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3RP - 439

ENTERPRISE FIELD SERVICES, LLC

SUPPLEMENTAL ENVIRONMENTAL SITE INVESTIGATION

Property:

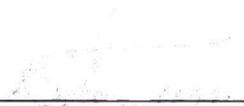
K-17/K-Trunk Pipeline Release
Sec 23, T27N, R8W
San Juan County, New Mexico

August 21, 2012
SWG Project No. 0411015

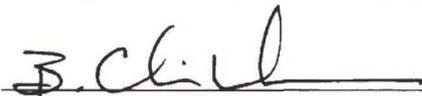
Prepared for:

Enterprise Field Services, LLC
P.O. Box 4324
Houston, Texas 77210-4324
Attn: Mr. David R. Smith, P.G.

Prepared by:



Kyle Summers, CPG
Manager, Four Corners Office



B. Chris Mitchell, P.G.
Senior Technical Review

Southwest

606 S. Rio Grande Avenue
Unit A, Downstairs West
Aztec, NM 87410
Ph: (505) 334-5200
Fax: (505) 334-5204

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SUPPLEMENTAL ENVIRONMENTAL SITE INVESTIGATION

K-17/K-Trunk Pipeline Release
Sec 23, T27N, R8W
San Juan County, New Mexico

SWG Project No. 0411015

1.0 INTRODUCTION

1.1 Site Description & Background

The Site is located in Section 23, Township 27 North, Range 8 West, in San Juan County, New Mexico. The Site consists of a pigging station utilized to collect liquids generated during pigging activities on the K-17 pipeline prior to discharge to the K-Trunk pipeline. In addition, corrosion inhibitor and methanol are injected into the K-Trunk pipeline at the Site to prevent corrosion and the freezing of liquids in the pipeline, which would limit the ability of the pig to proceed downstream during maintenance operations. Three (3) natural gas pipelines operated by Enterprise Field Services LLC (Enterprise) traverse the Site, which is surrounded by native rangeland. The objective of the supplemental site investigation activities was to further evaluate the magnitude of petroleum hydrocarbon constituents of concern (COCs) in groundwater at the Site, prior to the implementation of corrective actions.

In August 2010, LT Environmental, Inc. (LTE) advanced ten (10) soil borings (BH1 through BH10) in the vicinity of the petroleum hydrocarbon impacted soils identified during maintenance activities. The soil borings were advanced to depths ranging from 20 to 28 feet below ground surface (bgs). Based on the results of the investigation activities completed by LTE, petroleum hydrocarbon affected soils were identified in the immediate vicinity of the K-17/K-Trunk tie-in.

During March 2012, Southwest Geoscience (SWG) performed a Limited Site Investigation (LSI) at the Site (*Limited Site Investigation & Corrective Action Work Plan* - SWG, April 4, 2012). During the LSI, SWG advanced four (4) soil borings (TSW-11 through TSW-14) in the vicinity of the former pipeline release utilizing a direct push Geoprobe® drilling rig. Additionally, each of these soil borings was completed as a Temporary Sampling Well (TSW) to allow the collection of groundwater samples. Analytical results from the TSW soil samples verified that affected soils were present at the groundwater interface in the vicinity of the release, and analytical results from the groundwater samples identified groundwater impact at the source area.

A topographic map is included as Figure 1, an aerial photograph of the Site vicinity is included as Figure 2, and a Site plan is included as Figure 3 of Appendix A.

1.2 Scope of Work

The objective of the supplemental site investigation activities was to further evaluate the magnitude of petroleum hydrocarbon constituents of concern (COCs) in groundwater at the Site, prior to the implementation of corrective actions.

1.3 Standard of Care & Limitations

The findings and recommendations contained in this report represent SWG's professional opinions based upon information derived from on-Site activities and other services performed under this scope of work and were arrived at in accordance with currently acceptable professional standards. The findings were based upon analytical results provided by an independent laboratory. Evaluations of the geologic/hydrogeologic conditions at the Site for the purpose of this investigation are made from a limited number of available data points (i.e. soil borings and ground water samples) and Site wide subsurface conditions may vary from these data points. SWG makes no warranties, express or implied, as to the services performed hereunder. Additionally, SWG does not warrant the work of third parties supplying information used in the report (e.g. laboratories, regulatory agencies, or other third parties).

This report is based upon a specific scope of work requested by Enterprise Field Services, LLC. The agreement between SWG and Enterprise Field Services, LLC outlines the scope of work, and only those tasks specifically authorized by that agreement or outlined in this report were performed. This report has been prepared for the intended use of Enterprise Field Services, LLC, and any authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the Site) is prohibited without the express written authorization of Enterprise Field Services, LLC. and SWG.

2.0 PERMANENT MONITORING WELL INSTALLATION

2.1 Soil Boring & Monitoring Well Installation

Prior to the implementation of corrective actions, one (1) soil boring/permanent monitoring well was advanced in the vicinity of the release source to confirm the magnitude of COCs in groundwater as proposed in the *Limited Site Investigation & Corrective Action Work Plan* (SWG, April 4, 2012). The resulting field activities were initiated on July 11, 2012 by Mr. Kyle Summers, a SWG environmental professional. One (1) soil boring (MW-15) was advanced in the vicinity of the former pipeline release, adjacent to previous soil boring TSW-11 utilizing a direct push Geoprobe® drilling rig.

Figure 3 is a Site Plan that indicates the approximate location of the soil borings in relation to pertinent land features and former soil boring/temporary sampling well locations (Appendix A).

Soil samples were collected continuously utilizing four-foot core barrel samplers to the termination depth of each soil boring. Soil samples were observed to document soil lithology, color, moisture content, and visual and olfactory evidence of petroleum hydrocarbons. Field headspace analysis was conducted by placing the portion of the soil sample designated for field screening into a plastic ziplock bag.

