

TERRA-COM

Environmental Consulting, Inc.

Gainesville • Jacksonville • Marianna

November 15, 2012

TERRA-COM #2012-0041

Mr. Rick Rachal, P.G.

Florida Department of Environmental Protection-Northeast District

7777 Baymeadows Way West, Suite 100

Jacksonville, FL 32256-7590

**Re: Proposed Supplemental Site Assessment Plan
1640 Talleyrand Avenue
Jacksonville, Florida**

Dear Rick:

TERRA-COM Environmental Consulting, Inc. (TERRA-COM) has been engaged by Industrial Water Services, Inc. ("IWS") to submit this Proposed Supplemental Site Assessment Plan in support of the transfer of Department oversight on this property to the Waste Cleanup Section in the Northeast District in accordance with the recommendation of the Department's Hazardous Waste Regulation Section in Tallahassee. This property has been undergoing a RCRA Tank Closure since January 2010 when the ownership of the fixed improvements and other business assets of IWS were sold to Liquid Environmental Solutions, Inc. ("LES"). IWS retained ownership of the subject real property and leased it to LES to continue the transferred business operations.

One of the requirements in that transaction was the completion of the RCRA closure for eight above ground petroleum storage tanks that had been used by IWS for the storage of petroleum contact water ("PCW") when such PCW was defined as a "characteristic hazardous waste" under RCRA. IWS operated the tanks under a RCRA permit until PCW was exempted from RCRA by USEPA and the Department. These tanks continue to be used by LES for storage of PCW under permits issued by the Department to LES.

This RCRA closure process has been proceeding under the supervision of Bheen Kothur in the Hazardous Waste Section of the Department. The required sampling and the preparation of submissions to the Department have been the responsibility of LES under the Asset Purchase Agreement (at the expense of IWS). LES retained Golder Associates for the performance of the required tasks. Prior to the last meeting with the Department regarding this closure in September 2011, Bheen Kothur informed LES and IWS through Golder that the RCRA Closure Permit would be issued if the remaining contamination was addressed under an agreement the Waste Cleanup Section in Jacksonville. A copy of Bheen Kothur's letter to Golder dated August 23, 2011, is included as **Appendix A** for your convenience.

IWS has received no further communication from Bheen Kothur since that September 2011 meeting. It has asked us to submit this letter to complete this arrangement to complete the Department's final requirement for the issuance of the RCRA Closure Permit. IWS has retained

Mr. Rick Rachal, P.G.
FDEP N.E. District
November 15, 2012

TERRA-COM to complete the required waste cleanup assessment and remedial work following the issuance of the RCRA Closure Permit.

We are writing on behalf of IWS to request your concurrence with this arrangement and to advise you of IWS's plan for completion of the assessment of the remaining contamination. A copy of the last sampling report prepared by Golder Associates and submitted to the Department on July 13, 2011, is included in **Appendix B** for your information. Also included in **Appendix C** is a proposed plan for the installation of three additional monitoring wells to complete the assessment for the purpose of preparing an appropriate plan for further remediation, if necessary, or monitoring as required by Department regulations.

We understand that this is an unusual request and that the background is somewhat complicated. We would like to have a meeting with you to discuss this proposed arrangement and IWS's plan for further assessment. IWS is ready, willing and able to proceed with this work and would like to complete this work as soon as possible.

We appreciate your prompt attention to this request and will give you a call in a week or so to schedule the meeting.

Sincerely,

TERRA-COM ENVIRONMENTAL CONSULTING, INC.


Gregory A. Self, P.G.
President

Appendices:

1. Letter dated August 23, 2011, from Bheen Kothur, P.E.III, Hazardous Waste Regulation
2. Closure and Confirmatory Sampling Report dated July 13, 2011 from Golder Associates
3. Proposed Plan for Further Assessment dated November 15, 2012, from TERRA-COM

C: Bheem Kothuir, P.E. III, FDEP Hazardous Waste Regulation
Tom Dudley, IWS

APPENDIX A



Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

August 23, 2011

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinvard Jr.
Secretary

SENT VIA E-MAIL
Kirk_Blevins@golder.com

Mr. Kirk A. Blevins, CHMM
Golder Associates Inc.
9428 Baymeadows Road, Suite 400
Jacksonville, FL 32256

RE: Liquid Environmental Solutions (LES) Facility
1640 Talleyrand Avenue, Jacksonville, Florida
Used Oil Permit No. 72815-HO-009; FLD 981 928 484
RCRA Tank Closure and Solid Waste Management Units (SWMUs),
Confirmatory Sampling Report Dated July 13, 2011.

Dear Mr. Blevins:

The Florida Department of Environmental Protection (FDEP) has completed its review of the facility confirmatory sampling report dated July 13, 2011 related to Resource Conservation Recovery Act (RCRA) Tank Closure and Solid Waste Management Units for the Liquid Environmental Solutions (f.k.a. Industrial Water Services) facility. All eight (8) RCRA above ground storage tanks physical closure can be accepted contingent upon entry into a consent order to address contamination at the facility. The review comments are enclosed in an attachment.

A meeting date of September 12, 2011 has been scheduled in Tallahassee to discuss the impacted soils and groundwater and the appropriate mechanism or instrument to remediate the concerned contaminants.

Should you have any questions, please contact Bheem Kothur at (850) 245-8781 or e-mail: bheem.kothur@dep.state.fl.us

Sincerely,

Bheem Kothur, P.E. III
Hazardous Waste Regulation

Mr. Kirk A. Blevins, CHMM
August 23, 2011
Page Two

BK/
Attachment

cc: James P. Oliveros, Golder Associates, Inc., jim.Oliveros@golder.com
Ashwin Patel, DEP/Jacksonville, ashwin.patel@dep.state.fl.us
Tommy Dudley, Jr, tomdudley44@gmail.com
Tommy Dudley, Jr, tommy.dudley@liquidenviro.com
Georgiana Holmes, OGC/Tallahassee, Georgiana.holmes@dep.state.fl.us
Jenna Perry, DEP/Jacksonville, jenna.d.perry@dep.state.fl.us
Edgar Echevarria, DEP/Tallahassee, edgar.echevarria@dep.state.fl.us
Karen Knight, EPA Region 4, knight.karen@epamail.epa.gov
Patrick Reilly, LES/Jacksonville, patrick.reilly@liquidenviro.com

ENCLOSURE
Liquid Environmental Solutions, LLC
EPA I.D. No.: FLD 981 928 484; Permit No.: 72815-HO-009
August 22, 2011


GENERAL COMMENTS:

1. The report must be certified, signed and sealed by a P.E. or P.G. as appropriate. Please resubmit the properly sealed certification page.
2. The soils and groundwater are impacted at the site and further assessment is necessary and appropriate.
3. All eight (8) RCRA above ground storage tanks physical closure can be accepted conditional upon entry into an appropriate mechanism or instrument to remediate the concerned areas. A face to face meeting has been set for September 12, 2011 to discuss the impacted soils and groundwater.

SPECIFIC COMMENTS:

4. Section 2.4.2-Groundwater Flow Determination, Top of Casing Survey: This Section refers to an "arbitrary datum" at the facility. Then Table 6 refers to a "TOC Elevation" as (ft NGVD), which is not an arbitrary datum. Which is correct? Please review and revise as appropriate.
5. Table 5, refers to (ftbs)-feet below ground surface for the Screened Interval. There is no ground surface elevation. There is no stick-up above ground surface information. Please review the Table and revise as appropriate.
6. Table -2, Soil Analytical Summary-Organic Constituents: In Soil Boring SB-2-1, the highest concentration of TRPH is 10,200 mg/kg which is above the Leachability Groundwater criteria of 340 mg/kg.
7. Table -2, SB-3-3, the highest concentration of benzene is 0.00748 mg/kg which is above the Leachability Criteria.
8. Table -7, Groundwater Analytical Summary-Inorganic Constituents: SB-7-GW, the highest concentration of Arsenic is 110 µg/l which is above the GCTL of 10 µg/l.
9. Table -8, Groundwater Analytical Summary-Organic Constituents: In SB-5-GW, the highest concentration of MTBE is 74.3 µg/l which is above the GCTL of 20 µg/l.

APPENDIX B



RESOURCE CONSERVATION AND RECOVERY ACT ABOVEGROUND STORAGE TANK CLOSURE AND CONFIRMATORY SAMPLING REPORT

Liquid Environmental Services
Jacksonville, Florida

Submitted to: Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400 USA

Submitted by: Golder Associates Inc.
9428 Baymeadows Road, Suite 400
Jacksonville, FL 32256 USA

Distribution:

1 Copy	FDEP Hazardous Waste Section, Tallahassee
2 Copies	Liquid Environmental Services
2 Copies	Industrial Water Services
1 Copy	Golder Associates Inc.

July 2011

103-82514

A world of
capabilities
delivered locally





July 13, 2011

103-82514

Mr. Bheem Kothur
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

**RE: RESOURCE CONSERVATION AND RECOVERY ACT ABOVEGROUND
STORAGE TANK CLOSURE AND CONFIRMATORY SAMPLING REPORT
LIQUID ENVIRONMENTAL SERVICES
1640 TALLEYRAND AVENUE
JACKSONVILLE, FLORIDA**

Dear Mr. Kothur:

Golder Associates Inc. (Golder) is pleased to submit this Resource Conservation and Recovery Act Aboveground Storage Tank (AST) Closure and Confirmatory Sampling Report to the Florida Department of Environmental Protection for the closure of eight ASTs and four solid waste management units at the Liquid Environmental Solutions (LES) facility, formerly known as Industrial Water Services, in Jacksonville, Florida.

Based upon the results of the physical inspections of the facility, review of historical records, and the results of soil and groundwater sampling, Golder recommends approval of clean closure of the ASTs.

Golder is providing professional environmental and engineering services on behalf of LES. If you have any questions regarding this report, please contact the undersigned at (904) 363-3430.

Sincerely,

GOLDER ASSOCIATES INC.

A handwritten signature in dark ink, appearing to read "Kirk A. Blevins".

Kirk A. Blevins, CHMM
Project Manager

A handwritten signature in dark ink, appearing to read "James P. Oliveros".

