

# RICE *Operating Company*

122 West Taylor • Hobbs, New Mexico 88240

Phone: (575) 393-9174 • Fax: (575) 397-1471

NV

**March 14, 2023**

**Nelson Velez**

Environmental Bureau, Oil Conservation Division  
New Mexico Energy, Minerals, & Natural Resources Department  
1220 S. St. Francis Drive  
Santa Fe, New Mexico 87505

**RE: Corrective Action Plan (CAP) and Variance Request  
Rice Operating Company – BD SWD System  
BD I-18 EOL (Mattern 5 EOL) (1R426-13): UL/I, Sec. 18, T21S, R37E**

Mr. Velez:

RICE Operating Company (ROC) submits the following to address potential environmental concerns at the above-referenced site in the BD Saltwater Disposal (SWD) system.

ROC is the service provider (agent) for the BD SWD System and has no ownership of any portion of the pipeline, well, or facility. The system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

**Background and Previous Work**

The site is located approximately 3.5 miles northwest of Eunice, New Mexico at UL/I, Sec. 18, T21S, R37E as shown on the Geographic Location Map and the Area Map. NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 100 feet below ground surface (bgs). A junction box disclosure report was submitted to NMOCD with all the 2003 junction box closures and disclosures.

In 2003, ROC initiated work on the former I-18 EOL junction box. The site was delineated using a backhoe to form a 12x3x12-ft deep excavation and soil samples were screened at regular intervals for hydrocarbon and chloride. The deepest sample, 12 ft bgs, was sent to a commercial laboratory for analysis. The bottom sample returned a chloride reading of 6,740 mg/kg, a BTEX and a Gasoline Range Organics (GRO) reading non-detect, and a Diesel Range Organics (DRO) reading of 1,490 mg/kg. The excavation was backfilled and contoured to the surrounding area. A new water-tight junction box was installed east of the site.

To further investigate the depth of chloride presence, sixteen soil bores were drilled on July 17<sup>th</sup>-18<sup>th</sup>, 2018, August 30<sup>th</sup>-31<sup>st</sup>, 2018, April 24<sup>th</sup>, 2019, and June 5<sup>th</sup>, 2019. Soil samples were collected at regular intervals and field screened for chloride and hydrocarbon using a PID. Representative samples from each bore were sent to a commercial laboratory for analysis of

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chloride and hydrocarbon. Laboratory analysis of the interior bores resulted in elevated concentrations of chloride and concentrations decreased laterally as additional bores were drilled. Soil bore (SB-1) was installed at the former junction box site and was advanced to a depth of 80 ft bgs. The 40 ft and 80 ft samples were sent to a commercial laboratory for analysis, resulting in a 40 ft chloride concentration of 4,640 mg/kg and GRO/Extended DRO (EXT-DRO) concentrations of non-detect, and a DRO concentration of 47.4 mg/Kg. The 80 ft sample resulted in a chloride concentration of 2,240 mg/kg and GRO/DRO/EXT-DRO concentrations of non-detect. The bore drilled furthest North (SB-14) resulted in a chloride concentration of 1,060 mg/kg at 5 ft bgs and 320 mg/kg at 15 ft bgs. Hydrocarbon concentrations, GRO/DRO/EXT-DRO and BTEX, were below detectable limits in both the 5 ft and 15 ft samples. The bore drilled furthest west (SB-15) resulted low concentrations throughout. The 5 ft bgs sample resulted in a chloride concentration of 96 mg/kg, GRO/DRO/EXT-DRO concentrations below detectable limit, and BTEX concentrations below detectable limit. The 15 ft bgs sample resulted in a chloride concentration of 16 mg/kg, GRO/DRO/EXT-DRO concentrations below detectable limit, and BTEX concentrations below detectable limit. The furthest soil bore to the south (SB-12) resulted in chloride concentration of 1,120 mg/kg at 5 ft bgs and 384 mg/kg at 25 ft bgs. Hydrocarbon concentrations, GRO/DRO/EXT-DRO and BTEX, were below detectable limits in both the 5 ft and 25 ft samples. The soil bore drilled furthest East (SB-16) resulted in a chloride concentration of 1,150 mg/kg at 20 ft bgs and 368 mg/kg at 30 ft bgs. Hydrocarbon concentrations, GRO/DRO/EXT-DRO and BTEX, were below detectable limits in both the 20 ft and 30 ft samples. Each bore hole was plugged with bentonite to ground surface.

### **Corrective Action Plan**

Based on the collected soil data and to remediate the upper 4 ft of the impacted area, ROC proposes to install a modified 140x64-ft, 20-mil, reinforced liner, and a modified 47x64-ft, 20-mil, reinforced liner at a depth of 5 - 4 ft bgs (covering approximately 11,608 sq ft). The proposed liner dimensions are nominal based on the sidewall soils sampling that return results of chloride concentrations of 600 mg/kg or less for each of the four walls. ROC will collect a 5-point composite from each wall and combine into a 4-wall composite sample. Samples will not be collected from the base of the excavation because the proposed liner will mitigate the downward migration of any remaining constituents. Uncontaminated soils (as determined by a composite sample) will be placed above the liner. Excavated soils will be evaluated for use as backfill (one sample per 100 cubic yards) and any soils that do not meet requirements (i.e. chloride concentrations above 600 mg/kg) will be properly disposed of at a NMOCD approved facility. The excavation will be backfilled to ground surface and contoured to the surrounding location. The soils over and surrounding the site will then be prepared with soil amendments as necessary and seeded with a native vegetative mix. Vegetation above the liner will also provide a natural infiltration barrier for the site since plants capture water through their roots, thereby reducing the volume of water moving through the vadose zone.

### **Variance Request**

ROC is requesting a variance in accordance with Section 14 of NMOCD Part 29. The variance request is for requirements of Paragraph (2) of Section 12 of Part 29. Samples taken at 80 bgs in several boring at the site returned a laboratory analysis of chloride concentrations of >600 mg/kg (i.e., above the remediation standard of 600 mg/kg for chloride). The variance is needed because of the prohibitive nature of excavating the site at a depth of over 80 ft bgs and remote disposal and backfilling with imported soils. Approval of the variance will provide equal or better protection of fresh water, public health and the environment. To determine if the residual chloride in the vadose zone pose a threat to groundwater quality, ROC ran the U.S.

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Environmental Protection Agency Exposure Assessment Multimedia Model (MULTIMED Version 1.5, 2005). The model output concludes that the peak concentration of chloride in groundwater contributed by the vadose zone soils would be approximately 250.7 mg/L in 295 years (based on boring data) with liner installation compared to approximately 305.6 mg/L in 9.8 years of the regulatory standard of 600 mg/Kg without a liner being installed. Based on the MULTIMED analysis and the concentration data, ROC requests approval of the variance. Additionally, the TPH concentrations were low or non-detect throughout the site.

Once the liner installation, backfill, and seeding are complete, ROC will submit a remediation termination request for site closure.

Please contact me at (575)393-9174 if you have any questions or wish to discuss this site. Thank you for your time and consideration.

Sincerely,

A handwritten signature in black ink that reads "Katie Davis". The signature is written in a cursive, slightly slanted style.

