



October 30, 2009

Mr. Grant Lidren
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

Supplemental Release Investigation Report
Anchorage Beverage Plant
The Odom Corporation
240 West 1st Avenue, Anchorage, AK
ADEC Hazard I.D. # 24878, File No. 2100.26.174
URS Project No. 26218662

Dear Mr. Lidren:

URS Corporation (URS) has been contracted by The Odom Corporation (Odom) to conduct investigative and groundwater monitoring activities at the Anchorage Beverage Plant (site) at 240 West 1st Avenue in Anchorage, Alaska (Figure 1). This report focuses on the results of supplemental site characterization activities conducted at the former underground storage tank (UST) area along the north side of the beverage plant building. The field activities were requested by the Alaska Department of Environmental Conservation (ADEC). The activities were conducted in accordance with "*Supplemental Release Investigation Work Plan Anchorage Beverage Plant*" dated August 5, 2008 prepared by URS. The work plan was conditionally approved by ADEC on August 12, 2008.

1.0 BACKGROUND

Two USTs were located on the north side of the Anchorage Beverage Plant (ABP) building adjacent to the south side of West 1st Avenue. On July 8, 1997, the two unleaded gasoline fuel USTs, dispensers, and associated piping were removed from the site. Tank 1 was a 2,000-gallon capacity UST that was located west of the Customer Pick-up/Deliveries entrance. Tank 2 was a 1,000-gallon UST that was located approximately 100 feet east of Tank 1 on the opposite side of the Customer Pick-up entrance. Upon removal, both USTs showed no evidence of damage and little corrosion. Based on soil analytical results Tank 2 was closed by ADEC. Three soil samples for chemical analysis were collected from the Tank 1 excavation during the site assessment activities (Table 1). Analytical results indicated benzene soil contamination within the east portion of the UST excavation at a depth of approximately 5.5 feet below ground surface (bgs).

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Interim corrective action activities were conducted at the Tank 1 area. Residual petroleum hydrocarbon impacted soils could not be completely removed due to the proximity of the ABP building foundation to the south and east (Figure 2). Approximately 25 cubic yards (yd³) of petroleum hydrocarbon contaminated soil was transported off-site for thermal treatment.

A sample was also collected of water that had entered the excavation during the UST removal activities. The water within the tank excavation appeared to be either perched groundwater or storm water run-off accumulating from building roof drains located near Tank 1. The water sample (T1GW-1) was analyzed for gasoline range organics (GRO), diesel range organics (DRO), and benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds. The analytical results of the water sample indicated that concentrations of GRO, DRO and benzene exceeded their respective ADEC Cleanup Levels (Table 2).

On May 24, 2000, groundwater monitoring well MW-1 was installed at the former location of the fuel dispenser island at Tank 1 (Figure 2). Soil samples were collected from the well borehole and analyzed for GRO and BTEX compounds. The analytical results indicated benzene concentrations in soil at a depth of approximately 5.5 feet bgs were less than ADEC Cleanup Levels, suggesting petroleum hydrocarbons did not extend below the ABP building foundation to the east. On May 30, 2000, a groundwater sample was collected from MW-1 for chemical analysis. The results indicated that groundwater below the former Tank 1 UST location was impacted with petroleum hydrocarbons (Table 2). No light non-aqueous phase liquid (LNAPL) free-product was observed during the sampling activities. Analytical results from MW-1 indicated concentrations of benzene that exceeded the ADEC Cleanup Level of 0.005 milligrams per liter (mg/L).

On March 22, 2001, "Draft Release Investigation Report Anchorage Cold Storage Facilities 240 West 1st Avenue" prepared by URS was submitted to ADEC for comment and review. In a letter dated December 11, 2001, ADEC confirmed receiving a copy of the draft report and requested a copy of the Final Report and a work plan addressing further investigation to determine the extent of the release and recommendations for corrective action. At the time, Odom was also responding to ADEC requests to address soil and groundwater contamination at three other UST sites (Orca Street, Post Road, and Nelchina Street properties).

On March 27, 2002, URS collected a primary and quality assurance/quality control (QA/QC) duplicate sample from MW-1 to further assess the extent of petroleum hydrocarbons in groundwater below the site. The samples were analyzed for GRO, DRO, residual range organics (RRO), and BTEX compounds. Concentrations of DRO, RRO, toluene, ethylbenzene, and xylenes were less than their respective method reporting limits and ADEC Cleanup Levels (Table 2). Detectable



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concentrations of GRO and benzene were reported for both samples. The GRO concentrations were less than the GRO ADEC Cleanup Level of 1.3 mg/L, and the benzene concentrations exceeded the ADEC Cleanup Level.

A sample collected in July 2003 reported similar results as 2002, with GRO and benzene detections above their respective method reporting limit and a benzene concentration that exceeded the ADEC Cleanup Level (Table 2). No LNAPL free-product was observed in MW-1 during the 2002 and 2003 sampling activities.

On July 1, 2008, URS collected a primary and QA/QC blind duplicate sample from MW-1 to evaluate groundwater conditions below the site. The samples were analyzed for GRO, DRO, RRO, and BTEX compounds. Concentrations of DRO, RRO, ethylbenzene, and xylenes were less than their respective method reporting limits and ADEC Cleanup Levels (Table 2). Detectable concentrations of GRO, benzene, and toluene were reported for both samples. The GRO and toluene concentrations were less than their respective ADEC Cleanup Levels and the benzene concentrations exceeded the ADEC Cleanup Level (Table 2). No LNAPL free-product was observed in MW-1 during the July 2008 sampling activities.

In August 2008, a *"Supplemental Release Investigation Work Plan Anchorage Beverage Plant"* prepared by URS was submitted to ADEC for approval. The work plan was conditionally approved by ADEC on August 12, 2008 requesting additional soil sampling at the soil/groundwater interface. In October 2008, URS requested an extension from ADEC to conduct the Supplemental Release Investigation field activities in 2009. In an electronic message dated October 15, 2008 from Ms. Eileen Olson of ADEC, the extension was granted.

2.0 FIELD ACTIVITIES

The 2009 field activities included evaluating the nature and extent of soil contamination (if any) at the former Tank 1 UST site by advancing soil borings, installing two groundwater monitoring wells (MW-2 and MW-3), assessing whether groundwater below the site has been impacted by hydrocarbons, and evaluating the lateral extent of contamination based on chemical and physical conditions. The location of the soil borings and wells MW-2 and MW-3 are presented in Figure 3.

In accordance with 18 AAC 75 and 78, the field activities were conducted by a qualified professional staff scientist with more than 4 years of environmental site investigation experience and a Registered Professional Geologist with over 22 years of environmental site investigation,



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groundwater monitoring, and soil and groundwater remediation experience. All sampling and analysis activities were conducted as described in the Sampling and Analysis Plan (SAP) included with the approved work plan. URS prepared a site-specific health and safety plan for the planned field activities. The release investigation drilling activities were conducted under Alaska DigLine Inc. Ticket Number 2009210784.

2.1 Soil Sampling

On May 28, 2009, URS supervised the advancement of well boreholes MW-2 and MW-3, and soil borings B3 through B7 to collect soil samples for chemical analysis. Boring B3 was placed near the southwest corner of the former UST within the 1997 tank excavation area (Figure 3). Borings B4 and B7 were placed approximately 10 feet north-northeast and northwest, respectively, of the former tank excavation. Borings B5 and B6 were placed 5-feet and 10-feet, respectively, west of the former tank excavation (Figure 3). Well boring MW-2 was placed 20-feet northeast of the former tank area and well boring MW-3 was placed 17-feet northwest of the former UST location (Figure 3). URS subcontracted GeoTek Alaska of Anchorage, Alaska to advance the soil borings and install monitor wells using a track mounted, pneumatic, direct push drill rig. All drilling and sampling equipment was decontaminated using the methods described in the SAP within the conditionally approved work plan.

A URS geologist classified the soil samples according to the Unified Soil Classification System and prepared a lithologic log of each boring. Field screening headspace measurements were conducted at each sample interval to evaluate the presence of volatile organic vapors. Field screening and sample collection was conducted using methods described in the approved work plan. Following sampler retrieval at each interval, a small amount of soil was placed in a sealed Ziploc bag, warmed and disaggregated. The volatile organic vapors were then measured with a photoionization detector and recorded in parts-per-million vapor on the boring logs. The field screening results for the five soil borings and two well boreholes are presented in Table 3.

The field screening measurements were recorded on the lithologic log prepared for each soil boring. The boring logs are presented in Appendix A. Between samples, the sampler was washed in a dilute non-phosphate detergent solution (liquinox) and rinsed with distilled water. All excess soil from the sample collection activities was placed in a 55-gallon drum and stored at the site pending analytical results.

Soil samples for laboratory analysis were labeled with the sample number, project number, location, depth, and collection date. One blind duplicate sample was collected for quality assurance/quality



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control (QA/QC) purposes. Each sample was placed in the appropriate laboratory supplied container and stored in an ice chest cooled with blue ice. At least three soil samples were collected for chemical analysis from each boring and analyzed according to the applicable Alaska Methods. In accordance with the conditionally approved work plan, two of the soil samples in each borehole were collected at and just above the depth where groundwater was encountered in each boring. Groundwater was encountered at depths ranging from 13.5 to 14.5 feet bgs during the drilling activities (Appendix A).

Boring B3 samples were collected at depths of 8.5, 13, and 13.5 feet bgs. Boring B4 samples were collected at depths of 7, 13.5, and 14 feet bgs. Boring B5 samples were collected at depths of 7.5, 14, and 14.5 feet bgs. Boring B6 samples were collected at depths of 6.5, 13.5, and 14 feet bgs. Boring B7 samples were collected at depths of 7, 13.5, and 14 feet bgs. A blind duplicate was collected at the 7 feet interval in boring B7. In well boring MW-2, samples were collected at depths of 7, 14, and 14.5 feet bgs. In well boring MW-3, samples were collected at depths of 4.5, 9.5, 13.5, and 14 feet bgs. The samples were analyzed for DRO, RRO, GRO, BTEX, and inorganic metals arsenic, cadmium, chromium, and lead. The samples were handled using standard chain of custody procedures and relinquished to SGS Alaska Division analytical laboratory in Anchorage, Alaska.

2.2 Well Installation and Development

Upon reaching the total depths of the two well borings URS supervised the installation of groundwater monitoring wells MW-2 and MW-3. The wells were installed in accordance with the approved work plan and ADEC's 2008 *"Monitoring Well Design and Construction for Investigation of Contaminated Sites"*, and the methods described in the SAP. The well installation activities were conducted under Municipality of Anchorage Right-of-Way Permit number 20090390 bonded by GeoTek Alaska. The well construction diagrams are included in Appendix A. The unconfined water table aquifer was first encountered at depths ranging from 14 to 14.5 feet bgs during installation of the two wells. A semi-confined (perched) groundwater zone was encountered at 2.5 to 3 feet bgs during installation of the two wells on the north side of the abandoned Alaska Railroad spur (Figure 3).

Wells MW-2 and MW-3 were constructed with 2-inch diameter flush-threaded Schedule 40 PVC casing with a total depth of 22 feet bgs. Ten feet of 0.020-inch slotted screen was placed from 22 to 12 feet bgs and #2/16 clean Colorado silica sand filter pack material was placed around and above the well screen from 22 to 10 feet bgs. The filter pack material and riser were sealed with medium-sized bentonite chips from 10 to 1.5 feet bgs (Appendix A). The wells were completed at ground surface within a water-tight, traffic-rated well box enclosure. No physical evidence of a LNAPL associated "smear zone" was encountered during the well installation activities.



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URS developed the two wells by surging, bailing, and then pumping. Each well was developed by removing approximately 5 well volumes of groundwater and surging the well screen. General water quality parameters of pH, specific conductance, and temperature were measured throughout the development procedures and recorded on the well development logs (Appendix B). No odors, sheen or LNAPL (free product) was observed on groundwater during the well development activities. The development was completed when all water quality parameters stabilized, or after approximately 40 gallons of groundwater had been removed. Development purge water was placed in 55-gallon drums and stored on site pending analytical results.

2.3 Well Surveying

On July 7, 2009, Karabelnikoff Surveying of Anchorage, Alaska measured the top of well casing and ground surface elevations at the site. Mr. Lee Karabelnikoff is a licensed State of Alaska Professional Land Surveyor (No. 3143-S). The horizontal locations of the two new wells and one existing well (MW-1) were also measured. The well specifications and top of well casing elevations are summarized in Table 4.

2.4 Groundwater Sampling

URS collected groundwater samples for chemical analysis from the three wells (MW-1 through MW-3) on June 2, 2009. Initially the depth to groundwater in each well was measured using an electronic sounder. The sounder was decontaminated with a liquinox detergent wash and rinsed in tap water between each measurement. Groundwater levels were measured prior to commencing well purging and recorded in the field logbook.

Each of the wells was then purged using the low-flow method requested by ADEC using a peristaltic pump prior to collection of groundwater samples. General water quality parameters were measured and the water quality was inspected throughout the purging procedures and recorded on the groundwater sample logs (Appendix B). All groundwater samples were decanted into the laboratory provided sample containers. All samples were labeled with sample number, date and time of collection, project number, and location, and then stored in a cooler with blue ice. The groundwater samples were analyzed for DRO, GRO, RRO, BTEX and total inorganic metals arsenic, cadmium, chromium, lead, and zinc. The samples were managed using chain of custody procedures and relinquished to SGS Alaska Division analytical laboratory in Anchorage, Alaska. No free-product (LNAPL) was observed on groundwater during the groundwater sampling activities. Sampling purge water was placed in 55-gallon drums and stored on site pending analytical results.



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3.0 CLEANUP LEVELS

The 1997 tank removal and 2000 well installation activities identified both soil and groundwater petroleum hydrocarbon contamination from the former 2,000-galloon UST at the ABP facility. The vertical and lateral extent of benzene in soil has not been defined to the north, west and south of the former UST location. The lateral extent of benzene groundwater contamination at the site has not been defined.

3.1 Soil Cleanup Levels

As required by Title 18 of the Alaska Administrative Code (AAC), Chapter 75 *Oil and Other Hazardous Substances Pollution Control* as amended, and 18 AAC, Chapter 78 *Underground Storage Tanks Procedures Manual* as amended; the site-specific matrix score for the former Tank 1 UST site at the ABP facility is calculated in the following table using chemical and physical data gathered during the 1997 tank removal and 2000 well installation activities:

Item	Scoring Criteria	Score
Depth to Groundwater	Less than 5 feet	10
Mean Annual Precipitation	25 to 40 inches	5
Soil Type (Native)	Clean, coarse-grained soils	10
Potential Receptor	Municipal/private well within 0.5 mile	12
Volume of Contaminated Soil	25 to 100 cubic yards	5
SCORE		42

Based on the score of 42, the former Tank 1 site qualifies for the following soil cleanup levels in accordance with 18 AAC 75.341, Table A1; Part B, and 18 AAC 75.341, Table B1:

- < 50 milligrams per kilogram (mg/kg) GRO
- < 100 mg/kg DRO
- < 2,000 mg/kg RRO
- < 0.02 mg/kg benzene
- < 5.4 mg/kg toluene
- < 5.5 mg/kg ethylbenzene
- < 78 mg/kg total xylenes



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3.2 Groundwater Cleanup Levels

Based on the contaminants of concern for the site (GRO and benzene), the following groundwater cleanup levels will be applied for the former Tank 1 in accordance with 18 AAC 75.345; Table C:

- < 1.5 mg/L DRO
- < 2.2 mg/L GRO
- < 1.1 mg/L RRO
- < 0.005 mg/L benzene
- < 1.0 mg/L toluene
- < 0.7 mg/L ethylbenzene
- < 10 mg/L total xylenes

4.0 RESULTS

Soil and groundwater samples collected during the release investigation were analyzed by an ADEC approved laboratory. Blind duplicate soil and groundwater samples were collected for QA/QC purposes. All analytical data generated through implementation of this release investigation was validated by a qualified chemist, in accordance with ADEC guidelines regarding chemical data quality. Target project reporting limits for each chemical constituent and media were evaluated and presented in the QA/QC Summary in Appendix C. Five exploratory borings and two groundwater monitoring well boreholes were advanced at the site to investigate the soil conditions where a former 2,000-gallon gasoline UST and associated fuel pump dispenser were located prior to their removal in 1997. The two groundwater monitoring wells were installed to evaluate the groundwater conditions at the site.