James P. Oliveros, PG
Senior Hydrogeologist and Principal

Golder Associates Inc.
9429 Baymeadows Road, Suite 400
Jacksonville, FL 32256 USA

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Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America



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1.0 INTRODUCTION

1.1 Background

Liquid Environmental Solutions (LES) purchased the former Industrial Water Services (IWS) business located at 1640 Talleyrand Avenue, Jacksonville, Florida (the facility/site) on January 1, 2010. The location of the facility is shown on Figure 1. As part of the transaction, IWS has retained ownership of the property, while LES owns and operates the facility and all associated equipment. The facility treats wastewater and processes used oil under a used oil processor's permit, which has been transferred from IWS to LES.

For approximately 20 years, the facility has stored and treated petroleum contact water (PCW) in eight aboveground storage tanks (ASTs), seven cone-bottom (Tanks 81 through 87) and one flat-bottomed (Tank 6). Certain PCW that the facility processed was designated in the early 1990s as a characteristically hazardous waste by virtue of benzene (D018) concentrations that exceeded the toxicity characteristic leaching procedure (TCLP) limit of 0.5 milligrams per liter (mg/L) and did not qualify for the petroleum exemption under the Resource Conservation and Recovery Act (RCRA). During the mid-1990s, the U.S. Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (FDEP) made a determination that all PCW was similar in composition and should all be afforded the RCRA exemption. IWS operated under a RCRA permit to treat D018 waste until the exemption was extended to all PCW and the processing of PCW has continued to the present day. The facility was then able to operate under their used oil processor's permit, without overlapping RCRA requirements. However, due to cost implications, the facility chose to maintain a separate financial assurance instrument for closure of the eight ASTs rather than complete closure activities. Now that the facility has been sold to LES, proper closure of the ASTs under RCRA is a condition of the sale and a requirement that must be met before the FDEP will release IWS from the financial assurance requirements associated with the RCRA closure.

In addition to regulatory closure of the eight ASTs, the FDEP has required, as part of this RCRA closure, that the four solid waste management units (SWMUs) identified with potential releases in the December 1993 RCRA Facility Assessment (RFA) be investigated. A RFA was completed for the facility by A.T. Kearney, Inc. (Kearney) and a revised RFA report was issued by the EPA on December 10, 1993 (Kearney, December 1993). The RFA identified 24 SWMUs, of which four were recommended for additional investigations. These included SWMUs 3A and 3C (offloading racks #1 and #3, respectively), SWMU 4 (Baffle Tanks #3, #4, and #8), SWMU 11F (tertiary containment), and SWMU 21 (underground oil/wastewater pipeline system). A more thorough description for each SWMU can be found in the RFA report.

To address the requirements for RCRA closure and conform to 40 CFR 265.112, Golder submitted a Confirmatory Sampling and Tank Closure Plan (CS Plan) to the FDEP on August 5, 2010. The plan addressed the soil and groundwater sampling methodology to evaluate whether there had been a release of constituents of concern (COC) from the regulated ASTs and/or the four identified SWMUs. Additionally, the plan included a description of the tank inspection of the flat-bottomed Tank 6, which concluded that the tank bottom generally appeared to be in adequate condition and there was no evidence suggesting that the tank had been leaking. The certified tank inspection form is included in Appendix A.

FDEP reviewed the CS Plan and provided comments in an October 14, 2010 correspondence. Golder provided responses to these comments in a November 5, 2010 letter. Given that the ASTs to be closed for RCRA purposes were still being used to process PCW, Golder requested a site meeting with FDEP to further discuss and clarify any additional changes to the CS Plan prior to a revised CS Plan being submitted.

Representatives from FDEP, IWS, LES, and Golder met at the site on December 15, 2010. As a result of this site meeting, it was mutually agreed that soil samples would only need to be collected from the perimeter of the tertiary containment structure and that groundwater samples would only need to be collected at the downgradient extent of the facility. Intrusive sampling within the tertiary containment would not be required for RCRA closure activities. Therefore, Golder provided revisions to the CS Plan in a March 7, 2011 correspondence, which included soil and groundwater samples being collected from the perimeter of the tertiary containment unit. FDEP approved the revisions to the CS Plan in a March 25, 2011 email correspondence. The following report includes the analytical results associated with the implementation of the revised CS Plan in order to obtain RCRA closure for the regulated ASTs and SWMUs.

2.0 INVESTIGATIVE PROCEDURES

2.1 RCRA Closure Objectives

The overall objective of the current investigation is to obtain closure approval for the eight ASTs and the four SWMUs regulated under RCRA. Specifically, the objectives are to determine if releases of COCs, associated with these tanks and SWMUs, have occurred at the site, during the time that the ASTs were used to treat or store waste that was classified by EPA and FDEP as D018 waste.

Field procedures were conducted in general accordance with the FDEP Standard Operating Procedures (SOPs) for Field Activities, DEP-SOP-001/01 (updated March 31, 2008) and Chapter 62-160 FAC. Laboratory analyses were performed by Pace Analytical Services, Inc. (Pace) of Ormond Beach, Florida. Pace is a National Environmental Laboratory Accreditation Conference (NELAC) – accredited laboratory approved by the FDEP. Analyses were performed using EPA methodologies from SW846, Update III.

A summary of investigative activities performed at the site is presented below. Documentation associated with the field investigation is presented in Appendix B. Laboratory analytical reports are included in Appendix C.

2.2 Constituents of Concern

Historically, the facility is reported to have stored mineral spirits, diesel, coal tar, fuel oil, ethanol, and gasoline additives. Since 1986, the facility has been accepting and treats oily wastewater and PCW. Given these historical activities at the facility, soil and groundwater samples were analyzed for the following COCs:

- Priority pollutant volatile organic compounds (VOCs),
- Polycyclic aromatic hydrocarbons (PAHs),
- Total recoverable petroleum hydrocarbons (TRPHs),
- Specific carbon-chain hydrocarbons that comprise TRPHs, and
- RCRA eight metals

Dioxins, furans, polychlorinated biphenyls (PCBs), pentachlorophenol (PCP), pesticides, and herbicides are not and have not been accepted at the facility, as attested by Mr. Thomas Dudley, President of IWS. A signed affidavit by Mr. Dudley is provided in Appendix D.

2.3 Soil Sampling

General

Golder mobilized a direct push technology (DPT) drill rig to the site on April 12, 2011 for the collection of soil samples. A total of 43 soil samples were collected from eight soil boring locations. Soil samples from certain intervals (deeper within the soil column) were placed on hold at the laboratory pending the results

of the analyses of the samples collected at shallower depths within the same boring(s). Soil boring locations are shown on Figure 2.

In general, soil samples were collected from the ground surface to 0.5 feet below ground surface (bgs) and from 0.5 foot bgs to 2 feet bgs. Deeper than 2 feet bgs, soil samples were collected in 2-foot intervals to a maximum depth of 8 feet bgs. Each sample was uniquely labeled so that the location and vertical interval of sample collection could be tracked using the designation system listed below.

<u>Sample Depth</u>	<u>Interval Designation</u>
0 – 0.5 feet	SB-X-1
0.5 – 2 feet	SB-X-2
2 – 4 feet	SB-X-3
4 – 6 feet	SB-X-4
6 – 8 feet	SB-X-5

X denotes the boring number.

Soil samples from each boring were submitted to Pace and analyzed by one or more of the following methods: EPA Method 8260 for priority pollutant VOCs, EPA Method 8270 SIM for PAHs, EPA Method 6010/7471 for RCRA eight metals, the Florida Pro Method for TRPHs, and the Massachusetts Department of Environmental Protection (MADEP) Method for specific carbon-chain constituents that comprise TRPH (commonly referred to as TRPH speciation). The soil analytical results for inorganic constituents are presented in Table 1. The soil analytical results for organic constituents are presented in Tables 2 through 4. Soil analytical results are presented on Figure 3.

2.4 Groundwater Investigation

2.4.1 Monitoring Well Installation

A total of four shallow surficial aquifer monitoring wells (SB-4 through SB-7) and two piezometers (PZ-2 and PZ-3) were installed by Probe Domain Inc. on April 12, 2011. The wells and piezometers were constructed using a 1-inch diameter slotted section of schedule 40 polyvinyl chloride (PVC) screen with an appropriate length riser to allow for approximately 2 feet of stick-up above the ground surface. Each monitoring well screen was encased with a pre-packed sand filter. Following installation, each well/piezometer was developed to remove sediments from the casing and annular space around the screened interval. The wells were completed with a grout seal at the ground surface and a locking cap. Construction of wells was consistent with FDEP well construction criteria.

Monitoring well construction details are presented in Table 5. Monitoring well construction logs are presented in Appendix E. Monitoring well locations are presented on Figure 2.

2.4.2 Groundwater Flow Determination

Top of Casing Survey

On April 12, 2011, the elevations of the top of casing (TOC) from the monitoring wells and piezometers were surveyed by Golder. All elevations were referenced to an arbitrary datum at the facility. Depth to water measurements from the TOC were collected from site monitoring wells and piezometers on April 13, 2011 and groundwater elevations were calculated (Table 6).

Groundwater elevation data were used to generate a potentiometric map of the shallow surficial aquifer and to determine groundwater flow direction and hydraulic gradient. Groundwater flow calculations are presented in Appendix F. Groundwater elevations are presented on Figure 4.

2.4.3 Groundwater Sampling and Analysis

Groundwater samples were collected from site monitoring wells (MW-1, MW-2, and SB-4 through SB-7) on April 13, 2011. The groundwater samples from each well were submitted to Pace and analyzed for one or more of the following: EPA Method 8260 for priority pollutant VOCs, EPA Method 8270 SIM for PAHs, EPA Method 6010/7471 for RCRA eight metals, the Florida Pro Method for TRPHs. The monitoring wells were sampled according to FDEP Groundwater Sampling SOPs (FS2000, DEP-SOP-001/01, updated March 31, 2008). The groundwater analytical results for inorganic constituents are presented in Table 7. The groundwater analytical results for organic constituents are presented in Table 8. Groundwater analytical results are presented on Figure 5. Groundwater sampling logs are presented in Appendix B.

