		ug/L		100	10 - 150		

Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 440-555027/2-A
Matrix: Water
Analysis Batch: 555490

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555027

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl	73		50 - 120
2-Fluorophenol	64		30 - 120
2,4,6-Tribromophenol	89		40 - 120
Nitrobenzene-d5	76		45 - 120
Terphenyl-d14	77		10 - 150
Phenol-d6	70		35 - 120

Lab Sample ID: LCSD 440-555027/3-A
Matrix: Water
Analysis Batch: 555490

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 555027

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bis(2-ethylhexyl) phthalate			100	103		ug/L		103	10 - 150	3	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
2-Fluorobiphenyl	83		50 - 120
2-Fluorophenol	70		30 - 120
2,4,6-Tribromophenol	98		40 - 120
Nitrobenzene-d5	81		45 - 120
Terphenyl-d14	81		10 - 150
Phenol-d6	77		35 - 120

Method: 8315A - Carbonyl Compounds (HPLC)

Lab Sample ID: MB 440-555345/1-A
Matrix: Water
Analysis Batch: 555542

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 555345

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	ND		0.010	0.0050	mg/L		06/29/19 05:05	07/01/19 10:55	1

Lab Sample ID: LCS 440-555345/2-A
Matrix: Water
Analysis Batch: 555542

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555345

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Formaldehyde			0.0500	0.0518		mg/L		104	70 - 129

Lab Sample ID: 440-244801-A-1-A MS
Matrix: Water
Analysis Batch: 555542

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 555345

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Formaldehyde	0.0085	J	0.0500	0.0615		mg/L		106	50 - 150

Method: 8315A - Carbonyl Compounds (HPLC) (Continued)

Lab Sample ID: 440-244801-A-1-B MSD
Matrix: Water
Analysis Batch: 555542

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 555345

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Formaldehyde	0.0085	J	0.0500	0.0629		mg/L		109	50 - 150	2	20

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 440-554883/1-A
Matrix: Water
Analysis Batch: 555055

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 554883

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.10	0.050	mg/L		06/26/19 17:58	06/27/19 12:56	1
Arsenic	ND		0.010	0.0089	mg/L		06/26/19 17:58	06/27/19 12:56	1
Barium	ND		0.010	0.0050	mg/L		06/26/19 17:58	06/27/19 12:56	1
Boron	ND		0.050	0.025	mg/L		06/26/19 17:58	06/27/19 12:56	1
Cadmium	ND		0.0050	0.0025	mg/L		06/26/19 17:58	06/27/19 12:56	1
Chromium	ND		0.0050	0.0025	mg/L		06/26/19 17:58	06/27/19 12:56	1
Copper	ND		0.010	0.0050	mg/L		06/26/19 17:58	06/27/19 12:56	1
Magnesium	ND		0.020	0.010	mg/L		06/26/19 17:58	06/27/19 12:56	1
Manganese	ND		0.020	0.015	mg/L		06/26/19 17:58	06/27/19 12:56	1
Nickel	ND		0.010	0.0050	mg/L		06/26/19 17:58	06/27/19 12:56	1
Selenium	ND		0.010	0.0087	mg/L		06/26/19 17:58	06/27/19 12:56	1
Titanium	ND		0.0050	0.0025	mg/L		06/26/19 17:58	06/27/19 12:56	1
Zinc	ND		0.020	0.012	mg/L		06/26/19 17:58	06/27/19 12:56	1

Lab Sample ID: LCS 440-554883/2-A
Matrix: Water
Analysis Batch: 555055

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 554883

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	1.00	1.02		mg/L		102	80 - 120
Arsenic	1.00	1.03		mg/L		103	80 - 120
Barium	1.00	1.02		mg/L		102	80 - 120
Boron	1.00	1.02		mg/L		102	80 - 120
Cadmium	1.00	1.02		mg/L		102	80 - 120
Chromium	1.00	1.03		mg/L		103	80 - 120
Copper	1.00	1.04		mg/L		104	80 - 120
Magnesium	5.00	5.13		mg/L		103	80 - 120
Manganese	1.00	1.03		mg/L		103	80 - 120
Nickel	1.00	1.02		mg/L		102	80 - 120
Selenium	1.00	0.988		mg/L		99	80 - 120
Titanium	1.00	1.04		mg/L		104	80 - 120
Zinc	1.00	1.01		mg/L		101	80 - 120

Lab Sample ID: 440-244629-K-1-B MS ^10
Matrix: Water
Analysis Batch: 555055

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 554883

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	ND	F2	1.00	1.19		mg/L		119	75 - 125
Arsenic	ND		1.00	0.943		mg/L		94	75 - 125

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 440-244629-K-1-B MS ^10
Matrix: Water
Analysis Batch: 555055

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 554883

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	0.056	J	1.00	1.02		mg/L		96	75 - 125
Boron	1.7		1.00	2.75		mg/L		102	75 - 125
Cadmium	ND		1.00	0.968		mg/L		97	75 - 125
Chromium	ND		1.00	0.982		mg/L		98	75 - 125
Copper	0.065	J	1.00	1.07		mg/L		101	75 - 125
Magnesium	230		5.00	245	4	mg/L		228	75 - 125
Manganese	4.9		1.00	6.04	4	mg/L		117	75 - 125
Nickel	ND		1.00	1.03		mg/L		103	75 - 125
Selenium	ND		1.00	0.982		mg/L		98	75 - 125
Titanium	ND		1.00	1.11		mg/L		111	75 - 125
Zinc	ND		1.00	0.944		mg/L		94	75 - 125

Lab Sample ID: 440-244629-K-1-C MSD ^10
Matrix: Water
Analysis Batch: 555055

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 554883

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	ND	F2	1.00	0.919	J F2	mg/L		92	75 - 125	26	20
Arsenic	ND		1.00	1.08		mg/L		108	75 - 125	13	20
Barium	0.056	J	1.00	1.09		mg/L		103	75 - 125	7	20
Boron	1.7		1.00	2.81		mg/L		108	75 - 125	2	20
Cadmium	ND		1.00	1.03		mg/L		103	75 - 125	6	20
Chromium	ND		1.00	1.05		mg/L		105	75 - 125	7	20
Copper	0.065	J	1.00	1.14		mg/L		107	75 - 125	6	20
Magnesium	230		5.00	246	4	mg/L		248	75 - 125	0	20
Manganese	4.9		1.00	6.06	4	mg/L		119	75 - 125	0	20
Nickel	ND		1.00	1.09		mg/L		109	75 - 125	6	20
Selenium	ND		1.00	1.05		mg/L		105	75 - 125	7	20
Titanium	ND		1.00	1.08		mg/L		108	75 - 125	3	20
Zinc	ND		1.00	1.01		mg/L		101	75 - 125	6	20

Lab Sample ID: MB 440-556202/1-A
Matrix: Water
Analysis Batch: 556398

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 556202

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.10	0.050	mg/L		07/05/19 09:49	07/05/19 18:57	1
Arsenic	ND		0.010	0.0089	mg/L		07/05/19 09:49	07/05/19 18:57	1
Barium	ND		0.010	0.0050	mg/L		07/05/19 09:49	07/05/19 18:57	1
Boron	ND		0.050	0.025	mg/L		07/05/19 09:49	07/05/19 18:57	1
Cadmium	ND		0.0050	0.0025	mg/L		07/05/19 09:49	07/05/19 18:57	1
Chromium	ND		0.0050	0.0025	mg/L		07/05/19 09:49	07/05/19 18:57	1
Copper	ND		0.010	0.0050	mg/L		07/05/19 09:49	07/05/19 18:57	1
Magnesium	ND		0.020	0.010	mg/L		07/05/19 09:49	07/05/19 18:57	1
Manganese	ND		0.020	0.015	mg/L		07/05/19 09:49	07/05/19 18:57	1
Nickel	ND		0.010	0.0050	mg/L		07/05/19 09:49	07/05/19 18:57	1
Selenium	ND		0.010	0.0087	mg/L		07/05/19 09:49	07/05/19 18:57	1
Titanium	ND		0.0050	0.0025	mg/L		07/05/19 09:49	07/05/19 18:57	1
Zinc	ND		0.020	0.012	mg/L		07/05/19 09:49	07/05/19 18:57	1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCS 440-556202/2-A
Matrix: Water
Analysis Batch: 556398

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 556202

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			1.00	0.983		mg/L		98	80 - 120		
Arsenic			1.00	0.980		mg/L		98	80 - 120		
Barium			1.00	0.980		mg/L		98	80 - 120		
Boron			1.00	0.975		mg/L		98	80 - 120		
Cadmium			1.00	0.985		mg/L		98	80 - 120		
Chromium			1.00	0.986		mg/L		99	80 - 120		
Copper			1.00	0.993		mg/L		99	80 - 120		
Magnesium			5.00	4.87		mg/L		97	80 - 120		
Manganese			1.00	0.983		mg/L		98	80 - 120		
Nickel			1.00	0.980		mg/L		98	80 - 120		
Selenium			1.00	0.950		mg/L		95	80 - 120		
Titanium			1.00	0.991		mg/L		99	80 - 120		
Zinc			1.00	0.989		mg/L		99	80 - 120		

Lab Sample ID: 440-244965-Y-1-B MS
Matrix: Water
Analysis Batch: 556398

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 556202

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum	ND		1.00	1.10		mg/L		110	75 - 125		
Arsenic	ND		1.00	1.06		mg/L		106	75 - 125		
Barium	0.080		1.00	1.05		mg/L		97	75 - 125		
Boron	0.15		1.00	1.21		mg/L		106	75 - 125		
Cadmium	ND		1.00	0.990		mg/L		99	75 - 125		
Chromium	ND		1.00	1.02		mg/L		102	75 - 125		
Copper	ND		1.00	1.05		mg/L		105	75 - 125		
Magnesium	37		5.00	41.9	4	mg/L		102	75 - 125		
Manganese	0.26		1.00	1.27		mg/L		101	75 - 125		
Nickel	ND		1.00	0.967		mg/L		97	75 - 125		
Selenium	ND		1.00	0.999		mg/L		100	75 - 125		
Titanium	0.0025	J	1.00	1.04		mg/L		104	75 - 125		
Zinc	ND		1.00	0.976		mg/L		98	75 - 125		

Lab Sample ID: 440-244965-Y-1-C MSD
Matrix: Water
Analysis Batch: 556398

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 556202

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	ND		1.00	1.10		mg/L		110	75 - 125	0	20
Arsenic	ND		1.00	1.06		mg/L		106	75 - 125	0	20
Barium	0.080		1.00	1.05		mg/L		97	75 - 125	0	20
Boron	0.15		1.00	1.19		mg/L		104	75 - 125	1	20
Cadmium	ND		1.00	0.983		mg/L		98	75 - 125	1	20
Chromium	ND		1.00	1.01		mg/L		101	75 - 125	0	20
Copper	ND		1.00	1.05		mg/L		105	75 - 125	0	20
Magnesium	37		5.00	41.0	4	mg/L		85	75 - 125	2	20
Manganese	0.26		1.00	1.26		mg/L		99	75 - 125	1	20
Nickel	ND		1.00	0.960		mg/L		96	75 - 125	1	20
Selenium	ND		1.00	1.00		mg/L		100	75 - 125	0	20

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 440-244965-Y-1-C MSD
Matrix: Water
Analysis Batch: 556398

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 556202

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Titanium	0.0025	J	1.00	1.02		mg/L		102	75 - 125	2	20
Zinc	ND		1.00	0.971		mg/L		97	75 - 125	1	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 440-555647/1-A
Matrix: Water
Analysis Batch: 555834

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 555647

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00010	mg/L		07/01/19 16:27	07/02/19 12:06	1

Lab Sample ID: LCS 440-555647/2-A
Matrix: Water
Analysis Batch: 555834

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555647

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00400	0.00440		mg/L		110	80 - 120

Lab Sample ID: 720-93762-A-1-G MSD
Matrix: Water
Analysis Batch: 555834

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 555647

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00400	0.00433		mg/L		108	75 - 125	0	20

Method: 1664A - HEM and SGT-HEM

Lab Sample ID: MB 440-555282/1-A
Matrix: Water
Analysis Batch: 555325

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 555282

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	ND		5.0	1.4	mg/L		06/28/19 15:07	06/28/19 18:55	1

Lab Sample ID: LCS 440-555282/2-A
Matrix: Water
Analysis Batch: 555325

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555282

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
HEM	20.0	19.20		mg/L		96	78 - 114

Lab Sample ID: LCSD 440-555282/3-A
Matrix: Water
Analysis Batch: 555325

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 555282

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
HEM	20.0	19.70		mg/L		99	78 - 114	3	11

Method: 2540E - Solids, Volatile and Fixed (VS)

Lab Sample ID: MB 440-554894/1
Matrix: Water
Analysis Batch: 554894

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	ND		10	10	mg/L			06/26/19 19:05	1

Lab Sample ID: 440-244608-1 DU
Matrix: Water
Analysis Batch: 554894

Client Sample ID: 0620 BUTCHER
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Volatile Solids	12000			13500		mg/L				10	20

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 440-555267/3-A
Matrix: Water
Analysis Batch: 555602

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 555267

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	ND		0.20	0.10	mg/L		06/28/19 14:14	06/28/19 20:52	1

Lab Sample ID: LCS 440-555267/4-A
Matrix: Water
Analysis Batch: 555602

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555267

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Kjeldahl Nitrogen			5.00	4.85		mg/L		97	90 - 110		

Lab Sample ID: LCSD 440-555267/5-A
Matrix: Water
Analysis Batch: 555602

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 555267

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Kjeldahl Nitrogen			5.00	4.88		mg/L		98	90 - 110	1	20

Lab Sample ID: 440-244619-K-1-B MS
Matrix: Water
Analysis Batch: 555602

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 555267

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Kjeldahl Nitrogen	ND	F1	5.00	2.31	F1	mg/L		46	90 - 110		

Lab Sample ID: 440-244619-K-1-C MSD
Matrix: Water
Analysis Batch: 555602

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 555267

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Kjeldahl Nitrogen	ND	F1	5.00	2.34	F1	mg/L		47	90 - 110	1	20

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 320-306826/15
Matrix: Water
Analysis Batch: 306826

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	ND		0.050	0.0031	mg/L			07/10/19 10:35	1

Lab Sample ID: LCS 320-306826/16
Matrix: Water
Analysis Batch: 306826

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	1.00	1.02		mg/L		102	90 - 110

Lab Sample ID: 440-244710-A-1 MS
Matrix: Water
Analysis Batch: 306826

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.19		1.00	1.23		mg/L		104	90 - 110

Lab Sample ID: 440-244710-A-1 MSD
Matrix: Water
Analysis Batch: 306826

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	0.19		1.00	1.19		mg/L		100	90 - 110	4	20

Method: 365.3 - Phosphorus, Total

Lab Sample ID: MB 440-555362/1-A
Matrix: Water
Analysis Batch: 555384

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 555362

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.050	0.025	mg/L		06/29/19 08:17	06/29/19 10:47	1

Lab Sample ID: LCS 440-555362/2-A
Matrix: Water
Analysis Batch: 555384

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555362

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.501	0.502		mg/L		100	80 - 120

Lab Sample ID: 440-244457-B-1-B MS
Matrix: Water
Analysis Batch: 555384

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 555362

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.15	F1	0.501	0.226	F1	mg/L		15	75 - 125

Method: 365.3 - Phosphorus, Total (Continued)

Lab Sample ID: 440-244457-B-1-C MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 555384 — **Prep Batch: 555362**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.15	F1	0.501	0.217	F1	mg/L		13	75 - 125	4	20

Method: 420.1 - Phenolics, Total Recoverable

Lab Sample ID: MB 680-576470/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 576857 — **Prep Batch: 576470**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND		0.050	0.025	mg/L		07/01/19 10:02	07/02/19 10:49	1

Lab Sample ID: LCS 680-576470/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 576857 — **Prep Batch: 576470**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phenolics, Total Recoverable	0.100	0.0868		mg/L		87	75 - 125

Lab Sample ID: 440-244688-J-1-B MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 576857 — **Prep Batch: 576470**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phenolics, Total Recoverable	ND		0.100	0.102		mg/L		102	75 - 125

Lab Sample ID: 440-244688-J-1-C MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 576857 — **Prep Batch: 576470**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phenolics, Total Recoverable	ND		0.100	0.0991		mg/L		99	75 - 125	2	30

Method: ASTM D5057-90 - Specific Gravity and Bulk Density (Screening)

Lab Sample ID: 180-92006-A-1 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 284432

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Gravity	1.0		0.986		No Unit		2	20

Method: SM 2540B - Solids, Total

Lab Sample ID: MB 440-554877/1 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 554877

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Solids	ND		10	10	mg/L			06/26/19 17:46	1

Method: SM 2540B - Solids, Total (Continued)

Lab Sample ID: LCS 440-554877/2
Matrix: Water
Analysis Batch: 554877

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Solids			1000	1020		mg/L		102	90 - 110		

Lab Sample ID: 440-244608-1 DU
Matrix: Water
Analysis Batch: 554877

Client Sample ID: 0620 BUTCHER
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Solids	17000			17700		mg/L				6	10

Method: SM 4500 CN E - Cyanide, Total

Lab Sample ID: MB 440-555064/1-A
Matrix: Water
Analysis Batch: 555114

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 555064

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.025	0.013	mg/L		06/27/19 14:53	06/27/19 20:43	1

Lab Sample ID: LCS 440-555064/2-A
Matrix: Water
Analysis Batch: 555114

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555064

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cyanide, Total			0.200	0.201		mg/L		100	80 - 120		

Lab Sample ID: 720-93715-K-1-B MS
Matrix: Water
Analysis Batch: 555114

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 555064

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cyanide, Total	ND		0.200	0.198		mg/L		99	75 - 125		

Lab Sample ID: 720-93715-K-1-C MSD
Matrix: Water
Analysis Batch: 555114

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 555064

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	ND		0.200	0.200		mg/L		100	75 - 125	1	20

Method: SM 4500 NH3 D - Ammonia

Lab Sample ID: MB 440-555710/2-A
Matrix: Water
Analysis Batch: 555735

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 555710

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (as N)	ND		0.50	0.10	mg/L		07/02/19 04:00	07/02/19 07:00	1
Ammonia as NH3	ND		0.60	0.12	mg/L		07/02/19 04:00	07/02/19 07:00	1

Method: SM 4500 NH3 D - Ammonia (Continued)

Lab Sample ID: LCS 440-555710/1-A
Matrix: Water
Analysis Batch: 555735

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555710

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia (as N)	2.50	2.29		mg/L		92	85 - 115
Ammonia as NH3	3.04	2.78		mg/L		92	85 - 115

Lab Sample ID: MRL 440-555710/3-A
Matrix: Water
Analysis Batch: 555735

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555710

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia (as N)	0.500	0.503		mg/L		101	10 - 200
Ammonia as NH3	0.607	0.611		mg/L		101	10 - 200

Lab Sample ID: 440-244729-A-6-B MS
Matrix: Water
Analysis Batch: 555735

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 555710

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia (as N)	0.13	J	2.50	2.57		mg/L		97	75 - 125
Ammonia as NH3	0.16	J	3.04	3.12		mg/L		97	75 - 125

Lab Sample ID: 440-244729-A-6-C MSD
Matrix: Water
Analysis Batch: 555735

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 555710

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia (as N)	0.13	J	2.50	2.66		mg/L		101	75 - 125	4	15
Ammonia as NH3	0.16	J	3.04	3.24		mg/L		101	75 - 125	4	15

Lab Sample ID: 440-244608-1 DU
Matrix: Water
Analysis Batch: 555735

Client Sample ID: 0620 BUTCHER
Prep Type: Total/NA
Prep Batch: 555710

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Ammonia (as N)	62		64.1		mg/L		4	15
Ammonia as NH3	75		77.9		mg/L		4	15

Method: SM 5220D - COD

Lab Sample ID: MB 440-555681/3
Matrix: Water
Analysis Batch: 555681

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		20	10	mg/L			07/01/19 18:36	1

Lab Sample ID: LCS 440-555681/4
Matrix: Water
Analysis Batch: 555681

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	200	194		mg/L		97	90 - 110

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Method: SM 5220D - COD (Continued)

Lab Sample ID: 440-244472-I-1 MS
Matrix: Water
Analysis Batch: 555681

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chemical Oxygen Demand	29		200	210		mg/L		90	70 - 120		

Lab Sample ID: 440-244472-I-1 MSD
Matrix: Water
Analysis Batch: 555681

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chemical Oxygen Demand	29		200	210		mg/L		90	70 - 120	0	15

GC/MS VOA

Analysis Batch: 555513

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-2	0620 OD STREAMS	Total/NA	Water	8260B	
440-244608-3	0621 BUTCHER	Total/NA	Water	8260B	
440-244608-4	0621 OD STREAMS	Total/NA	Water	8260B	
MB 440-555513/4	Method Blank	Total/NA	Water	8260B	
LCS 440-555513/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 440-555513/7	Lab Control Sample Dup	Total/NA	Water	8260B	
550-124860-N-1 MS	Matrix Spike	Total/NA	Water	8260B	
550-124860-N-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Analysis Batch: 555721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	8260B	
440-244608-3 - RA	0621 BUTCHER	Total/NA	Water	8260B	
MB 440-555721/4	Method Blank	Total/NA	Water	8260B	
LCS 440-555721/5	Lab Control Sample	Total/NA	Water	8260B	
440-244488-B-3 MS	Matrix Spike	Total/NA	Water	8260B	
440-244488-B-3 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 555027

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	625	
440-244608-2	0620 OD STREAMS	Total/NA	Water	625	
440-244608-3	0621 BUTCHER	Total/NA	Water	625	
440-244608-4	0621 OD STREAMS	Total/NA	Water	625	
MB 440-555027/1-A	Method Blank	Total/NA	Water	625	
LCS 440-555027/2-A	Lab Control Sample	Total/NA	Water	625	
LCSD 440-555027/3-A	Lab Control Sample Dup	Total/NA	Water	625	

Analysis Batch: 555490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	625	555027
440-244608-2	0620 OD STREAMS	Total/NA	Water	625	555027
440-244608-3	0621 BUTCHER	Total/NA	Water	625	555027
440-244608-4	0621 OD STREAMS	Total/NA	Water	625	555027
MB 440-555027/1-A	Method Blank	Total/NA	Water	625	555027
LCS 440-555027/2-A	Lab Control Sample	Total/NA	Water	625	555027
LCSD 440-555027/3-A	Lab Control Sample Dup	Total/NA	Water	625	555027

HPLC/IC

Prep Batch: 555345

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	8315_W_Prep	
440-244608-2	0620 OD STREAMS	Total/NA	Water	8315_W_Prep	
440-244608-3	0621 BUTCHER	Total/NA	Water	8315_W_Prep	
440-244608-4	0621 OD STREAMS	Total/NA	Water	8315_W_Prep	
MB 440-555345/1-A	Method Blank	Total/NA	Water	8315_W_Prep	
LCS 440-555345/2-A	Lab Control Sample	Total/NA	Water	8315_W_Prep	
440-244801-A-1-A MS	Matrix Spike	Total/NA	Water	8315_W_Prep	
440-244801-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	8315_W_Prep	

HPLC/IC

Analysis Batch: 555542

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	8315A	555345
440-244608-2	0620 OD STREAMS	Total/NA	Water	8315A	555345
440-244608-3	0621 BUTCHER	Total/NA	Water	8315A	555345
440-244608-4	0621 OD STREAMS	Total/NA	Water	8315A	555345
MB 440-555345/1-A	Method Blank	Total/NA	Water	8315A	555345
LCS 440-555345/2-A	Lab Control Sample	Total/NA	Water	8315A	555345
440-244801-A-1-A MS	Matrix Spike	Total/NA	Water	8315A	555345
440-244801-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	8315A	555345

Analysis Batch: 555628

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	NO3NO2 Calc	
440-244608-2	0620 OD STREAMS	Total/NA	Water	NO3NO2 Calc	
440-244608-3	0621 BUTCHER	Total/NA	Water	NO3NO2 Calc	
440-244608-4	0621 OD STREAMS	Total/NA	Water	NO3NO2 Calc	

Metals

Prep Batch: 554883

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total Recoverable	Water	3005A	
440-244608-3	0621 BUTCHER	Total Recoverable	Water	3005A	
MB 440-554883/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-554883/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
440-244629-K-1-B MS ^10	Matrix Spike	Total Recoverable	Water	3005A	
440-244629-K-1-C MSD ^10	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 555055

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total Recoverable	Water	6010B	554883
440-244608-3	0621 BUTCHER	Total Recoverable	Water	6010B	554883
MB 440-554883/1-A	Method Blank	Total Recoverable	Water	6010B	554883
LCS 440-554883/2-A	Lab Control Sample	Total Recoverable	Water	6010B	554883
440-244629-K-1-B MS ^10	Matrix Spike	Total Recoverable	Water	6010B	554883
440-244629-K-1-C MSD ^10	Matrix Spike Duplicate	Total Recoverable	Water	6010B	554883

Prep Batch: 555647

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	7470A	
440-244608-2	0620 OD STREAMS	Total/NA	Water	7470A	
440-244608-3	0621 BUTCHER	Total/NA	Water	7470A	
440-244608-4	0621 OD STREAMS	Total/NA	Water	7470A	
MB 440-555647/1-A	Method Blank	Total/NA	Water	7470A	
LCS 440-555647/2-A	Lab Control Sample	Total/NA	Water	7470A	
720-93762-A-1-G MSD	Matrix Spike Duplicate	Total/NA	Water	7470A	

Analysis Batch: 555834

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	7470A	555647
440-244608-2	0620 OD STREAMS	Total/NA	Water	7470A	555647
440-244608-3	0621 BUTCHER	Total/NA	Water	7470A	555647

Metals (Continued)

Analysis Batch: 555834 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-4	0621 OD STREAMS	Total/NA	Water	7470A	555647
MB 440-555647/1-A	Method Blank	Total/NA	Water	7470A	555647
LCS 440-555647/2-A	Lab Control Sample	Total/NA	Water	7470A	555647
720-93762-A-1-G MSD	Matrix Spike Duplicate	Total/NA	Water	7470A	555647

Prep Batch: 556202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-2	0620 OD STREAMS	Total Recoverable	Water	3005A	
440-244608-4	0621 OD STREAMS	Total Recoverable	Water	3005A	
MB 440-556202/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-556202/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
440-244965-Y-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
440-244965-Y-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 556398

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-2	0620 OD STREAMS	Total Recoverable	Water	6010B	556202
440-244608-4	0621 OD STREAMS	Total Recoverable	Water	6010B	556202
MB 440-556202/1-A	Method Blank	Total Recoverable	Water	6010B	556202
LCS 440-556202/2-A	Lab Control Sample	Total Recoverable	Water	6010B	556202
440-244965-Y-1-B MS	Matrix Spike	Total Recoverable	Water	6010B	556202
440-244965-Y-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6010B	556202

General Chemistry

Analysis Batch: 284432

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	ASTM D5057-90	
440-244608-2	0620 OD STREAMS	Total/NA	Water	ASTM D5057-90	
440-244608-3	0621 BUTCHER	Total/NA	Water	ASTM D5057-90	
440-244608-4	0621 OD STREAMS	Total/NA	Water	ASTM D5057-90	
180-92006-A-1 DU	Duplicate	Total/NA	Water	ASTM D5057-90	

Analysis Batch: 306826

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	353.2	
440-244608-2	0620 OD STREAMS	Total/NA	Water	353.2	
440-244608-3	0621 BUTCHER	Total/NA	Water	353.2	
440-244608-4	0621 OD STREAMS	Total/NA	Water	353.2	
MB 320-306826/15	Method Blank	Total/NA	Water	353.2	
LCS 320-306826/16	Lab Control Sample	Total/NA	Water	353.2	
440-244710-A-1 MS	Matrix Spike	Total/NA	Water	353.2	
440-244710-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	353.2	

Analysis Batch: 554877

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	SM 2540B	
440-244608-2	0620 OD STREAMS	Total/NA	Water	SM 2540B	
440-244608-3	0621 BUTCHER	Total/NA	Water	SM 2540B	
440-244608-4	0621 OD STREAMS	Total/NA	Water	SM 2540B	
MB 440-554877/1	Method Blank	Total/NA	Water	SM 2540B	

General Chemistry (Continued)

Analysis Batch: 554877 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 440-554877/2	Lab Control Sample	Total/NA	Water	SM 2540B	
440-244608-1 DU	0620 BUTCHER	Total/NA	Water	SM 2540B	

Analysis Batch: 554894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	2540E	
440-244608-2	0620 OD STREAMS	Total/NA	Water	2540E	
440-244608-3	0621 BUTCHER	Total/NA	Water	2540E	
440-244608-4	0621 OD STREAMS	Total/NA	Water	2540E	
MB 440-554894/1	Method Blank	Total/NA	Water	2540E	
440-244608-1 DU	0620 BUTCHER	Total/NA	Water	2540E	

Prep Batch: 555064

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	Distill/CN	
440-244608-2	0620 OD STREAMS	Total/NA	Water	Distill/CN	
440-244608-3	0621 BUTCHER	Total/NA	Water	Distill/CN	
440-244608-4	0621 OD STREAMS	Total/NA	Water	Distill/CN	
MB 440-555064/1-A	Method Blank	Total/NA	Water	Distill/CN	
LCS 440-555064/2-A	Lab Control Sample	Total/NA	Water	Distill/CN	
720-93715-K-1-B MS	Matrix Spike	Total/NA	Water	Distill/CN	
720-93715-K-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	Distill/CN	

Analysis Batch: 555114

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	SM 4500 CN E	555064
440-244608-2	0620 OD STREAMS	Total/NA	Water	SM 4500 CN E	555064
440-244608-3	0621 BUTCHER	Total/NA	Water	SM 4500 CN E	555064
440-244608-4	0621 OD STREAMS	Total/NA	Water	SM 4500 CN E	555064
MB 440-555064/1-A	Method Blank	Total/NA	Water	SM 4500 CN E	555064
LCS 440-555064/2-A	Lab Control Sample	Total/NA	Water	SM 4500 CN E	555064
720-93715-K-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN E	555064
720-93715-K-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN E	555064

Prep Batch: 555267

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	351.2	
440-244608-2	0620 OD STREAMS	Total/NA	Water	351.2	
440-244608-3	0621 BUTCHER	Total/NA	Water	351.2	
440-244608-4	0621 OD STREAMS	Total/NA	Water	351.2	
MB 440-555267/3-A	Method Blank	Total/NA	Water	351.2	
LCS 440-555267/4-A	Lab Control Sample	Total/NA	Water	351.2	
LCSD 440-555267/5-A	Lab Control Sample Dup	Total/NA	Water	351.2	
440-244619-K-1-B MS	Matrix Spike	Total/NA	Water	351.2	
440-244619-K-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	

Prep Batch: 555282

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	1664A	
440-244608-2	0620 OD STREAMS	Total/NA	Water	1664A	
440-244608-3	0621 BUTCHER	Total/NA	Water	1664A	

General Chemistry (Continued)

Prep Batch: 555282 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-4	0621 OD STREAMS	Total/NA	Water	1664A	
MB 440-555282/1-A	Method Blank	Total/NA	Water	1664A	
LCS 440-555282/2-A	Lab Control Sample	Total/NA	Water	1664A	
LCSD 440-555282/3-A	Lab Control Sample Dup	Total/NA	Water	1664A	

Analysis Batch: 555325

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	1664A	555282
440-244608-2	0620 OD STREAMS	Total/NA	Water	1664A	555282
440-244608-3	0621 BUTCHER	Total/NA	Water	1664A	555282
440-244608-4	0621 OD STREAMS	Total/NA	Water	1664A	555282
MB 440-555282/1-A	Method Blank	Total/NA	Water	1664A	555282
LCS 440-555282/2-A	Lab Control Sample	Total/NA	Water	1664A	555282
LCSD 440-555282/3-A	Lab Control Sample Dup	Total/NA	Water	1664A	555282

Prep Batch: 555362

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	365.2/365.3/365	
440-244608-2	0620 OD STREAMS	Total/NA	Water	365.2/365.3/365	
440-244608-3	0621 BUTCHER	Total/NA	Water	365.2/365.3/365	
440-244608-4	0621 OD STREAMS	Total/NA	Water	365.2/365.3/365	
MB 440-555362/1-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 440-555362/2-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
440-244457-B-1-B MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
440-244457-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

Analysis Batch: 555384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	365.3	555362
440-244608-2	0620 OD STREAMS	Total/NA	Water	365.3	555362
440-244608-3	0621 BUTCHER	Total/NA	Water	365.3	555362
440-244608-4	0621 OD STREAMS	Total/NA	Water	365.3	555362
MB 440-555362/1-A	Method Blank	Total/NA	Water	365.3	555362
LCS 440-555362/2-A	Lab Control Sample	Total/NA	Water	365.3	555362
440-244457-B-1-B MS	Matrix Spike	Total/NA	Water	365.3	555362
440-244457-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	365.3	555362

Analysis Batch: 555602

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	351.2	555267
440-244608-2	0620 OD STREAMS	Total/NA	Water	351.2	555267
440-244608-3	0621 BUTCHER	Total/NA	Water	351.2	555267
440-244608-4	0621 OD STREAMS	Total/NA	Water	351.2	555267
MB 440-555267/3-A	Method Blank	Total/NA	Water	351.2	555267
LCS 440-555267/4-A	Lab Control Sample	Total/NA	Water	351.2	555267
LCSD 440-555267/5-A	Lab Control Sample Dup	Total/NA	Water	351.2	555267
440-244619-K-1-B MS	Matrix Spike	Total/NA	Water	351.2	555267
440-244619-K-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	555267

General Chemistry

Analysis Batch: 555681

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	SM 5220D	
440-244608-2	0620 OD STREAMS	Total/NA	Water	SM 5220D	
440-244608-3	0621 BUTCHER	Total/NA	Water	SM 5220D	
440-244608-4	0621 OD STREAMS	Total/NA	Water	SM 5220D	
MB 440-555681/3	Method Blank	Total/NA	Water	SM 5220D	
LCS 440-555681/4	Lab Control Sample	Total/NA	Water	SM 5220D	
440-244472-I-1 MS	Matrix Spike	Total/NA	Water	SM 5220D	
440-244472-I-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 5220D	

Prep Batch: 555710

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	SM 4500 NH3 B	
440-244608-2	0620 OD STREAMS	Total/NA	Water	SM 4500 NH3 B	
440-244608-3	0621 BUTCHER	Total/NA	Water	SM 4500 NH3 B	
440-244608-4	0621 OD STREAMS	Total/NA	Water	SM 4500 NH3 B	
MB 440-555710/2-A	Method Blank	Total/NA	Water	SM 4500 NH3 B	
LCS 440-555710/1-A	Lab Control Sample	Total/NA	Water	SM 4500 NH3 B	
MRL 440-555710/3-A	Lab Control Sample	Total/NA	Water	SM 4500 NH3 B	
440-244729-A-6-B MS	Matrix Spike	Total/NA	Water	SM 4500 NH3 B	
440-244729-A-6-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 NH3 B	
440-244608-1 DU	0620 BUTCHER	Total/NA	Water	SM 4500 NH3 B	

Analysis Batch: 555735

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	SM 4500 NH3 D	555710
440-244608-2	0620 OD STREAMS	Total/NA	Water	SM 4500 NH3 D	555710
440-244608-3	0621 BUTCHER	Total/NA	Water	SM 4500 NH3 D	555710
440-244608-4	0621 OD STREAMS	Total/NA	Water	SM 4500 NH3 D	555710
MB 440-555710/2-A	Method Blank	Total/NA	Water	SM 4500 NH3 D	555710
LCS 440-555710/1-A	Lab Control Sample	Total/NA	Water	SM 4500 NH3 D	555710
MRL 440-555710/3-A	Lab Control Sample	Total/NA	Water	SM 4500 NH3 D	555710
440-244729-A-6-B MS	Matrix Spike	Total/NA	Water	SM 4500 NH3 D	555710
440-244729-A-6-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 NH3 D	555710
440-244608-1 DU	0620 BUTCHER	Total/NA	Water	SM 4500 NH3 D	555710

Analysis Batch: 556060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	Total Nitrogen	
440-244608-2	0620 OD STREAMS	Total/NA	Water	Total Nitrogen	
440-244608-3	0621 BUTCHER	Total/NA	Water	Total Nitrogen	
440-244608-4	0621 OD STREAMS	Total/NA	Water	Total Nitrogen	

Prep Batch: 576470

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	Distill/Phenol	
440-244608-2	0620 OD STREAMS	Total/NA	Water	Distill/Phenol	
440-244608-3	0621 BUTCHER	Total/NA	Water	Distill/Phenol	
440-244608-4	0621 OD STREAMS	Total/NA	Water	Distill/Phenol	
MB 680-576470/1-A	Method Blank	Total/NA	Water	Distill/Phenol	
LCS 680-576470/2-A	Lab Control Sample	Total/NA	Water	Distill/Phenol	
440-244688-J-1-B MS	Matrix Spike	Total/NA	Water	Distill/Phenol	

General Chemistry (Continued)

Prep Batch: 576470 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244688-J-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	Distill/Phenol	

Analysis Batch: 576857

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244608-1	0620 BUTCHER	Total/NA	Water	420.1	576470
440-244608-2	0620 OD STREAMS	Total/NA	Water	420.1	576470
440-244608-3	0621 BUTCHER	Total/NA	Water	420.1	576470
440-244608-4	0621 OD STREAMS	Total/NA	Water	420.1	576470
MB 680-576470/1-A	Method Blank	Total/NA	Water	420.1	576470
LCS 680-576470/2-A	Lab Control Sample	Total/NA	Water	420.1	576470
440-244688-J-1-B MS	Matrix Spike	Total/NA	Water	420.1	576470
440-244688-J-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	420.1	576470

Definitions/Glossary

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-244608-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS Semi VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

HPLC/IC

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F2	MS/MSD RPD exceeds control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 440-244608-1
Project/Site: Ocean Disposal WW Sample

Laboratory: Eurofins TestAmerica, Irvine

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	CA ELAP 2706	06-30-19 *

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6010B	3005A	Water	Aluminum
6010B	3005A	Water	Boron
6010B	3005A	Water	Magnesium
6010B	3005A	Water	Manganese
6010B	3005A	Water	Titanium
8260B		Water	m,p-Xylene
8260B		Water	Xylenes, Total
NO3NO2 Calc		Water	Nitrate as N
NO3NO2 Calc		Water	Nitrite as N
SM 2540B		Water	Total Solids
SM 4500 NH3 D	SM 4500 NH3 B	Water	Ammonia as NH3
Total Nitrogen		Water	Nitrogen, Total