4.1 Field Screening Results and Soil Characteristics

Headspace measurements and visual observations at depths ranging from 4.5 to 8.5 feet bgs indicated evidence of petroleum hydrocarbon soil contamination during the soil sampling activities. No physical evidence of a LNAPL associated "smear zone" was encountered during the well installation activities.

Soil characteristics noted during the advancement of the soil borings and well boreholes at the site are depicted in east-west geologic cross-section A-A' (Figure 4). The general subsurface conditions consist of up to 7-feet of brown, medium dense, sandy gravel fill with debris consisting of fragments of glass, wood timbers, and brick that is underlain by up to 3-feet of brown to dark brown, clay with



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organic peat. The peat rich clay is underlain by up to 6-feet of blue-gray, stiff, dry silty clay. The lowermost soil horizon encountered below the silty clay during the field activities was composed of dark gray to dark brown, medium dense to dense, sandy gravel interlayered with gravelly sands. A semi-confined groundwater zone was encountered at 2.5 to 3 feet bgs during installation of wells MW-2 and MW-3. Unconfined groundwater was encountered during the drilling activities at 13.5 to 14.5 feet bgs (Figure 4).

4.2 Analytical Results

URS collected soil and groundwater samples for chemical analysis during the 2009 supplemental site characterization activities at the site. The samples were analyzed by SGS Alaska Division Analytical Services of Anchorage, Alaska. Soil samples were collected from the five soil borings and two well boreholes. A groundwater sample was collected from each of the three monitoring wells. The 2009 soil analytical results are summarized in Table 5. The 2009 groundwater analytical results are summarized in Table 6. Copies of the Analytical Laboratory Reports, a QA/QC Summary, and Data Review Checklists are provided in Appendix C.

4.2.1 Soil Analytical Results

A total of 23 soil samples (22 primary, one blind duplicate) were collected and analyzed for DRO using Alaska Method (AK) 102, RRO using AK 103, GRO using AK 101, BTEX using U.S. Environmental Protection Agency (EPA) Method 8021B, and total inorganic metals arsenic, cadmium, chromium, and lead using EPA Method 6020.

The analytical results of soil samples collected from the soil borings and well boreholes indicate none of the detectable concentrations of GRO, RRO, toluene, ethylbenzene, xylenes, cadmium or lead exceeded their respective ADEC Cleanup Level (Table 5). All of the borings except B4 contained detectable benzene concentrations that exceeded the regulatory criteria. All of the samples contained concentrations of arsenic and chromium that exceeded their respective ADEC Cleanup Level. None of the samples contained concentrations of DRO above the Method Reporting Limit (MRL) however, six of the 23 samples contained a DRO Practical Quantitation Limit (PQL) that exceeded the ADEC Cleanup Level due to high moisture content of the samples (see Section 6.0 of QA/QC Summary in Appendix C).

More than 50% of the samples contained a benzene PQL that exceeded the ADEC Cleanup Level that was attributed to high moisture content of the samples (Appendix C). The high moisture content reflects the persistent light rain conditions experienced at the time of sample collection on May 28, 2009. The benzene concentrations in soil from well boreholes MW-3 and MW-2 at a depth of 14.5 feet bgs, were just slightly above the ADEC Cleanup Level of 0.02 mg/kg. The



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detectable benzene concentrations ranged from 0.0222 to 0.862 mg/kg. Arsenic concentrations ranged from 6.18 to 30.4 mg/kg. Chromium concentrations ranged from 27.9 to 63.5 mg/kg. Based on the analytical results, all of the samples were below the ADEC Soil Cleanup Levels for DRO, RRO, GRO, toluene, ethylbenzene, xylenes, cadmium and lead (Table 5). Six samples contained a DRO PQL that exceeded the ADEC Cleanup Level.

4.2.2 Groundwater Analytical Results

Groundwater samples were collected from wells MW-1 through MW-3 on June 2, 2009 and analyzed for DRO using AK 102, RRO using AK 103, GRO using AK 101, BTEX using EPA Method 8021B, and total inorganic metals arsenic, cadmium, chromium, lead, and zinc using EPA Method 6020. A blind duplicate sample was collected from well MW-1 for QA/QC purposes. Based on the analytical results, groundwater below the site contains low concentrations of GRO that were below the ADEC Cleanup Level and benzene and arsenic concentrations that exceeded the regulatory criteria (Table 6, Figure 5). None of the samples contained detectable concentrations of DRO, RRO, cadmium, chromium, lead or zinc. The benzene concentrations in the samples from the two new wells (MW-2 and MW-3) were just slightly above the ADEC Cleanup Level of 0.005 mg/L. Detectable concentrations of toluene, ethylbenzene and xylenes were only found in well MW-1. Concentrations of arsenic above the ADEC Cleanup Level were found in groundwater samples from wells MW-1 and MW-2 and were just slightly above the regulatory criteria (Table 6).

5.0 DISCUSSION OF 2009 RELEASE INVESTIGATION RESULTS

Analytical results of soil and groundwater samples collected in May and June 2009 at the UST site along the north side of the ABP building indicate that low concentrations of petroleum hydrocarbons are present in the subsurface at the site. Based on the results from the 2009 site characterization activities presented in this report, the main areas of petroleum hydrocarbon contamination in soil are in a soil horizon of gravel fill with glass, brick, and timber debris believed to be originated during cleanup of the Ship Creek basin following the 1964 earthquake. The soil samples from Boring B5 and wells MW-2 and MW-3 from a depth of 14 to 14.5 feet bgs, were the only samples to contain benzene concentrations above the ADEC Cleanup Level below the gravelly debris zone. The presence of benzene soil contamination in well boreholes MW-2 and MW-3, and no detectable petroleum hydrocarbon contaminants found in soil samples from boring B4, located between the two wells and the former UST location, suggest a potential off-site contaminant source on the north side of the abandoned Alaska Railroad Spur (Figure 3).

Benzene soil contamination in boring B5 occurred at a depth of 7.5 feet bgs and at 14.5 feet bgs. The sample collected at a depth of 14 feet bgs in boring B5 contained only concentrations of arsenic



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and chromium that exceeded the ADEC Cleanup Level, suggesting the silty clay soil horizon between the gravel debris zone and sandy gravel aquifer material, is impeding the vertical migration of benzene through soil. The lateral and vertical extent of GRO, DRO, RRO, toluene, ethylbenzene, and xylenes in soil has been defined. The lateral extent of benzene in soil has not been defined. The vertical extent of benzene in soil has been defined along the south-southwest corner of the former tank excavation, and north, northwest, and west of the former tank excavation as shown in samples from B3, B4, B7, and B6, respectively (Table 5, Figure 3).

The arsenic and chromium concentrations above the regulatory criteria in all of the soil samples were within or slightly above background concentration ranges for regional surficial soils for the Anchorage region reported by the U.S. Geological Survey in 1984 and 1988. Background arsenic concentrations range from <10 to 20 mg/kg and background chromium concentrations range from 40 to 60 mg/kg. Arsenic concentrations at the site ranged from 6.18 to 30.4 mg/kg. Chromium concentrations at the site ranged from 27.9 to 63.5 mg/kg.

The unconfined water table aquifer was first encountered at depths ranging from 13.5 to 14.5 feet bgs within a sandy gravel material. Based on depth to groundwater measurements collected at the site on June 2, 2009, the direction of groundwater flow is to the west with a gradient of 0.0025 feet per foot (Figure 5). Groundwater below the site contains low concentrations of GRO below the ADEC Cleanup Level, and benzene and arsenic concentrations that exceeded the regulatory criteria. The benzene concentrations in the new wells were just slightly above the ADEC Cleanup Level. Concentrations of arsenic in groundwater samples from wells MW-1 and MW-2 were just slightly above the regulatory criteria. The lateral and vertical extent of GRO, DRO, RRO, toluene, ethylbenzene, and xylenes in groundwater at the site has been defined. The lateral extent of benzene in groundwater has not been defined (Figure 5).

6.0 CONCEPTUAL SITE MODEL

As stated in the conditionally approved work plan, a human health conceptual site model is presented herein for the Anchorage Beverage Plant UST site. The source UST, dispenser island, and associated piping were removed from the site in 1997. Based on the site characterization activities conducted to date, petroleum hydrocarbon contaminated soil above ADEC Cleanup Levels remains at the site along the west edge of the former tank excavation. Based on groundwater analytical results presented in this report, benzene is the only site-specific contaminant of concern that exceeds the ADEC Cleanup Level.



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The purpose of the conceptual site model (CSM) is to identify potential present and future contaminant exposure pathways to people, animals, and plants. In accordance with CSM guidelines, a *Human Health Conceptual Site Model Scoping Form* and *Graphic Flow Chart* have been completed for the site and are presented in Appendix D. The primary source for contaminants at the site is in residual subsurface soil that is covered by asphalt surfacing. The primary release mechanism for contaminants to move from that soil is leaching to groundwater. Concentrations of benzene in soil and groundwater exceed ADEC Cleanup Levels (Tables 5 and 6). Free-phase product (LNAPL) has never been found on the groundwater.

6.1 Present and Future Exposure Pathways

The contaminant of concern for the site is benzene, which is a volatile compound. The area of the site where soil contamination exists in the subsurface greater than 2-feet bgs are currently covered by asphalt or concrete paving. The complete contaminant exposure pathways to people, animals, and plants at the site include incidental soil ingestion, dermal absorption of soil, ingestion of groundwater, inhalation of outdoor air, and inhalation of indoor air. The incidental soil ingestion and dermal exposure pathway would require removal of the asphalt or concrete paving during future construction activities. The ingestion of groundwater pathway would require utilization of the unconfined water table aquifer below the site.

The inhalation of outdoor air exposure pathway would require any future construction activities that remove the asphalt paving and expose contaminated material at depth. The inhalation of indoor air into the ABP building could occur if the concrete floor of the facility building developed cracks allowing upward seepage of vapors.

6.2 Contaminant Migration Routes

The current and future migration route of contaminants is through soil to groundwater. The ingestion of groundwater exposure pathway would require utilization of the groundwater below the site. Inhalation of outdoor air migration route could occur when any future construction activities expose the contaminated soil.

6.3 Potential Receptors

The current and future potential receptors (people) who could be exposed to the contaminants include commercial or industrial workers and site visitors (Appendix D). Odom has no future plans to change the current subject property land use from an industrial entity or plans to remove the



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asphalt or concrete, hence the incidental soil ingestion exposure pathway has construction workers as the only future receptor. The utilization of the groundwater below the site in the future would impact all of the receptors, and construction workers are the only future receptors of ingestion of groundwater, however the more likely exposure pathway in that occurrence would be dermal absorption. All current and future receptors of the inhalation exposure route (both outdoor and indoor air) are protected and a low risk, since no apparent inhalation exposure routes are present.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Both soil and groundwater in the vicinity of the former unleaded gasoline UST site has been impacted by petroleum hydrocarbons. Two vertical zones of soil contamination are separated by a stiff, dry, silty clay soil horizon found in all seven boreholes advanced during the release investigation. The shallow zone extends from depths of approximately 4 to 8 feet bgs and is likely attributed to the former UST and was found along the west edge of the former tank excavation. The deeper zone exists at the soil/groundwater interface at an approximate depth of 14.5 feet bgs and was found in only one boring along the west edge of the former tank excavation and within the two well boreholes that were located on the West 1st Avenue side of an abandoned Alaska Railroad spur line. A semi-confined (perched) groundwater condition was also found on the north side of the abandoned Alaska Railroad spur.

URS recommends evaluating the potential for an off-site contaminant source east of the site by adding volatile organic compounds analysis using EPA Method 8260B during the next groundwater sampling event at the site as part of an annual groundwater monitoring program.

If you have any questions regarding the supplemental site characterization activities at the Anchorage Beverage Plant facility please don't hesitate to call me at (907) 261-6736.

Sincerely,

URS Corporation

William Loskutoff, P.G.
Project Manager



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Attachments: Table 1 – Soil Analytical Results-1997 to 2000
Table 2 – Groundwater Analytical Results-2000 to 2008
Table 3 – Field Screening Results-May 2009
Table 4 – Well Specifications
Table 5 – Soil Analytical Results-2009
Table 6 – Groundwater Analytical Results-2009
Figure 1 – Location Map
Figure 2 – Site Plan
Figure 3 – 2009 Sample Locations
Figure 4 – Geologic Cross-Section A-A'
Figure 5 – Groundwater Conditions June 2009
Appendix A – Soil Boring Logs and Well Construction Diagrams
Appendix B – Well Development and Groundwater Sampling Logs
Appendix C – Analytical Laboratory Reports, QA/QC Summary, Data Checklist
Appendix D – Human Health Conceptual Site Model Scoping Form and Graphic

cc: Mr. Tim Wiepking, Odom

TABLES

TABLE 1 - SOIL ANALYTICAL RESULTS-1997 TO 2000
Anchorage Beverage Plant, 240 West 1st Avenue Anchorage, Alaska

Sample Number	Location	Collection Date	Depth in feet (bgs)	GRO	Benzene	Toluene	Ethylbenzene	Xylenes
1997 2,000-gallon unleaded gasoline UST Removal Activities								
T1S-1	Below east end of UST and fill piping	7/8/1997	5.5	21.7	0.159	0.119	0.572	1.764
T1S-2	North central edge of tank excavation	7/8/1997	5.5	<0.630	<0.0157	<0.0157	<0.0157	0.0332
T1S-3	East end of excavation below tank	7/8/1997	5.5	20.1	0.584	0.0987	0.440	1.517
2000 Well MW-1 Borehole								
MW-1	East end of UST and below dispenser island	5/24/2000	5.5	<1.89	0.0126	<0.0378	<0.0378	0.103
MW-1-Duplicate	East end of UST and below dispenser island	5/24/2000	5.5	<1.72	0.0144	<0.0343	<0.0343	0.098
ADEC Cleanup Level ²				50	0.02	5.4	5.5	78

All results are in milligrams per kilogram (mg/kg)

bgs = below ground surface

BTEX = benzene, toluene, ethylbenzene, xylenes by EPA Method 8021B.

GRO = gasoline range organics using AK 101.

MW = monitoring well

UST = underground storage tank

1) < = not detected. Detection limit shown.

na = indicates concentration exceeds Practical Quantitation Limit

na = indicates concentration exceeds ADEC Cleanup Level

2) Per 18 AAC 75.340 Tables A1 and B1

TABLE 2 - GROUNDWATER ANALYTICAL RESULTS- 2000 TO 2008
Anchorage Beverage Plant, 240 West 1st Avenue Anchorage, Alaska

Well/ Sample Number	Collection Date	GRO	DRO	RRO	Benzene	Toluene	Ethyl- benzene	Xylenes
Sample Collected During UST Removal Activities								
T1GW-1	7/9/1997	5.9	71.3	na	0.522	0.0505	0.160	0.5064
Groundwater Samples from MW-1								
MW-1	5/30/2000	0.26	na	na	0.0130	<0.0020	<0.0020	<0.0040
MW-1 Duplicate	5/30/2000	0.25	na	na	0.0125	<0.0020	<0.0020	<0.0040
2002-WFirst-GW-001	3/27/2002	0.196	<0.515	<1.03	0.00792	<0.0020	<0.0020	<0.0040
GW-001 duplicate	3/27/2002	0.203	<0.515	<1.03	0.00826	<0.0020	<0.0020	<0.0040
2003-WFirst-GW-001	7/23/2003	0.145	<0.313	<0.521	0.01060	<0.0020	<0.0020	<0.0040
MW-1	7/1/2008	0.132	<0.319	<0.532	0.00893	0.00386	<0.0020	<0.0040
MW-4 (blind duplicate)	7/1/2008	0.131	<0.317	<0.532	0.00940	0.00354	<0.0020	<0.0040
ADEC Cleanup Goals ²		1.3	1.5	1.1	0.005	1	0.7	10

All results are in milligrams per liter (mg/L)

BTEX = benzene, toluene, ethylbenzene, xylenes by EPA Method 8021B.