3.0 INVESTIGATIVE FINDINGS

3.1 Soil

Analytical results indicated that certain COCs were detected in soil at concentrations above the groundwater leachability and/or direct exposure soil cleanup target levels (SCTLs) at six of the eight boring locations (SB-2, SB-3, and SB-5 through SB-8). Soil analytical results are presented in Figure 3. Discussions of specific constituents are presented below.

Inorganic Compounds

Analytical results indicated that arsenic was reported in soil at concentrations above the commercial/industrial SCTL of 12 milligrams per kilogram (mg/kg) in one soil sample (SB-6-2) and above the residential SCTL of 2.1 mg/kg in six other soil samples (SB-2-1, SB-2-2, SB-6-3, SB-7-1, SB-7-2, and SB-8-1). The highest reported concentration of arsenic was 13.0 mg/kg at soil sample SB-6-2 (0.5 to 2 feet bgs. No other inorganic constituents tested for were present in soil at concentrations above applicable SCTLs. Arsenic is not a constituent associated with the PCW that was temporarily considered a characteristically hazardous waste. Furthermore, the concentrations of arsenic detected are within the range of that found as naturally occurring in area soil. It should also be noted that the borings where arsenic was detected in soil samples are beneath concrete, thus eliminating the direct exposure route. Soil inorganic analytical results are presented in Table 1.

Volatile Organic Compounds

Analytical results indicated that benzene was detected in soil at concentrations slightly above the groundwater leachability SCTL of 0.007 mg/kg in two soil samples (SB-3-2 and SB-3-3), but less than the residential direct exposure SCTL of 1.2 mg/kg. The highest reported concentration of benzene was 0.0748 mg/kg at SB-3-3. No other VOCs tested for were present in soil at concentrations above applicable SCTLs, including methyl-tert-butyl-ether (MTBE). Soil VOC analytical results are presented in Table 2.

Polycyclic Aromatic Hydrocarbons

Analytical results indicated that naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and acenaphthene, were detected in soil sample SB-2-1 at concentrations above groundwater leachability SCTLs of 1.2 mg/kg, 3.1 mg/kg, 8.5 mg/kg, and 2.1 mg/kg, respectively. Additionally, 1-methylnaphthalene and 2-methylnaphthalene were detected in soil sample SB-2-2 and 1-methylnaphthalene was detected in soil sample SB-2-3 at concentrations above groundwater leachability criteria SCTLs. The highest concentrations for each of these PAH compounds were reported in soil sample SB-2-1. Soil boring SB-2 was located approximately 15 feet to the west of SWMU 3C. No

other PAH compounds were detected at concentrations above applicable SCTLs in soil from any other boring locations. PAH analytical results are presented in Table 2.

Benzo(a)pyrene Toxicity Equivalents

Analytical results indicated that benzo(a)pyrene toxicity equivalents (BaP TE_s) were detected in soil at concentrations above the commercial/industrial direct exposure SCTL of 0.7 mg/kg in soil samples SB-2-1, SB-3-2, and SB-5-1 and above the residential direct exposure SCTL of 0.1 mg/kg in soil samples SB-2-2, SB-7-1, and SB-8-1. The highest concentration of BaP TE_s was 1.8 mg/kg at SB-2-1. No other BaP TE_s were detected at concentrations above applicable SCTLs in soil from any other boring locations. BaP TE_s analytical results are presented in Table 3.

Total Recoverable Petroleum Hydrocarbons

Analytical results from the Florida-Pro Method initially indicated that TRPH_s were detected in soil at concentrations above the commercial/industrial direct exposure SCTL of 2,700 mg/kg in soil sample SB-2-1; above the residential direct exposure SCTL of 460 mg/kg in soil samples SB-2-2 and SB-7-1, and above the groundwater leachability SCTL of 340 mg/kg in soil sample SB-1-2. The highest concentration of TRPH was 10,200 mg/kg at SB-2-1. TRPH analytical results are presented in Table 2.

Each of these samples were analyzed for specific carbon-chain compounds, which comprise TRPH, by the MADEP Method. The SCTLs for the specific carbon-chain compounds are greater than the values for TRPH. Analytical results indicated that certain carbon-chain compounds were detected in soil at concentrations above residential direct exposure and/or groundwater leachability SCTLs in soil samples SB-2-1 and SB-2-2, but below commercial/industrial direct exposure SCTLs. No other specific carbon-chain compounds were detected at concentrations above applicable SCTLs in soil from the other two soil samples (SB-1-2 or SB-7-1). Specific carbon-chain compounds analytical results are presented in Table 4.

3.2 Groundwater

3.2.1 Groundwater Flow Direction

Depth-to-water measurements, from the TOCs, were measured from monitoring wells MW-1, MW-2, SB-4 through SB-7, and piezometers PZ-1 through PZ-3. The depth-to-water measurements ranged from 5.35 feet to 7.38 feet bgs. These measurements were used in conjunction with the surveyed TOC elevations to determine the approximate groundwater flow direction in the shallow surficial aquifer. The water-level data indicated that the direction of groundwater flow was approximately southeast. The hydraulic gradient was calculated to be 0.003 feet per foot (ft/ft). A summary of the groundwater elevations are presented in Table 6. A potentiometric map generated using the data collected on

April 13, 2011 is presented in Figure 4. Groundwater flow and hydraulic gradient calculations are presented in Attachment F.

3.2.2 Groundwater Analytical Results

Inorganic Compounds

Analytical results indicated that arsenic was reported in groundwater at concentrations above its groundwater cleanup target level (GCTL) of 10 micrograms per liter ($\mu\text{g/l}$) in four groundwater samples (MW-2 and SB-4-GW through SB-6-GW) and above its natural attenuation default concentration (NADC) of 100 $\mu\text{g/l}$ in one groundwater sample (SB-7-GW). The highest reported concentration of arsenic was 110 $\mu\text{g/l}$ in sample SB-7-GW. No other inorganic compounds tested for were present in groundwater at concentrations above GCTLs. Arsenic is not a constituent associated with PCW that was temporarily considered and characteristically hazardous waste. Groundwater inorganic analytical results are presented in Table 7.

Volatile Organic Compounds

Analytical results indicated that MTBE was reported in groundwater at concentrations above the GCTL of 20 $\mu\text{g/l}$ in three groundwater samples (SB-5-GW through SB-7-GW), but below its NADC of 200 $\mu\text{g/l}$. The highest reported concentration of MTBE was 74.3 $\mu\text{g/l}$ in groundwater sample SB-7-GW. No other VOCs tested for were present in groundwater at concentrations above GCTLs. Groundwater VOCs analytical results are presented in Table 8.

Polycyclic Aromatic Hydrocarbons

PAH compounds tested for were not present in groundwater at concentrations above GCTLs. Groundwater PAHs analytical results are presented in Table 8. Given this, the leachability SCTLs would not apply for these constituents in soil samples.

Total Recoverable Petroleum Hydrocarbons

TRPHs were not present in groundwater at concentrations above GCTLs. Groundwater TRPHs analytical results are presented in Table 8. Given this, the leachability SCTLs would not apply for TRPH in soil samples.

4.0 SUMMARY

Golder inspected and attested to the integrity of one flat-bottomed AST (Tank 6) and installed and/or collected samples from eight soil borings and six monitoring wells for the purpose of obtaining closure of the RCRA-regulated ASTs. Tank inspection concluded that Tank 6 appeared to be in adequate condition and there was no evidence suggesting that the tank had been leaking.

Multiple soils samples were collected from eight soil boring locations and analyzed for inorganic and organic compounds. Arsenic, benzene, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, BaP TEs, and TRPHs were detected in soil at concentrations above direct exposure and/or groundwater leachability SCTLs. No other COCs were detected in soil samples at concentrations above applicable SCTLs. Soil samples from boring SB-2, located approximately 15 feet to the west of SWMU 3C (an offloading area), had the most COCs and the highest concentrations of organic COCs. Soil from soil boring SB-6, located in the southeastern corner of the facility and installed beneath a concrete cap, contained soil with the highest concentration of arsenic.

Groundwater samples were collected from four newly installed monitoring wells and two previously installed monitoring wells. The samples were analyzed for the same parameters as for the soil samples. Arsenic was detected in groundwater at a concentration above its NADC at monitoring well SB-7 and at concentrations above GCTLs at monitoring wells MW-2, SB-4, SB-5, and SB-6. MTBE was detected in groundwater at concentrations above GCTLs at monitoring wells SB-5 through SB-7. No other COC was detected in groundwater at concentrations above GCTLs.

It is important to note that nearly all the soil within the facility property is covered by concrete pavement, effectively serving as a barrier to direct contact. Therefore, the direct exposure risk has been mitigated. Furthermore, with the exception of arsenic and MTBE, no COCs were detected in groundwater samples at concentrations exceeding the GCTLs, therefore, the leachability SCTLs would only apply to these two constituents. Only arsenic was detected in both soil and groundwater. Arsenic is not a constituent associated with PCW, which was temporarily considered a characteristically hazardous waste due to benzene concentrations.

Based on the results of the physical inspections of the facility, review of historical records and the results of soil and groundwater sampling, Golder recommends clean closure approval of the ASTs. Remaining issues associated with the soil impacts detected beneath the concrete structures and arsenic and MTBE in groundwater are not believed to be associated with releases from the eight

RCRA-regulated ASTs. These impacts, if necessary and appropriate, can be addressed under a separate instrument.

GOLDER ASSOCIATES INC.