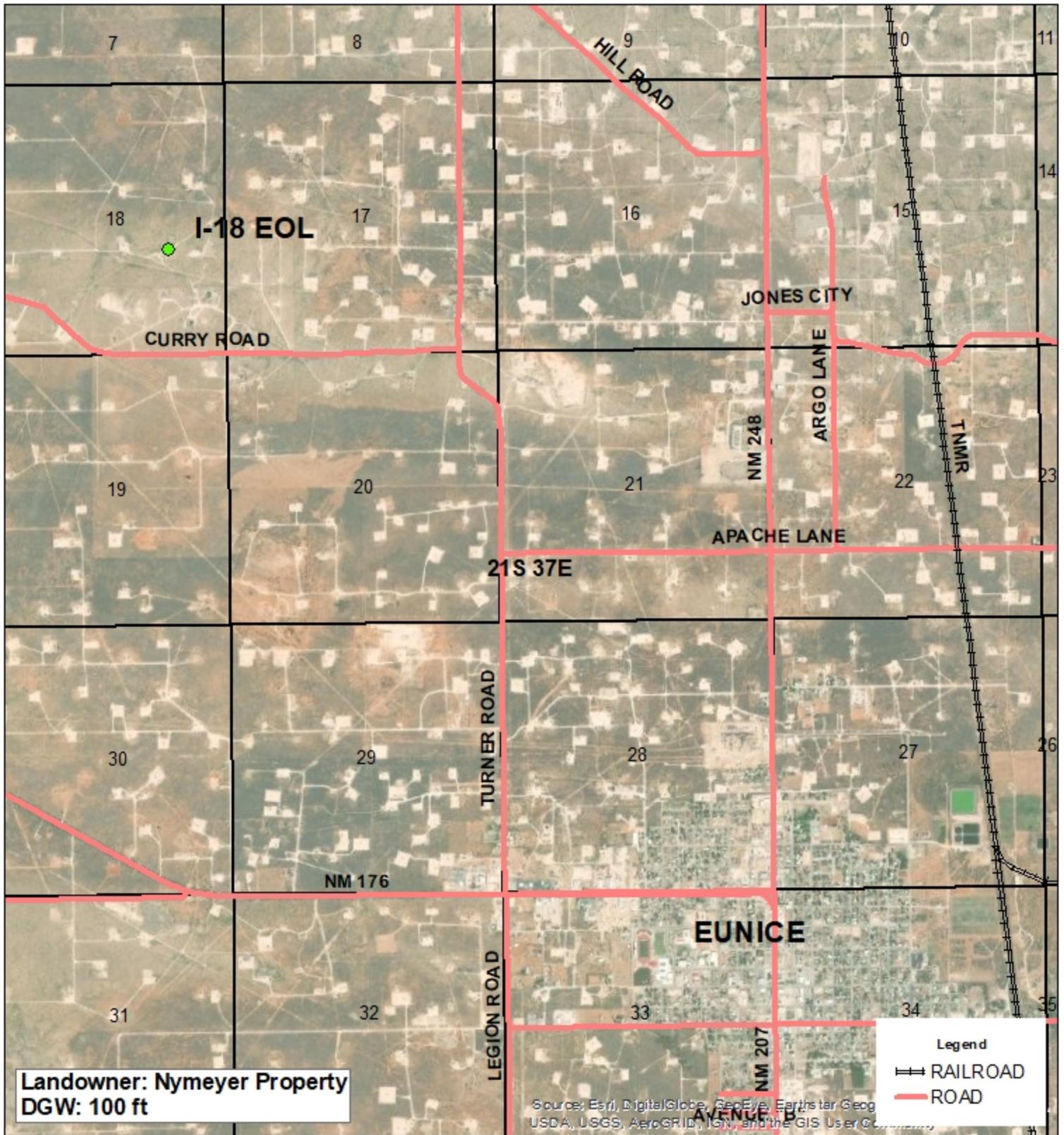
Katie Davis  
Environmental Manager  
ROC