DRO = diesel range organics using Alaska Method (AK) 102.

GRO = gasoline range organics using AK 101.

MW = monitoring well

RRO = residual range organics using AK 103

UST = underground storage tank

1) < = not detected. Detection limit shown.

bold = indicates concentration exceeds Practical Quantitation Limit

na = not analyzed

2) Per 18 AAC 75.345 Table C, prior to revision on October 9, 2008.

TABLE 3 FIELD SCREENING RESULTS - MAY 2009
Anchorage Beverage Plant, 240 West 1st Avenue Anchorage, Alaska

Soil Boring	Sample Designation	Date Measured	Depth in feet (bgs)	PID Result (ppmv)	Analytical Sample Number
B3	3-1	5/28/2009	8 to 8.5	4.0	OCB3-1
B3	3-2	5/28/2009	12.5 to 13	0.0	OCB3-2
B3	3-3	5/28/2009	13 to 13.5	0.0	OCB3-3
B4	4-1	5/28/2009	6.6 to 7	0.5	OCB4-1
B4	4-2	5/28/2009	13 to 13.5	0.0	OCB4-2
B4	4-3	5/28/2009	13.5 to 14	0.0	OCB4-3
B5	5-1	5/28/2009	7 to 7.5	3.0	OCB5-1
B5	5-2	5/28/2009	13.5 to 14	0.0	OCB5-2
B5	5-3	5/28/2009	14 to 14.5	0.0	OCB5-3
B6	6-1	5/28/2009	6 to 6.5	4.0	OCB6-1
B6	6-2	5/28/2009	13 to 13.5	0.0	OCB6-2
B6	6-3	5/28/2009	13.5 to 14	0.0	OCB6-3
B7	7-1	5/28/2009	6.5 to 7	5.0	OCB7-1
B7	7-2	5/28/2009	7	4.0	OCB7-2
B7	7-3	5/28/2009	13 to 13.5	0.0	OCB7-3
B7	7-4	5/28/2009	13.5 to 14	0.0	OCB7-4
MW-2	MW2-1	5/28/2009	6.5 to 7	3.0	OCMW2-1
MW-2	MW2-2	5/28/2009	13.5 to 14	0.5	OCMW2-2
MW-2	MW2-3	5/28/2009	14 to 14.5	0.0	OCMW2-3
MW-3	MW3-1	5/28/2009	4 to 4.5	5.0	OCMW3-1
MW-3	MW3-2	5/28/2009	9 to 9.5	1.5	OCMW3-2
MW-3	MW3-3	5/28/2009	13 to 13.5	0.0	OCMW3-3
MW-3	MW3-4	5/28/2009	13.5 to 14	0.0	OCMW3-4

Notes:

bgs = below ground surface
 PID = photoionization detector
 ppmv = parts per million vapor

TABLE 4 - WELL SPECIFICATIONS
Anchorage Beverage Plant, 240 West 1st Avenue Anchorage, Alaska

Well Number	Date Installed	Location	Total Depth (in feet bgs)	Well Screen Interval (in feet bgs)	TOC Elevation ¹	Groundwater Elevation ²
MW-1	5/24/2000	Former dispenser island	19	9 to 19	17.77	7.83
MW-2	5/28/2009	Northeast of former UST	22	12 to 22	17.22	7.85
MW-3	5/28/2009	Northwest of former UST	22	12 to 22	17.25	7.79

bgs = below ground surface

MW = monitoring well

TOC = top of well casing

UST = underground storage tank

1) Elevation in feet above Mean Sea Level (MSL) datum [1972 National Geodetic Survey] measured by Karabelnikoff Surveying July 7, 2009.

2) Groundwater elevations based on depth to groundwater measured on June 2, 2009

TABLE 5 - SOIL ANALYTICAL RESULTS-2009
Anchorage Beverage Plant, 240 West 1st Avenue Anchorage, Alaska

Sample Number	Location	Collection Date	Depth in feet (bgs)	GRO	DRO	RRO	Ethyl-			UST Metals			
							Benzene	Toluene	Xylenes	As	Cd	Cr	Pb
Soil Borings													
OCB3-1	Soil boring B3	5/28/2009	8 to 8.5	<4.47 ¹	<122	502	0.413	<0.0894	<0.1788	<0.296	55.4	14.4	
OCB3-2		5/28/2009	12.5 to 13	<4.75	<4.7	65.7	<0.0138	<0.0551	<0.1102	<0.243	56.8	13.1	
OCB3-3		5/28/2009	13 to 13.5	<3.79	<4.7	59.2	<0.0190	<0.0759	<0.1518	<0.238	57.8	14.1	
OCB4-1	Soil boring B4	5/28/2009	6.5 to 7	<7.02	<127	880	<0.0351	<0.140	<0.280	<0.310	61.9	17.5	
OCB4-2		5/28/2009	13 to 13.5	<4.82	<25.2	177	<0.0241	<0.0965	<0.193	<0.252	58.9	13.1	
OCB4-3		5/28/2009	13.5 to 14	<4.41	<24.9	98.6	<0.0222	<0.0881	<0.1762	<0.244	60.2	13.4	
OCB5-1	Soil boring B5	5/28/2009	7 to 7.5	14.6	<123	<123	0.754	0.486	1.01	2.925	21.5	13.4	
OCB5-2		5/28/2009	13.5 to 14	<4.43	<4.7	68.8	<0.0221	<0.0885	<0.177	<0.243	58.9	13.2	
OCB5-3		5/28/2009	14 to 14.5	<7.03	<31.6	73.3	0.0358	<0.141	<0.282	<0.297	63.4	13.9	
OCB6-1	Soil boring B6	5/28/2009	6 to 6.5	20.3	<128	659	0.862	0.328	0.627	2.966	21.6	20.6	
OCB6-2		5/28/2009	13 to 13.5	<4.92	<25.3	109	<0.0246	<0.0985	<0.197	<0.244	59.1	13.5	
OCB6-3		5/28/2009	13.5 to 14	<5.20	<25.0	109	<0.0260	<0.104	<0.208	<0.247	56.7	12.9	
OCB7-1	Soil boring B7	5/28/2009	6.5 to 7	<7.92	<123	303	0.277	<0.158	<0.316	<0.298	49.7	25	
OCB7-2	Blind duplicate of 7-1	5/28/2009	7	<9.44	<29.9	572	<0.0472	<0.189	<0.378	<0.301	52.6	13.1	
OCB7-3		5/28/2009	13 to 13.5	<6.36	<25.9	118	<0.0318	<0.127	<0.254	<0.251	51.9	16.2	
OCB7-4		5/28/2009	13.5 to 14	<5.26	<25.4	61.6	<0.0263	<0.105	<0.210	<0.254	48.8	11.8	
Monitoring Well Boreholes													
OCMW3-1	Well borehole MW-3	5/28/2009	4 to 4.5	<3.82	<92.1	513	0.0288	<0.0765	0.107	0.356	31.4	102	
OCMW3-2	Well borehole MW-3	5/28/2009	9 to 9.5	<5.08	<26.1	162	<0.0254	<0.102	<0.204	<0.257	56.2	13.3	
OCMW3-3	Well borehole MW-3	5/28/2009	13 to 13.5	<4.78	<23.3	34	<0.0239	<0.0956	<0.1912	9.26	44.1	7.62	
OCMW3-4	Well borehole MW-3	5/28/2009	13.5 to 14	<3.04	<22.3	28.7	0.027	<0.0607	<0.1214	6.18	29.3	4.69	
OCMW2-1	Well borehole MW-2	5/28/2009	6.5 to 7	<5.41	<109	196	<0.0271	<0.108	<0.216	20.6	60.9	14	
OCMW2-2	Well borehole MW-2	5/28/2009	13.5 to 14	<3.30	<22	<22	0.034	<0.066	<0.132	26.3	37.2	6.10	
OCMW2-3	Well borehole MW-2	5/28/2009	14 to 14.5	<3.13	<21.8	<21.8	0.0222	<0.0625	<0.125	6.02	27.9	4.85	
ADEC Cleanup Level ²				50	100	2,000	0.02	5.4	5.5	78	5	25	800

All results are in milligrams per kilogram (mg/kg)
As = Arsenic using U.S. Environmental Protection Agency (EPA) Method 6020
bgs = below ground surface
BTX = benzene, toluene, ethylbenzene, xylenes by EPA Method 8021B.
Cd = Cadmium using EPA Method 6020
Cr = Chromium (total) using EPA Method 6020
DRO = diesel range organics using Alaska Method (AK) 102
GRO = gasoline range organics using AK 101
Pb = Lead using EPA Method 6020
RRO = residual range organics using AK 103
UST = underground storage tank
1) < = not detected. Detection limit shown.
na = not analyzed
na = not analyzed
na = indicates concentration exceeds Practical Quantitation Limit
2) Per 18 AAC 75.340 Tables A1 and B1

TABLE 6 - GROUNDWATER ANALYTICAL RESULTS- 2009
Anchorage Beverage Plant, 240 West 1st Avenue Anchorage, Alaska

Well/ Sample Number	Collection Date	GRO	DRO	RRO	Benzene	Toluene	Ethyl- benzene	Xylenes	UST Metals				
									As	Cd	Cr	Pb	Zn
MW-1	6/2/2009	0.383	<0.851 ¹	<0.532	0.0261	0.00246	0.00202	0.00771	<0.002	<0.004	<0.001	<0.025	
Blind duplicate		0.369	<0.842	<0.526	0.0252	0.00244	<0.002	0.00770	<0.002	<0.004	<0.001	<0.025	
MW-2	6/2/2009	0.238	<0.842	<0.526	0.00555	<0.002	<0.002	<0.004	<0.002	<0.004	<0.001	<0.025	
MW-3	6/2/2009	0.238	<0.842	<0.526	0.00524	<0.002	<0.002	<0.004	<0.002	<0.004	<0.001	<0.025	
ADEC Cleanup Goals ²		2.2	1.5	1.1	0.005	1	0.7	10	0.005	0.1	0.015	5	

All results are in milligrams per liter (mg/L)

As = Arsenic using U.S. Environmental Protection Agency (EPA) Method 6020

BTEX = benzene, toluene, ethylbenzene, xylenes by EPA Method 8021B.

Cd = Cadmium using EPA Method 6020

Cr = Chromium (total) using EPA Method 6020

DRO = diesel range organics using Alaska Method (AK) 102.

GRO = gasoline range organics using AK 101.

Pb = Lead using EPA Method 6020

RRO = residual range organics using AK 103

UST = underground storage tank

Zn = Zinc using EPA Method 6020

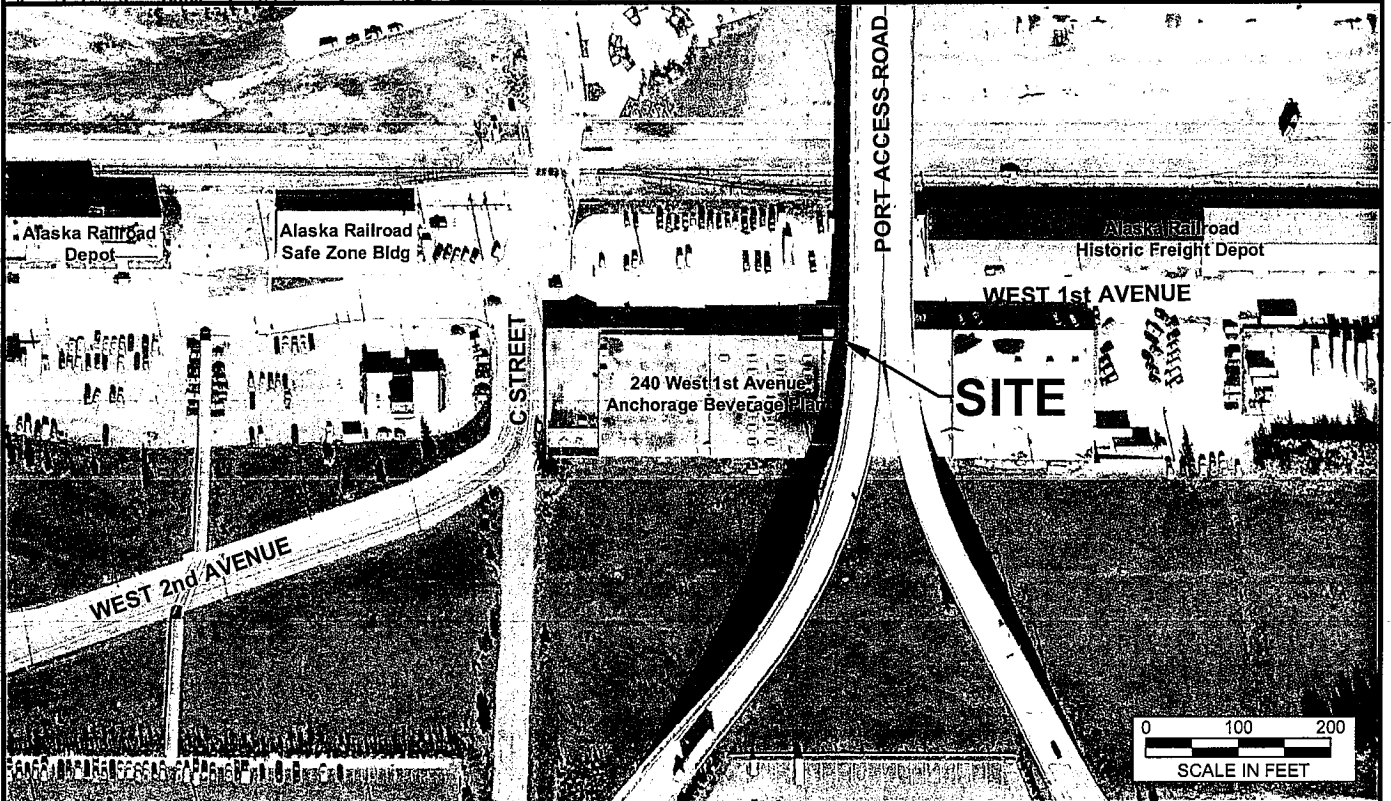
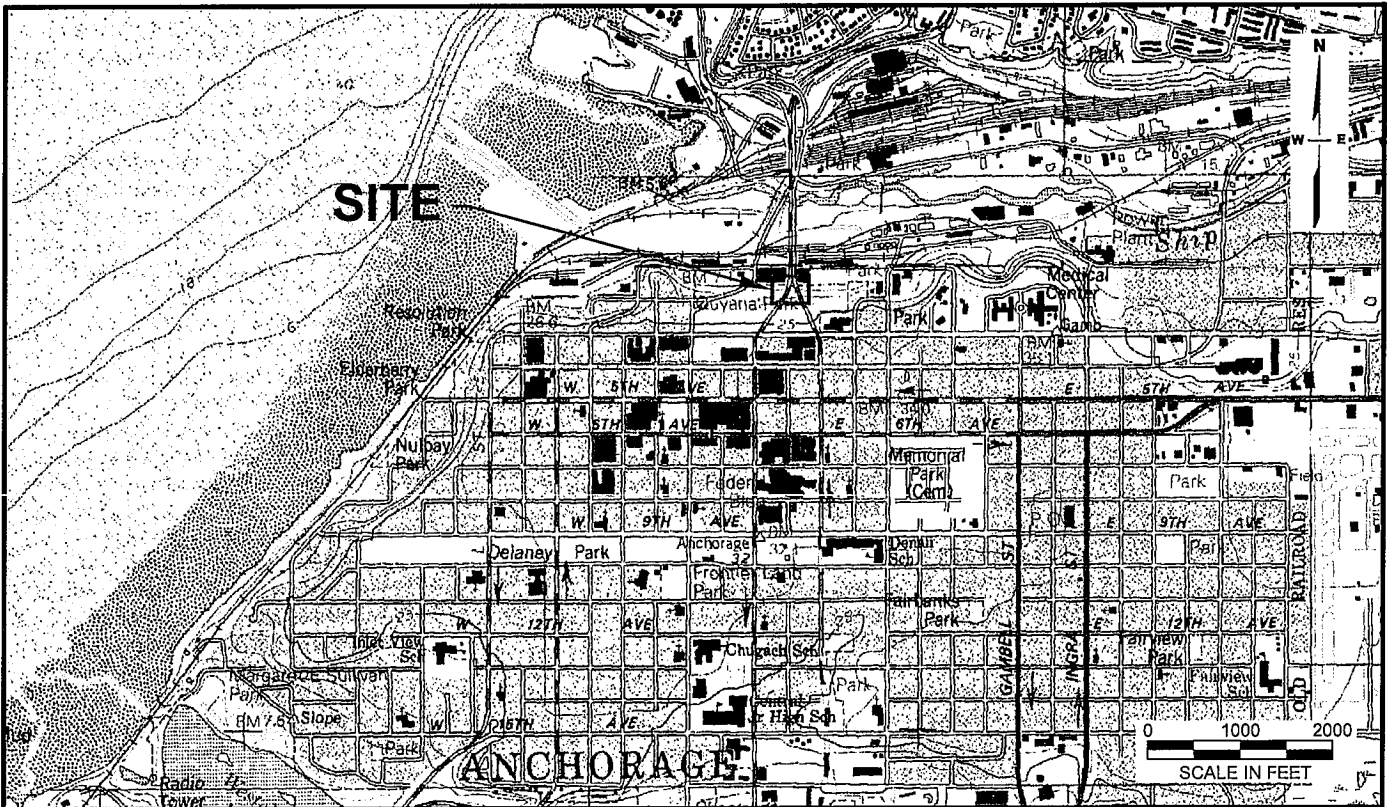
1) < = not detected. Detection limit shown.

