APPENDIX D

POST CRUISE FIELD REPORTS

July 2005
August 2005
September 2005
October 2005
November 2005
December 2005
January 2006
February 2006
March 2006
April 2006
May 2006
June 2006

POST-CRUISE FIELD REPORT
403(c) Study and Toxicity Testing Program, Interim Mixing Zone Validation Study, and Metals Translator Study for Shell Chemical Yabucoa, Inc.'s Yabucoa Refinery Ocean Outfall as Required by NPDES Permit No. PR0000400

July 2005 Survey

18 August 2005

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 TASKS ACCOMPLISHED 3

3.0 PROBLEMS ENCOUNTERED 4

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS 5

ATTACHMENTS 6
ATTACHMENT 1: SAMPLE AND ANALYSIS LISTS 1-1
ATTACHMENT 2: FIELD LOG TRANSCRIPT 2-1

1.0 INTRODUCTION

This report summarizes the tasks accomplished, problems encountered and how they were addressed and resolved, significant observations, and recommendations from the survey for the 403(c) Study and Toxicity Testing Program (403(c)), Interim Mixing Zone Validation Study (IMZVS), and Metals Translator Study (MTS) conducted from 21 to 27 July 2005 in Yabucoa, Puerto Rico. The 403(c), IMZVS, and MTS are field studies conducted as a requirement under Shell Chemical Yabucoa, Inc.'s (SCY's) National Pollution Discharge Elimination System (NPDES) Permit PR0000400. The field studies are implemented under a Quality Assurance Project Plan (QAPP) approved by the U.S. Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (EQB). The sampling protocol for the July 2005 survey consisted of three components:

1) The 403(c) Study required the collection of effluent samples every hour for a 24-h period. Hourly measurements of temperature and pH of the effluent were also done. Samples were collected in pre-cleaned containers, placed on ice, and shipped to the laboratory under a chain-of-custody (CoC) process. For sample security purposes, two sets of samples were prepared and shipped in separate containers to the laboratory. After shipment, the samples were received and logged into the receiving laboratory's internal sample tracking system. EnviroSystems, Inc. (ESI), located in Hampton, New Hampshire, will composite and test the effluent sample for toxicity using selected test species as specified in the SCY NPDES permit and QAPP. Columbia Analytical Services, Inc. (CAS), located in Kelso, Washington, provided analysis of composited effluent samples for volatile organic compounds, semivolatile compounds, dioxin, metals, cyanide, organochlorine pesticides, and polychlorinated biphenyls (PCB) as specified in the SCY NPDES permit and QAPP. The sample and analysis lists sent to ESI and CAS are provided as **Attachment 1**.

2) The IMZVS required collection of time-composite samples of ambient seawater from three levels (near-surface, midwater, and near-bottom) at four mixing zone stations and at a reference station in Yabucoa Bay as well as a sample at the effluent sampling port 001. Samples were collected over a 6-h period. All sampling equipment and sample containers that made contact with the samples were cleaned according to protocol. Hourly hydrographic profiles of the water column at each Interim Mixing Zone (IMZ) and reference station also were collected using field-calibrated instruments, and similar measurements were made in the effluent samples. A continuous flow sampling method was used to collect samples of ambient seawater from the IMZ and reference stations that were composited in the laboratory, preserved as required, placed on ice, and shipped to the laboratory under a CoC process. Effluent samples and quality control (QC) samples also were collected, composited, and processed similarly. Color was measured in composited seawater and effluent samples. For sample security purposes, two sets of samples were prepared and shipped in separate containers to the analytical

laboratory. After shipment, the samples were received and logged into the laboratory's internal sample tracking system. CAS will provide analysis of effluent and ambient water samples for metals, fluoride, nitrogen, and phenolics as specified in the SCY NPDES permit. The sample and analysis list sent to CAS is provided in **Attachment 1**.

3) The MTS required the collection of a suite of samples of ambient seawater at four mixing zone stations and at a reference station in Yabucoa Bay as well as a sample at the effluent sampling port 001. Samples were collected under stringent conditions specified by EPA Method 1669. A hydrographic profile of the water column was collected at each of the four stations and the reference station using field-calibrated instruments, while measurements of temperature and pH were made at effluent sampling port 001 during sampling. A continuous flow sampling method was used to collect samples of ambient seawater from the offshore and reference stations. Samples were preserved, placed on ice, and shipped to the laboratory under a CoC process. Effluent samples and QC samples also were collected processed similarly. Samples were prepared and shipped to the analytical laboratory. After shipment, the samples were received and logged into the laboratory's internal sample tracking system. Battelle Marine Sciences Laboratory (Battelle) located in Sequim, Washington will provide analysis of effluent and ambient water samples for dissolved copper and lead, total recoverable copper and lead, and total suspended solids as specified in the SCY NPDES permit and QAPP. The sample and analysis list sent to Battelle is provided in **Attachment 1**.

Upon completion of the survey, all required field measurements were made and all planned field and QC samples were collected. A transcript of the field log maintained during the course of the survey is provided as **Attachment 2**. The transcript provides a chronological account of the field activities.

The survey was conducted by a field team composed of Continental Shelf Associates, Inc. (CSA) Staff Scientists Robert Cady and Virginia Cornett, CSA Operations Manager Frank Johnson, and CSA Field Operations Specialists David McGreggor. Robert Cady acted as Chief Scientist, and Virginia Cornett was the Quality Assurance/Quality Control Coordinator's Field Representative. The following personnel from Panzardi-ERM, Inc. assisted in the field sampling and laboratory processing: Alberto Melendez, Carlos Cordero, Elvin Varela, and Ivanska Merced.

2.0 TASKS ACCOMPLISHED

The following tasks were completed during and subsequent to the survey:

- Safety training and facility orientation for all members of the field team;
- Assembly and deployment of IMZ/MTS and reference station marker buoys and tubing assemblies;
- Calibration of primary and backup field instruments;
- Preparation of sampling equipment, interim sampling bottles, and composite sample bottles;
- Collection of hydrographic data (temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations;
- Collection of hourly water samples from three levels at IMZ and reference stations (total of seven cycles for IMZVS) including QC samples;
- Collection of hourly water samples from effluent sampling port 001 and measurement of temperature and pH (total of seven cycles for IMZVS) including QC samples;
- Collection of hydrographic data (temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of one cycle for MTS sampling);
- Collection of water samples from three levels at IMZ and reference stations under EPA Method 1669;
- Collection of water samples from effluent sampling port 001 under EPA Method 1669 and measurement of temperature and pH;
- Collection of hourly water samples from effluent sampling port 001 and measurement of temperature and pH (total of 24 samples for 403(c));
- Compositing of hourly grab samples for the IMZVS from IMZ and reference stations and sampling port 001;
- Measurement of color in composite IMZ, reference, and effluent samples;
- Shipment of samples to the ESI, CAS, and Battelle laboratories under a CoC process according to the required protocols to meet preservation and holding time requirements;
- Demobilization of field equipment and supplies for storage on SCY premises or shipment back to Jupiter, Florida;
- Confirmation of the delivery of all samples in good condition at ESI, CAS, and Battelle;
- Work authorization provided to CSA, ESI, and Battelle to analyze samples according to analysis instructions;
- Completion of CoC forms received from laboratories and entered into project files; and
- Preparation of preliminary field report.

3.0 PROBLEMS ENCOUNTERED

This section describes the major problems encountered during the survey and a description of how the problems were addressed and resolved. Problems encountered during the survey included the following:

- *Survey Boat.* CSA staff was required to provide assistance in the launching and retrieval of the survey boat resulting in lost sampling time.

- *Shipping.* Some sample coolers shipped to CAS by Federal Express (preserved metals samples) were not delivered at the same time. Coolers were eventually delivered and holding time requirements were not compromised. Reasons for delayed delivery were undetermined. Close coordination between CSA and laboratories and close shipment tracking should be continued.

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS

The following are the significant observations and recommendations made during the survey:

- *Mobilization.* **Authorization to proceed with mobilization should be provided at least 2 weeks** before a survey to ensure that sampling equipment (tubing) and sample bottles can be prepared in time for a survey. A week's notice is required by CAS to prepare sample bottles and to ship them to Jupiter. In addition, **ESI requires at least 1 week notice** prior to receiving biotoxicity samples to arrange for a source of exactly 7-day old *Menidia*. Sample tubing should be pre-cleaned and packed for ready use in the field. Pre-cleaned sample containers should be labeled, sorted, inventoried, and packed in coolers for ready use in the field. Battery packs for peristaltic pumps should be recharged prior to each survey. Survey equipment should be shipped about a week before a survey to realize savings in shipping costs.

- *Sample Tubing.* This was the second time that the same Teflon-lined tygon tubing was used for water sampling. Some minor delamination of the Teflon lining occurred at the connection point where the tygon tubing is connected to the silicone tubing on the peristaltic pump via a connector. When this happened it was quickly corrected by trimming off a small section of the Teflon-lined tygon tubing where the Teflon was delaminated. We anticipate being able to use the same Teflon-lined tygon tubing for several surveys before requiring replacement. This will be done on an as-needed basis.

- *Redundancy.* Spare sample containers, preservatives, deionized water, and sampling equipment should be available at CSA and in the field/Yabucoa so that unexpected problems can be dealt with without resorting to shipping replacement items from the laboratories or CSA.

ATTACHMENTS

ATTACHMENT 1

SAMPLE AND ANALYSIS LISTS

JOB #: 1987 **CLIENT:** Shell Chemical Yabucoa, Inc. **DATE:** 7/25/2005 – 7/26/2005
SURVEY/CRUISE: IMZVS and 403(c) - July 2005 **Laboratory:** Columbia Analytical Services, Inc.

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-IMZVS-1-S-FI-A	7/25/05	20:07	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-1-M-FI-A	7/25/05	21:50	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-1-B-FI-A	7/25/05	22:37	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-2-S-FI-A	7/25/05	20:21	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-2-M-FI-A	7/25/05	22:00	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-2-B-FI-A	7/25/05	22:50	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-3-S-FI-A	7/25/05	20:40	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-3-M-FI-A	7/25/05	22:10	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-3-B-FI-A	7/25/05	22:56	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-4-S-FI-A	7/25/05	20:45	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-4-M-FI-A	7/25/05	22:20	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-4-B-FI-A	7/25/05	23:10	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-R-S-FI-A	7/25/05	20:57	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-R-M-FI-A	7/25/05	22:25	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-R-B-FI-A	7/25/05	23:20	Composited Grab	250-mL HDPE	Seawater	Fluoride

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-IMZVS-E-0-Fl-A	7/25/05	21:05	Manual	250-mL HDPE	Effluent	Fluoride
7/05-IMZVS-1-S-Fl-B	7/25/05	20:07	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-1-M-Fl-B	7/25/05	21:50	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-1-B-Fl-B	7/25/05	22:37	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-2-S-Fl-B	7/25/05	20:21	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-2-M-Fl-B	7/25/05	22:00	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-2-B-Fl-B	7/25/05	22:50	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-3-S-Fl-B	7/25/05	20:40	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-3-M-Fl-B	7/25/05	22:10	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-3-B-Fl-B	7/25/05	22:56	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-4-S-Fl-B	7/25/05	20:45	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-4-M-Fl-B	7/25/05	22:20	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-4-B-Fl-B	7/25/05	23:10	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-R-S-Fl-B	7/25/05	20:57	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-R-M-Fl-B	7/25/05	22:25	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-R-B-Fl-B	7/25/05	23:20	Composited Grab	250-mL HDPE	Seawater	Fluoride
7/05-IMZVS-E-0-Fl-B	7/25/05	21:05	Manual	250-mL HDPE	Effluent	Fluoride

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-IMZVS-1-S-Metals-A	7/25/05	20:07	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-1-M-Metals-A	7/25/05	21:50	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-1-B-Metals-A	7/25/05	22:37	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-2-S-Metals-A	7/25/05	20:21	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-2-M-Metals-A	7/25/05	22:00	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-2-B-Metals-A	7/25/05	22:50	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-3-S-Metals-A	7/25/05	20:40	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-3-M-Metals-A	7/25/05	22:10	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-3-B-Metals-A	7/25/05	22:56	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-4-S-Metals-A	7/25/05	20:45	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-4-M-Metals-A	7/25/05	22:20	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-4-B-Metals-A	7/25/05	23:10	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-R-S-Metals-A	7/25/05	20:57	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-R-M-Metals-A	7/25/05	22:25	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-R-B-Metals-A	7/25/05	23:20	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-E-0-Metals-A	7/25/05	21:05	Manual	1-L HDPE	Effluent	Metals
7/05-IMZVS-1-S-Metals-B	7/25/05	20:07	Composited Grab	1-L HDPE	Seawater	Metals

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-IMZVS-1-M-Metals-B	7/25/05	21:50	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-1-B-Metals-B	7/25/05	22:37	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-2-S-Metals-B	7/25/05	20:21	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-2-M-Metals-B	7/25/05	22:00	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-2-B-Metals-B	7/25/05	22:50	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-3-S-Metals-B	7/25/05	20:40	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-3-M-Metals-B	7/25/05	22:10	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-3-B-Metals-B	7/25/05	22:56	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-4-S-Metals-B	7/25/05	20:45	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-4-M-Metals-B	7/25/05	22:20	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-4-B-Metals-B	7/25/05	23:10	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-R-S-Metals-B	7/25/05	20:57	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-R-M-Metals-B	7/25/05	22:25	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-R-B-Metals-B	7/25/05	23:20	Composited Grab	1-L HDPE	Seawater	Metals
7/05-IMZVS-E-0-Metals-B	7/25/05	21:05	Manual	1-L HDPE	Effluent	Metals
7/05-IMZVS-1-S-N-A	7/25/05	20:07	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-1-M-N-A	7/25/05	21:50	Composited Grab	500-mL HDPE	Seawater	Nitrogen

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-IMZVS-1-B-N-A	7/25/05	22:37	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-2-S-N-A	7/25/05	20:21	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-2-M-N-A	7/25/05	22:00	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-2-B-N-A	7/25/05	22:50	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-3-S-N-A	7/25/05	20:40	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-3-M-N-A	7/25/05	22:10	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-3-B-N-A	7/25/05	22:56	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-4-S-N-A	7/25/05	20:45	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-4-M-N-A	7/25/05	22:20	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-4-B-N-A	7/25/05	23:10	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-R-S-N-A	7/25/05	20:57	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-R-M-N-A	7/25/05	22:25	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-R-B-N-A	7/25/05	23:20	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-E-0-N-A	7/25/05	21:05	Manual	500-mL HDPE	Effluent	Nitrogen
7/05-IMZVS-1-S-N-B	7/25/05	20:07	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-1-M-N-B	7/25/05	21:50	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-1-B-N-B	7/25/05	22:37	Composited Grab	500-mL HDPE	Seawater	Nitrogen