[Signature]
for

Tanel Esin Andry, PE
Certifying Engineer

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Kirk A. Blevins, CHMM
Project Manager

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James P. Oliveros, PG
Senior Consultant and Principal

TEA/JPO/ams

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TABLE 1
SOIL ANALYTICAL SUMMARY - INORGANIC CONSTITUENTS

Liquid Environmental Solutions
1640 Talleyrand Avenue
Jacksonville, Florida

Sample Identification	Date Collected	Sample Depth (ft bgs)	Target Constituents							
			Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
Residential Direct Exposure SCTL			2.1	120	82	210	400	3	440	410
Commercial/Industrial Direct Exposure SCTL			12	130,000	1,700	470	1,400	17	11,000	8,200
Leachability Based on Groundwater SCTL			*	1,600	7.5	38	*	2.1	5.2	17
SB-1-1	4/12/2011	0 - 0.5	0.421	7.6	0.0501	1.4	7.7	0.012 U	0.39 U	0.13 U
SB-1-2	4/12/2011	0.5 - 2	0.61	20.5	0.20	5.5	37.7	0.013 U	0.035 U	0.12 U
SB-2-1	4/12/2011	0 - 0.5	4.2	68.4	0.63	2.9	217	0.20	0.31 U	0.10 U
SB-2-2	4/12/2011	0.5 - 2	1.2	36.7	0.11	3.3	91.7	0.052	0.35 U	0.12 U
SB-3-1	4/12/2011	0 - 0.5	0.79	9.8	0.11	2.9	20.3	0.0281	0.36 U	0.12 U
SB-3-2	4/12/2011	0.5 - 2	7.5	77.7	0.73	3.2	205	0.19	0.34 U	0.181
SB-3-3	4/12/2011	2 - 4	0.31 U	NA	NA	NA	NA	NA	NA	NA
SB-4-1	4/12/2011	0 - 0.5	1.6	6.5	0.055	2.8	41.4	0.0201	0.33 U	0.11 U
SB-4-2	4/12/2011	0.5 - 2	0.62	7.5	0.0321	2.4	12.8	0.0161	0.33 U	0.11 U
SB-5-1	4/12/2011	0 - 0.5	1.5	11.5	0.072	3.1	22.4	0.0201	0.29 U	0.095 U
SB-5-2	4/12/2011	0.5 - 2	0.361	2.1	0.025 U	1.1	4.8	0.013 U	0.38 U	0.13 U
SB-6-1	4/12/2011	0 - 0.5	0.90	8.0	0.15	5.6	17.4	0.0131	0.31 U	0.10 U
SB-6-2	4/12/2011	0.5 - 2	13.0	17.7	0.34	9.9	83.3	0.11	0.33 U	0.131
SB-6-3	4/12/2011	2 - 4	8.2	NA	NA	NA	NA	NA	NA	NA
SB-7-1	4/12/2011	0 - 0.5	5.9	19.4	0.26	8.2	45.2	0.0371	0.33 U	0.11 U

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TABLE 1
SOIL ANALYTICAL SUMMARY - INORGANIC CONSTITUENTS

Liquid Environmental Solutions
1640 Talleyrand Avenue
Jacksonville, Florida

Sample Identification	Date Collected	Sample Depth (ft bgs)	Target Constituents							
			Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
Residential Direct Exposure SCTL			2.1	120	82	210	400	3	440	410
Commercial/Industrial Direct Exposure SCTL			12	130,000	1,700	470	1,400	17	11,000	8,200
Leachability Based on Groundwater SCTL			*	1,600	7.5	38	*	2.1	5.2	17
SB-7-2	4/12/2011	0.5 - 2	10.9	8.8	0.13	7.3	42.0	0.041 I	0.33 U	0.11 U
SB-7-3	4/12/2011	2 - 4	1.2	NA	NA	NA	NA	NA	NA	NA
SB-8-1	4/12/2011	0 - 0.5	8.0	9.1	0.29	11.6	63.6	0.012 U	0.36 U	0.12 U
SB-8-2	4/12/2011	0.5 - 2	0.38 I	9.1	0.025 U	6.0	4.3	0.013 U	0.37 U	0.12 U

Notes:

ft bgs = feet below ground surface

mg/kg = milligrams per kilogram

NA = Constituent not analyzed for

U = Indicates the compound was analyzed for but not detected at a concentration greater than the shown method detection limit (MDL).

I = The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

SCTL = Soil Cleanup Target Level

SPLP = Synthetic Precipitation Leaching Procedure

* Leachability SCTL values derived using SPLP analyses

Bold font indicates the constituent concentration was detected above the SCTL

Notes:

ft bgs = feet below ground surface

mg/kg = milligrams per kilogram

NA = Constituent not analyzed for

U = Indicates the compound was analyzed for but not detected at a concentration greater than the shown method detection limit (MDL).

I = The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

SCTL = Soil Cleanup Target Level

SPLP = Synthetic Precipitation Leaching Procedure

* Leachability SCTL values derived using SPLP analyses

Bold font indicates the constituent concentration was detected above the SCTL.

Checked by: KAB
Reviewed by: JPO

TABLE 2
SOIL ANALYTICAL SUMMARY - ORGANIC CONSTITUENTS
Liquid Environmental Solutions
15401 Valley Road Avenue
Jacksonville, Florida

Sample			Analytical Testing										
Sample Identification	Date Collected	Sample Depth (ftgs)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	Naphthalene (mg/kg)	1-Methylnaphthalene (mg/kg)	2-Methylnaphthalene (mg/kg)	Acenaphthylene (mg/kg)	Acenaphthene (mg/kg)	TPH (mg/kg)
Residential Direct Exposure Limits			1.2	1,500	7,500	130	4,400	55	200	210	1,800	2,400	480
Commercial/Industrial Exposure			1.7	9,200	60,000	700	24,000	300	1,800	2,100	20,000	20,000	2,700
Leachability Groundwater Criteria			0.007	0.6	0.5	0.2	0.09	1.2	3.1	8.5	27	2.1	340
SB-1-1	4/12/2011	0 - 0.5	0.0031 U	0.0035 U	0.0092	0.0063 U	0.0031 U	0.0043 U	0.0051 U	0.0056 U	0.0065 U	0.004 U	17.2
SB-1-2	4/12/2011	0.5 - 2	0.003 U	0.0033 U	0.0032 U	0.0061 U	0.0029 U	0.0123 U	0.0248 U	0.0283 U	0.0348 U	0.0039 U	424
SB-2-1	4/12/2011	0 - 0.5	0.285 U	0.315 U	0.301 U	0.572 U	0.278 U	1.23	33.4	56.7	1.77	2.69	10,200
SB-2-2	4/12/2011	0.5 - 2	0.303 U	0.335 U	0.320 U	0.809 U	0.296 U	0.545	17.2	25.8	0.543	0.642	4,380
SB-2-3	4/12/2011	2 - 4	NA	NA	NA	NA	NA	0.314	5.75	8.05	0.0048 U	0.0041 U	NA
SB-3-1	4/12/2011	0 - 0.5	0.0018 U	0.002 U	0.0019 U	0.0037 U	0.0018 U	0.0061 U	0.0051 U	0.0074 U	0.0264 U	0.0051 U	22.2
SB-3-2	4/12/2011	0.5 - 2	0.0103	0.0044 U	0.0049 U	0.008 U	0.0039 U	0.0764	0.280	0.314	0.117	0.0599	250
SB-3-3	4/12/2011	2 - 4	0.0748	0.0078 U	0.0168	0.0146 U	0.0108	0.141	0.199	0.185	0.0058 U	0.0049 U	NA
SB-4-1	4/12/2011	0 - 0.5	0.0034 U	0.0038 U	0.0036 U	0.0068 U	0.0033 U	0.0185 U	0.0219 U	0.0242 U	0.0302 U	0.0174 U	58.3
SB-4-2	4/12/2011	0.5 - 2	0.0041 U	0.0033 U	0.013	0.0059 U	0.0029 U	0.0041 U	0.0049 U	0.0054 U	0.0046 U	0.0086 U	6.8
SB-5-1	4/12/2011	0 - 0.5	0.0046 U	0.005 U	0.0117	0.0032 U	0.0045 U	0.138	0.511	0.388	0.654	0.0555	24.5
SB-5-2	4/12/2011	0.5 - 2	0.0034 U	0.0037 U	0.0068	0.0068 U	0.0033 U	0.0045 U	0.0054 U	0.0059 U	0.0054 U	0.0051	3.3 U
SB-6-1	4/12/2011	0 - 0.5	0.0032 U	0.0036 U	0.0216	0.0065 U	0.0031 U	0.0071 U	0.0084 U	0.0093 U	0.0091 U	0.0067 U	46.0
SB-6-2	4/12/2011	0.5 - 2	0.0036 U	0.004 U	0.0117	0.0073 U	0.0036 U	0.0039 U	0.0046 U	0.0051 U	0.0101 U	0.0037 U	34.4
SB-7-1	4/12/2011	0 - 0.5	0.0035 U	0.0038 U	0.0037 U	0.007 U	0.0034 U	0.0043 U	0.0052 U	0.0057 U	0.1451	0.0417 U	543
SB-7-2	4/12/2011	0.5 - 2	0.0023 U	0.0026 U	0.0025 U	0.0047 U	0.0023 U	0.0188 U	0.0223 U	0.0246 U	0.0310 U	0.0177 U	89.8
SB-8-1	4/12/2011	0 - 0.5	0.0031 U	0.0034 U	0.0033 U	0.0062 U	0.003 U	0.0061 U	0.0121 U	0.0179 U	0.054	0.0921	23.7

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TABLE 2
SOIL ANALYTICAL SUMMARY - ORGANIC CONSTITUENTS
Liquid Environmental Solutions
1640 Fallowfield Avenue
Jacksonville, Florida

Sample			Analytical Testing										
Sample Identification	Date Collected	Sample Depth (ftgs)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	Naphthalene (mg/kg)	1-Methylnaphthalene (mg/kg)	2-Methylnaphthalene (mg/kg)	Acenaphthylene (mg/kg)	Acenaphthene (mg/kg)	TRPH (mg/kg)
Residential Direct Exposure Limits			1.2	1,500	7,500	150	4,400	55	200	210	1,300	2,400	450
Commercial/Industrial Exposure			1.7	9,200	60,000	700	24,000	300	1,400	2,100	20,000	20,000	2,700
Leachability Groundwater Criteria			0.007	0.6	0.5	0.2	0.08	1.2	3.1	8.5	27	2.1	340
SB-8-2	4/12/2011	0.5-2	0.0028 U	0.0031 U	0.003 U	0.0057 U	0.0028 U	0.0043 U	0.0085 U	0.0123 U	0.0171 U	0.0547	9.5
DUP-S1	4/12/2011		0.0064 U	0.0046 U	0.0279	0.0083	0.004 U	0.004 U	0.0045 U	0.0059 U	0.0416	0.0041 U	10.1

Notes:

ft = feet

Bgs = feet below ground surface

mg/kg = milligrams per kilogram

SCITL = Soil Cleanup Target Level

OVA = organic vapor analyzer

VDA = volatile organic aromatics

MTBE = methyl tert-butyl ether

TRPH = total recoverable petroleum hydrocarbons

N/A = Not measured

NA = Constituent not analyzed for

U = Indicates the compound was analyzed for but not detected at a concentration greater than the shown method detection limit (MDL).