The plastic bag was sealed and then placed in a warm area to promote volatilization. The air above the sample, the headspace, was then evaluated using a photoionization detector (PID) capable of detecting volatile organic compounds (VOCs). The PID was calibrated utilizing an isobutylene standard prior to use in the field.

During the completion of each soil boring, an on-Site geoscientist documented the lithology encountered and constructed a continuous profile of the soil column from the surface to the boring terminus. Undisturbed soil samples from the boring location were visually inspected and logged in the field. The lithology encountered during the advancement of soil boring MW-15 included tan sandy silt from the ground surface to a depth of approximately 12 feet bgs. The sandy silt stratum was underlain by a tan silty sand to a depth of approximately 16 feet bgs. The silty sand stratum was underlain by a brown silty clay from a depth of approximately 16 to 22 feet bgs. The silty clay stratum was underlain by a tan silty clay to a depth of approximately 24 feet bgs. A tan silty sand was encountered at a depth of 24 feet bgs to the terminus of the boring at approximately 25 feet bgs. More detailed lithologic descriptions are presented on the soil boring log included in Appendix B.

Petroleum hydrocarbon odors were detected in the field in soil samples collected from soil boring MW-15. The PID readings from soil boring MW-15 ranged from below detection to 298 parts per million (ppm), with the highest reading near the groundwater interface at depths of 18 to 20 feet bgs. Due to the close proximity of former soil boring TSW-11, soil samples were not collected for laboratory analysis during the advancement of soil boring MW-15. Field screening results are presented on soil boring logs included in Appendix B.

Subsequent to advancement, the soil boring was converted to a permanent monitoring well (MW-15). The groundwater monitoring well was completed as follows:

- Installation of 10 feet of 2-inch diameter, machine slotted PVC well screen assembly with a threaded bottom plug;
- Installation of riser pipe to surface;
- Addition of graded silica sand for annular sand pack around the well screen from the bottom of the well to two feet above the top of the screen;
- Placement of hydrated bentonite pellets above the sand pack;
- Installation of a locking well cap and below-grade circular well vault.

The monitoring well was developed by surging and removing groundwater until the fluid was relatively free of fine-grained sediment.

Monitoring well construction details are presented on the soil boring/monitoring well log included in Appendix B.

2.2 Investigation Sampling Program

2.2.1 Groundwater Sampling Program

One (1) groundwater sample was collected from the permanent monitoring well. Prior to sample collection, the monitoring well was micro-purged utilizing low-flow sampling techniques. Low-flow refers to the velocity with which groundwater enters the pump intake and that is imparted to the formation pore water in the immediate

vicinity of the well screen. It does not necessarily refer to the flow rate of water discharged at the surface which can be affected by flow regulators or restrictions. Water level drawdown provides the best indication of the stress imparted by a given flow-rate for a given hydrological situation. The objective was to pump in a manner that minimizes stress (drawdown) to the system to the extent practical taking into account established Site sampling objectives. Flow rates on the order of 0.1 to 0.5 L/min were maintained during the sampling activities using dedicated sampling equipment.

The utilization of low-flow minimal drawdown techniques enables the isolation of the screened interval groundwater from the overlying stagnant casing water. The pump intake is placed within the screened interval such that the groundwater recovered is drawn in directly from the formation with little mixing of casing water or disturbance to the sampling zone.

The groundwater sample was collected once produced groundwater was consistent in color, clarity, pH, dissolved oxygen (DO), oxidation/reduction potential (ORP), temperature and conductivity.

3.0 LABORATORY ANALYTICAL PROGRAM

3.1 Laboratory Analytical Methods

The groundwater sample collected from monitoring well MW-15 was analyzed for total petroleum hydrocarbons (TPH) gasoline range organics (GRO) and diesel range organics (DRO) utilizing EPA SW-846 method #8015B and benzene, toluene, ethylbenzene and xylenes (BTEX) using EPA SW-846 method #8021B.

Laboratory results are summarized in Table 1, included in Appendix C. The executed chain-of-custody form and laboratory data sheets are provided in Appendix D.

3.2 Quality Assurance/Quality Control (QA/QC)

Non-disposable sampling equipment was cleaned using an Alconox® wash and potable water rinse prior to the beginning of the project and before the collection of each sample.

The groundwater sample was collected and placed in laboratory prepared glassware, sealed with custody tape and placed on ice in a cooler, which was secured with a custody seal. The sample cooler and completed chain-of-custody form was relinquished to Hall Environmental Analysis Laboratory (Hall) in Albuquerque, New Mexico for standard turnaround.

Hall performed the analysis of the sample under an adequate and documented quality assurance program to meet the project and data quality objectives. The laboratory's quality assurance program is generally consistent the quality standards outlined in the National Environmental Laboratory Accreditation Program, as amended. In addition, the data generated by Hall meets the intralaboratory performance standards for the selected analytical method and the performance standards are sufficient to meet the bias, precision, sensitivity, representativeness, comparability, and completeness, as specified in the project data quality objectives.

4.0 SITE CHARACTERIZATION

4.1 Geology & Hydrogeology

According to the New Mexico Bureau of Geology and Mineral Resource (Geologic Map of New Mexico 2003), the Site overlies the Nacimiento geologic formation. The Nacimiento geologic formation is a heterogeneous non-marine formation composed of sandstone, siltstone, and shale, comprised of sediment eroded from the San Juan and Brazos-Sangre de Cristo uplifts. The Paleocene-age Nacimiento Group includes the Puerco and Torrejon Formations. The lithology encountered at the Site during boring activities are composed of Quaternary alluvial deposits derived from erosion of the parent Nacimiento sandstones and siltstones which comprise the canyon walls. Based on the data collected during the completion of previous soil borings, the alluvia generally consist of brown silty sands and silty clays from the ground surface to at least 28 feet bgs.