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-IMZVS-2-S-N-B	7/25/05	20:21	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-2-M-N-B	7/25/05	22:00	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-2-B-N-B	7/25/05	22:50	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-3-S-N-B	7/25/05	20:40	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-3-M-N-B	7/25/05	22:10	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-3-B-N-B	7/25/05	22:56	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-4-S-N-B	7/25/05	20:45	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-4-M-N-B	7/25/05	22:20	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-4-B-N-B	7/25/05	23:10	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-R-S-N-B	7/25/05	20:57	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-R-M-N-B	7/25/05	22:25	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-R-B-N-B	7/25/05	23:20	Composited Grab	500-mL HDPE	Seawater	Nitrogen
7/05-IMZVS-E-0-N-B	7/25/05	21:05	Manual	500-mL HDPE	Effluent	Nitrogen
7/05-IMZVS-1-S-Phen-A	7/25/05	20:07	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-1-M-Phen-A	7/25/05	21:50	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-1-B-Phen-A	7/25/05	22:37	Composited Grab	500-mL amber glass	Seawater	Phenolics

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-IMZVS-2-S-Phen-A	7/25/05	20:21	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-2-M-Phen-A	7/25/05	22:00	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-2-B-Phen-A	7/25/05	22:50	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-3-S-Phen-A	7/25/05	20:40	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-3-M-Phen-A	7/25/05	22:10	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-3-B-Phen-A	7/25/05	22:56	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-4-S-Phen-A	7/25/05	20:45	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-4-M-Phen-A	7/25/05	22:20	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-4-B-Phen-A	7/25/05	23:10	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-R-S-Phen-A	7/25/05	20:57	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-R-M-Phen-A	7/25/05	22:25	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-R-B-Phen-A	7/25/05	23:20	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-E-0-Phen-A	7/25/05	21:05	Manual	500-mL amber glass	Effluent	Phenolics
7/05-IMZVS-1-S-Phen-B	7/25/05	20:07	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-1-M-Phen-B	7/25/05	21:50	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-1-B-Phen-B	7/25/05	22:37	Composited Grab	500-mL amber glass	Seawater	Phenolics

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-IMZVS-2-S-Phen-B	7/25/05	20:21	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-2-M-Phen-B	7/25/05	22:00	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-2-B-Phen-B	7/25/05	22:50	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-3-S-Phen-B	7/25/05	20:40	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-3-M-Phen-B	7/25/05	22:10	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-3-B-Phen-B	7/25/05	22:56	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-4-S-Phen-B	7/25/05	20:45	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-4-M-Phen-B	7/25/05	22:20	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-4-B-Phen-B	7/25/05	23:10	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-R-S-Phen-B	7/25/05	20:57	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-R-M-Phen-B	7/25/05	22:25	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-R-B-Phen-B	7/25/05	23:20	Composited Grab	500-mL amber glass	Seawater	Phenolics
7/05-IMZVS-E-0-Phen-B	7/25/05	21:05	Manual	500-mL amber glass	Effluent	Phenolics
7/05-IMZVS-F- Blank1	7/25/05	8:33	Pump	1-L HDPE	Deionized water	Field Blank 1 (Boat)
7/05-IMZVS-B- Blank	7/25/05	19:56	Pump	1-L HDPE	Deionized water	Bottle Blank

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-IMZVS-F- Blank2	7/25/05	8:05	Manual	1-L HDPE	Deionized water	Field Blank 2 (Effluent)
7/05-IMZVS-T- Blank-Filtered	7/25/05	8:47	Pump	1-L HDPE	Deionized water	Tubing and Filter Blank
7/05-403(c)-E-1-VOC-A	7/25/05	9:15	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-2-VOC-A	7/25/05	10:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-3-VOC-A	7/25/05	11:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-4-VOC-A	7/25/05	12:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-5-VOC-A	7/25/05	13:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-6-VOC-A	7/25/05	14:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-7-VOC-A	7/25/05	15:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-8-VOC-A	7/25/05	16:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-9-VOC-A	7/25/05	17:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-10-VOC-A	7/25/05	18:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-11-VOC-A	7/25/05	19:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-12-VOC-A	7/25/05	20:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-13-VOC-A	7/25/05	21:30	Manual	40-mL amber glass	Effluent	VOC

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-403(c)-E-14-VOC-A	7/25/05	22:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-15-VOC-A	7/25/05	23:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-16-VOC-A	7/26/05	0:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-17-VOC-A	7/26/05	1:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-18-VOC-A	7/26/05	2:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-19-VOC-A	7/26/05	3:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-20-VOC-A	7/26/05	4:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-21-VOC-A	7/26/05	5:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-22-VOC-A	7/26/05	6:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-23-VOC-A	7/26/05	7:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-24-VOC-A	7/26/05	8:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-1-VOC-B	7/25/05	9:15	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-2-VOC-B	7/25/05	10:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-3-VOC-B	7/25/05	11:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-4-VOC-B	7/25/05	12:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-5-VOC-B	7/25/05	13:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-6-VOC-B	7/25/05	14:30	Manual	40-mL amber glass	Effluent	VOC

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-403(c)-E-7-VOC-B	7/25/05	15:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-8-VOC-B	7/25/05	16:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-9-VOC-B	7/25/05	17:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-10-VOC-B	7/25/05	18:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-11-VOC-B	7/25/05	19:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-12-VOC-B	7/25/05	20:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-13-VOC-B	7/25/05	21:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-14-VOC-B	7/25/05	22:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-15-VOC-B	7/25/05	23:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-16-VOC-B	7/26/05	0:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-17-VOC-B	7/26/05	1:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-18-VOC-B	7/26/05	2:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-19-VOC-B	7/26/05	3:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-20-VOC-B	7/26/05	4:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-21-VOC-B	7/26/05	5:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-22-VOC-B	7/26/05	6:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E-23-VOC-B	7/26/05	7:30	Manual	40-mL amber glass	Effluent	VOC

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-403(c)-E-24-VOC-B	7/26/05	8:30	Manual	40-mL amber glass	Effluent	VOC
7/05-403(c)-E- Blank	7/25/05	9:15	Manual	40-mL amber glass	Deionized water	Effluent Blank

JOB #: 1987 **CLIENT:** Shell Chemical Yabucoa, Inc. **DATE:** 7/25/2005 – 7/26/2005
SURVEY/CRUISE: 403(c) - July 2005 **Laboratory:** EnviroSystems, Inc.

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-403(c)-E-1-Biotox-A	7/25/05	9:15	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-2-Biotox-A	7/25/05	10:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-3-Biotox-A	7/25/05	11:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-4-Biotox-A	7/25/05	12:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-5-Biotox-A	7/25/05	13:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-6-Biotox-A	7/25/05	14:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-7-Biotox-A	7/25/05	15:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-8-Biotox-A	7/25/05	16:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-9-Biotox-A	7/25/05	17:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-10-Biotox-A	7/25/05	18:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-11-Biotox-A	7/25/05	19:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-12-Biotox-A	7/25/05	20:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-13-Biotox-A	7/25/05	21:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-14-Biotox-A	7/25/05	22:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-15-Biotox-A	7/25/05	23:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-403(c)-E-16-Biotox-A	7/25/05	0:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-17-Biotox-A	7/25/05	1:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-18-Biotox-A	7/25/05	2:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-19-Biotox-A	7/25/05	3:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-20-Biotox-A	7/25/05	4:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-21-Biotox-A	7/25/05	5:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-22-Biotox-A	7/25/05	6:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-23-Biotox-A	7/25/05	7:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-24-Biotox-A	7/25/05	8:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-1-Biotox-B	7/25/05	9:15	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-2-Biotox-B	7/25/05	10:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-3-Biotox-B	7/25/05	11:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-4-Biotox-B	7/25/05	12:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-5-Biotox-B	7/25/05	13:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-6-Biotox-B	7/25/05	14:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-7-Biotox-B	7/25/05	15:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-8-Biotox-B	7/25/05	16:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-403(c)-E-9-Biotox-B	7/25/05	17:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-10-Biotox-B	7/25/05	18:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-11-Biotox-B	7/25/05	19:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-12-Biotox-B	7/25/05	20:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-13-Biotox-B	7/25/05	21:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-14-Biotox-B	7/25/05	22:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-15-Biotox-B	7/25/05	23:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-16-Biotox-B	7/25/05	0:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-17-Biotox-B	7/25/05	1:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-18-Biotox-B	7/25/05	2:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-19-Biotox-B	7/25/05	3:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-20-Biotox-B	7/25/05	4:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-21-Biotox-B	7/25/05	5:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-22-Biotox-B	7/25/05	6:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-23-Biotox-B	7/25/05	7:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-24-Biotox-B	7/25/05	8:30	Manual	1-gal. cubitainer	Effluent	Biotoxicity
7/05-403(c)-E-SVOC1-A	Completed by ESI	–	Empty	1-L amber glass	Empty/fill and send to CAS	Semivolatile Compounds

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-403(c)-E-SVOC1-A	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Semivolatile Compounds
7/05-403(c)-E-SVOC1-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Semivolatile Compounds
7/05-403(c)-E-SVOC1-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Semivolatile Compounds
7/05-403(c)-E-SVOC-1-Extra	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Semivolatile Compounds
7/05-403(c)-E-SVOC2-A	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Nitrosodiethylamine
7/05-403(c)-E-SVOC2-A	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Nitrosodiethylamine
7/05-403(c)-E-SVOC-2-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Nitrosodiethylamine
7/05-403(c)-E-SVOC-2-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Nitrosodiethylamine
7/05-403(c)-E-SVOC-2-Extra	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Nitrosodiethylamine
7/05-403(c)-E-SVOC3-A	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Dioxins
7/05-403(c)-E-SVOC3-A	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Dioxins
7/05-403(c)-E-SVOC3-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Dioxins
7/05-403(c)-E-SVOC3-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Dioxins
7/05-403(c)-E-SVOC3-Extra	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Dioxins
7/05-403(c)-E-Metals-A	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Metals excluding Hg
7/05-403(c)-E-Metals-A	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Metals excluding Hg
7/05-403(c)-E-Metals-A	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Metals excluding Hg

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-403(c)-E-Metals-B	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Metals excluding Hg
7/05-403(c)-E-Metals-B	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Metals excluding Hg
7/05-403(c)-E-Metals-B	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Metals excluding Hg
7/05-403(c)-E-Cyanide-A	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Cyanide
7/05-403(c)-E-Cyanide-A	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Cyanide
7/05-403(c)-E-Cyanide-B	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Cyanide
7/05-403(c)-E-Cyanide-B	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Cyanide
7/05-403(c)-E-Cyanide-Extra	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Cyanide
7/05-403(c)-E-Cyanide-Extra	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Cyanide
7/05-403(c)-E-Cyanide-Extra	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Cyanide
7/05-403(c)-E-Pesticides-A	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Organochlorine Pesticides
7/05-403(c)-E-Pesticides-A	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Organochlorine Pesticides
7/05-403(c)-E-Pesticides-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Organochlorine Pesticides
7/05-403(c)-E-Pesticides-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Organochlorine Pesticides
7/05-403(c)-E-Pesticides-Extra	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	Organochlorine Pesticides
7/05-403(c)-E-PCB-A	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	PCBs
7/05-403(c)-E-PCB-A	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	PCBs

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-403(c)-E-PCB-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	PCBs
7/05-403(c)-E-PCB-B	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	PCBs
7/05-403(c)-E-PCB-Extra	Completed by ESI	--	Empty	1-L amber glass	Empty/fill and send to CAS	PCBs
7/05-403(c)-E-Hg-A	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Mercury
7/05-403(c)-E-Hg-B	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Mercury
7/05-403(c)-E-Hg-Extra	Completed by ESI	--	Empty	500-mL HDPE	Empty/fill and send to CAS	Mercury

JOB #: 1987 **CLIENT:** Shell Chemical Yabucoa, Inc. **DATE:** 7/25/2005
SURVEY/CRUISE: MTS - July 2005 **Laboratory:** Battelle Marine Sciences Laboratory

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-MTS-1-DissMet-F-A	7/25/05	17:00	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-2-DissMet-F-A	7/25/05	17:56	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-3-DissMet-F-A	7/25/05	17:17	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-4-DissMet-F-A	7/25/05	17:34	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-4QC-DissMet-F-A	7/25/05	17:44	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-R-DissMet-F-A	7/25/05	16:40	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-E-DissMet-F-A	7/25/05	16:30	Manual	500-mL HDPE	Effluent	Dissolved Metals
7/05-MTS-1-DissMet-F-B	7/25/05	17:00	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-2-DissMet-F-B	7/25/05	17:56	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-3-DissMet-F-B	7/25/05	17:17	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-4-DissMet-F-B	7/25/05	17:34	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-4QC-DissMet-F-B	7/25/05	17:44	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-R-DissMet-F-B	7/25/05	16:40	Pump	500-mL HDPE	Seawater	Dissolved Metals
7/05-MTS-E-DissMet-F-B	7/25/05	16:30	Manual	500-mL HDPE	Effluent	Dissolved Metals
7/05-MTS-1-TRM-U-A	7/25/05	17:00	Pump	500-mL HDPE	Seawater	Total Recov. Metals

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-MTS-2-TRM-U-A	7/25/05	17:56	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-3-TRM-U-A	7/25/05	17:17	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-4-TRM-U-A	7/25/05	17:34	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-4QC-TRM-U-A	7/25/05	17:44	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-R-TRM-U-A	7/25/05	16:40	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-E-TRM-U-A	7/25/05	16:30	Manual	500-mL HDPE	Effluent	Total Recov. Metals
7/05-MTS-1-TRM-U-B	7/25/05	17:00	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-2-TRM-U-B	7/25/05	17:56	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-3-TRM-U-B	7/25/05	17:17	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-4-TRM-U-B	7/25/05	17:34	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-4QC-TRM-U-B	7/25/05	17:44	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-R-TRM-U-B	7/25/05	16:40	Pump	500-mL HDPE	Seawater	Total Recov. Metals
7/05-MTS-E-TRM-U-B	7/25/05	16:30	Manual	500-mL HDPE	Effluent	Total Recov. Metals
7/05-MTS-1-TSS-U-A	7/25/05	17:00	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-2-TSS-U-A	7/25/05	17:26	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-3-TSS-U-A	7/25/05	17:17	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-4-TSS-U-A	7/25/05	17:34	Pump	500-mL HDPE	Seawater	TSS