enclosures

# Figures

**RICE Operating Company**  
112 West Taylor, Hobbs, NM 88240  
Phone 575.393.9174

# Geographic Location



**BD**  
**I-18 EOL**

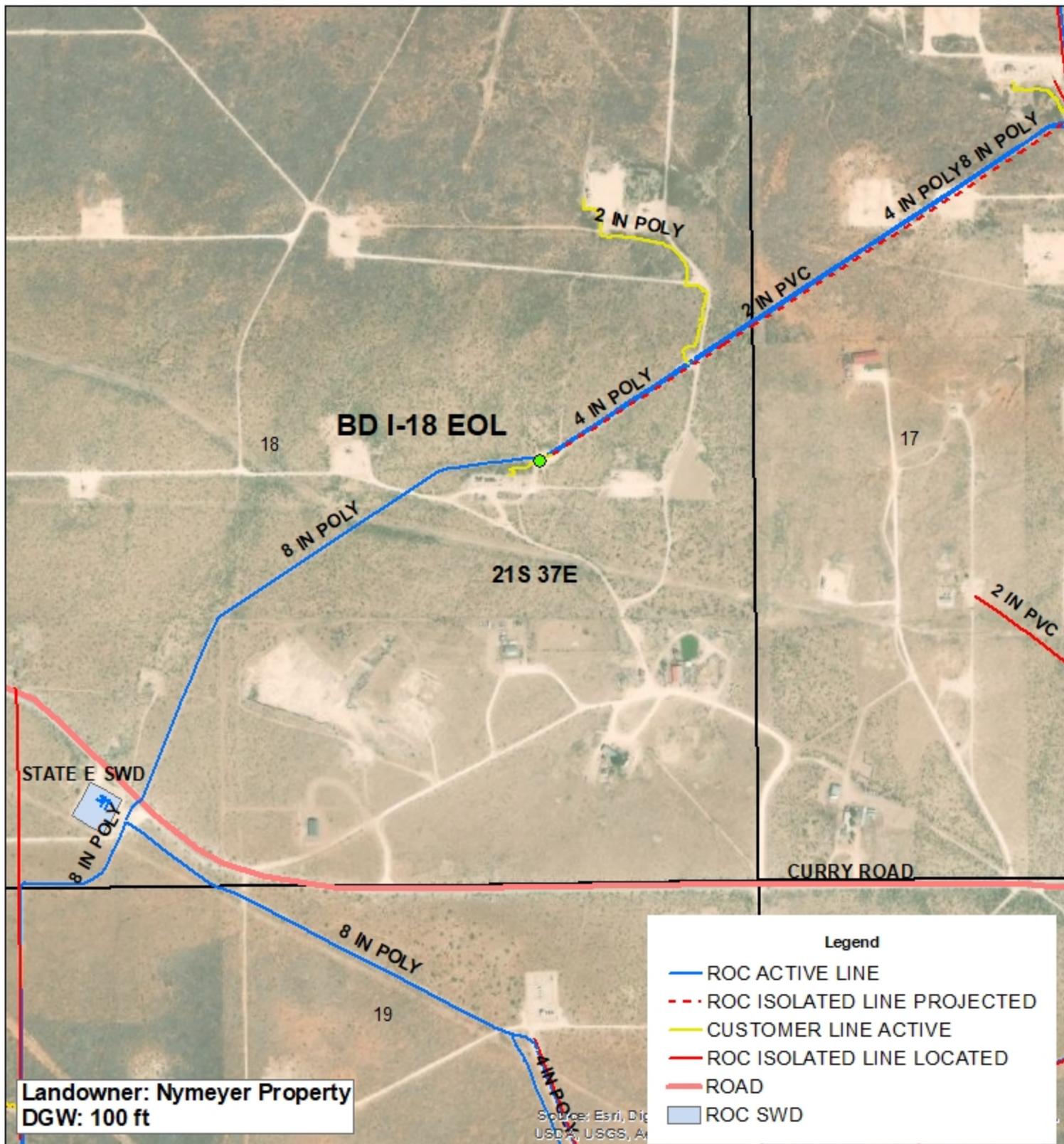
1R426-13

ULI SECTION 18  
 T-21-S R-37-E  
 LEA COUNTY, NM

GPS: 32.477379 -103.197098  
 NAD 83 STATE PLANE PROJECTION  
 NM EAST ZONE

0 0.5 1 Miles

Drawing date: 11/19/21  
 Drafted by: T. Grieco



**BD  
I-18 EOL  
1R426-13**

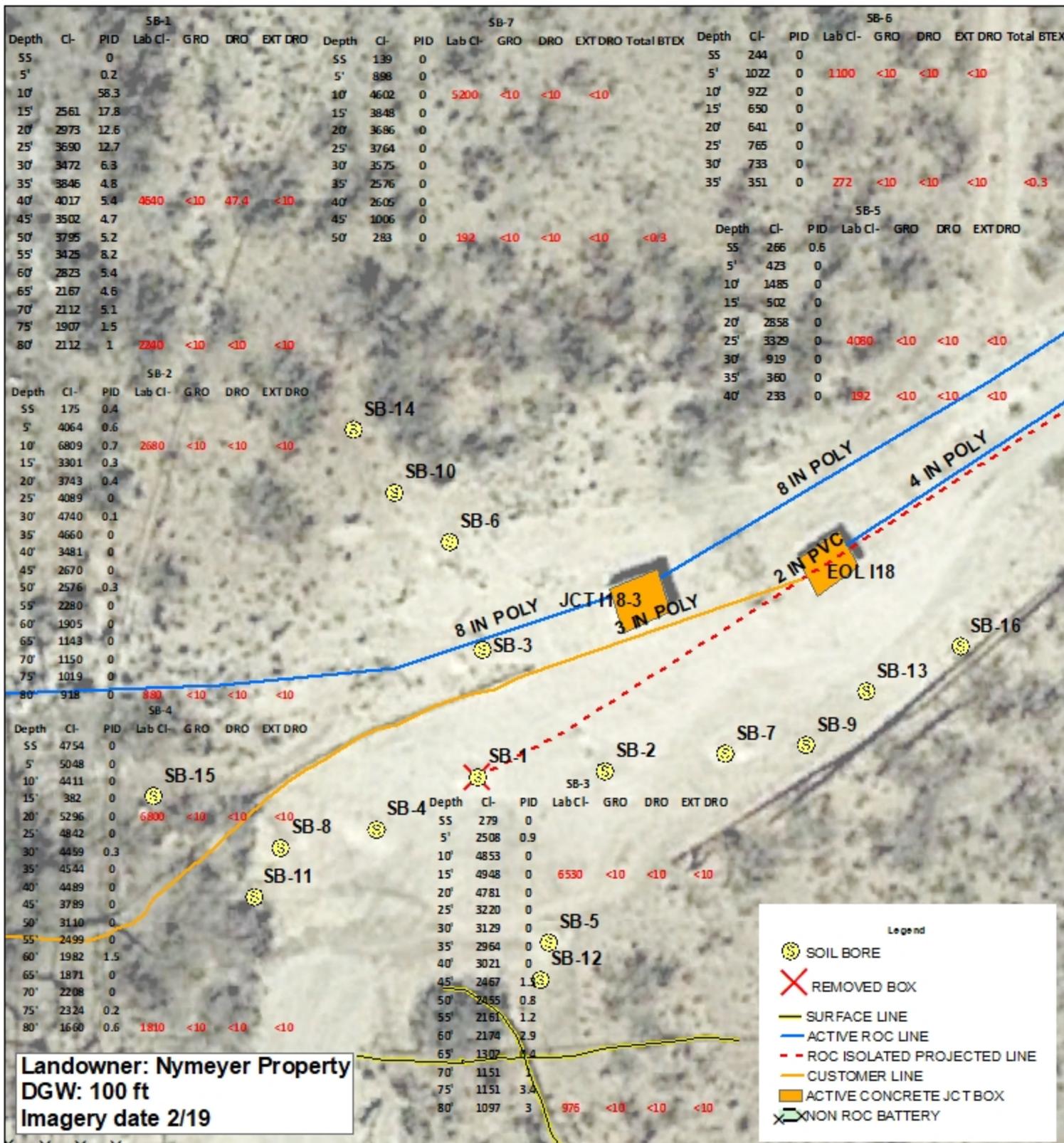
**UL I SECTION 18  
T-21-S R-37-E  
LEA COUNTY, NM**

**GPS: 32.477379 -103.197098**  
**NAD 83 STATE PLANE PROJECTION**  
**NM EAST ZONE**

0 500 1,000 Feet

Drawing date: 11/19/21  
 Drafted by: T. Grieco

# Soil Bores 1 - 7 Installation



**BD**  
**I-18 EOL**  
1R426-13

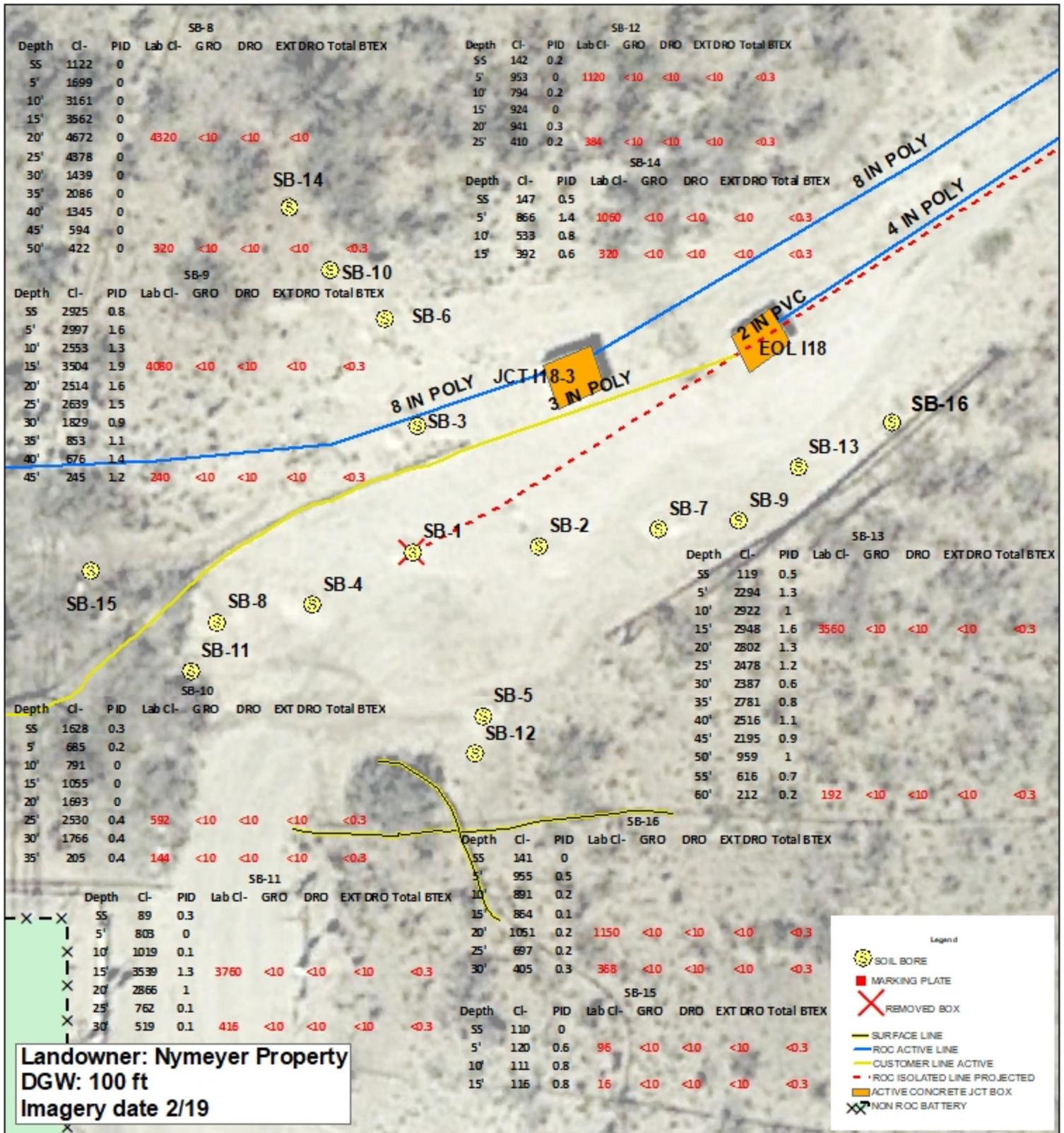
UL I SECTION 18  
T-21-S R-37-E  
LEA COUNTY, NM