[] = indicates concentration exceeds Practical Quantitation Limit

bold = indicates concentration exceeds ADEC Cleanup Levels for groundwater

2) Per 18 AAC 75.345 Table C, as amended October 9, 2008.

FIGURES



G:\PROJECTS\26218662 ODOM W FIRST\26218662 SRI.DWG ; Revised 10/29/2009 10:41:47 AM

Sources: USGS 1:25,000 Topographic Map Series
Anchorage (A-8) NW Quadrangle, 1994; Google, inc.

**THE ODOM CORPORATION
SUPPLEMENTAL RELEASE INVESTIGATION**

LOCATION MAP

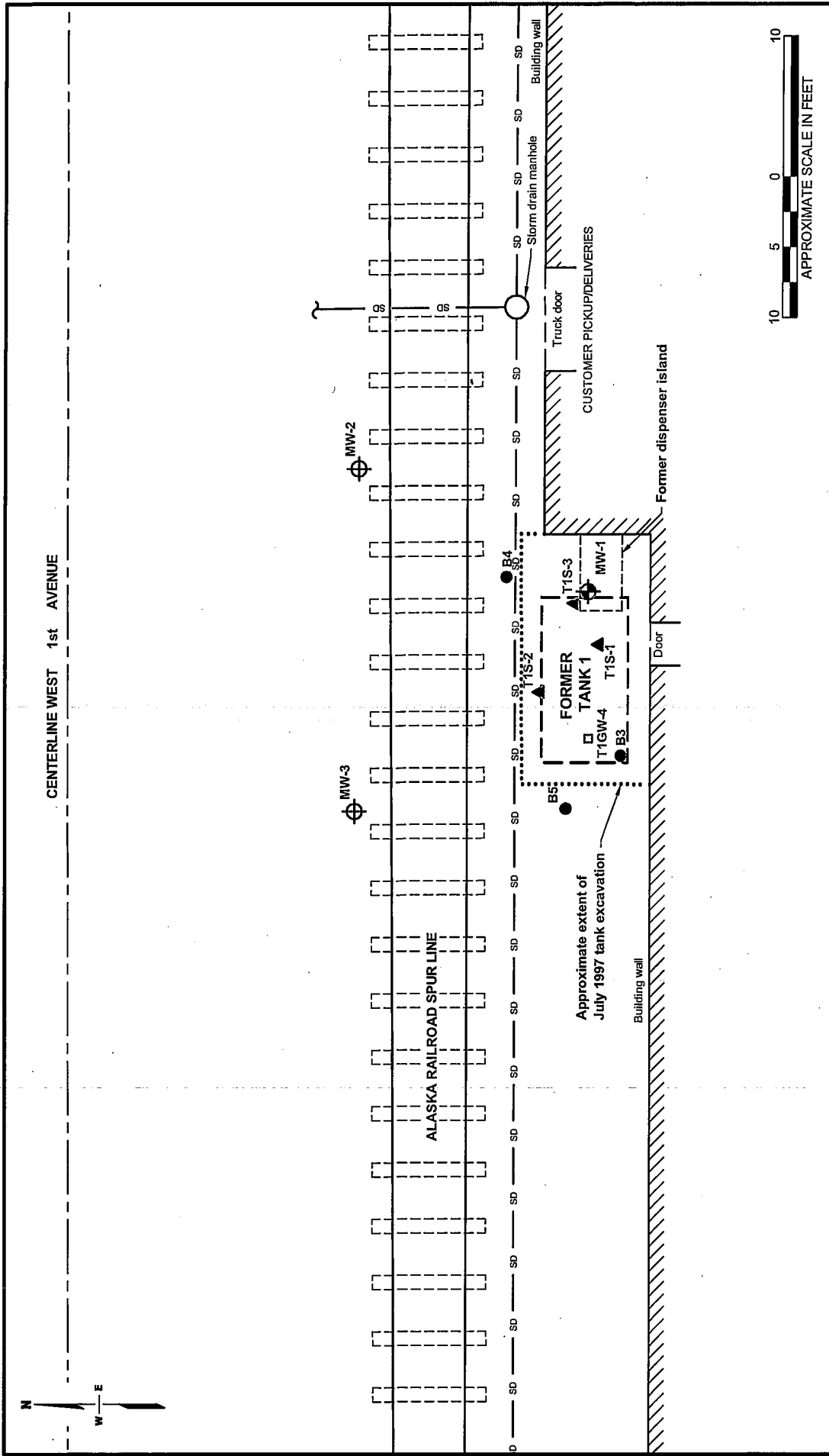
**240 WEST 1st AVENUE
ANCHORAGE, ALASKA**



JOB NO: 26218662
DATE: SEPTEMBER 2009

DRAWN: ELK
FILE: 26218662 SRI.DWG

FIGURE 1



THE ODOM CORPORATION
SUPPLEMENTAL RELEASE INVESTIGATION

SITE PLAN

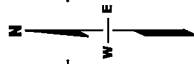
240 WEST 1st AVENUE
 ANCHORAGE, ALASKA

JOB NO: 26218662 DRAWN: ELK
 DATE: SEPTEMBER 2009 FILE: 26218662 SRI.DWG

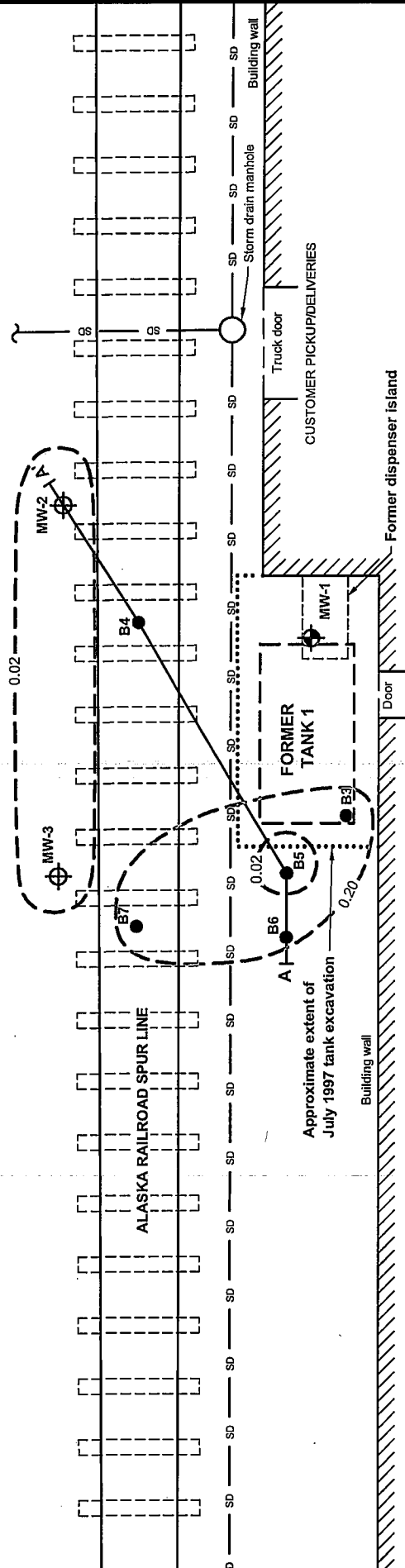
FIGURE 2

LEGEND

- ▲ T1S-3 Location of soil sample collected July 8, 1997
- T1GW-4 Location of water sample collected July 9, 1997
- ⊕ MW-1 Location of monitoring well installed May 24, 2000
- B5 Approximate location of proposed soil boring
- ⊕ MW-3 Approximate location of proposed groundwater monitoring well
- SD — Underground storm drain utility



CENTERLINE WEST 1st AVENUE



- LEGEND**
- MW-1 Location of monitoring well installed May 24, 2000
 - B7 Location of soil boring advanced May 28, 2009
 - ⊕ MW-3 Location of groundwater monitoring well installed May 28, 2009
 - SD Underground storm drain utility
 - A-| Location of geologic cross-section
 - - - 0.02 Benzene isoconcentration contour in milligrams per kilogram (mg/kg) in soil; red to a depth of 14.5 feet below ground surface (bgs); green to a depth of 8.5 feet bgs
 - - - 0.20

THE ODOM CORPORATION
SUPPLEMENTAL RELEASE INVESTIGATION

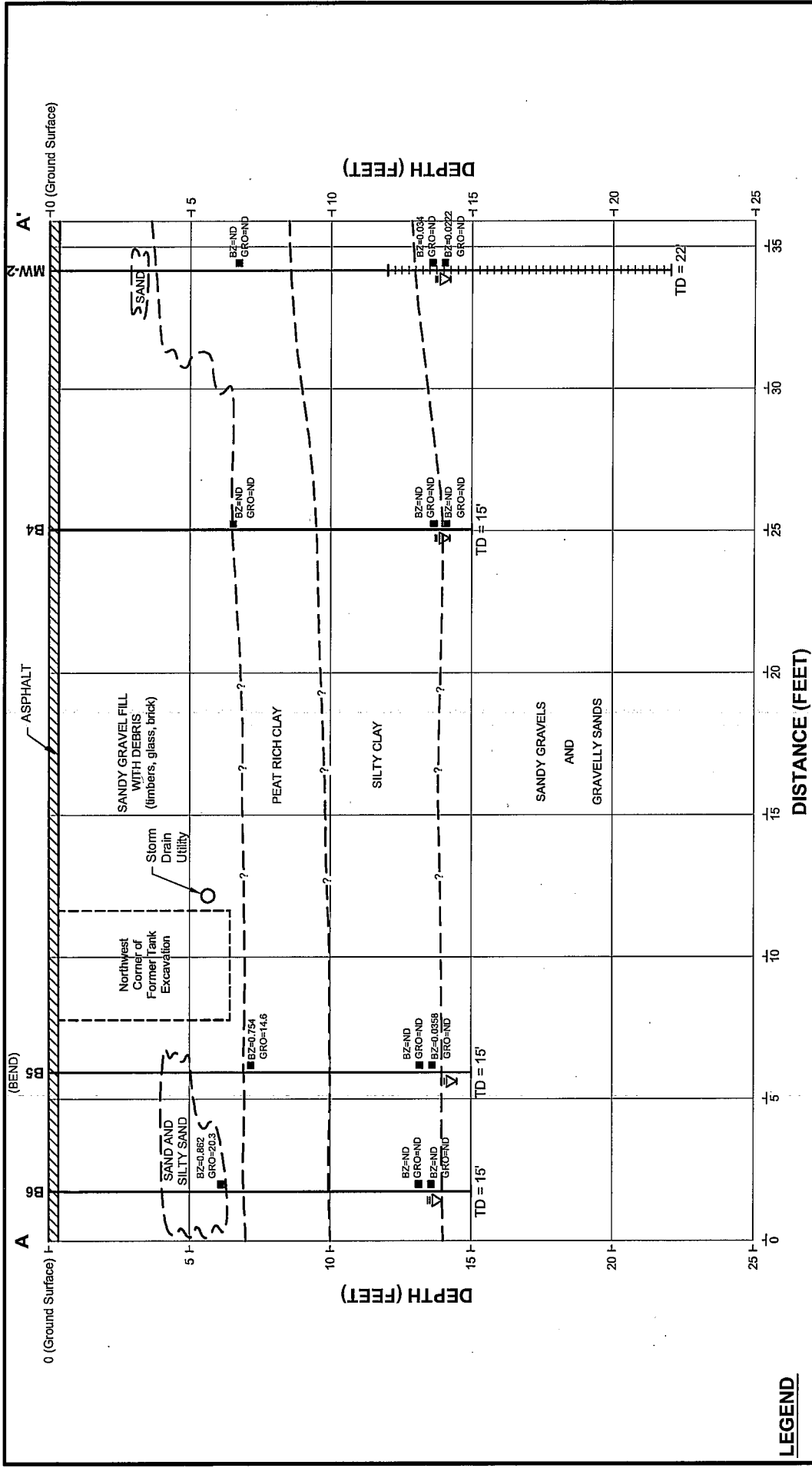
2009 SAMPLE LOCATIONS

240 WEST 1st AVENUE
 ANCHORAGE, ALASKA



JOB NO: 26218662 DRAWN: ELK
 DATE: OCTOBER 2009 FILE: 26218662 SRI.DWG

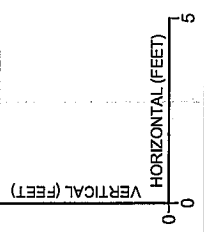
FIGURE 3



LEGEND

- Well/boring designation
- Location and analytical results of soil sample in milligrams per kilogram (mg/kg)
 BZ = Benzene
 GRO = Gasoline range organics
 ND = Not detected
- Groundwater elevation at time of installation
- Screened interval of well
- Geologic contact (queried where inferred)
- TD = total depth

