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Clayton
ENVIRONMENTAL
CONSULTANTS

# Subsurface Investigation
# at
# Ballena Isle Marina
# 1150 Ballena Boulevard
# Alameda, California

Clayton Project No. 57787.00
December 20, 1994

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## 1.0 INTRODUCTION

Ballena Isle Marina retained Clayton Environmental Consultants, Inc. to prepare a work plan and conduct a limited subsurface investigation at the Ballena Isle Marina facility located at 1150 Ballena Boulevard in Alameda, California. The purpose of the work plan and the investigation was to monitor the groundwater for presence of petroleum hydrocarbons near the former underground storage tank (UST) location at the site.

The subject facility is located on an artificial island in a commercial area of the City of Alameda (Figure 1). The site is currently used as a yacht harbor by Ballena Isle Marina.

A waste oil underground storage tank (UST) was located under the sidewalk, approximately 30 feet from the San Francisco Bay shoreline. A site diagram showing the tank location is included in Figure 2.

## 1.1 BACKGROUND

In September 1991 a 250-gallon waste oil UST was removed from the subject facility by the owner of the site. The soil around the tank appeared to be impacted with petroleum hydrocarbons. One soil sample was collected from the excavation pit and transported to Trace Analysis Laboratory (TAL). The soil sample was analyzed using the following methods:

- Department of Health Services (DHS) Method for total petroleum hydrocarbons as gasoline (TPH-G)
- DHS Method for total petroleum hydrocarbons as diesel (TPH-D)
- United States Environmental Protection Agency (USEPA) Method 8020 for benzene, toluene, ethylbenzene, and xylenes (BTEX)
- USEPA Method 8010 for chlorinated hydrocarbons
- Standard Method (SM) 5520 for total oil and grease (TOG)
- USEPA 7000 series Methods for cadmium, chromium, lead, nickel, and zinc (Metals)

Analytical results of the soil samples collected from the excavation pit identified TPH-G, TPH-D, and TOG above the analytical detection limits. Analytical results for organic compounds are summarized in Table 1.

**Table 1**

**Analytical Results for Soil Samples Collected by TAL in September 1991**
**All Concentrations in Milligrams per Kilogram (mg/kg)**

| Sample | TPH-D | TPH-G | TOG | Toluene | Ethylbenzene | Xylenes |
|---|---|---|---|---|---|---|
| 1 | 5,700 | 860 | 11,000 | 3.9 | 13 | 140 |

Subsequently, the excavation pit was overexcavated to remove petroleum hydrocarbon impacted soils. According to the ENSR Consulting and Engineering (ENSR) report dated May 21, 1992, two soil samples were collected from the overexcavated tank pit. One sample was collected from the north wall of the pit (SW-1) and the other sample was collected from the bottom of the pit (PB-1). The soil samples were analyzed for, TPH-G, TPH-D, BTEX, volatile organic compounds (VOCs), TOG, and Cadmium, chromium, and Metals.

Analytical results of the soil samples collected by ENSR identified TPH-D and TPH-G in the soil samples from the excavation pit. Analytical results for petroleum hydrocarbons are summarized in Table 2.

**Table 2**

**Analytical Results for Soil Samples Collected by ENSR in May 1992**
**All Concentrations in Milligrams per Kilogram (mg/kg)**

| Sample | TPH-D | TPH-G | TOG | Benzene | Toluene | Ethylbenzene | Xylenes |
|---|---|---|---|---|---|---|---|
| SW-1 | 2,200 | 91 | 5,300 | ND | ND | ND | 1.9 |
| PB-1 | 1,800 | 79 | 4,200 | ND | 1 | 0.84 | 9.2 |

ND = Not detected at or above the analytical detection limits

Further excavation of the contaminated soil was not possible because the excavation pit is bounded by a building foundation on the south and southwest, and utility vaults on the north.

In December 1992 Law/Crandall, Inc. drilled five soil borings and collected five samples (B-1 through B-5) from the surrounding area of the former waste oil UST. The soil samples were collected from approximately 10 feet below ground surface (bgs) and approximately 8 to 34 feet away from the excavation pit. In addition, one grab water sample was collected from hydropunch (HP-1) located approximately 8 feet northwest of the pit.

The soil and grab water samples were analyzed for TPH-G, TPH-D, BTEX, VOCs, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs) and pesticides, TOG, and Metals.

TOG was detected in the soil samples ranging from 53 mg/kg in soil sample B-5 to 110 mg/kg in soil sample B-1. The grab water sample contained a toluene concentration of 0.3 micrograms per liter (µg/L). The other analytes in the soil and grab water samples were not detected at or above the analytical detection limits.

On October 2, 1993, Hydrocarbon Consultants collected a grab water sample from the excavation pit (OP-1). Sample OP-1 was analyzed for TPH-G, TPH-D, BTEX, SVOCs, PCBs, TOG, and Metals.

Analytical results for the soil sample OP-1 are summarized in Table 3.

**Table 3**

**Analytical Results for Grab Water Sample OP-1**
**Collected by Hydrocarbon Consultant in September 1993**
**All concentrations in µg/L**

| Sample | TPH-D | TPH-G | TOG | Toluene | Ethylbenzene |
|---|---|---|---|---|---|
| OP-1 | 9,100 | 580 | 43,000 | 3.9 | 19 |

SVOCs, PCBs, and metals were not detected at concentrations at or above the analytical detection limit.

In March 1994 Clayton prepared a work plan to collect a soil sample from the excavation pit, and install a temporary monitoring well (TW-1) and collect a grab water sample. This work plan was prepared at the request of Alameda County Health Care Services (ACHCS). The work plan was approved by the ACHCS on March 17, 1994.

The soil and groundwater samples were analyzed for TPH-D, TPH-G, BTEX, and TOG. The groundwater sample was also analyzed for total dissolved solids (TDS). Analytical results identified TPH-D in the soil and groundwater samples. TPH-G and TOG were detected in the soil sample from the excavation pit. The groundwater sample did contain TPH-G, TOG, or BTEX at concentrations at or above the analytical detection limits.

In June, 1994 Clayton collected one soil and one groundwater samples to further define the extent of soil and possible groundwater contamination. To collect the groundwater samples one temporary well (TW-1) was installed near the former UST excavation pit. The well was placed in the estimated downgradient direction of the former tank location. The temporary well location is shown in Figure 2. The soil sample (SS-1) was collected from the south wall of the excavation pit at approximately 8 feet bgs. The soil sample was collected from the excavation wall to determine the extent of contamination within the pit. Before collecting the soil sample, approximately 2-feet of soil was removed by a backhoe. The soil sample was then be collected using a 2.5-inch diameter barrel hand sampler.

One soil sample (SS-1) and one groundwater sample (TW-1) were collected and transported to the state-certified laboratory. The soil and groundwater samples were analyzed for TPH-D, TPH-G, BTEX, TOG. In addition the groundwater sample was analyzed using EPA Method 160.1 for total dissolved solids (TDS).

Analytical results identified the following:

- TPH-D was detected in the soil sample at concentration of 460 milligrams per kilogram (mg/kg)

- TPH-D was detected in the groundwater sample at concentration of 260 micrograms per liter (µg/l)
- TPH-G was detected in the soil sample SS-1 at concentration of 0.3 mg/kg
- TOG was detected in the soil sample at concentration of 2,100 mg/kg.
- TPH-G and TOG were not detected in the groundwater sample
- BTEX was not detected in the soil or groundwater samples
- TDS was detected in the groundwater sample at concentration of 28,000 mg/l.

On July 19, 1994, ACHCS requested that Ballena Isle Marina prepare a work plan to install a permanent monitoring well (MW-1) and collect quarterly groundwater samples for a period of 1 year.

## 2.0 SCOPE OF WORK

The scope of work for this project was based on the work plan approved by ACHCS for additional investigative tasks for the Ballena Isle Marina site. To implement the work plan, Clayton performed the following tasks. A copy of the ACHCS approval letter is included in Appendix A.