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arkansas DEQ	State		19-033-0	06-27-20
Arkansas DEQ	State Program	6	88-0690	06-27-20
California	State		2891	04-30-20
California	State Program	9	2891	04-30-20
Connecticut	State		PH-0688	09-30-20
Connecticut	State Program	1	PH-0688	09-30-20
Florida	NELAP	4	E871008	06-30-20
Florida	NELAP		E871008	06-30-20
Illinois	NELAP	5	200005	06-30-20
Illinois	NELAP		004375	06-30-20
Kansas	NELAP	7	E-10350	01-31-20
Kansas	NELAP		E-10350	03-31-20
Kentucky (UST)	State Program	4	162013	04-30-20
Kentucky (WW)	State Program	4	KY98043	12-31-19
Louisiana	NELAP	6	04041	06-30-20
Minnesota	NELAP Secondary AB	5	042-999-482	12-31-19
Nevada	State		PA00164	07-31-19
Nevada	State Program	9	PA00164	07-31-19
New Hampshire	NELAP	1	2030	04-04-20
New Jersey	NELAP	2	PA005	06-30-20
New Jersey	NELAP		PA005	06-30-20
New York	NELAP	2	11182	03-31-20
New York	NELAP		11182	04-01-20
North Carolina (WW/SW)	State Program	4	434	12-31-19
Oregon	NELAP	10	PA-2151	02-06-20
Oregon	NELAP		PA-2151	02-06-20
Pennsylvania	NELAP	3	02-00416	04-30-20
Pennsylvania	NELAP		02-00416	04-30-20
Rhode Island	State		LAO00362	12-30-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 440-244608-1
Project/Site: Ocean Disposal WW Sample

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Rhode Island	State Program	1	LAO00362	12-30-19
South Carolina	State Program	4	89014	04-30-20
Texas	NELAP	6	T104704528-15-2	03-31-20
Texas	NELAP		T104704528	03-31-20
US Fish & Wildlife	Federal		LE94312A-1	07-31-19
US Fish & Wildlife	US Federal Programs		058448	07-31-20
USDA	Federal		P-Soil-01	06-26-22
Utah	NELAP	8	PA001462015-4	05-31-20
Utah	NELAP		PA001462019-8	05-31-20
Virginia	NELAP	3	460189	09-14-19
Virginia	NELAP		10043	09-14-19
West Virginia DEP	State		142	01-31-20
West Virginia DEP	State Program	3	142	01-31-20
Wisconsin	State		998027800	08-31-19
Wisconsin	State Program	5	998027800	08-31-19

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 440-244608-1
Project/Site: Ocean Disposal WW Sample

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD		L2468	01-20-21
ANAB	DOE		L2468.01	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-20
California	State Program	9	2897	01-31-20
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State		PH-0691	06-30-21
Connecticut	State Program	1	PH-0691	06-30-21
Florida	NELAP	4	E87570	06-30-20
Florida	NELAP		E87570	06-30-20
Hawaii	State Program	9	N/A	01-29-20
Illinois	NELAP	5	200060	03-17-19 *
Kansas	NELAP	7	E-10375	10-31-19
Louisiana	NELAP	6	30612	06-30-20
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-20-20
New York	NELAP	2	11666	04-01-20
Oregon	NELAP	10	4040	01-29-20
Oregon	NELAP		4040	01-29-20
Pennsylvania	NELAP	3	68-01272	03-31-20
Pennsylvania	NELAP		68-01272	03-31-20
Texas	NELAP	6	T104704399	05-31-20
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	12-31-20
Utah	NELAP	8	CA00044	02-29-20
Vermont	State Program	1	VT-4040	04-16-20
Virginia	NELAP	3	460278	03-14-20
Washington	State Program	10	C581	05-05-20
West Virginia (DW)	State Program	3	9930C	12-31-19
Wyoming	State Program	8	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 440-244608-1
Project/Site: Ocean Disposal WW Sample

Laboratory: Eurofins TestAmerica, Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-19 *
Alaska	State Program	10		06-30-20
Alaska (UST)	State Program	10	UST-104	09-22-19
ANAB	DoD		L2463	09-22-19
ANAB	ISO/IEC 17025		L2463.01	09-22-19
Arizona	State Program	9	AZ0808	12-14-19
Arkansas DEQ	State Program	6	88-0692	02-01-20
California	State Program	9	2939	06-30-19 *
Colorado	State Program	8	N/A	12-31-19
Connecticut	State Program	1	PH-0161	03-31-21
Florida	NELAP	4	E87052	06-30-20
Georgia	State Program	4	803	06-30-20
Guam	State Program	9	15-005r	04-17-20
Hawaii	State Program	9	N/A	06-30-20
Illinois	NELAP	5	200022	11-30-19
Indiana	State Program	5	N/A	06-30-20
Iowa	State Program	7	353	06-30-20
Kentucky (DW)	State Program	4	90084	12-31-19
Kentucky (UST)	State Program	4	18	06-30-20
Kentucky (WW)	State Program	4	90084	12-31-19
Louisiana	NELAP	6	30690	06-30-20
Louisiana (DW)	NELAP	6	LA160019	12-31-19
Maine	State Program	1	GA00006	09-25-20
Maryland	State Program	3	250	12-31-19
Massachusetts	State Program	1	M-GA006	06-30-20
Michigan	State Program	5	9925	06-30-20
Mississippi	State Program	4	N/A	06-30-19 *
Nebraska	State Program	7	TestAmerica-Savannah	06-30-19 *
New Jersey	NELAP	2	GA769	06-30-20
New Mexico	State Program	6	N/A	06-30-20
New York	NELAP	2	10842	04-01-20
North Carolina (DW)	State Program	4	13701	07-31-19 *
North Carolina (WW/SW)	State Program	4	269	12-31-19
Oklahoma	State Program	6	9984	08-31-19
Pennsylvania	NELAP	3	68-00474	06-30-20
Puerto Rico	State Program	2	GA00006	01-01-20
South Carolina	State Program	4	98001	06-30-19 *
Tennessee	State Program	4	TN02961	06-30-20
Texas	NELAP	6	T104704185-19-13	11-30-19
Texas (DW)	State Program	1	T104704185	06-30-20
US Fish & Wildlife	Federal		LE058448-0	07-31-19
Virginia	NELAP	3	460161	06-14-20
Washington	State Program	10	C805	06-10-20
West Virginia (DW)	State Program	3	9950C	12-31-19
West Virginia DEP	State Program	3	094	06-30-19 *
Wisconsin	State Program	5	999819810	08-31-19 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

July 25, 2019

Lena Davidkova
TestAmerica
17461 Derian Avenue
Suite 100
Irvine, CA 92614-

Project Name: Ocean Disposal WW Sample 44022550
Physis Project ID: 1803004-003

Dear Lena,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 6/27/2019. A total of 4 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Organics
Pyrethrins by EPA 625

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier
714 602-5320
Extension 202
mistymercier@physislabs.com

PROJECT SAMPLE LIST

TestAmerica

PHYSIS Project ID: 1803004-003

Ocean Disposal WW Sample 44022550

Total Samples: 4

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
64823	0620 BUTCHER (440-244608-1)		6/20/2019	6:11	Liquid
64824	)620 OD STREAMS (440-244608-2		6/20/2019	6:33	Liquid
64825	0621 BUTCHER (440-244608-3)		6/21/2019	6:01	Liquid
64826	)621 OD STREAMS (440-244608-4		6/21/2019	6:20	Liquid

1904 E. Wright Circle Anaheim, CA 92806 (714) 602-5320 fax (714) 602-5321 www.physislabs.com CA ELAP #2769

ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

1904 E. Wright Circle Anaheim, CA 92806 (714) 602-5320 fax (714) 602-5321 www.physislabs.com CA ELAP #2769

QUALITY ASSURANCE SUMMARY

LABORATORY BATCH: Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and were used to assess the validity of the sample analyses.

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

ACCURACY: Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

BLANK SPIKES: BS is the introduction of a known concentration of analyte into the procedural blank. BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

MATRIX SPIKES: MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

CERTIFIED REFERENCE MATERIALS: CRMs are materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of an analytical method. CRMs provide evidence that the laboratory preparation and analysis produces results that are comparable to those obtained by an independent organization.

LABORATORY CONTROL MATERIAL: LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

SURROGATES: A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to

1904 E. Wright Circle Anaheim, CA 92806 (714) 602-5320 fax (714) 602-5321 www.physislabs.com CA ELAP #2769

the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

HOLDING TIME: Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

SAMPLE STORAGE/RETENTION: In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

TOTAL/DISSOLVED FRACTION: In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

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PHYSIS QUALIFIER CODES

CODE	DEFINITION
#	see Case Narrative
ND	analyte not detected at or above the MDL
B	analyte was detected in the procedural blank greater than 10 times the MDL
E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore accuracy and/or precision acceptance limits do not apply
SL	analyte results were lower than 10 times the MDL, therefore accuracy and/or precision acceptance limits do not apply
NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore accuracy and/or precision acceptance limits do not apply
Q	analyte was outside the specified QAPP acceptance limits for precision and/or accuracy but within Physis derived acceptance limits, therefore the sample data was reported without further clarification
R	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

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ANALYTICAL REPORT

Pyrethroids

ANALYTE	Method	Units	RESULT	MDL	RL	Fraction	QA CODE	Batch ID	Date Processed	Date Analyzed
Sample ID: 64823-R1	**0620 BUTCHER (440-244608-1)**		**Matrix: Liquid**			**Sampled: 20-Jun-19**		**6:11**	**Received: 27-Jun-19**	
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total		O-23068	27-Jun-19	18-Jul-19
Sample ID: 64824-R1	**0620 OD STREAMS (440-244608-2)**		**Matrix: Liquid**			**Sampled: 20-Jun-19**		**6:33**	**Received: 27-Jun-19**	
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total		O-23068	27-Jun-19	18-Jul-19
Sample ID: 64825-R1	**0621 BUTCHER (440-244608-3)**		**Matrix: Liquid**			**Sampled: 21-Jun-19**		**6:01**	**Received: 27-Jun-19**	
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total		O-23068	27-Jun-19	18-Jul-19
Sample ID: 64826-R1	**0621 OD STREAMS (440-244608-4)**		**Matrix: Liquid**			**Sampled: 21-Jun-19**		**6:20**	**Received: 27-Jun-19**	
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total		O-23068	27-Jun-19	18-Jul-19

QUALITY CONTROL REPORT

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature
1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

Pyrethroids — QUALITY CONTROL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURACY %	ACCURACY LIMITS		PRECISION %	PRECISION LIMITS	QA CODE
Sample ID: 64822-B1	**QAQC Procedural Blank**				**Matrix: DI Water**			**Sampled:**			**Received:**		
	Method: EPA 625-NCI				Batch ID: O-23068			Prepared: 27-Jun-19			Analyzed: 17-Jul-19		
Pyrethrins	Total	ND	100	200	ng/L								
Sample ID: 64822-BS1	**QAQC Procedural Blank**				**Matrix: DI Water**			**Sampled:**			**Received:**		
	Method: EPA 625-NCI				Batch ID: O-23068			Prepared: 27-Jun-19			Analyzed: 17-Jul-19		
Pyrethrins	Total	508	100	200	ng/L	500	0	102	50 - 150%	PASS			
Sample ID: 64822-BS2	**QAQC Procedural Blank**				**Matrix: DI Water**			**Sampled:**			**Received:**		
	Method: EPA 625-NCI				Batch ID: O-23068			Prepared: 27-Jun-19			Analyzed: 17-Jul-19		
Pyrethrins	Total	508	100	200	ng/L	500	0	102	50 - 150%	PASS	0	30	PASS

CHAIN OF CUSTODY

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

1803004-003

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-140384.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: Physis Environmental Laboratories		Accreditations Required (See note): State Program - California		Job #: 440-244608-1
Address: 1904 Wright Circle,	Due Date Requested: 7/3/2019			
City: Anaheim	TAT Requested (days):			
State, Zip: CA, 92806				
Phone:	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Pyrethrins)/ Pyrethrins	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
0620 BUTCHER (440-244608-1)	6/20/19	06:11 Pacific		Water			X	2	
0620 OD STREAMS (440-244608-2)	6/20/19	06:33 Pacific		Water			X	2	
0621 BUTCHER (440-244608-3)	6/21/19	06:01 Pacific		Water			X	2	
0621 OD STREAMS (440-244608-4)	6/21/19	06:20 Pacific		Water			X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:
Empty Kit Relinquished by:	Date: Time: Method of Shipment:
Relinquished by:	Date/Time: 6/26/19 1450 Company FAIRx Received by: Date/Time: 6/27/19 0930 Company PHYSIS
Relinquished by:	Date/Time: Company Received by: Date/Time: Company
Relinquished by:	Date/Time: Company Received by: Date/Time: Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.: Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

PHYSIS
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

Physis Project ID
1803004-003

Sample Receipt Summary

Client: TestAmerica | Date Received: 6/27/2019 | Received By: MN | Inspected By: RGH

Courier:	Cooler:	Temperature:
☐ Physis ☑ FEDEX ☐ UPS ☐ Client	☑ Cooler ☐ Box Total #: 1	☐ BLUE ☑ WET ☐ DRY
Start ____ End ____ ☐ Other: ____	☐ Other : ____	☐ None 0.9 °C

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out..... Yes
2. All sample containers arrived intact..... Yes
3. All samples listed on COC(s) are present..... Yes
4. Information on containers consistent with information on COC(s)..... Yes
5. Correct containers and volume for all analyses indicated..... Yes
6. All samples received within method holding time..... Yes
7. Correct preservation used for all analyses indicated..... Yes
8. Name of sampler included on COC(s)..... No

Notes:

17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone (949) 261-1022 Fax (949) 260-3297

Chain of Custody Record

eurofins

Client Information

Client Contact: Nick Butson	Sampler: NICK BUTSON	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-163988-29891.1
Company: Geosyntec Consultants, Inc	Phone: 519-573-9100	E-Mail: lena.davidkova@testamericainc.com		Page: Page 1 of 1
Address: 295 Hagey Blvd. Suite 290	Due Date Requested:			Job #
City: Waterloo	TAT Requested (days): 10 5 DAYS NB 6/06/24			
State, Zip: ON, N2L 6R5	PO #: Purchase Order not required			
Phone: 519-514-2253(Tel)	WO #:			
Email: nbutson@geosyntec.com	Project #: 44022550			
Project Name: Ocean Disposal WW Sample	SSOW#:			
Site: STARKIST SAMOA				

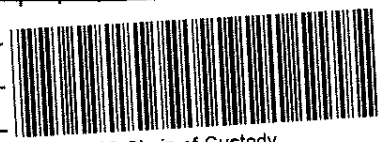
Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	D5057 - Bulk Density (Screening)	351.2-TKN, 365.3-Phosphorus, 5220D-COD, SM4500NH3_D-Ammonia	300-Nitrates, SM2540B-Total Solids, SM2540E-VS	6010B-Total Metals, Mercury 7470A	8260B - VOCs	625-Bis(2-Ethyl-hexyl) phthalate	4500_CN_E - Cyanide, Total	1664A - HEM Only	420.1 - Phenolics, Total Recoverable	8015-Formaldehyde	625-Pyrethrins	353.2-Nitrates	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	S	N	D	A	N	B	A	S	N	N	S		
0620 BUTCHER	06/20/19	06:11	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
0620 OD STREAMS	06/20/19	06:33	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
0621 BUTCHER	06/21/19	06:01	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
~~0622~~ OD STREAMS	06/21/19	06:20	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
0621				Water																
				Water																
				Water																
				Water																
				Water																
				Water																
				Water																



Page 59 of 69

JB 6/20/19 0621

JD 6/20/19

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify): LEVEL IV

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment
Relinquished by:	Date/Time: 2019/06/24 11:42am	Company: GEOSYNTEC	Received by: / Date/Time: / Company:
Relinquished by:	Date/Time:	Company:	Received by: / Date/Time: / Company:
Relinquished by:	Date/Time:	Company:	Received by: / Date/Time: 6/26/19 1030 / Company: TAIRV

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: Thawed blue 16.8/16.5 12.2/11.9 12.4/12.1 11.8/11.5 12.9/12.4

11/25/2019 (Rev. 1)

COMMERCIAL INVOICE

Starkist Samoa Co.
P.O. Box 368
Pago Pago, AS 96799

Sender: Nick Butson
Department: Environmental Compliance
Phone: 684-733-4385

Date: 6/24/19

Item Description (Contents)	**Coolers**	**Dimensions**	**Weight** (kg)	**Unit Value**
Water Samples	4	22" x 12" x 14"	12 kg ea.	$25
Totals	**4**			**$100**

Shipping:

Mode of Shipping		**Tracking #**
USPS: Priority or Express		
Other (Specify):	**Island Cargo Support**	

Ship To:

Company	**Test America Irvine**
Contact Name	**Lena Davidkova**
Address	**17461 Derian Ave., Suite 100**
City, State, Zip	**Irvine, CA 92614-5817**
Phone #	**(949) 261-1022**

Do Not Lift Using This Tag

eurofins | Environment Testing TestAmerica

ORIGIN ID:DTHA (949) 261-1022
TESTAMERICA-IRVINE/SAMPLE CONTROL

17461 DERIAN AVE
SUITE 100
IRVINE, CA 92614
UNITED STATES US

SHIP DATE: 26JUN19
ACTWGT: 21.25 LB
CAD: 6162304/CAFE3211

BILL

RT 97

TO SHIPPING/RECEIVING
TESTAMERICA LABORATORIES
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 15238

FZ

(412) 963-7058
PO: YES

REF: 8440-166958

FedEx Express

TRK# 0201 4538 3732 5197

THU - 27 JUN 10:30
PRIORITY OVERNIGHT

XH AGCA

15238
PA-US PIT

Uncorrected temp
Thermometer ID
CF -0.3
Initials

PT-WI-SR-001 effective 11/8/18

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

440-244608 Chain of Custody

Eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena		0381.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	California	Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-244608-1
Address: 301 Alpha Drive, RIDC Park,	Due Date Requested: 7/3/2019	Analysis Requested		Preservation Codes:
City: Pittsburgh	TAT Requested (days):			A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify) Other:
State, Zip: PA, 15238				
Phone: 412-963-7058(Tel) 412-963-2468(Fax)	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	D5057/ Bulk Density (Screening)	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X		X	
0620 BUTCHER (440-244608-1)	6/20/19	06:11 Pacific		Water			X	1	
0620 OD STREAMS (440-244608-2)	6/20/19	06:33 Pacific		Water			X	1	
0621 BUTCHER (440-244608-3)	6/21/19	06:01 Pacific		Water			X	1	
0621 OD STREAMS (440-244608-4)	6/21/19	06:20 Pacific		Water			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/26/19 1450	TAMV		6/27/19 940	TAMA
2						
3						

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-140382.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-244608-1
Address: 880 Riverside Parkway, ,	Due Date Requested: 7/3/2019			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	353.2_Pres/ Nitrogen, Nitrate-Nitrite	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
0620 BUTCHER (440-244608-1)	6/20/19	06:11 Pacific		Water			X	1	
0620 OD STREAMS (440-244608-2)	6/20/19	06:33 Pacific		Water			X	1	
0621 BUTCHER (440-244608-3)	6/21/19	06:01 Pacific		Water			X	1	
0621 OD STREAMS (440-244608-4)	6/21/19	06:20 Pacific		Water			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	6/26/19 1450	TAIRV		27 June 19 0935	ETAW Sac
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.: —	Cooler Temperature(s) °C and Other Remarks: 0.6°C

Ver: 01/16/2019

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-140383.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-244608-1
Address: 5102 LaRoche Avenue,	Due Date Requested: 7/3/2019			
City: Savannah	TAT Requested (days):			
State, Zip: GA, 31404				
Phone: 912-354-7858(Tel) 912-352-0165(Fax)	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	420.1/Distill_Phenol Phenolics, Total Recoverable	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
0620 BUTCHER (440-244608-1)	6/20/19	06:11 Pacific		Water			X	2	
0620 OD STREAMS (440-244608-2)	6/20/19	06:33 Pacific		Water			X	2	
0621 BUTCHER (440-244608-3)	6/21/19	06:01 Pacific		Water			X	2	
0621 OD STREAMS (440-244608-4)	6/21/19	06:20 Pacific		Water			X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/26/19 1450	TAI RV			
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 6/27/19 850	Company TA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.9 / 3.0

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 440-244608-1

Login Number: 244608
List Number: 1
Creator: Bonta, Lucia F

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thawed blue ice
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 440-244608-1

Login Number: 244608
List Number: 2
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh
List Creation: 06/27/19 01:48 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 440-244608-1

Login Number: 244608
List Number: 3
Creator: Rosas, Jaime

List Source: Eurofins TestAmerica, Sacramento
List Creation: 06/28/19 09:03 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.6c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 440-244608-1

Login Number: 244608
List Number: 4
Creator: Flanagan, Naomi V

List Source: Eurofins TestAmerica, Savannah
List Creation: 07/01/19 10:18 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time (excluding tests with immediate HTs)		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

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Sacramento Sample Receiving Notes

440-244608 Field Sheet

Job: _____

Tracking # : 4538 3732 5201

SO / PO / FO / 2-Day / Ground / UPS / CDO / Courier

GSO / OnTrac / Goldstreak / USPS / Other _____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations. File in the job folder with the COC.

Notes: _____

Therm. ID: AK-10 Corr. Factor: —

Ice ✓ Wet — Gel _____ Other _____

Cooler Custody Seal: —

Sample Custody Seal: —

Cooler ID: —

Temp Observed: 0.6°C Corrected: 0.6°C

From: Temp Blank ☐ Sample ☑

NCM Filed: Yes ☐ No ☐

	Yes	No	NA
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
CoC is complete w/o discrepancies?	☑	☐	☐
Samples received within holding time?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Cooler compromised/tampered with?	☐	☑	☐
Samples compromised/tampered with?	☐	☑	☐
Samples w/o discrepancies?	☑	☐	☐
Sample containers have legible labels?	☑	☐	☐
Containers are not broken or leaking?	☑	☐	☐
Sample date/times are provided.	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Zero headspace?*	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐
Sample temp OK?	☑	☐	☐
Sample out of temp?	☐	☑	☐

Initials: _____ Date: 27 June 19

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Ocean Disposal Wastewater Sample Validation

July 23, 2019

Laboratory Report 440-244608-1

Introduction:

The samples were reported to the method detection limit (MDL) and validated at a Stage 2A level. The samples were received outside of the 0-6 degree Celsius (°C) temperature range at 11.5 °C, 11.9 °C, 12.1 °C, and 16.5 °C. Qualifications were applied to the majority of the data based on the temperature exceedance indicating that the reported values are considered estimated (J) or the non-detect values are considered as estimated less than the MDL (UJ). The metals data were unaffected by the temperature exceedances. Additionally, a subset of the non-detect volatile organic compounds and non-detect nitrite, nitrate, and nitrate/nitrite results were R qualified as rejected due to holding time exceedances. The remaining data are considered usable within the limitation of the qualifications. The results for the associated laboratory quality control (QC) samples e.g. method blanks and laboratory control samples, were within the laboratory acceptance for all of the tests listed below. Batch matrix spike/matrix spike duplicate pairs were reported with the data. Since these were batch QC the results had no impact on the project samples and qualifications were not applied to the data based on these results.

Method 8260 B Volatile Qualifications

Reason Codes

1 = preservation (received outside of temperature >10 degrees Celsius, significant head space)

2 = holding times (pH was greater than 2 and analyzed greater than 7 days past collection

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result*	Reason Code**
0620 BUTCHER	8260B	1,2-Dichloropropane	0.25 U	ug/L	0.25 UJ	1
		Benzene	0.83 J	ug/L	0.83 J	1
		Chloroform	0.25 U	ug/L	0.25 UJ	1
		Ethylbenzene	1.6 J	ug/L	1.6 J	1
		m,p-Xylene	0.50 U	ug/L	0.25 UJ	1
		Methylene Chloride	1.1 U	ug/L	0.50 UJ	1
		o-Xylene	0.25 U	ug/L	0.25 UJ	1
		Toluene	0.5 J	ug/L	0.5 J	1
		Xylenes, Total	0.25 U	ug/L	0.25 UJ	1
0620 OD STREAMS		1,2-Dichloropropane	2.5 U	ug/L	2.5 R	1,2
		Benzene	2.5 U	ug/L	2.5 R	1,2
		Chloroform	2.5 U	ug/L	2.5 R	1,2
		Ethylbenzene	2.5 U	ug/L	2.5 R	1,2
		m,p-Xylene	5 U	ug/L	5 R	1,2
		Methylene Chloride	11 U	ug/L	11 R	1,2
		o-Xylene	2.5 U	ug/L	2.5 R	1,2
		Toluene	2.5 U	ug/L	2.5 R	1,2
		Xylenes, Total	2.5 U	ug/L	2.5 R	1,2

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result*	Reason Code**
0621 BUTCHER	8260B	1,2-Dichloropropane	0.25 U	ug/L	0.25 UJ	1
		Benzene	1.2 J	ug/L	1.2 J	1
		Chloroform	0.25 U	ug/L	0.25 UJ	1
		Ethylbenzene	3.4	ug/L	3.4 J	1
		m,p-Xylene	0.50 U	ug/L	0.50 UJ	1
		Methylene Chloride	1.1 U	ug/L	1.1 UJ	1
		o-Xylene	0.25 U	ug/L	0.25 UJ	1
		Toluene	1.1 J	ug/L	1.1 J	1
		Xylenes, Total	0.25 U	ug/L	0.25 UJ	1
0621 OD STREAMS	8260B	1,2-Dichloropropane	2.5 U	ug/L	2.5 R	1,2
		Benzene	2.5 U	ug/L	2.5 R	1,2
		Chloroform	2.5 U	ug/L	2.5 R	1,2
		Ethylbenzene	2.5 U	ug/L	2.5 R	1,2
		m,p-Xylene	5 U	ug/L	5 R	1,2
		Methylene Chloride	11 U	ug/L	11 R	1,2
		o-Xylene	2.5 U	ug/L	2.5 R	1,2
		Toluene	2.5 U	ug/L	2.5 R	1,2
		Xylenes, Total	2.5 U	ug/L	2.5 R	1,2

*Validation qualifier definitions are included in Attachment 1 of this report
**Reason code definitions are included in Attachment 2 of this report
ug/L – microgram per liter
U – the analyte was not detected at or above the reported value
J -laboratory flag; result is less than the reporting limit but greater than the method detection limit and the concentration is an approximate value.

Method 625 Semi-Volatiles Qualifications

Reason Codes

1 = preservation (received outside of temperature >10 degrees Celsius)

2 = holding times (pH was greater than 2 and analyzed greater than 7 days past collection

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
0620 BUTCHER	625	Bis(2-ethylhexyl) phthalate	40 U	ug/L	40 UJ	1
0620 OD STREAMS	625	Bis(2-ethylhexyl) phthalate	179 U	ug/L	179 UJ	1
0621 BUTCHER	625	Bis(2-ethylhexyl) phthalate	82 U	ug/L	82 UJ	1
0621 OD STREAMS	625	Bis(2-ethylhexyl) phthalate	170 U	ug/L	170 UJ	1

ug/L – microgram per liter
U – the analyte was not detected at or above the reported value

Method 8315 Carbonyl Compounds Qualifications

Reason Codes

1 = preservation (received outside of temperature >10 degrees Celsius)

2= holding time exceedance

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
0620 BUTCHER	8315	Formaldehyde	0.052 H	mg/L	0.052 J	1,2
0620 OD STREAMS	8315	Formaldehyde	0.080 H	mg/L	0.080 J	1,2
0621 BUTCHER	8315	Formaldehyde	0.051 H	mg/L	0.051 J	1,2
0621 OD STREAMS	8315	Formaldehyde	0.069 H	mg/L	0.069 J	1,2

ug/L – microgram per liter
H – Lab flag; Sample was prepped or analyzed beyond the specified holding time

Method 6010B Metals Qualifications – None

Method 7470A Mercury Qualifications - None

Wet Chemistry Parameters

Reason Code

1 = preservation (received outside of temperature >10 degrees Celsius and pH >2 upon receipt, COD and HEM)

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
0620 BUTCHER	1664A	HEM	330	mg/L	330 J	1
	351.2	Total Kjeldahl Nitrogen	1000	mg/L	1000 J	1
	353.2	Nitrate Nitrite as	0.31 U	mg/L	0.31 UJ	1
	365.3	Phosphorous,	100	mg/L	100 J	1
	420.1	Phenolics, Total	0.10	mg/L	0.10	1
	4500 CN E	Cyanide, Total	0.013 U	mg/L	0.013 UJ	1
	--	Ammonia (as N)	62	mg/L	62 J	1
	4500 NH3	Ammonia as	75	mg/L	75 J	1
	5220D	Chemical	12000	mg/L	12000 J	1
	2540E	Total Volatile	12000	mg/L	12000 J	1
	2540B	Total Solids	17000	mg/L	17000 J	1
	--	Total Nitrogen	1000	mg/L	1000 J	1
0620 OD STREAMS	1664A	HEM	6370	mg/L	6370 J	1
	351.2	Total Kjeldahl Nitrogen	3700	mg/L	3700 J	1
	353.2	Nitrate Nitrite as N	0.31 U	mg/L	0.31 UJ	1
	365.3	Phosphorous, Total	550	mg/L	550 J	1
	420.1	Phenolics, Total Recoverable	7.2	mg/L	7.2 J	1

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
	4500 CN E	Cyanide, Total	0.045	mg/L	0.045 J	1
	--	Ammonia (as N)	1800	mg/L	1800 J	1
	4500 NH3 D	Ammonia as NH3	2200	mg/L	2200 J	1
	5220D	Chemical Oxygen Demand	74000	mg/L	74000 J	1
	2540E	Total Volatile Solids	21000	mg/L	21000 J	1
	2540B	Total Solids	35000	mg/L	35000 J	1
	--	Total Nitrogen	3700	mg/L	3700 J	1
0621 BUTCHER	1664A	HEM	633	mg/L	633 J	1
	351.2	Total Kjeldahl Nitrogen	570	mg/L	570 J	1
	353.2	Nitrate Nitrite as N	0.31 U	mg/L	0.31 UJ	1
	365.3	Phosphorous, Total	130	mg/L	130 J	1
	420.1	Phenolics, Total Recoverable	0.087	mg/L	0.087 J	1
	4500 CN E	Cyanide, Total	0.013 U	mg/L	0.013 UJ	1
	--	Ammonia (as N)	120	mg/L	120 J	1
	4500 NH3 D	Ammonia as NH3	140	mg/L	140 J	1
	5220D	Chemical Oxygen Demand	11000	mg/L	11000 J	1
	2540E	Total Volatile Solids	7700	mg/L	7700 J	1
	2540B	Total Solids	11000	mg/L	11000 J	1
	--	Total Nitrogen	570	mg/L	570 J	1
	1664A	HEM	7090	mg/L	7090 J	1

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
0621 OD STREAMS	351.2	Total Kjeldahl Nitrogen	4000	mg/L	4000 J	1
	353.2	Nitrate Nitrite as N	0.31 U	mg/L	0.31 UJ	1
	365.3	Phosphorous, Total	980	mg/L	980 J	1
	420.1	Phenolics, Total Recoverable	11	mg/L	11 J	1
	4500 CN E	Cyanide, Total	0.037	mg/L	0.037 J	1
	--	Ammonia (as N)	2200	mg/L	2200 J	1
	4500 NH3 D	Ammonia as NH3	2600	mg/L	2600 J	1
	5220D	Chemical Oxygen Demand	65000	mg/L	65000 J	1
	2540E	Total Volatile Solids	16000	mg/L	16000 J	1
	2540B	Total Solids	31000	mg/L	31000 J	1
	--	Total Nitrogen	4000	mg/L	4000 J	1

mg/L – milligram per liter
U – the analyte was not detected at or above the reported value
J -laboratory flag; result is less than the reporting limit but greater than the method detection limit and the concentration is an approximate value.

Method NO3NO2 Calc – Nitrogen, Nitrate-Nitrite Qualifications

Reason Codes

1 = preservation (received outside of temperature >10 degrees Celsius)

2= holding time exceedance

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
0620 BUTCHER	NO3NO2 Calc	Nitrate as N	1.1 U H	mg/L	1.1 R	1,2
		Nitrite as N	0.50 U H	mg/L	0.50 R	1,2
		Nitrate Nitrite as N	1.1 U H	mg/L	1.1 R	1,2
0620 OD STREAMS	NO3NO2 Calc	Nitrate as N	5.5 U H	mg/L	5.5 R	1,2
		Nitrite as N	2.5 U H	mg/L	2.5 R	1,2
		Nitrate Nitrite as N	5.5 U H	mg/L	5.5 R	1,2
0621 BUTCHER	NO3NO2 Calc	Nitrate as N	1.1 U H	mg/L	1.1 R	1,2
		Nitrite as N	0.50 U H	mg/L	0.50 R	1,2
		Nitrate Nitrite as N	1.1 U H	mg/L	1.1 R	1,2
0621 OD STREAMS	NO3NO2 Calc	Nitrate as N	5.5 U H	mg/L	5.5 R	1,2
		Nitrite as N	2.5 U H	mg/L	2.5 R	1,2
		Nitrate Nitrite as N	5.5 U H	mg/L	5.5 R	1,2

mg/L – milligram per liter
U – the analyte was not detected at or above the reported value
H – Lab flag; Sample was prepped or analyzed beyond the specified holding time

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

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ANALYTICAL REPORT

Eurofins TestAmerica, Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

Laboratory Job ID: 440-245042-1
Client Project/Site: Ocean Disposal WW Sample
Revision: 1

For:
Geosyntec Consultants, Inc.
295 Hagey Blvd.
Suite 290
Waterloo, Ontario N2L 6R5

Attn: Nick Butson

Authorized for release by:
7/31/2019 12:03:48 PM

Lena Davidkova, Project Manager II
(949)260-3229
lena.davidkova@testamericainc.com

Table of Contents

Sample Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
440-245042-1	06 25 BUTCH	Water	06/25/19 08:15	07/02/19 10:10	
440-245042-2	06 25 OD STREAMS	Water	06/25/19 08:24	07/02/19 10:10	
440-245042-3	06 25 BUTCH DUP	Water	06/25/19 08:15	07/02/19 10:10	
440-245042-4	BUTCHER	Water	06/26/19 06:06	07/02/19 10:10	
440-245042-5	OD STREAMS	Water	06/26/19 06:19	07/02/19 10:10	
440-245042-6	BUTCHER	Water	06/27/19 06:09	07/02/19 10:10	
440-245042-7	OD STREAMS	Water	06/27/19 06:22	07/02/19 10:10	

Job ID: 440-245042-1

Laboratory: Eurofins TestAmerica, Irvine

Narrative

Job Narrative
440-245042-1

Comments
This it final report. Pyrethrins results were included under this cover

Receipt
The samples were received on 7/2/2019 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 7 coolers at receipt time were 18.1º C, 18.3º C, 20.5º C, 20.6º C, 20.6º C, 21.4º C and 26.0º C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: 06 25 BUTCH (440-245042-1), 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), BUTCHER (440-245042-4), OD STREAMS (440-245042-5), BUTCHER (440-245042-6) and OD STREAMS (440-245042-7). Received samples on thawed blue ice. The temperatures recorded were 20.9/20.6 ,21.7/21.4,18.6/18.3,18.4/18.1,20.8/20.5,20.9/20.6 IR 94 outside the required temperature criteria.

The following sample(s) was received with headspace in the sample container. This sample container was received with headspace. 06 25 BUTCH (440-245042-1), 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), BUTCHER (440-245042-6) and OD STREAMS (440-245042-7). All voa vials HCL that were received have headspace more than 6 mm including sample # 4 and # 5.

GC/MS VOA
Method(s) 8260B: The sample was collected in properly preserved vials for analysis of volatile organic compounds (VOCs). However, when verified by the laboratory, the pH was 7 and the following sample was analyzed after 7 days from sampling: 06 25 OD STREAMS (440-245042-2).

Method(s) 8260B: The following sample was diluted due to the abundance of non-target analytes: 06 25 OD STREAMS (440-245042-2). Elevated reporting limits (RLs) are provided.

Method(s) 8260B: The laboratory control sample (LCS) for analytical batch 440-556388 recovered outside control limits for the following analyte: Ethylbenzene. This analyte was biased high in the LCS and was not detected in the associated samples; therefore, the data have been reported.

Method(s) 8260B: Internal standard (ISTD) response for TBA-d9 for the following sample was outside acceptance criteria: (CCVIS 440-556388/2). This ISTD does not correspond to any of the requested target compounds; therefore, the data have been reported.

Method(s) 8260B: The following volatile samples were received and analyzed with significant headspace in the sample container(s): 06 25 OD STREAMS (440-245042-2) and 06 25 BUTCH DUP (440-245042-3). Significant headspace is defined as a bubble greater than 6 mm in diameter. All VOA vials had headspace.

Method(s) 8260B: The sample was collected in properly preserved vials for analysis of volatile organic compounds (VOCs). However, when verified by the laboratory, the pH was 7 and the following samples were analyzed after 7 days from sampling: OD STREAMS (440-245042-5) and OD STREAMS (440-245042-7).

Method(s) 8260B: The following volatile sample was received and analyzed with significant headspace in the sample container(s): OD STREAMS (440-245042-5). Significant headspace is defined as a bubble greater than 6 mm in diameter. All VOA vials had headspace.

Method(s) 8260B: The following samples were diluted due to the abundance of non-target analytes: OD STREAMS (440-245042-5) and OD STREAMS (440-245042-7). Elevated reporting limits (RLs) are provided.

Method(s) 8260B: The matrix spike / matrix spike duplicate (MS/MSD) precision for analytical batch 440-556394 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected.

Method(s) 8260B: The continuing calibration verification (CCV) associated with batch 440-556543 recovered above the upper control limit for Chloroform and 1,2-Dichloropropane. The samples associated with this CCV were non-detects for the affected analytes; therefore, the

Job ID: 440-245042-1 (Continued)

Laboratory: Eurofins TestAmerica, Irvine (Continued)

data have been reported. The following samples are impacted: 06 25 BUTCH (440-245042-1) and (CCVIS 440-556543/3).

Method(s) 8260B: *The following volatile samples were received and analyzed with significant headspace in the sample vials: 06 25 BUTCH (440-245042-1) and 06 25 BUTCH DUP (440-245042-3). Significant headspace is defined as a bubble greater than 6 mm in diameter. All VOA vials had headspace.

Method(s) 8260B: Surrogate 4-Bromofluorobenzene recovery for the following sample was outside the upper control limits: 06 25 BUTCH (440-245042-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method(s) 8260B: The following volatile samples were received and analyzed with significant headspace in the sample container(s): BUTCHER (440-245042-4) and BUTCHER (440-245042-6). Significant headspace is defined as a bubble greater than 6 mm in diameter.

Method(s) 8260B: Surrogate 4-Bromofluorobenzene recovery for the following sample(s) was outside the upper control limits: BUTCHER (440-245042-6). Re-analysis was performed with concurring results. This analysis has been reported.

Method(s) 8260B: Internal standard (ISTD) 1,4-Dichlorobenzene-d4 response for the following sample(s) was outside the lower control limits: BUTCHER (440-245042-6). The sample(s) was re-analyzed with concurring results, this set of data has been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA

Method(s) 625: The following samples were diluted due to the abundance of non-target analytes: 06 25 BUTCH (440-245042-1), 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), BUTCHER (440-245042-4), OD STREAMS (440-245042-5), BUTCHER (440-245042-6) and OD STREAMS (440-245042-7). Elevated reporting limits (RLs) are provided.

Method(s) 625: The following samples required a dilution due to the nature of the sample matrix: 06 25 OD STREAMS (440-245042-2), OD STREAMS (440-245042-5) and OD STREAMS (440-245042-7). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

HPLC/IC

Method(s) 300.0: The following samples were diluted due to the nature of the sample matrix: 06 25 BUTCH (440-245042-1), 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), BUTCHER (440-245042-4), OD STREAMS (440-245042-5), BUTCHER (440-245042-6) and OD STREAMS (440-245042-7). Elevated reporting limits (RLs) are provided. Due to fishy samples.