GPS: 32.477379 -103.197098  
NAD83 STATE PLANE PROJECTION  
NM EAST ZONE

0 10 20  
Feet

GPS date: 5/7/18, 7/24/18, 9/4/18 TG  
Drawing date: 12/1/21  
Drafted by: T. Grieco

# Soil Bores 8 - 16 Installation



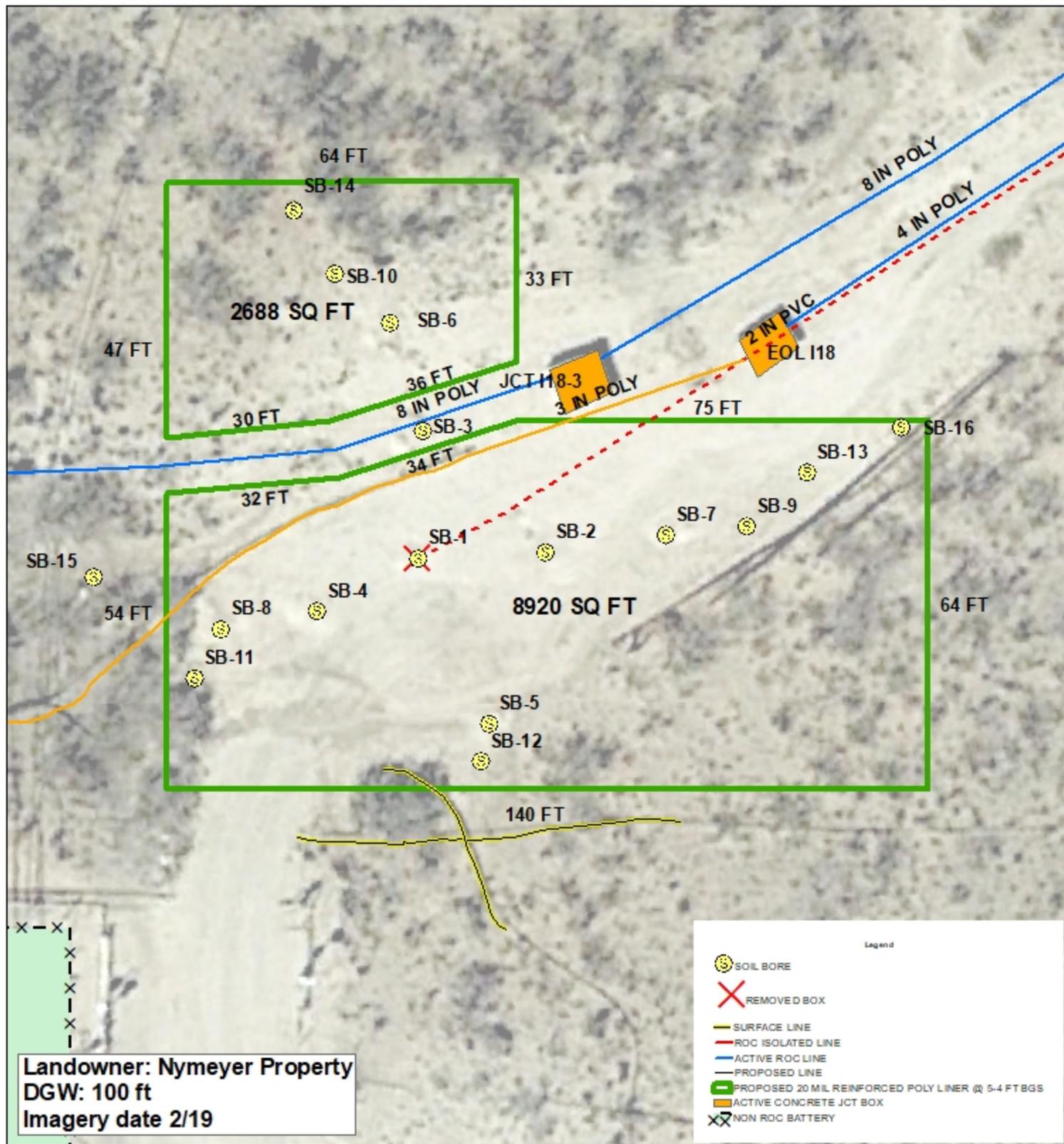
**BD**  
**I-18 EOL**  
1R426-13

UL I SECTION 18  
T-21-S R-37-E  
LEA COUNTY, NM

GPS: 32.477379 -103.197098  
NAD83 STATE PLANE PROJECTION  
NM EAST ZONE

0 10 20  
Feet

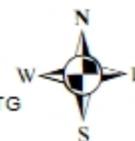
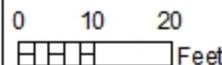
GPS date: 5/7/18, 7/24/18, 9/4/18 TG  
Drawing date: 10/17/19  
Drafted by: T. Grieco



**BD**  
**I-18 EOL**  
 1R426-13

UL I SECTION 18  
 T-21-S R-37-E  
 LEA COUNTY, NM

GPS: 32.477379 -103.197098  
 NAD83 STATE PLANE PROJECTION  
 NM EAST ZONE



GPS date: 5/7/18, 7/24/18, 9/4/18 TG  
 Drawing date: 4/20/22  
 Drafted by: T. Grieco

Multimed

**RICE Operating Company**  
112 West Taylor, Hobbs, NM 88240  
Phone 575.393.9174



BD I-18 EOL (1R426-13) boring ejh

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	18.00	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	-999.	-999.
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	-999.	-999.
Air entry pressure head	m	CONSTANT	0.700	-999.	-999.	-999.
Depth of the unsaturated zone	m	CONSTANT	18.0	0.000	0.000	0.000

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Residual water content	--	CONSTANT	0.116	-999.	-999.	-999.
Brook and Corey exponent, EN	--	CONSTANT	-999.	-999.	-999.	-999.
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	-999.	-999.
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	-999.	-999.