### 2.1 TASK 1: HEALTH AND SAFETY PLAN

Before commencing the field activities Clayton prepared a health and safety plan for the work outlined in the work plan. The health and safety plan was prepared in accordance with the requirements of Title 29 of the Code of Federal Regulations, Section 1910.120 (29 CFR 1910.120) and California Occupational Safety and Health Administration (Cal/OSHA) General Industry Safety Order (GISO) 5192.

### 2.2 TASK 2: DRILLING AND MONITORING WELL INSTALLATION PERMITS

Before commencing the field activities, Clayton obtained the necessary permits from the Zone 7 Water Agency. A copy of the drilling permit is included in Appendix B.

### 2.3 TASK 3: IDENTIFICATION OF UNDERGROUND UTILITY TRENCHES

Clayton contacted Underground Service Alert (USA) to identify the utilities in the vicinity of the soil boring location. No underground utilities were identified by USA within 3 feet of the soil boring location.

### 2.4 TASK 4: MONITORING WELL INSTALLATION AND SAMPLING

Clayton installed the monitoring well MW-1 near the previous location of temporary well TW-1 to monitor the groundwater for the presence of petroleum hydrocarbons and TDS. The monitoring well location is shown in Figure 2.

During drilling of the monitoring well, Mr. Dariush Dastmalchi, Project Geologist with Clayton's San Francisco Region Office logged the soil characteristics in the field. Distinguishing features such as color, odor, and relative soil moisture content were noted. The boring log for the monitoring well MW-1 is included in Appendix C. Drilling activities were conducted in accordance with the Regional Water Quality Control Board (RWQCB) guidelines and Clayton's Drilling, Well Construction, and Sampling Protocols for Borehole/Monitoring Well Installation (Appendix D), under the supervision of a geologist registered in the State of California.

The monitoring well was drilled to an approximate depth of 20 feet (bgs). Clayton collected a soil samples at approximately 6.5 feet bgs from the monitoring well for laboratory analysis. The groundwater table was encountered at approximately 9 feet bgs. To aid in locating possible volatile contamination, Clayton screened the soil cuttings during drilling using a photoionization detector (PID). The PID did not detect volatile organic compounds.

The soil sample was collected in precleaned brass tube. The brass tube selected for analysis was sealed with aluminum foil, plastic end caps, and immediately placed in an iced cooler for shipment to Clayton's state-certified laboratory in Pleasanton, California, for analysis. Standard chain-of-custody procedures was followed for handling of soil samples.

The monitoring well was extended approximately 11 feet into the first encountered groundwater and constructed of 2-inch polyvinyl chloride (PVC) casing. Screened casing was used extending 3 feet above the water table. Solid casing was then installed to the surface. The sand pack will extend 1 foot above the screen. A 1-foot bentonite seal was placed on top of the sand pack and the well was sealed to the surface using cement grout. A locking cap secured the well in a Christie box raised above the surface grade to prevent surface runoff from entering the well head.

## 2.5 TASK 5: MONITORING WELL DEVELOPMENT AND SAMPLING

Following completion of the well, the seal in the newly installed well was allowed to set for 48 hours prior to well development. The new well was then developed to increase its yield and to prevent native material from entering the well casing. Well development is accomplished by removing finer materials from the natural formations surrounding the perforated sections of the well and sorting the sand pack to retard migration of finer materials. Development of the well can volatilize present contaminants; therefore, the well was allowed to settle for 72 hours between development and the first purging/sampling event.

A water sample from the well was collected using clean disposable bailers. Water was collected in clean laboratory supplied containers and placed immediately into an iced cooler for transport to Clayton's laboratory for analysis. One trip blank was furnished in accordance with Clayton's quality assurance/quality control (QA/QC) program. The trip blank was not analyzed, because no cross-contamination was suspected.

The water sampling field survey form is included in Appendix E.

## 2.6 TASK 6: LABORATORY ANALYSIS

One soil and one water sample were collected and transported to the state-certified laboratory. The soil and groundwater samples were analyzed for TPH-D, BTEX, TOG. In addition the groundwater sample was analyzed for TDS. Clayton's analytical reports are included in Appendix F.

## 3.0 FINDINGS AND RECOMMENDATIONS

Based on the analytical results and our field investigation our findings follow:

- TPH-D, BTEX, and TOG were not detected in the soil or groundwater samples.
- TDS was detected in the groundwater sample at concentration of 33,000 mg/l. According to the State of California Water Resources Control Board (CWRCB) Resolution No. 88-63 groundwater with TDS concentration greater than 3,000 mg/l may not be a potential source of municipal and domestic water supply. Therefore, groundwater beneath the site is not considered to be a suitable drinking water source.

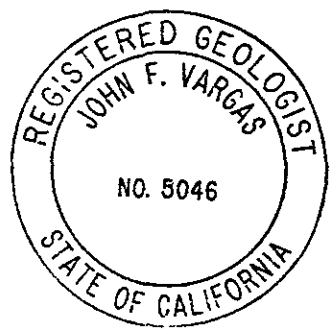
Based on our findings we recommend the following:

- Submit a copy of this report ACHCS for review.
- Collect quarterly groundwater samples from monitoring well MW-1 for period of 1 year.
- Request a case closure after completion of the fourth quarterly sampling event.

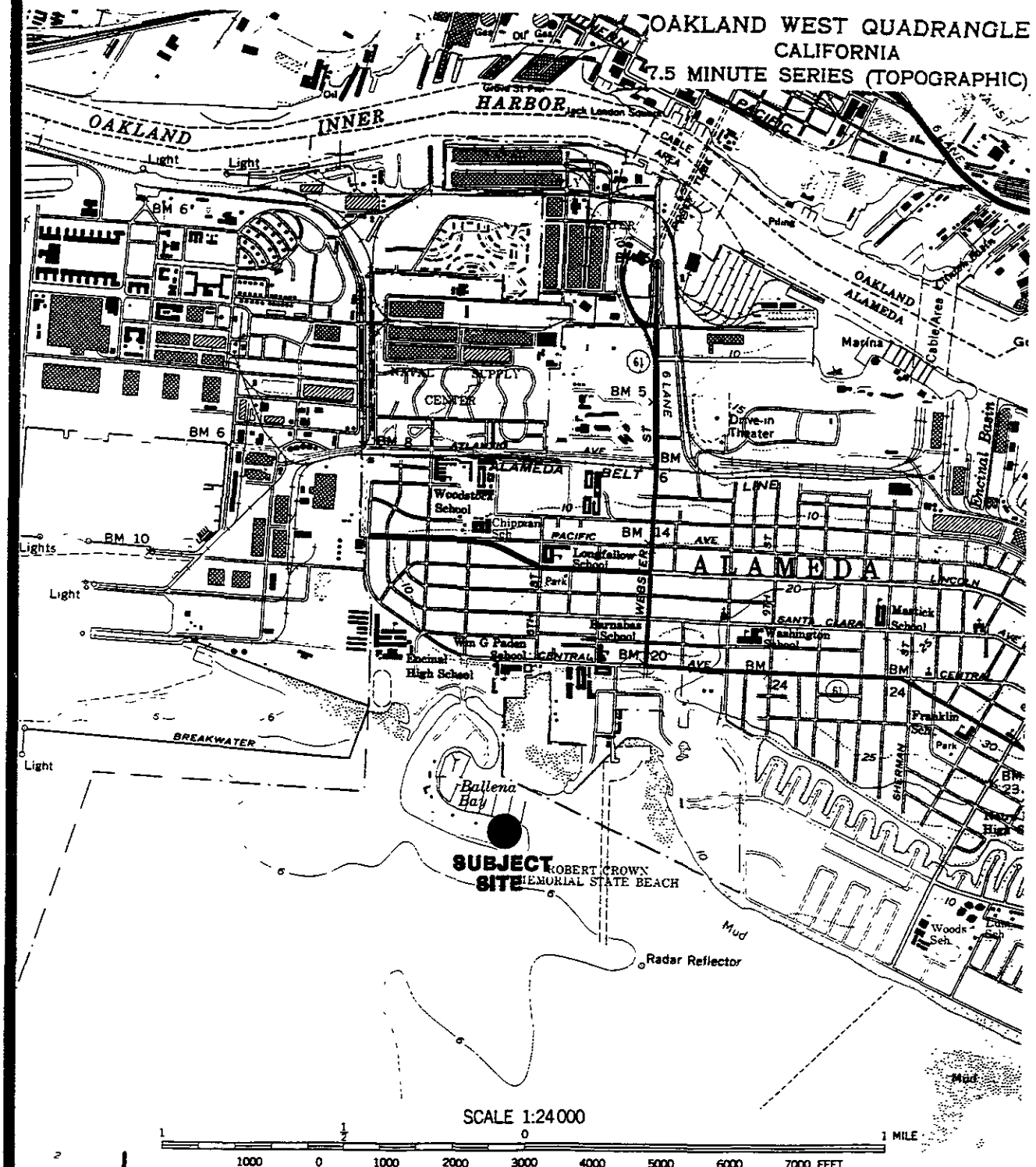
This work plan prepared by: _____
Dariush Dastmalchi
Geologist