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
7/05-MTS-4QC-TSS-U-A	7/25/05	17:44	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-R-TSS-U-A	7/25/05	16:40	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-E-TSS-U-A	7/25/05	16:30	Manual	500-mL HDPE	Effluent	TSS
7/05-MTS-1-TSS-U-B	7/25/05	17:00	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-2-TSS-U-B	7/25/05	17:26	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-3-TSS-U-B	7/25/05	17:17	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-4-TSS-U-B	7/25/05	17:34	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-4QC-TSS-U-B	7/25/05	17:44	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-R-TSS-U-B	7/25/05	16:40	Pump	500-mL HDPE	Seawater	TSS
7/05-MTS-E-TSS-U-B	7/25/05	16:30	Manual	500-mL HDPE	Effluent	TSS
7/05-MTS-T-Tubing Blank-U	7/25/05	16:30	Pump	1-L HDPE	Deionized water	Tubing Blank
7/05-MTS-F-Field Blank-U	7/25/05	8:40	Pump	1-L HDPE	Deionized water	Field Blank

ATTACHMENT 2

FIELD LOG TRANSCRIPT

ATTACHMENT 2: SHELL CHEMICAL YABUCOA, INC. PROJECT INTERIM MIXING ZONE VALIDATION STUDY JULY 2005 SURVEY TRANSCRIPT OF FIELD LOG

Date	Day	Time (h)	Activity
7/21/05	Thursday	7:45	Robert Cady (RC), Virginia Cornett (VC), Frank Johnson (FJ), and David McGregor (DM) arrive at Continental Shelf Associates, Inc. (CSA). Depart for Fort Lauderdale airport.
		10:40	Flight departs for San Juan, Puerto Rico.
		13:05	Arrive in San Juan. Obtain rental car.
		14:00	Following lunch, picked up box truck, from Popular Auto.
		15:20	Arrive at Delta Air Cargo. Unable to obtain equipment. Tax office closed.
		15:45	Arrive at Fed Ex to obtain shipment of sample jars.
		16:10	Arrive at warehouse to obtain additional equipment.
		16:50	Transit to Sam's Club for supplies.
		17:50	Transit to Yabucoa.
		19:30	Arrive in Palmas del Mar. Cease operations for the day.
7/22/05	Friday	6:30	RC, VC, FJ, and DM meet for breakfast.
		7:00	Transit to Shell Plant.
		7:30	Arrive at Shell Plant and meet with ERM staff (Alberto Melendez, Carlos Cordero, Elvin Varela, and Invanska Merced). Obtain vehicle passes.
		8:00	Meet with Orlando Ramos for safety training.
		10:00	Safety training complete. Security ID badges obtained. Await Orlando for trip to container housing CSA supplies.
		11:00	FJ transit to storage connex, lab, and boat.
		12:00	RC, FJ, VC, and DM transit to connex to organize equipment.
		12:45	RC and VC transit to lab to arrange lab for sample compositing. FJ and DM transit to San Juan to obtain cargo from Delta.
		15:00	RC and VC discuss survey boat logistics with Rafael and boat driver (Roberto). Obtain shipment of coolers at Shell warehouse. Continue organization of connex container and lab.
		17:00	FJ and DM arrive.
		19:00	Transit to hotel and cease operations.
7/23/05	Saturday	7:30	RC, VC, FJ, and DM meet for breakfast.
		8:00	Transit to Shell refinery, obtain box truck, and transit to dock.
		9:00	Arrive at dock. Begin mobilization and preparation of site buoys.
		10:00	Transit to lab and meet with boat driver (Roberto). RC and VC continue lab preparations. FJ and DM set site buoys.
		17:00	Obtain gasoline for rental car (gas tanker drivers on strike). All buoys deployed. Calibrate YSI meter.
		18:30	Transit to container to drop off box truck.
		19:00	Transit to hotel and cease operations.
7/24/05	Sunday	7:30	RC, VC, FJ, and DM meet for breakfast.
		8:00	Transit to obtain ice and transit to refinery.
		8:30	Arrive at refinery. Drop off FJ and DM at box truck to meet Roberto to attach tubing to site buoys. RC and VC go to lab and prepare color standards.
		12:00	RC and VC transit to box truck to obtain and transport sample cooler to effluent 001.
		13:15	FJ and DM finished attaching tubing to all site buoys.
		14:00	FJ, RC, VC, and DM organize sample coolers onto 2 survey boats.
		15:40	Arrive at lab to print copies of chain-of-custody (CoC) forms.
		16:30	Transit to obtain ice.
		17:00	Return box truck to connex area.
		18:00	Transit to Subway to obtain food for sampling event. Cease operations.

Date	Day	Time (h)	Activity
7/25/05	Monday	6:30	FJ, RC, VC, and DM arrive at Shell refinery. Prepare for sampling event.
		7:30	VC and 2 ERM staff obtain work permit to sample at effluent sampling port 001.
		8:05	IMZ blank at the effluent sampling port 001.
		8:35	Begin IMZ field blanks offshore.
		9:15	Begin 403(c) sampling hour 1 at effluent sampling port 001.
		9:30	Begin IMZ Cycle 1 at offshore sites and effluent sampling port 001.
		10:25	End IMZ Cycle 1.
		10:30	Begin IMZ Cycle 2 at offshore sites and effluent sampling port 001. 403(c) sampling hour 2 at effluent sampling port 001.
		11:24	End IMZ Cycle 2.
		11:30	Begin IMZ Cycle 3 at offshore sites and effluent sampling port 001. 403(c) sampling hour 3 at effluent sampling port 001.
		12:14	End IMZ Cycle 3.
		12:30	Begin IMZ Cycle 4 at offshore sites and effluent sampling port 001. 403(c) sampling hour 4 at effluent sampling port 001.
		13:13	End IMZ Cycle 4.
		13:30	Begin IMZ Cycle 5 at offshore sites and effluent sampling port 001. 403(c) sampling hour 5 at effluent sampling port 001.
		14:07	End IMZ Cycle 5.
		14:30	Begin IMZ Cycle 6 at offshore sites and effluent sampling port 001. 403(c) sampling hour 6 at effluent sampling port 001.
		15:07	End IMZ Cycle 6.
		15:30	Begin IMZ Cycle 7 at offshore sites and effluent sampling port 001. 403(c) sampling hour 7 at effluent sampling port 001.
		16:05	End IMZ Cycle 7. Prepare for MTS sampling.
		16:30	MTS field blank offshore. 403(c) sampling hour 8 at effluent sampling port 001.
		16:35	Begin MTS at effluent sampling port 001.
		16:40	Begin MTS sampling at offshore sites.
		17:15	End MTS sampling at effluent sampling port 001.
		17:30	403(c) sampling hour 9 at effluent sampling port 001.
		18:10	End MTS sampling at offshore sites.
		18:30	403(c) sampling hour 10 at effluent sampling port 001. Transit sampling coolers to shore.
		19:00	Transit coolers to lab for sample compositing and shipping preparations. RC and VC arrive at lab; ERM staff to continue 403(c) sampling at effluent sampling port 001.
		19:30	403(c) sampling hour 11 at effluent sampling port 001. Begin sample compositing/processing.
		20:30	403(c) sampling hour 12 at effluent sampling port 001. FJ and DM arrive at lab to assist with sample compositing and shipping preparations.
		21:30	403(c) sampling hour 13 at effluent sampling port 001.
		22:30	403(c) sampling hour 14 at effluent sampling port 001.
		23:27	Sample compositing/processing complete. Clean lab and continue packing sample for shipping.
		23:30	403(c) sampling hour 15 at effluent sampling port 001.
7/26/05	Tuesday	0:30	403(c) sampling hour 16 at effluent sampling port 001.
		1:00	Cease operations from 7/25/05.
		1:30	403(c) sampling hour 17 at effluent sampling port 001.
		2:30	403(c) sampling hour 18 at effluent sampling port 001.
		3:30	403(c) sampling hour 19 at effluent sampling port 001.
		4:30	403(c) sampling hour 20 at effluent sampling port 001.
		5:30	403(c) sampling hour 21 at effluent sampling port 001.
		6:30	403(c) sampling hour 22 at effluent sampling port 001.
		7:30	403(c) sampling hour 23 at effluent sampling port 001.
		8:00	RC, VC, FJ, and DM meet for breakfast.

Date	Day	Time (h)	Activity
		8:30	403(c) sampling hour 24 at effluent sampling port 001. RC, VC, FJ, and DM arrive at Shell refinery. RC and VC transit to effluent 001 to obtain remaining sample cooler from ERM staff. FJ and DM transit to connex to prepare to demobilize buoys.
		9:00	RC and VC demobilize lab and finalize sample for shipping.
		15:10	RC, VC, FJ, and DM transit to San Juan to ship samples to labs and equipment to CSA, Jupiter.
		16:50	Arrive at Fed Ex in San Juan. Ship samples to Columbia Analytical Services, Inc., Battelle Marine Sciences Laboratory, and EnviroSystems, Inc.
		17:15	Arrive at warehouse to store equipment.
		17:50	Transit to Delta Air Cargo to ship equipment to CSA, Jupiter.
		18:15	Transit to Popular Auto to return box truck.
		18:35	Transit to hotel. Cease operations.
7/27/05	Wednesday	7:00	RC, FJ, VC, and DM meet for breakfast.
		7:30	Transit to San Juan Airport.
		7:45	Arrive at airport.
		9:00	Flight to Ft. Lauderdale, Florida.
		12:00	Arrive in Ft. Lauderdale, Florida. Transit to CSA, Jupiter.
		13:30	Arrive at CSA, Jupiter. Cease operations.

POST-CRUISE FIELD REPORT
Interim Mixing Zone Validation Study and Metals Translator Study for Shell Chemical Yabucoa, Inc.'s Yabucoa Refinery Ocean Outfall as Required by NPDES Permit No. PR0000400

August 2005 Survey

16 September 2005

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 TASKS ACCOMPLISHED 3

3.0 PROBLEMS ENCOUNTERED 4

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS 5

ATTACHMENTS 6
ATTACHMENT 1: SAMPLE AND ANALYSIS LISTS 1-1
ATTACHMENT 2: FIELD LOG TRANSCRIPT 2-1

1.0 INTRODUCTION

This report summarizes the tasks accomplished, problems encountered and how they were addressed and resolved, significant observations, and recommendations from the survey for the Interim Mixing Zone Validation Study (IMZVS) and Metals Translator Study (MTS) conducted from 21 to 26 August 2005 in Yabucoa, Puerto Rico. The IMZVS and MTS are field studies conducted as a requirement under Shell Chemical Yabucoa, Inc.'s (SCY's) National Pollution Discharge Elimination System (NPDES) Permit PR0000400. The field studies are implemented under a Quality Assurance Project Plan (QAPP) approved by the U.S. Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (EQB). The sampling protocol for the August 2005 survey consisted of two components:

1) The IMZVS required collection of time-composite samples of ambient seawater from three levels (near-surface, midwater, and near-bottom) at four mixing zone stations and at a reference station in Yabucoa Bay as well as a sample at the effluent sampling port 001. Samples were collected over a 6-h period. All sampling equipment and sample containers that made contact with the samples were cleaned according to protocol. Hourly hydrographic profiles of the water column at each Interim Mixing Zone (IMZ) and reference station also were collected using field-calibrated instruments, and similar measurements were made in the effluent samples. A continuous flow sampling method was used to collect samples of ambient seawater from the IMZ and reference stations that were composited in the laboratory, preserved as required, placed on ice, and shipped to the laboratory under a chain-of-custody (CoC) process. Effluent samples and quality control (QC) samples also were collected, composited, and processed similarly. Color was measured in composited seawater and effluent samples. For sample security purposes, two sets of samples were prepared and shipped in separate containers to the analytical laboratory. After shipment, the samples were received and logged into the laboratory's internal sample tracking system. Columbia Analytical Services, Inc. (CAS) will provide analysis of effluent and ambient water samples for metals, fluoride, nitrogen, and phenolics as specified in the SCY NPDES permit. The sample and analysis list sent to CAS is provided in **Attachment 1**.

2) The MTS required the collection of a suite of samples of ambient seawater at four mixing zone stations and at a reference station in Yabucoa Bay as well as a sample at the effluent sampling port 001. Samples were collected under stringent conditions specified by EPA Method 1669. A hydrographic profile of the water column was collected at each of the four stations and the reference station using field-calibrated instruments, while measurements of temperature and pH were made at effluent sampling port 001 during sampling. A continuous flow sampling method was used to collect samples of ambient seawater from the offshore and reference stations. Samples were preserved, placed on ice, and shipped to the laboratory under a CoC process. Effluent samples

and QC samples also were collected processed similarly. Samples were prepared and shipped to the analytical laboratory. After shipment, the samples were received and logged into the laboratory's internal sample tracking system. Battelle Marine Sciences Laboratory (Battelle) located in Sequim, Washington will provide analysis of effluent and ambient water samples for dissolved copper and lead, total recoverable copper and lead, and total suspended solids as specified in the SCY NPDES permit and QAPP. The sample and analysis list sent to Battelle is provided in **Attachment 1**.

Prior to the survey, an e-mail message was sent to Carlos Martinez at SCY to confirm that the refinery would be operating and discharging under normal conditions. CSA was informed by Rafael Muniz that normal refinery operations and discharges were planned during the survey period. Upon completion of the survey, all required field measurements were made and all planned field and QC samples were collected. A transcript of the field log maintained during the course of the survey is provided as **Attachment 2**. The transcript provides a chronological account of the field activities.

The survey was conducted by a field team composed of Continental Shelf Associates, Inc. (CSA) Staff Scientists Robert Cady and Virginia Cornett, CSA Operations Manager Frank Johnson, and CSA Field Operations Specialist Timothy Shaw. Robert Cady acted as Chief Scientist, and Virginia Cornett was the Quality Assurance/Quality Control Coordinator's Field Representative. Elvin Varela and Ivanska Merced from Panzardi-ERM, Inc. of San Juan, Puerto Rico assisted in the field sampling and laboratory processing.