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	2
N	- Stehfest terms or number of increments	18
NTEL	- Points in Lagrangian interpolation	3
NGPTS	- Number of Gauss points	104
NIT	- Convolution integral segments	2
IBOUND	- Type of boundary condition	3

BD I-18 EOL (1R426-13) boring ejh

ITSGEN - Time values generated or input 1  
 TMAX - Max simulation time -- 0.0  
 WTFUN - Weighting factor -- 1.2

OPTIONS CHOSEN

-----  
 Convolution integral approach  
 Exponentially decaying continuous source  
 Computer generated times for computing concentrations

1

DATA FOR LAYER 1

-----  
 VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	18.0	-999.	-999.	-999.
Longitudinal dispersivity of layer	m	DERIVED	-999.	-999.	-999.	-999.
Percent organic matter	--	CONSTANT	0.000	-999.	-999.	-999.
Bulk density of soil for layer	g/cc	CONSTANT	1.99	-999.	-999.	-999.
Biological decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Reference temperature	C	CONSTANT	25.0	-999.	-999.	-999.
Normalized distribution coefficient	ml/g	CONSTANT	0.000	-999.	-999.	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Air diffusion coefficient	cm2/s	CONSTANT	-999.	-999.	-999.	-999.
Reference temperature for air diffusion	C	CONSTANT	-999.	-999.	-999.	-999.
Molecular weight	g/M	CONSTANT	-999.	-999.	-999.	-999.

BD I-18 EOL (1R426-13) boring ejh

Mole fraction of solute	--	CONSTANT	-999.	-999.	-999.	-999.
Vapor pressure of solute	mm Hg	CONSTANT	-999.	-999.	-999.	-999.
Henry's law constant	atm-m <sup>3</sup> /M	CONSTANT	-999.	-999.	-999.	-999.
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000	0.000	0.000	1.00
Not currently used		CONSTANT	0.000	0.000	0.000	0.000
Not currently used		CONSTANT	0.000	0.000	0.000	0.000

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.152E-01	-999.	-999.	-999.
Area of waste disposal unit	m <sup>2</sup>	CONSTANT	0.144E+04	-999.	-999.	-999.
Duration of pulse	yr	DERIVED	0.100E-08	-999.	-999.	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	-999.	-999.
Recharge rate	m/yr	CONSTANT	0.000	-999.	-999.	-999.
Source decay constant	1/yr	CONSTANT	0.250E-01	0.000	0.000	0.000
Initial concentration at landfill	mg/l	CONSTANT	0.332E+04	-999.	-999.	-999.
Length scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Width scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

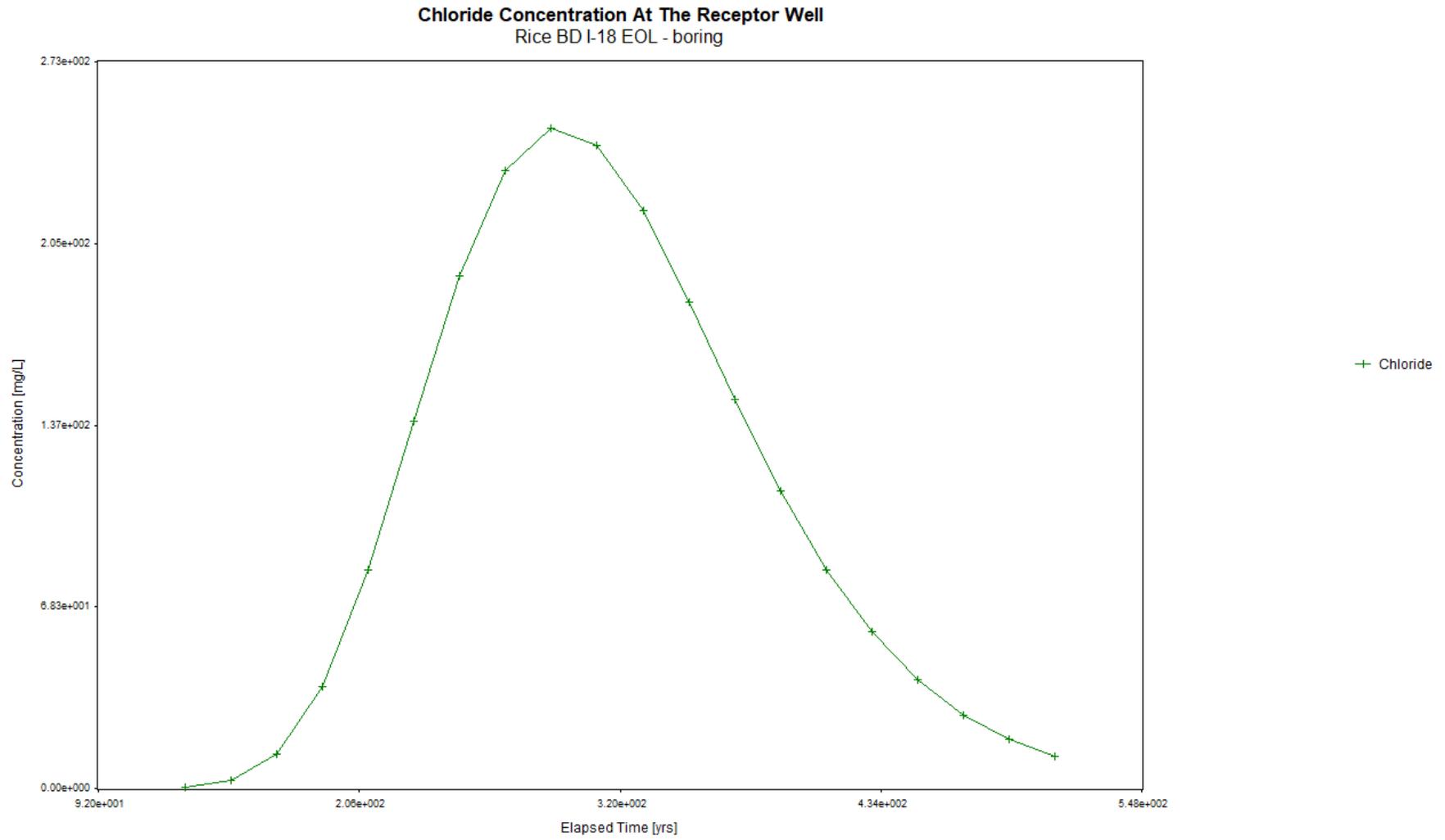
1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Particle diameter	cm	CONSTANT	-999.	-999.	-999.	-999.
Aquifer porosity	--	CONSTANT	0.300	-999.	-999.	-999.
Bulk density	g/cc	CONSTANT	1.86	-999.	-999.	-999.
Aquifer thickness	m	CONSTANT	6.10	-999.	-999.	-999.
Source thickness (mixing zone depth)	m	DERIVED	-999.	-999.	-999.	-999.
Conductivity (hydraulic)	m/yr	CONSTANT	315.	-999.	-999.	-999.
Gradient (hydraulic)		CONSTANT	0.300E-02	-999.	-999.	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	-999.	-999.
Retardation coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Temperature of aquifer	C	CONSTANT	20.0	-999.	-999.	-999.
pH	--	CONSTANT	7.00	-999.	-999.	-999.
Organic carbon content (fraction)		CONSTANT	0.000	-999.	-999.	-999.
Well distance from site	m	CONSTANT	1.00	-999.	-999.	-999.

Angle off center	degree	BD I-18 EOL (1R426-13) boring ejh				
Well vertical distance	m	CONSTANT	0.000	-999.	-999.	-999.
		CONSTANT	0.000	-999.	-999.	-999.