Method(s) NO3NO2 Calc: The following samples were received outside of holding time for Nitrate Nitrite as N: 06 25 BUTCH (440-245042-1), 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), BUTCHER (440-245042-4), OD STREAMS (440-245042-5), BUTCHER (440-245042-6) and OD STREAMS (440-245042-7).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

The reference method requires samples to be preserved to a pH of <2. The following samples were received with insufficient preservation at a pH of 4 and 6: 06 25 BUTCH DUP (440-245042-3) and OD STREAMS (440-245042-5). The sample(s) was preserved to the appropriate pH in the laboratory.

Method(s) 6010B: The continuing calibration blank (CCB) for 440-556566 contained Titanium above the method detection limit (MDL). This target analyte concentration was less than the reporting limit (RL).(CCB 440-556566/15), (CCB 440-556566/27), (CCB 440-556566/39) and (CCB 440-556566/51)

Method(s) 6010B: The method blank for preparation batch 440-556431 and analytical batch 440-556566 contained Chromium above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

Job ID: 440-245042-1 (Continued)

Laboratory: Eurofins TestAmerica, Irvine (Continued)

Method(s) 6010B: The serial dilution performed for the following sample associated with batch 440-556566 was outside control limits for Magnesium, Manganese and Titanium: (440-245154-J-1-A SD ^5)

Method(s) 6010B: The post digestion spike % recovery for Manganese and Titanium associated with batch 440-556566 was outside of control limits.

Method(s) 6010B: The following samples were diluted due to the nature of the sample matrix: 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), OD STREAMS (440-245042-5) and OD STREAMS (440-245042-7). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
Method(s) 353.2: The following samples were diluted in analytical batch 320-306826 due to the nature of the sample matrix: 06 25 BUTCH (440-245042-1), 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), BUTCHER (440-245042-4), OD STREAMS (440-245042-5), BUTCHER (440-245042-6) and OD STREAMS (440-245042-7). Samples were a dark brown color, had high sediment, and were extremely difficult to filter Elevated reporting limits (RLs) are provided. Data is being reported with this narration.

Method(s) 365.3: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 440-556226 and analytical batch 440-556268 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) SM 5220D: The reference method requires samples to be preserved to a pH of <2. The following samples were received with insufficient preservation at a pH of 7: 06 25 OD STREAMS (440-245042-2) and OD STREAMS (440-245042-7). The sample(s) was preserved to the appropriate pH in the laboratory.

Method(s) Distill/Phenol: Sample was received with a pH of >2. Container was preserved with sulfuric acid, then prepped for analysis.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method(s) 8315_W_Prep: The following samples were received outside of holding time: 06 25 BUTCH (440-245042-1), 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), BUTCHER (440-245042-4), OD STREAMS (440-245042-5), BUTCHER (440-245042-6) and OD STREAMS (440-245042-7). Method 8315

Method(s) 8315_W_Prep: Sample received was cloudy red color, strong odor with residue with pH of 7. After added DNPH to make the color change initial reaction was murky brown. Method 8315
06 25 BUTCH (440-245042-1)

Method(s) 8315_W_Prep: Sample received was cloudy green color strong odor with pH of 7. Adjusted pH of 3. After added DNPH to make the color change initial reaction was murky green. Method 8315
06 25 OD STREAMS (440-245042-2)

Method(s) 8315_W_Prep: sample received was cloudy red color strong odor with pH of 7. After added DNPH to make the color change initial reaction was murky brown. Method 8315
06 25 BUTCH DUP (440-245042-3)

Method(s) 8315_W_Prep: Sample received was cloudy red color strong odor with pH of 7. After added DNPH to make the color change initial reaction was murky brown. Method 8315
BUTCHER (440-245042-4)

Method(s) 8315_W_Prep: Sample received was cloudy olive green color strong odor with pH of 7. Adjusted pH of 3. After added DNPH to make the color change initial reaction was murky yellow. Method 8315
OD STREAMS (440-245042-5)

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Laboratory: Eurofins TestAmerica, Irvine (Continued)

Method(s) 8315_W_Prep: Sample received was cloudy red pink color strong odor with residue with pH of 7. After added DNPH to make the color change initial reaction was murky brown. Method 8315
BUTCHER (440-245042-6)

Method(s) 8315_W_Prep: Sample received was cloudy green color strong odor with pH of 7. Adjusted pH of 3. After added DNPH to make the color change initial reaction was murky yellow. Method 8315
OD STREAMS (440-245042-7)

Method(s) 8315_W_Prep: The following samples were diluted due to the nature of the sample matrix: 20 mL. Elevated reporting limits (RLs) are provided. Method 8315

Method(s) 8315_W_Prep: Sample was cloudy light pink color strong odor with residue. After added DNPH to make the color change initial reaction was murky yellow. Heavy emulsion. Method 8315
06 25 BUTCH (440-245042-1)

Method(s) 8315_W_Prep: Sample was cloudy light green color strong odor. Adjusted pH of 3. After added DNPH to make the color change initial reaction was murky yellow.Heavy emulsion. Method 8315
06 25 OD STREAMS (440-245042-2)

Method(s) 8315_W_Prep: Sample was cloudy light pink color strong odor. After added DNPH to make the color change initial reaction was murky yellow. Heavy emulsion. Method 8315
06 25 BUTCH DUP (440-245042-3)

Method(s) 8315_W_Prep: Sample was cloudy light brown color strong odor. After added DNPH to make the color change initial reaction was murky yellow. Heavy emulsion. Method 8315
BUTCHER (440-245042-4)

Method(s) 8315_W_Prep: sample was cloudy light green color strong odor. Adjusted pH of 3. After added DNPH to make the color change initial reaction was murky yellow. Heavy emulsion. Method 8315
OD STREAMS (440-245042-5)

Method(s) 8315_W_Prep: Sample was cloudy light brown color strong odor with residue. After added DNPH to make the color change initial reaction was murky yellow. Heavy emulsion. Method 8315
BUTCHER (440-245042-6)

Method(s) 8315_W_Prep: Sample was cloudy light green color strong odor. Adjusted pH of 3. After added DNPH to make the color change initial reaction was murky yellow. Heavy emulsion. Method 8315
OD STREAMS (440-245042-7)

Method(s) 625: The following samples were diluted due to the abundance of non-target analytes: 06 25 BUTCH (440-245042-1), 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), BUTCHER (440-245042-4), OD STREAMS (440-245042-5) and OD STREAMS (440-245042-7) at 100 ml. Elevated reporting limits (RLs) are provided. Method 625-REG. LCS was performed in duplicate to provide precision of data.

Method(s) 625: The following sample was diluted due to the abundance of non-target analytes: BUTCHER (440-245042-6) at 200 ml. Elevated reporting limits (RLs) are provided. Method 625-REG.

Method(s) 625: The following samples were prepared outside of preparation holding time : 06 25 BUTCH (440-245042-1), 06 25 OD STREAMS (440-245042-2), 06 25 BUTCH DUP (440-245042-3), BUTCHER (440-245042-4), OD STREAMS (440-245042-5), BUTCHER (440-245042-6) and OD STREAMS (440-245042-7).

Method(s) 3520C, 625: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 8270 preparation batch 440-556176. LCS was performed in duplicate to maintain precision of data.

Method(s) 1664A, 1664B: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated

Job ID: 440-245042-1 (Continued)

Laboratory: Eurofins TestAmerica, Irvine (Continued)

with preparation batch 440-556396 and analytical batch 440-556472.1664 The Laboratory Control Sample (LCS) was performed in duplicate to provide precision data for this batch

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: 06 25 BUTCH

Date Collected: 06/25/19 08:15
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-1

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/09/19 05:59	1
Benzene	**2.0**		2.0	0.25	ug/L			07/09/19 05:59	1
Chloroform	ND		2.0	0.25	ug/L			07/09/19 05:59	1
Ethylbenzene	**10**		2.0	0.25	ug/L			07/09/19 05:59	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/09/19 05:59	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/09/19 05:59	1
o-Xylene	ND		2.0	0.25	ug/L			07/09/19 05:59	1
Toluene	**0.81**	**J**	2.0	0.25	ug/L			07/09/19 05:59	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/09/19 05:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*134*	*X*	*80 - 120*		*07/09/19 05:59*	*1*
Dibromofluoromethane (Surr)	*111*		*76 - 132*		*07/09/19 05:59*	*1*
Toluene-d8 (Surr)	*110*		*80 - 128*		*07/09/19 05:59*	*1*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND	H	400	80	ug/L		07/05/19 08:23	07/09/19 07:20	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*88*		*50 - 120*	*07/05/19 08:23*	*07/09/19 07:20*	*2*
2-Fluorophenol	*97*		*30 - 120*	*07/05/19 08:23*	*07/09/19 07:20*	*2*
2,4,6-Tribromophenol	*71*		*40 - 120*	*07/05/19 08:23*	*07/09/19 07:20*	*2*
Nitrobenzene-d5	*97*		*45 - 120*	*07/05/19 08:23*	*07/09/19 07:20*	*2*
Terphenyl-d14	*49*		*10 - 150*	*07/05/19 08:23*	*07/09/19 07:20*	*2*
Phenol-d6	*109*		*35 - 120*	*07/05/19 08:23*	*07/09/19 07:20*	*2*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.091**	**H**	0.050	0.025	mg/L		07/03/19 08:09	07/03/19 16:53	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	2.2	1.1	mg/L			07/09/19 16:07	1
Nitrite as N	ND	H	3.0	0.50	mg/L			07/09/19 16:07	1
Nitrate Nitrite as N	ND	H	3.0	1.1	mg/L			07/09/19 16:07	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.38**		0.10	0.050	mg/L		07/03/19 08:03	07/05/19 12:09	1
Arsenic	**0.16**		0.010	0.0089	mg/L		07/03/19 08:03	07/05/19 12:09	1
Barium	**0.014**		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 12:09	1
Boron	**0.13**		0.050	0.025	mg/L		07/03/19 08:03	07/05/19 12:09	1
Cadmium	**0.042**		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 12:09	1
Chromium	**0.029**		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 12:09	1
Copper	**0.053**		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 12:09	1
Magnesium	**26**		0.020	0.010	mg/L		07/03/19 08:03	07/05/19 12:09	1
Manganese	**0.018**	**J**	0.020	0.015	mg/L		07/03/19 08:03	07/05/19 12:09	1
Nickel	**0.015**		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 12:09	1
Selenium	**0.13**		0.010	0.0087	mg/L		07/03/19 08:03	07/05/19 12:09	1
Titanium	**0.020**		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 12:09	1

Client Sample ID: 06 25 BUTCH

Lab Sample ID: 440-245042-1

Date Collected: 06/25/19 08:15

Matrix: Water

Date Received: 07/02/19 10:10

Method: 6010B - Metals (ICP) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	**1.1**		0.020	0.012	mg/L		07/03/19 08:03	07/05/19 12:09	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0039**		0.0020	0.0010	mg/L		07/05/19 13:01	07/06/19 10:40	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	**79.2**		5.4	1.5	mg/L		07/08/19 06:52	07/08/19 13:23	1
Total Kjeldahl Nitrogen	**750**		50	25	mg/L		07/05/19 14:00	07/09/19 21:47	5
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 11:13	100
Phosphorus, Total	**63**		25	13	mg/L		07/05/19 18:05	07/06/19 13:33	1
Phenolics, Total Recoverable	**0.14**		0.050	0.025	mg/L		07/09/19 12:53	07/09/19 17:37	1
Cyanide, Total	ND		0.025	0.013	mg/L		07/03/19 10:24	07/03/19 12:39	1
Ammonia (as N)	**82**		25	5.0	mg/L		07/05/19 04:00	07/05/19 06:00	1
Ammonia as NH3	**100**		30	6.0	mg/L		07/05/19 04:00	07/05/19 06:00	1
Chemical Oxygen Demand	**8600**		400	200	mg/L			07/10/19 16:46	20

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	**7100**		200	200	mg/L			07/02/19 19:36	1
Specific Gravity	**0.98**		0.010	0.010	No Unit			07/10/19 15:21	1
Total Solids	**10000**		200	200	mg/L			07/02/19 19:36	1
Nitrogen, Total	**750**		0.11	0.11	mg/L			07/11/19 15:16	1

Client Sample ID: 06 25 OD STREAMS

Lab Sample ID: 440-245042-2

Date Collected: 06/25/19 08:24

Matrix: Water

Date Received: 07/02/19 10:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		10	1.3	ug/L			07/08/19 17:00	5
Benzene	ND		10	1.3	ug/L			07/08/19 17:00	5
Chloroform	ND		10	1.3	ug/L			07/08/19 17:00	5
Ethylbenzene	ND	*	10	1.3	ug/L			07/08/19 17:00	5
m,p-Xylene	ND		10	2.5	ug/L			07/08/19 17:00	5
Methylene Chloride	ND		25	5.5	ug/L			07/08/19 17:00	5
o-Xylene	ND		10	1.3	ug/L			07/08/19 17:00	5
Toluene	ND		10	1.3	ug/L			07/08/19 17:00	5
Xylenes, Total	ND		10	1.3	ug/L			07/08/19 17:00	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*07/08/19 17:00*	*5*
Dibromofluoromethane (Surr)	*100*		*76 - 132*		*07/08/19 17:00*	*5*
Toluene-d8 (Surr)	*103*		*80 - 128*		*07/08/19 17:00*	*5*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND	H	2000	400	ug/L		07/05/19 08:23	07/09/19 07:44	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*103*		*50 - 120*	*07/05/19 08:23*	*07/09/19 07:44*	*10*
2-Fluorophenol	*100*		*30 - 120*	*07/05/19 08:23*	*07/09/19 07:44*	*10*

Client Sample ID: 06 25 OD STREAMS

Date Collected: 06/25/19 08:24
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-2

Matrix: Water

Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol	*87*		*40 - 120*	*07/05/19 08:23*	*07/09/19 07:44*	*10*
Nitrobenzene-d5	*106*		*45 - 120*	*07/05/19 08:23*	*07/09/19 07:44*	*10*
Terphenyl-d14	*40*		*10 - 150*	*07/05/19 08:23*	*07/09/19 07:44*	*10*
Phenol-d6	*73*		*35 - 120*	*07/05/19 08:23*	*07/09/19 07:44*	*10*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.096**	**H**	0.050	0.025	mg/L		07/03/19 08:09	07/03/19 17:14	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	11	5.5	mg/L			07/09/19 16:07	1
Nitrite as N	ND	H	15	2.5	mg/L			07/09/19 16:07	1
Nitrate Nitrite as N	ND	H	15	5.5	mg/L			07/09/19 16:07	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**180**		1.0	0.50	mg/L		07/08/19 09:56	07/08/19 18:23	10
Arsenic	**0.27**		0.10	0.089	mg/L		07/08/19 09:56	07/08/19 18:23	10
Barium	**0.063**	**J**	0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:23	10
Boron	**0.32**	**J**	0.50	0.25	mg/L		07/08/19 09:56	07/08/19 18:23	10
Cadmium	**0.077**		0.050	0.025	mg/L		07/08/19 09:56	07/08/19 18:23	10
Chromium	**0.080**	**B**	0.050	0.025	mg/L		07/08/19 09:56	07/08/19 18:23	10
Copper	**0.22**		0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:23	10
Magnesium	**100**		0.20	0.10	mg/L		07/08/19 09:56	07/08/19 18:23	10
Manganese	ND		0.20	0.15	mg/L		07/08/19 09:56	07/08/19 18:23	10
Nickel	**0.054**	**J**	0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:23	10
Selenium	**0.20**		0.10	0.087	mg/L		07/08/19 09:56	07/08/19 18:23	10
Titanium	**0.18**		0.050	0.025	mg/L		07/08/19 09:56	07/08/19 18:23	10
Zinc	**11**		0.20	0.12	mg/L		07/08/19 09:56	07/08/19 18:23	10

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0023**		0.0020	0.0010	mg/L		07/05/19 13:01	07/06/19 10:43	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	**11.2**		5.3	1.5	mg/L		07/08/19 06:52	07/08/19 13:23	1
Total Kjeldahl Nitrogen	**3700**		100	50	mg/L		07/05/19 14:00	07/09/19 21:47	10
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 11:23	100
Phosphorus, Total	**570**		100	50	mg/L		07/05/19 12:08	07/05/19 14:39	1
Phenolics, Total Recoverable	**2.5**		0.50	0.25	mg/L		07/09/19 12:53	07/10/19 05:44	10
Cyanide, Total	**0.018**	**J**	0.025	0.013	mg/L		07/03/19 10:24	07/03/19 12:39	1
Ammonia (as N)	**1700**		250	50	mg/L		07/05/19 04:00	07/05/19 06:00	1
Ammonia as NH3	**2100**		300	60	mg/L		07/05/19 04:00	07/05/19 06:00	1
Chemical Oxygen Demand	**51000**		5000	2500	mg/L			07/10/19 16:46	250

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	**15000**		500	500	mg/L			07/02/19 19:36	1
Specific Gravity	**1.0**		0.010	0.010	No Unit			07/10/19 15:19	1
Total Solids	**33000**		500	500	mg/L			07/02/19 19:36	1

Client Sample ID: 06 25 OD STREAMS

Lab Sample ID: 440-245042-2
Date Collected: 06/25/19 08:24
Matrix: Water
Date Received: 07/02/19 10:10

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total	**3700**		0.11	0.11	mg/L			07/11/19 15:16	1

Client Sample ID: 06 25 BUTCH DUP

Lab Sample ID: 440-245042-3
Date Collected: 06/25/19 08:15
Matrix: Water
Date Received: 07/02/19 10:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/08/19 17:29	1
Benzene	**1.5**	**J**	2.0	0.25	ug/L			07/08/19 17:29	1
Chloroform	ND		2.0	0.25	ug/L			07/08/19 17:29	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/08/19 17:29	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/08/19 17:29	1
o-Xylene	ND		2.0	0.25	ug/L			07/08/19 17:29	1
Toluene	**0.67**	**J**	2.0	0.25	ug/L			07/08/19 17:29	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/08/19 17:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*119*		*80 - 120*		*07/08/19 17:29*	*1*
Dibromofluoromethane (Surr)	*99*		*76 - 132*		*07/08/19 17:29*	*1*
Toluene-d8 (Surr)	*113*		*80 - 128*		*07/08/19 17:29*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	**5.6**		2.0	0.25	ug/L			07/09/19 06:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*118*		*80 - 120*		*07/09/19 06:29*	*1*
Dibromofluoromethane (Surr)	*112*		*76 - 132*		*07/09/19 06:29*	*1*
Toluene-d8 (Surr)	*109*		*80 - 128*		*07/09/19 06:29*	*1*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND	H	400	80	ug/L		07/05/19 08:23	07/09/19 08:09	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*93*		*50 - 120*	*07/05/19 08:23*	*07/09/19 08:09*	*2*
2-Fluorophenol	*95*		*30 - 120*	*07/05/19 08:23*	*07/09/19 08:09*	*2*
2,4,6-Tribromophenol	*79*		*40 - 120*	*07/05/19 08:23*	*07/09/19 08:09*	*2*
Nitrobenzene-d5	*99*		*45 - 120*	*07/05/19 08:23*	*07/09/19 08:09*	*2*
Terphenyl-d14	*41*		*10 - 150*	*07/05/19 08:23*	*07/09/19 08:09*	*2*
Phenol-d6	*118*		*35 - 120*	*07/05/19 08:23*	*07/09/19 08:09*	*2*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.057**	**H**	0.050	0.025	mg/L		07/03/19 08:09	07/03/19 17:35	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	2.2	1.1	mg/L			07/09/19 16:07	1
Nitrite as N	ND	H	3.0	0.50	mg/L			07/09/19 16:07	1
Nitrate Nitrite as N	ND	H	3.0	1.1	mg/L			07/09/19 16:07	1

Client Sample ID: 06 25 BUTCH DUP

Lab Sample ID: 440-245042-3

Date Collected: 06/25/19 08:15

Matrix: Water

Date Received: 07/02/19 10:10

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		2.0	1.0	mg/L		07/08/19 09:56	07/08/19 18:33	10
Arsenic	**0.23**		0.20	0.18	mg/L		07/08/19 09:56	07/08/19 18:33	10
Barium	ND		0.20	0.10	mg/L		07/08/19 09:56	07/08/19 18:33	10
Boron	ND		1.0	0.50	mg/L		07/08/19 09:56	07/08/19 18:33	10
Cadmium	**0.084**	**J**	0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:33	10
Chromium	**0.060**	**J B**	0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:33	10
Copper	ND		0.20	0.10	mg/L		07/08/19 09:56	07/08/19 18:33	10
Magnesium	**55**		0.40	0.20	mg/L		07/08/19 09:56	07/08/19 18:33	10
Manganese	ND		0.40	0.30	mg/L		07/08/19 09:56	07/08/19 18:33	10
Nickel	ND		0.20	0.10	mg/L		07/08/19 09:56	07/08/19 18:33	10
Selenium	**0.17**	**J**	0.20	0.17	mg/L		07/08/19 09:56	07/08/19 18:33	10
Titanium	**0.064**	**J**	0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:33	10
Zinc	**2.1**		0.40	0.24	mg/L		07/08/19 09:56	07/08/19 18:33	10

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0034**		0.0020	0.0010	mg/L		07/05/19 13:01	07/06/19 10:45	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	**203**		5.3	1.5	mg/L		07/08/19 06:52	07/08/19 13:23	1
Total Kjeldahl Nitrogen	**820**		50	25	mg/L		07/05/19 14:00	07/10/19 17:40	5
Nitrate Nitrite as N	**10**		5.0	0.31	mg/L			07/10/19 11:27	100
Phosphorus, Total	**66**		25	13	mg/L		07/05/19 18:05	07/06/19 13:33	1
Phenolics, Total Recoverable	**0.18**		0.050	0.025	mg/L		07/09/19 12:53	07/09/19 17:41	1
Cyanide, Total	ND		0.025	0.013	mg/L		07/03/19 10:24	07/03/19 12:39	1
Ammonia (as N)	**82**		25	5.0	mg/L		07/05/19 04:00	07/05/19 06:00	1
Ammonia as NH3	**100**		30	6.0	mg/L		07/05/19 04:00	07/05/19 06:00	1
Chemical Oxygen Demand	**9100**		1000	500	mg/L			07/10/19 16:46	50

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	**5600**		200	200	mg/L			07/02/19 19:36	1
Specific Gravity	**0.98**		0.010	0.010	No Unit			07/10/19 15:18	1
Total Solids	**8500**		200	200	mg/L			07/02/19 19:36	1
Nitrogen, Total	**820**		0.11	0.11	mg/L			07/11/19 15:16	1

Client Sample ID: BUTCHER

Lab Sample ID: 440-245042-4

Date Collected: 06/26/19 06:06

Matrix: Water

Date Received: 07/02/19 10:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/09/19 09:28	1
Benzene	**0.93**	**J**	2.0	0.25	ug/L			07/09/19 09:28	1
Chloroform	ND		2.0	0.25	ug/L			07/09/19 09:28	1
Ethylbenzene	**1.2**	**J**	2.0	0.25	ug/L			07/09/19 09:28	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/09/19 09:28	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/09/19 09:28	1
o-Xylene	ND		2.0	0.25	ug/L			07/09/19 09:28	1
Toluene	**0.33**	**J**	2.0	0.25	ug/L			07/09/19 09:28	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/09/19 09:28	1

Client Sample ID: BUTCHER

Date Collected: 06/26/19 06:06
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-4

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*119*		*80 - 120*		*07/09/19 09:28*	*1*
Dibromofluoromethane (Surr)	*112*		*76 - 132*		*07/09/19 09:28*	*1*
Toluene-d8 (Surr)	*104*		*80 - 128*		*07/09/19 09:28*	*1*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND	H	400	80	ug/L		07/05/19 08:23	07/09/19 08:33	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*95*		*50 - 120*	*07/05/19 08:23*	*07/09/19 08:33*	*2*
2-Fluorophenol	*95*		*30 - 120*	*07/05/19 08:23*	*07/09/19 08:33*	*2*
2,4,6-Tribromophenol	*100*		*40 - 120*	*07/05/19 08:23*	*07/09/19 08:33*	*2*
Nitrobenzene-d5	*104*		*45 - 120*	*07/05/19 08:23*	*07/09/19 08:33*	*2*
Terphenyl-d14	*41*		*10 - 150*	*07/05/19 08:23*	*07/09/19 08:33*	*2*
Phenol-d6	*96*		*35 - 120*	*07/05/19 08:23*	*07/09/19 08:33*	*2*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.052**	**H**	0.050	0.025	mg/L		07/03/19 08:09	07/03/19 17:56	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	1.1	0.55	mg/L			07/09/19 16:07	1
Nitrite as N	ND	H	1.5	0.25	mg/L			07/09/19 16:07	1
Nitrate Nitrite as N	ND	H	1.5	0.55	mg/L			07/09/19 16:07	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.20**		0.10	0.050	mg/L		07/03/19 08:03	07/05/19 12:11	1
Arsenic	**0.083**		0.010	0.0089	mg/L		07/03/19 08:03	07/05/19 12:11	1
Barium	**0.0085**	**J**	0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 12:11	1
Boron	**0.090**		0.050	0.025	mg/L		07/03/19 08:03	07/05/19 12:11	1
Cadmium	**0.018**		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 12:11	1
Chromium	**0.0098**		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 12:11	1
Copper	**0.031**		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 12:11	1
Magnesium	**20**		0.020	0.010	mg/L		07/03/19 08:03	07/05/19 12:11	1
Manganese	ND		0.020	0.015	mg/L		07/03/19 08:03	07/05/19 12:11	1
Nickel	**0.0063**	**J**	0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 12:11	1
Selenium	**0.091**		0.010	0.0087	mg/L		07/03/19 08:03	07/05/19 12:11	1
Titanium	**0.0083**		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 12:11	1
Zinc	**0.51**		0.020	0.012	mg/L		07/03/19 08:03	07/05/19 12:11	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0012**	**J**	0.0020	0.0010	mg/L		07/05/19 13:01	07/06/19 10:47	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	**120**		5.1	1.4	mg/L		07/08/19 06:52	07/08/19 13:23	1
Total Kjeldahl Nitrogen	**470**		10	5.0	mg/L		07/05/19 14:00	07/09/19 21:47	1
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 11:31	100
Phosphorus, Total	**58**		25	13	mg/L		07/05/19 18:05	07/06/19 13:33	1

Client Sample ID: BUTCHER

Lab Sample ID: 440-245042-4

Date Collected: 06/26/19 06:06

Matrix: Water

Date Received: 07/02/19 10:10

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	**0.088**		0.050	0.025	mg/L		07/09/19 12:53	07/09/19 17:45	1
Cyanide, Total	ND		0.025	0.013	mg/L		07/03/19 10:24	07/03/19 12:39	1
Ammonia (as N)	**28**		13	2.5	mg/L		07/05/19 04:00	07/05/19 06:00	1
Ammonia as NH3	**34**		15	3.0	mg/L		07/05/19 04:00	07/05/19 06:00	1
Chemical Oxygen Demand	**6000**		400	200	mg/L			07/10/19 16:46	20

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	**2300**		200	200	mg/L			07/02/19 19:37	1
Specific Gravity	**0.99**		0.010	0.010	No Unit			07/10/19 15:16	1
Total Solids	**5000**		200	200	mg/L			07/02/19 19:36	1
Nitrogen, Total	**470**		0.11	0.11	mg/L			07/11/19 15:16	1

Client Sample ID: OD STREAMS

Lab Sample ID: 440-245042-5

Date Collected: 06/26/19 06:19

Matrix: Water

Date Received: 07/02/19 10:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		10	1.3	ug/L			07/08/19 16:56	5
Benzene	ND		10	1.3	ug/L			07/08/19 16:56	5
Chloroform	ND		10	1.3	ug/L			07/08/19 16:56	5
Ethylbenzene	ND		10	1.3	ug/L			07/08/19 16:56	5
m,p-Xylene	ND		10	2.5	ug/L			07/08/19 16:56	5
Methylene Chloride	ND		25	5.5	ug/L			07/08/19 16:56	5
o-Xylene	ND		10	1.3	ug/L			07/08/19 16:56	5
Toluene	ND		10	1.3	ug/L			07/08/19 16:56	5
Xylenes, Total	ND		10	1.3	ug/L			07/08/19 16:56	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*		*07/08/19 16:56*	*5*
Dibromofluoromethane (Surr)	*113*		*76 - 132*		*07/08/19 16:56*	*5*
Toluene-d8 (Surr)	*100*		*80 - 128*		*07/08/19 16:56*	*5*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND	H	2000	400	ug/L		07/05/19 08:23	07/09/19 08:58	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*87*		*50 - 120*	*07/05/19 08:23*	*07/09/19 08:58*	*10*
2-Fluorophenol	*91*		*30 - 120*	*07/05/19 08:23*	*07/09/19 08:58*	*10*
2,4,6-Tribromophenol	*86*		*40 - 120*	*07/05/19 08:23*	*07/09/19 08:58*	*10*
Nitrobenzene-d5	*93*		*45 - 120*	*07/05/19 08:23*	*07/09/19 08:58*	*10*
Terphenyl-d14	*40*		*10 - 150*	*07/05/19 08:23*	*07/09/19 08:58*	*10*
Phenol-d6	*44*		*35 - 120*	*07/05/19 08:23*	*07/09/19 08:58*	*10*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.11**	**H**	0.050	0.025	mg/L		07/03/19 08:09	07/03/19 18:17	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	11	5.5	mg/L			07/09/19 16:07	1

Client Sample ID: OD STREAMS

Lab Sample ID: 440-245042-5

Date Collected: 06/26/19 06:19
Matrix: Water
Date Received: 07/02/19 10:10

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrite as N	ND	H	15	2.5	mg/L			07/09/19 16:07	1
Nitrate Nitrite as N	ND	H	15	5.5	mg/L			07/09/19 16:07	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**740**		2.0	1.0	mg/L		07/08/19 09:56	07/08/19 18:35	10
Arsenic	**1.3**		0.20	0.18	mg/L		07/08/19 09:56	07/08/19 18:35	10
Barium	**0.23**		0.20	0.10	mg/L		07/08/19 09:56	07/08/19 18:35	10
Boron	**1.2**		1.0	0.50	mg/L		07/08/19 09:56	07/08/19 18:35	10
Cadmium	**0.37**		0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:35	10
Chromium	**0.27**	**B**	0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:35	10
Copper	**0.86**		0.20	0.10	mg/L		07/08/19 09:56	07/08/19 18:35	10
Magnesium	**330**		0.40	0.20	mg/L		07/08/19 09:56	07/08/19 18:35	10
Manganese	ND		0.40	0.30	mg/L		07/08/19 09:56	07/08/19 18:35	10
Nickel	**0.14**	**J**	0.20	0.10	mg/L		07/08/19 09:56	07/08/19 18:35	10
Selenium	**0.73**		0.20	0.17	mg/L		07/08/19 09:56	07/08/19 18:35	10
Titanium	**0.58**		0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:35	10
Zinc	**43**		0.40	0.24	mg/L		07/08/19 09:56	07/08/19 18:35	10

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0045**		0.0020	0.0010	mg/L		07/05/19 13:01	07/06/19 10:49	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	**8.8**		5.2	1.5	mg/L		07/08/19 06:52	07/08/19 13:23	1
Total Kjeldahl Nitrogen	**4200**		100	50	mg/L		07/05/19 14:00	07/10/19 17:40	10
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 11:35	100
Phosphorus, Total	**630**		100	50	mg/L		07/05/19 12:08	07/05/19 14:40	1
Phenolics, Total Recoverable	**3.3**		0.50	0.25	mg/L		07/09/19 12:53	07/10/19 05:44	10
Cyanide, Total	**0.021**	**J**	0.025	0.013	mg/L		07/03/19 19:20	07/05/19 15:10	1
Ammonia (as N)	**2400**		250	50	mg/L		07/05/19 04:00	07/05/19 06:00	1
Ammonia as NH3	**2900**		300	60	mg/L		07/05/19 04:00	07/05/19 06:00	1
Chemical Oxygen Demand	**42000**		5000	2500	mg/L			07/10/19 16:46	250

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	**17000**		500	500	mg/L			07/02/19 19:37	1
Specific Gravity	**1.0**		0.010	0.010	No Unit			07/10/19 15:15	1
Total Solids	**33000**		500	500	mg/L			07/02/19 19:36	1
Nitrogen, Total	**4200**		0.11	0.11	mg/L			07/11/19 15:16	1

Client Sample ID: BUTCHER

Lab Sample ID: 440-245042-6

Date Collected: 06/27/19 06:09
Matrix: Water
Date Received: 07/02/19 10:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/09/19 09:58	1
Benzene	**1.1**	**J**	2.0	0.25	ug/L			07/09/19 09:58	1
Chloroform	ND		2.0	0.25	ug/L			07/09/19 09:58	1
Ethylbenzene	**2.0**		2.0	0.25	ug/L			07/09/19 09:58	1

Client Sample ID: BUTCHER

Date Collected: 06/27/19 06:09
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-6

Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		2.0	0.50	ug/L			07/09/19 09:58	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/09/19 09:58	1
o-Xylene	ND		2.0	0.25	ug/L			07/09/19 09:58	1
Toluene	**0.40**	**J**	2.0	0.25	ug/L			07/09/19 09:58	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/09/19 09:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*124*	*X **	*80 - 120*		*07/09/19 09:58*	*1*
Dibromofluoromethane (Surr)	*110*		*76 - 132*		*07/09/19 09:58*	*1*
Toluene-d8 (Surr)	*107*		*80 - 128*		*07/09/19 09:58*	*1*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND	H	200	40	ug/L		07/05/19 08:23	07/09/19 09:22	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*83*		*50 - 120*	*07/05/19 08:23*	*07/09/19 09:22*	*2*
2-Fluorophenol	*77*		*30 - 120*	*07/05/19 08:23*	*07/09/19 09:22*	*2*
2,4,6-Tribromophenol	*49*		*40 - 120*	*07/05/19 08:23*	*07/09/19 09:22*	*2*
Nitrobenzene-d5	*84*		*45 - 120*	*07/05/19 08:23*	*07/09/19 09:22*	*2*
Terphenyl-d14	*55*		*10 - 150*	*07/05/19 08:23*	*07/09/19 09:22*	*2*
Phenol-d6	*82*		*35 - 120*	*07/05/19 08:23*	*07/09/19 09:22*	*2*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**0.13**	**H**	0.050	0.025	mg/L		07/03/19 08:09	07/03/19 18:38	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	2.2	1.1	mg/L			07/09/19 16:07	1
Nitrite as N	ND	H	3.0	0.50	mg/L			07/09/19 16:07	1
Nitrate Nitrite as N	ND	H	3.0	1.1	mg/L			07/09/19 16:07	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.30**		0.10	0.050	mg/L		07/03/19 08:03	07/05/19 12:14	1
Arsenic	**0.086**		0.010	0.0089	mg/L		07/03/19 08:03	07/05/19 12:14	1
Barium	**0.016**		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 12:14	1
Boron	**0.14**		0.050	0.025	mg/L		07/03/19 08:03	07/05/19 12:14	1
Cadmium	**0.022**		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 12:14	1
Chromium	**0.020**		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 12:14	1
Copper	**0.042**		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 12:14	1
Magnesium	**29**		0.020	0.010	mg/L		07/03/19 08:03	07/05/19 12:14	1
Manganese	**0.016**	**J**	0.020	0.015	mg/L		07/03/19 08:03	07/05/19 12:14	1
Nickel	**0.015**		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 12:14	1
Selenium	**0.088**		0.010	0.0087	mg/L		07/03/19 08:03	07/05/19 12:14	1
Titanium	**0.011**		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 12:14	1
Zinc	**1.1**		0.020	0.012	mg/L		07/03/19 08:03	07/05/19 12:14	1

Client Sample ID: BUTCHER

Lab Sample ID: 440-245042-6

Date Collected: 06/27/19 06:09

Matrix: Water

Date Received: 07/02/19 10:10

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0013**	**J**	0.0020	0.0010	mg/L		07/05/19 13:01	07/06/19 10:52	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	**138**		5.4	1.5	mg/L		07/08/19 06:52	07/08/19 13:23	1
Total Kjeldahl Nitrogen	**450**		10	5.0	mg/L		07/05/19 14:00	07/09/19 21:47	1
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 11:39	100
Phosphorus, Total	**50**		25	13	mg/L		07/05/19 18:05	07/06/19 13:33	1
Phenolics, Total Recoverable	**0.083**		0.050	0.025	mg/L		07/09/19 12:53	07/09/19 17:45	1
Cyanide, Total	ND		0.025	0.013	mg/L		07/03/19 19:20	07/05/19 15:10	1
Ammonia (as N)	**35**		13	2.5	mg/L		07/05/19 04:00	07/05/19 06:00	1
Ammonia as NH3	**43**		15	3.0	mg/L		07/05/19 04:00	07/05/19 06:00	1
Chemical Oxygen Demand	**5500**		400	200	mg/L			07/10/19 16:47	20

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	**6900**		200	200	mg/L			07/02/19 19:37	1
Specific Gravity	**0.97**		0.010	0.010	No Unit			07/10/19 15:13	1
Total Solids	**12000**		200	200	mg/L			07/02/19 19:36	1
Nitrogen, Total	**450**		0.11	0.11	mg/L			07/11/19 15:16	1

Client Sample ID: OD STREAMS

Lab Sample ID: 440-245042-7

Date Collected: 06/27/19 06:22

Matrix: Water

Date Received: 07/02/19 10:10

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		10	1.3	ug/L			07/08/19 17:56	5
Benzene	ND		10	1.3	ug/L			07/08/19 17:56	5
Chloroform	ND		10	1.3	ug/L			07/08/19 17:56	5
Ethylbenzene	ND		10	1.3	ug/L			07/08/19 17:56	5
m,p-Xylene	ND		10	2.5	ug/L			07/08/19 17:56	5
Methylene Chloride	ND		25	5.5	ug/L			07/08/19 17:56	5
o-Xylene	ND		10	1.3	ug/L			07/08/19 17:56	5
Toluene	ND		10	1.3	ug/L			07/08/19 17:56	5
Xylenes, Total	ND		10	1.3	ug/L			07/08/19 17:56	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*07/08/19 17:56*	*5*
Dibromofluoromethane (Surr)	*107*		*76 - 132*		*07/08/19 17:56*	*5*
Toluene-d8 (Surr)	*101*		*80 - 128*		*07/08/19 17:56*	*5*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND	H	2000	400	ug/L		07/05/19 08:23	07/09/19 09:47	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*90*		*50 - 120*	*07/05/19 08:23*	*07/09/19 09:47*	*10*
2-Fluorophenol	*86*		*30 - 120*	*07/05/19 08:23*	*07/09/19 09:47*	*10*
2,4,6-Tribromophenol	*92*		*40 - 120*	*07/05/19 08:23*	*07/09/19 09:47*	*10*
Nitrobenzene-d5	*86*		*45 - 120*	*07/05/19 08:23*	*07/09/19 09:47*	*10*
Terphenyl-d14	*74*		*10 - 150*	*07/05/19 08:23*	*07/09/19 09:47*	*10*
Phenol-d6	*48*		*35 - 120*	*07/05/19 08:23*	*07/09/19 09:47*	*10*

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Client Sample ID: OD STREAMS

Date Collected: 06/27/19 06:22
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-7

Matrix: Water

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	0.15	H	0.050	0.025	mg/L		07/03/19 08:09	07/03/19 18:59	1