The lithology encountered during the advancement of soil boring MW-15 included tan sandy silt from the ground surface to a depth of approximately 12 feet bgs. The sandy silt stratum was underlain by a tan silty sand with to a depth of approximately 16 feet bgs. The silty sand stratum was underlain by a brown silty clay from a depth of approximately 16 to 22 feet bgs. The silty clay stratum was underlain by a tan silty clay to a depth of approximately 24 feet bgs. A tan silty sand was encountered at a depth of 24 feet bgs to the terminus of the boring at approximately 25 feet bgs. More detailed lithologic descriptions are presented on the soil boring log included in Appendix B.

The major aquifer underlying the Site vicinity is listed as the Colorado Plateaus Aquifer, which is made up of four smaller aquifers, the Uinta-Animas, the Mesa Verde, the Dakota-Glen, and the Coconino-De Chelly. The Uinta-Animas is the shallowest of these aquifers, and is present in the San Juan Basin. The general composition of the aquifers is moderately to well-consolidated sedimentary rocks of an age ranging from Permian to Tertiary. Each aquifer is separated from the others by an impermeable confining unit. Two of the confining units are completely impermeable and cover the entire area of the aquifers. The other two confining units are less extensive and are thinner. These units allow water to flow between the principal aquifers. There are countless streams, rivers, and lakes that overlay the Colorado Plateaus Aquifers. The surface water bodies in this region provide a place for the aquifers to discharge. Some of the high altitude rivers and lakes may also provide recharge.

The initial groundwater-bearing unit (GWBU) at the Site was encountered at a depth of approximately 19 feet bgs during the investigation activities.

4.2 Site Ranking

In accordance with the New Mexico Oil Conservation Division's (OCD's) *Guidelines for Remediation of Leaks, Spills and Releases*, SWG utilized the general site characteristics to determine the appropriate "ranking" for the Site. The ranking criteria and associated scoring are provided in the table below:

Ranking Criteria		Ranking Score
Depth to Groundwater	<50 feet	20
	50 to 99 feet	10
	>100 feet	0
Wellhead Protection Area • <1,000 feet from a water source, or; <200 feet from private domestic water source.	Yes	20
	No	0
Distance to Surface Water Body	<200 feet	20
	200 to 1,000 feet	10
	>1,000 feet	0
Total Ranking Score		30

Based on SWG's evaluation of the scoring criteria, the Site would have a Total Ranking Score of 30. This ranking is based on the following:

- The depth to the initial groundwater-bearing zone is <50 feet at the Site.
- Largo wash, which is approximately 550 feet north of the Site, drains into the San Juan River and is the nearest surface water feature.

Based on a Total Ranking Score of 30, the *Remediation Action Levels* (RALs) for soil at the Site are: 10 mg/Kg for benzene, 50 mg/Kg for total BTEX and 100 mg/Kg for TPH GRO/DRO.

In addition, the Water Quality Control Commission (WQCC) *Groundwater Quality Standards* (GQSS) for groundwater are: 0.010 mg/L for benzene, 0.75 mg/L for toluene, 0.75 mg/L for ethylbenzene, and 0.62 mg/L for total xylenes.

5.0 DATA EVALUATION

The Site is subject to regulatory oversight by the New Mexico Energy, Minerals and Natural Resources Department (EMNRD) OCD. To address activities related to crude oil/condensate related releases, the New Mexico EMNRD OCD utilizes the *Guidelines for Remediation of Leaks, Spills and Releases* as guidance, in addition to the EMNRD/OCD rules, specifically New Mexico Administrative Code (NMAC) 19.15.30 Remediation. These guidance documents establish investigation and abatement action requirements for sites subject to reporting and/or corrective action.

5.1 Groundwater

SWG compared BTEX concentrations or reporting limits (RLs) associated with the groundwater sample collected from monitoring well MW-15 to the WQCC *Groundwater Quality Standards*.

The results of the groundwater sample analysis are summarized in Table 1 of Appendix C.

Total Petroleum Hydrocarbons

The groundwater sample collected from monitoring well MW-15 exhibited a TPH GRO/DRO concentration of 1.3 mg/L.

Benzene, Toluene, Ethylbenzene, and Xylenes

The groundwater sample collected from monitoring well MW-15 exhibited a benzene concentration of 76 µg/L, which exceeds the WQCC *Groundwater Quality Standard* of 10 µg/L.

The groundwater sample collected from monitoring well MW-15 exhibited a toluene concentration of 150 µg/L, which is below the WQCC *Groundwater Quality Standard* of 750 µg/L.

The groundwater sample collected from monitoring well MW-15 exhibited an ethylbenzene concentration of 10 µg/L, which is below the WQCC *Groundwater Quality Standard* of 750 µg/L.

The groundwater sample collected from monitoring well MW-15 exhibited a total xylenes concentration of 200 µg/L, which is below the WQCC *Groundwater Quality Standard* of 620 µg/L.