MAXIMUM WELL CONCENTRATION IS 250.7 AT 0.295E+03 YEARS



MULTIMED V1.01 DATE OF CALCULATIONS: 17-OCT-2019 TIME: 17:39:28

BD I-18 EOL (1R426-13) regulatory ejh

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.50, 2005)

1  
Run options  
--- -----

Rice BD I-18 EOL - Regulatory limit

1R426-13  
Chemical simulated is Chloride

Option Chosen Saturated and unsaturated zone models  
Run was DETERMIN  
Infiltration Specified By User: 3.050E-02 m/yr  
Run was transient  
Well Times: Find Maximum Concentration  
Reject runs if Y coordinate outside plume  
Reject runs if Z coordinate outside plume  
Gaussian source used in saturated zone model

1  
1  
UNSATURATED ZONE FLOW MODEL PARAMETERS  
(input parameter description and value)  
NP - Total number of nodal points 240  
NMAT - Number of different porous materials 1  
KPROP - Van Genuchten or Brooks and Corey 1  
IMSHGN - Spatial discretization option 1  
NVFLAYR - Number of layers in flow model 1

OPTIONS CHOSEN  
-----  
Van Genuchten functional coefficients  
User defined coordinate system

1

BD I-18 EOL (1R426-13) regulatory ejh

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	0.50	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	-999.	-999.
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	-999.	-999.
Air entry pressure head	m	CONSTANT	0.700	-999.	-999.	-999.
Depth of the unsaturated zone	m	CONSTANT	0.500	0.000	0.000	0.000

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Residual water content	--	CONSTANT	0.116	-999.	-999.	-999.
Brook and Corey exponent, EN	--	CONSTANT	-999.	-999.	-999.	-999.
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	-999.	-999.
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	-999.	-999.

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used	1
NTSTPS	- Number of time values concentration calc	40
DUMMY	- Not presently used	1
ISOL	- Type of scheme used in unsaturated zone	2
N	- Stehfest terms or number of increments	18
NTEL	- Points in Lagrangian interpolation	3
NGPTS	- Number of Gauss points	104
NIT	- Convolution integral segments	2
IBOUND	- Type of boundary condition	3

BD I-18 EOL (1R426-13) regulatory ejh

ITSGEN - Time values generated or input 1  
 TMAX - Max simulation time -- 0.0  
 WTFUN - Weighting factor -- 1.2

OPTIONS CHOSEN

-----  
 Convolution integral approach  
 Exponentially decaying continuous source  
 Computer generated times for computing concentrations

1

DATA FOR LAYER 1

-----  
 VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	0.500	-999.	-999.	-999.
Longitudinal dispersivity of layer	m	DERIVED	-999.	-999.	-999.	-999.
Percent organic matter	--	CONSTANT	0.000	-999.	-999.	-999.
Bulk density of soil for layer	g/cc	CONSTANT	1.99	-999.	-999.	-999.
Biological decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Reference temperature	C	CONSTANT	25.0	-999.	-999.	-999.
Normalized distribution coefficient	ml/g	CONSTANT	0.000	-999.	-999.	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Air diffusion coefficient	cm2/s	CONSTANT	-999.	-999.	-999.	-999.
Reference temperature for air diffusion	C	CONSTANT	-999.	-999.	-999.	-999.
Molecular weight	g/M	CONSTANT	-999.	-999.	-999.	-999.

BD I-18 EOL (1R426-13) regulatory ejh

Mole fraction of solute	--	CONSTANT	-999.	-999.	-999.	-999.
Vapor pressure of solute	mm Hg	CONSTANT	-999.	-999.	-999.	-999.
Henry's law constant	atm-m <sup>3</sup> /M	CONSTANT	-999.	-999.	-999.	-999.
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000	0.000	0.000	1.00
Not currently used		CONSTANT	0.000	0.000	0.000	0.000
Not currently used		CONSTANT	0.000	0.000	0.000	0.000

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.305E-01	-999.	-999.	-999.
Area of waste disposal unit	m <sup>2</sup>	CONSTANT	0.144E+04	-999.	-999.	-999.
Duration of pulse	yr	DERIVED	0.100E-08	-999.	-999.	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	-999.	-999.
Recharge rate	m/yr	CONSTANT	0.000	-999.	-999.	-999.
Source decay constant	1/yr	CONSTANT	0.250E-01	0.000	0.000	0.000
Initial concentration at landfill	mg/l	CONSTANT	600.	-999.	-999.	-999.
Length scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Width scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

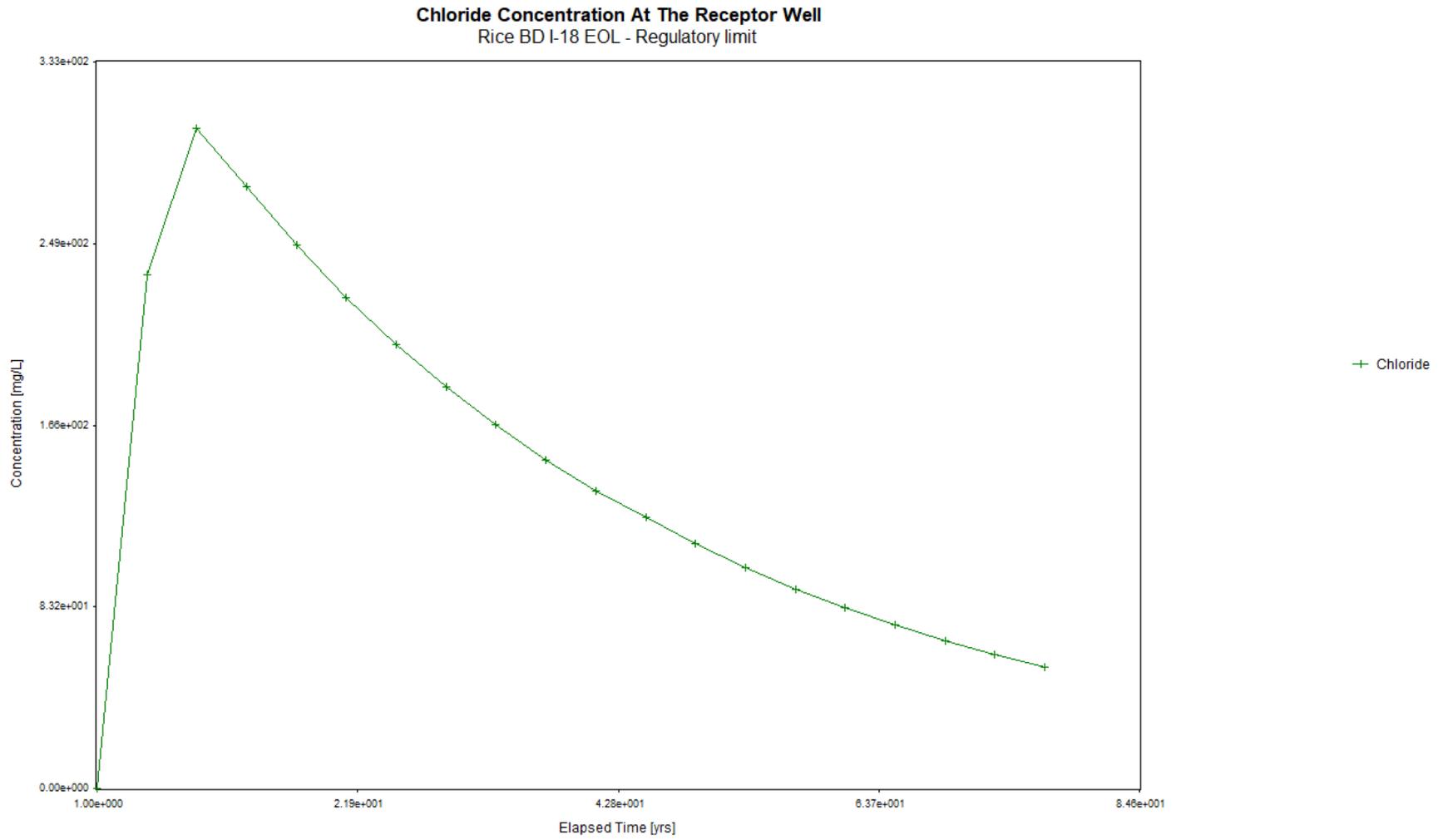
1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Particle diameter	cm	CONSTANT	-999.	-999.	-999.	-999.
Aquifer porosity	--	CONSTANT	0.300	-999.	-999.	-999.
Bulk density	g/cc	CONSTANT	1.86	-999.	-999.	-999.
Aquifer thickness	m	CONSTANT	6.10	-999.	-999.	-999.
Source thickness (mixing zone depth)	m	DERIVED	-999.	-999.	-999.	-999.
Conductivity (hydraulic)	m/yr	CONSTANT	315.	-999.	-999.	-999.
Gradient (hydraulic)		CONSTANT	0.300E-02	-999.	-999.	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	-999.	-999.
Retardation coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Temperature of aquifer	C	CONSTANT	20.0	-999.	-999.	-999.
pH	--	CONSTANT	7.00	-999.	-999.	-999.
Organic carbon content (fraction)		CONSTANT	0.000	-999.	-999.	-999.
Well distance from site	m	CONSTANT	1.00	-999.	-999.	-999.