2.0 TASKS ACCOMPLISHED

The following tasks were completed during and subsequent to the survey:

- Safety training and facility orientation for Timothy Shaw;
- Assembly and deployment of IMZ/MTS and reference station marker buoys and tubing assemblies;
- Performance checks and calibration of primary and backup field instruments;
- Preparation of sampling equipment, interim sampling bottles, and composite sample bottles;
- Collection of hydrographic data (temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations;
- Collection of hourly water samples from three levels at IMZ and reference stations (total of seven cycles for IMZVS) including QC samples;
- Collection of hourly water samples from effluent sampling port 001 and measurement of temperature and pH (total of seven cycles for IMZVS) including QC samples;
- Collection of hydrographic data (temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of one cycle for MTS sampling);
- Collection of water samples from three levels at IMZ and reference stations under EPA Method 1669;
- Collection of water samples from effluent sampling port 001 under EPA Method 1669 and measurement of temperature and pH;
- Compositing of hourly grab samples for the IMZVS from IMZ and reference stations and sampling port 001;
- Measurement of color in composite IMZ, reference, and effluent samples;
- Shipment of samples to the CAS and Battelle laboratories under a CoC process according to the required protocols to meet preservation and holding time requirements;
- Demobilization of field equipment and supplies for storage on SCY premises or shipment back to Jupiter, Florida;
- Confirmation of the delivery of all samples in good condition at CAS and Battelle;
- Completion of CoC forms received from laboratories and entered into project files; and
- Preparation of preliminary field report.

3.0 PROBLEMS ENCOUNTERED

This section describes the major problems encountered during the survey and a description of how the problems were addressed and resolved. Problems encountered during the survey included the following:

- *Survey Boat.* Both the battery and bilge pump on the Boston Whaler survey boat needed to be replaced, resulting in lost mobilization time.

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS

The following are the significant observations and recommendations made during the survey:

- *Mobilization*. Authorization to proceed with mobilization was provided 2 weeks before the survey, thus ensuring that sampling equipment (tubing) and sample bottles were prepared in time for the survey (a week's notice is required by CAS to prepare sample bottles and to ship them to Jupiter). Sample tubing was pre-cleaned and packed for ready use in the field. Pre-cleaned sample containers were labeled, sorted, inventoried, and packed in coolers for ready use in the field. Battery packs for peristaltic pumps were recharged prior to each survey. Survey equipment was shipped about a week before the survey to realize savings in shipping costs. The 2-week mobilization time was crucial to the success and smooth operation of the survey.

- *Sample Tubing*. This was the third time that the same Teflon-lined tygon tubing was used for water sampling. Some minor delamination of the Teflon lining occurred at the connection point where the tygon tubing is connected to the silicone tubing on the peristaltic pump via a connector. When this happened it was quickly corrected by trimming off a small section of the Teflon-lined tygon tubing where the Teflon was delaminated. We anticipate being able to use the same Teflon-lined tygon tubing for several surveys before requiring replacement. This will be done on an as-needed basis.

- *Redundancy*. Spare sample containers, preservatives, deionized water, and sampling equipment were ordered and are now available at CSA and in the field/Yabucoa so that unexpected problems can be dealt with without resorting to shipping replacement items from the laboratories or CSA.

ATTACHMENTS

ATTACHMENT 1

SAMPLE AND ANALYSIS LISTS

JOB #: 1987 **CLIENT:** Shell Chemical Yabucoa, Inc. **DATE:** 8/24/2005
SURVEY/CRUISE: IMZVS - August 2005 **Laboratory:** Columbia Analytical Services, Inc.

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-1-S-Fl-A	8/24/05	18:20	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-1-S-Fl-B	8/24/05	18:20	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-1-S-Metals1-A	8/24/05	18:20	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-1-S-Metals1-B	8/24/05	18:20	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-1-S-Metals2-A	8/24/05	18:20	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-1-S-Metals2-B	8/24/05	18:20	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-1-S-N-A	8/24/05	18:20	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-1-S-N-B	8/24/05	18:20	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-1-S-Phen-A	8/24/05	18:20	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-1-S-Phen-B	8/24/05	18:20	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-2-S-Fl-A	8/24/05	18:21	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-2-S-Fl-B	8/24/05	18:21	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-2-S-Metals1-A	8/24/05	18:21	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-2-S-Metals1-B	8/24/05	18:21	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-2-S-Metals2-A	8/24/05	18:21	Composited Grab	500-mL HDPE	Seawater	Metals

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-2-S-Metals2-B	8/24/05	18:21	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-2-S-N-A	8/24/05	18:21	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-2-S-N-B	8/24/05	18:21	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-2-S-Phen-A	8/24/05	18:21	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-2-S-Phen-B	8/24/05	18:21	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-3-S-Fl-A	8/24/05	18:22	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-3-S-Fl-B	8/24/05	18:22	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-3-S-Metals1-A	8/24/05	18:22	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-3-S-Metals1-B	8/24/05	18:22	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-3-S-Metals2-A	8/24/05	18:22	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-3-S-Metals2-B	8/24/05	18:22	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-3-S-N-A	8/24/05	18:22	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-3-S-N-B	8/24/05	18:22	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-3-S-Phen-A	8/24/05	18:22	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-3-S-Phen-B	8/24/05	18:22	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-4-S-Fl-A	8/24/05	18:23	Composited Grab	250-mL HDPE	Seawater	Fluoride

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-4-S-Fl-B	8/24/05	18:23	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-4-S-Metals1-A	8/24/05	18:23	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-4-S-Metals1-B	8/24/05	18:23	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-4-S-Metals2-A	8/24/05	18:23	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-4-S-Metals2-B	8/24/05	18:23	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-4-S-N-A	8/24/05	18:23	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-4-S-N-B	8/24/05	18:23	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-4-S-Phen-A	8/24/05	18:23	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-4-S-Phen-B	8/24/05	18:23	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-R-S-Fl-A	8/24/05	18:24	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-R-S-Fl-B	8/24/05	18:24	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-R-S-Metals1-A	8/24/05	18:24	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-R-S-Metals1-A	8/24/05	18:24	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-R-S-Metals2-A	8/24/05	18:24	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-R-S-Metals2-A	8/24/05	18:24	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-R-S-N-A	8/24/05	18:24	Composited Grab	500-mL HDPE	Seawater	Nitrogen

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-R-S-N-B	8/24/05	18:24	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-R-S-Phen-A	8/24/05	18:24	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-R-S-Phen-B	8/24/05	18:24	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-1-M-Fl-A	8/24/05	19:20	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-1-M-Fl-B	8/24/05	19:20	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-1-M-Metals1-A	8/24/05	19:20	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-1-M-Metals1-B	8/24/05	19:20	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-1-M-Metals2-A	8/24/05	19:20	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-1-M-Metals2-B	8/24/05	19:20	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-1-M-N-A	8/24/05	19:20	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-1-M-N-B	8/24/05	19:20	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-1-M-Phen-A	8/24/05	19:20	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-1-M-Phen-B	8/24/05	19:20	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-2-M-Fl-A	8/24/05	19:21	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-2-M-Fl-B	8/24/05	19:21	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-2-M-Metals1-A	8/24/05	19:21	Composited Grab	1-L HDPE	Seawater	Metals

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-2-M-Metals1-B	8/24/05	19:21	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-2-M-Metals2-A	8/24/05	19:21	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-2-M-Metals2-B	8/24/05	19:21	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-2-M-N-A	8/24/05	19:21	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-2-M-N-B	8/24/05	19:21	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-2-M-Phen-A	8/24/05	19:21	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-2-M-Phen-B	8/24/05	19:21	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-3-M-Fl-A	8/24/05	19:22	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-3-M-Fl-B	8/24/05	19:22	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-3-M-Metals1-A	8/24/05	19:22	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-3-M-Metals1-B	8/24/05	19:22	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-3-M-Metals2-A	8/24/05	19:22	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-3-M-Metals2-B	8/24/05	19:22	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-3-M-N-A	8/24/05	19:22	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-3-M-N-B	8/24/05	19:22	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-3-M-Phen-A	8/24/05	19:22	Composited Grab	500-mL amber glass	Seawater	Phenolics

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-3-M-Phen-B	8/24/05	19:22	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-4-M-Fl-A	8/24/05	19:23	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-4-M-Fl-B	8/24/05	19:23	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-4-M-Metals1-A	8/24/05	19:23	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-4-M-Metals1-B	8/24/05	19:23	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-4-M-Metals2-A	8/24/05	19:23	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-4-M-Metals2-B	8/24/05	19:23	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-4-M-N-A	8/24/05	19:23	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-4-M-N-B	8/24/05	19:23	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-4-M-Phen-A	8/24/05	19:23	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-4-M-Phen-B	8/24/05	19:23	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-R-M-Fl-A	8/24/05	19:24	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-R-M-Fl-B	8/24/05	19:24	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-R-M-Metals1-A	8/24/05	19:24	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-R-M-Metals1-B	8/24/05	19:24	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-R-M-Metals2-A	8/24/05	19:24	Composited Grab	500-mL HDPE	Seawater	Metals

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-R-M-Metals2-B	8/24/05	19:24	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-R-M-N-A	8/24/05	19:24	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-R-M-N-B	8/24/05	19:24	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-R-M-Phen-A	8/24/05	19:24	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-R-M-Phen-B	8/24/05	19:24	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-1-B-Fl-A	8/24/05	20:10	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-1-B-Fl-B	8/24/05	20:10	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-1-B-Metals1-A	8/24/05	20:10	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-1-B-Metals1-B	8/24/05	20:10	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-1-B-Metals2-A	8/24/05	20:10	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-1-B-Metals2-B	8/24/05	20:10	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-1-B-N-A	8/24/05	20:10	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-1-B-N-B	8/24/05	20:10	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-1-B-Phen-A	8/24/05	20:10	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-1-B-Phen-B	8/24/05	20:10	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-2-B-Fl-A	8/24/05	20:11	Composited Grab	250-mL HDPE	Seawater	Fluoride

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-2-B-Fl-B	8/24/05	20:11	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-2-B-Metals1-A	8/24/05	20:11	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-2-B-Metals1-B	8/24/05	20:11	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-2-B-Metals2-A	8/24/05	20:11	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-2-B-Metals2-B	8/24/05	20:11	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-2-B-N-A	8/24/05	20:11	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-2-B-N-B	8/24/05	20:11	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-2-B-Phen-A	8/24/05	20:11	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-2-B-Phen-B	8/24/05	20:11	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-3-B-Fl-A	8/24/05	20:13	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-3-B-Fl-B	8/24/05	20:13	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-3-B-Metals1-A	8/24/05	20:13	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-3-B-Metals1-B	8/24/05	20:13	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-3-B-Metals2-A	8/24/05	20:13	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-3-B-Metals2-B	8/24/05	20:13	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-3-B-N-A	8/24/05	20:13	Composited Grab	500-mL HDPE	Seawater	Nitrogen

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-3-B-N-B	8/24/05	20:13	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-3-B-Phen-A	8/24/05	20:13	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-3-B-Phen-B	8/24/05	20:13	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-4-B-Fl-A	8/24/05	20:14	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-4-B-Fl-B	8/24/05	20:14	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-4-B-Metals1-A	8/24/05	20:14	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-4-B-Metals1-B	8/24/05	20:14	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-4-B-Metals2-A	8/24/05	20:14	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-4-B-Metals2-B	8/24/05	20:14	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-4-B-N-A	8/24/05	20:14	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-4-B-N-B	8/24/05	20:14	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-4-B-Phen-A	8/24/05	20:14	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-4-B-Phen-B	8/24/05	20:14	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-R-B-Fl-A	8/24/05	20:15	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-R-B-Fl-B	8/24/05	20:15	Composited Grab	250-mL HDPE	Seawater	Fluoride
8/05-IMZVS-R-B-Metals1-A	8/24/05	20:15	Composited Grab	1-L HDPE	Seawater	Metals

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-R-B-Metals1-B	8/24/05	20:15	Composited Grab	1-L HDPE	Seawater	Metals
8/05-IMZVS-R-B-Metals2-A	8/24/05	20:15	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-R-B-Metals2-B	8/24/05	20:15	Composited Grab	500-mL HDPE	Seawater	Metals
8/05-IMZVS-R-B-N-A	8/24/05	20:15	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-R-B-N-B	8/24/05	20:15	Composited Grab	500-mL HDPE	Seawater	Nitrogen
8/05-IMZVS-R-B-Phen-A	8/24/05	20:15	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-R-B-Phen-B	8/24/05	20:15	Composited Grab	500-mL amber glass	Seawater	Phenolics
8/05-IMZVS-E-0-Fl-A	8/24/05	16:45	Manual	250-mL HDPE	Effluent	Fluoride
8/05-IMZVS-E-0-Fl-B	8/24/05	16:45	Manual	250-mL HDPE	Effluent	Fluoride
8/05-IMZVS-E-0-Metals1-A	8/24/05	16:45	Manual	1-L HDPE	Effluent	Metals
8/05-IMZVS-E-0-Metals1-B	8/24/05	16:45	Manual	1-L HDPE	Effluent	Metals
8/05-IMZVS-E-0-Metals2-A	8/24/05	16:45	Manual	500-mL HDPE	Effluent	Metals
8/05-IMZVS-E-0-Metals2-B	8/24/05	16:45	Manual	500-mL HDPE	Effluent	Metals
8/05-IMZVS-E-0-N-A	8/24/05	16:45	Manual	500-mL HDPE	Effluent	Nitrogen
8/05-IMZVS-E-0-N-B	8/24/05	16:45	Manual	500-mL HDPE	Effluent	Nitrogen
8/05-IMZVS-E-0-Phen-A	8/24/05	16:45	Manual	500-mL amber glass	Effluent	Phenolics

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-E-0-Phen-B	8/24/05	16:45	Manual	500-mL amber glass	Effluent	Phenolics
8/05-IMZVS-F-Tubing Blank-Fluoride	8/24/05	7:55	Pump	250-mL HDPE	Deionized water	Blank
8/05-IMZVS-F-Field Blank-Fluoride	8/24/05	7:55	Manual	250-mL HDPE	Deionized water	Blank
8/05-IMZVS-F-Tubing Blank-Metals1	8/24/05	7:55	Pump	1-L HDPE	Deionized water	Blank
8/05-IMZVS-F-Field Blank-Metals1	8/24/05	7:55	Manual	1-L HDPE	Deionized water	Blank
8/05-IMZVS-F-Tubing Blank-Metals2	8/24/05	7:55	Pump	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-F-Field Blank-Metals2	8/24/05	7:55	Manual	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-F-Tubing Blank-Nitrogen	8/24/05	7:55	Pump	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-F-Field Blank-Nitrogen	8/24/05	7:55	Manual	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-F-Tubing Blank-Phenolics	8/24/05	7:55	Pump	500-mL amber glass	Deionized water	Blank
8/05-IMZVS-F-Field Blank-Phenolics	8/24/05	7:55	Manual	500-mL amber glass	Deionized water	Blank