! = The reported value is between the laboratory MDL and the laboratory practical quantitation limit (POL).

BOD indicates percent saturation exceeds the SCITL.

Notes:
ft = feet
mg/kg = feet below ground surface
mg/kg = milligrams per kilogram
SCTL = Soil Cleanup Target Level
OVA = organic vapor analyzer
MTBE = methyl tert-butyl ether
TRPH = total recoverable petroleum hydrocarbons
NM = Not measured
NA = Constituent not analyzed for
U = Indicates the compound was analyzed for but not detected at a concentration greater than the shown method detection limit (MDL).
= The reported value is between the laboratory MDL and the laboratory practical quantitation limit (PQL).
BOLD indicates concentration exceeds the SCTL.

Checked by: KAB
Reviewed by: JPO



TABLE 3
SOIL ANALYTICAL SUMMARY
TOTAL BENZO(a)PYRENE EQUIVALENTS
 Liquid Environmental Solutions
 1840 Talleyrand Avenue
 Jacksonville, Florida

Sample			Targeted Constituents Used For Calculation									Result
Sample ID	Date Collected	Sample Interval (hrs)	Benzo(a)pyrene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a,h)anthracene (mg/kg)	Indeno (1,2,3-c,d)pyrene (mg/kg)	Total Benzo(a)pyrene equivalents (mg/kg)		
Residential Direct Exposure Limits			0.1	#	#	#	#	#	#	0.1		
Commercial/Industrial Exposure Limits			0.7	#	#	#	#	#	#	0.7		
Leachability Groundwater Criteria			2.4	0.8	2.4	2.4	77	0.7	6.6	2.4		
Toxicity Equivalent Factors			1	0.1	0.1	0.01	0.001	1	0.1	1		
Laboratory TE	SB-1-1	4/12/2011	0.0165	0.0035	0.0253	0.0107	0.0161	0.0043	0.0123	0.0		
Laboratory TE	SB-1-2	4/12/2011	0.0165	0.0002	0.0025	0.0007	0.0000	0.0022	0.0012	0.0		
Laboratory TE	SB-2-1	4/12/2011	0.0396	0.0052	0.0530	0.0193	0.0314	0.0087	0.0325	0.1		
Laboratory TE	SB-2-1	4/12/2011	1.1800	1.4800	1.6900	0.5690	1.4300	0.0033	0.5870	0.1		
Laboratory TE	SB-2-2	4/12/2011	0.0396	0.0005	0.0530	0.0057	0.0014	0.0220	0.0687	1.8		
Laboratory TE	SB-2-3	4/12/2011	0.0230	0.1940	0.3090	0.0878	0.0047	0.0137	0.1370	0.3		
Laboratory TE	SB-2-3	4/12/2011	0.0647	0.0325	0.1030	0.0829	0.0598	0.0044	0.0015	0.3		
Laboratory TE	SB-3-1	4/12/2011	0.0273	0.0035	0.0103	0.0008	0.0001	0.0022	0.0002	0.1		
Laboratory TE	SB-3-2	4/12/2011	0.0273	0.0002	0.0272	0.0058	0.0001	0.0042	0.0122	0.0		
Laboratory TE	SB-3-2	4/12/2011	1.1000	0.9610	1.4800	0.5310	0.0219	0.0021	0.0012	0.0		
Laboratory TE	SB-3-3	4/12/2011	0.0996	0.0386	0.1450	0.0053	0.0009	0.0021	0.0012	1.7		
Laboratory TE	SB-3-3	4/12/2011	0.0385	0.0037	0.0145	0.1120	0.0901	0.0052	0.0020	0.1		
Laboratory TE	SB-4-1	4/12/2011	0.0385	0.0153	0.0485	0.0011	0.0001	0.0026	0.0002	0.1		
Laboratory TE	SB-4-1	4/12/2011	0.0385	0.0008	0.0050	0.0001	0.0000	0.0165	0.0259	0.1		
Laboratory TE	SB-4-2	4/12/2011	0.0747	0.0768	0.0864	0.0024	0.0078	0.0120	0.0379	0.1		
Laboratory TE	SB-5-1	4/12/2011	0.5700	0.0077	0.0086	0.0003	0.0001	0.0120	0.0038	0.1		
Laboratory TE	SB-5-2	4/12/2011	0.0265	0.0136	0.0351	0.0143	0.0313	0.0045	0.0151	1.1		
Laboratory TE	SB-6-1	4/12/2011	0.0507	0.0075	0.0084	0.0001	0.0000	0.0045	0.0015	0.0		
Laboratory TE	SB-6-1	4/12/2011	0.0507	0.0008	0.0088	0.0034	0.0059	0.0146	0.0040	0.1		
Laboratory TE	SB-6-2	4/12/2011	0.0246	0.0033	0.0365	0.0127	0.0268	0.0051	0.0188	0.1		
Laboratory TE	SB-6-2	4/12/2011	0.0246	0.0002	0.0037	0.0001	0.0000	0.0051	0.0019	0.0		

TABLE 3
SOIL ANALYTICAL SUMMARY
TOTAL BENZO(A)PYRENE EQUIVALENTS

Liquid Environmental Solutions
1840 Telford Avenue
Jacksonville, Florida

Sample			Targeted Constituents Used For Calculation										Result
Sample ID	Date Collected	Sample Interval (days)	Benzo(a)pyrene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a,h)anthracene (mg/kg)	Indeno (1,2,3-c,d)pyrene (mg/kg)	Total Benzo(a)pyrene equivalents (mg/kg)			
Residential Direct Exposure Limits			0.1	#	#	#	#	#	#	0.1			
Commercial/Industrial Exposure Limits			0.7	#	#	#	#	#	#	0.7			
Leachability Groundwater Criteria			2.4	0.8	2.4	24	77	0.7	6.6	2.4			
Toxicity Equivalent Factors			1	0.1	0.1	0.01	0.001	1	0.1	1			
Laboratory TE	SB-7-1	4/12/2011	0 - 0.5	0.1320	0.0372	0.2360	0.0618	0.1280	0.0444	0.0939			
Laboratory TE	SB-7-2	4/12/2011	0.5 - 2	0.0431	0.0019	0.0720	0.0003	0.0001	0.0222	0.0094			
Laboratory TE	SB-8-1	4/12/2011	0 - 0.5	0.0431	0.0008	0.0059	0.0001	0.0000	0.0094	0.0029			
Laboratory TE	SB-8-2	4/12/2011	0 - 0.5	0.1370	0.2280	0.2160	0.0907	0.2270	0.0257	0.0716			
Laboratory TE	SB-9-2	4/12/2011	0.5 - 2	0.1370	0.0725	0.2160	0.0907	0.0002	0.0257	0.0072			
Laboratory TE			0.0478	0.0886	0.0804	0.0272	0.1010	0.0083	0.0223	0.0223			
Laboratory TE			0.0478	0.0886	0.0804	0.0272	0.1010	0.0083	0.0223	0.0223			
Laboratory TE	DUP-S-1	4/12/2011	0.1090	0.1060	0.1480	0.0582	0.1110	0.0228	0.0643	0.1			
Laboratory TE			0.1090	0.1060	0.1480	0.0582	0.1110	0.0228	0.0643	0.2			

Notes:

Soils = Test below ground surfaces

mg/kg = milligrams per kilogram

MDL = Method Detection Limit

TEF = Toxic Equivalency Factor used to convert specific PAHs to benzo(a)pyrene equivalents

TE = Toxic Equivalents

PAHs = Polycyclic aromatic hydrocarbons

Steepling indicates that the concentration exceeds the Chapter 62-777 F.A.C. SCTL

Solid indicates concentration exceeds the Method Detection Limit (MDL)

SCTL = Soil Cleanup Target Level

= Site concentrations for carcinogenic polycyclic aromatic hydrocarbons must be converted to benzo(a)pyrene.

Total carcinogenic PAHs = Sum of the TE concentrations of carcinogenic PAH parameters compared to the appropriate direct exposure SCTL for benzo(a)pyrene using the approach described in the February 2005 Final Technical Report: Development of Cleanup Target Levels For Chapter 62-777.

Notes:

TE = Total polycyclic aromatic hydrocarbons

mg/kg = milligrams per kilogram

TEF = Toxic Equivalency Factor

TEF = Toxic Equivalency Factor used to convert specific PAHs to benzo(a)pyrene equivalents

TE = Toxic Equivalents

PAHs = Polycyclic aromatic hydrocarbons

Staging indicates that this concentration exceeds the Method Detection Limit (MDL)

Soil indicates concentration exceeds the Method Detection Limit (MDL)

Soil = Soil Cleanup Target Level

Soil = Site concentrations for carcinogenic polycyclic aromatic hydrocarbons must be converted to benzo(a)pyrene

Total carcinogenic PAHs = Sum of the TE concentrations of carcinogenic PAHs compared to the appropriate direct exposure SCTL for benzo(a)pyrene using the approach described in the February 2005 Final Technical Report Development of Cleanup Target Levels for Chapter 62-772

To Calculate:

If the value is greater than the MDL and is not estimated, then use the stated value.

U = The reported value is between the laboratory MDL and the laboratory practical quantitation limit (PQL), use full value.

M = Compound was detected at a concentration equal to or higher than the MDL but lower than the PQL and it is not estimated, use 1/2 the value.

If the value is greater than the PQL and is not estimated, then use the stated value.

If the value is greater than the PQL and is not estimated, then use the stated value.

If the value is greater than the PQL and is not estimated, then use the stated value.

If the value is greater than the PQL and is not estimated, then use the stated value.

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If the value is greater than the PQL and is not estimated, then use the stated value.

If the value is greater than the PQL and is not estimated, then use the stated value.