SCALE

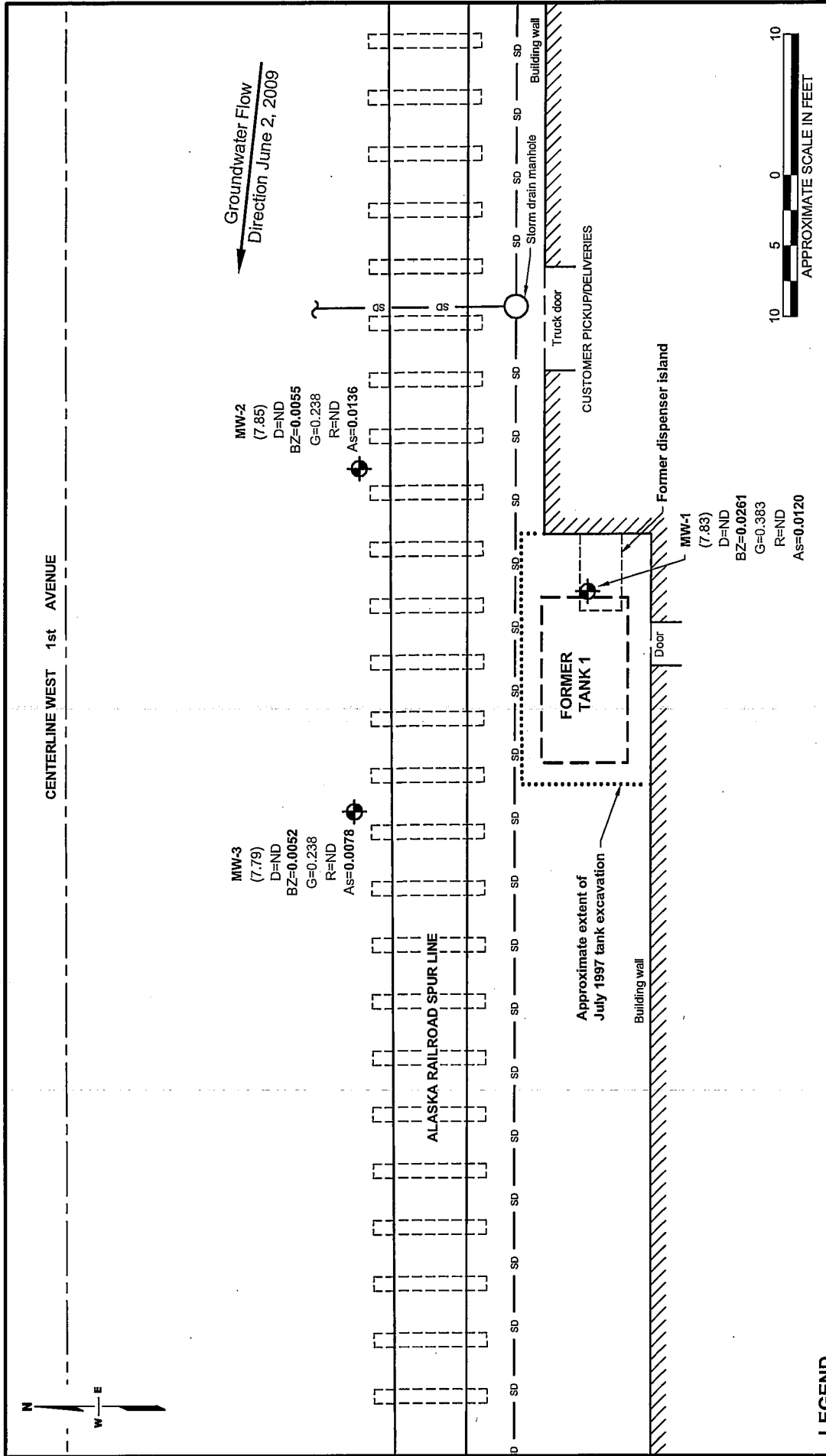


THE ODOM CORPORATION
SUPPLEMENTAL RELEASE INVESTIGATION

GEOLOGIC CROSS-SECTION A-A'
 240 WEST 1st AVENUE
 ANCHORAGE, ALASKA



JOB NO: 26218662
 DATE: SEPTEMBER 2009
 DRAWN: ELK
 FILE: 26218662 SRI.DWG



MW-2
(7.85)
D=ND
BZ=0.0055
G=0.238
R=ND
As=0.0136

MW-3
(7.79)
D=ND
BZ=0.0052
G=0.238
R=ND
As=0.0078

MW-1
(7.83)
D=ND
BZ=0.0261
G=0.383
R=ND
As=0.0120



LEGEND

- MW-3
(7.79)
D=ND
BZ=0.0052
G=0.238
R=ND
As=0.0078
- MW-2
(7.85)
D=ND
BZ=0.0055
G=0.238
R=ND
As=0.0136
- MW-1
(7.83)
D=ND
BZ=0.0261
G=0.383
R=ND
As=0.0120
- Groundwater monitoring well with groundwater elevation in feet above mean sea level (MSL); diesel range organics (D), benzene (BZ), gasoline range organics (G), residual range organics (R), and arsenic (As) concentrations in milligrams per liter (mg/L); ND = not detected; **bold** indicates concentration exceeds ADEC groundwater criteria
- Underground storm drain utility

**THE ODOM CORPORATION
SUPPLEMENTAL RELEASE INVESTIGATION**

**GROUNDWATER CONDITIONS
JUNE 2, 2009**

240 WEST 1st AVENUE
ANCHORAGE, ALASKA



JOB NO: 26218662 DRAWN: ELK
DATE: SEPTEMBER 2009 FILE: 26218662 SRI.DWG

APPENDIX A

**SOIL BORING LOGS AND
WELL CONSTRUCTION DIAGRAMS**

Project: ODOM Corporation West First Avenue
Project Location: Anchorage, Alaska
Project Number: 26218662

Log of Boring B3

Sheet 1 of 1

Date(s) Drilled	5/28/09	Logged By	W. Loskutoff	Checked By	R. Rapuzzi
Drilling Method	Direct Push	Drill Bit Size/Type	3" Macrocore	Total Depth of Borehole	15.0 feet
Drill Rig Type	6620 Geoprobe	Drilling Contractor	GeoTek Alaska	Approximate Surface Elevation	
Groundwater Level and Date Measured	13.50' bgs, 5/28/09	Sampling Method(s)	MacroCore Continuous Sampler	Hammer Data	N/A
Borehole Completion	Upon reaching TD, Boring was backfilled with bentonite chips		Location Southwest corner of former UST excavation		

Elevation feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	REMARKS AND WELL DETAILS
		Type	Number	PID (ppmv)			
0					@ 0-0.5' (ASP) Asphalt		
					@ 0.5' (SP) SANDY GRAVEL, brown, dry, loose, 75% gravel to 3" size, subrounded, 25% medium-grained sand, tank backfill materials		
					@ 6.5' DEBRIS, glass and timber debris		
		OCB3-1 @ 1320		4.0	@ 7.5' (CL) PEATY CLAY, dark brown, moist to very moist, firm, 60-65% clay, 35-40% organic peat layers to 2" thick	← Backfilled with Bentonite chips	
10					@ 11.5' (CL) SILTY CLAY, gray/blue, dry, stiff, trace organic peat layers		
		OCB3-2 @ 1325 OCB3-3 @ 1330		0.0 0.0			
15					@ -14' (GP) SANDY GRAVEL, dark-gray, wet, medium dense to dense, 70% gravel to 3" size, subrounded, 30% medium-grained sand	Groundwater encountered @ 13.5' bgs during drilling	
					Boring terminated at 15' bgs		
20							
25							

Report: ENV_12SW_ANCHORAGE; File: ODOM 2009.GPJ; 9/21/2009 B3

Project: ODOM Corporation West First Avenue
Project Location: Anchorage, Alaska
Project Number: 26218662

Log of Boring B4

Sheet 1 of 1

Date(s) Drilled	5/28/09	Logged By	W. Loskutoff	Checked By	R. Rapuzzi
Drilling Method	Direct Push	Drill Bit Size/Type	3" Macrocore	Total Depth of Borehole	15.0 feet
Drill Rig Type	6620 Geoprobe	Drilling Contractor	GeoTek Alaska	Approximate Surface Elevation	
Groundwater Level and Date Measured	14.5' bgs, 5/28/09	Sampling Method(s)	MacroCore Continuous Sampler	Hammer Data	N/A
Borehole Completion	Upon reaching TD, Boring was backfilled with bentonite chips		Location	North Northeast of former UST excavation	

Elevation feet	Depth, feet	SAMPLES				Graphic Log	MATERIAL DESCRIPTION	REMARKS AND WELL DETAILS
		Type	Number		PID (ppmv)			
0						@ 0-0.5' (ASP) Asphalt		
						@ 0.5' (GP) SANDY GRAVEL, brown, dry, loose, 75% gravel, subrounded, 25% medium-grained sand		
						@ 2.5' DEBRIS, timbers, glass, brick, steel rods		
						@ 3' (GP) SANDY GRAVEL, brown, dry, loose, 75% gravel, subrounded, 25% medium-grained sand		
						@ 4.5' DEBRIS, glass, brick, steel rods		
						@ 5' (GP) SANDY GRAVEL, brown, dry, loose, 75% gravel, subrounded, 25% medium-grained sand		
			OCB4-1 @ 1355		0.5	@ 6.5' (CL) PEATY CLAY, brown, moist, firm, 65% clay, 35% organic peat layers to 2" thick	← Backfilled with Bentonite chips	
						@ 9.5' (CL) SILTY CLAY, blue/gray, moist, stiff, trace peat layers to <0.5" thick		
			OCB4-2 @ 1400 OCB4-3 @ 1405		0.0 0.0			
						@ 14.5' (GP) SANDY GRAVEL, gray, wet, medium dense to dense, 70-80% gravel to 3" size, subrounded, 20-30% medium-grained sand	Groundwater encountered @ 14.5' bgs during drilling	
						Boring terminated at 15' bgs		
15								
20								
25								

Report: ENV_12S/W_ANCHORAGE; File: ODOM 2009.GPJ; 9/21/2009 B4



Project: ODOM Corporation West First Avenue
Project Location: Anchorage, Alaska
Project Number: 26218662

Log of Boring B5

Sheet 1 of 1

Date(s) Drilled	5/28/09	Logged By	W. Loskutoff	Checked By	R. Rapuzzi
Drilling Method	Direct Push	Drill Bit Size/Type	3" Macrocore	Total Depth of Borehole	15.0 feet
Drill Rig Type	6620 Geoprobe	Drilling Contractor	GeoTek Alaska	Approximate Surface Elevation	
Groundwater Level and Date Measured	14.50' bgs, 5/28/09	Sampling Method(s)	MacroCore Continuous Sampler	Hammer Data	N/A
Borehole Completion	Upon reaching TD, Boring was backfilled with bentonite chips		Location	2' West of East edge of former UST excavation	

Elevation feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	REMARKS AND WELL DETAILS
	Type	Number	PID (ppmv)			
0					@ 0-0.5' (ASP) Asphalt	
					@ 0.5' (GP) SANDY GRAVEL, dark brown, dry, loose, fill rock with debris zones, 75-80% subrounded gravel, 20-25% medium-grained sand	
					@ 3' DEBRIS, timbers, glass	
					@ 4' (SM) SILTY SAND, dark brown, wet, loose, fine- to medium-grained sand	
5					@ 5' DEBRIS, brick, timbers	
					@ 6' (GP) SANDY GRAVEL, dark brown, dry, loose, fill rock with debris zones, 75-80% subrounded gravel, 20-25% medium-grained sand	
	OCB5-1 @ 1335		3.0		@ 7' (CL) PEATY CLAY, dark brown, moist, firm, 65-70% clay, 30-35% organic peat layers to 2" thick	← Backfilled with Bentonite chips
10					@ 11' (CL) SILTY CLAY, blue/gray, dry, stiff, some peat layers to 0.5" thick	
					@ 13' (SP) SAND, gray, very moist, medium dense, medium- to coarse-grained sand	
	OCB5-2 @ 1340 OCB5-3 @ 1345		0.0 0.0		@ 14' (GP) SANDY GRAVEL, dark gray, wet, medium dense, 65% gravel to 3" size, subrounded, 35% medium-grained sand	Groundwater encountered @ 14.5' bgs during drilling
15					Boring terminated at 15' bgs	
20						
25						

Report: ENV_12SW_ANCHORAGE; File: ODOM 2009.GPJ; 9/21/2009 B5

Project: ODOM Corporation West First Avenue
Project Location: Anchorage, Alaska
Project Number: 26218662

Log of Boring B6

Sheet 1 of 1

Date(s) Drilled	5/28/09	Logged By	W. Loskutoff	Checked By	R. Rapuzzi
Drilling Method	Direct Push	Drill Bit Size/Type	3" Macrocore	Total Depth of Borehole	15.0 feet
Drill Rig Type	6620 Geoprobe	Drilling Contractor	GeoTek Alaska	Approximate Surface Elevation	
Groundwater Level and Date Measured	14.00' bgs, 5/28/09	Sampling Method(s)	MacroCore Continuous Sampler	Hammer Data	N/A
Borehole Completion	Upon reaching TD, Boring was backfilled with bentonite chips		Location	6' West of East edge of former UST excavation	

Elevation feet	Depth, feet	SAMPLES				Graphic Log	MATERIAL DESCRIPTION	REMARKS AND WELL DETAILS
		Type	Number		PID (ppmv)			
0						@ 0-0.5' (ASP) Asphalt		
						@ 0.5' (GP) SANDY GRAVEL, brown, dry, loose, 70-75% gravel, subrounded, 25-30% medium-grained sand		
						@ 3' DEBRIS, timbers, glass, brick		
						@ 4' (SM) SILTY SAND, brown, moist, medium dense, fine- to medium-grained sand		
						@ 4.5' (SP) SAND, dark brown, very moist, medium dense, medium-grained sand		
4.0		OCB6-1	@ 1415		4.0			
						@ 7' (CL) PEATY CLAY, dark brown, moist, firm, 70% clay, 30% organic peat layers to 2" thick, slight odor	← Backfilled with Bentonite chips	
						@ 9.5' (CL) SILTY CLAY, blue/gray, dry, stiff, trace gravel to 2" size, subrounded		
10								
						@ 14' (GP) SANDY GRAVEL, gray to dark brown, wet, medium dense, 70-75% gravel to 2" size, subrounded, 25-30% medium-grained sand	Groundwater encountered @ 14' bgs during drilling	
15		OCB6-2	@ 1420		0.0			
					0.0			
		OCB6-3	@ 1425					
						Boring terminated at 15' bgs		
20								
25								

Report: ENV_12S/W_ANCHORAGE; File: ODOM 2009.GPJ; 9/21/2009 B6



Project: ODOM Corporation West First Avenue
Project Location: Anchorage, Alaska
Project Number: 26218662

Log of Boring B7

Sheet 1 of 1

Date(s) Drilled	5/28/09	Logged By	W. Loskutoff	Checked By	R. Rapuzzi
Drilling Method	Direct Push	Drill Bit Size/Type	3" Macrocore	Total Depth of Borehole	15.0 feet
Drill Rig Type	6620 Geoprobe	Drilling Contractor	GeoTek Alaska	Approximate Surface Elevation	
Groundwater Level and Date Measured	14.00' bgs, 5/28/09	Sampling Method(s)	MacroCore Continuous Sampler	Hammer Data	N/A
Borehole Completion	Upon reaching TD, Boring was backfilled with bentonite chips		Location	9' Northwest of northwest corner of former UST excavation	

Elevation feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	REMARKS AND WELL DETAILS
		Type	Number	PID (ppmv)			
0						@ 0-0.5' (ASP) Asphalt	
						@ 0.5' (GP) SANDY GRAVEL, brown, dry, loose, 70% gravel, subrounded, fill with debris layers, 30% medium-grained sand	
						@ 3' DEBRIS, timbers, brick, metal debris	
						@ 4' (SM) SILTY SAND, brown, moist, medium dense, fine- to medium- grained sand	
						@ 4.5' (SP) SAND, brown to dark brown, very moist, medium dense, medium- grained sand, slight odor	
		OCB7-1 @ 1450		5.0		@ 7' (CL) PEATY CLAY, brown, moist, firm, 65% clay, 35% organic peat layers to 2" thick, moderate odor	← Backfilled with Bentonite chips
		OCB7-2 @ 1455		4.0			
						@ 9.5' (CL) SILTY CLAY, blue/gray, dry, stiff, trace organic peat layers to 0.5" thick	
		OCB7-3 @ 1505		0.0			
		OCB7-4 @ 1510		0.0		@ 14' (GP) SANDY GRAVEL, gray, wet, medium dense, 80% gravel to 2" size, subrounded, 20% medium-grained sand	Groundwater encountered @ 14' bgs during drilling
						Boring terminated at 15' bgs	
15							
20							
25							