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-E-Tubing Blank-Fluoride	8/24/05	7:45	Pump	250-mL HDPE	Deionized water	Blank
8/05-IMZVS-E-Field Blank-Fluoride	8/24/05	7:45	Manual	250-mL HDPE	Deionized water	Blank
8/05-IMZVS-E-Tubing Blank-Metals1	8/24/05	7:45	Pump	1-L HDPE	Deionized water	Blank
8/05-IMZVS-E-Field Blank-Metals1	8/24/05	7:45	Manual	1-L HDPE	Deionized water	Blank
8/05-IMZVS-E-Tubing Blank-Metals2	8/24/05	7:45	Pump	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-E-Field Blank-Metals2	8/24/05	7:45	Manual	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-E-Tubing Blank-Nitrogen	8/24/05	7:45	Pump	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-E-Field Blank-Nitrogen	8/24/05	7:45	Manual	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-E-Tubing Blank-Phenolics	8/24/05	7:45	Pump	500-mL amber glass	Deionized water	Blank
8/05-IMZVS-E-Field Blank-Phenolics	8/24/05	7:45	Manual	500-mL amber glass	Deionized water	Blank
8/05-IMZVS-B-Blank-Fluroide	8/24/05	17:00	Manual	250-mL HDPE	Deionized water	Blank

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-IMZVS-B-Blank-Metals1	8/24/05	17:00	Manual	1-L HDPE	Deionized water	Blank
8/05-IMZVS-B-Blank-Metals2	8/24/05	17:00	Manual	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-B-Blank-Nitrogen	8/24/05	17:00	Manual	500-mL HDPE	Deionized water	Blank
8/05-IMZVS-B-Blank-Phenolics	8/24/05	17:00	Manual	500-mL amber glass	Deionized water	Blank
8/05-IMZVS-B-Blank-Composite	8/24/05	17:00	Manual	1-L amber glass	Deionized water	Blank

JOB #: 1987
SURVEY/CRUISE: MTS - August 2005

CLIENT: Shell Chemical Yabucoa, Inc.
Laboratory: Battelle Marine Sciences Laboratory

DATE: 8/24/2005

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-MTS-1-DissMet-F-A	8/24/05	16:08	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-1-DissMet-F-B	8/24/05	16:08	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-2-DissMet-F-A	8/24/05	16:45	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-2-DissMet-F-B	8/24/05	16:45	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-3-DissMet-F-A	8/24/05	16:21	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-3-DissMet-F-B	8/24/05	16:21	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-4-DissMet-F-A	8/24/05	16:34	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-4-DissMet-F-B	8/24/05	16:34	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-R-DissMet-F-A	8/24/05	15:45	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-R-DissMet-F-B	8/24/05	15:45	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-RQC-DissMet-F-A	8/24/05	15:45	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-RQC-DissMet-F-B	8/24/05	15:45	Pump	500-mL HDPE	Seawater	Dissolved Metals
8/05-MTS-E-DissMet-F-A	8/24/05	16:10	Manual	500-mL HDPE	Effluent	Dissolved Metals
8/05-MTS-E-DissMet-F-B	8/24/05	16:10	Manual	500-mL HDPE	Effluent	Dissolved Metals
8/05-MTS-1-TRM-U-A	8/24/05	16:08	Pump	500-mL HDPE	Seawater	Total Recov. Metals

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-MTS-1-TRM-U-B	8/24/05	16:08	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-2-TRM-U-A	8/24/05	16:45	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-2-TRM-U-B	8/24/05	16:45	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-3-TRM-U-A	8/24/05	16:21	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-3-TRM-U-B	8/24/05	16:21	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-4-TRM-U-A	8/24/05	16:34	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-4-TRM-U-B	8/24/05	16:34	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-R-TRM-U-A	8/24/05	15:45	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-R-TRM-U-B	8/24/05	15:45	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-RQC-TRM-U-A	8/24/05	15:45	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-RQC-TRM-U-B	8/24/05	15:45	Pump	500-mL HDPE	Seawater	Total Recov. Metals
8/05-MTS-E-TRM-U-A	8/24/05	16:10	Manual	500-mL HDPE	Effluent	Total Recov. Metals
8/05-MTS-E-TRM-U-B	8/24/05	16:10	Manual	500-mL HDPE	Effluent	Total Recov. Metals
8/05-MTS-1-TSS-U-A	8/24/05	16:08	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-1-TSS-U-B	8/24/05	16:08	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-2-TSS-U-A	8/24/05	16:45	Pump	500-mL HDPE brown	Seawater	TSS

Sample I.D.	Date	Time (h)	Collection Method	Container Type	Sample Type	Analysis
8/05-MTS-2-TSS-U-B	8/24/05	16:45	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-3-TSS-U-A	8/24/05	16:21	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-3-TSS-U-B	8/24/05	16:21	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-4-TSS-U-A	8/24/05	16:34	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-4-TSS-U-B	8/24/05	16:34	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-R-TSS-U-A	8/24/05	15:45	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-R-TSS-U-B	8/24/05	15:45	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-RQC-TSS-U-A	8/24/05	15:45	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-RQC-TSS-U-B	8/24/05	15:45	Pump	500-mL HDPE brown	Seawater	TSS
8/05-MTS-E-TSS-U-A	8/24/05	16:10	Manual	500-mL HDPE brown	Effluent	TSS
8/05-MTS-E-TSS-U-B	8/24/05	16:10	Manual	500-mL HDPE brown	Effluent	TSS
8/05-MTS-F-Tubing Blank-DissMet-F	8/24/05	8:10	Pump	500-mL HDPE	Deionized water	Blank
8/05-MTS-F-Field Blank-DissMet-F	8/24/05	8:10	Pump	500-mL HDPE	Deionized water	Blank
8/05-MTS-F-Tubing Blank-TRM-U	8/24/05	8:10	Pump	500-mL HDPE	Deionized water	Blank
8/05-MTS-F-Field Blank-TRM-U	8/24/05	8:10	Pump	500-mL HDPE	Deionized water	Blank
8/05-MTS-F-Tubing Blank-TSS-U	8/24/05	8:10	Pump	500-mL HDPE brown	Deionized water	Blank

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 TASKS ACCOMPLISHED 2

3.0 PROBLEMS ENCOUNTERED 3

ATTACHMENT: FIELD LOG TRANSCRIPT A-1

1.0 INTRODUCTION

This report summarizes the tasks accomplished and problems encountered and how they were addressed and resolved from the survey for the Interim Mixing Zone Validation Study (IMZVS) and Metals Translator Study (MTS) conducted from 12-15 December 2005 in Yabucoa, Puerto Rico. The IMZVS and MTS are field studies conducted as a requirement under Shell Chemical Yabucoa, Inc.'s (SCY's) National Pollution Discharge Elimination System (NPDES) Permit PR0000400. The field studies are implemented under a Quality Assurance Project Plan (QAPP) approved by the U.S. Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (EQB).

Upon completion of the survey, all required field measurements were made and all planned field and quality control (QC) samples were collected. A transcript of the field log maintained during the course of the survey is provided as an **Attachment.** The transcript provides a chronological account of the field activities.

The survey was conducted by a field team composed of Continental Shelf Associates, Inc. (CSA) Staff Scientist Virginia Cornett, CSA Operations Manager Frank Johnson, and CSA Field Operations Specialist David McGregor. Virginia Cornett acted as Chief Scientist and the Quality Assurance/QC Coordinator's Field Representative. Luis Lugo, Andres Colom, and Edwin Rivera from Panzardi-ERM, Inc. (ERM) assisted in the field sampling and laboratory processing.

2.0 TASKS ACCOMPLISHED

The following tasks were completed during and subsequent to the survey:

- Assembly and deployment of IMZ/MTS and reference station marker buoys and tubing assemblies;
- Calibration of primary and backup field instruments;
- Preparation of sampling equipment, interim sampling bottles, and composite sample bottles;
- Collection of hydrographic data for IMZVS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of seven cycles);
- Collection of water samples for IMZVS from three levels at IMZ and reference stations under EPA Method 1669 (total of seven cycles);
- Collection of water samples for IMZVS from effluent Sampling Port 001 and measurement of water temperature and pH (total of seven cycles);
- Collection of hydrographic data for MTS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of one cycle);
- Collection of water samples for MTS from mid-depth at IMZ and reference stations under EPA Method 1669 (total of one cycle);
- Collection of water samples for MTS from effluent Sampling Port 001 and measurement of water temperature and pH (total of one cycle);
- Compositing of hourly grab samples for the IMZVS from IMZ and reference stations and Sampling Port 001;
- Measurement of color in composite IMZ, reference, and effluent samples;
- Shipment of samples to the Columbia Analytical Services (CAS) and Battelle laboratories under a chain-of-custody (CoC) process according to the required protocols to meet preservation and holding time requirements;
- Demobilization of field equipment and supplies for storage on SCY premises, storage in San Juan, or shipment back to Jupiter, Florida;
- Confirmation of the delivery of all samples in good condition at CAS and Battelle;
- Work authorization provided to CSA and Battelle to process and/or analyze samples according to analysis instructions; and
- Completion of CoC forms received from laboratories and entered into project files.

3.0 PROBLEMS ENCOUNTERED

This section describes the major problems encountered during the survey and a description of how the problems were addressed and resolved. Problems encountered during the survey included the following:

- *Personnel Consistency*. Assignment of the same ERM personnel to the field surveys would be extremely valuable. This would significantly increase the efficiency within the field surveys as personnel would be familiar with procedures and operations and not require field training each survey.

- *Communications*. Having a two-way radio for personnel stationed in field and at effluent is critical. As cellular telephones are not permitted on the SCY property, these radios are the only method of communication between field and effluent personnel to determine start and end times of sample collection as well as any problems (personnel issues, etc.) encountered on either end.

- *Safety Training*. ERM employee Luis again arrived at the SCY facility without safety training from SCY, and he was not allowed onto the SCY property. Luis was then sent home. MTS sampling at the effluent had to be postponed until field personnel arrived from sample collection and CSA employee David McGregor was able to assist in sample collection at the effluent. This put the MTS sampling behind schedule and meant that the effluent sample was not collected at the same time offshore sampling occurred.

- *Language*. Andres Colom from ERM has been assisting with sample collections and laboratory processing. He does not speak any English, which is not a problem when he is with another ERM employee. As CSA personnel are not conversational in Spanish, it would be preferable to have assistance of ERM personnel with some level of English fluency. It is understood that Andres was called upon at the last minute to fill in for Luis Lugo, who was unable to assist in sampling due to lack of safety training (see above).

ATTACHMENT

FIELD LOG TRANSCRIPT

ATTACHMENT: SHELL CHEMICAL YABUCOA, INC. PROJECT
DECEMBER 2005 SURVEY
FIELD LOG TRANSCRIPT

DATE	DAY	TIME	ACTIVITY
12/12/2005	Monday	0545	CSA personnel transit to FLL; fly to SJU
		1300	Arrive SJU; pick up rental vehicle and box truck; pick up equipment from warehouse
		1500	Arrive SCY; pick up coolers from SCY central receiving; begin mob; equip calibrated, equip to lab, moorings prepped, etc.
		1830	Cease ops
12/13/2005	Tuesday	0730	Arrive SCY and continue mob; prep for mooring installation; begin lab prep
		0800	Ready to begin mooring installation; awaiting for SCY boat crew
		0855	Divers begin mooring and tubing installation
		1030	Divers return to dock; continue prep for MTS sampling; demob dive equip
		1145	Collect MTS blanks
		1305	Begin MTS sample collection
		1448	Complete MTS sample collection
		1550	Return to dock; begin demob; DM transit to effluent to help VC sample MTS as non-badged ERM personnel reported to plant and were not admitted in
		1630	MTS samples packed for shipping
		1800	Vessel, lab, and effluent prepped for a.m. sampling; cease ops
12/14/2005	Wednesday	0645	Arrive SCY; continue vessel prep for IMZ sampling
		0715	Collect IMZ field blanks
		0720	SCY crew arrive with fuel for vessel
		0750	Boats launched
		0806	Begin IMZ sample collection
		1423	Complete IMZ sample collection
		1500	Divers return to sites to retrieve moorings and tubing; IMZ sample compositing begins in lab
		1603	Divers return to dock; go to store to get ice; assist w/sample prep for shipping at lab
		1810	IMZ compositing complete; IMZ samples prepped for shipping; demob partially complete
		1930	Cease ops
12/15/2005	Thursday	0730	Arrive plant; finish demob; IMZ and MTS samples to SCY central receiving for FedEx shipment; FedEx called to request pickup; CAS and Battelle called to inform of incoming shipments
		1100	Demob complete; return to hotel
		1200	Depart Humacao; transit to San Juan; return equip to warehouse;
		1350	Return box truck; VC and DM depart SJU for FLL; FJ remain and travel to KRUGER B to conduct PRASA surveys
		1930	VC and DM arrive CSA office; cease ops

POST-CRUISE FIELD REPORT
Interim Mixing Zone Validation Study, Metals Translator Study, and 403c Biotoxicity Study for Shell Chemical Yabucoa, Inc.'s Yabucoa Refinery Ocean Outfall as Required by NPDES Permit No. PR0000400

January 2006 Survey

6 February 2006

Prepared for:

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 TASKS ACCOMPLISHED 2

3.0 PROBLEMS ENCOUNTERED 3

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS 4

ATTACHMENT: FIELD LOG TRANSCRIPT A-1

1.0 INTRODUCTION

This report summarizes the tasks accomplished, problems encountered and how they were addressed and resolved, significant observations, and recommendations from the survey for the Interim Mixing Zone Validation Study (IMZVS), Metals Translator Study (MTS), and 403c Biotoxicity Study (403c) conducted from 16-19 January 2006 in Yabucoa, Puerto Rico. The IMZVS, MTS, and 403c are field studies conducted as a requirement under Shell Chemical Yabucoa, Inc.'s (SCY's) National Pollution Discharge Elimination System (NPDES) Permit PR0000400. The field studies are implemented under a Quality Assurance Project Plan (QAPP) approved by the U.S. Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (EQB).