Method: NO3NO2 Calc - Nitrogen, Nitrate-Nitrite

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND	H	11	5.5	mg/L			07/09/19 16:07	1
Nitrite as N	ND	H	15	2.5	mg/L			07/09/19 16:07	1
Nitrate Nitrite as N	ND	H	15	5.5	mg/L			07/09/19 16:07	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	160		1.0	0.50	mg/L		07/08/19 09:56	07/08/19 18:38	10
Arsenic	0.32		0.10	0.089	mg/L		07/08/19 09:56	07/08/19 18:38	10
Barium	0.055	J	0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:38	10
Boron	0.57		0.50	0.25	mg/L		07/08/19 09:56	07/08/19 18:38	10
Cadmium	0.081		0.050	0.025	mg/L		07/08/19 09:56	07/08/19 18:38	10
Chromium	0.083	B	0.050	0.025	mg/L		07/08/19 09:56	07/08/19 18:38	10
Copper	0.21		0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:38	10
Magnesium	97		0.20	0.10	mg/L		07/08/19 09:56	07/08/19 18:38	10
Manganese	ND		0.20	0.15	mg/L		07/08/19 09:56	07/08/19 18:38	10
Nickel	ND		0.10	0.050	mg/L		07/08/19 09:56	07/08/19 18:38	10
Selenium	0.20		0.10	0.087	mg/L		07/08/19 09:56	07/08/19 18:38	10
Titanium	0.15		0.050	0.025	mg/L		07/08/19 09:56	07/08/19 18:38	10
Zinc	10		0.20	0.12	mg/L		07/08/19 09:56	07/08/19 18:38	10

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0036		0.0020	0.0010	mg/L		07/05/19 13:01	07/06/19 10:54	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	52.0		5.3	1.5	mg/L		07/08/19 06:52	07/08/19 13:23	1
Total Kjeldahl Nitrogen	4200		100	50	mg/L		07/05/19 14:00	07/10/19 17:40	10
Nitrate Nitrite as N	ND		5.0	0.31	mg/L			07/10/19 11:49	100
Phosphorus, Total	690		100	50	mg/L		07/05/19 12:08	07/05/19 14:40	1
Phenolics, Total Recoverable	7.5		1.0	0.50	mg/L		07/09/19 12:53	07/10/19 06:10	20
Cyanide, Total	0.032		0.025	0.013	mg/L		07/03/19 19:20	07/05/19 15:10	1
Ammonia (as N)	2400		250	50	mg/L		07/05/19 04:00	07/05/19 06:00	1
Ammonia as NH3	3000		300	60	mg/L		07/05/19 04:00	07/05/19 06:00	1
Chemical Oxygen Demand	43000		5000	2500	mg/L			07/10/19 16:47	250

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	15000		500	500	mg/L			07/02/19 19:37	1
Specific Gravity	1.0		0.010	0.010	No Unit			07/10/19 15:12	1
Total Solids	13000		200	200	mg/L			07/02/19 19:36	1
Nitrogen, Total	4200		0.11	0.11	mg/L			07/11/19 15:16	1

Method Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL IRV
625	Semivolatile Organic Compounds (GC/MS)	40CFR136A	TAL IRV
8315A	Carbonyl Compounds (HPLC)	SW846	TAL IRV
NO3NO2 Calc	Nitrogen, Nitrate-Nitrite	EPA	TAL IRV
6010B	Metals (ICP)	SW846	TAL IRV
7470A	Mercury (CVAA)	SW846	TAL IRV
1664A	HEM and SGT-HEM	1664A	TAL IRV
2540E	Solids, Volatile and Fixed (VS)	SM	TAL IRV
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL IRV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL SAC
365.3	Phosphorus, Total	EPA	TAL IRV
420.1	Phenolics, Total Recoverable	MCAWW	TAL SAV
ASTM D5057-90	Specific Gravity and Bulk Density (Screening)	ASTM	TAL PIT
SM 2540B	Solids, Total	SM	TAL IRV
SM 4500 CN E	Cyanide, Total	SM	TAL IRV
SM 4500 NH3 D	Ammonia	SM	TAL IRV
SM 5220D	COD	SM	TAL IRV
Total Nitrogen	Nitrogen, Total	EPA	TAL IRV
Subcontract	Pyrethrins	None	Physis Env
1664A	HEM and SGT-HEM (Aqueous)	1664A	TAL IRV
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL IRV
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL IRV
365.2/365.3/365	Phosphorus, Total	MCAWW	TAL IRV
5030B	Purge and Trap	SW846	TAL IRV
625	Liquid-Liquid Extraction	40CFR136A	TAL IRV
7470A	Preparation, Mercury	SW846	TAL IRV
8315_W_Prep	Liquid-Liquid Extraction (Carbonyl Compounds)	SW846	TAL IRV
Distill/CN	Distillation, Cyanide	None	TAL IRV
Distill/Phenol	Distillation, Phenolics	None	TAL SAV
SM 4500 NH3 B	Distillation, Ammonia	SM	TAL IRV

Protocol References:

1664A = EPA-821-98-002

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

ASTM = ASTM International

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

Physis Env = Physis Environmental Laboratories, 1904 Wright Circle, Anaheim, CA 92806

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Client Sample ID: 06 25 BUTCH

Lab Sample ID: 440-245042-1

Date Collected: 06/25/19 08:15

Matrix: Water

Date Received: 07/02/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	10 mL	10 mL	556543	07/09/19 05:59	JB	TAL IRV
Total/NA	Prep	625			100 mL	2.0 mL	556176	07/05/19 08:23	JAA	TAL IRV
Total/NA	Analysis	625		2			556467	07/09/19 07:20	L1B	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555931	07/03/19 08:09	FTD	TAL IRV
Total/NA	Analysis	8315A		1			556054	07/03/19 16:53	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			556718	07/09/19 16:07	NN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	555968	07/03/19 08:03	BV	TAL IRV
Total Recoverable	Analysis	6010B		1			556263	07/05/19 12:09	P1R	TAL IRV
Total/NA	Prep	7470A			20 mL	20 mL	556247	07/05/19 13:01	EMS	TAL IRV
Total/NA	Analysis	7470A		10			556352	07/06/19 10:40	EMS	TAL IRV
Total/NA	Prep	1664A			930 mL	1000 mL	556396	07/08/19 06:52	JC1	TAL IRV
Total/NA	Analysis	1664A		1			556472	07/08/19 13:23	JC1	TAL IRV
Total/NA	Analysis	2540E		1	5 mL	100 mL	555904	07/02/19 19:36	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	556300	07/05/19 14:00	HTL	TAL IRV
Total/NA	Analysis	351.2		5			556894	07/09/19 21:47	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:13	TCS	TAL SAC
Total/NA	Prep	365.2/365.3/365			0.100 mL	50 mL	556299	07/05/19 18:05	MMP	TAL IRV
Total/NA	Analysis	365.3		1			556353	07/06/19 13:33	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	577256	07/09/19 12:53	NVF	TAL SAV
Total/NA	Analysis	420.1		1	6 mL	6 mL	577344	07/09/19 17:37	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:21	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	5 mL	100 mL	555974	07/02/19 19:36	XL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	556015	07/03/19 10:24	KMY	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			556040	07/03/19 12:39	KMY	TAL IRV
Total/NA	Prep	SM 4500 NH3 B			1.0 mL	50 mL	556152	07/05/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			556165	07/05/19 06:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		20	2 mL	2 mL	556931	07/10/19 16:46	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			557104	07/11/19 15:16	TLN	TAL IRV

Client Sample ID: 06 25 OD STREAMS

Lab Sample ID: 440-245042-2

Date Collected: 06/25/19 08:24

Matrix: Water

Date Received: 07/02/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	10 mL	10 mL	556388	07/08/19 17:00	TCN	TAL IRV
Total/NA	Prep	625			100 mL	2.0 mL	556176	07/05/19 08:23	JAA	TAL IRV
Total/NA	Analysis	625		10			556467	07/09/19 07:44	L1B	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555931	07/03/19 08:09	FTD	TAL IRV
Total/NA	Analysis	8315A		1			556054	07/03/19 17:14	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			556718	07/09/19 16:07	NN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	556431	07/08/19 09:56	BV	TAL IRV
Total Recoverable	Analysis	6010B		10			556566	07/08/19 18:23	P1R	TAL IRV

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Client Sample ID: 06 25 OD STREAMS

Lab Sample ID: 440-245042-2

Date Collected: 06/25/19 08:24
Matrix: Water
Date Received: 07/02/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			20 mL	20 mL	556247	07/05/19 13:01	EMS	TAL IRV
Total/NA	Analysis	7470A		10			556352	07/06/19 10:43	EMS	TAL IRV
Total/NA	Prep	1664A			945 mL	1000 mL	556396	07/08/19 06:52	JC1	TAL IRV
Total/NA	Analysis	1664A		1			556472	07/08/19 13:23	JC1	TAL IRV
Total/NA	Analysis	2540E		1	2 mL	100 mL	555904	07/02/19 19:36	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	556300	07/05/19 14:00	HTL	TAL IRV
Total/NA	Analysis	351.2		10			556894	07/09/19 21:47	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:23	TCS	TAL SAC
Total/NA	Prep	365.2/365.3/365			0.025 mL	50 mL	556226	07/05/19 12:08	MMP	TAL IRV
Total/NA	Analysis	365.3		1			556268	07/05/19 14:39	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	577256	07/09/19 12:53	NVF	TAL SAV
Total/NA	Analysis	420.1		10	6 mL	6 mL	577344	07/10/19 05:44	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:19	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	2 mL	100 mL	555974	07/02/19 19:36	XL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	556015	07/03/19 10:24	KMY	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			556040	07/03/19 12:39	KMY	TAL IRV
Total/NA	Prep	SM 4500 NH3 B			0.1 mL	50 mL	556152	07/05/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			556165	07/05/19 06:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		250	2 mL	2 mL	556931	07/10/19 16:46	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			557104	07/11/19 15:16	TLN	TAL IRV

Client Sample ID: 06 25 BUTCH DUP

Lab Sample ID: 440-245042-3

Date Collected: 06/25/19 08:15
Matrix: Water
Date Received: 07/02/19 10:10

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	10 mL	10 mL	556388	07/08/19 17:29	TCN	TAL IRV
Total/NA	Analysis	8260B	RA	1	10 mL	10 mL	556543	07/09/19 06:29	JB	TAL IRV
Total/NA	Prep	625			100 mL	2.0 mL	556176	07/05/19 08:23	JAA	TAL IRV
Total/NA	Analysis	625		2			556467	07/09/19 08:09	L1B	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555931	07/03/19 08:09	FTD	TAL IRV
Total/NA	Analysis	8315A		1			556054	07/03/19 17:35	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			556718	07/09/19 16:07	NN	TAL IRV
Total Recoverable	Prep	3005A			12.5 mL	25 mL	556431	07/08/19 09:56	BV	TAL IRV
Total Recoverable	Analysis	6010B		10			556566	07/08/19 18:33	P1R	TAL IRV
Total/NA	Prep	7470A			20 mL	20 mL	556247	07/05/19 13:01	EMS	TAL IRV
Total/NA	Analysis	7470A		10			556352	07/06/19 10:45	EMS	TAL IRV
Total/NA	Prep	1664A			950 mL	1000 mL	556396	07/08/19 06:52	JC1	TAL IRV
Total/NA	Analysis	1664A		1			556472	07/08/19 13:23	JC1	TAL IRV
Total/NA	Analysis	2540E		1	5 mL	100 mL	555904	07/02/19 19:36	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	556300	07/05/19 14:00	HTL	TAL IRV
Total/NA	Analysis	351.2		5			556947	07/10/19 17:40	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:27	TCS	TAL SAC

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Client Sample ID: 06 25 BUTCH DUP

Date Collected: 06/25/19 08:15
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			0.100 mL	50 mL	556299	07/05/19 18:05	MMP	TAL IRV
Total/NA	Analysis	365.3		1			556353	07/06/19 13:33	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	577256	07/09/19 12:53	NVF	TAL SAV
Total/NA	Analysis	420.1		1	6 mL	6 mL	577344	07/09/19 17:41	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:18	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	5 mL	100 mL	555974	07/02/19 19:36	XL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	556015	07/03/19 10:24	KMY	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			556040	07/03/19 12:39	KMY	TAL IRV
Total/NA	Prep	SM 4500 NH3 B			1.0 mL	50 mL	556152	07/05/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			556165	07/05/19 06:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		50	2 mL	2 mL	556931	07/10/19 16:46	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			557104	07/11/19 15:16	TLN	TAL IRV

Client Sample ID: BUTCHER

Date Collected: 06/26/19 06:06
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	10 mL	10 mL	556591	07/09/19 09:28	TCN	TAL IRV
Total/NA	Prep	625			100 mL	2.0 mL	556176	07/05/19 08:23	JAA	TAL IRV
Total/NA	Analysis	625		2			556467	07/09/19 08:33	L1B	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555931	07/03/19 08:09	FTD	TAL IRV
Total/NA	Analysis	8315A		1			556054	07/03/19 17:56	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			556718	07/09/19 16:07	NN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	555968	07/03/19 08:03	BV	TAL IRV
Total Recoverable	Analysis	6010B		1			556263	07/05/19 12:11	P1R	TAL IRV
Total/NA	Prep	7470A			20 mL	20 mL	556247	07/05/19 13:01	EMS	TAL IRV
Total/NA	Analysis	7470A		10			556352	07/06/19 10:47	EMS	TAL IRV
Total/NA	Prep	1664A			985 mL	1000 mL	556396	07/08/19 06:52	JC1	TAL IRV
Total/NA	Analysis	1664A		1			556472	07/08/19 13:23	JC1	TAL IRV
Total/NA	Analysis	2540E		1	5 mL	100 mL	555904	07/02/19 19:37	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	556300	07/05/19 14:00	HTL	TAL IRV
Total/NA	Analysis	351.2		1			556894	07/09/19 21:47	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:31	TCS	TAL SAC
Total/NA	Prep	365.2/365.3/365			0.100 mL	50 mL	556299	07/05/19 18:05	MMP	TAL IRV
Total/NA	Analysis	365.3		1			556353	07/06/19 13:33	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	577256	07/09/19 12:53	NVF	TAL SAV
Total/NA	Analysis	420.1		1	6 mL	6 mL	577344	07/09/19 17:45	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:16	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	5 mL	100 mL	555974	07/02/19 19:36	XL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	556015	07/03/19 10:24	KMY	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			556040	07/03/19 12:39	KMY	TAL IRV

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Client Sample ID: BUTCHER

Date Collected: 06/26/19 06:06
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SM 4500 NH3 B			2.0 mL	50 mL	556152	07/05/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			556165	07/05/19 06:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		20	2 mL	2 mL	556931	07/10/19 16:46	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			557104	07/11/19 15:16	TLN	TAL IRV

Client Sample ID: OD STREAMS

Date Collected: 06/26/19 06:19
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	10 mL	10 mL	556394	07/08/19 16:56	TCN	TAL IRV
Total/NA	Prep	625			100 mL	2.0 mL	556176	07/05/19 08:23	JAA	TAL IRV
Total/NA	Analysis	625		10			556467	07/09/19 08:58	L1B	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555931	07/03/19 08:09	FTD	TAL IRV
Total/NA	Analysis	8315A		1			556054	07/03/19 18:17	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			556718	07/09/19 16:07	NN	TAL IRV
Total Recoverable	Prep	3005A			12.5 mL	25 mL	556431	07/08/19 09:56	BV	TAL IRV
Total Recoverable	Analysis	6010B		10			556566	07/08/19 18:35	P1R	TAL IRV
Total/NA	Prep	7470A			20 mL	20 mL	556247	07/05/19 13:01	EMS	TAL IRV
Total/NA	Analysis	7470A		10			556352	07/06/19 10:49	EMS	TAL IRV
Total/NA	Prep	1664A			955 mL	1000 mL	556396	07/08/19 06:52	JC1	TAL IRV
Total/NA	Analysis	1664A		1			556472	07/08/19 13:23	JC1	TAL IRV
Total/NA	Analysis	2540E		1	2 mL	100 mL	555904	07/02/19 19:37	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	556300	07/05/19 14:00	HTL	TAL IRV
Total/NA	Analysis	351.2		10			556947	07/10/19 17:40	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:35	TCS	TAL SAC
Total/NA	Prep	365.2/365.3/365			0.025 mL	50 mL	556226	07/05/19 12:08	MMP	TAL IRV
Total/NA	Analysis	365.3		1			556268	07/05/19 14:40	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	577256	07/09/19 12:53	NVF	TAL SAV
Total/NA	Analysis	420.1		10	6 mL	6 mL	577344	07/10/19 05:44	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:15	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	2 mL	100 mL	555974	07/02/19 19:36	XL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	556121	07/03/19 19:20	QTN	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			556276	07/05/19 15:10	QTN	TAL IRV
Total/NA	Prep	SM 4500 NH3 B			0.1 mL	50 mL	556152	07/05/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			556165	07/05/19 06:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		250	2 mL	2 mL	556931	07/10/19 16:46	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			557104	07/11/19 15:16	TLN	TAL IRV

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Client Sample ID: BUTCHER

Date Collected: 06/27/19 06:09
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	10 mL	10 mL	556591	07/09/19 09:58	TCN	TAL IRV
Total/NA	Prep	625			200 mL	2.0 mL	556176	07/05/19 08:23	JAA	TAL IRV
Total/NA	Analysis	625		2			556467	07/09/19 09:22	L1B	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555931	07/03/19 08:09	FTD	TAL IRV
Total/NA	Analysis	8315A		1			556054	07/03/19 18:38	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			556718	07/09/19 16:07	NN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	555968	07/03/19 08:03	BV	TAL IRV
Total Recoverable	Analysis	6010B		1			556263	07/05/19 12:14	P1R	TAL IRV
Total/NA	Prep	7470A			20 mL	20 mL	556247	07/05/19 13:01	EMS	TAL IRV
Total/NA	Analysis	7470A		10			556352	07/06/19 10:52	EMS	TAL IRV
Total/NA	Prep	1664A			925 mL	1000 mL	556396	07/08/19 06:52	JC1	TAL IRV
Total/NA	Analysis	1664A		1			556472	07/08/19 13:23	JC1	TAL IRV
Total/NA	Analysis	2540E		1	5 mL	100 mL	555904	07/02/19 19:37	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	556300	07/05/19 14:00	HTL	TAL IRV
Total/NA	Analysis	351.2		1			556894	07/09/19 21:47	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:39	TCS	TAL SAC
Total/NA	Prep	365.2/365.3/365			0.100 mL	50 mL	556299	07/05/19 18:05	MMP	TAL IRV
Total/NA	Analysis	365.3		1			556353	07/06/19 13:33	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	577256	07/09/19 12:53	NVF	TAL SAV
Total/NA	Analysis	420.1		1	6 mL	6 mL	577344	07/09/19 17:45	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:13	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	5 mL	100 mL	555974	07/02/19 19:36	XL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	556121	07/03/19 19:20	QTN	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			556276	07/05/19 15:10	QTN	TAL IRV
Total/NA	Prep	SM 4500 NH3 B			2.0 mL	50 mL	556152	07/05/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			556165	07/05/19 06:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		20	2 mL	2 mL	556931	07/10/19 16:47	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			557104	07/11/19 15:16	TLN	TAL IRV

Client Sample ID: OD STREAMS

Date Collected: 06/27/19 06:22
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	10 mL	10 mL	556394	07/08/19 17:56	TCN	TAL IRV
Total/NA	Prep	625			100 mL	2.0 mL	556176	07/05/19 08:23	JAA	TAL IRV
Total/NA	Analysis	625		10			556467	07/09/19 09:47	L1B	TAL IRV
Total/NA	Prep	8315_W_Prep			20 mL	1 mL	555931	07/03/19 08:09	FTD	TAL IRV
Total/NA	Analysis	8315A		1			556054	07/03/19 18:59	D1D	TAL IRV
Total/NA	Analysis	NO3NO2 Calc		1			556718	07/09/19 16:07	NN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	556431	07/08/19 09:56	BV	TAL IRV
Total Recoverable	Analysis	6010B		10			556566	07/08/19 18:38	P1R	TAL IRV

Lab Chronicle

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Client Sample ID: OD STREAMS

Date Collected: 06/27/19 06:22
Date Received: 07/02/19 10:10

Lab Sample ID: 440-245042-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			20 mL	20 mL	556247	07/05/19 13:01	EMS	TAL IRV
Total/NA	Analysis	7470A		10			556352	07/06/19 10:54	EMS	TAL IRV
Total/NA	Prep	1664A			940 mL	1000 mL	556396	07/08/19 06:52	JC1	TAL IRV
Total/NA	Analysis	1664A		1			556472	07/08/19 13:23	JC1	TAL IRV
Total/NA	Analysis	2540E		1	2 mL	100 mL	555904	07/02/19 19:37	HTL	TAL IRV
Total/NA	Prep	351.2			0.5 mL	25 mL	556300	07/05/19 14:00	HTL	TAL IRV
Total/NA	Analysis	351.2		10			556947	07/10/19 17:40	HTL	TAL IRV
Total/NA	Analysis	353.2		100			306826	07/10/19 11:49	TCS	TAL SAC
Total/NA	Prep	365.2/365.3/365			0.025 mL	50 mL	556226	07/05/19 12:08	MMP	TAL IRV
Total/NA	Analysis	365.3		1			556268	07/05/19 14:40	MMP	TAL IRV
Total/NA	Prep	Distill/Phenol			6 mL	6 mL	577256	07/09/19 12:53	NVF	TAL SAV
Total/NA	Analysis	420.1		20	6 mL	6 mL	577344	07/10/19 06:10	NVF	TAL SAV
Total/NA	Analysis	ASTM D5057-90		1	50 g	50 mL	284432	07/10/19 15:12	TAM	TAL PIT
Total/NA	Analysis	SM 2540B		1	5 mL	100 mL	555974	07/02/19 19:36	XL	TAL IRV
Total/NA	Prep	Distill/CN			50 mL	50 mL	556121	07/03/19 19:20	QTN	TAL IRV
Total/NA	Analysis	SM 4500 CN E		1			556276	07/05/19 15:10	QTN	TAL IRV
Total/NA	Prep	SM 4500 NH3 B			0.1 mL	50 mL	556152	07/05/19 04:00	YZ	TAL IRV
Total/NA	Analysis	SM 4500 NH3 D		1			556165	07/05/19 06:00	YZ	TAL IRV
Total/NA	Analysis	SM 5220D		250	2 mL	2 mL	556931	07/10/19 16:47	KYP	TAL IRV
Total/NA	Analysis	Total Nitrogen		1			557104	07/11/19 15:16	TLN	TAL IRV

Laboratory References:

Physis Env = Physis Environmental Laboratories, 1904 Wright Circle, Anaheim, CA 92806
TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022
TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058
TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600
TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-556388/4
Matrix: Water
Analysis Batch: 556388

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/08/19 08:22	1
Benzene	ND		2.0	0.25	ug/L			07/08/19 08:22	1
Chloroform	ND		2.0	0.25	ug/L			07/08/19 08:22	1
Ethylbenzene	ND		2.0	0.25	ug/L			07/08/19 08:22	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/08/19 08:22	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/08/19 08:22	1
o-Xylene	ND		2.0	0.25	ug/L			07/08/19 08:22	1
Toluene	ND		2.0	0.25	ug/L			07/08/19 08:22	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/08/19 08:22	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*07/08/19 08:22*	*1*
Dibromofluoromethane (Surr)	*90*		*76 - 132*		*07/08/19 08:22*	*1*
Toluene-d8 (Surr)	*114*		*80 - 128*		*07/08/19 08:22*	*1*

Lab Sample ID: LCS 440-556388/5
Matrix: Water
Analysis Batch: 556388

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	10.0	10.7		ug/L		107	67 - 130
Benzene	10.0	11.5		ug/L		115	68 - 130
Chloroform	10.0	10.8		ug/L		108	70 - 130
Ethylbenzene	10.0	13.5	*	ug/L		135	70 - 130
m,p-Xylene	10.0	12.8		ug/L		128	70 - 130
Methylene Chloride	10.0	8.37		ug/L		84	52 - 130
o-Xylene	10.0	12.5		ug/L		125	70 - 130
Toluene	10.0	12.9		ug/L		129	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*89*		*76 - 132*
Toluene-d8 (Surr)	*108*		*80 - 128*

Lab Sample ID: 440-244865-A-2 MS
Matrix: Water
Analysis Batch: 556388

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	ND		250	233		ug/L		93	69 - 130
Benzene	1200		250	1280	4	ug/L		27	66 - 130
Chloroform	ND		250	245		ug/L		98	70 - 130
Ethylbenzene	71	*	250	361		ug/L		116	70 - 130
m,p-Xylene	66		250	342		ug/L		110	70 - 133
Methylene Chloride	ND		250	208		ug/L		83	52 - 130
o-Xylene	43	J	250	325		ug/L		113	70 - 133
Toluene	37	J	250	321		ug/L		114	70 - 130

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 440-244865-A-2 MS
Matrix: Water
Analysis Batch: 556388

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*88*		*76 - 132*
Toluene-d8 (Surr)	*107*		*80 - 128*

Lab Sample ID: 440-244865-A-2 MSD
Matrix: Water
Analysis Batch: 556388

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane	ND		250	244		ug/L		97	69 - 130	5	20
Benzene	1200		250	1390	4	ug/L		68	66 - 130	8	20
Chloroform	ND		250	257		ug/L		103	70 - 130	5	20
Ethylbenzene	71	*	250	379		ug/L		123	70 - 130	5	20
m,p-Xylene	66		250	361		ug/L		118	70 - 133	5	25
Methylene Chloride	ND		250	228		ug/L		91	52 - 130	9	20
o-Xylene	43	J	250	342		ug/L		119	70 - 133	5	20
Toluene	37	J	250	336		ug/L		120	70 - 130	5	20

Surrogate	MSD %Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*90*		*76 - 132*
Toluene-d8 (Surr)	*108*		*80 - 128*

Lab Sample ID: MB 440-556394/4
Matrix: Water
Analysis Batch: 556394

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/08/19 08:27	1
Benzene	ND		2.0	0.25	ug/L			07/08/19 08:27	1
Chloroform	ND		2.0	0.25	ug/L			07/08/19 08:27	1
Ethylbenzene	ND		2.0	0.25	ug/L			07/08/19 08:27	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/08/19 08:27	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/08/19 08:27	1
o-Xylene	ND		2.0	0.25	ug/L			07/08/19 08:27	1
Toluene	ND		2.0	0.25	ug/L			07/08/19 08:27	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/08/19 08:27	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*		*07/08/19 08:27*	*1*
Dibromofluoromethane (Surr)	*106*		*76 - 132*		*07/08/19 08:27*	*1*
Toluene-d8 (Surr)	*103*		*80 - 128*		*07/08/19 08:27*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 440-556394/5
Matrix: Water
Analysis Batch: 556394

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,2-Dichloropropane			10.0	10.4		ug/L		104	67 - 130		
Benzene			10.0	9.54		ug/L		95	68 - 130		
Chloroform			10.0	10.4		ug/L		104	70 - 130		
Ethylbenzene			10.0	9.46		ug/L		95	70 - 130		
m,p-Xylene			10.0	9.64		ug/L		96	70 - 130		
Methylene Chloride			10.0	8.95		ug/L		90	52 - 130		
o-Xylene			10.0	9.44		ug/L		94	70 - 130		
Toluene			10.0	9.22		ug/L		92	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*
Dibromofluoromethane (Surr)	*114*		*76 - 132*
Toluene-d8 (Surr)	*98*		*80 - 128*

Lab Sample ID: 440-244985-B-1 MS
Matrix: Water
Analysis Batch: 556394

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,2-Dichloropropane	ND	F2	10.0	12.4		ug/L		124	69 - 130		
Benzene	ND	F2	10.0	11.5		ug/L		115	66 - 130		
Chloroform	ND	F2	10.0	12.4		ug/L		124	70 - 130		
Ethylbenzene	ND	F2	10.0	12.0		ug/L		120	70 - 130		
m,p-Xylene	ND	F2	10.0	11.7		ug/L		117	70 - 133		
Methylene Chloride	ND	F2	10.0	11.0		ug/L		110	52 - 130		
o-Xylene	ND	F2	10.0	11.7		ug/L		117	70 - 133		
Toluene	ND	F2	10.0	11.6		ug/L		116	70 - 130		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*
Dibromofluoromethane (Surr)	*111*		*76 - 132*
Toluene-d8 (Surr)	*96*		*80 - 128*

Lab Sample ID: 440-244985-B-1 MSD
Matrix: Water
Analysis Batch: 556394

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane	ND	F2	10.0	10.0	F2	ug/L		100	69 - 130	21	20
Benzene	ND	F2	10.0	8.27	F2	ug/L		83	66 - 130	32	20
Chloroform	ND	F2	10.0	9.63	F2	ug/L		96	70 - 130	25	20
Ethylbenzene	ND	F2	10.0	9.22	F2	ug/L		92	70 - 130	26	20
m,p-Xylene	ND	F2	10.0	9.08	F2	ug/L		91	70 - 133	26	25
Methylene Chloride	ND	F2	10.0	8.37	F2	ug/L		84	52 - 130	27	20
o-Xylene	ND	F2	10.0	9.10	F2	ug/L		91	70 - 133	25	20
Toluene	ND	F2	10.0	8.84	F2	ug/L		88	70 - 130	27	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 440-244985-B-1 MSD
Matrix: Water
Analysis Batch: 556394

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Surrogate	MSD %Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*
Dibromofluoromethane (Surr)	*110*		*76 - 132*
Toluene-d8 (Surr)	*102*		*80 - 128*

Lab Sample ID: MB 440-556543/5
Matrix: Water
Analysis Batch: 556543

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/08/19 20:58	1
Benzene	ND		2.0	0.25	ug/L			07/08/19 20:58	1
Chloroform	ND		2.0	0.25	ug/L			07/08/19 20:58	1
Ethylbenzene	ND		2.0	0.25	ug/L			07/08/19 20:58	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/08/19 20:58	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/08/19 20:58	1
o-Xylene	ND		2.0	0.25	ug/L			07/08/19 20:58	1
Toluene	ND		2.0	0.25	ug/L			07/08/19 20:58	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/08/19 20:58	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*		*07/08/19 20:58*	*1*
Dibromofluoromethane (Surr)	*111*		*76 - 132*		*07/08/19 20:58*	*1*
Toluene-d8 (Surr)	*99*		*80 - 128*		*07/08/19 20:58*	*1*

Lab Sample ID: LCS 440-556543/6
Matrix: Water
Analysis Batch: 556543

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	10.0	10.2		ug/L		102	67 - 130
Benzene	10.0	8.93		ug/L		89	68 - 130
Chloroform	10.0	10.2		ug/L		102	70 - 130
Ethylbenzene	10.0	9.03		ug/L		90	70 - 130
m,p-Xylene	10.0	9.95		ug/L		99	70 - 130
Methylene Chloride	10.0	8.27		ug/L		83	52 - 130
o-Xylene	10.0	9.78		ug/L		98	70 - 130
Toluene	10.0	9.10		ug/L		91	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*112*		*76 - 132*
Toluene-d8 (Surr)	*98*		*80 - 128*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 440-245245-C-1 MS
Matrix: Water
Analysis Batch: 556543

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,2-Dichloropropane	ND		1000	1010		ug/L		101	69 - 130		
Benzene	930		1000	1800		ug/L		87	66 - 130		
Chloroform	ND		1000	1010		ug/L		101	70 - 130		
Ethylbenzene	230		1000	1140		ug/L		91	70 - 130		
m,p-Xylene	790		1000	1660		ug/L		86	70 - 133		
Methylene Chloride	ND		1000	856		ug/L		86	52 - 130		
o-Xylene	410		1000	1300		ug/L		89	70 - 133		
Toluene	1400	F1	1000	2120		ug/L		75	70 - 130		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*115*		*76 - 132*
Toluene-d8 (Surr)	*96*		*80 - 128*

Lab Sample ID: 440-245245-C-1 MSD
Matrix: Water
Analysis Batch: 556543

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane	ND		1000	1050		ug/L		105	69 - 130	4	20
Benzene	930		1000	1770		ug/L		84	66 - 130	1	20
Chloroform	ND		1000	1040		ug/L		104	70 - 130	3	20
Ethylbenzene	230		1000	1120		ug/L		89	70 - 130	2	20
m,p-Xylene	790		1000	1640		ug/L		85	70 - 133	1	25
Methylene Chloride	ND		1000	877		ug/L		88	52 - 130	2	20
o-Xylene	410		1000	1350		ug/L		94	70 - 133	4	20
Toluene	1400	F1	1000	2050	F1	ug/L		68	70 - 130	3	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*114*		*76 - 132*
Toluene-d8 (Surr)	*99*		*80 - 128*

Lab Sample ID: MB 440-556591/4
Matrix: Water
Analysis Batch: 556591

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		2.0	0.25	ug/L			07/09/19 08:29	1
Benzene	ND		2.0	0.25	ug/L			07/09/19 08:29	1
Chloroform	ND		2.0	0.25	ug/L			07/09/19 08:29	1
Ethylbenzene	ND		2.0	0.25	ug/L			07/09/19 08:29	1
m,p-Xylene	ND		2.0	0.50	ug/L			07/09/19 08:29	1
Methylene Chloride	ND		5.0	1.1	ug/L			07/09/19 08:29	1
o-Xylene	ND		2.0	0.25	ug/L			07/09/19 08:29	1
Toluene	ND		2.0	0.25	ug/L			07/09/19 08:29	1
Xylenes, Total	ND		2.0	0.25	ug/L			07/09/19 08:29	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 440-556591/4
Matrix: Water
Analysis Batch: 556591

Client Sample ID: Method Blank
Prep Type: Total/NA

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		80 - 120		07/09/19 08:29	1
Dibromofluoromethane (Surr)	109		76 - 132		07/09/19 08:29	1
Toluene-d8 (Surr)	98		80 - 128		07/09/19 08:29	1

Lab Sample ID: LCS 440-556591/5
Matrix: Water
Analysis Batch: 556591

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloropropane	10.0	10.3		ug/L		103	67 - 130
Benzene	10.0	9.20		ug/L		92	68 - 130
Chloroform	10.0	10.2		ug/L		102	70 - 130
Ethylbenzene	10.0	9.20		ug/L		92	70 - 130
m,p-Xylene	10.0	9.47		ug/L		95	70 - 130
Methylene Chloride	10.0	9.19		ug/L		92	52 - 130
o-Xylene	10.0	9.50		ug/L		95	70 - 130
Toluene	10.0	9.06		ug/L		91	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		80 - 120
Dibromofluoromethane (Surr)	114		76 - 132
Toluene-d8 (Surr)	94		80 - 128

Lab Sample ID: 440-245066-F-1 MSD
Matrix: Water
Analysis Batch: 556591

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloropropane	ND		10.0	10.4		ug/L		104	69 - 130	9	20
Benzene	ND		10.0	9.22		ug/L		92	66 - 130	12	20
Chloroform	ND		10.0	10.3		ug/L		103	70 - 130	7	20
Ethylbenzene	ND		10.0	9.00		ug/L		90	70 - 130	5	20
m,p-Xylene	ND		10.0	9.15		ug/L		91	70 - 133	10	25
Methylene Chloride	ND		10.0	8.61		ug/L		86	52 - 130	11	20
o-Xylene	ND		10.0	9.33		ug/L		93	70 - 133	8	20
Toluene	ND		10.0	8.89		ug/L		89	70 - 130	7	20

Surrogate	MSD %Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		80 - 120
Dibromofluoromethane (Surr)	111		76 - 132
Toluene-d8 (Surr)	98		80 - 128

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-556176/1-A
Matrix: Water
Analysis Batch: 556467

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 556176

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-ethylhexyl) phthalate	ND		20	4.0	ug/L		07/05/19 08:23	07/08/19 14:58	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*81*		*50 - 120*	*07/05/19 08:23*	*07/08/19 14:58*	*1*
2-Fluorophenol	*78*		*30 - 120*	*07/05/19 08:23*	*07/08/19 14:58*	*1*
2,4,6-Tribromophenol	*90*		*40 - 120*	*07/05/19 08:23*	*07/08/19 14:58*	*1*
Nitrobenzene-d5	*76*		*45 - 120*	*07/05/19 08:23*	*07/08/19 14:58*	*1*
Terphenyl-d14	*80*		*10 - 150*	*07/05/19 08:23*	*07/08/19 14:58*	*1*
Phenol-d6	*76*		*35 - 120*	*07/05/19 08:23*	*07/08/19 14:58*	*1*

Lab Sample ID: LCS 440-556176/2-A
Matrix: Water
Analysis Batch: 556467

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 556176

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Bis(2-ethylhexyl) phthalate			100	109		ug/L		109	10 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl	*91*		*50 - 120*
2-Fluorophenol	*86*		*30 - 120*
2,4,6-Tribromophenol	*104*		*40 - 120*
Nitrobenzene-d5	*90*		*45 - 120*
Terphenyl-d14	*88*		*10 - 150*
Phenol-d6	*92*		*35 - 120*

Lab Sample ID: LCSD 440-556176/3-A
Matrix: Water
Analysis Batch: 556467

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 556176

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bis(2-ethylhexyl) phthalate			100	90.8		ug/L		91	10 - 150	18	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2-Fluorobiphenyl	*78*		*50 - 120*
2-Fluorophenol	*74*		*30 - 120*
2,4,6-Tribromophenol	*93*		*40 - 120*
Nitrobenzene-d5	*80*		*45 - 120*
Terphenyl-d14	*75*		*10 - 150*
Phenol-d6	*79*		*35 - 120*

Method: 8315A - Carbonyl Compounds (HPLC)

Lab Sample ID: MB 440-555931/1-A
Matrix: Water
Analysis Batch: 556054

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 555931

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	ND		0.010	0.0050	mg/L		07/03/19 04:52	07/03/19 15:08	1

Method: 8315A - Carbonyl Compounds (HPLC)

Lab Sample ID: LCS 440-555931/2-A
Matrix: Water
Analysis Batch: 556054

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 555931

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Formaldehyde	0.0500	0.0573		mg/L		115	70 - 129

Lab Sample ID: 440-245033-A-1-A MS
Matrix: Water
Analysis Batch: 556054

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 555931

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Formaldehyde	0.024		0.0500	0.0845		mg/L		122	50 - 150

Lab Sample ID: 440-245033-A-1-B MSD
Matrix: Water
Analysis Batch: 556054

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 555931

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Formaldehyde	0.024		0.0500	0.0851		mg/L		123	50 - 150	1	20

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 440-555968/1-A
Matrix: Water
Analysis Batch: 556263

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 555968

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.10	0.050	mg/L		07/03/19 08:03	07/05/19 11:51	1
Arsenic	ND		0.010	0.0089	mg/L		07/03/19 08:03	07/05/19 11:51	1
Barium	ND		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 11:51	1
Boron	ND		0.050	0.025	mg/L		07/03/19 08:03	07/05/19 11:51	1
Cadmium	ND		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 11:51	1
Chromium	ND		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 11:51	1
Copper	ND		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 11:51	1
Magnesium	ND		0.020	0.010	mg/L		07/03/19 08:03	07/05/19 11:51	1
Manganese	ND		0.020	0.015	mg/L		07/03/19 08:03	07/05/19 11:51	1
Nickel	ND		0.010	0.0050	mg/L		07/03/19 08:03	07/05/19 11:51	1
Selenium	ND		0.010	0.0087	mg/L		07/03/19 08:03	07/05/19 11:51	1
Titanium	ND		0.0050	0.0025	mg/L		07/03/19 08:03	07/05/19 11:51	1
Zinc	ND		0.020	0.012	mg/L		07/03/19 08:03	07/05/19 11:51	1