If the value is greater than the PQL and is not estimated, then use the stated value.

If the value is greater than the PQL and is not estimated, then use the stated value.

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TABLE 4
SOIL ANALYTICAL SUMMARY - TRPH SPECIATION RESULTS

Liquid Environmental Solutions
1640 Tallyrand Avenue
Jacksonville, Florida

Sample Identification	Date Collected	Sample Depth (ft bgs)	Petroroleum Hydrocarbon Fractions					
			Aromatics		Aliphatics			
			C ₉ -C ₁₀ (mg/kg)	C ₁₁ -C ₂₂ (mg/kg)	C ₅ -C ₈ (mg/kg)	C ₉ -C ₁₂ (mg/kg)	C ₁₃ -C ₁₈ (mg/kg)	C ₁₉ -C ₃₆ (mg/kg)
Residential Direct Exposure SCTL			560	1,800	7,100	1,700	2,900	42,000
Commercial/Industrial Direct Exposure SCTL			3,400	15,000	38,000	11,000	21,000	280,000
Leachability Based on Groundwater SCTL			380	1,000	960	31,000	140,000	*
SB-1-2	4/12/2011	0.5 - 2.0	1 U	30 U	5 U	5 U	30 U	30 U
SB-2-1	4/12/2011	0.0 - 0.5	792	2,400	126	1,025	2,388	310
SB-2-2	4/12/2011	0.5 - 2.0	491	2,758	38.4	643	3,662	125
SB-7-1	4/12/2011	0.0 - 0.5	1 U	61.3	5 U	5 U	30 U	30 U

Notes:

SCTL = soil cleanup target level as specified in Chapter 62-777 FAC

ft bgs = feet below ground surface

mg/kg = milligrams per kilogram

* = Not a health concern for this exposure scenario.

NA = Constituent not analyzed for

U = Indicates the compound was analyzed for but not detected at a concentration greater than the shown method detection limit (MDL).

I = The reported value is between the laboratory MDL and the laboratory practical quantitation limit (PQL).

Bold font indicates the constituent concentration was detected above the SCTL.

Checked by: KAB
Reviewed by: JPO

July 2011

103-82514

**TABLE 6
WELL CONSTRUCTION SUMMARY**

Liquid Environmental Solutions
1640 Talleyrand Avenue
Jacksonville, Florida

Well Number	Date Installed	Installation Method	Top of Casing Elevation	A/G Riser Length, if Applicable	Total Well Depth (feet)	Screened Interval (fbgs)	Well Diameter (inches)	Lithology of Screened Interval
MW-1	2/9/1	Unknown	11.05	NM	20	10-20*	2	Unknown
MW-2	2/9/1	Unknown	8.28	NM	20	10-20*	2	Unknown
PZ-1	3/5/2010	HA	10.81	NM	10	5-10	1	Fine Sand
PZ-2	4/12/2011	DPT	10.19	NM	15	4-14	1	Fine Sand
PZ-3	4/12/2011	DPT	9.73	NM	15	4-14	1	Fine Sand
SB-4	4/12/2011	DPT	9.29	NM	15	4-14	1	Fine Sand
SB-5	4/12/2011	DPT	9.36	NM	15	4-14	1	Fine Sand
SB-6	4/12/2011	DPT	9.37	NM	15	4-14	1	Fine Sand
SB-7	4/12/2011	DPT	9.49	NM	15	4-14	1	Fine Sand

Notes:

fbgs = Feet Below Ground Surface

NS = Not Surveyed

*Assumed

DPT = Direct Push Technology

HA = Hand Auger

NM = not measured

Checked by: KAB
Reviewed by: JPO

TABLE 6
GROUNDWATER ELEVATION SUMMARY

Liquid Environmental Solutions
1640 Talleyrand Avenue
Jacksonville, Florida

Well ID	TOC Elevation (ft NGVD)	4/12/2011	
		Groundwater Level (ft BTOC)	Groundwater Elevation (ft)
PZ-1	10.81	7.01	3.80
PZ-2	10.19	6.43	3.76
PZ-3	9.73	6.43	3.30
MW-1	11.05	7.38	3.67
MW-2	8.28	5.35	2.93
SB-4	9.29	6.55	2.74
SB-5	9.36	6.61	2.75
SB-6	9.37	6.59	2.78
SB-7	9.49	6.45	3.04

Notes:
ft = Elevation in feet above arbitrary datum at site
ft BTOC = feet below top of casing
NI = Not installed
NM = Not Measured
TOC = Top of Casing

Checked by: KAB
Reviewed by: JPO

TABLE 7
GROUNDWATER ANALYTICAL SUMMARY - INORGANIC CONSTITUENTS

Liquid Environmental Solutions
1640 Talleyrand Avenue
Jacksonville, Florida

Sample Location	Sample Date	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
GCTL		10	2,000	5	100	15	2	50	100
	NADC	100	20,000	50	1,000	150	20	5,000	1,000
MW-1	4/13/2011	5.3 I	140	0.50 U	2.6 I	5.0 U	0.10 U	7.5 U	2.5 U
	4/13/2011	13	43	0.50 U	2.6 I	5.0 U	0.10 U	7.5 U	2.5 U
SB-4-GW	4/13/2011	51	340	0.50 U	2.6 I	5.0 U	0.10 U	7.5 U	2.5 U
	4/13/2011	46	290	0.50 U	2.6 I	5.0 U	0.10 U	7.5 U	2.5 U
SB-6-GW	4/13/2011	14	140	0.50 U	2.6 I	5.0 U	0.10 U	7.5 U	2.5 U
	4/13/2011	110	100	0.50 U	2.6 I	5.0 U	0.10 U	7.5 U	2.5 U
DUP-1-GW	4/13/2011	52	340	0.50 U	2.6 I	5.0 U	0.10 U	7.5 U	2.5 U

Notes:

GCTL = Groundwater Cleanup Target Level

NADC = Natural Attenuation Default Concentration

Bold = Concentration is greater than GCTL

U = Indicates the compound was analyzed for but not detected at a concentration greater than the shown method detection limit (MDL).

I = The reported value is between the laboratory MDL and the laboratory practical quantitation limit (PQL).

Analytical Results = Micrograms per liter.

Checked by: KAB
Reviewed by: JPO

May 2011

083-82686.09

TABLE 6
GROUNDWATER ANALYTICAL SUMMARY - ORGANIC CONSTITUENTS

Liquid Environmental Solutions
1649 Talleyrand Avenue
Jacksonville, Florida

Sample Location	Sample Date	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	Naphthalene	1-Methyl-Naphthalene	2-Methyl-Naphthalene	Acenaphthylene	Acenaphthene	Florida PRO-TRPH
GCTL		1	40	30	20	20	14	26	26	210	20	5
NADC		100	400	300	200	200	140	280	280	2,100	200	50
MW-1	4/13/2011	0.50 U	0.50 U	0.50 U	0.50 U	2	0.078 U	0.088 U	0.059 U	0.049 U	0.029 U	0.56 U
MW-2	4/13/2011	0.50 U	0.50 U	0.50 U	0.50 U	2.4	0.076 U	0.086 U	0.057 U	0.048 U	0.029 U	0.056 U
SB-4-GW	4/13/2011	0.50 U	0.50 U	0.50 U	0.50 U	19.9	0.077 U	0.086 U	0.141	0.221	1.2	0.88
SB-5-GW	4/13/2011	0.50 U	0.50 U	0.50 U	6.8	74.3	0.078 U	0.088 U	0.059 U	0.049 U	0.321	0.38
SB-6-GW	4/13/2011	0.50 U	0.50 U	0.50 U	0.50 U	60.1	0.076 U	0.085 U	0.057 U	0.047 U	0.028 U	0.057 U
SB-7-GW	4/13/2011	0.50 U	0.50 U	0.50 U	0.50 U	32.7	0.076 U	0.086 U	0.057 U	0.048 U	0.029 U	0.056 U
DUP-1-GW	4/13/2011	0.50 U	0.50 U	0.50 U	0.50 U	19	0.0941	0.086 U	0.057 U	0.281	1.5	0.62

Notes:

TRPH = Total Recoverable Petroleum Hydrocarbon

MTBE = Methyl tert-butyl ether

NS = Not sampled

NA = Constituent not analyzed for

U = Indicates the compound was analyzed for but not detected at a concentration greater than the shown method detection limit (MDL).

I = The reported value is between the laboratory MDL and the laboratory practical quantitation limit (PQL).

Analytical Results = Micograms per liter except for TRPH, which is measured in milligrams per liter.

Duplicate sample collected at SB-4 location.

GCTL = Groundwater Cleanup Target Level

NADC = Natural Attenuation Default Concentration

Bold = Concentration is greater than GCTL

Checked by: KAB
Reviewed by: JPO

FIGURES

SEVENTH STREET

PZ-1

LEGEND

- PROPERTY BOUNDARY
- FENCE LINE
- TANK ID NO.
- RCRA TANKS FOR CLOSURE
- SOLID WASTE MANAGEMENT UNIT (SWMU)
- PRIVATE PROPERTY - INACCESSIBLE
- EXISTING MOUNTING WELL LOCATION
- TEMPORARY PIEZOMETER LOCATION
- SCA BORING LOCATION FOR RCRA CLOSURE
- SOIL BORING AND MOUNTING WELL LOCATION FOR RCRA CLOSURE

NOTES

- 1) SWMU 3A - RACK #1
- 2) SWMU 3C - RACK #3
- 3) SWMU 4 - BARGE TANKS
- 4) SWMU 15F - TENTATIVE CONTAMINANT ENCLOSURES MOST OF THE FACILITY
- 5) SWMU 21 - UNDERGROUND OIL / WASTEWATER PIPELINE SYSTEM THROUGHOUT THE FACILITY

REFERENCES

1) BASE MAP: MATTIAR & ASSOCIATES, INC. INDUSTRIAL WATER SERVICES, INC. USED OIL PROCESSING FACILITY PERMIT CLOSURE PLAN - SITE PLAN ATTACHMENT C.A. DATED AUGUST 2002.