This work plan reviewed by: _____
John F. Vargas, R.G.
Supervisor, Geosciences and Remediation
San Francisco Regional Office

December 20, 1994



# FIGURES



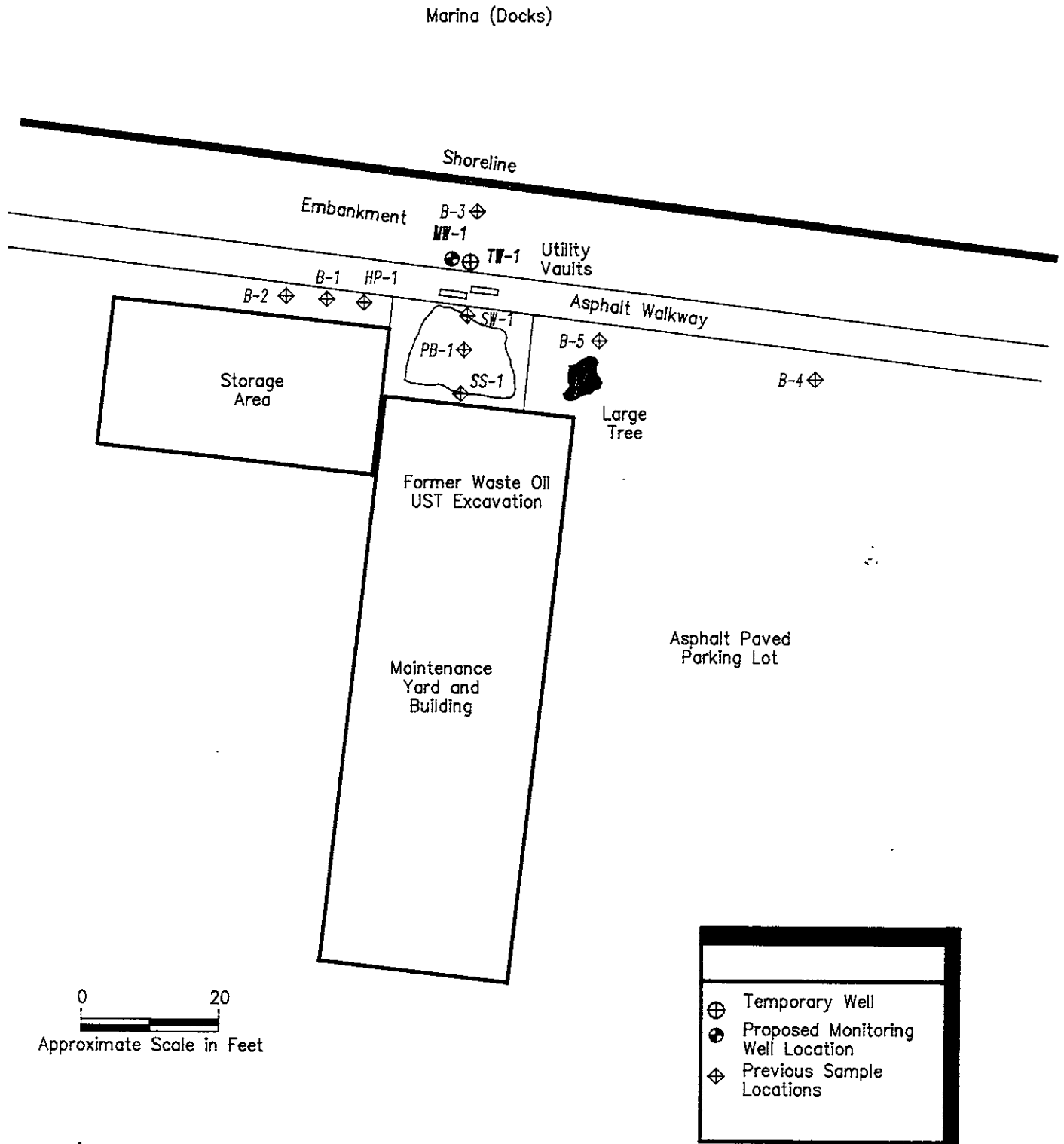

Site Location and Topographic Map
BALLENA ISLE MARINA
1150 Ballena Boulevard
Alameda, California

Clayton Project No. 57787.00

Figure 1

57798-00-16

Clayton
ENVIRONMENTAL CONSULTANTS




Monitoring Well Locations
BALLENA ISLE MARINA
1150 Ballena Boulevard
Alameda, California

Clayton Project No. 57787.00

**Figure**

57787-00-17

Clayton
ENVIRONMENTAL CONSULTANTS

# APPENDIX A

# ACHCS APPROVAL LETTER DATED SEPTEMBER 14, 1994

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

RAFAT A. SHAHID, Assistant Agency Director

DEPARTMENT OF ENVIRONMENTAL HEALTH
Hazardous Materials Division
80 Swan Way, Rm. 200
Oakland, CA 94621
(510) 271-4320

September 14, 1994

Mr. Don Anderson
Ballena Isle Marina
Ballena Bay Yacht Harbor
1150 Ballena Blvd.
Alameda, CA 94501

STID 3822

Re: Work plan for investigations at the Ballena Isle Marina Facility, located at 1150 Ballena Blvd., Alameda, CA

Dear Mr. Anderson,

This office has reviewed Clayton Environmental's work plan, dated September 8, 1994. This work plan is acceptable to this office. As proposed in the work plan, quarterly ground water monitoring shall be conducted for a minimum of four quarters out at the site. As outlined in the County's July 19, 1994 letter, "if unacceptable levels of contaminants continue to be identified from this proposed monitoring well, one of the following actions may be required:

- An ecological risk assessment - to assess the potential threat of observed contaminant levels on aquatic life.
- Remediate the remaining source of ground water contamination.

However, if contaminant concentrations attenuate to acceptable levels, the site may be considered for closure."

If you have any questions or comments, please contact me at (510) 567-6763.