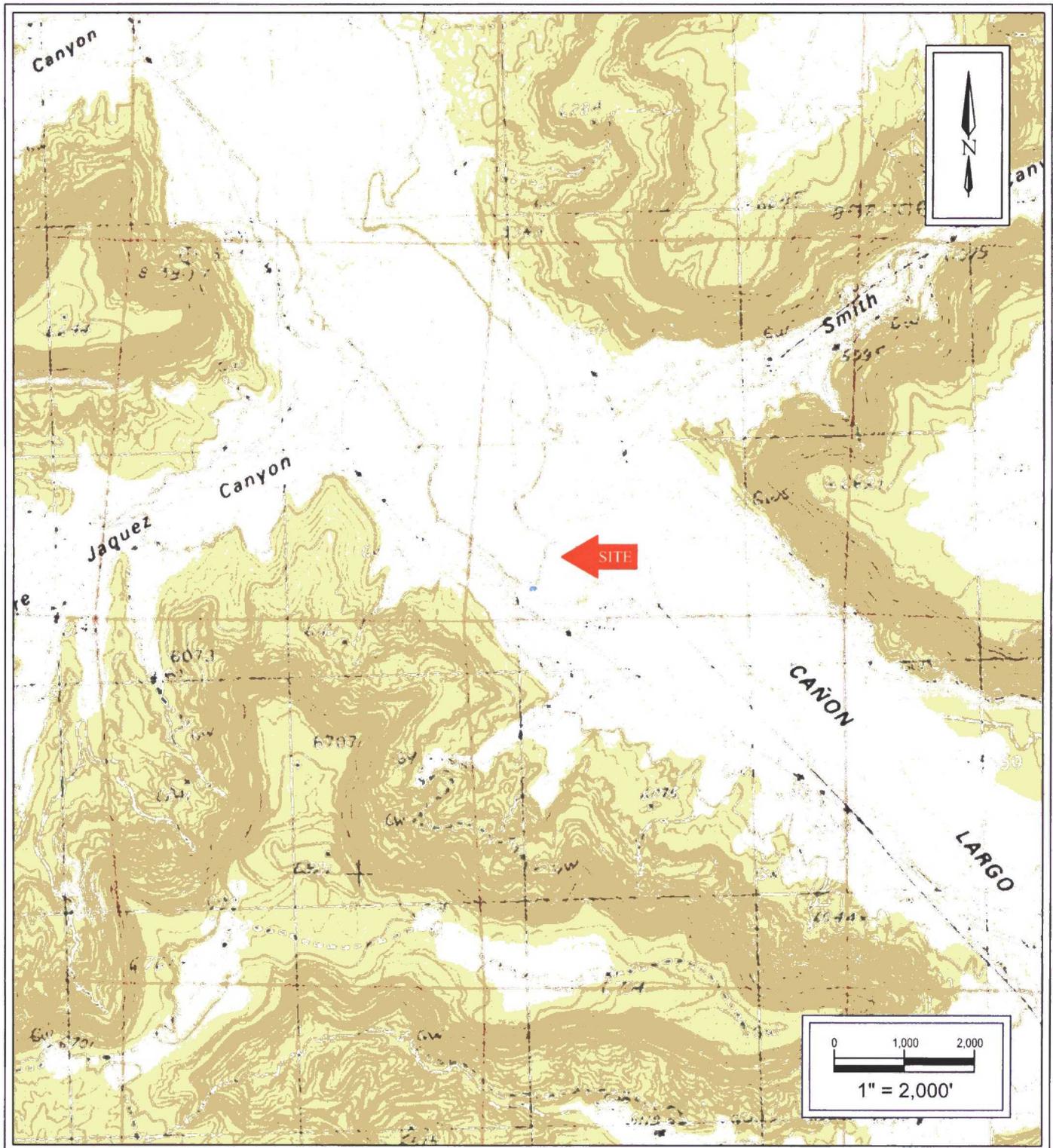
Figure 4 is a *Groundwater Quality Standard Exceedance Zone Map* that indicates the approximate distribution of benzene in relation to pertinent land features (Appendix A).

6.0 FINDINGS

The Site is located in Section 23, Township 27 North, Range 8 West, in San Juan County, New Mexico. The Site consists of a pigging station utilized to collect liquids generated during pigging activities on the K-17 pipeline prior to discharge to the K-Trunk pipeline. In addition, corrosion inhibitor and methanol are injected into the K-Trunk pipeline at the Site to prevent corrosion and the freezing of liquids in the pipeline, which would limit the ability of the pig to proceed downstream during maintenance operations. Three (3) natural gas pipelines operated by Enterprise Field Services LLC (Enterprise) traverse the Site, which is surrounded by native rangeland. The objective of the supplemental site investigation activities was to further evaluate the magnitude of petroleum hydrocarbon constituents of concern (COCs) in groundwater at the Site, prior to the implementation of corrective actions.

- Based on laboratory analysis, the groundwater sample collected from monitoring well MW-15 exhibited a benzene concentration of 76 µg/L which exceeds the WQCC *Groundwater Quality Standard* of 10 µg/L.

Based on the results of supplemental site investigation activities, the initial groundwater bearing unit does appear to be affected by a release of petroleum hydrocarbon COC above the New Mexico WQCC *Groundwater Quality Standards*. Therefore, SWG recommends Enterprise proceed with the corrective actions described in the *Limited Site Investigation & Corrective Action Work Plan* – SWG April 4, 2012.

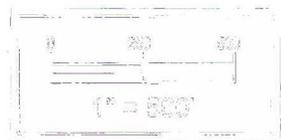


K-17/K Trunk Release
 S23 T27N R8W
 N36.552209°; W107.652894°
 San Juan County, New Mexico

SWG Project No. 0411015

Southwest

Figure 1
 USGS Topographic Map
 Fresno Canyon, NM Quadrangle
 Contour Interval = 20 Feet
 1985