Report: ENV_125MW_ANCHORAGE; File: ODOM_2009.GPJ; 9/21/2009 B7

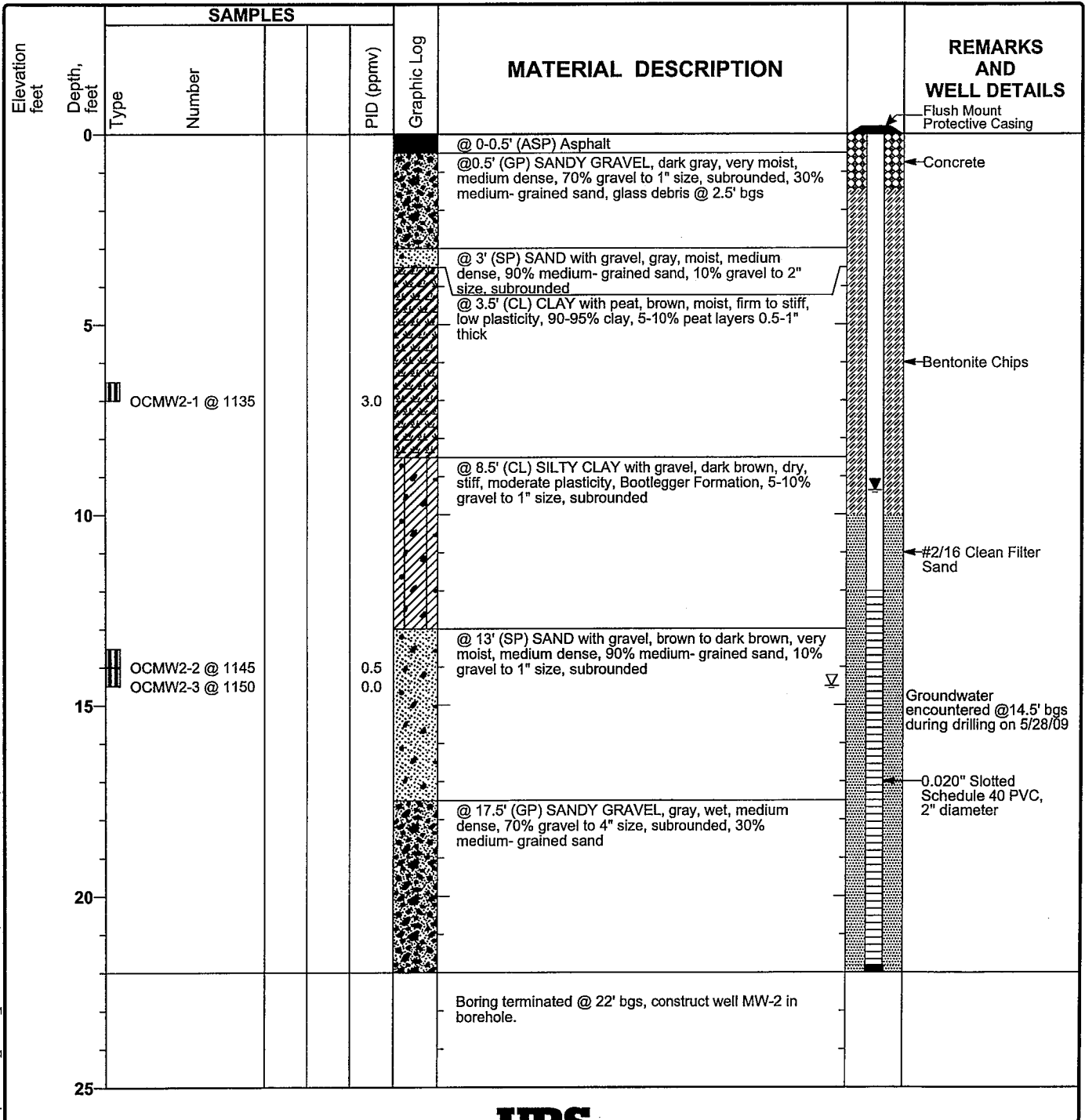


Project: ODOM Corporation West First Avenue
 Project Location: Anchorage, Alaska
 Project Number: 26218662

Log of Boring MW-2

Sheet 1 of 1

Date(s) Drilled	5/28/09	Logged By	W. Loskutoff	Checked By	R. Rapuzzi
Drilling Method	Direct Push	Drill Bit Size/Type	5" Dual Tube MCC System	Total Depth of Borehole	22.0 feet
Drill Rig Type	6620 Geoprobe	Drilling Contractor	GeoTek Alaska	Approximate Surface Elevation	
Groundwater Level and Date Measured	9.37' BTOC, 6/2/09	Sampling Method(s)	MacroCore Continuous Sampler	Hammer Data	N/A
Borehole Completion	Upon reaching TD, Monitoring well MW-2 was installed in borehole		Location	20' Northeast of former UST excavation	



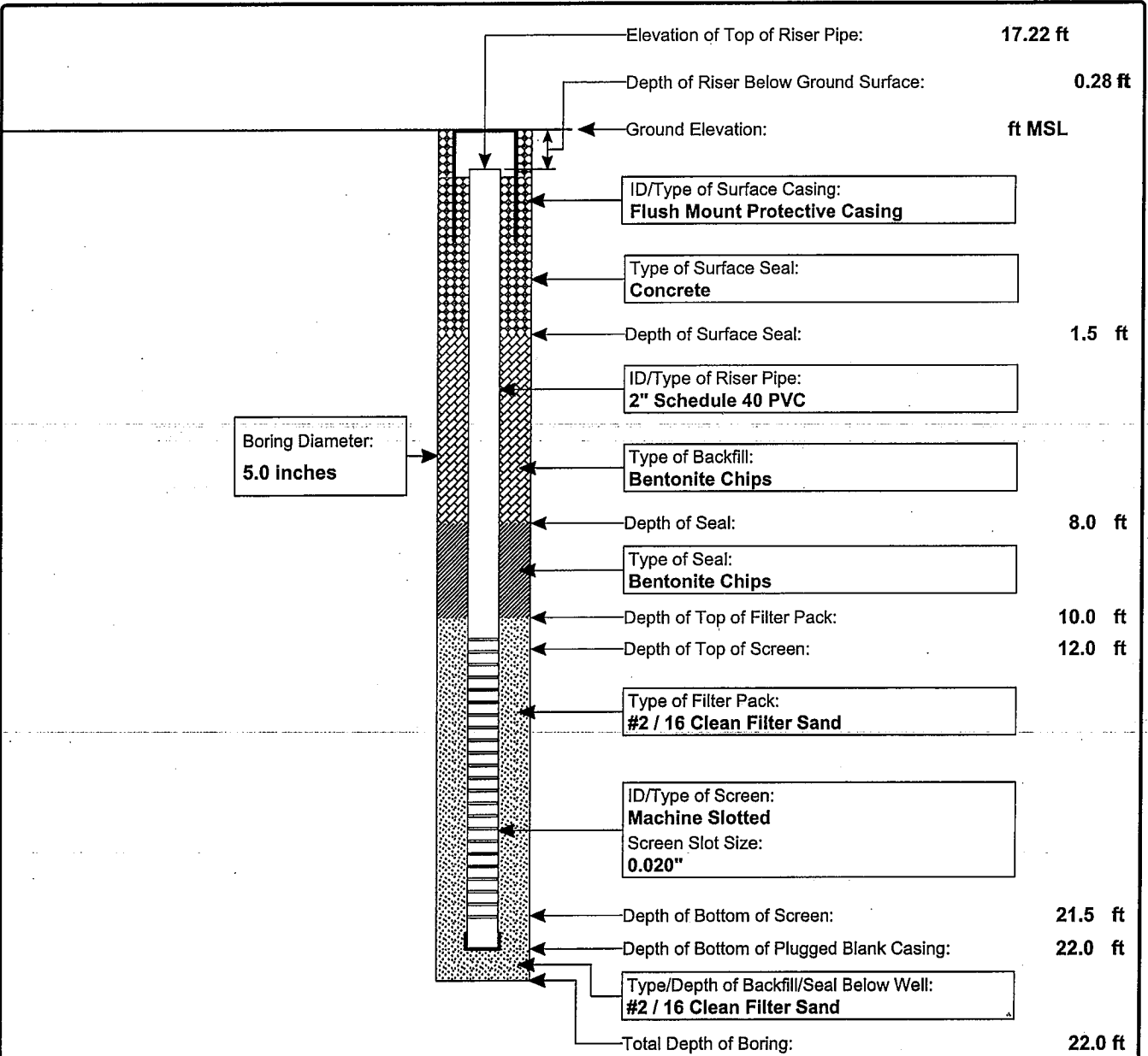
Report: ENV_12S/W_ANCHORAGE; File: ODOM 2009.GPJ; 10/23/2009 MW-2



Project: ODOM Corporation West First Avenue
Project Location: Anchorage, Alaska
Project Number: 26218662

**MONITORING WELL
 CONSTRUCTION LOG
 FOR WELL MW-2**

Well Location	20' Northeast of former UST excavation	Date(s) Installed	5/28/09	Time	1255
Installed By	GeoTek Alaska	Observed By	W. Loskutoff	Total Depth (ft)	22.0
Method of Installation	Direct push 6620 geoprobe				
Screened Interval	12-22' bgs	Completion Zone	10-22' bgs		
Remarks	See accompanying boring log for reference				



NOTE: DIAGRAM IS NOT TO SCALE

Report: ENV_WELL_CONSTR_BELOW_GROUND; File: ODOM_2009.GPJ; 10/23/2009 MW-2

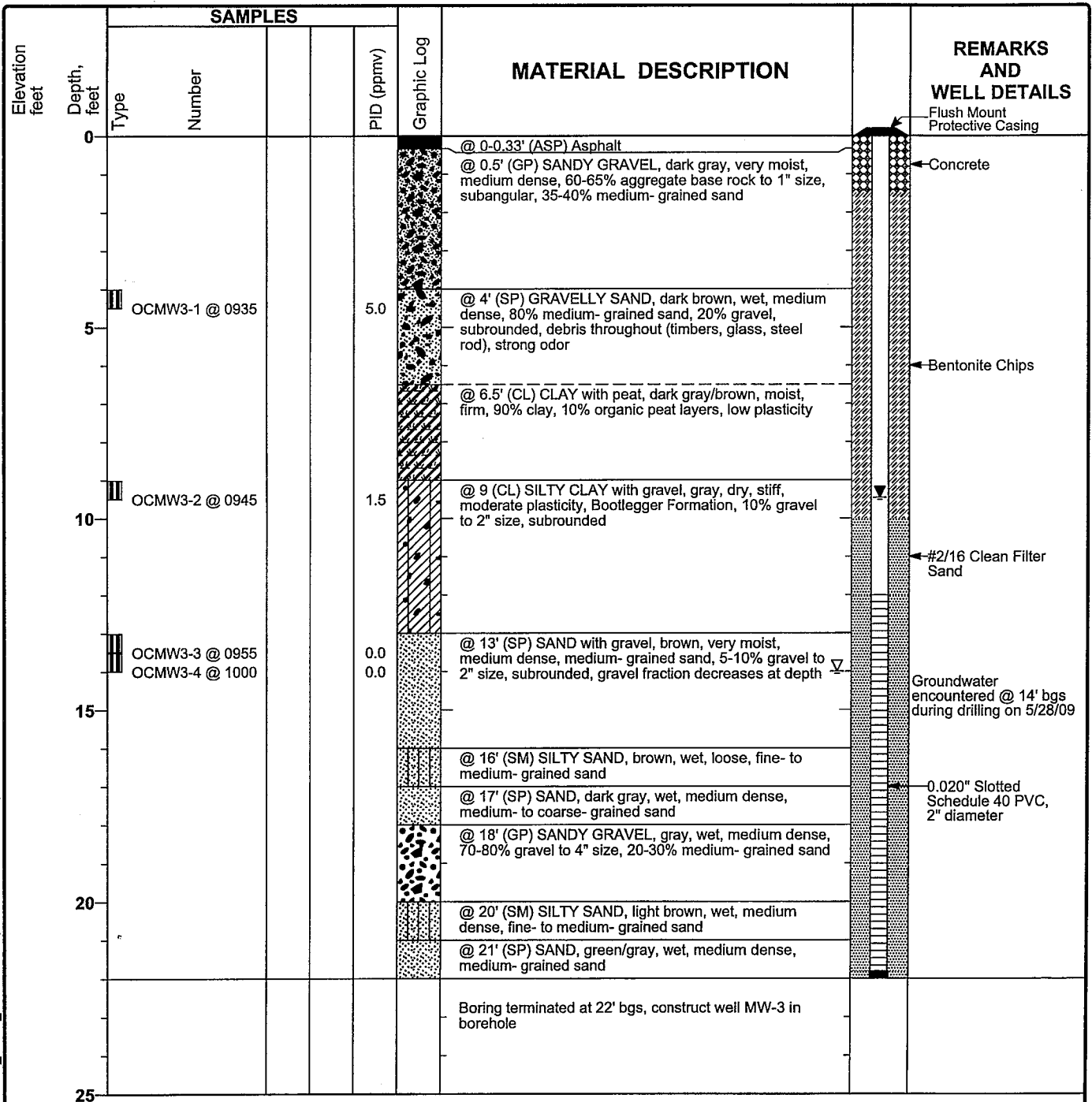


Project: ODOM Corporation West First Avenue
Project Location: Anchorage, Alaska
Project Number: 26218662

Log of Boring MW-3

Sheet 1 of 1

Date(s) Drilled	5/28/09	Logged By	W. Loskutoff	Checked By	R. Rapuzzi
Drilling Method	Direct Push	Drill Bit Size/Type	5" Dual Tube MCC System	Total Depth of Borehole	22.0 feet
Drill Rig Type	6620 Geoprobe	Drilling Contractor	GeoTek Alaska	Approximate Surface Elevation	
Groundwater Level and Date Measured	9.46' BTOC, 6/2/09	Sampling Method(s)	MacroCore Continuous Sampler	Hammer Data	N/A
Borehole Completion	Upon reaching TD, Monitoring well MW-3 was installed in borehole		Location	17' Northwest of former UST excavation	