Sincerely,

Juliet Shin
Hazardous Materials Specialist

cc: Dariush Dastmalchi
Clayton Environmental
P.O. Box 9019
Pleasanton, CA 94566

Edgar Howell

# APPENDIX B

# ZONE 7 WATER DISTRICT DRILLING PERMIT

# ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914


## DRILLING PERMIT APPLICATION

**FOR APPLICANT TO COMPLETE**

LOCATION OF PROJECT Ballena Isle Marina
Alameda, California

CLIENT
Name Ballena Isle Marina
Address 1150 Ballena Blvd. Voice 510-865-2257
City Alamada, CA Zip 95402

APPLICANT
Name Dariush Dastmalchi
Clayton Environmental Fax 510-4260106
Address 1252 Quarry Lane Voice 510-426-2609
City Pleasanton Zip 94566

TYPE OF PROJECT

| | | | |
|---|---|---|---|
| Well Construction | | Geotechnical Investigation | |
| Cathodic Protection | ___ | General | ___ |
| Water Supply | ___ | Contamination | ___ |
| Monitoring | XX | Well Destruction | ___ |

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger XX
Cable ___ Other ___

DRILLER'S LICENSE NO. 582696

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 20 ft.
Surface Seal Depth 4 ft. Number 2

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE 11/9/94
ESTIMATED COMPLETION DATE 11/9/94

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] Date 11/9/94

**FOR OFFICE USE**

PERMIT NUMBER 94729
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 10 Nov 94
Wyman Hong

91992

# APPENDIX C

# LITHOLOGICAL BORING LOG

# Monitoring Well No. MW-1

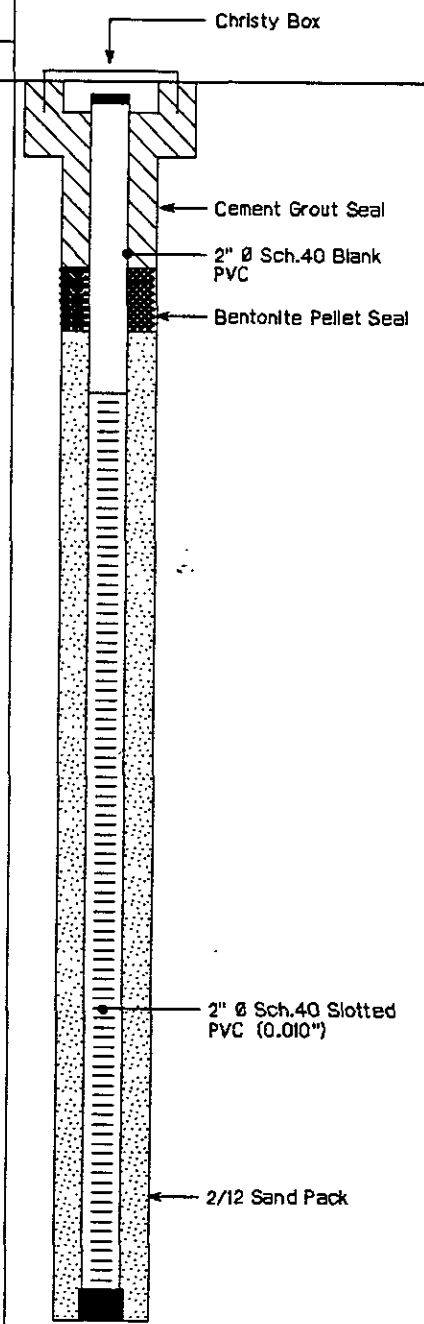
**PROJECT:** Ballena Isle Marina
**DRILL RIG:** Hollow Stem Auger
**INITIAL GW DEPTH:** ft.

**DATE:** 11/9/94
**HOLE DIA.:** 8 in.
**FINAL GW:** ft.

**LOGGED BY:** D. Dastmalchi
**SAMPLER:** Modified Cal
**HOLE ELEV.:**

| DESCRIPTION | USCS CLASS | GRAPHIC LOG | DEPTH | SAMPLE | BLOWS/FOOT |
|---|---|---|---|---|---|
| Sand, dark gray (2.5 YR, 4/4), moist, with shell fragments | SP | | 0 | | |
| Sand, dark gray (2.5 YR, 4/4) little to no fines, with shell fragments | | | 5 | | 6 |
| Saturated | | | 10 | | |
| Sand, dark gray (2.5 YR, 4/4), clayey, wet | SC | | 15 | | |
| Total Depth of Boring = 20 feet | | | 20 | | |

WELL CONSTRUCTION DETAIL




**Clayton Environmental Consultants**
1252 Quarry Lane
Pleasanton, California

*Notes:*

Project No. 57787.00

# APPENDIX D

# DRILLING, WELL CONSTRUCTION, AND SAMPLING PROTOCOLS FOR BOREHOLE/MONITORING WELL INSTALLATION

# DRILLING, WELL CONSTRUCTION, AND SAMPLING PROTOCOLS FOR BOREHOLE/MONITORING WELL INSTALLATION

## BOREHOLE INSTALLATION

Clayton Environmental Consultants, Inc. acquires the proper governmental agency permits to bore, drill, or destroy all proposed boreholes and monitoring wells that intersect with groundwater aquifers and writes a health and safety plan.

Clayton subcontracts only with drillers who possess a current C-57 water well contractor's license issued by the State of California and whose personnel have attended the OSHA 40-hour Hazardous Materials Safety Training. Prior to starting work, a "tailgate" safety meeting including discussion of the safety hazards and precautions relevant to the particular job will be held with all personnel working on the job. Well drillers are identified on permit applications.

Borings are drilled dry by hollow- or solid-stem, continuous flight augers. Augers, drill rods, and other working components of the drilling rig are steam-cleaned before arriving onsite to prevent the introduction of contaminants. These components are also steam-cleaned between borings away from boring locations. Cleaned augers, rods, and other components are stored, and/or covered when not in use.

Our bore logs include a detailed description of subsurface stratigraphy. Clayton examines the soil brought to the surface by drilling operations, and samples undisturbed soil every 5 feet or as otherwise specified. Soil cuttings are screened for hydrocarbon contamination using a photoionization detector. Boring logs are filled out in the field by a professional geologist, civil engineer, engineering geologist who is registered by the State of California, or a technician who is trained and working under the supervision of one of the previously mentioned persons, using the Unified Soil Classification System.

## SOIL SAMPLING

Soil samples are taken every 5 feet, at areas of obvious contamination, or as otherwise specified, with a California modified split-spoon sampler that is lined with three six-inch brass tubes. The sampler and rod are inserted into the borehole to the current depth and a hammer of known weight and height above the sampler are allowed to free-fall onto the rod, advancing the assembly 18 inches into undisturbed soil. Clayton uses the number of blows necessary to drive the sampler into the ground to help evaluate the consistency of materials encountered. The sampler is then pulled from the borehole and disassembled, and the three brass tubes are separated for inspection and labeling.

Clayton uses new brass liners or liners cleaned with a trisodium phosphate (TSP) solution, double rinsed with clean tap water, and air dried prior to each sampling. The sampler is also cleaned with TSP and rinsed with tap water between sampling events.

Soil samples selected for laboratory analysis are left in the brass liners, sealed with aluminum foil and plastic caps, taped for air tightness, labeled, and immediately placed into a pre-cooled ice chest chilled to less than 4°C. Labels contain the following information: site name, date and time sampled, borehole number and depth, and the sampler's initials. The samples are transported under chain-of-custody to a state-certified laboratory. The laboratory analyzes soil samples within the prescribed holding time, storing them at temperatures below 4°C at all times.

Pending results of laboratory analysis, excess drilling and sampling cuttings are placed into Department of Transportation (DOT)-approved drums, labeled with the name of the site, address, and well number, and left at the site. Uncontaminated soil may be disposed of by the client. Soil found to contain levels of contaminants above local or state action levels will require that the client dispose of it in accordance with hazardous waste regulations. At the client's request, we will assist with the disposal of contaminated soil.

## WELL CONSTRUCTION

Boreholes are converted to monitoring wells by placing 2-inch or 4-inch diameter well casing with flush-threaded joints and slotted screen into the borehole. Construction materials include polyvinyl chloride (PVC), stainless steel, or low carbon steel. The most suitable material for a particular installation will depend on the parameters to be monitored. All screens and casings used are in a contaminant-free condition when placed in the ground. No thread lubrication is used, other than teflon tape, for connecting the casing segments.