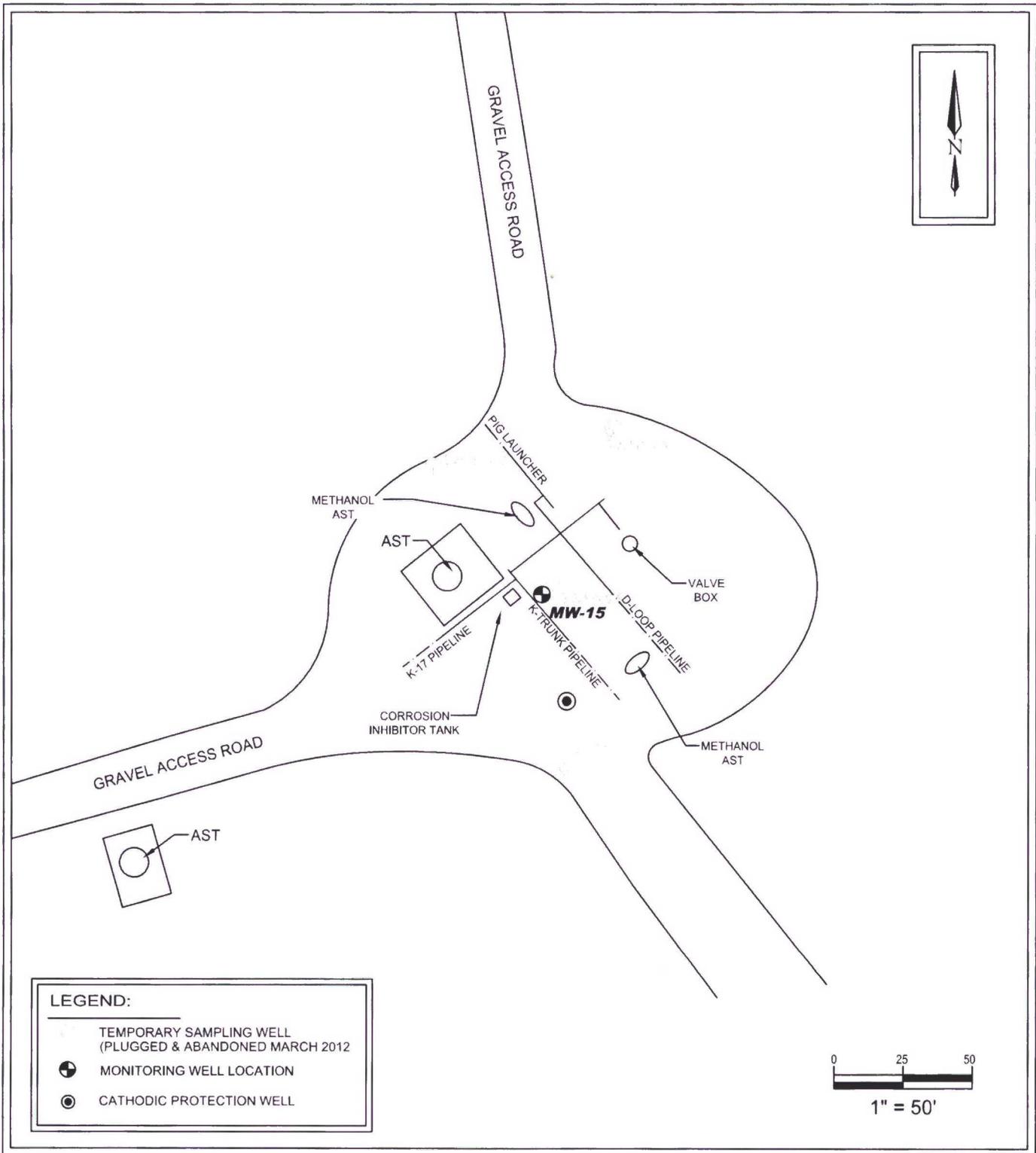


1617/K Trust's Release
S23 T27N R6W
N36.552209°, W107.552694°
San Juan County, New Mexico