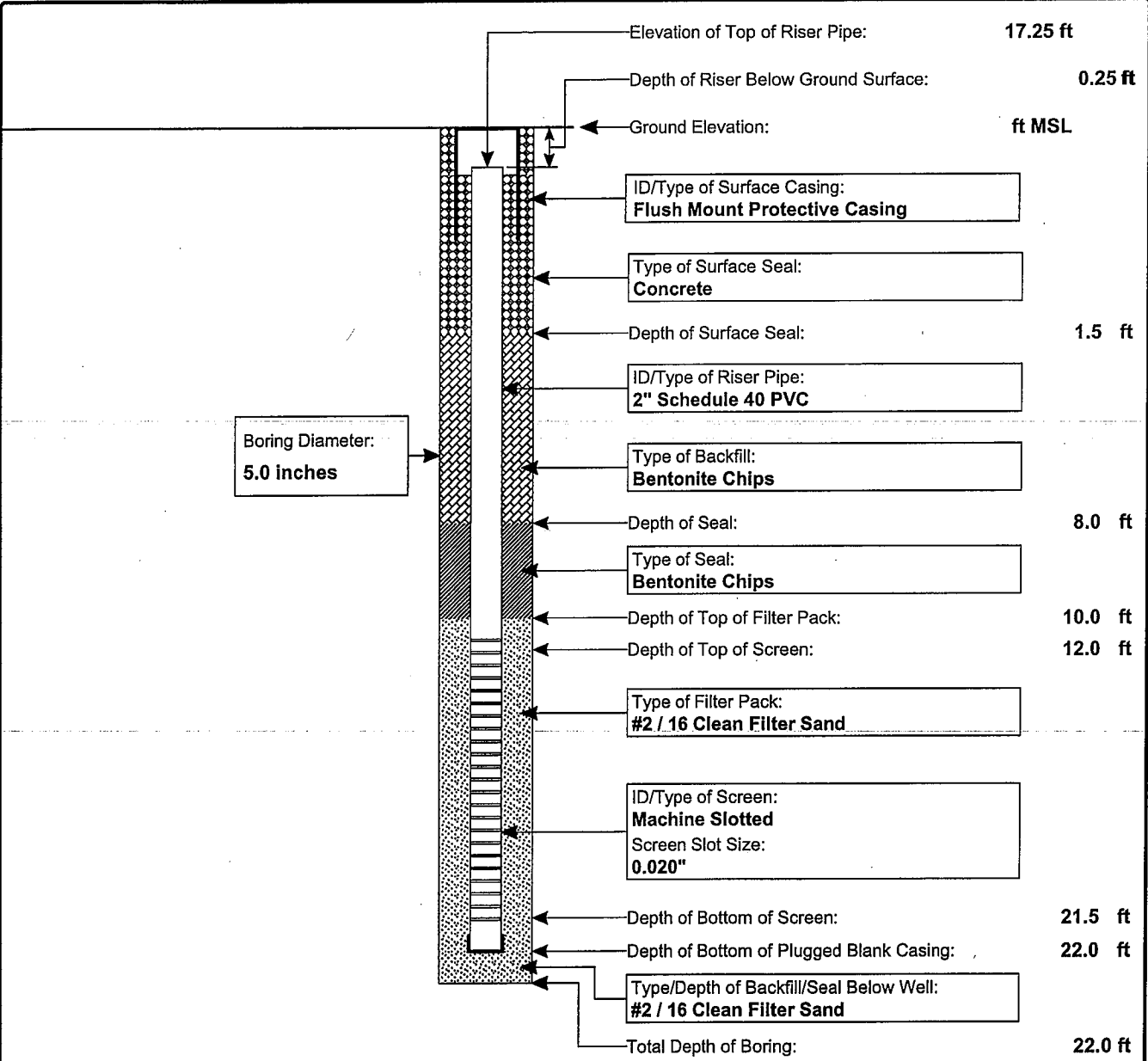
Report: ENV_125W_ANCHORAGE; File: ODOM 2009.GPJ; 10/23/2009 MW-3



Project: ODOM Corporation West First Avenue
Project Location: Anchorage, Alaska
Project Number: 26218662

**MONITORING WELL
CONSTRUCTION LOG
FOR WELL MW-3**

Well Location	17' Northwest of former UST excavation	Date(s) Installed	5/28/09	Time	1110
Installed By	GeoTek Alaska	Observed By	W. Loskutoff	Total Depth (ft)	22.0
Method of Installation	Direct push 6620 geoprobe				
Screened Interval	12-22' bgs	Completion Zone	10-22' bgs		
Remarks	See accompanying boring log for reference				



NOTE: DIAGRAM IS NOT TO SCALE

Report: ENV_WELL_CONSTR_BELW_GROUND; File: ODOM 2009.GPJ; 10/23/2009 MW-3



APPENDIX B

**WELL DEVELOPMENT AND
GROUNDWATER SAMPLE COLLECTION LOGS**

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WELL DEVELOPMENT, PURGE, & SAMPLE FORM

Date 5/29/09

Field Book #

Sampler Names: Ryan RapuzziProject Location: ODOM 240 West First RoadProject No. 26218662Page 1 of 2
(rev 4/4/05)Location / Well ID: MW2

Elevation TOC (feet msl):

Task (circle):

Annual

Quarterly

Initial Sample

Other (list)

EQUIPMENT USEDType of pump/equipment: Grundfos Peristaltic QED Air Bladder Bailer Other:
Type of slug (for development): Volume of Slug: Temp**METHOD OF DEVELOPMENT/PURGING** Bailing Pump - Well Volume Pump - Parameter Stabilization Low flow**WATER QUALITY PARAMETERS** by (a) HACH DR2400; (b) YSI 556 & 2100P Turbidimeter (c) other (describe):Calibrated? Yes No Equipment Decontaminated? Yes No Describe:**CASING WELL VOLUME INFORMATION (circle)****BAILER CHECK** Yes No Describe: Silt / sand on inner casingCasing ID (inch) 0.75 2.0 3.0 4.0Color: Silty Gray Sheen: Yes NoUnit Casing Volume (A) (gal/ft) 0.023 0.18 0.37 0.65Odor: Yes No Describe: Free-Phase Product: Yes NoFormula: (Diameter)² ÷ 24.5 = gals / ftNotes: slight musty odor. PVC casing**THICKNESS OF PRODUCT (if present)** Measured with: Bailer or Interface Probe Type:

Top of product (ft btoc): _____ Top of Groundwater (ft btoc): _____ Thickness of Product (ft): _____

PURGING INFORMATION Note: If no obvious reference, measure off north side of PVC casing and tick mark pipe.Measurement Reference Point: BTOC (at tick mark) BGS Bottom of "V" Notch on PVC casing Other (describe) North Casing

Depth to Top of Well Screen _____ (feet) Length of Well Screen: _____ (feet) Tubing Placement: _____ (feet)

Total Well Depth (B) 22.02 feetMeasured Water Level Depth (not product) [Start] (C) 2.96 feetLength of Static Water Column (D) = 14.06 feet
(B) (C) (D)Casing Water Volume _____ x _____ = 2.25 gallons
(A) (D)**Conversion from Gallons to Liters: # gal x 3.784 = Liters**Three Casing Water Volumes 2.25 GA (Liters) (gallons)

Maintain pump rate at less than 1 Liters / min for low flow purging.

Maintain pump rate at less than 4 Liters/min for all other purge methods

Calibration Notes	
Standard	Meter Value
pH 4.0	=
pH 7.0	=
pH 10.0	=
DO (mg/L)=	=
ORP (mV)=	=
Cond. (µS)=	=

Total Water Volume Removed _____ (Liters)

Measured Water Level Depth [End] (C) _____ feet

IMPORTANT! VERIFY UNITS AND CIRCLE APPROPRIATE VALUE FOR EACH WELL!

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter)	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)
Stabilization Method Only: three consecutive readings, taken every half well volume, are within the following limits (shaded):							NA	+/- 10%	+/- 20%	+/- 10% or less than 5 NTUs
1410	new to MW2									
1425	Begin Purge									
1445	water begins to clear - 25 Gallons - surge early w/ pump									
1507	water clear - 40 Gallons									

Samplers Signature: [Signature]Date: 6/29/09



WELL DEVELOPMENT, PURGE, & SAMPLE RECORD (Continued)

Date 5/29/09

Field Book #

Sampler Names: Ryan Rapuzzi

Project Location: ODOM 240 West First Road

Project No. 26218662

Page 2 of 2

Location / Well ID: MW-2

Elevation TOC (feet msl):

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter)	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)

SAMPLE COLLECTION

Sample ID: MW-1 <u>NA</u>	Sample Date/Time: 5/29/09 <u>N/A</u>

Additional Field Sample Parameters Analyzed in Field with Equipment/Test Kits

Analyzed with 1) DR2400 HACH Spectrophotometer 2) HACH Fe²⁺ Powder Pillow 3) YSI 556 & HACH 2100P Turbidimeter

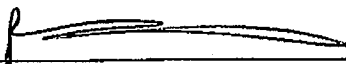
4) Chemetrics V-2000 (O₃ #2) 5) Chemetrics Peroxide Ampule 6) Other:

Ozone (4): <u>N/A</u> mg/L	Ferrous Iron (2): <u>N/A</u> mg/L	TDS (3): _____	Peroxide (5): <u>N/A</u> mg/L
Nitrate (1): <u>N/A</u> mg/L	Nitrite (1): <u>N/A</u> mg/L	Other: _____	

QA/QC SAMPLES

Trip blank carried with samples?	Yes	No	Sample ID: <u>NA</u>
Was a duplicate sample collected?	Yes	No	Sample ID: <u>NA</u>
Was an equipment blank sample collected?	Yes	No	Sample ID: <u>NA</u>
Was an MS/MSD sample collected?	Yes	No	Note on COC which sample is the MS/MSD

Scanned and Input to Database by: _____ Date: _____

Samplers Signature:  Date: 5/29/09



WELL DEVELOPMENT, PURGE, & SAMPLE FORM

Date 6/29/09

Field Book # _____

Sampler Names: Ryan RapuzziProject Location: ODOM 240 West First RoadProject No. 26218662Page 1 of 2
(rev 4/4/05)Location / Well ID: MW3

Elevation TOC (feet msl): _____

Task (circle):

 Annual Quarterly

Initial Sample

Other (list) _____

EQUIPMENT USED

Type of pump/equipment: Grundfos Peristaltic QED Air Bladder Bailor Other:
Type of slug (for development): _____ Volume of Slug: TempestMETHOD OF DEVELOPMENT/PURGING Bailing Pump - Well Volume Pump - Parameter Stabilization Low flow

WATER QUALITY PARAMETERS by (a) HACH DR2400; (b) YSI 556 & 2100P Turbidimeter (c) other (describe): _____

Calibrated? Yes No Equipment Decontaminated? Yes No Describe: _____

CASING WELL VOLUME INFORMATION (circle)

BAILER CHECK Yes No Describe: _____

Casing ID (Inch)

0.75

2.0

3.0

4.0

Color: SiltySheen: Yes No

Unit Casing Volume (A) (gal/ft)

0.023

0.16

0.37

0.65

Odor: Yes No Describe: _____Free-Phase Product: Yes NoFormula: (Diameter)² / ÷ 24.5 = gals / ftNotes: PVC Pieces in water. slight misty odorTHICKNESS OF PRODUCT (if present) Measured with: Bailor or Interface Probe Type: _____

Top of product (ft btoc): _____ Top of Groundwater (ft btoc): _____ Thickness of Product (ft): _____

PURGING INFORMATION

Note: If no obvious reference, measure off north side of PVC casing and tick mark pipe.

Measurement Reference Point: BTOC (at tick mark) BGS Bottom of "V" Notch on PVC casing Other (describe) Noting

Depth to Top of Well Screen _____ (feet)

Length of Well Screen: _____ (feet)

Tubing Placement: _____ (feet)

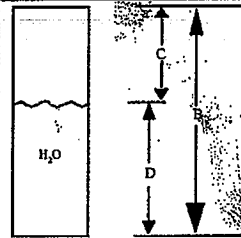
Total Well Depth (B) 22.12 feetMeasured Water Level Depth (not product) (Start) (C) 7.74 feetLength of Static Water Column (D) = 14.38 feetCasing Water Volume _____ x _____ = 23 gallons

Conversion from Gallons to Liters: # gal x 3.784 = Liters

Three Casing Water Volumes 25 GAL (Liters) (gallons)

Maintain pump rate at less than 1 Liters / min for low flow purging.

Maintain pump rate at less than 4 Liters/min for all other purge methods



Calibration Notes

Standard	Meter Value
pH 4.0	=
pH 7.0	=
pH 10.0	=
DO (mg/L)=	=
ORP (mV)=	=
Cond. (µS)=	=

Total Water Volume Removed _____ (Liters)

Measured Water Level Depth [End] (C) _____ feet

IMPORTANT! VERIFY UNITS AND CIRCLE APPROPRIATE VALUE FOR EACH WELL!

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter)	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)
Stabilization Method Only: three consecutive readings, taken every half well volume, are within the following limits (shaded):										
							NA	+/- 10%	+/- 20%	+/- 10% or less than 5 NTUs
1310	Setup & Begin Purge									
1330	Water being churning up - 15 gallons - surge heavily w/ pump									
1350	Water churning surge - 35 gallons -									

Samplers Signature: PDate: 6/29/09



WELL DEVELOPMENT, PURGE, & SAMPLE RECORD (Continued)

Date 6/29/09

Field Book #

Sampler Names: Ryan Rapuzzi

Project Location: ODOM 240 West First Road

Project No. 26218662

Page 2 of 2

Location / Well ID: MW-3

Elevation TOC (feet msl):

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter)	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)

SAMPLE COLLECTION

Sample ID: ~~MW-1~~ N/A

Sample Date/Time: ~~5/1/09~~ N/A

Additional Field Sample Parameters Analyzed in Field with Equipment/Test Kits

Analyzed with 1) DR2400 HACH Spectrophotometer 2) HACH Fe²⁺ Powder Pillow 3) YSI 556 & HACH 2100P Turbidimeter

4) Chemetrics V-2000 (O ₃ #2)	5) Chemetrics Peroxide Ampule	6) Other:
Ozone (4): N/A mg/L	Ferrous Iron (2): N/A mg/L	TDS (3): g/L
Nitrate (1): N/A mg/L	Nitrite (1): N/A mg/L	Peroxide (5): N/A mg/L
	Other:	

QA/QC SAMPLES

Trip blank carried with samples?	Yes	No	Sample ID:	N/A
Was a duplicate sample collected?	Yes	No	Sample ID:	N/A
Was an equipment blank sample collected?	Yes	No	Sample ID:	N/A
Was an MS/MSD sample collected?	Yes	No	Note on COC which sample is the MS/MSD	

Scanned and Input to Database by: _____ Date: _____

Samplers Signature: Date: 6/29/09



WELL DEVELOPMENT, PURGE, & SAMPLE FORM

Date 6/2/09

Field Book #

Sampler Names: RJRProject Location: ODOM West 2 stProject No. 26218662Page 1 of 2
(rev 4/4/05)Location / Well ID: mw-1

Elevation TOC (feet msl):

Task (circle):

Annual

Quarterly

Initial Sample

Other (list)

EQUIPMENT USEDType of pump/equipment: Grundfos Peristaltic QED Air Bladder Bailer Other:
Type of slug (for development): Volume of Slug:**METHOD OF DEVELOPMENT/PURGING** Bailing Pump - Well Volume Pump - Parameter Stabilization Low flow**WATER QUALITY PARAMETERS** by (a) HACH DR2400; (b) YSI 556 & 2100P Turbidimeter (c) other (describe):Calibrated? Yes No Equipment Decontaminated? Yes No Describe:**CASING WELL VOLUME INFORMATION (circle)****BAILER CHECK** Yes No Describe:Casing ID (inch) 0.75 2.0 3.0 4.0Color: iron flocculentSheen: Yes NoUnit Casing Volume (A) (gal/ft) 0.023 0.16 0.37 0.65Odor: Yes No Describe:Free-Phase Product: Yes NoFormula: (Diameter)² / ÷ 24.5 = gals / ft

Notes:

THICKNESS OF PRODUCT (if present) Measured with: Bailer or Interface Probe Type:

Top of product (ft btoc): _____ Top of Groundwater (ft btoc): _____ Thickness of Product (ft): _____

PURGING INFORMATION

Note: If no obvious reference, measure off north side of PVC casing and tick mark pipe.

Measurement Reference Point: BTOC (at tick mark) BGS Bottom of "V" Notch on PVC casing Other (describe) North casing

Depth to Top of Well Screen _____ (feet) Length of Well Screen: _____ (feet) Tubing Placement: _____ (feet)

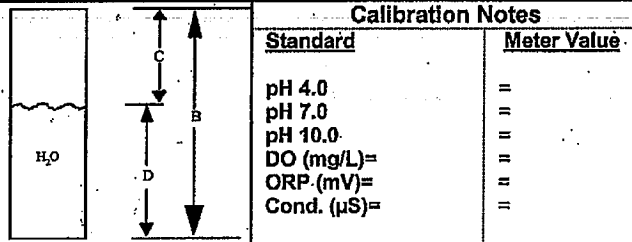
Total Well Depth (B) 19.05 feetMeasured Water Level Depth (not product) [Start] (C) 9.94 feetLength of Static Water Column (D) _____ = 9.11 feetCasing Water Volume _____ x _____ = 1.45 gallons

(A) (D)

Conversion from Gallons to Liters: # gal x 3.784 = LitersThree Casing Water Volumes 4.4 (Liters) (gallons)

Maintain pump rate at less than 1 Liters / min for low flow purging.