Lab Sample ID: LCS 440-555968/2-A
Matrix: Water
Analysis Batch: 556263

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 555968

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	1.00	1.00		mg/L		100	80 - 120
Arsenic	1.00	0.997		mg/L		100	80 - 120
Barium	1.00	1.00		mg/L		100	80 - 120
Boron	1.00	0.990		mg/L		99	80 - 120
Cadmium	1.00	0.990		mg/L		99	80 - 120
Chromium	1.00	0.997		mg/L		100	80 - 120
Copper	1.00	1.01		mg/L		101	80 - 120
Magnesium	5.00	5.00		mg/L		100	80 - 120

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCS 440-555968/2-A
Matrix: Water
Analysis Batch: 556263

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 555968

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	1.00	0.999		mg/L		100	80 - 120
Nickel	1.00	0.997		mg/L		100	80 - 120
Selenium	1.00	0.960		mg/L		96	80 - 120
Titanium	1.00	1.00		mg/L		100	80 - 120
Zinc	1.00	0.990		mg/L		99	80 - 120

Lab Sample ID: 440-244854-A-3-B MS
Matrix: Water
Analysis Batch: 556263

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 555968

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	0.20		1.00	1.26		mg/L		106	75 - 125
Arsenic	ND		1.00	1.04		mg/L		104	75 - 125
Barium	ND		1.00	1.03		mg/L		103	75 - 125
Boron	ND		1.00	1.06		mg/L		106	75 - 125
Cadmium	ND		1.00	1.02		mg/L		102	75 - 125
Chromium	ND		1.00	1.03		mg/L		103	75 - 125
Copper	0.041		1.00	1.10		mg/L		106	75 - 125
Magnesium	0.050		5.00	5.16		mg/L		102	75 - 125
Manganese	ND		1.00	1.05		mg/L		105	75 - 125
Nickel	ND		1.00	1.03		mg/L		103	75 - 125
Selenium	ND		1.00	0.992		mg/L		99	75 - 125
Titanium	0.0055		1.00	1.06		mg/L		105	75 - 125
Zinc	0.073		1.00	1.07		mg/L		99	75 - 125

Lab Sample ID: 440-244854-A-3-C MSD
Matrix: Water
Analysis Batch: 556263

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 555968

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	0.20		1.00	1.22		mg/L		102	75 - 125	3	20
Arsenic	ND		1.00	1.00		mg/L		100	75 - 125	3	20
Barium	ND		1.00	0.992		mg/L		99	75 - 125	4	20
Boron	ND		1.00	1.03		mg/L		103	75 - 125	3	20
Cadmium	ND		1.00	0.993		mg/L		99	75 - 125	3	20
Chromium	ND		1.00	1.01		mg/L		101	75 - 125	2	20
Copper	0.041		1.00	1.07		mg/L		103	75 - 125	3	20
Magnesium	0.050		5.00	4.94		mg/L		98	75 - 125	4	20
Manganese	ND		1.00	1.02		mg/L		102	75 - 125	3	20
Nickel	ND		1.00	1.01		mg/L		101	75 - 125	3	20
Selenium	ND		1.00	0.965		mg/L		96	75 - 125	3	20
Titanium	0.0055		1.00	1.03		mg/L		103	75 - 125	2	20
Zinc	0.073		1.00	1.04		mg/L		96	75 - 125	3	20

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: MB 440-556431/1-A
Matrix: Water
Analysis Batch: 556566

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 556431

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.10	0.050	mg/L		07/08/19 09:56	07/08/19 17:32	1
Arsenic	ND		0.010	0.0089	mg/L		07/08/19 09:56	07/08/19 17:32	1
Barium	ND		0.010	0.0050	mg/L		07/08/19 09:56	07/08/19 17:32	1
Boron	ND		0.050	0.025	mg/L		07/08/19 09:56	07/08/19 17:32	1
Cadmium	ND		0.0050	0.0025	mg/L		07/08/19 09:56	07/08/19 17:32	1
Chromium	0.00260	J	0.0050	0.0025	mg/L		07/08/19 09:56	07/08/19 17:32	1
Copper	ND		0.010	0.0050	mg/L		07/08/19 09:56	07/08/19 17:32	1
Magnesium	ND		0.020	0.010	mg/L		07/08/19 09:56	07/08/19 17:32	1
Manganese	ND		0.020	0.015	mg/L		07/08/19 09:56	07/08/19 17:32	1
Nickel	ND		0.010	0.0050	mg/L		07/08/19 09:56	07/08/19 17:32	1
Selenium	ND		0.010	0.0087	mg/L		07/08/19 09:56	07/08/19 17:32	1
Titanium	ND		0.0050	0.0025	mg/L		07/08/19 09:56	07/08/19 17:32	1
Zinc	ND		0.020	0.012	mg/L		07/08/19 09:56	07/08/19 17:32	1

Lab Sample ID: LCS 440-556431/2-A
Matrix: Water
Analysis Batch: 556566

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 556431

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	1.00	0.917		mg/L		92	80 - 120
Arsenic	1.00	0.913		mg/L		91	80 - 120
Barium	1.00	0.948		mg/L		95	80 - 120
Boron	1.00	0.922		mg/L		92	80 - 120
Cadmium	1.00	0.928		mg/L		93	80 - 120
Chromium	1.00	0.934		mg/L		93	80 - 120
Copper	1.00	0.951		mg/L		95	80 - 120
Magnesium	5.00	4.69		mg/L		94	80 - 120
Manganese	1.00	0.938		mg/L		94	80 - 120
Nickel	1.00	0.940		mg/L		94	80 - 120
Selenium	1.00	0.885		mg/L		88	80 - 120
Titanium	1.00	0.950		mg/L		95	80 - 120
Zinc	1.00	0.919		mg/L		92	80 - 120

Lab Sample ID: 440-245154-J-1-B MS
Matrix: Water
Analysis Batch: 556566

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 556431

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	16		1.00	22.9	4	mg/L		689	75 - 125
Arsenic	0.0092	J	1.00	0.967		mg/L		96	75 - 125
Barium	0.075		1.00	0.996		mg/L		92	75 - 125
Boron	0.65		1.00	1.61		mg/L		96	75 - 125
Cadmium	0.0056		1.00	0.854		mg/L		85	75 - 125
Chromium	0.022	B	1.00	0.926		mg/L		90	75 - 125
Copper	0.13		1.00	1.12		mg/L		100	75 - 125
Magnesium	210		5.00	214	4	mg/L		-24	75 - 125
Manganese	6.0		1.00	6.69	4	mg/L		68	75 - 125
Nickel	0.085		1.00	0.939		mg/L		85	75 - 125
Selenium	0.075		1.00	0.986		mg/L		91	75 - 125

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 440-245154-J-1-B MS
Matrix: Water
Analysis Batch: 556566

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 556431

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Titanium	0.15		1.00	1.25		mg/L		111	75 - 125
Zinc	0.11		1.00	0.936		mg/L		82	75 - 125

Lab Sample ID: 440-245154-J-1-C MSD
Matrix: Water
Analysis Batch: 556566

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 556431

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	16		1.00	22.6	4	mg/L		664	75 - 125	1	20
Arsenic	0.0092	J	1.00	0.968		mg/L		96	75 - 125	0	20
Barium	0.075		1.00	0.997		mg/L		92	75 - 125	0	20
Boron	0.65		1.00	1.62		mg/L		97	75 - 125	0	20
Cadmium	0.0056		1.00	0.851		mg/L		85	75 - 125	0	20
Chromium	0.022	B	1.00	0.923		mg/L		90	75 - 125	0	20
Copper	0.13		1.00	1.12		mg/L		99	75 - 125	0	20
Magnesium	210		5.00	217	4	mg/L		34	75 - 125	1	20
Manganese	6.0		1.00	6.73	4	mg/L		72	75 - 125	1	20
Nickel	0.085		1.00	0.939		mg/L		85	75 - 125	0	20
Selenium	0.075		1.00	0.983		mg/L		91	75 - 125	0	20
Titanium	0.15		1.00	1.29		mg/L		114	75 - 125	3	20
Zinc	0.11		1.00	0.933		mg/L		82	75 - 125	0	20

Method: 1664A - HEM and SGT-HEM

Lab Sample ID: MB 440-556396/1-A
Matrix: Water
Analysis Batch: 556472

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 556396

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM	ND		5.0	1.4	mg/L		07/08/19 06:52	07/08/19 13:23	1

Lab Sample ID: LCS 440-556396/2-A
Matrix: Water
Analysis Batch: 556472

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 556396

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
HEM	20.0	19.30		mg/L		97	78 - 114

Lab Sample ID: LCSD 440-556396/3-A
Matrix: Water
Analysis Batch: 556472

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 556396

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
HEM	20.0	19.10		mg/L		95	78 - 114	1	11

Method: 2540E - Solids, Volatile and Fixed (VS)

Lab Sample ID: MB 440-555904/1
Matrix: Water
Analysis Batch: 555904

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Volatile Solids	ND		10	10	mg/L			07/02/19 19:36	1

Lab Sample ID: 440-245042-1 DU
Matrix: Water
Analysis Batch: 555904

Client Sample ID: 06 25 BUTCH
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Volatile Solids	7100			6840		mg/L				3	20

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 440-556300/3-A
Matrix: Water
Analysis Batch: 556894

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 556300

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	ND		0.20	0.10	mg/L		07/05/19 14:00	07/09/19 20:50	1

Lab Sample ID: LCS 440-556300/4-A
Matrix: Water
Analysis Batch: 556894

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 556300

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Kjeldahl Nitrogen			5.00	4.76		mg/L		95	90 - 110		

Lab Sample ID: LCSD 440-556300/5-A
Matrix: Water
Analysis Batch: 556894

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 556300

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Kjeldahl Nitrogen			5.00	4.99		mg/L		100	90 - 110	5	20

Lab Sample ID: 440-245031-B-3-B MS
Matrix: Water
Analysis Batch: 556894

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 556300

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Kjeldahl Nitrogen	0.29		5.00	4.93		mg/L		93	90 - 110		

Lab Sample ID: 440-245031-B-3-C MSD
Matrix: Water
Analysis Batch: 556894

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 556300

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Kjeldahl Nitrogen	0.29		5.00	4.98		mg/L		94	90 - 110	1	20

Method: 351.2 - Nitrogen, Total Kjeldahl (Continued)

Lab Sample ID: 440-245181-A-1-D MS
Matrix: Water
Analysis Batch: 556894

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 556300

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Kjeldahl Nitrogen	0.56		5.00	5.32		mg/L		95	90 - 110

Lab Sample ID: 440-245181-A-1-E MSD
Matrix: Water
Analysis Batch: 556894

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 556300

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Kjeldahl Nitrogen	0.56		5.00	5.44		mg/L		98	90 - 110	2	20

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 320-306826/15
Matrix: Water
Analysis Batch: 306826

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	ND		0.050	0.0031	mg/L			07/10/19 10:35	1

Lab Sample ID: LCS 320-306826/16
Matrix: Water
Analysis Batch: 306826

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	1.00	1.02		mg/L		102	90 - 110

Lab Sample ID: 440-244710-A-1 MS
Matrix: Water
Analysis Batch: 306826

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.19		1.00	1.23		mg/L		104	90 - 110

Lab Sample ID: 440-244710-A-1 MSD
Matrix: Water
Analysis Batch: 306826

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	0.19		1.00	1.19		mg/L		100	90 - 110	4	20

Method: 365.3 - Phosphorus, Total

Lab Sample ID: MB 440-556226/1-A
Matrix: Water
Analysis Batch: 556268

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 556226

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.050	0.025	mg/L		07/05/19 12:08	07/05/19 14:38	1

Method: 365.3 - Phosphorus, Total (Continued)

Lab Sample ID: LCS 440-556226/2-A
Matrix: Water
Analysis Batch: 556268

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 556226

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Phosphorus, Total			0.501	0.508		mg/L		102	80 - 120		

Lab Sample ID: 440-245005-B-1-B MS
Matrix: Water
Analysis Batch: 556268

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 556226

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Phosphorus, Total	0.13	F1	0.501	0.170	F1	mg/L		8	75 - 125		

Lab Sample ID: 440-245005-B-1-C MSD
Matrix: Water
Analysis Batch: 556268

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 556226

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.13	F1	0.501	0.193	F1	mg/L		12	75 - 125	12	20

Lab Sample ID: MB 440-556299/1-A
Matrix: Water
Analysis Batch: 556353

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 556299

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	ND		0.050	0.025	mg/L		07/05/19 18:05	07/06/19 13:31	1

Lab Sample ID: LCS 440-556299/2-A
Matrix: Water
Analysis Batch: 556353

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 556299

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Phosphorus, Total			0.501	0.502		mg/L		100	80 - 120		

Lab Sample ID: 440-245008-B-1-B MS
Matrix: Water
Analysis Batch: 556353

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 556299

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Phosphorus, Total	0.065		0.501	0.580		mg/L		103	75 - 125		

Lab Sample ID: 440-245008-B-1-C MSD
Matrix: Water
Analysis Batch: 556353

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 556299

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.065		0.501	0.581		mg/L		103	75 - 125	0	20

Method: 420.1 - Phenolics, Total Recoverable

Lab Sample ID: MB 680-577256/1-A
Matrix: Water
Analysis Batch: 577344

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 577256

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND		0.050	0.025	mg/L		07/09/19 12:53	07/09/19 17:30	1

Lab Sample ID: LCS 680-577256/2-A
Matrix: Water
Analysis Batch: 577344

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 577256

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phenolics, Total Recoverable	0.100	0.114		mg/L		114	75 - 125

Lab Sample ID: 440-245195-J-1-B MS
Matrix: Water
Analysis Batch: 577344

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 577256

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phenolics, Total Recoverable	0.025	J	0.100	0.103		mg/L		78	75 - 125

Lab Sample ID: 440-245195-J-1-C MSD
Matrix: Water
Analysis Batch: 577344

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 577256

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phenolics, Total Recoverable	0.025	J	0.100	0.114		mg/L		89	75 - 125	10	30

Method: ASTM D5057-90 - Specific Gravity and Bulk Density (Screening)

Lab Sample ID: 180-92006-A-1 DU
Matrix: Water
Analysis Batch: 284432

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Gravity	1.0		0.986		No Unit		2	20

Method: SM 2540B - Solids, Total

Lab Sample ID: MB 440-555974/1
Matrix: Water
Analysis Batch: 555974

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Solids	ND		10	10	mg/L			07/02/19 19:36	1

Lab Sample ID: LCS 440-555974/2
Matrix: Water
Analysis Batch: 555974

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Solids	1000	966		mg/L		97	90 - 110

Method: SM 2540B - Solids, Total (Continued)

Lab Sample ID: 440-245042-1 DU
Matrix: Water
Analysis Batch: 555974

Client Sample ID: 06 25 BUTCH
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Solids	10000		9800		mg/L		2	10

Method: SM 4500 CN E - Cyanide, Total

Lab Sample ID: MB 440-556015/1-A
Matrix: Water
Analysis Batch: 556040

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 556015

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.025	0.013	mg/L		07/03/19 10:24	07/03/19 12:39	1

Lab Sample ID: LCS 440-556015/2-A
Matrix: Water
Analysis Batch: 556040

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 556015

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.200	0.190		mg/L		95	80 - 120

Lab Sample ID: 440-245069-B-1-B MS
Matrix: Water
Analysis Batch: 556040

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 556015

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	ND		0.200	0.202		mg/L		101	75 - 125

Lab Sample ID: 440-245069-B-1-C MSD
Matrix: Water
Analysis Batch: 556040

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 556015

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	ND		0.200	0.183		mg/L		91	75 - 125	10	20

Lab Sample ID: MB 440-556121/1-A
Matrix: Water
Analysis Batch: 556276

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 556121

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.025	0.013	mg/L		07/03/19 19:20	07/05/19 15:09	1

Lab Sample ID: LCS 440-556121/2-A
Matrix: Water
Analysis Batch: 556276

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 556121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.200	0.202		mg/L		101	80 - 120

Method: SM 4500 CN E - Cyanide, Total (Continued)

Lab Sample ID: 440-244677-A-6-B MS
Matrix: Water
Analysis Batch: 556276

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 556121

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	ND		0.200	0.208		mg/L		104	75 - 125

Lab Sample ID: 440-244677-A-6-C MSD
Matrix: Water
Analysis Batch: 556276

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 556121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	ND		0.200	0.205		mg/L		102	75 - 125	2	20

Method: SM 4500 NH3 D - Ammonia

Lab Sample ID: MB 440-556152/2-A
Matrix: Water
Analysis Batch: 556165

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 556152

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia (as N)	ND		0.50	0.10	mg/L		07/05/19 04:00	07/05/19 06:00	1
Ammonia as NH3	ND		0.60	0.12	mg/L		07/05/19 04:00	07/05/19 06:00	1

Lab Sample ID: LCS 440-556152/1-A
Matrix: Water
Analysis Batch: 556165

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 556152

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia (as N)	2.50	2.30		mg/L		92	85 - 115
Ammonia as NH3	3.04	2.80		mg/L		92	85 - 115

Lab Sample ID: MRL 440-556152/3-A
Matrix: Water
Analysis Batch: 556165

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 556152

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia (as N)	0.500	0.494	J	mg/L		99	10 - 200
Ammonia as NH3	0.607	0.599	J	mg/L		99	10 - 200

Lab Sample ID: 440-245045-A-1-B MS
Matrix: Water
Analysis Batch: 556165

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 556152

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia (as N)	0.25	J	2.50	2.68		mg/L		97	75 - 125
Ammonia as NH3	0.30	J	3.04	3.25		mg/L		97	75 - 125

Lab Sample ID: 440-245045-A-1-C MSD
Matrix: Water
Analysis Batch: 556165

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 556152

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia (as N)	0.25	J	2.50	2.58		mg/L		93	75 - 125	4	15
Ammonia as NH3	0.30	J	3.04	3.13		mg/L		93	75 - 125	4	15

Method: SM 4500 NH3 D - Ammonia (Continued)

Lab Sample ID: 440-245045-A-1-A DU
Matrix: Water
Analysis Batch: 556165

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 556152

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Ammonia (as N)	0.25	J	0.251	J	mg/L		0	15
Ammonia as NH3	0.30	J	0.305	J	mg/L		0	15

Method: SM 5220D - COD

Lab Sample ID: MB 440-556931/3
Matrix: Water
Analysis Batch: 556931

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	ND		20	10	mg/L			07/10/19 16:45	1

Lab Sample ID: LCS 440-556931/4
Matrix: Water
Analysis Batch: 556931

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	200	190		mg/L		95	90 - 110

Lab Sample ID: 440-245408-A-1 MS
Matrix: Water
Analysis Batch: 556931

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	79		200	265		mg/L		93	70 - 120

Lab Sample ID: 440-245408-A-1 MSD
Matrix: Water
Analysis Batch: 556931

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chemical Oxygen Demand	79		200	268		mg/L		95	70 - 120	1	15

Lab Sample ID: 440-245408-A-1 DU
Matrix: Water
Analysis Batch: 556931

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chemical Oxygen Demand	79		83.2		mg/L		6	15

GC/MS VOA

Analysis Batch: 556388

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-2	06 25 OD STREAMS	Total/NA	Water	8260B	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	8260B	
MB 440-556388/4	Method Blank	Total/NA	Water	8260B	
LCS 440-556388/5	Lab Control Sample	Total/NA	Water	8260B	
440-244865-A-2 MS	Matrix Spike	Total/NA	Water	8260B	
440-244865-A-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Analysis Batch: 556394

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-5	OD STREAMS	Total/NA	Water	8260B	
440-245042-7	OD STREAMS	Total/NA	Water	8260B	
MB 440-556394/4	Method Blank	Total/NA	Water	8260B	
LCS 440-556394/5	Lab Control Sample	Total/NA	Water	8260B	
440-244985-B-1 MS	Matrix Spike	Total/NA	Water	8260B	
440-244985-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Analysis Batch: 556543

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	8260B	
440-245042-3 - RA	06 25 BUTCH DUP	Total/NA	Water	8260B	
MB 440-556543/5	Method Blank	Total/NA	Water	8260B	
LCS 440-556543/6	Lab Control Sample	Total/NA	Water	8260B	
440-245245-C-1 MS	Matrix Spike	Total/NA	Water	8260B	
440-245245-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Analysis Batch: 556591

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-4	BUTCHER	Total/NA	Water	8260B	
440-245042-6	BUTCHER	Total/NA	Water	8260B	
MB 440-556591/4	Method Blank	Total/NA	Water	8260B	
LCS 440-556591/5	Lab Control Sample	Total/NA	Water	8260B	
440-245066-F-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 556176

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	625	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	625	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	625	
440-245042-4	BUTCHER	Total/NA	Water	625	
440-245042-5	OD STREAMS	Total/NA	Water	625	
440-245042-6	BUTCHER	Total/NA	Water	625	
440-245042-7	OD STREAMS	Total/NA	Water	625	
MB 440-556176/1-A	Method Blank	Total/NA	Water	625	
LCS 440-556176/2-A	Lab Control Sample	Total/NA	Water	625	
LCSD 440-556176/3-A	Lab Control Sample Dup	Total/NA	Water	625	

Analysis Batch: 556467

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	625	556176

GC/MS Semi VOA (Continued)

Analysis Batch: 556467 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-2	06 25 OD STREAMS	Total/NA	Water	625	556176
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	625	556176
440-245042-4	BUTCHER	Total/NA	Water	625	556176
440-245042-5	OD STREAMS	Total/NA	Water	625	556176
440-245042-6	BUTCHER	Total/NA	Water	625	556176
440-245042-7	OD STREAMS	Total/NA	Water	625	556176
MB 440-556176/1-A	Method Blank	Total/NA	Water	625	556176
LCS 440-556176/2-A	Lab Control Sample	Total/NA	Water	625	556176
LCSD 440-556176/3-A	Lab Control Sample Dup	Total/NA	Water	625	556176

HPLC/IC

Prep Batch: 555931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	8315_W_Prep	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	8315_W_Prep	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	8315_W_Prep	
440-245042-4	BUTCHER	Total/NA	Water	8315_W_Prep	
440-245042-5	OD STREAMS	Total/NA	Water	8315_W_Prep	
440-245042-6	BUTCHER	Total/NA	Water	8315_W_Prep	
440-245042-7	OD STREAMS	Total/NA	Water	8315_W_Prep	
MB 440-555931/1-A	Method Blank	Total/NA	Water	8315_W_Prep	
LCS 440-555931/2-A	Lab Control Sample	Total/NA	Water	8315_W_Prep	
440-245033-A-1-A MS	Matrix Spike	Total/NA	Water	8315_W_Prep	
440-245033-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	8315_W_Prep	

Analysis Batch: 556054

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	8315A	555931
440-245042-2	06 25 OD STREAMS	Total/NA	Water	8315A	555931
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	8315A	555931
440-245042-4	BUTCHER	Total/NA	Water	8315A	555931
440-245042-5	OD STREAMS	Total/NA	Water	8315A	555931
440-245042-6	BUTCHER	Total/NA	Water	8315A	555931
440-245042-7	OD STREAMS	Total/NA	Water	8315A	555931
MB 440-555931/1-A	Method Blank	Total/NA	Water	8315A	555931
LCS 440-555931/2-A	Lab Control Sample	Total/NA	Water	8315A	555931
440-245033-A-1-A MS	Matrix Spike	Total/NA	Water	8315A	555931
440-245033-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	8315A	555931

Analysis Batch: 556718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	NO3NO2 Calc	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	NO3NO2 Calc	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	NO3NO2 Calc	
440-245042-4	BUTCHER	Total/NA	Water	NO3NO2 Calc	
440-245042-5	OD STREAMS	Total/NA	Water	NO3NO2 Calc	
440-245042-6	BUTCHER	Total/NA	Water	NO3NO2 Calc	
440-245042-7	OD STREAMS	Total/NA	Water	NO3NO2 Calc	

Metals

Prep Batch: 555968

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total Recoverable	Water	3005A	
440-245042-4	BUTCHER	Total Recoverable	Water	3005A	
440-245042-6	BUTCHER	Total Recoverable	Water	3005A	
MB 440-555968/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-555968/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
440-244854-A-3-B MS	Matrix Spike	Total Recoverable	Water	3005A	
440-244854-A-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Prep Batch: 556247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	7470A	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	7470A	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	7470A	
440-245042-4	BUTCHER	Total/NA	Water	7470A	
440-245042-5	OD STREAMS	Total/NA	Water	7470A	
440-245042-6	BUTCHER	Total/NA	Water	7470A	
440-245042-7	OD STREAMS	Total/NA	Water	7470A	

Analysis Batch: 556263

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total Recoverable	Water	6010B	555968
440-245042-4	BUTCHER	Total Recoverable	Water	6010B	555968
440-245042-6	BUTCHER	Total Recoverable	Water	6010B	555968
MB 440-555968/1-A	Method Blank	Total Recoverable	Water	6010B	555968
LCS 440-555968/2-A	Lab Control Sample	Total Recoverable	Water	6010B	555968
440-244854-A-3-B MS	Matrix Spike	Total Recoverable	Water	6010B	555968
440-244854-A-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6010B	555968

Analysis Batch: 556352

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	7470A	556247
440-245042-2	06 25 OD STREAMS	Total/NA	Water	7470A	556247
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	7470A	556247
440-245042-4	BUTCHER	Total/NA	Water	7470A	556247
440-245042-5	OD STREAMS	Total/NA	Water	7470A	556247
440-245042-6	BUTCHER	Total/NA	Water	7470A	556247
440-245042-7	OD STREAMS	Total/NA	Water	7470A	556247

Prep Batch: 556431

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-2	06 25 OD STREAMS	Total Recoverable	Water	3005A	
440-245042-3	06 25 BUTCH DUP	Total Recoverable	Water	3005A	
440-245042-5	OD STREAMS	Total Recoverable	Water	3005A	
440-245042-7	OD STREAMS	Total Recoverable	Water	3005A	
MB 440-556431/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-556431/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
440-245154-J-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
440-245154-J-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

QC Association Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

Metals

Analysis Batch: 556566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-2	06 25 OD STREAMS	Total Recoverable	Water	6010B	556431
440-245042-3	06 25 BUTCH DUP	Total Recoverable	Water	6010B	556431
440-245042-5	OD STREAMS	Total Recoverable	Water	6010B	556431
440-245042-7	OD STREAMS	Total Recoverable	Water	6010B	556431
MB 440-556431/1-A	Method Blank	Total Recoverable	Water	6010B	556431
LCS 440-556431/2-A	Lab Control Sample	Total Recoverable	Water	6010B	556431
440-245154-J-1-B MS	Matrix Spike	Total Recoverable	Water	6010B	556431
440-245154-J-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6010B	556431

General Chemistry

Analysis Batch: 284432

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	ASTM D5057-90	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	ASTM D5057-90	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	ASTM D5057-90	
440-245042-4	BUTCHER	Total/NA	Water	ASTM D5057-90	
440-245042-5	OD STREAMS	Total/NA	Water	ASTM D5057-90	
440-245042-6	BUTCHER	Total/NA	Water	ASTM D5057-90	
440-245042-7	OD STREAMS	Total/NA	Water	ASTM D5057-90	
180-92006-A-1 DU	Duplicate	Total/NA	Water	ASTM D5057-90	

Analysis Batch: 306826

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	353.2	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	353.2	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	353.2	
440-245042-4	BUTCHER	Total/NA	Water	353.2	
440-245042-5	OD STREAMS	Total/NA	Water	353.2	
440-245042-6	BUTCHER	Total/NA	Water	353.2	
440-245042-7	OD STREAMS	Total/NA	Water	353.2	
MB 320-306826/15	Method Blank	Total/NA	Water	353.2	
LCS 320-306826/16	Lab Control Sample	Total/NA	Water	353.2	
440-244710-A-1 MS	Matrix Spike	Total/NA	Water	353.2	
440-244710-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	353.2	

Analysis Batch: 555904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	2540E	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	2540E	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	2540E	
440-245042-4	BUTCHER	Total/NA	Water	2540E	
440-245042-5	OD STREAMS	Total/NA	Water	2540E	
440-245042-6	BUTCHER	Total/NA	Water	2540E	
440-245042-7	OD STREAMS	Total/NA	Water	2540E	
MB 440-555904/1	Method Blank	Total/NA	Water	2540E	
440-245042-1 DU	06 25 BUTCH	Total/NA	Water	2540E	

Analysis Batch: 555974

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	SM 2540B	

General Chemistry (Continued)

Analysis Batch: 555974 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-2	06 25 OD STREAMS	Total/NA	Water	SM 2540B	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	SM 2540B	
440-245042-4	BUTCHER	Total/NA	Water	SM 2540B	
440-245042-5	OD STREAMS	Total/NA	Water	SM 2540B	
440-245042-6	BUTCHER	Total/NA	Water	SM 2540B	
440-245042-7	OD STREAMS	Total/NA	Water	SM 2540B	
MB 440-555974/1	Method Blank	Total/NA	Water	SM 2540B	
LCS 440-555974/2	Lab Control Sample	Total/NA	Water	SM 2540B	
440-245042-1 DU	06 25 BUTCH	Total/NA	Water	SM 2540B	

Prep Batch: 556015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	Distill/CN	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	Distill/CN	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	Distill/CN	
440-245042-4	BUTCHER	Total/NA	Water	Distill/CN	
MB 440-556015/1-A	Method Blank	Total/NA	Water	Distill/CN	
LCS 440-556015/2-A	Lab Control Sample	Total/NA	Water	Distill/CN	
440-245069-B-1-B MS	Matrix Spike	Total/NA	Water	Distill/CN	
440-245069-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	Distill/CN	

Analysis Batch: 556040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	SM 4500 CN E	556015
440-245042-2	06 25 OD STREAMS	Total/NA	Water	SM 4500 CN E	556015
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	SM 4500 CN E	556015
440-245042-4	BUTCHER	Total/NA	Water	SM 4500 CN E	556015
MB 440-556015/1-A	Method Blank	Total/NA	Water	SM 4500 CN E	556015
LCS 440-556015/2-A	Lab Control Sample	Total/NA	Water	SM 4500 CN E	556015
440-245069-B-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN E	556015
440-245069-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN E	556015

Prep Batch: 556121

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-5	OD STREAMS	Total/NA	Water	Distill/CN	
440-245042-6	BUTCHER	Total/NA	Water	Distill/CN	
440-245042-7	OD STREAMS	Total/NA	Water	Distill/CN	
MB 440-556121/1-A	Method Blank	Total/NA	Water	Distill/CN	
LCS 440-556121/2-A	Lab Control Sample	Total/NA	Water	Distill/CN	
440-244677-A-6-B MS	Matrix Spike	Total/NA	Water	Distill/CN	
440-244677-A-6-C MSD	Matrix Spike Duplicate	Total/NA	Water	Distill/CN	

Prep Batch: 556152

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	SM 4500 NH3 B	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	SM 4500 NH3 B	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	SM 4500 NH3 B	
440-245042-4	BUTCHER	Total/NA	Water	SM 4500 NH3 B	
440-245042-5	OD STREAMS	Total/NA	Water	SM 4500 NH3 B	
440-245042-6	BUTCHER	Total/NA	Water	SM 4500 NH3 B	
440-245042-7	OD STREAMS	Total/NA	Water	SM 4500 NH3 B	

General Chemistry (Continued)

Prep Batch: 556152 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 440-556152/2-A	Method Blank	Total/NA	Water	SM 4500 NH3 B	
LCS 440-556152/1-A	Lab Control Sample	Total/NA	Water	SM 4500 NH3 B	
MRL 440-556152/3-A	Lab Control Sample	Total/NA	Water	SM 4500 NH3 B	
440-245045-A-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 NH3 B	
440-245045-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 NH3 B	
440-245045-A-1-A DU	Duplicate	Total/NA	Water	SM 4500 NH3 B	

Analysis Batch: 556165

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	SM 4500 NH3 D	556152
440-245042-2	06 25 OD STREAMS	Total/NA	Water	SM 4500 NH3 D	556152
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	SM 4500 NH3 D	556152
440-245042-4	BUTCHER	Total/NA	Water	SM 4500 NH3 D	556152
440-245042-5	OD STREAMS	Total/NA	Water	SM 4500 NH3 D	556152
440-245042-6	BUTCHER	Total/NA	Water	SM 4500 NH3 D	556152
440-245042-7	OD STREAMS	Total/NA	Water	SM 4500 NH3 D	556152
MB 440-556152/2-A	Method Blank	Total/NA	Water	SM 4500 NH3 D	556152
LCS 440-556152/1-A	Lab Control Sample	Total/NA	Water	SM 4500 NH3 D	556152
MRL 440-556152/3-A	Lab Control Sample	Total/NA	Water	SM 4500 NH3 D	556152
440-245045-A-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 NH3 D	556152
440-245045-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 NH3 D	556152
440-245045-A-1-A DU	Duplicate	Total/NA	Water	SM 4500 NH3 D	556152

Prep Batch: 556226

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-2	06 25 OD STREAMS	Total/NA	Water	365.2/365.3/365	
440-245042-5	OD STREAMS	Total/NA	Water	365.2/365.3/365	
440-245042-7	OD STREAMS	Total/NA	Water	365.2/365.3/365	
MB 440-556226/1-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 440-556226/2-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
440-245005-B-1-B MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
440-245005-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

Analysis Batch: 556268

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-2	06 25 OD STREAMS	Total/NA	Water	365.3	556226
440-245042-5	OD STREAMS	Total/NA	Water	365.3	556226
440-245042-7	OD STREAMS	Total/NA	Water	365.3	556226
MB 440-556226/1-A	Method Blank	Total/NA	Water	365.3	556226
LCS 440-556226/2-A	Lab Control Sample	Total/NA	Water	365.3	556226
440-245005-B-1-B MS	Matrix Spike	Total/NA	Water	365.3	556226
440-245005-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	365.3	556226

Analysis Batch: 556276

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-5	OD STREAMS	Total/NA	Water	SM 4500 CN E	556121
440-245042-6	BUTCHER	Total/NA	Water	SM 4500 CN E	556121
440-245042-7	OD STREAMS	Total/NA	Water	SM 4500 CN E	556121
MB 440-556121/1-A	Method Blank	Total/NA	Water	SM 4500 CN E	556121
LCS 440-556121/2-A	Lab Control Sample	Total/NA	Water	SM 4500 CN E	556121
440-244677-A-6-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN E	556121

General Chemistry (Continued)

Analysis Batch: 556276 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-244677-A-6-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN E	556121

Prep Batch: 556299

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	365.2/365.3/365	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	365.2/365.3/365	
440-245042-4	BUTCHER	Total/NA	Water	365.2/365.3/365	
440-245042-6	BUTCHER	Total/NA	Water	365.2/365.3/365	
MB 440-556299/1-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 440-556299/2-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
440-245008-B-1-B MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
440-245008-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

Prep Batch: 556300

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	351.2	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	351.2	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	351.2	
440-245042-4	BUTCHER	Total/NA	Water	351.2	
440-245042-5	OD STREAMS	Total/NA	Water	351.2	
440-245042-6	BUTCHER	Total/NA	Water	351.2	
440-245042-7	OD STREAMS	Total/NA	Water	351.2	
MB 440-556300/3-A	Method Blank	Total/NA	Water	351.2	
LCS 440-556300/4-A	Lab Control Sample	Total/NA	Water	351.2	
LCSD 440-556300/5-A	Lab Control Sample Dup	Total/NA	Water	351.2	
440-245031-B-3-B MS	Matrix Spike	Total/NA	Water	351.2	
440-245031-B-3-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	
440-245181-A-1-D MS	Matrix Spike	Total/NA	Water	351.2	
440-245181-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	

Analysis Batch: 556353

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	365.3	556299
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	365.3	556299
440-245042-4	BUTCHER	Total/NA	Water	365.3	556299
440-245042-6	BUTCHER	Total/NA	Water	365.3	556299
MB 440-556299/1-A	Method Blank	Total/NA	Water	365.3	556299
LCS 440-556299/2-A	Lab Control Sample	Total/NA	Water	365.3	556299
440-245008-B-1-B MS	Matrix Spike	Total/NA	Water	365.3	556299
440-245008-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	365.3	556299

Prep Batch: 556396

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	1664A	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	1664A	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	1664A	
440-245042-4	BUTCHER	Total/NA	Water	1664A	
440-245042-5	OD STREAMS	Total/NA	Water	1664A	
440-245042-6	BUTCHER	Total/NA	Water	1664A	
440-245042-7	OD STREAMS	Total/NA	Water	1664A	
MB 440-556396/1-A	Method Blank	Total/NA	Water	1664A	

General Chemistry (Continued)

Prep Batch: 556396 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 440-556396/2-A	Lab Control Sample	Total/NA	Water	1664A	
LCSD 440-556396/3-A	Lab Control Sample Dup	Total/NA	Water	1664A	

Analysis Batch: 556472

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	1664A	556396
440-245042-2	06 25 OD STREAMS	Total/NA	Water	1664A	556396
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	1664A	556396
440-245042-4	BUTCHER	Total/NA	Water	1664A	556396
440-245042-5	OD STREAMS	Total/NA	Water	1664A	556396
440-245042-6	BUTCHER	Total/NA	Water	1664A	556396
440-245042-7	OD STREAMS	Total/NA	Water	1664A	556396
MB 440-556396/1-A	Method Blank	Total/NA	Water	1664A	556396
LCS 440-556396/2-A	Lab Control Sample	Total/NA	Water	1664A	556396
LCSD 440-556396/3-A	Lab Control Sample Dup	Total/NA	Water	1664A	556396

Analysis Batch: 556894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	351.2	556300
440-245042-2	06 25 OD STREAMS	Total/NA	Water	351.2	556300
440-245042-4	BUTCHER	Total/NA	Water	351.2	556300
440-245042-6	BUTCHER	Total/NA	Water	351.2	556300
MB 440-556300/3-A	Method Blank	Total/NA	Water	351.2	556300
LCS 440-556300/4-A	Lab Control Sample	Total/NA	Water	351.2	556300
LCSD 440-556300/5-A	Lab Control Sample Dup	Total/NA	Water	351.2	556300
440-245031-B-3-B MS	Matrix Spike	Total/NA	Water	351.2	556300
440-245031-B-3-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	556300
440-245181-A-1-D MS	Matrix Spike	Total/NA	Water	351.2	556300
440-245181-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	556300

Analysis Batch: 556931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	SM 5220D	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	SM 5220D	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	SM 5220D	
440-245042-4	BUTCHER	Total/NA	Water	SM 5220D	
440-245042-5	OD STREAMS	Total/NA	Water	SM 5220D	
440-245042-6	BUTCHER	Total/NA	Water	SM 5220D	
440-245042-7	OD STREAMS	Total/NA	Water	SM 5220D	
MB 440-556931/3	Method Blank	Total/NA	Water	SM 5220D	
LCS 440-556931/4	Lab Control Sample	Total/NA	Water	SM 5220D	
440-245408-A-1 MS	Matrix Spike	Total/NA	Water	SM 5220D	
440-245408-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 5220D	
440-245408-A-1 DU	Duplicate	Total/NA	Water	SM 5220D	