Upon completion of the survey, all required field measurements for IMZVS and MTS were made and all planned field and quality control (QC) samples were collected. The 403c sampling began the morning of January 17 but was aborted late in the afternoon due to difficulties the laboratory had in procuring *Arbacia* urchins ready to spawn. A transcript of the field log maintained during the course of the survey is provided as the **Attachment**. The transcript provides a chronological account of the field activities.

The survey was conducted by a field team composed of Continental Shelf Associates, Inc. (CSA) Staff Scientist Virginia Cornett, CSA Operations Manager Frank Johnson, and CSA Field Operations Specialist David McGregor. Virginia Cornett acted as Chief Scientist and the Quality Assurance/QC Coordinator's Field Representative. Andres Colom, Edwin Rivera, Waleska Rivera, Ivanska Merced, and Sabrina Orama from Panzardi-ERM, Inc. (ERM) assisted in the field sampling and laboratory processing.

2.0 TASKS ACCOMPLISHED

The following tasks were completed during and subsequent to the survey:

- Assembly and deployment of IMZ/MTS and reference station marker buoys and tubing assemblies;
- Calibration of primary and backup field instruments;
- Preparation of sampling equipment, interim sampling bottles, and composite sample bottles;
- Collection of hydrographic data for IMZVS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of seven cycles);
- Collection of water samples for IMZVS from three levels at IMZ and reference stations under EPA Method 1669 (total of seven cycles);
- Collection of water samples for IMZVS from effluent Sampling Port 001 and measurement of water temperature and pH (total of seven cycles);
- Collection of hydrographic data for MTS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of one cycle);
- Collection of water samples for MTS from mid-depth at IMZ and reference stations under EPA Method 1669 (total of one cycle);
- Collection of water samples for MTS from effluent Sampling Port 001 and measurement of water temperature and pH (total of one cycle);
- Compositing of hourly grab samples for the IMZVS from IMZ and reference stations and Sampling Port 001;
- Initial collection of water samples for 403c from effluent Sampling Port 001 under EPA Method 1669 and measurement of water temperature and pH (total of 9 cycles before sampling aborted);
- Measurement of color in composite IMZ, reference, and effluent samples;
- Shipment of samples to the Columbia Analytical Services (CAS) and Battelle laboratories under a chain-of-custody (CoC) process according to the required protocols to meet preservation and holding time requirements;
- Demobilization of field equipment and supplies for storage on SCY premises, storage in San Juan, or shipment back to Jupiter, Florida;
- Confirmation of the delivery of all samples in good condition at CAS and Battelle;
- Work authorization provided to CSA and Battelle to process and/or analyze samples according to analysis instructions; and
- Completion of CoC forms received from laboratories and entered into project files.

3.0 PROBLEMS ENCOUNTERED

This section describes the major problems encountered during the survey and a description of how the problems were addressed and resolved. Problems encountered during the survey included the following:

- *Communications*. Having a two-way radio for personnel stationed in field and at effluent is critical. As cellular telephones are not permitted on the SCY property, these radios are the only method of communication between field and effluent personnel to determine start and end times of sample collection as well as any problems (personnel issues, etc.) encountered on either end. During this survey, radios were presented to both offshore and effluent personnel. However, the battery in the radio used by the effluent personnel died less than 1 hour after the study began.

- *Boat Crew Coordination*. There are still problems having the boat crew arrive at the scheduled time. The crew arrived 30-45 minutes late on the day of the IMZVS sampling, which delays all collections, preparations, and demobilizations.

- *Weather*. Seas were choppy in the morning and continually worsened throughout the day. The crew was able to continue sample collection, though the rough seas made the procedures (i.e., tying off to skiff to exchange coolers) more hazardous for personnel moving between vessels.

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS

The following are the significant observations and recommendations made during the survey:

- F. Johnson noted the dissolved oxygen readings showed a significant decline throughout the day;
- Having boat crew arrive at the designated time will facilitate faster sample collection;
- Must have working and fully charged radios for effluent, boat, and laboratory personnel to facilitate communication in absence of cell phones; and
- Using the smaller boats, and particularly having to continually transit to and tie up to a smaller boat to exchange coolers, becomes a safety issue in wind-driven seas. Moving between the two boats is hazardous.

ATTACHMENT

FIELD LOG TRANSCRIPT

ATTACHMENT: SHELL CHEMICAL YABUCOA, INC. PROJECT
JANUARY 2006 SURVEY
FIELD LOG TRANSCRIPT

DATE	DAY	TIME	ACTIVITY
01/16/06	Monday	0530	CSA personnel transit to FLL; fly to SJU
		1130	Arrive SJU; pick up rental vehicle and box truck; pick up equipment from warehouse
		1400	Leave San Juan, transit to SCY
		1510	Arrive SCY; pick up coolers from SCY central receiving; begin mob; eqpt calibrated, eqpt to lab, moorings prepped, etc.
		1900	Arrive hotel; cease ops
01/17/06	Tuesday	0700	Arrive SCY with ice and continue mob; prep for mooring installation; begin lab prep
		0830	Ready to begin mooring installation
		0815	ERM personnel (ER, IM, and WR) go to effluent to set up for 403c testing
		0840	Divers begin mooring and tubing installation
		0855	Collect 403c blanks at effluent
		0900	Begin 403c sample collection
		0920	GC and ER begin prep at lab
		1005	Divers return to dock; continue prep for MTS sampling; demob dive eqpt
		1100	Collect MTS blanks in field
		1130	Collect MTS blanks at effluent
		1140	Begin MTS sample collection at effluent
		1215	Begin MTS sample collection in field
		1300	VC to lab to prep MTS samples for shipping; MTS samples taken to shipping; FedEx called to schedule pickup
		1307	Complete MTS sample collection
		1315	Return to dock; begin demob of MTS gear, prepare for IMZVS sampling; vessel, lab and effluent prepped for a.m. sampling
		1630	L. Lagera called to inform 403c sampling cancelled; IM at effluent told to halt sampling
		1800	Arrive hotel; cease ops
01/18/06	Wednesday	0630	Arrive SCY; continue vessel prep for IMZ sampling
		0700	VC to effluent to train WR on IMZ collection
		0715	Collect IMZVS field blanks
		0722	Waiting for boat crew to arrive; GC complete set-up at effluent
		0745	Leave ramp w/two vessels; transit to site
		0815	Begin IMZVS sample collection
		1421	Complete IMZ sample collection
		1505	Divers return to sites to retrieve moorings and tubing; IMZ sample compositing begins in lab
		1610	Divers return to dock; begin demob
		1830	IMZ compositing complete; IMZ samples prepped for shipping; demob partially complete
		1900	Arrive hotel; cease ops

01/19/06	Thursday	0745	Arrive plant; finish demob; IMZ and MTS samples to SCY central receiving for FedEx shipment; FedEx called to request pickup; CAS and Battelle called to inform of incoming shipments
		1100	Demob complete; return to hotel
		1200	Depart Humacao; transit to San Juan; VC to airport; FJ and DM remain and travel to KRUGER B to demob cancelled PRASA job
		1540	VC depart SJU
		1900	VC arrive CSA office; cease ops

POST-CRUISE FIELD REPORT
Interim Mixing Zone Validation Study, Metals Translator Study, and 403c Biotoxicity Study for Shell Chemical Yabucoa, Inc.'s Yabucoa Refinery Ocean Outfall as Required by NPDES Permit No. PR0000400

February 2006 Survey

24 February 2006

Prepared for:

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 TASKS ACCOMPLISHED 2

3.0 PROBLEMS ENCOUNTERED 3

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS 4

ATTACHMENT 5
ATTACHMENT 1: FIELD LOG TRANSCRIPT 1-1

1.0 INTRODUCTION

This report summarizes the tasks accomplished, problems encountered and how they were addressed and resolved, significant observations, and recommendations from the survey for the Interim Mixing Zone Validation Study (IMZVS), Metals Translator Study (MTS), and 403c Biotoxicity Study (403c) conducted from 13-16 February, 2006 in Yabucoa, Puerto Rico. The IMZVS, MTS, and 403c are field studies conducted as a requirement under Shell Chemical Yabucoa, Inc.'s (SCY's) National Pollution Discharge Elimination System (NPDES) Permit PR0000400. The field studies are implemented under a Quality Assurance Project Plan (QAPP) approved by the U.S. Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (EQB

Upon completion of the survey, all required field measurements for IMZVS, MTS, and 403c Biotoxicity were made and all planned field and QC samples were collected. A transcript of the field log maintained during the course of the survey is provided as **Attachment 1**. The transcript provides a chronological account of the field activities.

The survey was conducted by a field team composed of Continental Shelf Associates, Inc. (CSA) Staff Scientist Virginia Cornett, CSA Operations Manager Frank Johnson, and CSA Field Operations Specialist David McGregor. Virginia Cornett acted as Chief Scientist and the Quality Assurance/Quality Control Coordinator's Field Representative. Andres Colom, Edwin Rivera, Waleska Rivera, Ivanska Merced, Brian Racicot, and Miguel Vasquez from Panzardi-ERM, Inc. (ERM) assisted in the field sampling and laboratory processing.

2.0 TASKS ACCOMPLISHED

The following tasks were completed during and subsequent to the survey:

- Assembly and deployment of IMZ/MTS and reference station marker buoys and tubing assemblies;
- Calibration of primary and backup field instruments;
- Preparation of sampling equipment, interim sampling bottles, and composite sample bottles;
- Collection of hydrographic data for IMZVS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of seven cycles);
- Collection of water samples for IMZVS from three levels at IMZ and reference stations under EPA Method 1669 (total of seven cycles);
- Collection of water samples for IMZVS from effluent Sampling Port 001 and measurement of water temperature and pH (total of seven cycles);
- Collection of hydrographic data for MTS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of one cycle);
- Collection of water samples for MTS from mid-depth at IMZ and reference stations under EPA Method 1669 (total of one cycle);
- Collection of water samples for MTS from effluent Sampling Port 001 and measurement of water temperature and pH (total of one cycle);
- Compositing of hourly grab samples for the IMZVS from IMZ and reference stations and Sampling Port 001;
- Collection of water samples for 403c from effluent Sampling Port 001 under EPA Method 1669 and measurement of water temperature and pH (total of 24 cycles);
- Measurement of color in composite IMZ, reference, and effluent samples;
- Shipment of samples to the Columbia Analytical Services (CAS), Battelle Laboratories, and EnviroSystems, Inc. (ESI) under a CoC process according to the required protocols to meet preservation and holding time requirements;
- Demobilization of field equipment and supplies for storage on SCY premises, storage in San Juan, or shipment back to Jupiter, Florida;
- Confirmation of the delivery of all samples in good condition at CAS, Battelle and ESI;
- Work authorization provided to CAS, Battelle, and ESI to process and/or analyze samples according to analysis instructions; and,
- Completion of CoC forms received from laboratories and entered into project files.

3.0 PROBLEMS ENCOUNTERED

This section describes the major problems encountered during the survey and a description of how the problems were addressed and resolved. Problems encountered during the survey included the following:

Water Pressure at Outfall: The water pressure from the containment pond to the outfall spigot was very low when we arrived. This was occurring since the autosampler was not being run at that time so heavy pressure was not required. Luis Gonzalez instructed us how to increase the pressure so that sample collection could be completed quicker.

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS

The following are the significant observations and recommendations made during the survey:

ATTACHMENT 1

FIELD LOG TRANSCRIPT

ATTACHMENT 1: SHELL CHEMICAL YABUCOA, INC. PROJECT
FEBRUARY 2006 SURVEY
TRANSCRIPT OF FIELD LOG

DATE	DAY	TIME	ACTIVITY
02/13/06	Monday	0530	CSA personnel transit to FLL; fly to SJU
		1130	Arrive SJU; pick up rental vehicle and box truck; pick up equipment from warehouse
		1400	Leave San Juan, transit to SCY
		1500	Arrive SCY; pick up coolers from SCY central receiving; begin mob; eqpt calibrated, eqpt to lab, moorings prepped, effluent prepped, etc..
		1900	Arrive hotel; cease ops
02/14/06	Tuesday	0700	Arrive SCY with ice and continue mob; prep for mooring installation; begin lab prep
		0800	Ready to begin mooring installation
		0745	ERM personnel (ER, IM, and WR) go to effluent to set up for 403c testing
		0820	Collect 403c blanks at effluent
		0830	Begin 403c sample collection
		0830	Divers begin mooring and tubing installation
		0920	GC and ER begin prep at lab
		0950	Divers return to dock; continue prep for MTS sampling; demob dive eqpt
		1030	Lab prep completed
		1100	Collect MTS blanks in field
		1145	Collect MTS blanks at effluent
		1215	Collect MTS blanks at effluent
		1215	Begin MTS sample collection in field
		1355	Complete MTS sample collection
		1410	Return to dock; begin demob of MTS gear, prepare for IMZVS sampling; vessel, lab and effluent prepped for a.m. sampling
		1430	VC to lab to prep MTS samples for shipping
		1730	Arrive hotel; cease ops
02/15/06	Wednesday	0645	Arrive SCY; continue vessel prep for IMZ sampling
		0700	VC to effluent to train WR on IMZ collection
		0715	Collect IMZVS field blanks
		0725	Boat crew arrives; GC complete set-up at effluent
		0745	Leave ramp w/two vessels; transit to site
		0745	Collect IMZVS blanks at effluent
		0750	Begin IMZVS sample collection in field
		0800	Begin IMZVS sample collection at effluent
		0900	VC and AC to lab to prep 403c and MTS samples for shipping; take coolers to shipping; call FedEx to schedule pickup; call Battelle and ESI to inform of shipment
		1354	Complete IMZ sample collection in field
		1400	Complete IMZ sample collection at effluent
		1415	Divers return to dock; begin demob
		1730	IMZ compositing complete; IMZ samples prepped for shipping; demob partially complete
		1800	Arrive hotel; cease ops
02/16/06	Thursday	0745	Arrive plant; prep for mooring retrieval

0808	Begin mooring retrieval
0915	Mooring retrieval complete, return to dock
1000	Arrive dock, demob
1130	IMZ samples and CSA equipment to shipping for FedEx; FedEx called to request pickup; CAS called to inform of shipment
1200	Demob complete; return to hotel
1310	Depart Palmas del Mar; transit to San Juan; VC and FJ to airport; DM remain to mob Kruger B for PRASA
1540	VC and FJ depart SJU
1900	VC and FJ arrive CSA office; cease ops

POST-CRUISE FIELD REPORT
Interim Mixing Zone Validation Study and Metals Translator Study for Shell Chemical Yabucoa, Inc.'s Yabucoa Refinery Ocean Outfall as Required by NPDES Permit No. PR0000400

March 2006 Survey

27 March 2006

Prepared for:

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 TASKS ACCOMPLISHED 2

3.0 PROBLEMS ENCOUNTERED 3

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS 4

ATTACHMENT 5
ATTACHMENT 1: FIELD LOG TRANSCRIPT 1-1

1.0 INTRODUCTION

This report summarizes the tasks accomplished, problems encountered and how they were addressed and resolved, significant observations, and recommendations from the survey for the Interim Mixing Zone Validation Study (IMZVS) and Metals Translator Study (MTS) conducted from 20-24 March, 2006 in Yabucoa, Puerto Rico. The IMZVS and MTS are field studies conducted as a requirement under Shell Chemical Yabucoa, Inc.'s (SCY's) National Pollution Discharge Elimination System (NPDES) Permit PR0000400. The field studies are implemented under a Quality Assurance Project Plan (QAPP) approved by the U.S. Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (EQB

Upon completion of the survey, all required field measurements for IMZVS and MTS were made and all planned field and QC samples were collected. A transcript of the field log maintained during the course of the survey is provided as **Attachment 1**. The transcript provides a chronological account of the field activities.