Wells extend at least 10 feet into the upper saturated zone, but do not extend through any clay layers greater than 5 feet that are below the shallow water table. The standard practice for wells installed at hydrocarbon contamination sites is to construct a well with a 20-foot long perforated interval extending 15 feet below and 5 feet above the water table in an unconfined aquifer. The top of the well is solid casing. The annular space of the borehole is backfilled with washed, kiln-dried sand to a point at least 1 foot above the slotted screen. A seal above the filter pack is formed by placing a 1- to 2-foot layer of bentonite pellets on top of the sand. The bentonite pellets are moistened by pouring clean tap water down the hole so that they can expand and seal the annulus. A neat cement grout is placed above the bentonite seal and brought to the ground surface.

Well casings are protected from surface contamination, accidental damage, and unauthorized entry or tampering with water-tight locking caps on the well casings. The caps are usually surrounded by a concrete vault. Wells are clearly identified with a metal tag or other device where the following information is recorded: well number, depth to water, depth of well, casing data including location of screened interval.

## WELL DEVELOPMENT

The well seal in newly developed wells must set up for 48 to 72 hours prior to development. Since development of the well can volatilize contaminants present, the well must also settle for at least 48 to 72 hours between development and the first purging/sampling incident.

All monitoring wells are initially developed to clean the well and stabilize sand, gravel, and disturbed aquifer materials around the screened internal perforations. Wells are developed by

pumping (or bailing) and surging until water turbidity and specific conductance stabilize. In some cases, where wells are installed in low permeability formations and the wells purge dry, the well is allowed to recover and is purged dry three times. Clean tap water is introduced into the well if it does not recover rapidly enough.

Pending results by laboratory analysis, purge water from well development and sampling is placed into DOT-approved drums, labeled with the name of the site, address, well number. and left at the site. Uncontaminated water may be disposed of by the client. Water found to contain levels of contaminants above local or state action levels requires that the client dispose of it in accordance with hazardous waste requirements. At the client's request, we can assist with the disposal of contaminated purge water.

## GROUNDWATER SAMPLING

To collect a representative sample of the groundwater, stagnant water within the well casing and filter material must be purged and fresh aquifer water allowed to replace it. The water is purged from the well by pumping or bailing at least three well volumes. Well volumes are calculated by measuring depth to groundwater to the nearest 0.01 foot upon arrival at the well before any purging has begun. Groundwater samples are collected only after purging has been of sufficient duration for pH, temperature, and electrical conductivity to stabilize. When purging low-yield wells, the wells are purged to dryness. When the well recovers to 80% of the depth measured upon arrival, samples are collected.

Field sampling logs maintained for each well include:

- Monitoring well identification
- Static water level, before and after pumping
- Well depth
- Condition of water prior to purging (e.g., amount of free product)
- Purge rate and volume
- pH, temperature, and conductivity during purging
- Time purged
- Time of sample collection
- Sampling method
- Name of sampler
- Climatic conditions

Water samples are collected using clean teflon bailers. All equipment that contacts samples is thoroughly cleaned before arrival at the site and between sampling events.

Water is collected in clean laboratory-supplied containers, labeled, placed immediately into an ice chest pre-cooled to 4°C, and transported to Clayton's laboratory for analysis. One trip blank will be furnished in accordance with our quality assurance/quality control (QA/QC) program.

All samples are collected in such a manner so as to minimize the volatilization of a sample due to agitation and/or transfer from bailer to sample container. Samples are collected so that contaminants most sensitive to volatilization are sampled first.

Preservatives are not added to any sample, unless instructed. If requested, they are supplied by Clayton's laboratory.

All sample containers are labeled in the field. Labels contain the following information: project name, sample identification number, project number, date and time of collection, and sampler's initials.

Under no circumstances are sealed sample containers opened by anyone other than the laboratory personnel who perform the requested analyses. If it is necessary for samples or sample chests to leave the immediate control of the sampler prior to delivery to the laboratory, for example during shipment by an overnight shipper, a custody seal is placed on each sample container and/or sample chest to ensure that the samples have not been tampered with during transportation. The custody seal is signed by the sampler, and the date and time that the seal was placed is recorded. The elapsed time between sample collection and delivery to the laboratory never exceeds 48 hours. Water samples are not held for more than 14 days prior to analysis and are kept at 4°C at all times.

To document and trace samples from time of collection, a signed chain-of-custody record is filled out by the sampler and accompanies the samples through the laboratory analyses. The completed chain-of-custody is included with the analytical report from the laboratory.

## REFERENCES

Groundwater Monitoring Guidelines, Revised February 1990. Alameda County District Groundwater Protection Program.

Leaking Underground Fuel Tank (LUFT) Field Manual: Guidelines for Site Assessment, Cleanup, and Underground Tank Closure, May 1988. State of California LUFT Task Force.

Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks, Revised November 1989. North Coast, San Francisco Bay, and Central Valley regions of the California State Water Quality Control Board.

Standards for the Construction and Destruction of Wells and Other Deep Excavations in Santa Clara County, Revised June 1989. Santa Clara Valley Water District.

# APPENDIX E

# WATER SAMPLING FIELD SURVEY FORM

CLAYTON ENVIRONMENTAL CONSULTANTS, INC.

WATER SAMPLING FIELD SURVEY FORM

Job # 5778100 Site: BALLENA ISLE MARINA Date: NOVEMBER 15, 1994

Well # MW-1 Sampling Team: RICHARD SILVA

Sampling Method: DISPOSABLE BAILER

Field Conditions: HEAVY RAINS, WINDY, COLD

Describe Equipment D-Con Before Sampling This Well: ~~DEDICATED~~ SUBMERSIBLE PUMP WAS WASHED WITH DETERGENT AND TRIPLE RINSED.

Total Depth of Well: 17.98 feet Time: 1017 Depth to Water Before Pumping: 8.51 feet

| Volume Height of Water Column: | | Diameter 2-inch | Diameter 4-inch | | Volume | | Purge Factor | | To Purge |
|---|---|---|---|---|---|---|---|---|---|
| 9.47 | feet * | (.16) | .65 | = | 1.52 | gal * | 4 | = | 6.08 |

Depth Purging From: 17 feet Time Surging Begins: 1030

Notes on Initial Discharge: GRAYISH, SILTY, NO ODOR

| Time | Volume Purged | pH | Conductivity | T | Notes |
|---|---|---|---|---|---|
| 1032 | 2-GAL | 8.4 | 2000+ | 19.1 | MURKY |
| 1034 | 4-GAL | 8.6 | 2000+ | 19.2 | CLEAR |
| 1036 | 6-GAL | 8.6 | 2000+ | 19.1 | CLEAR |
| 1038 | 8-GAL | 8.7 | 2000+ | 19.1 | CLEAR |
| | | | | | |
| | | | | | |

# APPENDIX F

# ANALYTICAL REPORTS

**Western Operations**

1252 Quarry Lane
P.O. Box 9019
Pleasanton, CA 94566
(510) 426-2600
Fax (510) 426-0106

**Clayton**
ENVIRONMENTAL
CONSULTANTS

November 30, 1994

Mr. Dariush Dastmalchi
CLAYTON ENVIRONMENTAL CONSULTANTS, INC.
1252 Quarry Lane
Pleasanton, CA 94566

Client Ref.: 57787.00
Clayton Project No.: 94111.81

Dear Mr. Dastmalchi:

Attached is our analytical laboratory report for the samples received on November 15, 1994. A copy of the Chain-of-Custody form acknowledging receipt of these samples is attached.

Please note that any unused portion of the samples will be disposed of after December 30, 1994, unless you have requested otherwise.

We appreciate the opportunity to be of assistance to you. If you have any questions, please contact Suzanne Haus, Client Services Supervisor, at (510) 426-2657.