Analysis Batch: 556947

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	351.2	556300
440-245042-5	OD STREAMS	Total/NA	Water	351.2	556300
440-245042-7	OD STREAMS	Total/NA	Water	351.2	556300

QC Association Summary

Client: Geosyntec Consultants, Inc.
Project/Site: Ocean Disposal WW Sample

Job ID: 440-245042-1

General Chemistry

Analysis Batch: 557104

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	Total Nitrogen	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	Total Nitrogen	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	Total Nitrogen	
440-245042-4	BUTCHER	Total/NA	Water	Total Nitrogen	
440-245042-5	OD STREAMS	Total/NA	Water	Total Nitrogen	
440-245042-6	BUTCHER	Total/NA	Water	Total Nitrogen	
440-245042-7	OD STREAMS	Total/NA	Water	Total Nitrogen	

Prep Batch: 577256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	Distill/Phenol	
440-245042-2	06 25 OD STREAMS	Total/NA	Water	Distill/Phenol	
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	Distill/Phenol	
440-245042-4	BUTCHER	Total/NA	Water	Distill/Phenol	
440-245042-5	OD STREAMS	Total/NA	Water	Distill/Phenol	
440-245042-6	BUTCHER	Total/NA	Water	Distill/Phenol	
440-245042-7	OD STREAMS	Total/NA	Water	Distill/Phenol	
MB 680-577256/1-A	Method Blank	Total/NA	Water	Distill/Phenol	
LCS 680-577256/2-A	Lab Control Sample	Total/NA	Water	Distill/Phenol	
440-245195-J-1-B MS	Matrix Spike	Total/NA	Water	Distill/Phenol	
440-245195-J-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	Distill/Phenol	

Analysis Batch: 577344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-245042-1	06 25 BUTCH	Total/NA	Water	420.1	577256
440-245042-2	06 25 OD STREAMS	Total/NA	Water	420.1	577256
440-245042-3	06 25 BUTCH DUP	Total/NA	Water	420.1	577256
440-245042-4	BUTCHER	Total/NA	Water	420.1	577256
440-245042-5	OD STREAMS	Total/NA	Water	420.1	577256
440-245042-6	BUTCHER	Total/NA	Water	420.1	577256
440-245042-7	OD STREAMS	Total/NA	Water	420.1	577256
MB 680-577256/1-A	Method Blank	Total/NA	Water	420.1	577256
LCS 680-577256/2-A	Lab Control Sample	Total/NA	Water	420.1	577256
440-245195-J-1-B MS	Matrix Spike	Total/NA	Water	420.1	577256
440-245195-J-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	420.1	577256

Definitions/Glossary

Client: Geosyntec Consultants, Inc. Job ID: 440-245042-1
Project/Site: Ocean Disposal WW Sample

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*	ISTD response or retention time outside acceptable limits
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate is outside control limits

GC/MS Semi VOA

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

HPLC/IC

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 440-245042-1
Project/Site: Ocean Disposal WW Sample

Laboratory: Eurofins TestAmerica, Irvine

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	CA ELAP 2706	06-30-19 *

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6010B	3005A	Water	Aluminum
6010B	3005A	Water	Boron
6010B	3005A	Water	Magnesium
6010B	3005A	Water	Manganese
6010B	3005A	Water	Titanium
8260B		Water	m,p-Xylene
8260B		Water	Xylenes, Total
NO3NO2 Calc		Water	Nitrate as N
NO3NO2 Calc		Water	Nitrite as N
SM 2540B		Water	Total Solids
SM 4500 NH3 D	SM 4500 NH3 B	Water	Ammonia as NH3
Total Nitrogen		Water	Nitrogen, Total

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arkansas DEQ	State		19-033-0	06-27-20
Arkansas DEQ	State Program	6	88-0690	06-27-20
California	State		2891	04-30-20
California	State Program	9	2891	04-30-20
Connecticut	State		PH-0688	09-30-20
Connecticut	State Program	1	PH-0688	09-30-20
Florida	NELAP	4	E871008	06-30-20
Florida	NELAP		E871008	06-30-20
Illinois	NELAP	5	200005	06-30-20
Illinois	NELAP		004375	06-30-20
Kansas	NELAP	7	E-10350	01-31-20
Kansas	NELAP		E-10350	03-31-20
Kentucky (UST)	State Program	4	162013	04-30-20
Kentucky (WW)	State Program	4	KY98043	12-31-19
Louisiana	NELAP	6	04041	06-30-20
Minnesota	NELAP	5	042-999-482	12-31-19
Minnesota	NELAP		042-999-482	12-31-19
Nevada	State		PA00164	07-31-19
Nevada	State Program	9	PA00164	08-31-19 *
New Hampshire	NELAP	1	2030	04-04-20
New Jersey	NELAP	2	PA005	06-30-20
New Jersey	NELAP		PA005	06-30-20
New York	NELAP	2	11182	03-31-20
New York	NELAP		11182	04-01-20
North Carolina (WW/SW)	State Program	4	434	12-31-19
Oregon	NELAP	10	PA-2151	02-06-20
Oregon	NELAP		PA-2151	02-06-20
Pennsylvania	NELAP	3	02-00416	04-30-20
Pennsylvania	NELAP		02-00416	04-30-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 440-245042-1
Project/Site: Ocean Disposal WW Sample

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Rhode Island	State		LAO00362	12-30-19
Rhode Island	State Program	1	LAO00362	12-30-19
South Carolina	State Program	4	89014	04-30-20
Texas	NELAP	6	T104704528-15-2	03-31-20
Texas	NELAP		T104704528	03-31-20
US Fish & Wildlife	Federal		LE94312A-1	07-31-19
US Fish & Wildlife	US Federal Programs		058448	07-31-20
USDA	Federal		P-Soil-01	06-26-22
Utah	NELAP	8	PA001462015-4	05-31-20
Utah	NELAP		PA001462019-8	05-31-20
Virginia	NELAP	3	460189	09-14-19
Virginia	NELAP		10043	09-14-19
West Virginia DEP	State		142	01-31-20
West Virginia DEP	State Program	3	142	01-31-20
Wisconsin	State		998027800	08-31-19
Wisconsin	State Program	5	998027800	08-31-19

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 440-245042-1
Project/Site: Ocean Disposal WW Sample

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD		L2468	01-20-21
ANAB	DOE		L2468.01	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-20
California	State Program	9	2897	01-31-20
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State		PH-0691	06-30-21
Connecticut	State Program	1	PH-0691	06-30-21
Florida	NELAP	4	E87570	06-30-20
Florida	NELAP		E87570	06-30-20
Hawaii	State Program	9	N/A	01-29-20
Illinois	NELAP	5	200060	03-17-20 *
Kansas	NELAP	7	E-10375	10-31-19
Louisiana	NELAP	6	30612	06-30-20
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-20-20
New York	NELAP	2	11666	04-01-20
Oregon	NELAP	10	4040	01-29-20
Oregon	NELAP		4040	01-29-20
Pennsylvania	NELAP	3	68-01272	03-31-20
Pennsylvania	NELAP		68-01272	03-31-20
Texas	NELAP	6	T104704399	05-31-20
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	12-31-20
Utah	NELAP	8	CA00044	02-29-20
Vermont	State Program	1	VT-4040	04-16-20
Virginia	NELAP	3	460278	03-14-20
Washington	State Program	10	C581	05-05-20
West Virginia (DW)	State Program	3	9930C	12-31-19
Wyoming	State Program	8	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc. Job ID: 440-245042-1
Project/Site: Ocean Disposal WW Sample

Laboratory: Eurofins TestAmerica, Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-19 *
Alaska	State Program	10		06-30-20
Alaska (UST)	State Program	10	UST-104	09-22-19
ANAB	DoD		L2463	09-22-19
ANAB	ISO/IEC 17025		L2463.01	09-22-19
Arizona	State Program	9	AZ0808	12-14-19
Arkansas DEQ	State Program	6	88-0692	02-01-20
California	State Program	9	2939	06-30-19 *
Colorado	State Program	8	N/A	12-31-19
Connecticut	State Program	1	PH-0161	03-31-21
Florida	NELAP	4	E87052	06-30-20
Georgia	State Program	4	803	06-30-20
Guam	State Program	9	15-005r	04-17-20
Hawaii	State Program	9	N/A	06-30-20
Illinois	NELAP	5	200022	11-30-19
Indiana	State Program	5	N/A	06-30-20
Iowa	State Program	7	353	06-30-20
Kentucky (DW)	State Program	4	90084	12-31-19
Kentucky (UST)	State Program	4	18	06-30-20
Kentucky (WW)	State Program	4	90084	12-31-19
Louisiana	NELAP	6	30690	06-30-20
Louisiana (DW)	NELAP	6	LA160019	12-31-19
Maine	State Program	1	GA00006	09-25-20
Maryland	State Program	3	250	12-31-19
Massachusetts	State Program	1	M-GA006	06-30-20
Michigan	State Program	5	9925	06-30-20
Mississippi	State Program	4	N/A	06-30-19 *
Nebraska	State Program	7	TestAmerica-Savannah	06-30-19 *
New Jersey	NELAP	2	GA769	06-30-20
New Mexico	State Program	6	N/A	06-30-20
New York	NELAP	2	10842	04-01-20
North Carolina (DW)	State Program	4	13701	07-31-19 *
North Carolina (WW/SW)	State Program	4	269	12-31-19
Oklahoma	State Program	6	9984	08-31-19
Pennsylvania	NELAP	3	68-00474	06-30-20
Puerto Rico	State Program	2	GA00006	01-01-20
South Carolina	State Program	4	98001	06-30-19 *
Tennessee	State Program	4	TN02961	06-30-20
Texas	NELAP	6	T104704185-19-13	11-30-19
Texas (DW)	State Program	1	T104704185	06-30-20
US Fish & Wildlife	Federal		LE058448-0	07-31-19
Virginia	NELAP	3	460161	06-14-20
Washington	State Program	10	C805	06-10-20
West Virginia (DW)	State Program	3	9950C	12-31-19
West Virginia DEP	State Program	3	094	06-30-19 *
Wisconsin	State Program	5	999819810	08-31-19 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

July 30, 2019

Lena Davidkova
TestAmerica
17461 Derian Avenue
Suite 100
Irvine, CA 92614-

Project Name: Ocean Disposal WW Sample 44022550
Physis Project ID: 1803004-004

Dear Lena,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 7/3/2019. A total of 6 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Organics
Pyrethrins by EPA 625

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier
714 602-5320
Extension 202
mistymercier@physislabs.com

PROJECT SAMPLE LIST

TestAmerica

PHYSIS Project ID: 1803004-004

Ocean Disposal WW Sample 44022550

Total Samples: 6

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
64995	06 25 BUTCH (440-245042-1)		6/25/2019	8:15	Liquid
64996	06 25 BUTCH DUP (440-245042-3)		6/25/2019	8:15	Liquid
64997	BUTCHER (440-245042-4)		6/26/2019	6:06	Liquid
64998	OD STREAMS (440-245042-5)		6/26/2019	6:19	Liquid
64999	BUTCHER (440-245042-6)		6/27/2019	6:09	Liquid
65000	OD STREAMS (440-245042-7)		6/27/2019	6:22	Liquid

1904 E. Wright Circle Anaheim, CA 92806 (714) 602-5320 fax (714) 602-5321 www.physislabs.com CA ELAP #2769

ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

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QUALITY ASSURANCE SUMMARY

LABORATORY BATCH: Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and were used to assess the validity of the sample analyses.

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

ACCURACY: Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

BLANK SPIKES: BS is the introduction of a known concentration of analyte into the procedural blank. BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

MATRIX SPIKES: MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

CERTIFIED REFERENCE MATERIALS: CRMs are materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of an analytical method. CRMs provide evidence that the laboratory preparation and analysis produces results that are comparable to those obtained by an independent organization.

LABORATORY CONTROL MATERIAL: LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

SURROGATES: A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to

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the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

HOLDING TIME: Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

SAMPLE STORAGE/RETENTION: In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

TOTAL/DISSOLVED FRACTION: In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

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PHYSIS QUALIFIER CODES

CODE	DEFINITION
#	see Case Narrative
ND	analyte not detected at or above the MDL
B	analyte was detected in the procedural blank greater than 10 times the MDL
E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore accuracy and/or precision acceptance limits do not apply
SL	analyte results were lower than 10 times the MDL, therefore accuracy and/or precision acceptance limits do not apply
NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore accuracy and/or precision acceptance limits do not apply
Q	analyte was outside the specified QAPP acceptance limits for precision and/or accuracy but within Physis derived acceptance limits, therefore the sample data was reported without further clarification
R	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

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ANALYTICAL REPORT

PHYSIS Project ID: 1803004-004
Client: TestAmerica
Project: Ocean Disposal WW Sample 44022550

Pyrethroids

ANALYTE	Method	Units	RESULT	MDL	RL	Fraction	QA CODE	Batch ID	Date Processed	Date Analyzed
Sample ID: 64995-R1	**06 25 BUTCH (440-245042-1)**		**Matrix: Liquid**			**Sampled: 25-Jun-19**	**8:15**	**Received: 03-Jul-19**		
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total	H	O-23070	03-Jul-19	18-Jul-19
Sample ID: 64996-R1	**06 25 BUTCH DUP (440-245042-3)**		**Matrix: Liquid**			**Sampled: 25-Jun-19**	**8:15**	**Received: 03-Jul-19**		
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total	H	O-23070	03-Jul-19	18-Jul-19
Sample ID: 64997-R1	**BUTCHER (440-245042-4)**		**Matrix: Liquid**			**Sampled: 26-Jun-19**	**6:06**	**Received: 03-Jul-19**		
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total		O-23070	03-Jul-19	18-Jul-19
Sample ID: 64998-R1	**OD STREAMS (440-245042-5)**		**Matrix: Liquid**			**Sampled: 26-Jun-19**	**6:19**	**Received: 03-Jul-19**		
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total		O-23070	03-Jul-19	18-Jul-19
Sample ID: 64999-R1	**BUTCHER (440-245042-6)**		**Matrix: Liquid**			**Sampled: 27-Jun-19**	**6:09**	**Received: 03-Jul-19**		
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total		O-23070	03-Jul-19	18-Jul-19
Sample ID: 65000-R1	**OD STREAMS (440-245042-7)**		**Matrix: Liquid**			**Sampled: 27-Jun-19**	**6:22**	**Received: 03-Jul-19**		
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total		O-23070	03-Jul-19	18-Jul-19

QUALITY CONTROL REPORT

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature
1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

Pyrethroids QUALITY CONTROL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURACY %	ACCURACY LIMITS		PRECISION %	PRECISION LIMITS		QA CODE
Sample ID: 64994-B1	**QAQC Procedural Blank**				**Matrix: DI Water**			**Sampled:**				**Received:**		
	Method: EPA 625-NCI				Batch ID: O-23070			Prepared: 03-Jul-19				Analyzed: 17-Jul-19		
Pyrethrins	Total	ND	100	200	ng/L									
Sample ID: 64994-BS1	**QAQC Procedural Blank**				**Matrix: DI Water**			**Sampled:**				**Received:**		
	Method: EPA 625-NCI				Batch ID: O-23070			Prepared: 03-Jul-19				Analyzed: 18-Jul-19		
Pyrethrins	Total	500	100	200	ng/L	500	0	100	50 - 150%	PASS				
Sample ID: 64994-BS2	**QAQC Procedural Blank**				**Matrix: DI Water**			**Sampled:**				**Received:**		
	Method: EPA 625-NCI				Batch ID: O-23070			Prepared: 03-Jul-19				Analyzed: 18-Jul-19		
Pyrethrins	Total	519	100	200	ng/L	500	0	104	50 - 150%	PASS	4	30	PASS	

CHAIN OF CUSTODY

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

1803004-004

Chain of Custody Record

eurofins

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-140707.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: Physis Environmental Laboratories		Accreditations Required (See note): State Program - California		Job #: 440-245042-1
Address: 1904 Wright Circle, .	Due Date Requested: 7/10/2019			
City: Anaheim	TAT Requested (days):			
State, Zip: CA, 92806				
Phone:	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Pyrethrins)/ Pyrethrins	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
06 25 BUTCH (440-245042-1)	6/25/19	08:15 Pacific		Water			X	2	
06 25 BUTCH DUP (440-245042-3)	6/25/19	08:15 Pacific		Water			X	2	
BUTCHER (440-245042-4)	6/26/19	06:06 Pacific		Water			X	2	
OD STREAMS (440-245042-5)	6/26/19	06:19 Pacific		Water			X	2	
BUTCHER (440-245042-6)	6/27/19	06:09 Pacific		Water			X	2	
OD STREAMS (440-245042-7)	6/27/19	06:22 Pacific		Water			X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:			
Relinquished by: A. Kenney	Date/Time: 7/2/19 1700	Company TA IRV	Received by:	Date/Time: 7/3/19 918	Company Physis	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company	
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			

Ver: 01/16/2019

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

Physis Project ID
1803004-004

Sample Receipt Summary

Client: TestAmerica | Date Received: 7/3/2019 | Received By: RGH | Inspected By: RGH

Courier:	Cooler:	Temperature:
☐ Physis ☑ FEDEX ☐ UPS ☐ Client	☑ Cooler ☐ Box Total #: 1	☐ BLUE ☑ WET ☐ DRY
Start ____ End ____ ☐ Other: ____	☐ Other : ____	☐ None 0.3 °C

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out..... Yes
2. All sample containers arrived intact..... Yes
3. All samples listed on COC(s) are present..... Yes
4. Information on containers consistent with information on COC(s)..... Yes
5. Correct containers and volume for all analyses indicated..... Yes
6. All samples received within method holding time..... No; see notes below
7. Correct preservation used for all analyses indicated..... Yes
8. Name of sampler included on COC(s)..... No

Notes:

Sample ID(s) 06 25 BUTCH (440-245042-1), 06 25 BUTCH DUP (440-245042-3) were received on the 8th day of HT.

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

July 30, 2019

Lena Davidkova
TestAmerica
17461 Derian Avenue
Suite 100
Irvine, CA 92614-

Project Name: Ocean Disposal WW Sample 44022550
Physis Project ID: 1803004-005

Dear Lena,

Enclosed are the analytical results for the sample submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 7/5/2019. A total of 1 sample was received for analysis in accordance with the attached chain of custody (COC). Per the COC, the sample was analyzed for:

Organics
Pyrethrins by EPA 625

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

Misty Mercier
714 602-5320
Extension 202
mistymercier@physislabs.com

PROJECT SAMPLE LIST

TestAmerica

PHYSIS Project ID: 1803004-005

Ocean Disposal WW Sample 44022550

Total Samples: 1

PHYSIS ID	Sample ID	Description	Date	Time	Matrix
65064	16 25 OD STREAMS (440-245042-2		6/25/2019	8:24	Liquid

1904 E. Wright Circle Anaheim, CA 92806 (714) 602-5320 fax (714) 602-5321 www.physislabs.com CA ELAP #2769

ABBREVIATIONS and ACRONYMS

QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

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QUALITY ASSURANCE SUMMARY

LABORATORY BATCH: Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and were used to assess the validity of the sample analyses.

PROCEDURAL BLANK: Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

ACCURACY: Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

PRECISION: Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS1/MS2, BS1/BS2, LCS1/LCS2, LCM1/LCM2, CRM1/CRM2, surrogate spikes and/or replicate project sample analysis (R1/R2) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

BLANK SPIKES: BS is the introduction of a known concentration of analyte into the procedural blank. BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

MATRIX SPIKES: MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

CERTIFIED REFERENCE MATERIALS: CRMs are materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of an analytical method. CRMs provide evidence that the laboratory preparation and analysis produces results that are comparable to those obtained by an independent organization.

LABORATORY CONTROL MATERIAL: LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

LABORATORY CONTROL SPIKES: LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

SURROGATES: A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to

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the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

HOLDING TIME: Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

SAMPLE STORAGE/RETENTION: In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

TOTAL/DISSOLVED FRACTION: In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

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PHYSIS QUALIFIER CODES

CODE	DEFINITION
#	see Case Narrative
ND	analyte not detected at or above the MDL
B	analyte was detected in the procedural blank greater than 10 times the MDL
E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore accuracy and/or precision acceptance limits do not apply
SL	analyte results were lower than 10 times the MDL, therefore accuracy and/or precision acceptance limits do not apply
NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore accuracy and/or precision acceptance limits do not apply
Q	analyte was outside the specified QAPP acceptance limits for precision and/or accuracy but within Physis derived acceptance limits, therefore the sample data was reported without further clarification
R	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

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ANALYTICAL REPORT

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

PHYSIS Project ID: 1803004-005
Client: TestAmerica
Project: Ocean Disposal WW Sample 44022550

Pyrethroids

ANALYTE	Method	Units	RESULT	MDL	RL	Fraction	QA CODE	Batch ID	Date Processed	Date Analyzed
Sample ID: 65064-R1	**06 25 OD STREAMS (440-245042-2)**		**Matrix: Liquid**			**Sampled: 25-Jun-19**	**8:24**		**Received: 05-Jul-19**	
Pyrethrins	EPA 625-NCI	ng/L	ND	100	200	Total	H	O-23070	05-Jul-19	18-Jul-19

QUALITY CONTROL REPORT

PHYSIS
TERRA FAUNA FLORA AQUA AURA
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature
1904 E. Wright Circle, Anaheim CA 92806 main: (714) 602-5320 fax: (714) 602-5321 www.physislabs.com info@physislabs.com CA ELAP #2769

Pyrethroids QUALITY CONTROL REPORT

ANALYTE	FRACTION	RESULT	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURACY %	ACCURACY LIMITS		PRECISION %	PRECISION LIMITS		QA CODE
Sample ID: 65063-B1	**QAQC Procedural Blank**				**Matrix: DI Water**			**Sampled:**				**Received:**		
	Method: EPA 625-NCI				Batch ID: O-23070			Prepared: 03-Jul-19				Analyzed: 17-Jul-19		
Pyrethrins	Total	ND	100	200	ng/L									
Sample ID: 65063-BS1	**QAQC Procedural Blank**				**Matrix: DI Water**			**Sampled:**				**Received:**		
	Method: EPA 625-NCI				Batch ID: O-23070			Prepared: 03-Jul-19				Analyzed: 18-Jul-19		
Pyrethrins	Total	500	100	200	ng/L	500	0	100	50 - 150%	PASS				
Sample ID: 65063-BS2	**QAQC Procedural Blank**				**Matrix: DI Water**			**Sampled:**				**Received:**		
	Method: EPA 625-NCI				Batch ID: O-23070			Prepared: 03-Jul-19				Analyzed: 18-Jul-19		
Pyrethrins	Total	519	100	200	ng/L	500	0	104	50 - 150%	PASS	4	30	PASS	

CHAIN OF CUSTODY

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-140795.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: Physis Environmental Laboratories		Accreditations Required (See note): State Program - California		Job #: 440-245042-1
Address: 1904 Wright Circle, ,	Due Date Requested: 7/10/2019			
City: Anaheim	TAT Requested (days):			
State, Zip: CA, 92806				
Phone:	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (Pyrethrins)/ Pyrethrins	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
06 25 OD STREAMS (440-245042-2)	6/25/19	08:24 Pacific		Water			X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:	Time:		Method of Shipment:	
Relinquished by:	Date/Time: 7/5/19 1445	Company TAIRV	Received by:	Date/Time: 7/5/19 1405	Company TAIRV	
Relinquished by:	Date/Time: 7/5/19 1440 14:15	Company TAIRV	Received by: Meagan Morgan	Date/Time: 14:40 7/5/19	Company Physis	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company	

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

PHYSIS
ENVIRONMENTAL LABORATORIES, INC.
Innovative Solutions for Nature

Physis Project ID
1803004-005

Sample Receipt Summary

Client: TestAmerica | Date Received: 7/5/2019 | Received By: MM | Inspected By: RGH

Courier:	Cooler:	Temperature:
☐ Physis ☐ FEDEX ☐ UPS ☑ Client	☑ Cooler ☐ Box Total #: 1	☐ BLUE ☑ WET ☐ DRY
Start ____ End ____ ☐ Other: ____	☐ Other : ____	☐ None 2 °C

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out..... Yes
2. All sample containers arrived intact..... Yes
3. All samples listed on COC(s) are present..... Yes
4. Information on containers consistent with information on COC(s)..... Yes
5. Correct containers and volume for all analyses indicated..... Yes
6. All samples received within method holding time..... No; see notes below
7. Correct preservation used for all analyses indicated..... Yes
8. Name of sampler included on COC(s)..... Yes

Notes:

Sample ID(s) 06 25 OD STREAMS (440-245042-2) received on the 10th day (7 day HT).

17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone (949) 261-1022 Fax (949) 260-3297

Chain of Custody Record

eurofins

Client Information
Client Contact: Nick Butson
Company: Geosyntec Consultants, Inc.
Address: 295 Hagey Blvd. Suite 290
City: Waterloo
State, Zip: ON, N2L 6R5
Phone: 519-514-2253(Tel)
Email: nbutson@geosyntec.com
Project Name: Ocean Disposal WW Sample
Site:

Sampler: TINH LAM YUEN
Phone:
Due Date Requested:
TAT Requested (days): 5 DAYS
PO #: Purchase Order not required
WO #:
Project #: 44022550
SSOW#:

Lab PM: Davidkova, Lena
E-Mail: lena.davidkova@testamericainc.com
Carrier Tracking No(s): 7756 0118 7910

COC No: 440-163988-29891.1
Page: Page 1 of 1
Job #:

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - pH 4-5; Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	D5087 - Bulk Density (Screening)	351.2-TKN, 365.3-Phosphorus, 5220D-COD, SM4500NH3_D-Ammonia	300-Nitrates, SM2540B-Total Solids, SM2540E-VS	6010B-Total Metals, Mercury 7470A	8260B - VOCs	625-Bis(2-Ethyl-hexyl) phthalate	4500_CN_E - Cyanide, Total	1664A - HEM Only	420.1 - Phenolics, Total Recoverable	8015-Formaldehyde	625-Pyrethrins	353.2-Nitrates	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	G	N	D	A	N	B	A	G	N	N	S		
06 25 BUTCH	06/25/19	08:15	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
06 25 OD STREAMS	06/25/19	08:24	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
06 25 BUTCH DUP	06/25/19	08:15	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
				Water																
Butcher	6/26/19	06:06	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
OD Streams	6/26/19	06:19	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
				Water																
Butcher	6/27/19	06:09	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
OD Streams	6/27/19	06:22	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
				Water																

7/2/19 LD

440-245042 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

	Date/Time	Company		Date/Time	Company
Relinquished by:	6/27/19 10:30	SKS	Received by:		
Relinquished by:			Received by: Olga Cinelas 1294	7/2/19 1010	TBIRV
Relinquished by:			Received by:		

Custody Seals Intact: Δ Yes ✓ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: blue ice thawed 20.9/20.6 21.7/21.4 18.6/18.3 18.4/18.1 20.8/20.5 20.9/20.6

7461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone (949) 261-1022 Fax (949) 260-3297

Chain of Custody Record

eurofins

Client Information

Client Contact: Nick Butson
Company: Geosyntec Consultants, Inc.
Address: 295 Hagey Blvd. Suite 290
City: Waterloo
State, Zip: ON, N2L 6R5
Phone: 519-514-2253(Tel)
Email: nbutson@geosyntec.com
Project Name: Ocean Disposal WW Sample
Site:

Sampler: TINI LAM YUEN
Phone:
Due Date Requested:
TAT Requested (days): 5 DAYS
PO #: Purchase Order not required
WO #:
Project #: 44022550
SSOW#:

Lab PM: Davidkova, Lena
E-Mail: lena.davidkova@testamericainc.com
Carrier Tracking No(s):

COC No.: 440-163988-29891.1
Page: Page 1 of 1
Job #:

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	D5057 - Bulk Density (Screening) N	351.2-TKN, 365.3-Phosphorus, 5220D-COD, SM4500NH3_D-Ammonia S	300-Nitrates, SM2540B-Total Solids, SM2540E-VS N	6010B-Total Metals, Mercury 7470A D	8260B - VOCs A	625-Bis(2-Ethyl-hexyl) phthalate N	4500_CN_E - Cyanide, Total B	1664A - HEM Only A	420.1 - Phenolics, Total Recoverable S	8015-Formaldehyde N	625-Pyrethrins N	353.2-Nitrates S	Total Number of containers	Special Instructions/Note:
			Preservation Code:																	
06 25 BUTCH	06/25/19	08:15	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
06 25 OD STREAMS	06/25/19	08:24	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
06 25 BUTCH DUP	06/25/19	08:15	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
				Water																
Butcher	6/26/19	06:06	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
OD Streams	6/26/19	06:19	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
				Water																
Butcher	6/27/19	06:09	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
OD Streams	6/27/19	06:22	C	Water			X	X	X	X	X	X	X	X	X	X	X	X		
				Water																

440-245042 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

	Date/Time	Company		Date/Time	Company
Relinquished by:	6/27/19 10:30	SKS	Received by:	7/5/19 0955	TAMV
Relinquished by:			Received by:		
Relinquished by:			Received by:		

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.: Fedex 775601187910

Cooler Temperature(s) °C and Other Remarks: Thawed blue ice 24.9/26.0. IR93

After printing this label:

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com. FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-140690.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-245042-1
Address: 880 Riverside Parkway,	Due Date Requested: 7/10/2019			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	353.2_Pres/ Nitrogen, Nitrate-Nitrite	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
06 25 BUTCH (440-245042-1)	6/25/19	08:15 Pacific		Water			X	1	
06 25 OD STREAMS (440-245042-2)	6/25/19	08:24 Pacific		Water			X	1	
06 25 BUTCH DUP (440-245042-3)	6/25/19	08:15 Pacific		Water			X	1	
BUTCHER (440-245042-4)	6/26/19	06:06 Pacific		Water			X	1	
OD STREAMS (440-245042-5)	6/26/19	06:19 Pacific		Water			X	1	
BUTCHER (440-245042-6)	6/27/19	05:09 Pacific		Water			X	1	
OD STREAMS (440-245042-7)	6/27/19	06:22 Pacific		Water			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
A. Kennedy	7/2/19 1700	TA IRV	[illegible]	7/3/19 915	FedEx
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by	Date/Time:	Company

Custody Seals Intact:	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
X Δ Yes Δ No	Seal	2.8c

Ver: 01/16/2019

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-140690.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-245042-1
Address: 880 Riverside Parkway,	Due Date Requested: 7/10/2019			
City: West Sacramento	TAT Requested (days):			
State, Zip: CA, 95605				
Phone: 916-373-5600(Tel) 916-372-1059(Fax)	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	353.2_Prep/ Nitrogen, Nitrate-Nitrite	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
06 25 BUTCH (440-245042-1)	6/25/19	08:15 Pacific		Water			X	1	
06 25 OD STREAMS (440-245042-2)	6/25/19	08:24 Pacific		Water			X	1	
06 25 BUTCH DUP (440-245042-3)	6/25/19	08:15 Pacific		Water			X	1	
BUTCHER (440-245042-4)	6/26/19	06:06 Pacific		Water			X	1	
OD STREAMS (440-245042-5)	6/26/19	06:19 Pacific		Water			X	1	
BUTCHER (440-245042-6)	6/27/19	06:09 Pacific		Water			X	1	
OD STREAMS (440-245042-7)	6/27/19	06:22 Pacific		Water			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
A. Kennedy	7/2/19 1700	TA IRV	[illegible]	7/3/19 915	TA IRV
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by	Date/Time:	Company

Custody Seals Intact:	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
☐ Yes ☐ No	Seal	2.8°C

Ver: 01/16/2019

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-140684.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-245042-1
Address: 5102 LaRoche Avenue, ,	Due Date Requested: 7/10/2019			
City: Savannah	TAT Requested (days):			
State, Zip: GA, 31404				
Phone: 912-354-7858(Tel) 912-352-0165(Fax)	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	420.1/Distill_Phenol Phenolics, Total Recoverable	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
06 25 BUTCH (440-245042-1)	6/25/19	08:15 Pacific		Water			X	2	
06 25 OD STREAMS (440-245042-2)	6/25/19	08:24 Pacific		Water			X	2	
06 25 BUTCH DUP (440-245042-3)	6/25/19	08:15 Pacific		Water			X	2	
OD STREAMS (440-245042-5)	6/26/19	06:19 Pacific		Water			X	2	
OD STREAMS (440-245042-7)	6/27/19	06:22 Pacific		Water			X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: A Kennedy	Date/Time: 7/2/19 1700	Company: TA IRV	Received by:	Date/Time: 7/3/19 907	Company: TASTA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 5.6 5.6

Ver: 01/16/2019

Eurofins TestAmerica, Irvine
17461 Derian Ave Suite 100
Irvine, CA 92614-5817
Phone: 949-261-1022 Fax: 949-260-3297

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Davidkova, Lena	Carrier Tracking No(s):	COC No: 440-140794.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: lena.davidkova@testamericainc.com	State of Origin: California	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - California		Job #: 440-245042-1
Address: 5102 LaRoche Avenue, ,	Due Date Requested: 7/10/2019			
City: Savannah	TAT Requested (days):			
State, Zip: GA, 31404				
Phone: 912-354-7858(Tel) 912-352-0165(Fax)	PO #:			
Email:	WO #:			
Project Name: Ocean Disposal WW Sample	Project #: 44022550			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	420.1/Distill_Phenol Phenolics, Total Recoverable	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
BUTCHER (440-245042-4)	6/26/19	06:06 Pacific		Water			X	2	
BUTCHER (440-245042-6)	6/27/19	06:09 Pacific		Water			X	2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	7/5/19 1145	TAIRV		7-6-19 950	TASAV
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.1 / 3.1

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 440-245042-1

Login Number: 245042
List Number: 1
Creator: Bonta, Lucia F

List Source: Eurofins TestAmerica, Irvine

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Water present in cooler; indicates evidence of melted ice.
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	False	Headspace larger than 1/4".
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 440-245042-1

Login Number: 245042
List Number: 2
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh
List Creation: 07/03/19 10:28 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 440-245042-1

Login Number: 245042
List Number: 4
Creator: Darlington, Jennifer M

List Source: Eurofins TestAmerica, Sacramento
List Creation: 07/03/19 01:40 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	Seal present with no number.
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.8c
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 440-245042-1

Login Number: 245042
List Number: 3
Creator: Weston, Pamela

List Source: Eurofins TestAmerica, Savannah
List Creation: 07/03/19 03:23 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 440-245042-1

Login Number: 245042
List Number: 5
Creator: Sims, Robert D

List Source: Eurofins TestAmerica, Savannah
List Creation: 07/06/19 01:36 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing TestAmerica

Sacramento
Sample Receiving Notes

440-245042 Field Sheet

Job:_____

Tracking # : 4538 3732 7226

SO / PO / FO / 2-Day / Ground / UPS / CDO / Courier
GSO / OnTrac / Goldstreak / USPS / Other_____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations.
File in the job folder with the COC.

Notes:_____

Therm. ID: Ale Corr. Factor: -

Ice: X Wet: X Gel: _____ Other: _____

Cooler Custody Seal: seal

Sample Custody Seal: -

Cooler ID: -

Temp Observed: 2.6 Corrected: 2.6

From: Temp Blank ☒ Sample ☐

NCM Filed: Yes ☐ No ☐

	Yes	No	NA
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☒
Alkalinity has no headspace?	☐	☐	☒
CoC is complete w/o discrepancies?	☒	☐	☐
Samples received within holding time?	☒	☐	☐
Sample preservatives verified?	☐	☐	☒
Cooler compromised/tampered with?	☐	☒	☐
Samples compromised/tampered with?	☐	☒	☐
Samples w/o discrepancies?	☒	☐	☐
Sample containers have legible labels?	☒	☐	☐
Containers are not broken or leaking?	☒	☐	☐
Sample date/times are provided.	☒	☐	☐
Appropriate containers are used?	☒	☐	☐
Sample bottles are completely filled?	☒	☐	☐
Zero headspace?*	☐	☐	☒
Multiphasic samples are not present?	☒	☐	☐
Sample temp OK?	☒	☐	☐
Sample out of temp?	☐	☒	☐

Initials: DL Date: 7/18/19

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

eurofins | Environment Testing TestAmerica

Sacramento Sample Receiving Notes

440-245042 Field Sheet

Job:_____

Tracking # : US38 3732 7226

SO / PO / FO / 2-Day / Ground / UPS / CDO / Courier
GSO / OnTrac / Goldstreak / USPS / Other_____

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations.
File in the job folder with the COC.

Notes:

Therm. ID: Able Corr. Factor: -

Ice X Wet X Gel _____ Other _____

Cooler Custody Seal: seal

Sample Custody Seal: -

Cooler ID: -

Temp Observed: 2.6 Corrected: 2.6

From: Temp Blank ☒ Sample ☐

NCM Filed: Yes ☐ No ☐

	Yes	No	NA
Perchlorate has headspace? (Methods 314, 331, 6850)	☐	☐	☒
Alkalinity has no headspace?	☐	☐	☒
COC is complete w/o discrepancies?	☒	☐	☐
Samples received within holding time?	☒	☐	☐
Sample preservatives verified?	☐	☐	☒
Cooler compromised/tampered with?	☐	☒	☐
Samples compromised/tampered with?	☐	☒	☐
Samples w/o discrepancies?	☒	☐	☐
Sample containers have legible labels?	☒	☐	☐
Containers are not broken or leaking?	☒	☐	☐
Sample date/times are provided.	☒	☐	☐
Appropriate containers are used?	☒	☐	☐
Sample bottles are completely filled?	☒	☐	☐
Zero headspace?*	☐	☐	☒
Multiphasic samples are not present?	☒	☐	☐
Sample temp OK?	☒	☐	☐
Sample out of temp?	☐	☒	☐

Initials: DH Date: 7/31/19 DLR 7/31/19

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Ocean Disposal Wastewater Sample Validation

July 23, 2019

Laboratory Report 440-245042-1

Introduction:

The samples were reported to the method detection limit (MDL) and validated at a Stage 2A level. The samples were received outside of the 0-6 degree Celsius (°C) temperature range at 18.1 °C, 18.3 °C, 20.5 °C, 20.6 °C, 20.6 °C, 21.4°C and 26.0 °C. Qualifications were applied to the majority of the data based on the temperature exceedance indicating that the reported values are considered estimated (J) or the non-detect values are considered as estimated less than the MDL (UJ) or rejected (R) volatiles. The metals data were unaffected by the temperature exceedances. Additionally, a subset of the non-detect volatile organic compounds and non-detect nitrite, nitrate, and nitrate/nitrite results were R qualified as rejected due to holding time exceedances. The remaining data are considered usable within the limitation of the qualifications. The results for the associated laboratory quality control (QC) samples e.g. method blanks and laboratory control samples, were within the laboratory acceptance for all of the tests listed below with the exception of chromium in a method blank (see metals qualifications below). Batch matrix spike/matrix spike duplicate pairs were reported with the data. Since these were batch QC the results had no impact on the project samples and qualifications were not applied to the data based on these results.