The survey was conducted by a field team composed of Continental Shelf Associates, Inc. (CSA) Staff Scientist Virginia Cornett, CSA Operations Manager Frank Johnson, and CSA Field Operations Specialist David McGregor. Virginia Cornett acted as Chief Scientist and the Quality Assurance/Quality Control Coordinator's Field Representative. Andres Colom, Edwin Rivera, Waleska Rivera, Edmundo Quinones, Brian Racicot, and Miguel Vasquez from Panzardi-ERM, Inc. (ERM) assisted in the field sampling and laboratory processing.

2.0 TASKS ACCOMPLISHED

The following tasks were completed during and subsequent to the survey:

- Assembly and deployment of IMZ/MTS and reference station marker buoys and tubing assemblies;
- Calibration of primary and backup field instruments;
- Preparation of sampling equipment, interim sampling bottles, and composite sample bottles;
- Collection of hydrographic data for IMZVS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of seven cycles);
- Collection of water samples for IMZVS from three levels at IMZ and reference stations under EPA Method 1669 (total of seven cycles);
- Collection of water samples for IMZVS from effluent Sampling Port 001 and measurement of water temperature and pH (total of seven cycles);
- Collection of hydrographic data for MTS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of one cycle);
- Collection of water samples for MTS from mid-depth at IMZ and reference stations under EPA Method 1669 (total of one cycle);
- Collection of water samples for MTS from effluent Sampling Port 001 and measurement of water temperature and pH (total of one cycle);
- Compositing of hourly grab samples for the IMZVS from IMZ and reference stations and Sampling Port 001;
- Measurement of color in composite IMZ, reference, and effluent samples;
- Shipment of samples to the Columbia Analytical Services (CAS) and Battelle Laboratories under a CoC process according to the required protocols to meet preservation and holding time requirements;
- Demobilization of field equipment and supplies for storage on SCY premises, storage in San Juan, or shipment back to Jupiter, Florida;
- Confirmation of the delivery of all samples in good condition at CAS and Battelle;
- Work authorization provided to CAS and Battelle to process and/or analyze samples according to analysis instructions; and,
- Completion of CoC forms received from laboratories and entered into project files.

3.0 PROBLEMS ENCOUNTERED

This section describes the major problems encountered during the survey and a description of how the problems were addressed and resolved. Problems encountered during the survey included the following:

Confirmation of Knowledge: E:mails were sent to both SCY and ERM to inform of our proposed scheduling dates and to request support services. Neither recipient replied to e:mails. It is essential that SCY and ERM inform F. Johnson that sampling dates are satisfactory and/or that support personnel and equipment will be available on those dates.

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS

The following are the significant observations and recommendations made during the survey:

ATTACHMENT 1

FIELD LOG TRANSCRIPT

ATTACHMENT 1: SHELL CHEMICAL YABUCOA, INC. PROJECT
MARCH 2006 SURVEY
TRANSCRIPT OF FIELD LOG

DATE	DAY	TIME	ACTIVITY
03/20/06	Monday	0530	CSA personnel transit to FLL; fly to SJU
		1130	Arrive SJU; pick up rental vehicle and box truck; pick up equipment from warehouse
		1400	Leave San Juan, transit to SCY
		1530	Arrive SCY; pick up coolers from SCY central receiving; begin mob; eqpt calibrated, eqpt to lab, moorings prepped, effluent prepped, etc..
		1930	Arrive hotel; cease ops
03/21/06	Tuesday	0700	Arrive SCY with ice and continue mob; prep for mooring installation; begin lab prep
		0800	Ready to begin mooring installation; VC meet E. Rivera to begin lab preparation; purchase ice for MTS samples
		0900	Divers begin mooring and tubing installation
		1030	Lab prep completed
		1045	Divers return to dock; continue prep for MTS sampling; demob dive eqpt
		1130	Collect MTS blanks in field; M. Vasquez arrives to help with MTS
		1230	Collect MTS blanks at effluent
		1205	Begin MTS sample collection in field
		1215	Begin MTS sample collection at effluent
		1405	Complete MTS sample collection in field
		1410	Return to dock; begin demob of MTS gear, prepare for IMZVS sampling; Vessel, lab and effluent prepped for a.m. sampling
		1430	VC to lab to prep MTS samples for shipping; MTS samples to loading dock; call FedEx for pickup; call Battelle to inform of shipment
		1600	FJ log benchmark #3
		1800	Arrive hotel; cease ops
03/22/06	Wednesday	0645	Arrive SCY; continue vessel prep for IMZ sampling
		0700	VC to effluent to train WR on IMZ collection
		0730	Collect IMZVS field blanks
		0745	Collect IMZVS blanks at effluent
		0805	Begin IMZVS sample collection in field
		0800	Begin IMZVS sample collection at effluent
		0900	VC and AC to lab to prep
		1410	Complete IMZ sample collection in field
		1400	Complete IMZ sample collection at effluent
		1445	Diver begin removing moorings
		1610	Divers return to dock; begin demob
		1830	IMZ compositing complete; IMZ samples prepped for shipping; demob partially complete
		1900	Arrive hotel; cease ops
03/23/06	Thursday	0800	Arrive plant and begin demob
		0900	Andres Colom arrives at lab
		0930	CAS coolers to shipping; CAS called to inform of delivery; FedEx called to schedule pickup
		1000	Arrive dock, demob
		1130	IMZ samples and CSA equipment to shipping for FedEx; FedEx called to request pickup; CAS called to inform of shipment

1030	Demob complete; return to hotel
1130	Depart Palmas del Mar; transit to San Juan
1540	Depart SJU
1030	Arrive CSA office; cease ops

POST-CRUISE FIELD REPORT
Interim Mixing Zone Validation Study, Metals Translator Study, and 403c Biotoxicity Study for Shell Chemical Yabucoa, Inc.'s Yabucoa Refinery Ocean Outfall as Required by NPDES Permit No. PR0000400

April 2006 Survey

21 April 2006

Prepared for:

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 TASKS ACCOMPLISHED 2

3.0 PROBLEMS ENCOUNTERED 3

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS 4

ATTACHMENT 5
ATTACHMENT 1: FIELD LOG TRANSCRIPT 1-1

1.0 INTRODUCTION

This report summarizes the tasks accomplished, problems encountered and how they were addressed and resolved, significant observations, and recommendations from the survey for the Interim Mixing Zone Validation Study (IMZVS), Metals Translator Study (MTS), and 403c Biotoxicity Study (403c) conducted from 17-20 April, 2006 in Yabucoa, Puerto Rico. The IMZVS, MTS, and 403c are field studies conducted as a requirement under Shell Chemical Yabucoa, Inc.'s (SCY's) National Pollution Discharge Elimination System (NPDES) Permit PR0000400. The field studies are implemented under a Quality Assurance Project Plan (QAPP) approved by the U.S. Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (EQB

Upon completion of the survey, all required field measurements for IMZVS, MTS, and 403c Biotoxicity were made and all planned field and QC samples were collected. A transcript of the field log maintained during the course of the survey is provided as **Attachment 1**. The transcript provides a chronological account of the field activities.

The survey was conducted by a field team composed of Continental Shelf Associates, Inc. (CSA) Staff Scientist Virginia Cornett, CSA Operations Manager Frank Johnson, and CSA Field Operations Specialist David McGregor. Virginia Cornett acted as Chief Scientist and the Quality Assurance/Quality Control Coordinator's Field Representative. Andres Colom, Brian Racicot, Edmundo Quinones, Walleska Rivera-Rios, and Sabrina Orama from Panzardi-ERM, Inc. (ERM) assisted in the field sampling and laboratory processing.

2.0 TASKS ACCOMPLISHED

The following tasks were completed during and subsequent to the survey:

- Assembly and deployment of IMZ/MTS and reference station marker buoys and tubing assemblies;
- Calibration of primary and backup field instruments;
- Preparation of sampling equipment, interim sampling bottles, and composite sample bottles;
- Collection of hydrographic data for IMZVS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of seven cycles);
- Collection of water samples for IMZVS from three levels at IMZ and reference stations under EPA Method 1669 (total of seven cycles);
- Collection of water samples for IMZVS from effluent Sampling Port 001 and measurement of water temperature and pH (total of seven cycles);
- Collection of hydrographic data for MTS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of one cycle);
- Collection of water samples for MTS from mid-depth at IMZ and reference stations under EPA Method 1669 (total of one cycle);
- Collection of water samples for MTS from effluent Sampling Port 001 and measurement of water temperature and pH (total of one cycle);
- Compositing of hourly grab samples for the IMZVS from IMZ and reference stations and Sampling Port 001;
- Collection of water samples for 403c from effluent Sampling Port 001 under EPA Method 1669 and measurement of water temperature and pH (total of 24 cycles);
- Measurement of color in composite IMZ, reference, and effluent samples;
- Shipment of samples to the Columbia Analytical Services (CAS), Battelle Laboratories, and EnviroSystems, Inc. (ESI) under a CoC process according to the required protocols to meet preservation and holding time requirements;
- Demobilization of field equipment and supplies for storage on SCY premises, storage in San Juan, or shipment back to Jupiter, Florida;
- Confirmation of the delivery of all samples in good condition at CAS, Battelle and ESI;
- Work authorization provided to CAS, Battelle, and ESI to process and/or analyze samples according to analysis instructions; and,
- Completion of CoC forms received from laboratories and entered into project files.

3.0 PROBLEMS ENCOUNTERED

This section describes the major problems encountered during the survey and a description of how the problems were addressed and resolved. Problems encountered during the survey included the following:

Water Level at Outfall: SCY was having problems with their retention ponds and were working on them during the surveys. This would not affect the samples themselves but will cause an issue with the pH and temperature measurements. It was necessary for ERM and CSA field personnel to shut down the effluent pump except for during times of sample collection. Field personnel allowed effluent water to flush through the tubing for one minute before collection. However, as there was a leak in the drainage pipes from the effluent point source (from which samples are collected), it was not possible to allow an adequate amount of water to clear through the lines. This meant that some/much of the actual sample water collected had been sitting in the lines since the previous hour's collection. As such, the temperature of the water collected for samples was likely higher than normal as the low water levels in the retention ponds allowed for higher water temperatures. This also affected pH levels.

Boat Engine Failure: The engine on the boat used for offshore sample collection broke down at the beginning of the Cycle 5 collection. Approximately 40 minutes passed between the collection of the first and second stations in Cycle 5, thus the entire cycle took longer than the expected 1 hour. A second engine failure took approximately 15 minutes to repair and caused another delay in sampling at the end of Cycle 5.

SCY Boat Crew Arrival Time: Field mobilization and sampling was delayed by 45 minutes on Tuesday and 1 ½ hours on Wednesday due to the late arrival of the SCY crew to launch the boat for offshore sampling.

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS

The following are the significant observations and recommendations made during the survey:

Repair of Drainage Lines at Outfall: It is important to have effluent lines flushed thoroughly before sample collection or temperature/pH measurements are made. The PVC pipes draining overflow from the collection tank in the effluent shed need to be repaired. In addition, the dividing wall in the collection tank which allows for overflow into the drainage pipes has loosened from the tank walls and no longer holds water back. The tank itself is in very bad shape and should probably be replaced in its entirety. In the very least, the retention wall needs to be repaired.

Dependable Field Equipment: A dependable boat is necessary to complete sampling tasks within the required timetable. In addition, both vessels need to be equipped with anchors in case of engine failure at sea (as occurred during this survey).

SCY Crew Arrival Times: It is imperative that the SCY crew arrive at the scheduled time with all equipment in good condition. Commencement of sampling for the IMZ was delayed by 1 ½ hours. In addition to the 1+ hour delay later in the day due to boat issues, sampling was delayed by almost 3 hours.

- ERM personnel were required to stay 3+ hours over scheduled time causing problems for them in their commute as well as extra billed hours to the project.

- Mooring and tubing removal which occurs immediately following IMZ sampling was rushed in order to finish during daylight hours. The potential for not getting this task completed on schedule would lead to backups in demobilization and extra cost in time to the project.

- Had the boat engine failure not have been resolved as quickly as it was, the entire IMZ sampling would have been halted for that day and would have to have been initiated again the following day. This would have caused increased hours, extra field days for crew leading to additional hotel days and flight change costs, increased hours for ERM personnel, and duplicate sample collection containers.