SWO Project No. 0411015

Southwest
SURVEYING & ENGINEERING

Figure 2
Site Vicinity Map

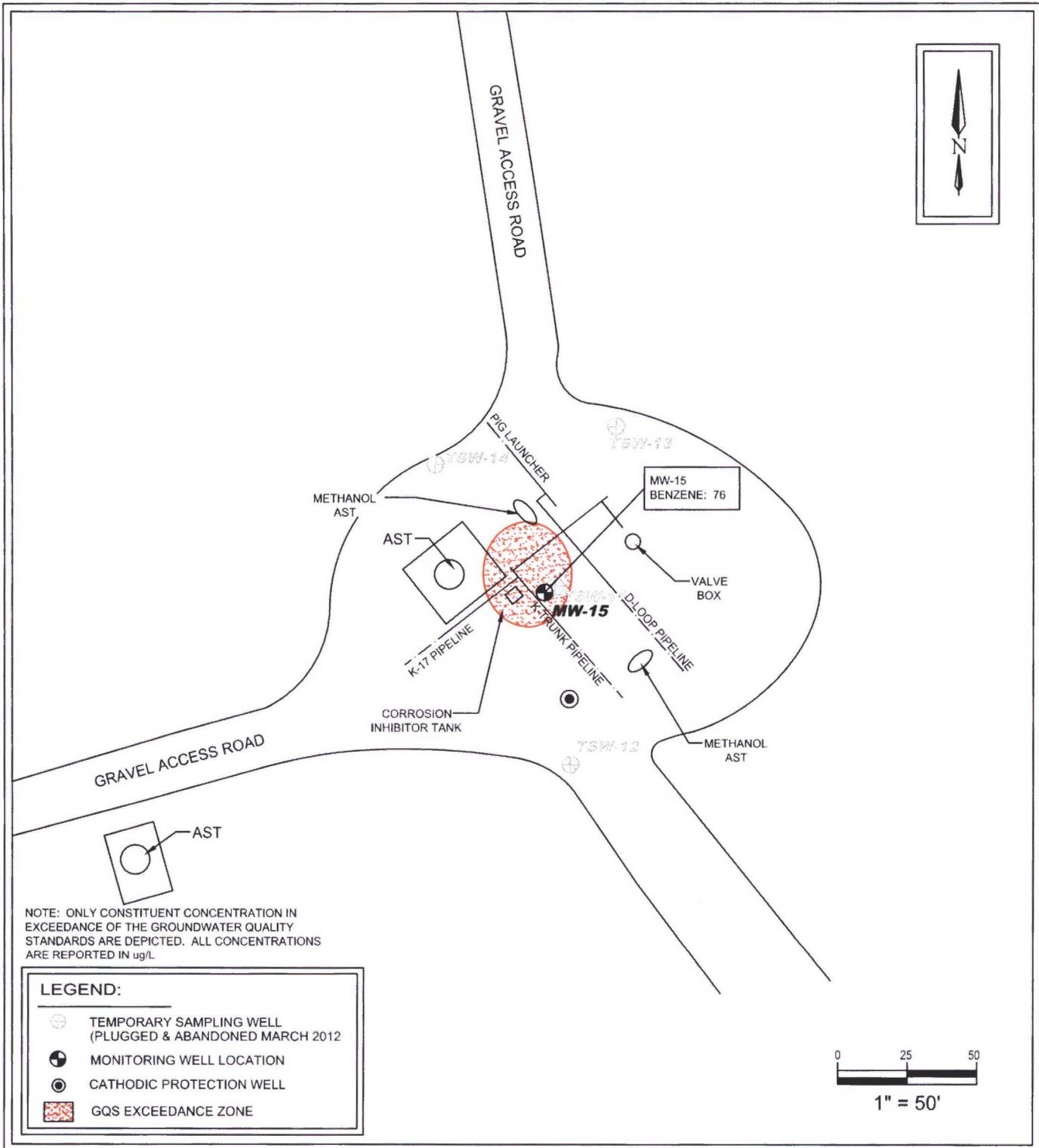


K-17/K Trunk Release
 S23 T27N R8W
 N36.552209°; W107.652894°
 San Juan County, New Mexico

SWG Project No. 0411015



Figure 3
Site Map



K-17/K Trunk Release
 S23 T27N R8W
 N36.552209°; W107.652894°
 San Juan County, New Mexico

SWG Project No. 0411015



Figure 4
 Groundwater Quality Standard (GQS) Exceedance Zone in Groundwater

Sample Date: 7.23.2012

TABLE 1
K-17/K-TRUNK PIPELINE RELEASE
GROUNDWATER ANALYTICAL SUMMARY

Sample I.D.	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	TPH GRO (mg/L)	TPH DRO (mg/L)
New Mexico Water Quality Control Commission Groundwater Quality Standards		10	750	750	620	NE	NE
TSW-11	3.21.12	25	75	11	120	0.83	<1.0
TSW-12	3.21.12	<2.0	<2.0	<2.0	<4.0	<0.10	<1.0
TSW-13	3.21.12	<2.0	<2.0	<2.0	<4.0	<0.10	<1.0
TSW-14	3.21.12	<2.0	<2.0	<2.0	<4.0	<0.10	<1.0
MW-15	7.23.12	76	150	10	200	1.3	<1.0

Note: Concentrations in bold and yellow exceed the applicable OCD Remediation Action Level

NA = Not Analyzed

NE = Not Established

APPENDIX D

Laboratory Data Sheets & Chain of Custody
Documentation



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

August 02, 2012

Kyle Summers

Southwest Geoscience
606 S. Rio Grande Unit A
Aztec, NM 87410
TEL: (214) 350-5469
FAX (214) 350-2914

RE: K-17

OrderNo.: 1207B00

Dear Kyle Summers:

Hall Environmental Analysis Laboratory received 1 sample(s) on 7/25/2012 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
 Lab Order 1207B00
 Date Reported: 8/2/2012

CLIENT: Southwest Geoscience
 Project: K-17
 Lab ID: 1207B00-001

Client Sample ID: MW-15
 Collection Date: 7/23/2012 2:05:00 PM
 Received Date: 7/25/2012 10:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE						Analyst: JMP
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	7/27/2012 9:25:54 AM
Surr: DNOP	117	79.5-166		%REC	1	7/27/2012 9:25:54 AM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	1.3	0.050		mg/L	1	7/26/2012 6:38:22 PM
Surr: BFB	113	69.8-119		%REC	1	7/26/2012 6:38:22 PM
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	76	1.0		µg/L	1	7/26/2012 6:38:22 PM
Toluene	150	10		µg/L	10	7/27/2012 4:06:10 PM
Ethylbenzene	10	1.0		µg/L	1	7/26/2012 6:38:22 PM
Xylenes, Total	200	2.0		µg/L	1	7/26/2012 6:38:22 PM
Surr: 4-Bromofluorobenzene	105	55-140		%REC	1	7/26/2012 6:38:22 PM

Qualifiers: */X Value exceeds Maximum Contaminant Level.
 E Value above quantitation range
 J Analyte detected below quantitation limits
 R RPD outside accepted recovery limits
 S Spike Recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank
 H Holding times for preparation or analysis exceeded
 ND Not Detected at the Reporting Limit
 RL Reporting Detection Limit
 U Samples with CalcVal < MDL

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1207B00

02-Aug-12

Client: Southwest Geoscience
Project: K-17

Sample ID: MB-3044	SampType: MBLK	TestCode: EPA Method 8015B: Diesel Range								
Client ID: PBW	Batch ID: 3044	RunNo: 4457								
Prep Date: 7/26/2012	Analysis Date: 7/27/2012	SeqNo: 124543			Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	1.0								
Surr: DNOP	1.1		1.000		113	79.5	166			

Sample ID: LCS-3044	SampType: LCS	TestCode: EPA Method 8015B: Diesel Range								
Client ID: LCSW	Batch ID: 3044	RunNo: 4457								
Prep Date: 7/26/2012	Analysis Date: 7/27/2012	SeqNo: 124598			Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	4.4	1.0	5.000	0	88.6	74	157			
Surr: DNOP	0.46		0.5000		91.4	79.5	166			