SITE MAP WITH SAMPLING LOCATIONS

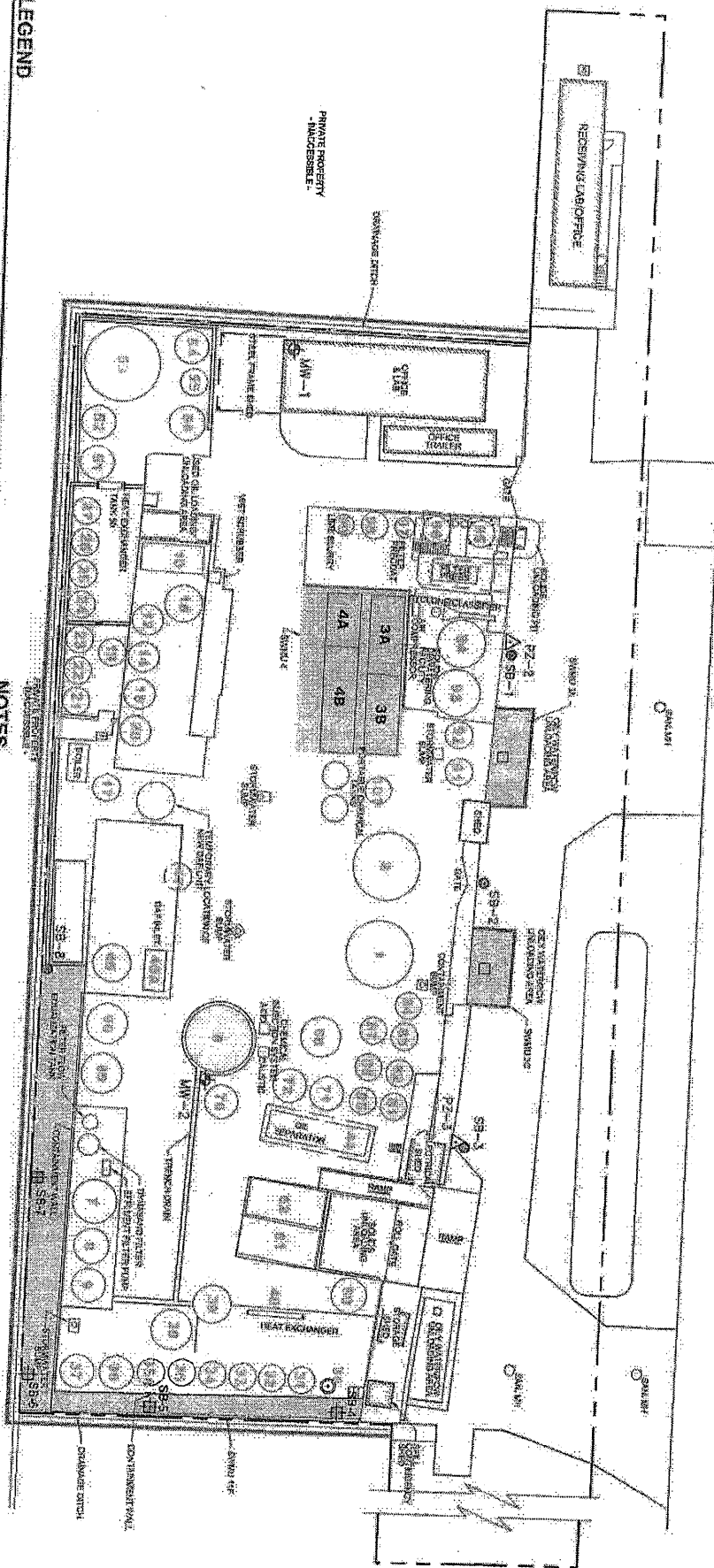
LIQUID ENVIRONMENTAL SOLUTIONS

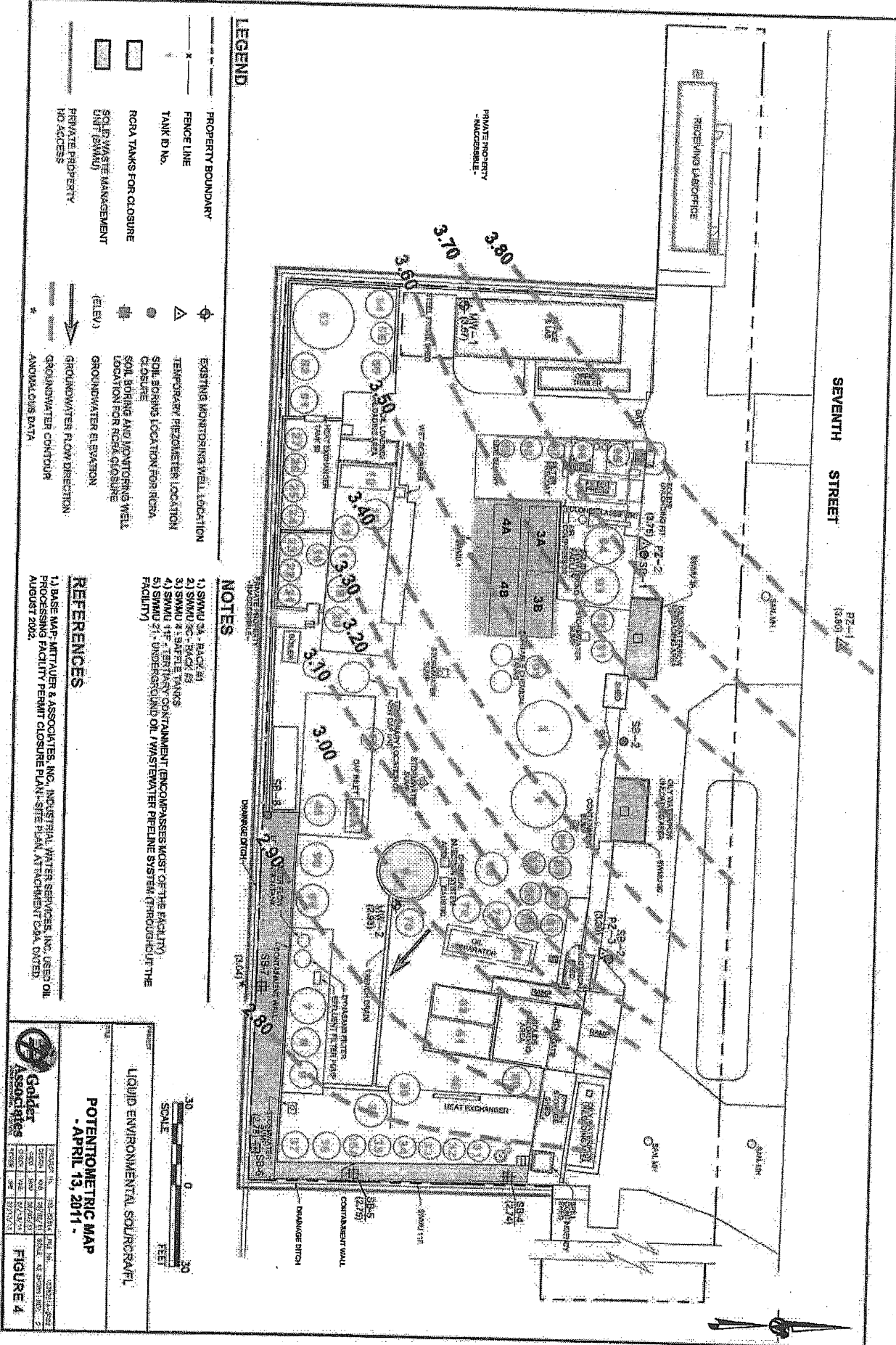
SCALE: 1" = 30' FEET

Goldier Associates

NO.	DATE	DESCRIPTION	BY	CHKD.
1	10/20/01	REVISED
2	11/15/01	REVISED
3	12/15/01	REVISED

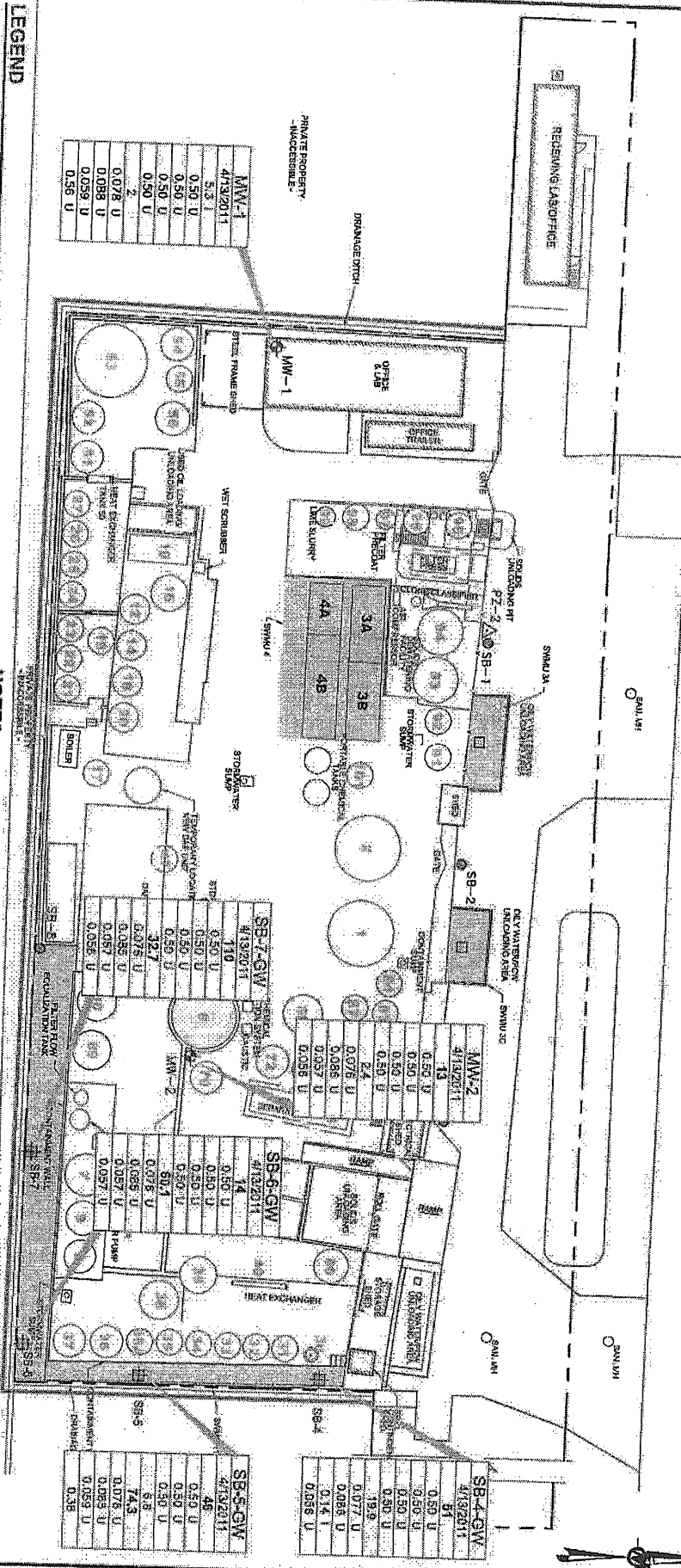
FIGURE 2





SEVENTH STREET

PZ-1



LEGEND

- PROPERTY BOUNDARY
- FENCE LINE
- TANK ID NO.
- RCCA TANKS FOR CLOSURE
- SOLID WASTE MANAGEMENT UNIT (SMWU)
- PRIVATE PROPERTY NO ACCESS
- EXISTING MONITORING WELL LOCATION
- TEMPORARY PIEZOMETER LOCATION
- SOIL BORING LOCATION FOR RCCA CLOSURE
- SOIL BORING AND MONITORING WELL LOCATION FOR RCCA CLOSURE

REFERENCES

1. BASE MAP: HATHAWAY & ASSOCIATES, INC., INDUSTRIAL WATER SERVICES, INC., USED FOR PROCESSING FACILITY PERMIT CLOSURE PLAN, SITE PLAN, ATTACHMENT C-6A, DATED AUGUST, 2002.

NOTES

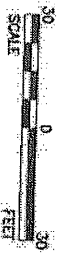
1. ANALYTICAL RESULTS SHOWN IN MICROGRAMS PER LITER (UG/L) EXCEPT THOSE WHICH ARE SHOWN IN MILLIGRAMS PER LITER (MG/L). RESULTS SHOWN IN BOLD EXCEED THE GOAL.

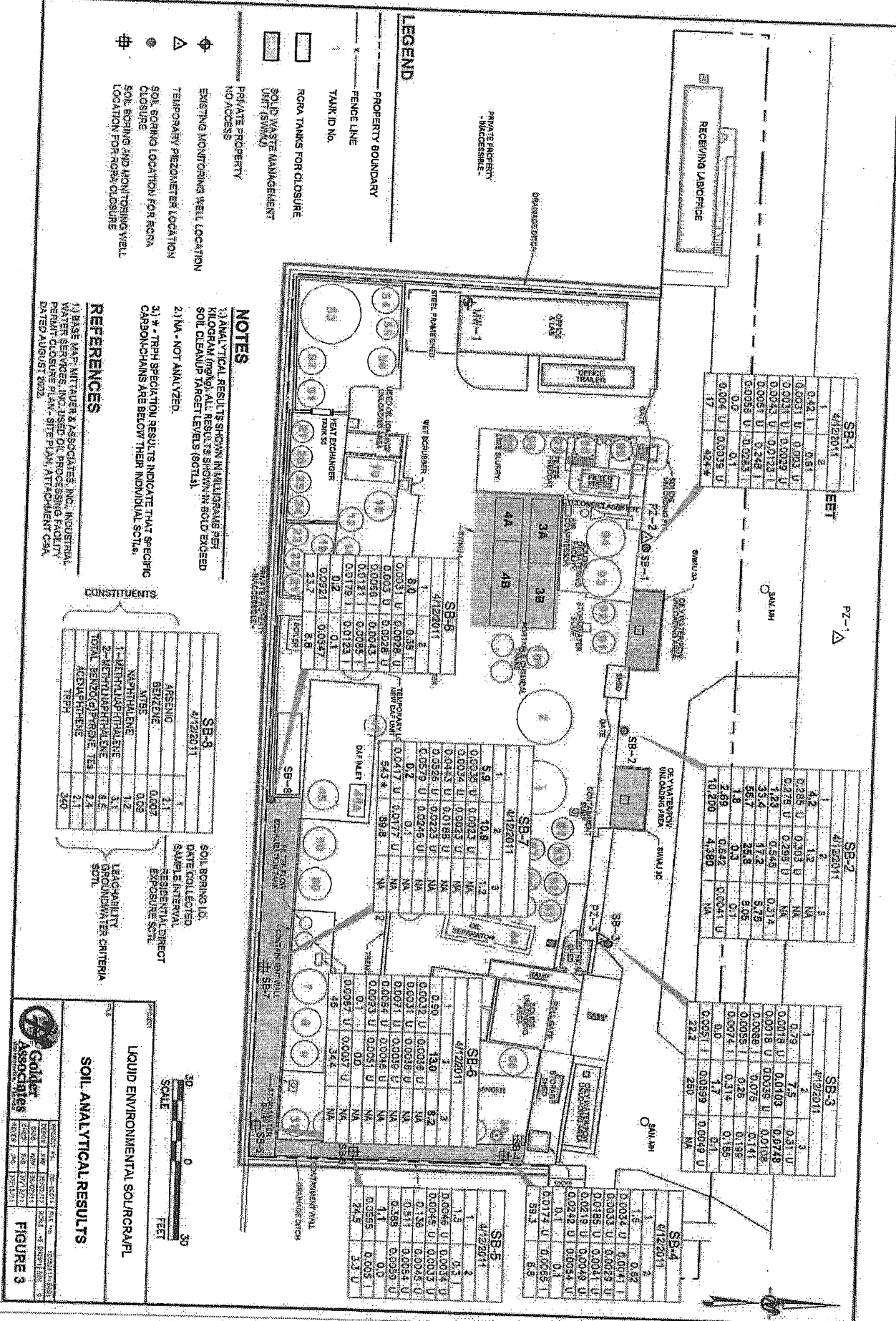
CONSTITUENTS

CONSTITUENT	SB-7-GW	DATE COLLECTED
ARSENIC	10	4/13/2011
BENZENE	1	
TOLUENE	40	
ETHYLENEGLYCOL	30	
TOTAL XYLENES	20	
WATER	20	
WATERPHASE	25	
1-METHYLWATERPHASE	25	
2-METHYLWATERPHASE	25	
TRICH	5	

GROUNDWATER ANALYTICAL RESULTS

FIGURE 5
<p>Goldier Associates</p> <p>Project No. 10382514 Date Rec'd. 10/26/2010</p> <p>Client: HATHAWAY & ASSOCIATES, INC.</p> <p>Analyst: J. B. BROWN</p> <p>Check: J. B. BROWN</p> <p>Scale: 1:1000</p>





APPENDIX C

**Proposed Supplemental Site Assessment Plan
Former Industrial Water Services
1640 Talleyrand Avenue
Jacksonville, Florida**

TERRA-COM Environmental Consulting, Inc. (TERRA-COM) is pleased to submit, on behalf of Industrial Water Services, Inc., ("IWS"), this Supplemental Site Assessment Plan for the property located at 1640 Talleyrand Avenue, Jacksonville, Florida (the "Property"). This Plan includes the level of effort necessary to determine current soil and groundwater conditions for contaminants previously identified in the July 13, 2011 Resource Conservation and Recovery Act Aboveground Storage Tank Closure and Confirmatory Sampling Report prepared by Golder Associates (2011 Report) (**Appendix A**). The work will be conducted in accordance with the applicable portions set forth in Chapter 62-780, Florida Administrative Code (F.A.C.).

GENERAL PLAN OBJECTIVES