		BD I-18 EOL (1R426-13) regulatory ejh				
Angle off center	degree	CONSTANT	0.000	-999.	-999.	-999.
Well vertical distance	m	CONSTANT	0.000	-999.	-999.	-999.

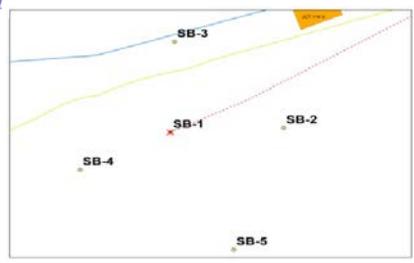
MAXIMUM WELL CONCENTRATION IS 305.6 AT 0.983E+01 YEARS



# Soil Bore Installation

**RICE Operating Company**  
112 West Taylor, Hobbs, NM 88240  
Phone 575.393.9174

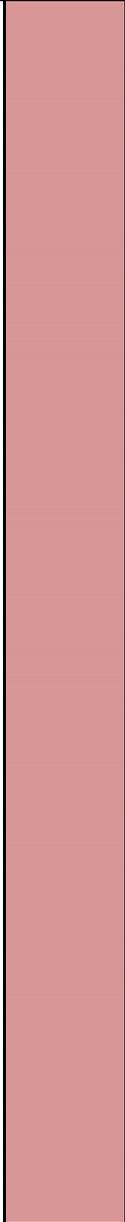
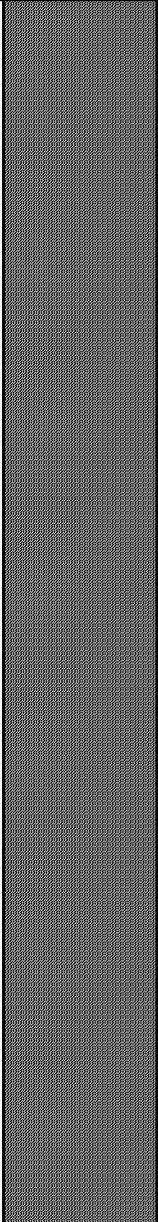
Logger: Nick Kopiasz  
 Driller: HCI Drilling  
 Drilling Method: 6" Air Rotary  
 Start Date: 7/17/2018  
 End Date: 7/17/2018



Company: Rice Operating Company  
 Project Name: BD I-18 EOL Well ID: SB-1  
 Project Consultant: Tasman  
 Location: Unit I, Section 18, T21S, R37E  
 Lat: 32.477379 County: Lea  
 Long: -103.197098 (NAD83) State: NM

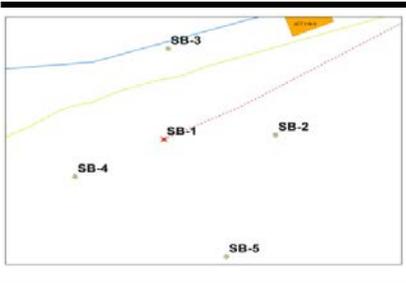
Comments: Soil samples were collected from drill cuttings at specified intervals.  
 SB-1 is located at source area near former box.  
 DRAFTED BY: Nick Kopiasz  
 TD = 80' GW = ~100'

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
SS	N/A		0.0	SW-tan, v.fine grained sand with well graded pebbles of caliche, no odor		Bentonite Seal
5 ft	N/A		0.2	SM-tan with dark staining, very fine grained sands, no odor		
10 ft	N/A		58.3	SM-tan with dark staining, very fine grained sands, hydrocarbon odor (HCO)		
15 ft	2,561		17.8	SM-reddish tan, very fine grain sand, HCO		
20 ft	2,973		12.6	SM-tan, very fine grained sand, no odor		
25 ft	3,690		12.7	SM-Same as above (SAA)		
30 ft	3,472		6.3	SM-SAA		
35 ft	3,846		4.8	SM-SAA		
40 ft	4,017	CI=4,640	5.4	SM-SAA		
		GRO=<10				
		DRO=47.4				
		EXT DRO=<10				

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
45 ft	3,502		4.7	SM-tan, very fine grained sand with occasional coarse pebbles of sandstone, no odor		
50 ft	3,795		5.2	SM-reddish tan, very fine grained sand with occasional coarse pebbles of sandstone, no odor		
55 ft	3,425		8.2	SM-tan, very fine grained sand with occasional coarse pebbles of sandstone, no odor		
60 ft	2,823		5.4	SM-tan, very fine grained sand, no odor		
65 ft	2,167		4.6	SM-reddish tan, very fine grained sand, no odor		
70 ft	2,112		5.1	SM-SAA		
75 ft	1,907		1.5	SM-SAA		
80 ft	2,112	CI=2,240	1.0	SM-SAA		
		GRO=<10				
		DRO=<10				
		EXT DRO=<10				

Bentonite Seal

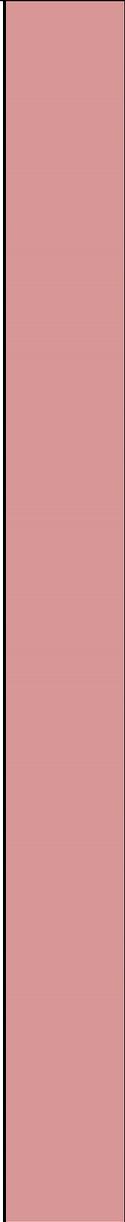
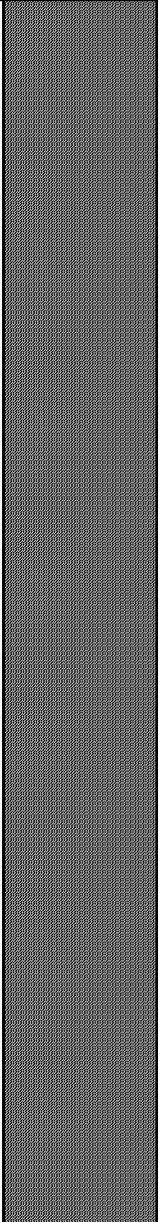
Logger: Nick Kopiasz  
 Driller: HCI Drilling  
 Drilling Method: 6" Air Rotary  
 Start Date: 7/17/2018  
 End Date: 7/18/2018