Sample ID: LCSD-3044	SampType: LCSD	TestCode: EPA Method 8015B: Diesel Range								
Client ID: LCSS02	Batch ID: 3044	RunNo: 4457								
Prep Date: 7/26/2012	Analysis Date: 7/27/2012	SeqNo: 124599			Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	4.3	1.0	5.000	0	85.5	74	157	3.53	23	
Surr: DNOP	0.44		0.5000		88.6	79.5	166	0	0	

Qualifiers:

*X Value exceeds Maximum Contaminant Level.
 E Value above quantitation range
 J Analyte detected below quantitation limits
 R RPD outside accepted recovery limits

B Analyte detected in the associated Method Blank
 H Holding times for preparation or analysis exceeded
 ND Not Detected at the Reporting Limit
 RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1207B00
02-Aug-12

Client: Southwest Geoscience
Project: K-17

Sample ID	5ML RB	SampType:	MBLK	TestCode:	EPA Method 8015B: Gasoline Range					
Client ID:	PBW	Batch ID:	R4462	RunNo:	4462					
Prep Date:		Analysis Date:	7/26/2012	SeqNo:	124647	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	18		20.00		88.3	69.8	119			

Sample ID	2.5UG GRO LCS	SampType:	LCS	TestCode:	EPA Method 8015B: Gasoline Range					
Client ID:	LCSW	Batch ID:	R4462	RunNo:	4462					
Prep Date:		Analysis Date:	7/26/2012	SeqNo:	124648	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.53	0.050	0.5000	0	105	75.9	119			
Surr: BFB	17		20.00		84.4	69.8	119			

Sample ID	5ML RB	SampType:	MBLK	TestCode:	EPA Method 8015B: Gasoline Range					
Client ID:	PBW	Batch ID:	R4480	RunNo:	4480					
Prep Date:		Analysis Date:	7/27/2012	SeqNo:	125476	Units:	%REC			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	19		20.00		95.1	69.8	119			

Sample ID	2.5UG GRO LCS	SampType:	LCS	TestCode:	EPA Method 8015B: Gasoline Range					
Client ID:	LCSW	Batch ID:	R4480	RunNo:	4480					
Prep Date:		Analysis Date:	7/27/2012	SeqNo:	125477	Units:	%REC			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	24		20.00		122	69.8	119			S

Sample ID	1207B00-001AMS	SampType:	MS	TestCode:	EPA Method 8015B: Gasoline Range					
Client ID:	MW-15	Batch ID:	R4480	RunNo:	4480					
Prep Date:		Analysis Date:	7/27/2012	SeqNo:	125480	Units:	%REC			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	24		20.00		118	69.8	119			

Sample ID	1207B00-001AMSD	SampType:	MSD	TestCode:	EPA Method 8015B: Gasoline Range					
Client ID:	MW-15	Batch ID:	R4480	RunNo:	4480					
Prep Date:		Analysis Date:	7/27/2012	SeqNo:	125481	Units:	%REC			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	23		20.00		116	69.8	119	0	0	

Qualifiers:

- *X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1207B00
02-Aug-12

Client: Southwest Geoscience
Project: K-17

Sample ID	5ML RB	SampType:	MBLK	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	PBW	Batch ID:	R4462	RunNo:	4462					
Prep Date:		Analysis Date:	7/26/2012	SeqNo:	124682	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
Surr: 4-Bromofluorobenzene	17		20.00		83.0	55	140			

Sample ID	100NG BTEX LCS	SampType:	LCS	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	LCSW	Batch ID:	R4462	RunNo:	4462					
Prep Date:		Analysis Date:	7/26/2012	SeqNo:	124683	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	104	80	120			
Ethylbenzene	21	1.0	20.00	0	105	80	120			
Xylenes, Total	65	2.0	60.00	0	109	80	120			
Surr: 4-Bromofluorobenzene	18		20.00		88.0	55	140			

Sample ID	1207B39-001AMS	SampType:	MS	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	BatchQC	Batch ID:	R4462	RunNo:	4462					
Prep Date:		Analysis Date:	7/26/2012	SeqNo:	124685	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	110	5.0	100.0	0	110	70.1	118			
Ethylbenzene	110	5.0	100.0	0.6900	106	73.5	117			
Xylenes, Total	330	10	300.0	0	109	73.1	119			
Surr: 4-Bromofluorobenzene	86		100.0		86.1	55	140			

Sample ID	1207B39-001AMSD	SampType:	MSD	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	BatchQC	Batch ID:	R4462	RunNo:	4462					
Prep Date:		Analysis Date:	7/26/2012	SeqNo:	124686	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	110	5.0	100.0	0	107	70.1	118	2.89	16.4	
Ethylbenzene	100	5.0	100.0	0.6900	103	73.5	117	2.93	13.5	
Xylenes, Total	320	10	300.0	0	106	73.1	119	3.50	12.9	
Surr: 4-Bromofluorobenzene	96		100.0		95.8	55	140	0	0	

Sample ID	5ML RB	SampType:	MBLK	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	PBW	Batch ID:	R4480	RunNo:	4480					
Prep Date:		Analysis Date:	7/27/2012	SeqNo:	125484	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	ND	1.0								
Surr: 4-Bromofluorobenzene	18		20.00		88.5	55	140			

Qualifiers:

- *X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1207B00**
02-Aug-12

Client: Southwest Geoscience
Project: K-17

Sample ID	100NG BTEX LCS	SampType:	LCS	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	LCSW	Batch ID:	R4480	RunNo:	4480					
Prep Date:		Analysis Date:	7/27/2012	SeqNo:	125485	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	22	1.0	20.00	0	112	80	120			
Surr: 4-Bromofluorobenzene	18		20.00		88.8	55	140			