ATTACHMENT 1

FIELD LOG TRANSCRIPT

ATTACHMENT 1: SHELL CHEMICAL YABUCOA, INC. PROJECT
APRIL 2006 SURVEY
TRANSCRIPT OF FIELD LOG

DATE	DAY	TIME	ACTIVITY
4/17/2006	Monday	0700	CSA personnel transit to MIA; fly to SJU
		1330	Arrive SJU; pick up rental vehicle and box truck; pick up equipment
			from warehouse
		1500	Leave San Juan, transit to SCY
		1600	Arrive SCY; pick up coolers from SCY central receiving; begin mob;
			eqpt calibrated, eqpt to lab, moorings prepped, effluent prepped, etc..
		1930	Arrive hotel; cease ops
4/18/2006	Tuesday	0700	Arrive SCY with ice and continue mob; prep for mooring installation; begin lab prep
		0800	Ready to begin mooring installation; waiting for boat crew
		0745	ERM personnel (SO and WR) go to effluent to set up for 403c testing
		0755	Begin 403c sample collection
		0845	Divers begin mooring and tubing installation
		0800	GC begin prep at lab
		1015	Divers return to dock; continue prep for MTS sampling; demob dive eqpt
		1045	Lab prep completed
		1100	Collect MTS blanks in field
		1210	Collect MTS blanks at effluent
		1215	Begin MTS sample collection in field
		1300	Collect MTS samples at effluent
		1215	Begin MTS sample collection in field
		1357	Complete MTS sample collection in field;
		1400	Return to dock; begin demob of MTS gear, prepare for IMZVS sampling; vessel, lab and effluent prepped for a.m. sampling
		1430	VC to lab to prep MTS samples for shipping
		1630	Arrive hotel; cease ops
4/19/2006	Wednesday	0700	Arrive SCY; continue vessel prep for IMZ sampling; VC to effluent to pick up 403c samples for shipping and begin IMZ collection
		0730	Collect IMZVS field blanks; collect IMZVS effluent blanks
		0800	Still waiting for boat crew and second vessel
		0800	VC and BR to lab to prep 403c and MTS samples for shipping; take coolers to shipping; call FedEx to schedule pickup; call Battelle and ESI to inform of shipment
		0825	Leave ramp w/two vessels; transit to site
		0845	Begin IMZVS sample collection in field
		1615	Complete IMZ sample collection at effluent
		1642	Complete IMZ sample collection in field
		1715	Divers begin mooring and tubing removal
		1830	Divers return to dock; begin demob
		1930	IMZ compositing complete; IMZ samples prepped for shipping; demob partially complete

		2000	Arrive hotel; cease ops
4/20/2006	Thursday	0730	Arrive plant; prep for mooring retrieval
		1000	IMZ samples and CSA equipment to shipping for FedEx; FedEx called to request pickup; CAS called to inform of shipment
		1130	Demob complete; return to hotel
		1200	Depart Palmas del Mar; transit to San Juan
		1400	Arrive San Juan; arrive warehouse to demob; pick up tanks at dive shop; return Leaseway truck; return rental vehicle
		1730	Leave SJU for FLL
		2200	Arrive Jupiter, cease ops.

POST-CRUISE FIELD REPORT
Interim Mixing Zone Validation Study for Shell Chemical Yabucoa, Inc.'s Yabucoa Refinery Ocean Outfall as Required by NPDES Permit No. PR0000400

May 2006 Survey

23 May 2006

Prepared for:

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 TASKS ACCOMPLISHED 2

3.0 PROBLEMS ENCOUNTERED 3

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS 4

ATTACHMENT 5
ATTACHMENT 1: FIELD LOG TRANSCRIPT 1-1

1.0 INTRODUCTION

This report summarizes the tasks accomplished, problems encountered and how they were addressed and resolved, significant observations, and recommendations from the survey for the Interim Mixing Zone Validation Study (IMZVS) conducted from 15-19 May, 2006 in Yabucoa, Puerto Rico. The IMZVS is a field study conducted as a requirement under Shell Chemical Yabucoa, Inc.'s (SCY's) National Pollution Discharge Elimination System (NPDES) Permit PR0000400. The study is implemented under a Quality Assurance Project Plan (QAPP) approved by the U.S. Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (EQB

Upon completion of the survey, all required field measurements for IMZVS were made and all planned field samples were collected. A transcript of the field log maintained during the course of the survey is provided as **Attachment 1**. The transcript provides a chronological account of the field activities.

The survey was conducted by a field team composed of Continental Shelf Associates, Inc. (CSA) Staff Scientist Virginia Cornett, CSA Operations Manager Frank Johnson, and CSA Field Operations Specialist David McGregor. Virginia Cornett acted as Chief Scientist and the Quality Assurance/Quality Control Coordinator's Field Representative. Waleska Rivera, Brian Racicot, and Ivanska Merced from Panzardi-ERM, Inc. (ERM) assisted in the laboratory processing.

2.0 TASKS ACCOMPLISHED

The following tasks were completed during and subsequent to the survey:

- Assembly and deployment of IMZ and reference station marker buoys and tubing assemblies;
- Calibration of primary and backup field instruments;
- Preparation of sampling equipment, interim sampling bottles, and composite sample bottles;
- Collection of hydrographic data for IMZVS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of seven cycles);
- Collection of water samples for IMZVS from three levels at IMZ and reference stations under EPA Method 1669 (total of seven cycles);
- Collection of water samples for IMZVS from effluent Sampling Port 001 and measurement of water temperature and pH (total of seven cycles);
- Compositing of hourly grab samples for the IMZVS from IMZ and reference stations and Sampling Port 001;
- Measurement of color in composite IMZ, reference, and effluent samples;
- Shipment of samples to Columbia Analytical Services (CAS) under a CoC process according to the required protocols to meet preservation and holding time requirements;
- Demobilization of field equipment and supplies for storage on SCY premises, storage in San Juan, or shipment back to Jupiter, Florida;
- Confirmation of the delivery of all samples in good condition at CAS;
- Work authorization provided to CAS to process and/or analyze samples according to analysis instructions; and,
- Completion of CoC forms received from laboratories and entered into project files.

3.0 PROBLEMS ENCOUNTERED

This section describes the major problems encountered during the survey and a description of how the problems were addressed and resolved. Problems encountered during the survey included the following:

Confirmation of Knowledge: E:mails were sent to both SCY and ERM to inform of our proposed scheduling dates and to request support services. Neither recipient replied to e:mails. It is essential that SCY and ERM inform F. Johnson that sampling dates are satisfactory and/or that support personnel and equipment will be available on those dates.

Vessel Prepared for Sampling: Delays due to new safety requirements for vessel caused a day's delay in sampling. On day sampling was to occur, boat was loaded and connected to trailer when it was noticed fuel was needed for vessel.

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS

The following are the significant observations and recommendations made during the survey:

- We need confirmation that e:mails have been received and that personnel and equipment will be available on the days requested.

- Vessels need to be prepared for sampling the day before sampling is to occur, including safety equipment and fuel.

ATTACHMENT 1

FIELD LOG TRANSCRIPT

ATTACHMENT 1: SHELL CHEMICAL YABUCOA, INC. PROJECT
MAY 2006 SURVEY
TRANSCRIPT OF FIELD LOG

DATE	DAY	TIME	ACTIVITY
05/15/06	Monday	0730	FJ, DM, and VC arrive CSA; waiting for Captain's Cab
		0820	Captain's Cab finally arrives; CSA personnel transit to MIA; fly to SJU
		1330	Arrive SJU; pick up rental vehicle and box truck; pick up equipment
			from warehouse
		1500	Leave San Juan, transit to SCY
		1630	Arrive SCY (terrible traffic); pick up coolers from SCY central receiving; begin mob;
		1830	Partial mob complete; eqpt calibrated, eqpt to lab, moorings prepped, effluent prepped, etc..; R. Muniz informed us that new safety protocol implemented regarding small survey vessel and they will need time to mount back-up engine
		1845	Arrive hotel; cease ops
05/16/06	Tuesday	0700	Arrive SCY and continue mob; prep for mooring installation; begin lab prep
		0830	Oscar L. informs us that vessel maintenance operations will take all day; sampling will now occur on Thursday instead of Wednesday; lab called to inform; VC to lab to prep for compositing
		1500	Prep work complete; arrive hotel; cease ops
05/17/06	Wednesday	0800	Arrive SCY; vessel on site, begin prep
		0830	Leave shore to begin mooring installation
		1035	Return to ramp; begin dive ops demob
		1415	Mob of vessel, lab and effluent complete for a.m. sampling
		1415	Arrive hotel; cease ops
05/18/06	Thursday	0645	Arrive SCY; continue vessel prep for IMZ sampling
		0700	VC to effluent for IMZ collection
		0730	Collect IMZVS field blanks
		0745	Collect IMZVS blanks at effluent
		0839	Begin IMZVS sample collection in field
		0845	Begin IMZVS sample collection at effluent
		1345	Complete IMZ sample collection at effluent
		1412	Complete IMZ sample collection in field
		1450	Divers begin removing moorings; VC to lab with ERM crew to begin IMZ compositing
		1600	Divers return to dock; begin demob
		1830	IMZ compositing complete; IMZ samples prepped for shipping; demob
			partially complete
		1900	Arrive hotel; cease ops
05/19/06	Friday	0800	Arrive plant and begin demob
		1015	IMZ samples to shipping for FedEx; FedEx called to request pickup; CAS called to inform of shipment
		1045	Demob complete; return to hotel
		1130	Depart Palmas del Mar; transit to San Juan
		1540	Depart SJU

		2000	Arrive CSA office; cease ops

POST-CRUISE FIELD REPORT
Interim Mixing Zone Validation Study for Shell Chemical Yabucoa, Inc.'s Yabucoa Refinery Ocean Outfall as Required by NPDES Permit No. PR0000400

June 2006 Survey

14 July 2006

Prepared for:

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 TASKS ACCOMPLISHED 2

3.0 PROBLEMS ENCOUNTERED 3

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS 4

ATTACHMENT 5
ATTACHMENT 1: FIELD LOG TRANSCRIPT 1-1

1.0 INTRODUCTION

This report summarizes the tasks accomplished, problems encountered and how they were addressed and resolved, significant observations, and recommendations from the survey for the Interim Mixing Zone Validation Study (IMZVS) conducted from 26-30 June, 2006 in Yabucoa, Puerto Rico. The IMZVS is a field study conducted as a requirement under Shell Chemical Yabucoa, Inc.'s (SCY's) National Pollution Discharge Elimination System (NPDES) Permit PR0000400. The study is implemented under a Quality Assurance Project Plan (QAPP) approved by the U.S. Environmental Protection Agency (EPA) and Puerto Rico Environmental Quality Board (EQB

Upon completion of the survey, all required field measurements for IMZVS were made and all planned field samples were collected. A transcript of the field log maintained during the course of the survey is provided as **Attachment 1**. The transcript provides a chronological account of the field activities.

The survey was conducted by a field team composed of Continental Shelf Associates, Inc. (CSA) Staff Scientist Virginia Cornett, CSA Operations Manager Frank Johnson, and CSA Field Operations Specialist David McGregor. Virginia Cornett acted as Chief Scientist and the Quality Assurance/Quality Control Coordinator's Field Representative. Ivanska Merced, Sabrina Rivas, and Andres Colom from Panzardi-ERM, Inc. (ERM) assisted in the laboratory processing.

2.0 TASKS ACCOMPLISHED

The following tasks were completed during and subsequent to the survey:

- Assembly and deployment of IMZ and reference station marker buoys and tubing assemblies;
- Calibration of primary and backup field instruments;
- Preparation of sampling equipment, interim sampling bottles, and composite sample bottles;
- Collection of hydrographic data for IMZVS (including temperature, salinity, pH, and dissolved oxygen) from at least three levels in IMZ and reference stations (total of seven cycles);
- Collection of water samples for IMZVS from three levels at IMZ and reference stations under EPA Method 1669 (total of seven cycles);
- Collection of water samples for IMZVS from effluent Sampling Port 001 and measurement of water temperature and pH (total of seven cycles);
- Compositing of hourly grab samples for the IMZVS from IMZ and reference stations and Sampling Port 001;
- Measurement of color in composite IMZ, reference, and effluent samples;
- Shipment of samples to Columbia Analytical Services (CAS) under a CoC process according to the required protocols to meet preservation and holding time requirements;
- Demobilization of field equipment and supplies for storage on SCY premises, storage in San Juan, or shipment back to Jupiter, Florida;
- Confirmation of the delivery of all samples in good condition at CAS;
- Work authorization provided to CAS to process and/or analyze samples according to analysis instructions; and,
- Completion of CoC forms received from laboratories and entered into project files.

3.0 PROBLEMS ENCOUNTERED

This section describes the major problems encountered during the survey and a description of how the problems were addressed and resolved. Problems encountered during the survey included the following:

4.0 SIGNIFICANT OBSERVATIONS AND RECOMMENDATIONS

The following are the significant observations and recommendations made during the survey:

ATTACHMENT 1

FIELD LOG TRANSCRIPT

ATTACHMENT 1: SHELL CHEMICAL YABUCOA, INC. PROJECT
JUNE 2006 SURVEY
TRANSCRIPT OF FIELD LOG

DATE	DAY	TIME	ACTIVITY
06/19/06	Monday	0500	DM, FJ, and VC arrive CSA and transit to Ft. Lauderdale
		0715	Depart FLL and transit to SJU
		1000	Arrive San Juan, pick up rental car, pick up box truck, go to warehouse to
			pick up equipment
		1215	Arrive SCY and begin lab equipment and vessel preparation
		1700	Operations cease
06/20/06	Tuesday	0800	Arrive SCY; sea conditions unfavorable – forecast will be high seas and
			thunderstorms through the week.
		1000	Operations aborted for the week; leave SCY and transit to San Juan
		2000	Arrive CSA; operations cease
06/26/06	Monday	1000	Leave CSA and transit to SCY
		1730	Arrive SCY; begin preliminary mob set up
		1900	Partial mob complete; operations cease
06/27/06	Tuesday	0730	Arrive SCY; begin dive operations preparation
		0830	Divers transit to sites to check for visibility for seagrass video transects
		0845	Visibility too low for transects
		0850	Begin mooring and tubing installation
		1030	Mooring installation complete; continue mob for sampling
		1345	Divers check viz at sites again; viz still too poor
		1600	Mob complete; operations cease
06/28/06	Wednesday	0640	Arrive SCY
		0710	Collect field blanks
		0730	Collect effluent blanks
		0805	Begin IMZ collection at effluent and at offshore sites
		1405	End IMZ collection at effluent and at offshore sites; divers begin
			mooring and tubing removal; VC to lab with ERM personnel to composite
			Samples
		1700	Mooring retrieval complete; sample preparation complete
		1830	Operations cease
06/29/06	Thursday	0800	Arrive SCY; samples taken to loading dock for FedEx shipping; CAS
			contacted to inform of shipment; FedEx called to schedule pickup
		1015	Divers in to check viz for seagrass transects; viz good enough to conduct
			transects; transects begin
		1300	Complete seagrass transects
		1900	Demobilization nearly complete; operations cease
06/30/06	Friday	0800	Arrive SCY for final demobilization
		0845	Leave SCY for San Juan; drop off 31 pieces at Delta Air Cargo; transit to
			warehouse to drop off equipment; return box truck and van; transit to
			airport
		1510	Depart SJU for FLL
		1930	Arrive CSA; operations cease