Sincerely,

Harriotte A. Hurley, CIH
Director, Laboratory Services
Western Operations

HAH/caa

Attachments

Analytical Results
for
Clayton Environmental Consultants, Inc.
Client Reference: 57787.00
Clayton Project No. 94111.81

| | | | |
|---|---|---|---|
| Sample Identification: | MW-1 | Date Sampled: | 11/15/94 |
| Lab Number: | 9411181-01A | Date Received: | 11/15/94 |
| Sample Matrix/Media: | WATER | Date Prepared: | 11/17/94 |
| Preparation Method: | EPA 5030 | Date Analyzed: | 11/17/94 |
| Method Reference: | EPA 8015/8020 | Analyst: | WAS |

| Analyte | CAS # | Concentration (ug/L) | Method Detection Limit (ug/L) |
|---|---|---|---|
| BTEX/Gasoline | | | |
| Benzene | 71-43-2 | ND | 0.4 |
| Ethylbenzene | 100-41-4 | ND | 0.3 |
| Toluene | 108-88-3 | ND | 0.3 |
| o-Xylene | 95-47-6 | ND | 0.4 |
| p,m-Xylenes | -- | ND | 0.4 |
| Gasoline | -- | ND | 50 |
| Surrogates | | Recovery (%) | QC Limits (%) |
| a,a,a-Trifluorotoluene | 98-08-8 | 101 | 50 - 150 |

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Clayton Environmental Consultants, Inc.
Client Reference: 57787.00
Clayton Project No. 94111.81

| | | | |
|---|---|---|---|
| Sample Identification: | METHOD BLANK | Date Sampled: | -- |
| Lab Number: | 9411181-03A | Date Received: | -- |
| Sample Matrix/Media: | WATER | Date Prepared: | 11/17/94 |
| Preparation Method: | EPA 5030 | Date Analyzed: | 11/18/94 |
| Method Reference: | EPA 8015/8020 | Analyst: | WAS |

| Analyte | CAS # | Concentration (ug/L) | Method Detection Limit (ug/L) |
|---|---|---|---|
| BTEX/Gasoline | | | |
| Benzene | 71-43-2 | ND | 0.4 |
| Ethylbenzene | 100-41-4 | ND | 0.3 |
| Toluene | 108-88-3 | ND | 0.3 |
| o-Xylene | 95-47-6 | ND | 0.4 |
| p,m-Xylenes | -- | ND | 0.4 |
| Gasoline | -- | ND | 50 |
| Surrogates | | Recovery (%) | QC Limits (%) |
| a,a,a-Trifluorotoluene | 98-08-8 | 109 | 50 - 150 |

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Clayton Environmental Consultants, Inc.
Client Reference: 57787.00
Clayton Project No. 94111.81

Sample Identification: MW-1
Lab Number: 9411181-01
Sample Matrix/Media: WATER

Date Sampled: 11/15/94
Date Received: 11/15/94

| Analyte | Concentration | Method Detection Limit | Units | Date Prepared | Date Analyzed | Prep Method | Method Reference |
|---|---|---|---|---|---|---|---|
| Hydrocarbons | ND | 5 | mg/L | 11/22/94 | 11/23/94 | SM 5520B | SM 5520F |
| TPH-D | ND | 50 | ug/L | 11/16/94 | 11/29/94 | EPA 3510 | EPA 8015* |
| Total Dissolved Solids | 33000 | 10 | mg/L | -- | 11/21/94 | -- | EPA 160.1 |

ND: Not detected at or above limit of detection
--: Information not available or not applicable

TPH-D = Extractable petroleum hydrocarbons from C10 to C42 quantitated as diesel.
* = Modified

Analytical Results
for
Clayton Environmental Consultants, Inc.
Client Reference: 57787.00
Clayton Project No. 94111.81

Sample Identification: METHOD BLANK
Lab Number: 9411181-03
Sample Matrix/Media: WATER

Date Sampled: --
Date Received: --

| Analyte | Concentration | Method Detection Limit | Units | Date Prepared | Date Analyzed | Prep Method | Method Reference |
|---|---|---|---|---|---|---|---|
| Hydrocarbons | ND | 5 | mg/L | 11/22/94 | 11/23/94 | SM 5520B | SM 5520F |
| TPH-D | ND | 50 | ug/L | 11/16/94 | 11/19/94 | EPA 3510 | EPA 8015* |
| Total Dissolved Solids | <10 | 10 | mg/L | -- | 11/21/94 | -- | EPA 160.1 |

ND: Not detected at or above limit of detection
--: Information not available or not applicable

TPH-D = Extractable petroleum hydrocarbons from C10 to C42 quantitated as diesel.
* = Modified

# Clayton ENVIRONMENTAL CONSULTANTS

## REQUEST FOR LABORATORY ANALYTICAL SERVICES

| For Clayton Use Only | Page 1 of 1 |
|---|---|
| Project No. | |
| Batch No. 9411161 | |
| Ind. Code | W.P. |
| Date Logged In 11/15 | By |

**REPORT RESULTS TO**

Name: DARIUSH DASTMALCHI | Title:
Company: CLAYTON | Dept.:
Mailing Address:
City, State, Zip:
Telephone No.: | Telefax No.:

**SEND INVOICE TO**

Purchase Order No.: | Client Job No.: 57787.00
Name:
Company: BALLENA ISLE MARINA | Dept.:
Address:
City, State, Zip:

Date Results Req.: NORMAL TAT | Rush Charges Authorized? ☐ Yes ☐ No | Phone / Fax Results ☐ ☐

Special Instructions: (method, limit of detection, etc.)

* Explanation of Preservative: P = HCl

Samples are: (check if applicable)
☐ Drinking Water
☐ Collected in the State of New York

ANALYSIS REQUESTED
(Enter an 'X' in the box below to indicate request; Enter a 'P' if Preservative added. *)

| CLIENT SAMPLE IDENTIFICATION | DATE SAMPLED | MATRIX/ MEDIA | AIR VOLUME (specify units) | Number of Containers | TPH-G/BTEX | TDS | TPH-DIESEL | 5520-F | HOLD | FOR LAB USE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 11-15-94 | $H_2O$ | 40 MLS | 2 | XP | | | | | 01 A-B |
| | | | 250 MLS | 1 | | X | | | | 02 C |
| | | | LITER | 2 | | | XP | | | 03 D-E |
| | | | LITER | 2 | | | | XP | | 04 F-G |
| TRIP BLANKS per RS # 0100294 | | | 40 MLS | 2 | | | | | XP | 05 [illegible] |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**CHAIN OF CUSTODY**

Collected by: RICHARD SILVA (print) | Collector's Signature: Richard Silva
Relinquished by: Richard Silva | Date/Time 11-15-94/4:15pm | Received by: | Date/Time
Relinquished by: | Date/Time | Received at Lab by: Kandis L. Sims | Date/Time 11/15/94 4:15 PM
Method of Shipment: | Sample Condition Upon Receipt: ☒ Acceptable ☐ Other (explain)

Authorized by: _____ Date _____
(Client Signature Must Accompany Request)

Please return completed form and samples to one of the Clayton Environmental Consultants, Inc. labs listed below:

22345 Roethel Drive, Novi, MI 48375, (810) 344-1770
Raritan Center, 160 Fieldcrest Ave., Edison, NJ 08837, (908) 225-6040
400 Chastain Center Blvd., N.W., Suite 490, Kennesaw, GA 30144, (404) 499-7500
1252 Quarry Lane, Pleasanton, CA 94566, (510) 426-2657

2/92

DISTRIBUTION:
WHITE - Clayton Laboratory
YELLOW - Clayton Accounting
PINK - Client Retains

# Quality Assurance Results Summary

## Matrix Spike/Matrix Spike Duplicate Results

## for

## Clayton Project No. 94111.81

Quality Assurance Results Summary
for
Clayton Project No. 94111.81

Clayton Lab Number: 9411134-LCS
Ext./Prep. Method: EPA 3510
Date: 11/16/94
Analyst: MBN
Std. Source: E941109-01W
Sample Matrix/Media: WATER