Method 8260 B Volatile Qualifications

Reason Codes

1 = preservation (received outside of temperature >10 degrees Celsius, significant head space)

2 = holding times (pH was greater than 2 and analyzed greater than 7 days past collection

7 = Field Duplicate RPD exceeded
11 = Internal standard criteria not met

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result*	Reason Code**
0625 BUTCH	8260B	1,2-Dichloropropane	0.25U	ug/L	0.25R	1
		Benzene	2.0	ug/L	2.0J	1,7
		Chloroform	0.25U	ug/L	0.25R	
		Ethylbenzene	10	ug/L	10J	1,7
		m,p-Xylene	0.5U	ug/L	0.5R	
		Methylene Chloride	1.1U	ug/L	1.1R	1
		o-Xylene	0.25U	ug/L	0.25R	1
		Toluene	0.81J	ug/L	0.81J	1
		Xylenes, Total	0.25U	ug/L	0.25R	
0625 OD STREAMS	8260B	1,2-Dichloropropane	1.3U	ug/L	1.3R	1,2
		Benzene	1.3U	ug/L	1.3R	1,2
		Chloroform	1.3U	ug/L	1.3R	1,2
		Ethylbenzene	1.3U*	ug/L	1.3R	1,2, 11
		m,p-Xylene	2.5U	ug/L	2.5R	1,2
		Methylene Chloride	5.5U	ug/L	5.5R	1,2
		o-Xylene	1.3U	ug/L	1.3R	1,2

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result*	Reason Code**
		Toluene	1.3U	ug/L	1.3R	1,2
		Xylenes, Total	1.3U	ug/L	1.3R	1,2
06 25 BUTCH DUP	8260B	1,2-Dichloropropane	0.25U	ug/L	0.25R	1
		Benzene	1.5J	ug/L	1.5J	1,7
		Chloroform	0.25U	ug/L	0.25R	
		Ethylbenzene	5.6	ug/L	5.6J	1,7
		m,p-Xylene	0.5U	ug/L	0.5R	
		Methylene Chloride	5.0U	ug/L	5.0R	1
		o-Xylene	0.25U	ug/L	0.25R	
		Toluene	0.67J	ug/L	0.67J	1
		Xylenes, Total	0.25U	ug/L	0.25R	
BUTCHER 6/26/19)	8260B	1,2-Dichloropropane	0.25U	ug/L	0.25R	1
		Benzene	0.93J	ug/L	0.93J	1
		Chloroform	0.25U	ug/L	0.25R	
		Ethylbenzene	1.2J	ug/L	1.2J	1
		m,p-Xylene	0.5U	ug/L	0.5R	
		Methylene Chloride	1.1U	ug/L	1.1R	1
		o-Xylene	0.25U	ug/L	0.25R	
		Toluene	0.33J	ug/L	0.33J	1
		Xylenes, Total	0.25U	ug/L	0.25R	
OD STREAMS (6/26/19)	8260B	1,2-Dichloropropane	1.3U	ug/L	1.3R	1,2
		Benzene	1.3U	ug/L	1.3R	1,2
		Chloroform	1.3U	ug/L	1.3R	1,2
		Ethylbenzene	1.3U	ug/L	1.3R	1,2

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result*	Reason Code**
		m,p-Xylene	2.5U	ug/L	2.5R	1,2
		Methylene Chloride	5.5U	ug/L	5.5R	1,2
		o-Xylene	1.3U	ug/L	1.3R	1,2
		Toluene	1.3U	ug/L	1.3R	1,2
		Xylenes, Total	1.3U	ug/L	1.3R	1,2
BUTCHER (6/27/29)	8260B	1,2-Dichloropropane	0.25U	ug/L	0.25R	1
		Benzene	1.1J	ug/L	1.1J	1
		Chloroform	0.25U	ug/L	0.25R	
		Ethylbenzene	2.0	ug/L	2.0J	1
		m,p-Xylene	0.5U	ug/L	0.5R	
		Methylene Chloride	1.1U	ug/L	1.1R	1
		o-Xylene	0.25U	ug/L	0.25R	1
		Toluene	0.4J	ug/L	0.4J	1
		Xylenes, Total	0.25U	ug/L	0.25R	
ODSTREAMS (6/27/29)	8260B	1,2-Dichloropropane	1.3U	ug/L	1.3R	1,2
		Benzene	1.3U	ug/L	1.3R	1,2
		Chloroform	1.3U	ug/L	1.3R	1,2
		Ethylbenzene	1.3U	ug/L	1.3R	1,2
		m,p-Xylene	2.5U	ug/L	2.5R	1,2
		Methylene Chloride	5.5U	ug/L	5.5R	1,2
		o-Xylene	1.3U	ug/L	1.3R	1,2
		Toluene	1.3U	ug/L	1.3R	1,2
		Xylenes, Total	1.3U	ug/L	1.3R	1,2

*Validation qualifier definitions are included in Attachment 1 of this report

**Reason code definitions are included in Attachment 2 of this report
ug/L – microgram per liter
U – the analyte was not detected at or above the reported value
J -laboratory flag; result is less than the reporting limit but greater than the method detection limit and the concentration is an approximate value.
*-laboratory flag; ISTD response or retention time outside acceptance limits

Field Duplicate Assessment = Acceptance criteria relative percent difference (RPD) <30%

Sample ID	Analytical Test	Analytes	Results (ug/L)	RPD	Validated/Qualified Result	Reason Code
0625 BUTCH	8260B	1,2-Dichloropropane	0.25U		NA	NA
		Benzene	2.0		2.0 J	7
		Chloroform	0.25U		NA	NA
		Ethylbenzene	10		10 J	7
		m,p-Xylene	0.5U		NA	NA
		Methylene Chloride	1.1U		NA	NA
		o-Xylene	0.25U		NA	NA
		Toluene	0.81J		NA	NA
		Xylenes, Total	0.25U		NA	NA
06 25 BUTCH DUP	8260B	1,2-Dichloropropane	0.25U	0%	NA	NA
		Benzene	1.5J	NC	1.5 J	7
		Chloroform	0.25U	0%	NA	NA
		Ethylbenzene	5.6	56%	5.6 J	7
		m,p-Xylene	0.5U	0%	NA	NA
		Methylene Chloride	5.0U	0%	NA	NA

		o-Xylene	0.25U	0%	NA	NA
		Toluene	0.67J	NC	NA	NA
		Xylenes, Total	0.25U	0%	NA	NA

NA – not applicable
NC – not calculable

Method 625 Semi-Volatiles Qualifications

Reason Codes

1 = preservation (received outside of temperature >10 degrees Celsius)

2 = holding time exceedance

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
06 25 BUTCH	625	Bis(2-ethylhexyl) phthalate	80U H	ug/L	80UJ	1,2
06 25 OD STREAMS	625	Bis(2-ethylhexyl) phthalate	400U H	ug/L	400UJ	1,2
06 25 BUTCH DUP	625	Bis(2-ethylhexyl) phthalate	80U H	ug/L	80UJ	1,2
BUTCHER (6/26/19)	625	Bis(2-ethylhexyl) phthalate	80U H	ug/L	80UJ	1,2
OD STREAMS (6/26/19)	625	Bis(2-ethylhexyl) phthalate	400U H	ug/L	400UJ	1,2
BUTCHER (6/27/19)	625	Bis(2-ethylhexyl) phthalate	40U H	ug/L	40UJ	1,2
OD STREAMS (06/27/19)	625	Bis(2-ethylhexyl) phthalate	400U H	ug/L	400UJ	1,2

ug/L – microgram per liter
U – the analyte was not detected at or above the reported value

H – Lab flag; Sample was prepped or analyzed beyond the specified holding time

Field Duplicate Assessment – no qualifications RPD = 0%

Method 8315 Carbonyl Compounds Qualifications

Reason Codes

1 = preservation (received outside of temperature >10 degrees Celsius)

2= holding time exceedance

7 = Field Duplicate RPD exceeded

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
06 25 BUTCH	8315	Formaldehyde	0.091 H	ug/L	0.091 J	1,2,7
06 25 OD STREAMS	8315	Formaldehyde	0.096 H	ug/L	0.096 J	1,2
06 25 BUTCH DUP	8315	Formaldehyde	0.057 H	ug/L	0.057 J	1,2,7
BUTCHER (6/26/19)	8315	Formaldehyde	0.052 H	ug/L	0.052 J	1,2
OD STREAMS (6/26/19)	8315	Formaldehyde	0.11 H	ug/L	0.11 J	1,2
BUTCHER (6/27/19)	8315	Formaldehyde	0.13 H	ug/L	0.13 J	1,2
OD STREAMS (06/27/19)	8315	Formaldehyde	0.15 H	ug/L	0.15 J	1,2

ug/L – microgram per liter

H – Lab flag; Sample was prepped or analyzed beyond the specified holding time

Field Duplicate Assessment = Acceptance criteria relative percent difference (RPD) <30%

Sample ID	Analytical Test	Analytes	Results (mg/L)	RPD	Validated/Qualified Result	Reason Code
06 25 BUTCH	8315	Formaldehyde	0.091 H	46%	0.091 J	7
06 25 BUTCH DUP	8315	Formaldehyde	0.057 H		0.057 J	7

Method 6010B Metals Qualifications –

Chromium was detected at an estimated concentration greater than the MDL and less than the RL in the method blank in batch 556431 (0.00260 mg/L). Chromium was detected above the RL in the associated samples except for sample 06 25 Butch DUP which had an estimated concentration of chromium (0.060 JB). Therefore the estimated chromium result in sample 06 25 Butch DUP was elevated as non-detect at the RL.

Reason Code

3 = Blank contamination (i.e., method, trip, equipment, etc.)

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
06 25 BUTCH DUP	6010	Chromium	0.060 JB	mg/L	0.10 U	3

J -laboratory flag; result is less than the reporting limit but greater than the method detection limit and the concentration is an approximate value.
mg/L – milligram per liter
B – lab flag; Compound was found in the blank and sample

Method 7470A Mercury Qualifications - None

Wet Chemistry Parameters

Reason Codes

1 = preservation (received outside of temperature >10 degrees Celsius and pH >2 upon receipt, COD and HEM)

7 = Field Duplicate RPD exceeded

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
06 25 BUTCH	1664A	HEM	79.2	mg/L	79.2 J	1,7
	351.2	Total Kjeldahl	750	mg/L	750 J	1
	353.2	Nitrate Nitrite as N	0.31U	mg/L	0.31 UJ	1,7
	365.3	Phosphorous, Total	63	mg/L	63 J	1
	420.1	Phenolics, Total	0.14	mg/L	0.14 J	1
	4500 CN E	Cyanide, Total	0.025	mg/L	0.025 J	1,7
	--	Ammonia (as N)	82	mg/L	82 J	1
	4500 NH3 D	Ammonia as NH3	100	mg/L	100 J	1
	5220D	Chemical Oxygen	8600	mg/L	8600 J	1
	2540E	Total Volatile	7100	mg/L	7100 J	1
	2540B	Total Solids	10000	mg/L	10000 J	1
	--	Total Nitrogen	750	mg/L	750 J	1
06 25 OD STREAMS	1664A	HEM	11.2	mg/L	11.2 J	1
	351.2	Total Kjeldahl Nitrogen	3700	mg/L	3700 J	1
	353.2	Nitrate Nitrite as N	0.31U	mg/L	0.31 UJ	1
	365.3	Phosphorous, Total	570	mg/L	570 J	1
	420.1	Phenolics, Total Recoverable	2.5	mg/L	2.5 J	1

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
	4500 CN E	Cyanide, Total	0.018J	mg/L	0.018 J	1
	--	Ammonia (as N)	1700	mg/L	1700 J	1
	4500 NH3 D	Ammonia as NH3	2100	mg/L	2100 J	1
	5220D	Chemical Oxygen Demand	51000	mg/L	51000 J	1
	2540E	Total Volatile Solids	15000	mg/L	15000 J	1
	2540B	Total Solids	33000	mg/L	33000 J	1
	--	Total Nitrogen	3700	mg/L	3700 J	1
06 25 BUTCH DUP	1664A	HEM	203	mg/L	203 J	1,7
	351.2	Total Kjeldahl Nitrogen	820	mg/L	820 J	1
	353.2	Nitrate Nitrite as N	10	mg/L	10 J	1,7
	365.3	Phosphorous, Total	66	mg/L	66 J	1
	420.1	Phenolics, Total Recoverable	0.18	mg/L	0.18 J	1
	4500 CN E	Cyanide, Total	0.013U	mg/L	0.013 UJ	1,7
	--	Ammonia (as N)	82	mg/L	82 J	1
	4500 NH3 D	Ammonia as NH3	100	mg/L	100 J	1
	5220D	Chemical Oxygen Demand	9100	mg/L	9100 J	1
	2540E	Total Volatile Solids	5600	mg/L	5600 J	1
	2540B	Total Solids	8500	mg/L	8500 J	1
	--	Total Nitrogen	820	mg/L	820 J	1
	1664A	HEM	120	mg/L	120 J	1

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
BUTCHER (6/26/19)	351.2	Total Kjeldahl Nitrogen	470	mg/L	470 J	1
	353.2	Nitrate Nitrite as N	0.31	mg/L	0.31 J	1
	365.3	Phosphorous, Total	58	mg/L	58 J	1
	420.1	Phenolics, Total Recoverable	0.088	mg/L	0.088 J	1
	4500 CN E	Cyanide, Total	0.013	mg/L	0.013 J	1
	--	Ammonia (as N)	28	mg/L	28 J	1
	4500 NH3 D	Ammonia as NH3	34	mg/L	34 J	1
	5220D	Chemical Oxygen Demand	6000	mg/L	6000 J	1
	2540E	Total Volatile Solids	2300	mg/L	2300 J	1
	2540B	Total Solids	5000	mg/L	5000 J	1
	--	Total Nitrogen	470	mg/L	470 J	1
OD STREAMS (6/26/19)	1664A	HEM	8.8	mg/L	8.8 J	1
	351.2	Total Kjeldahl Nitrogen	4200	mg/L	4200 J	1
	353.2	Nitrate Nitrite as N	0.31	mg/L	0.31 J	1
	365.3	Phosphorous, Total	630	mg/L	630 J	1
	420.1	Phenolics, Total Recoverable	3.3	mg/L	3.3 J	1
	4500 CN E	Cyanide, Total	0.021J	mg/L	0.021 J	1
	--	Ammonia (as N)	2400	mg/L	2400 J	1
	4500 NH3 D	Ammonia as NH3	2900	mg/L	2900 J	1

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
	5220D	Chemical Oxygen Demand	42000	mg/L	42000 J	1
	2540E	Total Volatile Solids	17000	mg/L	17000 J	1
	2540B	Total Solids	33000	mg/L	33000 J	1
	--	Total Nitrogen	4200	mg/L	4200 J	1
BUTCHER (6/27/19)	1664A	HEM	138	mg/L	138 J	1
	351.2	Total Kjeldahl Nitrogen	450	mg/L	450 J	1
	353.2	Nitrate Nitrite as N	0.31	mg/L	0.31 J	1
	365.3	Phosphorous, Total	50	mg/L	50 J	1
	420.1	Phenolics, Total Recoverable	0.083	mg/L	0.083 J	1
	4500 CN E	Cyanide, Total	0.013	mg/L	0.013 J	1
	--	Ammonia (as N)	35	mg/L	35 J	1
	4500 NH3 D	Ammonia as NH3	43	mg/L	43 J	1
	5220D	Chemical Oxygen Demand	5500	mg/L	5500 J	1
	2540E	Total Volatile Solids	6900	mg/L	6900 J	1
	2540B	Total Solids	12000	mg/L	12000 J	1
	--	Total Nitrogen	450	mg/L	450 J	1
OD STREAMS (06/27/19)	1664A	HEM	52	mg/L	52 J	1
	351.2	Total Kjeldahl Nitrogen	4200	mg/L	4200 J	1
	353.2	Nitrate Nitrite as N	0.31	mg/L	0.31 J	1
	365.3	Phosphorous, Total	690	mg/L	690 J	1

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
	420.1	Phenolics, Total Recoverable	7.5	mg/L	7.5 J	1
	4500 CN E	Cyanide, Total	0.032	mg/L	0.032 J	1
	--	Ammonia (as N)	2400	mg/L	2400 J	1
	4500 NH3 D	Ammonia as NH3	3000	mg/L	3000 J	1
	5220D	Chemical Oxygen Demand	43000	mg/L	43000 J	1
	2540E	Total Volatile Solids	15000	mg/L	15000 J	1
	2540B	Total Solids	13000	mg/L	13000 J	1
	--	Total Nitrogen	4200	mg/L	4200 J	1

mg/L – milligram per liter
U – the analyte was not detected at or above the reported value
J -laboratory flag; result is less than the reporting limit but greater than the method detection limit and the concentration is an approximate value.

Field Duplicate Assessment = Acceptance criteria relative percent difference (RPD) <30%

Sample ID	Analytical Test	Analytes	Results (mg/L)	RPD	Validated/Qualified Result	Reason Code
06 25 BUTCH	1664A	HEM	79.2		79.2 J	7
	351.2	Total Kjeldahl Nitrogen	750		NA	NA
	353.2	Nitrate Nitrite as N	0.31U		0.31 UJ	7
	365.3	Phosphorous,	63		NA	NA
	420.1	Phenolics,	0.14		NA	NA

Sample ID	Analytical Test	Analytes	Results (mg/L)	RPD	Validated/Qualified Result	Reason Code
	4500 CN E	Cyanide, Total	0.025		0.025 J	7
	--	Ammonia (as	82		NA	NA
	4500 NH3 D	Ammonia as NH3	100		NA	NA
	5220D	Chemical	8600		NA	NA
	2540E	Total Volatile	7100		NA	NA
	2540B	Total Solids	10000		NA	NA
	--	Total Nitrogen	750		NA	NA
06 25 BUTCH DUP	1664A	HEM	203	68%	203 J	7
	351.2	Total Kjeldahl Nitrogen	820	8.9%	NA	NA
	353.2	Nitrate Nitrite as N	10	NC	10 J	7
	365.3	Phosphorous, Total	66	4.6%	NA	NA
	420.1	Phenolics, Total Recoverable	0.18	25%	NA	NA
	4500 CN E	Cyanide, Total	0.013U	NC	0.013 UJ	7
	--	Ammonia (as N)	82	0%	NA	NA
	4500 NH3 D	Ammonia as NH3	100	0%	NA	NA
	5220D	Chemical Oxygen Demand	9100	5.6%	NA	NA

Sample ID	Analytical Test	Analytes	Results (mg/L)	RPD	Validated/Qualified Result	Reason Code
	2540E	Total Volatile Solids	5600	24%	NA	NA
	2540B	Total Solids	8500	16%	NA	NA
	--	Total Nitrogen	820	8.9%	NA	NA

NA – not applicable
NC – not calculable

Method NO3NO2 Calc – Nitrogen, Nitrate-Nitrite Qualifications

Reason Codes

1 = preservation (received outside of temperature >10 degrees Celsius)

2= holding time exceedance

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
06 25 BUTCH	NO3NO2 Calc	Nitrate as N	5.5U H	mg/L	5.5 R	1,2
		Nitrite as N	2.5 U H	mg/L	2.5 R	1,2
		Nitrate Nitrite as N	5.5 U H	mg/L	5.5 R	1,2
06 25 OD STREAMS	NO3NO2 Calc	Nitrate as N	1.1 U H	mg/L	1.1 R	1,2
		Nitrite as N	0.50 U H	mg/L	0.50 R	1,2
		Nitrate Nitrite as N	1.1 U H	mg/L	1.1 R	1,2
06 25 BUTCH DUP	NO3NO2 Calc	Nitrate as N	0.55 U H	mg/L	0.55 R	1,2
		Nitrite as N	0.25 U H	mg/L	0.25 R	1,2
		Nitrate Nitrite as N	0.55 U H	mg/L	0.55 R	1,2
BUTCHER (6/26/19)	NO3NO2 Calc	Nitrate as N	5.5 U H	mg/L	5.5 R	1,2
		Nitrite as N	2.5 U H	mg/L	2.5 R	1,2
		Nitrate Nitrite as N	1.1 UH	mg/L	1.1 R	1,2
OD STREAMS		Nitrate as N	5.5 U H	mg/L	5.5 R	1,2

Sample ID	Analytical Test	Analyte	Laboratory Result	Units	Validated/Qualified Result	Reason Code
(6/26/19)	NO3NO2 Calc	Nitrite as N	2.5 U H	mg/L	2.5 R	1,2
		Nitrate Nitrite as N	5.5 U H	mg/L	5.5 R	1,2
BUTCHER (6/27/19)	NO3NO2 Calc	Nitrate as N	1.1 U H	mg/L	1.1 R	1,2
		Nitrite as N	0.50 U H	mg/L	0.50 R	1,2
		Nitrate Nitrite as N	1.1 U H	mg/L	1.1 R	1,2
OD STREAMS (06/27/19)	NO3NO2 Calc	Nitrate as N	5.5 U H	mg/L	5.5 R	1,2
		Nitrite as N	2.5 U H	mg/L	2.5 R	1,2
		Nitrate Nitrite as N	5.5 U H	mg/L	5.5 R	1,2

mg/L – milligram per liter
U – the analyte was not detected at or above the reported value
H – Lab flag; Sample was prepped or analyzed beyond the specified holding time

Field Duplicate Assessment – no qualifications RPD = 0%

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

APPENDIX C
Pollutant Minimization Report 2010

StarKist Samoa Pollutant Minimization Plan: Final Report

Prepared for:

StarKist Samoa

NPDES Permit AS0000019

Submitted to:

U.S. Environmental Protection Agency

American Samoa Environmental Protection Agency

Prepared by:

gdc

glatzel da costa (**gdc**)
P.O. Box 1238
Trinidad, CA 95570

14 December 2010

StarKist Samoa Pollutant Minimization Plan: Final Report

1. Introduction

The StarKist Samoa (SKS) cannery discharges treated process wastewater through the Joint Cannery Outfall (JCO) into Outer Pago Pago Harbor under a National Pollutant Discharge Elimination Permit (NPDES: permit number AS0000019). Special condition A.2 of Part V of the current SKS NPDES permit requires the development and implementation of a Pollutant Minimization Plan (PMP). This report describes the sampling done based on the workplan[1] submitted to U.S. Environmental Protection Agency (USEPA) and the American Samoa Environmental Protection Agency (ASEPA). The report also presents the action proposed based on the result of the sampling. The NPDES permit requires assessment of copper, mercury, and zinc[2].

1.1 Purpose

The purpose of the PMP is to assess and identify the sources of pollutants in different waste streams in the SKS cannery and develop a plan to minimize the entry of these pollutants into the facility's wastewater and subsequent discharge into the receiving water. As stated in the NPDES permit the goal of the PMP "shall be to achieve as soon as practicable for the discharge to meet water quality standards [for] copper, zinc, and mercury with a minimally sized mixing zone."

1.2 Background

SKS has two waste streams consisting of high strength waste and low strength waste. High strength waste is not discharged through the JCO (and is not regulated under NPDES permit AS0000019). Therefore, only the low strength waste stream is addressed in this report.

Whole effluent toxicity (WET) testing has been conducted on the final effluent from the StarKist Samoa cannery since the initial issuance of the NPDES permit. Prior to the current permit cycle (through 2007) acute WET testing was conducted on a regular basis. The source of acute toxicity was determined to be ammonia, which was and still is regulated by an effluent limitation and an approved mixing zone. The current permit requires semi-annual chronic WET testing, which has been done since May 2008. Testing for Cu, Zn, and Hg is also done on the samples collected for WET testing.

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[1] *Workplan for the StarKist Samoa Pollutant Minimization Plan*. Prepared for StarKist Samoa. Submitted to U.S. Environmental Protection Agency and American Samoa Environmental Protection Agency. Prepared by gdc. 14 July 2010.

[2] With the exception of ammonia, no other toxic parameters of concern have been identified in previous priority pollutant scans. Additional priority pollutant scans will be performed as required by the current NPDES permit in year four of the permit term. The presence of ammonia is recognized as an unavoidable consequence of fish processing and is controlled by discharge limitations and an approved mixing zone.

Priority pollutant scans and routine discharge monitoring reports (DMRs) monitoring of the effluent have indicated that, in addition to ammonia, levels of copper, zinc, and mercury exceed or have the potential to exceed the American Samoa Water Quality Standards (ASWQS) and/or the USEPA National Recommended Water Quality Criteria (NRWQC) for these parameters. All of the parameters in question are currently discharged under NPDES permit limitations into approved mixing zones. The mixing zones are small, well within the zone of initial dilution (ZID), and result in compliance with water quality criteria within a few seconds after discharge.

1.3 Approach

The approach to the PMP was described in the PMP workplan and involves the sampling and analysis of in-plant waste streams at locations that provide information required to identify the sources of the parameters addressed (Cu, Zn, and Hg). The sampling was done at nine locations within the plant over a normal processing period at three hour intervals. These data were examined to identify potential sources.

1.4 Scope and Limitations

As mentioned above only the waste streams that are treated and discharged through the JCO were included. High strength waste streams were not sampled. This report describes the sampling procedures (Section 2), the results of the sample analyses (Section 3), and the proposed actions deemed practicable to address the discharge of the parameters.

2. Sampling Procedures

The sampling locations, frequency, methods, management, and analytical methods are described in this section.

2.1 Sampling Locations

Two sites were sampled to characterize the incoming seawater and raw freshwater used in cannery operations. In-plant process wastewater streams were selected based on the principal sources of contributions to the effluent and operational characteristics of the cannery as summarized in Table 1. A flow diagram for the SKS facility is shown in Figure 1.

The primary effluent streams, which make up the total flow to the outfall, include thaw, butchering, spray cooling, can washer, boiler blowdown, and washwater. These six primary effluent streams, the final effluent at the permit specified sampling point 001, and the external input sources create a total of nine sources that were sampled. The selected sampling points are shown schematically in Figure 1.Actual physical sampling points representing these flows were determined based on consultation with SKS operations staff. The sampling points were:

- Point 1: Incoming freshwater prior to operations to be used as a control sample; sample was taken from the ASPA line entering the StarKist plant.
- Point 2: Incoming seawater prior to operations to be used as a control sample; sample was taken from the 6'' PVC pipe at the thawing area that delivers water from the sea water pump.
- Point 3: Flow from thaw water; sample was taken in front of thaw area #7, where flows from other thaw tanks meet before flowing to the sump pit.
- Point 4: Flow from butchering (including flow from freezer if a combined sampling site is available); sample was taken in between butchering table #1 & #2 where the flows meet before flowing to the sump pit.
- Point 5: Flow from spray cooling; sample was taken next to cooling zone #15 where all the flows from other cooling zones meet.
- Point 6: Can washer output; sample was taken at the can washer area next to the stairs that leads to the old QC office.
- Point 7: Flow from boiler blowdown; sample was taken just outside the boilers on the left side where the blow down flow exits.
- Point 8: Flow from wash down; sample was taken from the flow exiting the packing room before entering the sump pit.
- Point 9: Total effluent flow following DAF treatment at sampling point 001; sample was taken from the flow entering the wet well.

Table 1. Table of Flows, Sources, and Treatment Technologies for StarKist Samoa, Inc. - Outfall No. 001 [1]

Operations Contributing to Flow		Percent of Flow		Treatment	
Item[3]	Description	Total Process Flow	Flow Through Outfall[2]	Description	Codes[4]
a	Freezer Condensate	0.4	0.4	DAF Unit	1-H, 2-C, 4-B
b	Thaw Water + Can Washer + Boiler Blowdown	63.7	66.6	DAF Unit	1-H, 2-C, 4-B
c	Butchering	1.7	1.8	DAF Unit	1-H, 2-C, 4-B
d	Precooker	3.5	0.0	Ocean Disposal[5]	
e	Spray Cooling	4.3	4.5	DAF Unit	1-H, 2-C, 4-B
f	Press Scrap Reduction	0.8	0.0	Ocean Disposal[5]	
g	Can Washer + Boiler Blowdown	(included in b)		DAF Unit	1-H, 2-C, 4-B
h	Washdown	25.6	26.7	DAF Unit	1-H, 2-C, 4-B

[1] From NPDES renewal application Form 2C, Item II.B.
[2] Permit basis is a maximum daily flow is 2.9 mgd.
[3] Items referenced to Figure 1.
[4] Codes from Table 2C-1 (Form 2C) of NPDES permit application: 1-H = Flotation; 2-C = Chemical Precipitation; 4-B = Ocean Discharge Through Outfall.
[5] Barged to permitted offshore ocean dumping site - permit OD-93-01 Special

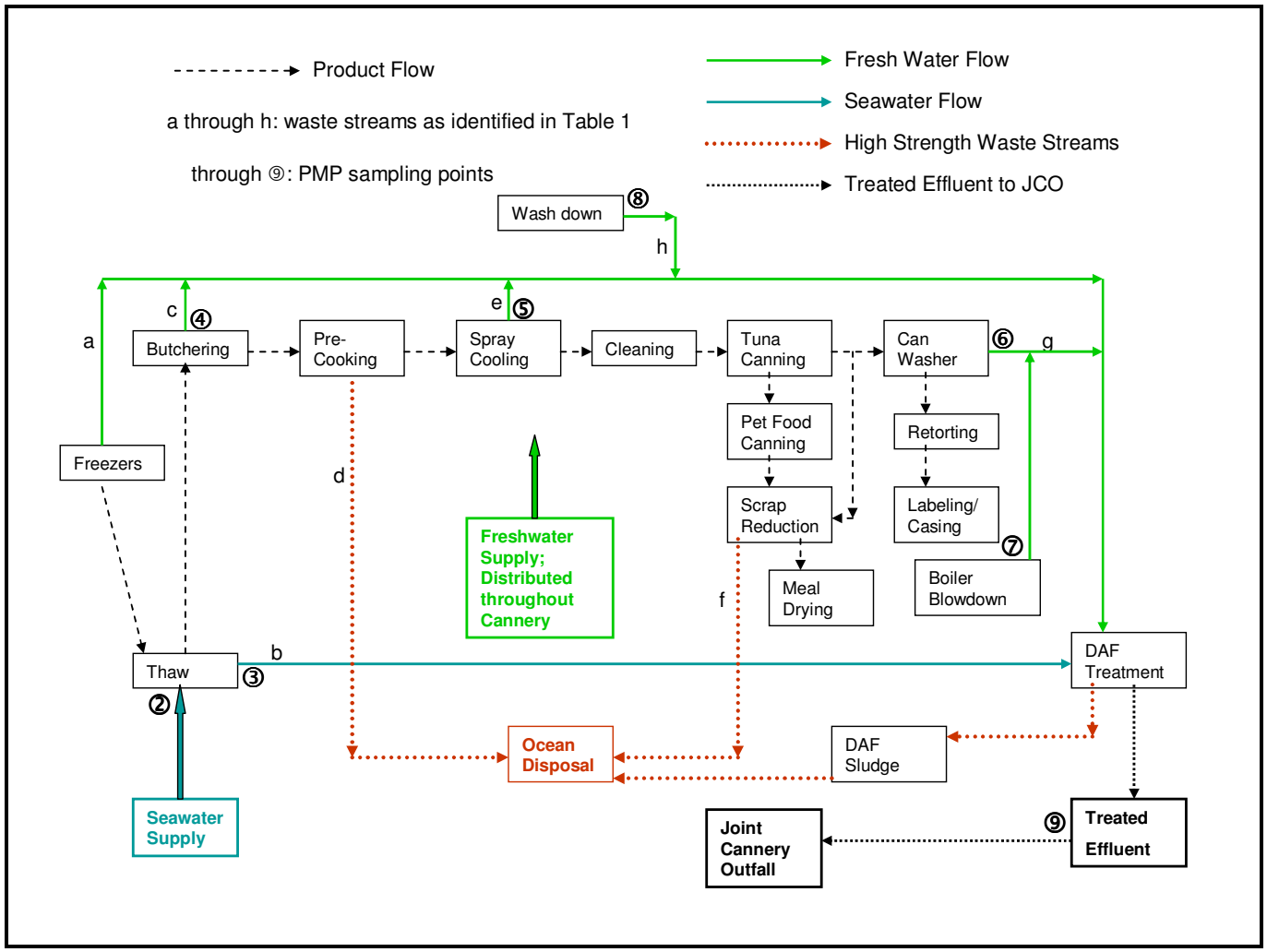

Figure 1
Flow Diagram and Proposed Sampling Points

2.2 Sampling Frequency

Four samples were collected at each sampling point. Samples were collected at three hour intervals during a normal production day. Nominal times of sampling were 09:00, 12:00, 15:00, and 18:00. Samples were taken within 20 minutes of the target times at all locations.

2.3 Sampling Methods

Sample bottles were prepared and supplied by the analytical laboratory conducting the analyses. Two sample bottles were filled for each sampling period at each of the designated sampling points, one for zinc and copper, and the other for low level mercury analysis. Depending on the effluent sampling point, sample bottles were filled directly from a spigot or lowered directly into the effluent stream and filled. Filled bottles were labeled with time, date, and sample location. Samples were stored on ice or refrigerated following collection.

2.4 Sample Management and Shipping

Samples were kept on ice until shipping. Samples were shipped to the analytical laboratory (Columbia Analytical Services) by express package shipment (DHL) in ice chests with bagged ice. The chain-of-custody form is included with the laboratory report (Attachment 1).

2.5 Sample Analysis

All samples were analyzed for total metal concentration. Samples were analyzed as follows:

Copper:	Method 200.8 (Preconcentration and ICP-MS) with a target detection limit of ≤0.01 µg/l
Zinc:	Method 200.8 (Preconcentration and ICP-MS) with a target detection limit of ≤0.1 µg/l
Mercury:	Method 1631E (Oxidation, Purge and Trap, and CVAFS) with a target detection limit of ≤0.1 ng/l (0.0001 µg/l)

3. Results of Analyses

Laboratory sampling results were assessed, summarized, and compared to the ASWQS criteria and NPDES permit limitations. The full laboratory report is included with all appropriate QA/QC documentation in Attachment 1 (provided on CD-ROM). Based on the results, potential sources of the three metals were identified. Applicable potential source control measures are described in Section 4. A discussion of the effluent values compared to routine effluent monitoring is also presented.

3.1 Mercury

Results for total mercury are shown in Table 2. The ASWQS[3] for total mercury is 0.050 µg/l. The NPDES limitations for mercury are 1.80 µg/l and 4.72 µg/l for monthly average and daily maximum, respectively. None of the samples analyzed were reported with concentrations above the maximum daily NPDES limitations. Samples with concentrations above the ASWQS criterion are shaded in gold. The results are summarized as follows:

- Inflow water concentrations were below the ASWQS criterion. The fresh water supply to the cannery was 0.00060 µg/l (average of the four samples). The seawater inflow was typical of the receiving water as measured during the semi-annual receiving water in the vicinity of the discharge and at the reference station just outside the Harbor. For example the September 2010 receiving water values were between 0.00048 µg/l and 0.00937 µg/l. The average of the seawater supply concentrations for the four samples was 0.00276 µg/l, well below the criterion.
- In-plant waste stream concentrations were elevated for those streams where process water comes into direct contact with the tuna; thaw water, butchering, spray cooling, and washdown (in the packing room). The highest values reported were from the butchering operations.
- Effluent concentrations, following treatment, were above the ASWQS (but well below the effluent limitation) and nearly identical to the thaw water values. This is consistent with the relative volumes of the various in-plant flows with the thaw water and washdown being the primary contributors to the final effluent (see Table 1).

3.2 Copper

Results for total copper are shown in Table 2. The ASWQS for mercury is referenced to the NRWQC, which is 3.73 µg/l[4]. The NPDES limitations for copper are 58.42 µg/l and 117.42 µg/l for monthly average and daily maximum, respectively. None of the samples analyzed were reported with concentrations above the maximum daily NPDES limitations. Samples with concentrations above the ASWQS criterion are shaded in gold. The results are summarized as follows:

- Inflow fresh water concentrations were below the ASWQS criterion. The fresh water supply to the cannery was 0.869 µg/l (average of the four samples). The seawater inflow was <u>not</u> typical of the receiving water as measured during the semi-annual receiving water in the vicinity of the discharge and at the reference station just outside the Harbor. The values were elevated, and were the highest levels in any of the waste streams. During the September 2010 receiving water values were between 0.118 µg/l and 0.788 µg/l. Further investigation revealed that the seawater supply pump and the valves immediately upstream of the sampling point are treated with a copper based anti-seize compound, a normal and necessary practice for seawater supply lines. It is believed that the samples were inadvertently contaminated with the anti-seize compound and the samples are not representative of seawater influent copper concentrations.

[3] American Samoa Water Quality Standards. 2005 Revision. Administrative Rule No. 006-2005. The criteria presented in this report are for Pago Pago Harbor:

[4] The criteria continuous criterion (chronic effects criterion) and based on total recoverable copper using the default translator from dissolved to total in the NRWQC. The dissolved fraction criterion is 3.1 µg/l.

- In-plant waste stream concentrations were elevated for certain streams where process water comes into direct contact with the tuna; butchering, spray cooling, and washdown (in the packing room). Elevated concentrations were not apparent in the thaw water outflow (further indication the sea water inflow samples were contaminated). The highest values reported were from the butchering operations.
- Effluent concentrations, following treatment were below the ASWQS and well below the effluent limitation. Concentrations were somewhat elevated compared to the thaw water values, and reflect the contributions from the butchering, spray cooling, and washdown streams. The results are consistent with the relative volumes of the various in-plant flows with the washdown being the second most important contributor to the final effluent (see Table 1).

3.3 Zinc

Results for total zinc are shown in Table 3. The ASWQS for zinc is referenced to the NRWQC, which is 85.62 µg/l[5]. The NPDES limitations for zinc are 1138 µg/l and 2284 µg/l for monthly average and daily maximum, respectively. None of the samples analyzed were reported with concentrations above the maximum daily NPDES limitations. Samples with concentrations above the ASWQS criterion are shaded in gold. The results are summarized as follows:

- Inflow fresh water concentrations were below the ASWQS criterion. The fresh water supply to the cannery was 9.84 µg/l (average of the four samples). The seawater inflow was not typical of the receiving water as measured during the semi-annual receiving water in the vicinity of the discharge and at the reference station just outside the Harbor. The values were elevated above what was expected, but were not the highest levels in any of the waste streams. During the September 2010 receiving water values were between 8.47 µg/l and 0.51 µg/l. It is believed that some or all of the seawater influent samples may have been inadvertently contaminated similar to the case for copper described above, but not as severely. These values are not necessarily representative of seawater influent zinc concentrations.
- In-plant waste stream concentrations were elevated for most of the streams where process water comes into direct contact with the tuna and/or with galvanized equipment such as fish boxes, piping, and similar equipment. Elevated concentrations were reported for thaw water, butchering, spray cooling, and washdown (in the packing room). Zinc concentrations were also elevated for the boiler blowdown, but not for the can washer outflow stream. The highest values reported were from the butchering operations.
- Effluent concentrations, following treatment were below the ASWQS for all but one sample and well below the effluent limitation. Concentrations were somewhat elevated compared to the thaw water values, and reflect the contributions from the other in-plant streams. The results appear consistent with the relative volumes of the various in-plant flows with the washdown being the second most important contributor to the final effluent (see Table 1).

[5] The criteria continuous criterion (chronic effects criterion) and based on total recoverable zinc using the default translator from dissolved to total in the NRWQC. The dissolved fraction criterion is 81 µg/l.