Maintain pump rate at less than 4 Liters/min for all other purge methods



Total Water Volume Removed _____ (Liters)

Measured Water Level Depth [End] (C) _____ feet

IMPORTANT! VERIFY UNITS AND CIRCLE APPROPRIATE VALUE FOR EACH WELL!

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter) Gallons	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)
Stabilization Method Only: three consecutive readings, taken every half well volume, are within the following limits (shaded):							NA	+/- 10%	+/- 20%	+/- 10% or less than 5 NTUs
1105			<u>0</u>	8.87	5.56	538	0.38	0.82	17.2	78
1110			0.75	8.10	4.93	507	0.37	1.66	40.1	45
1115			1.5	8.03	5.00	489	0.36	1.81	35.0	30
1120			2.25	8.06	5.08	472	0.34	1.77	31.2	9
1125			3.0	7.96	5.02	468	0.34	1.67	33.9	10
1130	Collect Sample mw-1									
1145	Collect Sample mw-4 - Duplicate									

Samplers Signature: _____

Date: 6/2/09



WELL DEVELOPMENT, PURGE, & SAMPLE RECORD (Continued)

Date 6/2/09

Field Book #

Sampler Names: RLR

Project Location: ODom - West 1st

Project No. 2678667

Page 2 of 2

Location / Well ID: mw-1

Elevation TOC (feet msl):

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter)	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)

SAMPLE COLLECTION

Sample ID: mw-1

Sample Date/Time: 6/2/09 1130

Additional Field Sample Parameters Analyzed in Field with Equipment/Test Kits
 Analyzed with 1) DR2400 HACH Spectrophotometer 2) HACH Fe²⁺ Powder Pillow 3) YSI 556 & HACH 2100P Turbidimeter

4) Chemetrics V-2000 (O ₃ #2)		5) Chemetrics Peroxide Ampule		6) Other:	
Ozone (4): <u>N/A</u> mg/L	Ferrous Iron (2): <u>N/A</u> mg/L	TDS (3): <u>0.471</u> g/L	Peroxide (5): <u>N/A</u> mg/L		
Nitrate (1): <u>N/A</u> mg/L	Nitrite (1): <u>N/A</u> mg/L	Other:			

QA/QC SAMPLES

Trip blank carried with samples?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sample ID:	<u>mw-1-TB</u>
Was a duplicate sample collected?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sample ID:	<u>mw-4</u>
Was an equipment blank sample collected?	Yes <input checked="" type="radio"/> No	Sample ID:	
Was an MS/MSD sample collected?	Yes <input checked="" type="radio"/> No	Note on COC which sample is the MS/MSD	

Scanned and Input to Database by: _____ Date: _____

Samplers Signature: R _____ Date: 6/2/09



WELL DEVELOPMENT, PURGE, & SAMPLE FORM

Date 6/2/09

Field Book #

Sampler Names: R-L-RProject Location: ODom west 2stProject No. 2621862Page 1 of 2
(rev 4/4/05)Location / Well ID: mw-2

Elevation TOC (feet msl):

Task (circle):

Annual

Quarterly

Initial Sample

Other (list)

EQUIPMENT USED

Type of pump/equipment: Grundfos Peristaltic QED Air Bladder Bailor Other:
Type of slug (for development): Volume of Slug:METHOD OF DEVELOPMENT/PURGING Bailing Pump - Well Volume Pump - Parameter Stabilization Low flow

WATER QUALITY PARAMETERS by (a) HACH DR2400; (b) YSI 556 & 2100P Turbidimeter (c) other (describe):

Calibrated? Yes No Equipment Decontaminated? Yes No Describe:

CASING WELL VOLUME INFORMATION (circle)

BAILER CHECK Yes No Describe:Casing ID (inch) 0.75 (2.0) 3.0 4.0Color: ClearSheen: Yes NoUnit Casing Volume (A) (gal/ft) 0.023 (0.16) 0.37 0.65Odor: Yes No Describe:Free-Phase Product: Yes NoFormula: (Diameter)² / ÷ 24.5 = gals / ft

Notes:

THICKNESS OF PRODUCT (if present) Measured with: Bailor or Interface Probe Type:

Top of product (ft btoc): _____ Top of Groundwater (ft btoc): _____ Thickness of Product (ft): _____

PURGING INFORMATION

Note: If no obvious reference, measure off north side of PVC casing and tick mark pipe.

Measurement Reference Point: BTOC (at tick mark) BGS Bottom of "V" Notch on PVC casing
 Other (describe) North casing

Depth to Top of Well Screen _____ (feet) Length of Well Screen: _____ (feet) Tubing Placement: _____ (feet)

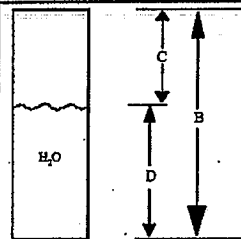
Total Well Depth (B) 22.0 feetMeasured Water Level Depth (not product) [Start] (C) 9.37 feetLength of Static Water Column (D) _____ = 12.63 feet
(B) (C) (D)Casing Water Volume _____ x _____ = 2.02 gallons
(A) (D)

Conversion from Gallons to Liters: # gal x 3.784 = Liters

Three Casing Water Volumes 6.1 (Liters) (gallons)

Maintain pump rate at less than 1 Liters / min for low flow purging.

Maintain pump rate at less than 4 Liters/min for all other purge methods.



Calibration Notes

Standard	Meter Value
pH 4.0	
pH 7.0	
pH 10.0	
DO (mg/L)=	
ORP (mV)=	
Cond. (µS)=	

Total Water Volume Removed _____ (Liters)

Measured Water Level Depth [End] (C) _____ feet

IMPORTANT! VERIFY UNITS AND CIRCLE APPROPRIATE VALUE FOR EACH WELL!

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter) <u>Circle</u>	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)
Stabilization Method Only: three consecutive readings, taken every half well volume, are within the following limits (shaded):							NA	+/- 10%	+/- 20%	+/- 10% or less than 5 NTUs
1151			<u>0</u>	6.79	6.55	387	0.29	1.50	-38.6	26
1156			0.75	6.32	6.11	378	0.29	1.59	-19.6	24
1201			1.50	6.25	5.98	378	0.29	1.62	-13.9	11
1206			2.25	6.26	6.00	379	0.29	1.58	-19.7	8
1211			3.0	6.28	6.10	379	0.29	1.49	-20.7	4
1215	Collect Sample		<u>mw-2</u>							

Samplers Signature: [Signature]Date: 6/2/09



WELL DEVELOPMENT, PURGE, & SAMPLE RECORD (Continued)

Date 6/2/09

Field Book #

Sampler Names:

RLK

Project Location: ODom West 7st

Project No. 26218662

Page 2 of 2

Location / Well ID: MW-2

Elevation TOC (feet msl):

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter)	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)

SAMPLE COLLECTION

Sample ID: MW-2

Sample Date/Time: 6/2/09 1215

Additional Field Sample Parameters Analyzed in Field with Equipment/Test Kits

Analyzed with 1) DR2400 HACH Spectrophotometer 2) HACH Fe²⁺ Powder Pillow 3) YSI 556 & HACH 2100P Turbidimeter

4) Chemetrics V-2000 (O₃ #2) 5) Chemetrics Peroxide Ampule 6) Other:

Ozone (4): N/A mg/L Ferrous Iron (2): N/A mg/L TDS (3): 0.385 g/L Peroxide (5): N/A mg/L

Nitrate (1): N/A mg/L Nitrite (1): N/A mg/L Other:

QA/QC SAMPLES

Trip blank carried with samples? Yes No Sample ID: MW-1-TB

Was a duplicate sample collected? Yes No Sample ID:

Was an equipment blank sample collected? Yes No Sample ID:

Was an MS/MSD sample collected? Yes No Note on COC which sample is the MS/MSD

Scanned and Input to Database by: _____ Date: _____

Samplers Signature:  _____ Date: 6/2/09



WELL DEVELOPMENT, PURGE, & SAMPLE FORM

Date 6/2/09

Field Book #

Sampler Names: RLRProject Location: 0 Dom - west 2 stProject No. 26218662Page 1 of 2
(rev 4/4/05)Location / Well ID: mw-3

Elevation TOC (feet msl):

Task (circle):

Annual

Quarterly

Initial Sample

Other (list)

EQUIPMENT USEDType of pump/equipment: Grundfos Peristaltic QED Air Bladder Bailer Other:
Type of slug (for development):
Volume of Slug:**METHOD OF DEVELOPMENT/PURGING** Bailing Pump - Well Volume Pump - Parameter Stabilization Low flow**WATER QUALITY PARAMETERS** by (a) HACH DR2400; (b) YSI 556 & 2100P Turbidimeter (c) other (describe):Calibrated? Yes No Equipment Decontaminated? Yes No Describe:**CASING WELL VOLUME INFORMATION**
(circle)**BAILER CHECK** Yes No Describe:

Casing ID (inch)

0.75

2.0

3.0

4.0

Color: clearSheen: Yes NoUnit Casing Volume
(A) (gal/ft)

0.023

0.16

0.37

0.65

Odor: Yes No Describe:Free-Phase Product: Yes NoFormula: (Diameter)² / ÷ 24.5 = gals / ft

Notes:

THICKNESS OF PRODUCT (if present) Measured with: Bailer or Interface Probe Type:

Top of product (ft btoc): _____ Top of Groundwater (ft btoc): _____ Thickness of Product (ft): _____

PURGING INFORMATION

Note: If no obvious reference, measure off north side of PVC casing and tick mark pipe.

Measurement Reference Point: BTOC (at tick mark) BGS Bottom of "V" Notch on PVC casing Other (describe)North casing

Depth to Top of Well Screen _____ (feet) Length of Well Screen: _____ (feet) Tubing Placement: _____ (feet)

Total Well Depth (B) 22.12 feetMeasured Water Level Depth (not product) [Start] (C) 9.46 feetLength of Static Water Column (D) _____ = 12.66 feet

(B)

(C)

(D)

Casing Water Volume _____ x _____ = 2.03 gallons

(A)

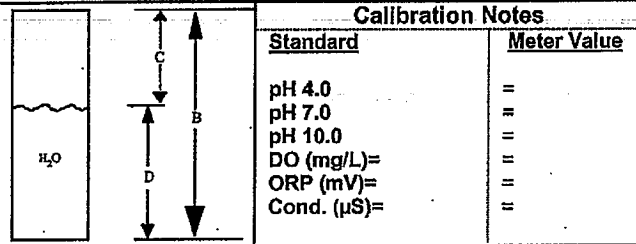
(D)

Conversion from Gallons to Liters: # gal x 3.784 = Liters

Three Casing Water Volumes 6.1 (Liters) (gallons)

Maintain pump rate at less than 1 Liters / min for low flow purging.

Maintain pump rate at less than 4 Liters/min for all other purge methods



Total Water Volume Removed _____ (Liters)

Measured Water Level Depth [End] (C) _____ feet

IMPORTANT! VERIFY UNITS AND CIRCLE APPROPRIATE VALUE FOR EACH WELL!

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter) (gallons)	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)
Stabilization Method Only: three consecutive readings, taken every half well volume, are within the following limits (shaded):							NA	+/- 10%	+/- 20%	+/- 10% or less than 5 NTUs
1230			<u>0.75</u>	7.24	6.71	368	0.27	0.93	-24.6	11
1235			<u>1.5</u>	7.01	6.69	367	0.27	1.66	-30.7	8
1240			<u>2.25</u>	7.00	6.72	367	0.27	1.72	-33.2	5
1245				7.01	6.67	366	0.27	1.67	-30.1	3
1300	Collect sample	mw-3								

Samplers Signature: _____

Date: 6/2/09



WELL DEVELOPMENT, PURGE, & SAMPLE RECORD (Continued)

Date 6/2/09

Field Book # _____

Sampler Names: PLR

Project Location: ODOM-west 2A

Project No. 26218662

Page 2 of 2

Location / Well ID: mw-3

Elevation TOC (feet msl): _____

Time	Purge Rate (L/min)	Water Level Depth (feet)	Volume Purged (Liter)	Temp (°C)	pH	Specific Cond. (µS/cm)	Salinity (ppt)	DO (mg/L)	ORP (mV)	Turbidity (NTU)

SAMPLE COLLECTION

Sample ID: mw-3

Sample Date/Time: 6/2/09 1300

Additional Field Sample Parameters Analyzed in Field with Equipment/Test Kits

Analyzed with 1) DR2400 HACH Spectrophotometer 2) HACH Fe²⁺ Powder Pillow 3) YSI 556 & HACH 2100P Turbidimeter

4) Chemetrics V-2000 (O ₃ #2)	5) Chemetrics Peroxide Ampule	6) Other:
Ozone (4): N/A mg/L _____	Ferrous Iron (2): N/A mg/L _____	TDS (3): 0.362 g/L
Nitrate (1): N/A mg/L _____	Nitrite (1): N/A mg/L _____	Other: _____
Peroxide (5): N/A mg/L _____		

QA/QC SAMPLES

Trip blank carried with samples?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Sample ID: <u>mw-1-TB</u>
Was a duplicate sample collected?	Yes <input checked="" type="radio"/> No	Sample ID: _____
Was an equipment blank sample collected?	Yes <input checked="" type="radio"/> No	Sample ID: _____
Was an MS/MSD sample collected?	Yes <input checked="" type="radio"/> No	Note on COC which sample is the MS/MSD _____

Scanned and Input to Database by: _____ Date: _____

Samplers Signature:  Date: 6/2/09



WATER LEVEL MEASUREMENT FORM

Date 6/2/09

Field Book #

Sampler Names:

R4Project Location: 000m-west 2 stProject No. 21218662Page 1 of 1
(rev 4/20/05)

Field Task and General Comments:

Measuring Point Reference: Reference is Below Top Of PVC Casing (BTOC) unless otherwise noted in comments

Water Level Instrument Model:

	Location ID	Date Measured	Time Measured	Product Thickness (feet)	Depth to Static Water Level (ft-btoc)	Total Depth of Well or Borehole (ft-btoc)	Comments
1	<u>mw1</u>	<u>6/2/09</u>	<u>1030</u>	<u>NA</u>	<u>9.94</u>	<u>19.05</u>	
2	<u>mw2</u>		<u>1036</u>	<u>NA</u>	<u>9.77</u>	<u>22.0</u>	
3	<u>mw3</u>		<u>1042</u>	<u>NA</u>	<u>9.46</u>	<u>22.12</u>	
4							
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25							



SGS Environmental Services Inc.
CHAIN OF CUSTODY RECORD

1092361



CLIENT: URS Corporation PHONE NO: 907-562-3366 page 1 of 1

CONTACT: Bill Lookstofer SITE/PROJECT#: _____

PROJECT: ODOM - west 1st EMAIL: Bill.Lookstofer@urscorp.com

REPORTS TO: Bill Lookstofer QUOTE #: _____

INVOICE TO: URS Corp P.O. #: 18701105

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/MATRIX CODE	# CONTAINERS	SAMPLE TYPE C- COMP G- GRAB MI- Muff Incidental Samples	Preservatives Used			REMARKS/LOC ID
							HCl	KI	HNO3	
	MW-1	6/2/09	1130	W	6	G/B/PTX	X	X	X	AK101 / 80219
	MW-2		1215	W	6	G/B/PTX	X	X	X	AK102 / 103
	MW-3		1300	W	6	G/B/PTX	X	X	X	UST Metals 6020
	MW-4		1145	W	6	G/B/PTX	X	X	X	AK102 / 103
	MW-1-TB	6/2/09	0900	W	3	G/B/PTX	X	X	X	AK101 / 80219

Special Deliverable Requirements: _____

DOD Project? YES NO

Cooler ID _____

Requested Turnaround Time and/or Special Instructions: _____

Samples Received Cold? YES NO

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Temperature C: 5.6 TB 1.2