The goal of this Plan is to determine current soil and groundwater conditions for contaminants previously identified in the 2011 Report. The work will be conducted in accordance with the applicable portions set forth in Chapter 62-780, Florida Administrative Code (F.A.C.). All field activities will be conducted in accordance with the FDEP Standard Operating Procedures (SOP) for Field Activities (FDEP-SOP-001/01).

Confirmatory Groundwater Assessment

Four new permanent monitoring wells will be installed along the eastern and southern boundaries of the Property at locations shown on the attached figure. These wells will be installed via hollow stem auger (HSA) drilling methods and will be constructed of 2-inch PVC to a total depth of 12 feet with 10 feet of PVC standard 0.01-inch slotted screen. The borehole annulus will be filled to a minimum of six to twelve inches above the screen with a medium-grained (20/30 grade) silica sand pack. A minimum of six to twelve inches of fine silica sand seal (30/65 Grade) will be placed above the sand pack, followed by a neat cement grout to the surface. All wells will be completed inside 8-inch diameter steel manholes with bolt down lids, set slightly above grade (for proper drainage) in concrete pads. Following installation, each well will be properly developed and secured with a locking cap. At least 24 hours after installation the groundwater in the wells will be sampled for analysis by EPA Methods 8260B (BTEX + MTBE) and 6010E (Arsenic only). Samples will be properly preserved, packed on wet ice, and shipped to Alpha Analytics Inc. (Alpha) located in Orlando, Florida.

Confirmatory Soil Assessment

TERRA-COM believes, based on extensive experience in this area, that the Arsenic reported present in both the soil and groundwater in the 2011 Report is either naturally occurring and/or anthropogenic. Soil samples will be taken during installation of the new monitoring wells at a depth of 1, 2 and 3 ft-bls for analysis by EPA Method 6010E (Arsenic only). Analytical results from these borings, combined with historical soil analytical data from the 2011 Report, should provide adequate resolution regarding the origin of the Arsenic reported present on site.

Supplemental Site Assessment Report(SSAR)

Upon completion of the proposed field work and receipt of the laboratory analytical results, TERRA-COM will submit the SSAR providing a detailed evaluation of the results from this scope of work integrated with historical data from the 2011 Golder report. This report will include conclusions and recommendations regarding additional work that may be required to satisfy assessment requirements of Chapter 62-780, F.A.C., evaluation of options for conditional closure, and or remedial action.