Table 2. Mercury (total, µg/l)				
Waste Stream	**Sample**	**Time**	**Result**	
Fresh Water Supply	SKS-1a	09:08	0.00058	J
	SKS-1b	12:08	0.00053	J
	SKS-1c	15:08	0.00063	J
	SKS-1d	18:08	0.00066	J
	Average		**0.00060**	
Seawater Supply	SKS-2a	09:12	0.00492	=
	SKS-2b	12:12	0.00352	=
	SKS-2c	15:12	0.00139	=
	SKS-2d	18:12	0.00121	=
	Average		**0.00276**	
Thaw Water Outflow	SKS-3a	09:00	0.128	=
	SKS-3b	12:00	0.162	=
	SKS-3c	15:00	0.115	=
	SKS-3d	18:00	0.0652	=
	Average		**0.1176**	
Butchering Outflow	SKS-4a	09:02	2.260	=
	SKS-4b	12:02	2.160	=
	SKS-4c	15:02	0.132	=
	SKS-4d	18:02	0.390	=
	Average		**1.2355**	
Spray Cooling Outflow	SKS-5a	09:04	0.042	=
	SKS-5b	12:04	0.263	=
	SKS-5c	15:04	0.0255	=
	SKS-5d	18:04	0.0611	=
	Average		**0.0979**	
Can Washer Outflow	SKS-6a	09:15	0.00118	=
	SKS-6b	12:15	0.00143	=
	SKS-6c	15:15	0.00117	=
	SKS-6d	18:15	0.00104	=
	Average		**0.001205**	
Boiler Blowdown	SKS-7a	09:17	0.00375	=
	SKS-7b	12:17	0.00468	=
	SKS-7c	15:17	0.00105	=
	SKS-7d	18:17	0.00286	=
	Average		**0.003085**	
Washdown	SKS-8a	09:06	0.255	=
	SKS-8b	12:06	0.438	=
	SKS-8c	15:06	0.247	=
	SKS-8d	18:06	0.292	=
	Average		**0.308**	
Outfall Effluent	SKS-9a	09:20	0.0973	=
	SKS-9b	12:20	0.119	=
	SKS-9c	15:20	0.112	=
	SKS-9d	1820	0.125	=
	Average		**0.1133**	

Shaded cells indicate concentrations great than the ASWQS criterion
J indicates concentration estimated between the method detection limit and the reporting limit
"=" indicates parameter was detected at the concentration shown

Table 3. Copper (total, µg/l)				
Waste Stream	**Sample**	**Time**	**Result**	
Fresh Water Supply	SKS-1a	09:08	1.01	=
	SKS-1b	12:08	0.866	=
	SKS-1c	15:08	0.861	=
	SKS-1d	18:08	0.739	=
	Average		0.869	
Seawater Supply	SKS-2a	09:12	16.0	=
	SKS-2b	12:12	50.3	=
	SKS-2c	15:12	8.910	=
	SKS-2d	18:12	7.090	=
	Average		20.575	
Thaw Water Outflow	SKS-3a	09:00	0.894	=
	SKS-3b	12:00	1.460	=
	SKS-3c	15:00	0.761	=
	SKS-3d	18:00	0.910	=
	Average		1.006	
Butchering Outflow	SKS-4a	09:02	24.9	=
	SKS-4b	12:02	29.8	=
	SKS-4c	15:02	3.28	=
	SKS-4d	18:02	6.18	=
	Average		16.04	
Spray Cooling Outflow	SKS-5a	09:04	4.06	=
	SKS-5b	12:04	6.09	=
	SKS-5c	15:04	3.55	=
	SKS-5d	18:04	3.67	=
	Average		4.34	
Can Washer Outflow	SKS-6a	09:15	1.59	=
	SKS-6b	12:15	1.31	=
	SKS-6c	15:15	1.34	=
	SKS-6d	18:15	1.41	=
	Average		1.41	
Boiler Blowdown	SKS-7a	09:17	1.700	=
	SKS-7b	12:17	1.090	=
	SKS-7c	15:17	1.360	=
	SKS-7d	18:17	1.460	=
	Average		1.403	
Washdown	SKS-8a	09:06	6.100	=
	SKS-8b	12:06	5.150	=
	SKS-8c	15:06	8.870	=
	SKS-8d	18:06	2.650	=
	Average		5.693	
Outfall Effluent	SKS-9a	09:20	2.400	=
	SKS-9b	12:20	1.440	=
	SKS-9c	15:20	1.280	=
	SKS-9d	1820	1.910	=
	Average		1.758	

Shaded cells indicate concentrations great than the ASWQS criterion
"=" indicates parameter was detected at the concentration shown

Table 4. Zinc (total, µg/l)				
Waste Stream	**Sample**	**Time**	**Result**	
Fresh Water Supply	SKS-1a	09:08	13.8	=
	SKS-1b	12:08	10.3	=
	SKS-1c	15:08	8.91	=
	SKS-1d	18:08	6.36	=
	Average		9.84	
Seawater Supply	SKS-2a	09:12	19	=
	SKS-2b	12:12	39.2	=
	SKS-2c	15:12	8.48	=
	SKS-2d	18:12	6.87	=
	Average		18.39	
Thaw Water Outflow	SKS-3a	09:00	96.6	=
	SKS-3b	12:00	159	=
	SKS-3c	15:00	107	=
	SKS-3d	18:00	352	=
	Average		178.7	
Butchering Outflow	SKS-4a	09:02	885	=
	SKS-4b	12:02	1080	=
	SKS-4c	15:02	126	=
	SKS-4d	18:02	416	=
	Average		627	
Spray Cooling Outflow	SKS-5a	09:04	43.5	=
	SKS-5b	12:04	74.6	=
	SKS-5c	15:04	63.2	=
	SKS-5d	18:04	44.3	=
	Average		56.4	
Can Washer Outflow	SKS-6a	09:15	5.65	=
	SKS-6b	12:15	4.8	=
	SKS-6c	15:15	3.60	=
	SKS-6d	18:15	5.35	=
	Average		4.85	
Boiler Blowdown	SKS-7a	09:17	40.7	=
	SKS-7b	12:17	20.2	=
	SKS-7c	15:17	34.3	=
	SKS-7d	18:17	28.8	=
	Average		31.0	
Washdown	SKS-8a	09:06	644	=
	SKS-8b	12:06	512	=
	SKS-8c	15:06	477	=
	SKS-8d	18:06	546	=
	Average		545	
Outfall Effluent	SKS-9a	09:20	91	=
	SKS-9b	12:20	73.5	=
	SKS-9c	15:20	85.5	=
	SKS-9d	1820	77.4	=
	Average		81.9	

Shaded cells indicate concentrations great than the ASWQS criterion
"=" indicates parameter was detected at the concentration shown

3.4 Effluent Monitoring Results

The semi-annual effluent toxicity monitoring results for the three metals considered in this report are shown in Table 5. Six monitoring events have been conducted under the current NPDES permit. The samples analyzed were a 24-hour, flow-weighted composites. Mercury and zinc are typically above the ASWQS criterion. Copper is typically below the ASWQS criterion, but the results do indicate a reasonable potential to exceed the criterion when statistically analyzed using the USEPA method for such an analysis. The results are all well below the NPDES permit limitations. It is noted that the limitations were based on effluent concentrations measured during the previous permit cycle. The low concentrations compared to the permit limitations are at least partly attributable to past improvements in plant operations, equipment, and housekeeping practices. A shift to canning loins with a concomitant reduction in whole fish processing may also be a factor.

Table 5. Summary of Chemistry Results for StarKist Samoa
May 2008 - September 2010 JCO Effluent Sampling

Sample Date	Sampling Season	Constituent		
		Copper (µg/l)	Zinc (µg/l)	Mercury (µg/l)
ASWQS Criterion		3.73	85.62	0.050
NPDES Daily Maximum Limitation		117.22	2284	4.72
NPDES Monthly Average Limitation		58.42	1138	1.80
5/8/2008	2008 Non-tradewind	2.86	263	0.159
9/4/2008	2008 Tradewind	3.10	233	0.089
2/19/2009	2009 Non-tradewind	2.00	153	0.135
9/17/2009	2009 Tradewind	1.27	125	0.130
2/25/2010	2010 Non-tradewind	2.01	114	0.103
9/8/2010	2010 Tradewind	2.12	81.1	0.029

4. Conclusions and Proposed Action

Based on the results of the sampling and analysis described in this report the following conclusions and proposed actions are as follows for each constituent:

4.1 Mercury

The source of mercury is clearly from the tuna. There is no practicable way to reduce this source other than maintaining good housekeeping practices that involve clean-up of scrap that is removed during washdown activities. Plant operating staff will be instructed/reminded to sweep and remove obvious scrap material prior to washdown, as is the current practice. The unavoidable and uncontrollable mercury concentrations can be addressed by appropriate NPDES permit limitations and maintaining an approved mixing zone. As described in previous mixing zone applications, the mixing zone for mercury is very small, extending only a few meters from the diffuser and at depths below 150 feet. Water quality standards are achieved within a few seconds after discharge.

4.2 Copper

The primary source of copper is clearly from the tuna. Secondary sources from copper plumbing and fittings appear minor. There is no practicable way to reduce this source other than maintaining good housekeeping practices that involve clean-up of scrap that is removed during washdown activities. Plant operating staff will be instructed/reminded to sweep and remove obvious scrap material prior to washdown, as is the current practice. The unavoidable and uncontrollable copper concentrations can be addressed by appropriate NPDES permit limitations and maintaining an approved mixing zone. As described in previous mixing zone applications, the mixing zone for copper is very small, extending only a few meters from the diffuser and at depths below 150 feet. Water quality standards are achieved within a few seconds after discharge, and as indicated in Section 3.4 the water quality standards are generally met at the discharge point.

The source of the apparent sample contamination in the seawater influent flow will be further investigated and documented. A letter report will be provided to USEPA and ASEPA with the results of this investigation. The additional sampling and analysis is planned during the normal 2011 effluent toxicity monitoring event.

4.2 Zinc

The primary sources of zinc are clearly from the tuna and galvanized fish boxes and other equipment. Galvanized equipment is required in a marine environment to avoid excessive corrosion. There is no practicable way to reduce these sources other than maintaining good housekeeping practices that involve clean-up of scrap that is removed during washdown activities. Plant operating staff will be instructed/reminded to sweep and remove obvious scrap material prior to washdown, as is the current practice. The unavoidable and uncontrollable zinc concentrations can be addressed by appropriate NPDES permit limitations and maintaining an approved mixing zone. As described in previous mixing zone applications, the mixing zone for copper is very small, extending only a few meters from the diffuser and at depths below 150 feet. Water quality standards are achieved within a few seconds after discharge.

The source of the apparent sample contamination in the seawater influent flow will be further investigated and documented. A letter report will be provided to USEPA and ASEPA with the results of this investigation. The additional sampling and analysis planned during the normal 2011 effluent toxicity monitoring event.

ATTACHMENT 3

Ocean Dumping Monitoring Plan

Geosyntec consultants

engineers | scientists | innovators

OCEAN DUMPING RECEVING WATER QUALITY MONITORING PLAN

StarKist Samoa Co., American Samoa

Prepared for

United States Environmental Protection Agency
75 Hawthorne Street
San Francisco, California, 94105

Prepared by

Geosyntec Consultants, Inc.
130 Stone Road West
Guelph, Ontario N1G 3Z5

August 29, 2019

Project Number PH0094U

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LIST OF ACRONYMS AND ABBREVIATIONS

ASEPA	American Samoa Environmental Protection Agency
m bws	meters below the water surface
MPRSA	Marine Protection, Research, and Sanctuaries Act
NMFS	National Marine Fisheries Service
OD	ocean dumping
THA	Task Hazard Analysis
TestAmerica	TestAmerica, Inc.
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WPRFMC	Western Pacific Regional Fishery Management Council

1 INTRODUCTION

Starkist Samoa Co., a wholly owned subsidiary of the StarKist Co. (collectively referred to as (StarKist) is seeking to obtain an Ocean Dumping permit for the ocean disposal of high-strength fish processing wastes from its tuna processing facility in American Samoa (the Facility). StarKist previously obtained a series of ocean dumping permits[1] issued by the Regional Administrator of U.S. Environmental Protection Agency (USEPA) Region 9 for the disposal of fish processing wastes off American Samoa that met USEPA's ocean dumping criteria at 40 C.F.R. Parts 227 and 228.

StarKist has developed this Monitoring Plan to document receiving water quality monitoring activities to be conducted during Ocean Dumping (OD) activities in American Samoa. The data collected under this program will be used to monitor conditions around the OD location (Figure 1). The scope of the monitoring plan was developed based on the previous permit, OD98-01 Special, and the plan was developed to comply with previous permit requirements pursuant to the Marine Protection, Research, and Sanctuaries Act (MPRSA). Although the 1998 Special Permit was never made effective,[2] StarKist understands from recent discussions with USEPA that it would be the basis and framework for a future ocean disposal permit for the StarKist waste streams. This monitoring plan specifically addresses terms and conditions outlined in Special Conditions 5 – Dump Site Monitoring in the 1998 Special Permit.

This receiving water Monitoring Plan does not address Special Condition 3 which includes the analysis of fish processing wastes from the StarKist onshore storage tank and toxicity testing and reporting requirements. The Sampling and Analysis Plans (SAPs) describing procedures for collecting and analyzing fish processing wastes and performing bioassay testing are discussed in separate plans. The Ocean Disposal Bioassay Testing SAP was developed June 24, 2019. The previously developed Wastewater Characterization for Ocean Disposal SAP dated June 14, 2019 does not reflect the use of an onshore storage tank; therefore, a new SAP will be developed and provided to USEPA for review prior to the start of ocean dumping.

1.1 Monitoring Plan Organization

This monitoring plan is organized as follows:

- Section 2 describes monitoring frequency requirements.
- Section 3 describes sample collection, including sampling locations, sampling methodology, and analyses.
- Section 4 summarizes required communication with agencies and other organizations.

[1] The previous permits included VCS Samoa Packing under separate permit numbers. However, the former VCS facility, now owned by Samoa Tuna Processors, is not seeking an ocean disposal permit.
[2] Letter from Carl L. Goldstein, USEPA, dated March 4, 2002.

- Section 5 presents the reporting schedule.
- Section 6 describes Health and Safety practices to be implemented during monitoring.
- Section 7 summarizes oversight requirements.
- Section 8 describes permit requirements.
- Section 9 describes quality assurance practices which will be observed during monitoring.
- Section 10 presents references used in the development of this monitoring plan.
- Appendix A provides reporting form templates which will be used during monitoring and reporting activities.

2 PERMIT MONITORING REQUIREMENTS

The receiving water quality monitoring program for dumping of fish processing wastes in the ocean is intended to document effects of disposed wastes on the receiving waters, biota, and beneficial uses of the receiving waters. The monitoring program is required for compliance with USEPA's Ocean Dumping Regulations and permit terms and conditions.

The permit requires the following:

- Sampling Frequency: OD events may occur multiple times per month, and record-keeping is required for each OD event. Sampling (referred to as a "monitoring cruise") will be completed once per month during active dumping.
- Required Notification: American Samoa Environmental Protection Agency (ASEPA) shall be notified 48 hours before commencing scheduled monitoring activities.
- Summary of Sampling Requirements: During each monitoring cruise, the disposal plume from the disposal vessel shall be sampled by taking discrete water samples for the measurement of parameters listed in Table 1. Control samples and monitoring samples are required from depths of 1, 3, and 10 meters below the water surface (m bws).
- Reporting Requirements: Reports will be routinely submitted to USEPA, ASEPA, National Marine Fisheries (NMFS), U.S. Fish and Wildlife (USFWS), and Western Pacific Regional Fishery Management Council (WPRFMC) documenting the findings of monitoring. Monthly, quarterly, and annual reports will be prepared.

3 SCOPE OF WORK

3.1 Sample Collection Schedule

Receiving water quality sampling will be completed once per month during active dumping. OD events may occur multiple times per month, and record-keeping is required for each OD event.

Sampling will be scheduled during the first two weeks of each month to allow time for lab analysis and reporting. Additionally, because of the time required to ship samples from American Samoa to the laboratory and because of the short hold time of some of the analyses, sampling will be coordinated with flight schedules.

3.2 Sample Locations

During each monitoring cruise, the disposal plume from the disposal vessel shall be sampled by taking discrete water samples. Conceptual Monitoring Stations are depicted in Figure 2; actual monitoring stations will be selected during the disposal event in accordance with the Special Conditions for Dump Site Monitoring where the determination of the disposal location within the dump site are described.

The following discrete samples will be collected:

- Control Samples (i.e., background samples) will be collected from Station 1 prior to beginning dumping. Water samples will be collected from depths of 1, 3, and 10 m bws.

- Monitoring Samples will be collected from five stations in the center of the discharge plume (Figure 2). Station 1 sampled for the control sample prior to dumping at the center of the dump site. The dumping vessel will move 1.1 nautical miles up current from the center of the disposal site. Station 1 will be sampled again from a point within the plume immediately after discharge operations cease. Stations 2, 3, 4, and 5 will be sampled in order, moving in the prevailing surface current direction[3], after Station 1 is sampled. Station 5 will be the last sample collected. All stations will be sampled at depths of 1, 3, and 10 m bws.

- Sampling Stations are located at the starting position (Control Sample - Station 1), 0.25 nautical miles (nmi) down current (Station 2), 0.5 nmi down current (Station 3), 1.0 nmi down current (Station 4), and at the leading edge of the plume, but within the plume (Station 5).

[3] The vessel Captain will observe the ocean conditions upon arrival at the center of the dump site, noting the wind direction and observed current direction. These observations will allow the Captain to determine the location within the dump site to begin discharge operations.

3.3 Sampling Methodology

Samples will be collected using a self-closing 3-liter water sampling device (e.g., Van Dorn type sampler) deployed at each depth (1, 3, and 10 m bws). Samples will be decanted into bottleware from the sampling device. Samples and duplicates will be collected and preserved in accordance with Table 2.

Sample containers will be properly preserved, labeled, logged onto a chain-of-custody form, and placed into an iced cooler prior to shipment to the analytical laboratory. Field documentation will be maintained in accordance with details presented in Section 5.1.

The sampling device will be rinsed three times with water obtained at each sampling depth prior to filling. The sampling device and any other reusable equipment will be decontaminated between sampling stations in accordance with Section 9.6.

No investigation derived waste is expected to be generated during sampling. All disposable equipment, including gloves, will be disposed as municipal solid waste.

4 COMMUNICATION

U.S. Coast Guard Liaison Officer (CGLO) Pago Pago and ASEPA will be notified a minimum of 24 hours before scheduled monitoring activities as follows:

- The waste transporter shall provide telephone notification of sailing to CGLO Pago Pago at 684-633-2299 and the ASEPA at 684-633-2304 during working hours (7:00 a.m. to 3:30 p.m. Samoa Standard Time). The following information will be provided:
    - Planned time of departure;
    - Estimated time of arrival at dump site;
    - Estimated time of departure from dump site; and
    - Estimate time of return to port.
- The waste transporter shall immediately notify CGLO Pago Pago and ASEPA about changes in the estimated time of departure greater than two hours.

5 REPORTING

Records will be kept during all discharge events and during all monitoring events.

5.1 Record Keeping During Sampling Events

In addition to the requirements listed in Section 5.1, the following shall be recorded during all sampling events. These details will be recorded on Table 4 and additionally reported in the navigational plot created after the disposal event.

- Sampling Details:
    - Time each sample is collected
    - Sampling locations at each station and method of determination
    - Observations of plume color (e.g., Forel-Ule color scale - http://forel-ule-scale.com), odor, floating materials, oil & grease, scum, and foam
    - Temperature measurements and pH at each sample depth
- All sightings of fish, sea turtles, sea birds, cetaceans
    - Time, location, bearing
    - Species name
    - Approximate number of individuals.

5.2 Sampling Cruise Monthly Reports

Monthly receiving water quality monitoring reports shall be submitted to USEPA Region 9, ASEPA, NMFS, USFWS, and WPRFMC with the 3-month reports as specified in Section 5.4.

The reports shall include:

- Cover Page:
    - Monitoring vessel
    - Discharge vessel
    - Chief investigator
    - Number of trips
    - Gallons for the month
    - Running time on trips
    - Discharge time on trips

- Average gallons per minute (GPM) discharge rate
- Average trip time

- A compilation of all Table 3's created during ocean dumping activities
- Table 4 created during sampling
- The navigational plot created to record sampling activities
- Report Form 1 (Appendix A), which records total volume generated (gal/day), volume ocean disposed (gal/day), and monthly volumes of alum (aluminum sulfate) and coagulant polymer added to fish processing waste streams.

5.3 Quarterly Reports

Quarterly reports shall be submitted to USEPA Region 9, ASEPA, NMFS, USFWS, and WPRFMC within 45 days of the end of the preceding 3-month period for which they were prepared.[4]

Quarterly reports shall include:

- Cover page with list of attachments
- A compilation of disposal event records
- The monthly Sampling Cruise Monitoring Reports
- The navigational plots created during disposal and sampling activities
- Results of Monthly Monitoring Analyses.
- A comparison with the permit limits as required on Report Form 1 (Appendix A).
    - Report Form 1 (Appendix A) which records daily volume of fish processing waste (total combined waste streams of DAF Sludge, Pre-Cooker, and Fishmeal Sump) generated at the StarKist facility and pumped into the onshore storage tanks; and the daily volume of fish processing waste disposed at the ocean disposal site.
- Report Form 2 (Appendix A), which records the monthly amount of alum (aluminum sulfate) and coagulant polymer added to the fish processing waste streams.

[4] The reports shall be submitted within this time unless extenuating circumstances are communicated to USEPA Region 9 and the ASEPA in writing.

- Letter to ASEPA reporting exceedances and irregularities during the 3-month period.
- List of cc'd individuals

5.4 Annual Report

Annual reports shall be submitted within 45 days of the end of the last quarterly report for that year to USEPA Region 9, the ASEPA, NMFS, USFWS, and WPRFMC.

- Annual compilation of data
- Statistical analysis of sample variability between stations and within samples for each parameter
- Detailed discussion of results
- Summary table of Monthly Report Form 1 (Appendix A) data.

5.5 Final Summary Report

A Final Summary Report shall be submitted to USEPA Region 9, ASEPA, NMFS, USFWS, and WPRFMC 60 days after permit expires. The purpose of the Final Summary Report is to summarize all data collected to characterize fish processing wastes and results of the dump site monitoring program, including a comparison with permit limits and a detailed discussion of the summary results.

5.5.1 Notice of Violation

Upon detection of a violation of any permit condition, the permittee shall send a written notification of this violation to USEPA Region 9 and the ASEPA within five working days and a detailed written report of the violation shall be sent to the agencies within 15 working days. This notification shall pertain to any permit limits (Table 1) that are exceeded, violation of volume limits (transport and dispose a combined waste stream total maximum of 200,000 gallons per day of fish processing wastes), and any disposal operation that occurs outside the disposal site.

6 HEALTH AND SAFETY

Prior to mobilization for the first monitoring cruise, a task hazard analysis (THA) will be created to prepare the sampling team for hazards they may encounter during sampling.

The THA will include emergency contact information, a summary of the work process and associated hazards and mitigators, and a list of required personal protective equipment. The THA will be updated, as necessary, and be available to the sampling team during sampling activities.

7 QUALITY ASSURANCE

Qualifications of the on-site Principal Investigator in charge of the field monitoring program at the dump site will be submitted to USEPA Region 9 and ASEPA for approval whenever a new Principal Investigator is retained. The Principal Investigator will have experience in coordinating and leading water quality studies, collection of deep-water samples, and operation and maintenance of field sampling equipment.

Notification of any change in this individual will be submitted to USEPA Region 9 and ASEPA at least 7 days before the planned dumping is scheduled.

7.1 Field Instrumentation

Field equipment needed for sampling will be properly maintained and calibrated prior to and during continued use to assure that measurements are as accurate as possible. Personnel will follow manufacturers' instructions to evaluate whether instruments are functioning within their established operational ranges. Calibration data will be recorded in the field logbook or on field data sheets.

Other requirements relating to calibration are as follows.

- To be acceptable, a field test must be bracketed between acceptable calibration results.
- The first check of the day may be an initial calibration, but the second check must be a continuing verification check.
- Each field instrument must be calibrated prior to use at no more than 24-hour intervals.
- The calibration must be verified at no more than 24-hour intervals during use and at the end of use if the instrument will not be used the next day or within a time period greater than 24 hours.
- Initial calibration and verification checks must meet the acceptance criteria are as follows:
    - Temperature: +/-0.2 ºC against an NIST-traceable thermometer
    - pH: +/-0.2 pH units of stated buffer value
    - Dissolved Oxygen: +/-0.3 mg/L
    - Turbidity: Manufacturer specified
- If an initial calibration or verification check fails to meet the acceptance criteria, the instrument should be immediately recalibrated or removed from service.

- If a calibration check fails to meet the acceptance criteria and it is not possible to reanalyze the samples, the following actions should be taken:
    - Results collected between the last acceptable calibration check and the failed calibration check should be reported as estimated (qualified with a "J");
    - A narrative of the problem should be included; and
    - The time period between verification checks should be shortened, or the instrument should be repaired or replaced.
- If historically generated data demonstrate that a specific instrument remains stable for extended periods of time, the interval between initial calibration and calibration checks may be increased.
    - Acceptable field data should be bracketed by acceptable checks. Data that are not bracketed by acceptable checks must be qualified.
    - The time interval should be selected based on the shortest interval that the instrument maintains stability.
    - If an extended time interval is used and the instrument consistently fails to meet the final calibration check, then the instrument may require maintenance to repair the problem or the time period between calibrations must be shortened.
- For continuous monitoring equipment, field data should be bracketed by acceptable checks or the data must be qualified.

7.2 Field Duplicates

Field duplicates are two samples (an original and a duplicate) of the same matrix, to the extent practicable, collected at the same time and location and using the same sampling techniques. Field duplicate samples are used to evaluate the precision of the overall sample collection and analysis process. Field duplicates will be collected as indicated in Table 2 and analyzed for the same set of analytes as for the regular sample collected. Exact locations of duplicate samples and sample identifications will be recorded in the field logbook or on field forms.

7.3 Decontamination Procedures

Reusable equipment will be decontaminated between sample stations. Equipment will be washed with phosphorous-free detergent (e.g., Liquinox®) and rinsed with tap water.

8 REFERENCES

CH2M Hill. 1997. Revised Report for Joint Cannery Ocean Dumping Studies in American Samoa.

Table 1 - Median Permitted Not to Exceed Values by Parameter

Parameter	Meadian Not to Exceed the Given Value in Oceanic Waters
Turbidity	0.2 NTU
Total Phosphorus	11.0 µg-P/L
Total Ntirogen	115 µg-N/L
Chlorophyll a	0.18 µg/L
Light Penetration Depth	150 feet
Dissolved Oxygen	Not less than 80% of saturation or less than 5.5 mg/L. If the natural level of dissolved oxygen is less than 5.5 mg/L, then the natural dissolved oxygen level shall become the standard.
pH	The pH range shall be 6.5 to 8.6 pH units and within 0.2 pH units of the level which occurs naturally.

Notes

1. Values in this table are from §24.0206(p) Standards of Water Quality - Ocean Waters from 2013 Revision American Samoa Water Quality Standards, Administrative Rule No. 001-2013.

Table 2 - Analytical Sampling Details

	Analyte(s)	EPA Method	Volume Required (mL)	Container	Preservation	Hold Time	Duplicate Collection Frequency	Required Method Detection Limit (mg/L)	Expected Method Detection Limit (mg/L)
	Total Suspended Solids	Standard Method 2540D/EPA Method 160.2	1000	Plastic 1 liter - unpreserved	Cool to ≤6ºC	7 days	1/20	10	10
	Total Volatile Suspended Solids	EPA 160.4	1000	Plastic 1 liter - unpreserved	Cool to ≤6ºC	7 days	1/20	10	10
	Oil and Grease	EPA 1664	1000	Glass 1 liter - unpreserved	Cool to <6ºC Preserve with H2SO4 to pH < 2	28 days	1/20	10	5
	Total Phosphorus	EPA 365.4	250	Plastic 250ml - with Sulfuric Acid **(same bottle as TKN**)	Cool to <6ºC Preserve with H2SO4 to pH < 2	28 days	1/10	1	0.05
Total Nitrogen	TKN	EPA 351.2: TKN	250	Plastic 250ml - with Sulfuric Acid **(same bottle as TP)**	Cool to ≤6ºC Preserve with H_2SO_4 to pH < 2	28 days	1/10	1	0.2
	No2+No3	EPA 353.2/SM4500-NO-3-F	250	Plastic 250ml - unpreserved	Cool to ≤6ºC Preserve with H_2SO_4 to pH < 2	28 days	1/10	1	0.1
	Ammonia	EPA 350.1	250	Plastic 250ml - with Sulfuric Acid	Cool to ≤6ºC Preserve with H_2SO_4 to pH < 2	28 days	1/10	1	0.1
	Chlorophyll a	SM 10200H (Field Filtered)	100	plastic or glass container	Frozen, Dark	28 days (dark)	1/10	Not stated	0.02
	field parameters (Temperature, tubidity, pH, light penetration depth, DO)	Field Water Quality Meter, secchi disk	N/A	N/A	N/A	Measured immediately	N/A	pH: 0.1 units	pH: 0.1 units turbidity: 0.01 NTU DO: 0.1 mg/L

Notes:

1. Hold times are listed from time of sample collection.
2. Field water quality meter shall be YSI 6-Series/EXO Sonde or equivalent. YSI Sonde User Manual found at https://www.ysi.com/File%20Library/Documents/Manuals/069300-YSI-6-Series-Manual-RevJ.pdf
3. QA/QC to comply with protocols and references in Special Condition 3.1.2 .
4. The required MDL is listed in Table 4 of Section 7.2.4 of GDC 16696 - Special Conditions of Monitoring Dump Site (1998).

Table 3 - Ocean Dumping Log **Permit #: ###**

Date: _____ **Voyage #:** _____ **Volume Loaded:**

Vessel: _____ Wave height _____ SK _____ Gallons

	Begin Loading SK	Visibility _____ Other	Gallons
	Finish Loading SK	Total	Gallons

Notifications made: ASEPA _____ GCLO _____

Time (every 15 min during dumping)	Task Performing	GPS Position (Lat/Long)		Wind Speed	Wind Direction	Speed (kts)	Course (True)
	Departure						
	Arrival at dump site						
	Finish Discharge						
	Depart dump site						
	Return to port/Secure SK Dock						

Current Direction: At Beginning of discharge _____ At end of Discharge: _____ Discharge Pattern: _____

Total Discharge Time: _____mins Average Speed During Discharge: _____kts. Discharge direction: _____

Discharge Rate: _____ Gallons/min/kt. Total Time Run: _____

Time and position of any floating material (incl grease, oil, scum, foam): _____

Precense of previous disposal plume and unusual occurrences: _____

Deviation from normal disposal pattern: _____ Reason for deviation: _____

MASTER OF VESSEL TO SIGN: Disposal Operations occurred in the manner required by the permit: _____

Table 4 - Ocean Dumping Sampling Log **Permit #: ###**

Date _____ **Wind (Direction/Speed):** _____ **Sampling Personnel:** _____
Vessel **Current Direction:** **Wave Height:**

Time	Station	Depth (meters)	Latitude	Longitude	Temp (°C)	pH	Secchi Disk Reading	Odor	Floating Material	Oil & Grease	Scum/Foam	Color
	Control	1										
		3										
		10										
	Station 1	1										
		3										
		10										
	Station 2	1										
		3										
		10										
	Station 3	1										
		3										
		10										
	Station 4	1										
		3										
		10										
	Station 5	1										
		3										
		10										

Sightings of fish, sea turtles, sea birds, cetaceans

Time	Species	Location	Bearing	# of individuals

Notes:
1. Ocean Dumping Site is located at 14° 24.00'S, 170° 38.30'W per OD permit #OD98-01 Special

2 1 0 2 4 Miles

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

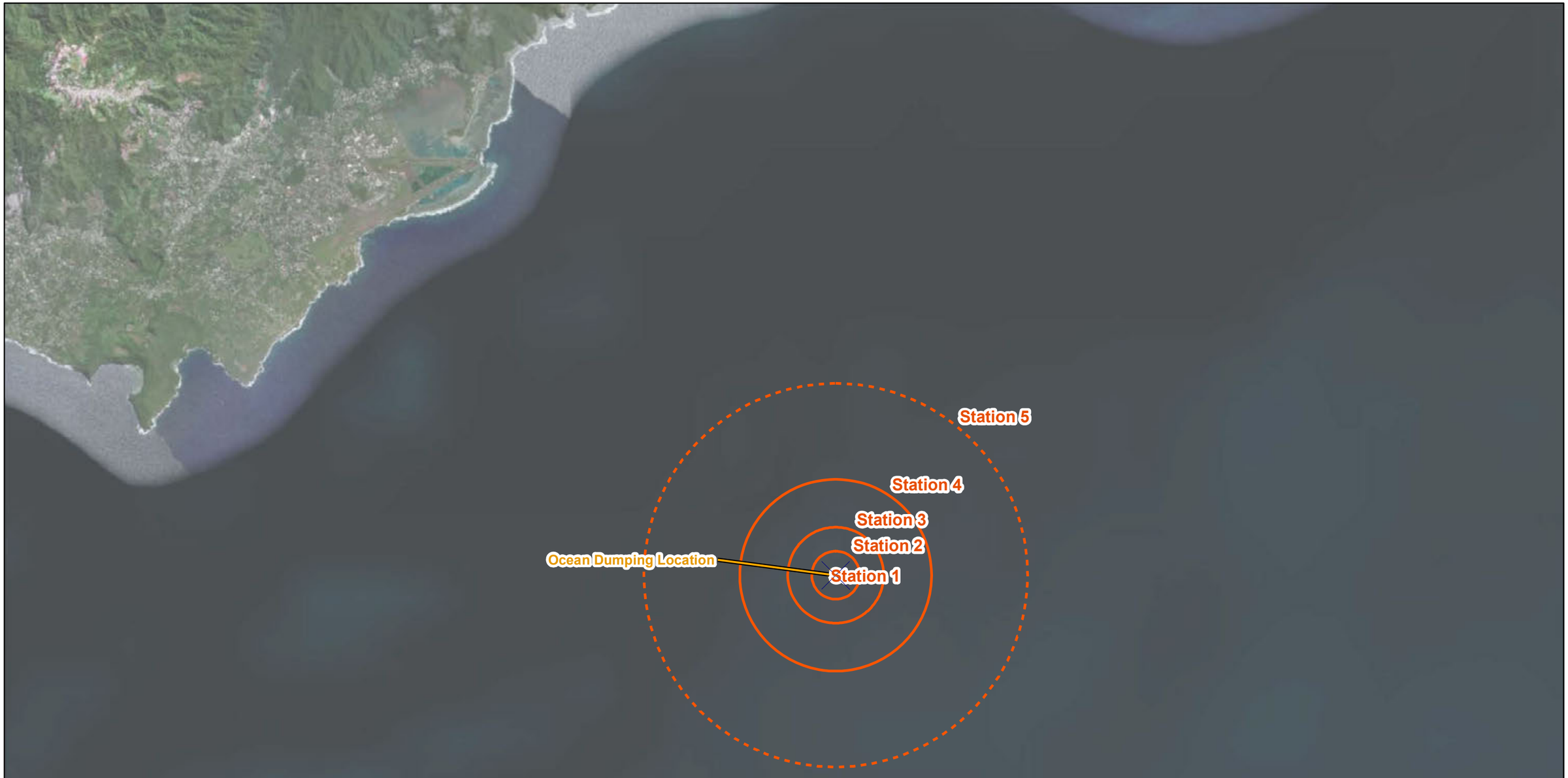
Dump Site Location
Ocean Dumping Monitoring Plan

Geosyntec consultants

Seattle | April 2019

Figure 1

Path: C:\Users\lwellborn\Desktop\Desktop\Starkist\GIS\Fig 1 - Site Location.mxd



Notes:
1. Ocean Dumping Site is located at 14° 24.00'S, 170° 38.30'W per OD permit #OD98-01 Special.
2. Sampling Stations are located at the starting position (Station 1), 0.25 nautical miles (nmi) downcurrent (Station 2), 0.5 nmi downcurrent (Station 3), 1.0 nmi downcurrent (Station 4), and at the leading edge of the plume (Station 5).
3. All sample stations show here are conceptual and will depend on the exact location of the discharge.
4. Station 5 should be located at the leading edge of the plume. It is shown here at 2 nmi from the discharge location for illustration purposes only.

1 0.5 0 1 2 Miles

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Conceptual Sampling Stations
Ocean Dumping Monitoring Plan

Geosyntec consultants

Seattle

April 2019

Figure **2**

Path: C:\Users\kwilloom\Desktop\Desktop\Starkist\GIS\Fig 2 - Concept Monitoring.mxd

APPENDIX A
Report Forms

APPENDIX A - REPORT FORM 1

Monthly Volumes of Starkist Samoa Co. Fish Processing Wastes Generated Per Day and Volume of Fish Processing Wastes Disposed at the Ocean Site

Month:				
OD 93-01	**DAF Sludge Generated (gallons/day)**	**Cooker Water Generated (gallons/day)**	**Press Liquor Generated (gallons/day)**	**Total Generated (gallons/day)**
Permit Limits	**TBD**	**TBD**	**TBD**	**TBD**

Date	DAF Sludge Generated (gallons/day)	Cooker Water Generated (gallons/day)	Press Liquor Generated (gallons/day)	Total Generated (gallons/day)	Volume Ocean Disposed (gallons/day)
Monthly Totals	0	0	0	0	0

Note:

TBD - Permit Limits will be populated upon issuance of the permit

An asterick (*) to the right of the fish processign waste volume signifies that a violation of the permit limit has occurred.

The number of violations are shown in monthly totals row.

Monthly quantities of alum (aluminum sulfate) and coagulant polymer added to the fish processing waste streams:

Aluminum sulfate: _____ Pounds/Month

Coagulant polymer: _____ Pounds/Month

APPENDIX A - REPORT FORM 2
Cumulative Yearly Data on Fish Processing Wastes
Generated at Starkist Samoa Co and Disposed at the Ocean Site
MPRSA 102 Special Permit #OD

Reporting Period: From				To			
Month & Year	**DAF Sludge Generated (gallons/month)**	**Cooker Water Generated (gallons/month)**	**Press Water Generated (gallons/month)**	**Total Generated (gallons/month)**	**Aluminum sulfate (pounds/month)**	**Coagulate Polymer (pounds/month)**	**Volume Ocean Disposed (gallons/month)**
Cumulative Yearly Totals	0	0	0	0	0	0	0

Note:
A separate table shall be prepared for each calendar year.

StarKist Samoa CO
Ocean Dump Site Monitoring Reports - Analytical Results

Date	Depth (m)	TSS mg/L SKS	TVSS mg/l sks	TP mg/l SKS	TN mg/l SKS	O&G mg/l SKS	Ammonia mg/l SKS
Station 1	control - 1						
	control - 3						
	control - 0						
Station 1	1						
	3						
	10						
Station 2	1						
	3						
	10						
Station 3	1						
	3						
	10						
Station 4	1						
	3						
	10						
Station 5	1						
	3						
	10						

Date	Depth (m)	TSS mg/L SKS	TVSS mg/l sks	TP mg/l SKS	TN mg/l SKS	O&G mg/l SKS	Ammonia mg/l SKS
Station 1	control - 1						
	control - 3						
	control - 0						
Station 1	1						
	3						
	10						
Station 2	1						
	3						
	10						
Station 3	1						
	3						
	10						
Station 4	1						
	3						
	10						
Station 5	1						
	3						
	10						

Note:
TSS is reported as non-filterable residue
TVSS is reported as volatile non-filterable residue