Sample ID	1207B89-001AMS	SampType:	MS	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	BatchQC	Batch ID:	R4480	RunNo:	4480					
Prep Date:		Analysis Date:	7/27/2012	SeqNo:	125487	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	200	5.0	100.0	86.13	114	72.3	117			
Surr: 4-Bromofluorobenzene	94		100.0		93.6	55	140			

Sample ID	1207B89-001AMSD	SampType:	MSD	TestCode:	EPA Method 8021B: Volatiles					
Client ID:	BatchQC	Batch ID:	R4480	RunNo:	4480					
Prep Date:		Analysis Date:	7/27/2012	SeqNo:	125488	Units:	µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	190	5.0	100.0	86.13	107	72.3	117	3.61	13.9	
Surr: 4-Bromofluorobenzene	91		100.0		91.2	55	140	0	0	

Qualifiers:

- | | |
|--|--|
| *X Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| J Analyte detected below quantitation limits | ND Not Detected at the Reporting Limit |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |



Hall Environmental Analysis Laboratory
 4901 Hawkins NE
 Albuquerque, NM 87106
 TEL: 505-345-3975 FAX: 505-345-4107
 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **Southwest Geoscience** Work Order Number: **1207B00**

Received by/date: *[Signature]* **07/25/12**
 Logged By: **Ashley Gallegos** **7/25/2012 10:00:00 AM** *[Signature]*
 Completed By: **Ashley Gallegos** **7/25/2012 12:56:14 PM** *[Signature]*
 Reviewed By: *[Signature]* **7/25/12**

Chain of Custody

- 1. Were seals intact? Yes No Not Present
- 2. Is Chain of Custody complete? Yes No Not Present
- 3. How was the sample delivered? Courier

Log In

- 4. Coolers are present? (see 19. for cooler specific information) Yes No NA
- 5. Was an attempt made to cool the samples? Yes No NA
- 6. Were all samples received at a temperature of >0° C to 6.0°C Yes No NA
- 7. Sample(s) in proper container(s)? Yes No
- 8. Sufficient sample volume for indicated test(s)? Yes No
- 9. Are samples (except VOA and ONG) properly preserved? Yes No
- 10. Was preservative added to bottles? Yes No NA
- 11. VOA vials have zero headspace? Yes No No VOA Vials
- 12. Were any sample containers received broken? Yes No
- 13. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes No # of preserved bottles checked for pH:
- 14. Are matrices correctly identified on Chain of Custody? Yes No (<2 or >12 unless noted)
- 15. Is it clear what analyses were requested? Yes No Adjusted?
- 16. Were all holding times able to be met? (If no, notify customer for authorization.) Yes No Checked by:

Special Handling (if applicable)

- 17. Was client notified of all discrepancies with this order? Yes No NA

Person Notified: Date:
 By Whom: Via: eMail Phone Fax In Person
 Regarding:
 Client Instructions:

18. Additional remarks:

19. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Yes			

CHAIN OF CUSTODY RECORD

<h1 style="margin: 0;">Southwest</h1> <p style="margin: 0;">GEOSCIENCE</p> <p style="margin: 0; font-size: small;">Environmental & Hydrogeologic Consultants</p>		Laboratory: <u>Hall</u> Address: <u>ARBQ</u>		ANALYSIS REQUESTED <div style="border: 1px solid black; padding: 5px; transform: rotate(-90deg); display: inline-block;"> ARTEX 0021 TPH GROUND PDIS </div>				Lab use only Due Date: _____											
		Office Location: <u>Artec</u>						Contact: <u>Andy Freeman</u>		Temp. of coolers when received (C°): <u>10</u>									
Project Manager: <u>R. Summers</u>		Phone: _____						<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20%;">1</td> <td style="width: 20%;">2</td> <td style="width: 20%;">3</td> <td style="width: 20%;">4</td> <td style="width: 20%;">5</td> </tr> <tr> <td colspan="5">Page <u>1</u> of <u>1</u></td> </tr> </table>		1	2	3	4	5	Page <u>1</u> of <u>1</u>				
1	2	3	4					5											
Page <u>1</u> of <u>1</u>																			
Sampler's Name: <u>Ryle Summers</u>		Sampler's Signature: <u>[Signature]</u>		Lab Sample ID (Lab Use Only) <u>1207800-001</u>															
Proj. No.: <u>0411015</u>		Project Name: <u>R-17</u>						No./Type of Containers: _____											
Matrix	Date	Time	COOP	Grab	Identifying Marks of Sample(s)	Start Depth	End Depth	VOA	A/G 1 L	250 ml	P/O	 N.F.S R.S 							
<u>W</u>	<u>7/23/12</u>	<u>1405</u>		<u>X</u>	<u>PW-15</u>			<u>5</u>											

Turn around time: <input checked="" type="checkbox"/> Normal <input type="checkbox"/> 25% Rush <input type="checkbox"/> 50% Rush <input type="checkbox"/> 100% Rush			
Relinquished by (Signature): <u>[Signature]</u>	Date: <u>7/24/12</u>	Time: <u>1633</u>	Received by (Signature): <u>Mustine Waelz</u>
Relinquished by (Signature): <u>Mustine Waelz</u>	Date: <u>7/24/12</u>	Time: <u>1724</u>	Received by (Signature): <u>[Signature]</u>
Relinquished by (Signature): _____	Date: _____	Time: _____	Received by (Signature): _____
Relinquished by (Signature): _____	Date: _____	Time: _____	Received by (Signature): _____

Matrix: WW - Wastewater W - Water S - Soil SD - Solid L - Liquid A - Air Bag C - Charcoal tube SL - sludge O - Oil
 Container: VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other