Analytical Method: EPA8015
Instrument ID: 02883
Date: 11/19/94
Time: 06:38
Analyst: AMN
Units: UG/L

| Analyte | Sample Result | Spike Level | Matrix Spike Result | MS Recovery (%) | Matrix Spike Duplicate Result | MSD Recovery (%) | Average Recovery (% R) | LCL (% R) | UCL (% R) | RPD (%) | UCL (%RPD) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DIESEL | ND | 1,000 | 1,060 | 106 | 1,100 | 110 | 108 | 40 | 140 | 4.0 | 40 |

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection
LCL = Lower Control Limit
UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

Quality Assurance Results Summary
for
Clayton Project No. 94111.81

Clayton Lab Number: 9411181-01A
Ext./Prep. Method: EPA 5030
Date: 11/17/94
Analyst: WAS
Std. Source: V941111-01W
Sample Matrix/Media: WATER

Analytical Method: EPA8015 8020
Instrument ID: 05587
Date: 11/17/94
Time: 16:25
Analyst: WAS
Units: ug/L

| Analyte | | Sample Result | Spike Level | Matrix Spike Result | MS Recovery (%) | Matrix Spike Duplicate Result | MSD Recovery (%) | Average Recovery (% R) | LCL (% R) | UCL (% R) | RPD (%) | UCL (%RPD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BENZENE | (PID) | ND | 10.2 | 9.91 | 97 | 9.87 | 97 | 97 | 81 | 118 | 0.4 | 20 |
| ETHYLBENZENE | (PID) | ND | 8.57 | 8.46 | 99 | 8.51 | 99 | 99 | 81 | 114 | 0.6 | 20 |
| GASOLINE | (FID) | ND | 500 | 483 | 97 | 477 | 95 | 96 | 80 | 150 | 1.3 | 25 |
| TOLUENE | (PID) | ND | 42.4 | 40.2 | 95 | 40.9 | 96 | 96 | 84 | 118 | 1.7 | 20 |
| TOTAL XYLENE | (PID) | ND | 47.6 | 47.2 | 99 | 48.3 | 101 | 100 | 85 | 115 | 2.3 | 20 |

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection
LCL = Lower Control Limit
UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

Quality Assurance Results Summary
for
Clayton Project No. 94111.81

Clayton Lab Number: 9411181-MB
Ext./Prep. Method: SM5520BF
Date: 11/22/94
Analyst: GUD
Std. Source: E940825-01W
Sample Matrix/Media: WATER

Analytical Method: SM5520BF
Instrument ID: AE200
Date: 11/23/94
Time: 20:30
Analyst: GUD
Units: MG/L

| Analyte | Sample Result | Spike Level | Matrix Spike Result | MS Recovery (%) | Matrix Spike Duplicate Result | MSD Recovery (%) | Average Recovery (% R) | LCL (% R) | UCL (% R) | RPD (%) | UCL (%RPD) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL PETROLEUM HYDROCARBONS | ND | 20.1 | 18.0 | 89 | 17.3 | 86 | 88 | 75 | 125 | 4.0 | 25 |

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection
LCL = Lower Control Limit
UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

**Western Operations**

1252 Quarry Lane
P.O. Box 9019
Pleasanton, CA 94566
(510) 426-2600
Fax (510) 426-0106

Clayton
ENVIRONMENTAL
CONSULTANTS

November 23, 1994

Mr. Dariush Dastmalchi
CLAYTON ENVIRONMENTAL CONSULTANTS, INC.
1252 Quarry Lane
Pleasanton, CA 94566

Client Ref.: 57787.00
Clayton Project No.: 94111.16

Dear Mr. Dastmalchi:

Attached is our analytical laboratory report for the samples received on November 9, 1994. A copy of the Chain-of-Custody form acknowledging receipt of these samples is attached.

Please note that any unused portion of the samples will be disposed of after December 23, 1994, unless you have requested otherwise.

We appreciate the opportunity to be of assistance to you. If you have any questions, please contact Suzanne Haus, Client Services Supervisor, at (510) 426-2657.

Sincerely,

Harriotte A. Hurley, CIH
Director, Laboratory Services
Western Operations

HAH/tjb

Attachments

Analytical Results
for
Clayton Environmental Consultants, Inc.
Client Reference: 57787.00
Clayton Project No. 94111.16

| | | | |
|---|---|---|---|
| Sample Identification: | MW-1-6.3 | Date Sampled: | 11/09/94 |
| Lab Number: | 9411116-01A | Date Received: | 11/09/94 |
| Sample Matrix/Media: | SOIL | Date Prepared: | 11/15/94 |
| Preparation Method: | EPA 5030 | Date Analyzed: | 11/17/94 |
| Method Reference: | EPA 8020 | Analyst: | WAS |

| Analyte | CAS # | Concentration (mg/kg) | Method Detection Limit (mg/kg) |
|---|---|---|---|
| BTEX | | | |
| Benzene | 71-43-2 | ND | 0.005 |
| Ethylbenzene | 100-41-4 | ND | 0.005 |
| Toluene | 108-88-3 | ND | 0.005 |
| o-Xylene | 95-47-6 | ND | 0.005 |
| p,m-Xylenes | -- | ND | 0.005 |
| Surrogates | | Recovery (%) | QC Limits (%) |
| a,a,a-Trifluorotoluene | 98-08-8 | 93 | 50 - 150 |

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Results are reported on a wet-weight basis, as received.

Analytical Results
for
Clayton Environmental Consultants, Inc.
Client Reference: 57787.00
Clayton Project No. 94111.16

| | | | |
|---|---|---|---|
| Sample Identification: | METHOD BLANK | Date Sampled: | -- |
| Lab Number: | 9411116-02A | Date Received: | -- |
| Sample Matrix/Media: | SOIL | Date Prepared: | 11/15/94 |
| Preparation Method: | EPA 5030 | Date Analyzed: | 11/17/94 |
| Method Reference: | EPA 8020 | Analyst: | WAS |

| Analyte | CAS # | Concentration (mg/kg) | Method Detection Limit (mg/kg) |
|---|---|---|---|
| BTEX | | | |
| Benzene | 71-43-2 | ND | 0.005 |
| Ethylbenzene | 100-41-4 | ND | 0.005 |
| Toluene | 108-88-3 | ND | 0.005 |
| o-Xylene | 95-47-6 | ND | 0.005 |
| p,m-Xylenes | -- | ND | 0.005 |
| Surrogates | | Recovery (%) | QC Limits (%) |
| a,a,a-Trifluorotoluene | 98-08-8 | 104 | 50 - 150 |

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Results are reported on a wet-weight basis, as received.

Analytical Results
for
Clayton Environmental Consultants, Inc.
Client Reference: 57787.00
Clayton Project No. 94111.16

Sample Identification: See Below
Lab Number: 9411116
Sample Matrix/Media: SOIL
Extraction Method: SM 5520E
Method Reference: SM 5520F

Date Received: 11/09/94
Date Extracted: 11/14/94
Date Analyzed: 11/21/94

| Lab Number | Sample Identification | Date Sampled | Hydrocarbons (mg/kg) | Method Detection Limit (mg/kg) |
|---|---|---|---|---|
| -01 | MW-1-6.3 | 11/09/94 | ND | 50 |
| -02 | METHOD BLANK | -- | ND | 50 |

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Results are reported on a wet-weight basis, as received.

# Analytical Results
for
Clayton Environmental Consultants, Inc.
Client Reference: 57787.00
Clayton Project No. 94111.16

Sample Identification: See Below
Lab Number: 9411116
Sample Matrix/Media: SOIL
Extraction Method: EPA 3550
Method Reference: EPA 8015 (Modified)

Date Received: 11/09/94
Date Extracted: 11/14/94
Date Analyzed: 11/15/94

| Lab Number | Sample Identification | Date Sampled | TPH-D (mg/kg) | Method Detection Limit (mg/kg) |
|---|---|---|---|---|
| -01 | MW-1-6.3 | 11/09/94 | ND | 1 |
| -02 | METHOD BLANK | -- | ND | 1 |

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Results are reported on a wet-weight basis, as received.
TPH-D = Extractable petroleum hydrocarbons from C10 to C42 quantitated as diesel.

# Clayton ENVIRONMENTAL CONSULTANTS

## REQUEST FOR LABORATORY ANALYTICAL SERVICES

| For Clayton Use Only | Page 1 of 1 |
|---|---|
| Project No. | 5778.00 |
| Batch No. | 9411116 |
| Ind. Code | W.P. |
| Date Logged In 11/9/94 | By |

**REPORT RESULTS TO**

Name Darrick Deshazo | Title

Company | Dept.

Mailing Address

City, State, Zip

Telephone No. | Telefax No.

**SEND INVOICE TO**

Purchase Order No. | Client Job No.

Name

Company Ballena Gate Marina | Dept.

Address

City, State, Zip

Date Results Req.: | Rush Charges Authorized? ☐ Yes ☐ No | Phone / Fax Results ☐ ☐

Special Instructions: (method, limit of detection, etc.)

* Explanation of Preservative:

Samples are: (check if applicable)
- ☐ Drinking Water
- ☐ Collected in the State of New York

| CLIENT SAMPLE IDENTIFICATION | DATE SAMPLED | MATRIX/ MEDIA | AIR VOLUME (specify units) | Number of Containers | TPH-D | BTEX | 5520F | TOS (Carrel) | FOR LAB USE ONLY |
|---|---|---|---|---|---|---|---|---|---|
| MW-1-6.5 | 11/9/94 | Soil | 2x6" BC | 1 | ✓ | ✓ | ✓ | ✓ | 01A |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

ANALYSIS REQUESTED (Enter an 'X' in the box below to indicate request; Enter a 'P' if Preservative added. *)

**CHAIN OF CUSTODY**

Collected by: Darrick Deshazo (print) | Collector's Signature:

Relinquished by: [signature] | Date/Time 11/9/94 5:30

Received by Carol Hammerberg | Date/Time 11/9/94 5:30pm

Relinquished by: | Date/Time

Received at Lab by: | Date/Time

Method of Shipment:

Sample Condition Upon Receipt: ☒ Acceptable ☐ Other (explain)

Authorized by: _____ Date _____

(Client Signature Must Accompany Request)

Please return completed form and samples to one of the Clayton Environmental Consultants, Inc. labs listed below:

| | | | |
|---|---|---|---|
| 22345 Roethel Drive<br>Novi, MI 48375<br>(810) 344-1770 | Raritan Center<br>160 Fieldcrest Ave.<br>Edison, NJ 08837<br>(908) 225-6040 | 400 Chastain Center Blvd., N.W.<br>Suite 490<br>Kennesaw, GA 30144<br>(404) 499-7500 | 1252 Quarry Lane<br>Pleasanton, CA 94566<br>(510) 426-2657 |

2/92

DISTRIBUTION:
- WHITE - Clayton Laboratory
- YELLOW - Clayton Accounting
- PINK - Client Retains

# Quality Assurance Results Summary

## Matrix Spike/Matrix Spike Duplicate Results

## for

## Clayton Project No. 94111.16

Quality Assurance Results Summary
for
Clayton Project No. 94111.16



Clayton Lab Number: 9411120-LCS
Ext./Prep. Method: EPA3550
Date: 11/14/94
Analyst: FHK
Std. Source: E941109-01W
Sample Matrix/Media: SOIL

Analytical Method: EPA8015
Instrument ID: 02883
Date: 11/15/94
Time: 17:40
Analyst: AMN
Units: MG/KG

| Analyte | Sample Result | Spike Level | Matrix Spike Result | MS Recovery (%) | Matrix Spike Duplicate Result | MSD Recovery (%) | Average Recovery (% R) | LCL (% R) | UCL (% R) | RPD (%) | UCL (%RPD) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DIESEL | 3.20 | 25.0 | 29.5 | 105 | 29.5 | 105 | 105 | 51 | 147 | 0.0 | 30 |

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection
LCL = Lower Control Limit
UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

Quality Assurance Results Summary
for
Clayton Project No. 94111.16

| | |
|---|---|
| Clayton Lab Number: | 9411120-15A |
| Ext./Prep. Method: | EPA3550 |
| Date: | 11/14/94 |
| Analyst: | FHK |
| Std. Source: | E941109-01W |
| Sample Matrix/Media: | SOIL |

| | |
|---|---|
| Analytical Method: | EPA8015 |
| Instrument ID: | 02883 |
| Date: | 11/15/94 |
| Time: | 21:52 |
| Analyst: | AMN |
| Units: | MG/KG |

| Analyte | Sample Result | Spike Level | Matrix Spike Result | MS Recovery (%) | Matrix Spike Duplicate Result | MSD Recovery (%) | Average Recovery (% R) | LCL (% R) | UCL (% R) | RPD (%) | UCL (%RPD) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DIESEL | ND | 25.0 | 23.9 | 96 | 24.1 | 96 | 96 | 51 | 147 | 0.9 | 30 |

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection

LCL = Lower Control Limit

UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

Quality Assurance Results Summary
for
Clayton Project No. 94111.16

Clayton Lab Number: 9411057-20A
Ext./Prep. Method: EPA5030
Date: 11/15/94
Analyst: WAS
Std. Source: V941019-01W
Sample Matrix/Media: SOIL

Analytical Method: EPA8015 8020
Instrument ID: 05587
Date: 11/16/94
Time: 11:50
Analyst: WAS
Units: MG/KG

| Analyte | | Sample Result | Spike Level | Matrix Spike Result | MS Recovery (%) | Matrix Spike Duplicate Result | MSD Recovery (%) | Average Recovery (% R) | LCL (% R) | UCL (% R) | RPD (%) | UCL (%RPD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BENZENE | (PID) | ND | 0.0470 | 0.0450 | 96 | 0.0510 | 109 | 102 | 53 | 140 | 13 | 28 |
| ETHYLBENZENE | (PID) | ND | 0.0410 | 0.0470 | 115 | 0.0480 | 117 | 116 | 56 | 134 | 2.1 | 25 |
| GASOLINE | (FID) | ND | 2.50 | 3.10 | 124 | 3.00 | 120 | 122 | 41 | 164 | 3.3 | 37 |
| TOLUENE | (PID) | ND | 0.200 | 0.240 | 120 | 0.240 | 120 | 120 | 60 | 139 | 0.0 | 22 |
| TOTAL XYLENE | (PID) | ND | 0.230 | 0.270 | 117 | 0.270 | 117 | 117 | 61 | 129 | 0.0 | 26 |

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection
LCL = Lower Control Limit
UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

Quality Assurance Results Summary
for
Clayton Project No. 94111.16

Clayton Lab Number: 9411057-20A
Ext./Prep. Method: SM5520E
Date: 11/11/94
Analyst: HYT
Std. Source: E940825-01W
Sample Matrix/Media: SOIL

Analytical Method: SM5520EF
Instrument ID: AE200
Date: 11/21/94
Time: 13:00
Analyst: GUD
Units: MG/KG

| Analyte | Sample Result | Spike Level | Matrix Spike Result | MS Recovery (%) | Matrix Spike Duplicate Result | MSD Recovery (%) | Average Recovery (% R) | LCL (% R) | UCL (% R) | RPD (%) | UCL (%RPD) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL PETROLEUM HYDROCARBONS | 30.0 | 1,010 | 820 | 78 | 900 | 86 | 82 | 73 | 103 | 9.3 | 25 |

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection
LCL = Lower Control Limit
UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.