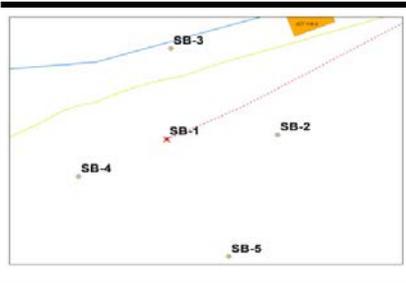
**Company:** Rice Operating Company  
**Project Name:** BD I-18 EOL  
**Well ID:** SB-2  
**Project Consultant:** Tasman  
**Location:** Unit I, Section 18, T21S, R37E  
**Lat:** 32.477382  
**Long:** -103.197023 (NAD83)  
**County:** Lea  
**State:** NM

Comments: Soil samples were collected from drill cuttings at specified intervals. SB-2 is approximately 15 feet East of the source area.  
**DRAFTED BY:** Nick Kopiasz  
 TD = 80' GW = ~100'

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
SS	175		0.4	SW-tan, very fine grained to coarse sand with coarse pebbles of caliche, no odor		Bentonite Seal
5 ft	4,064		0.6	SM-tan, very fine grained sand with some coarse pebbles of caliche, no odor		
10 ft	6,809	Cl=2,680 GRO=<10 DRO=<10 EXT DRO=<10	0.7	SM-Same as above (SAA)		
15 ft	3,301		0.3	SM-reddish tan, very fine grained sand with some coarse pebbles of caliche, no odor		
20 ft	3,743		0.4	SM-SAA		
25 ft	4,089		0.0	GM-tan, very fine grained sand with gravel sized chunks of caliche, no odor		
30 ft	4,740		0.1	SM-tan, very fine grained sand, no odor		
35 ft	4,660		0.0	SM-SAA		
40 ft	3,481		0.0	SM-SAA		

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
45 ft	2,670		0.0	SM-SAA		 Bentonite Seal
				SM-SAA		
50 ft	2,576		0.3	SM-SAA		
				SM-SAA		
55 ft	2,280		0.0	SM-tan, very fine grained sand with coarse pebbles of sandstone, no odor		
60 ft	1,905		0.0	SM-reddish tan, very fine grained sand, no odor		
65 ft	1,143		0.0	SM-SAA		
70 ft	1,150		0.0	SM-SAA		
75 ft	1,019		0.0	SM-SAA		
80 ft	918	Cl=880	0.0	SM-SAA		
		GRO=<10				
		DRO=<10				
		EXT DRO=<10				

Logger: Nick Kopiasz  
 Driller: HCI Drilling  
 Drilling Method: 6" Air Rotary  
 Start Date: 7/18/2018  
 End Date: 7/18/2018



Company: Rice Operating Company  
 Project Name: BD I-18 EOL Well ID: SB-3  
 Project Consultant: Tasman

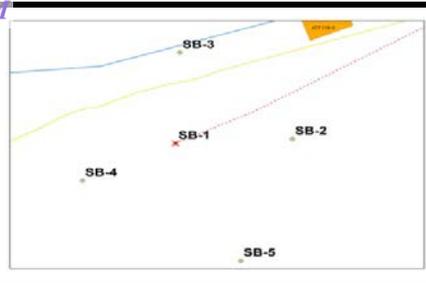
Comments: Soil samples were collected from drill cuttings at specified intervals. SB-3 is approximately 15 feet North of the source area.  
 DRAFTED BY: Nick Kopiasz  
 TD = 80' GW = ~100'

Location: Unit I, Section 18, T21S, R37E  
 Lat: 32.477444 County: Lea  
 Long: -103.197095 (NAD83) State: NM

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
SS	279		0.0	SW-tan, very fine grained sand with coarse pebbles of caliche, no odor		
5 ft	2,508		0.9	SM-tan, very fine grained sand with occasional pebbles of limestone, no odor		
10 ft	4,853		0.0	SM-reddish tan, very fine grained sand with coarse caliche grains, no odor		
15 ft	4,948	Cl=6,530 GRO=<10 DRO=<10 EXT DRO=<10	0.0	SM-reddish tan, very fine grained sand with occasional coarse caliche grains, no odor		
20 ft	4,781		0.0	GM-reddish tan, very fine grained sandstone with gravel sized grains of caliche, no odor		Bentonite Seal
25 ft	3,220		0.0	SM-tan, very fine grained sand with occasional pebbles of limestone, no odor		
30 ft	3,129		0.0	SM-Same as above (SAA)		
35 ft	2,964		0.0	SM-SAA		
40 ft	3,021		0.0	SM-SAA		

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction	
45 ft	2,467		1.3	SM-tan, very fine grained sand, occasional sandstone chunks, no odor			
50 ft	2,455		0.8	SM-SAA			
55 ft	2,161		1.2	GM-tan, very fine grained sand with gravel sized sandstone, no odor			
60 ft	2,174		2.9	SM-tan, very fine grained sand, no odor			
65 ft	1,302		0.4	SM-SAA			
70 ft	1,151		1.0	SM-SAA			
75 ft	1,151		3.4	SM-SAA			
80 ft	1,097	Cl=976	3.0	SM-SAA			Bentonite Seal
		GRO=<10					
		DRO=<10					
		EXT DRO=<10					

Logger: Nick Kopiasz  
 Driller: HCI Drilling  
 Drilling Method: 6" Air Rotary  
 Start Date: 7/18/2018  
 End Date: 7/18/2018



Company: Rice Operating Company  
 Project Name: BD I-18 EOL Well ID: SB-4  
 Project Consultant: Tasman

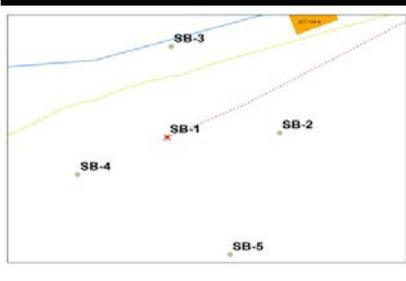
Comments: Soil samples were collected from drill cuttings at specified intervals. SB-4 is approximately 15 feet West of the source area.  
 DRAFTED BY: Nick Kopiasz  
 TD = 80' GW = ~100'

Location: Unit I, Section 18, T 21S, R 37E  
 Lat: 32.477353 County: Lea  
 Long: -103.197159 (NAD83) State: NM

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
SS	4,754		0.0	SW-light brown, very fine grained with coarse caliche grains, no odor		Bentonite Seal
5 ft	5,048		0.0	SW-tan, very fine grained with coarse caliche grains, no odor		
10 ft	4,411		0.0	SM-reddish tan, very fine grained sand occasional coarse caliche grains, no odor		
15 ft	382		0.0	SM-light reddish tan, very fine grained sand with occasional gravel sized chunks of sandstone, no odor		
20 ft	5,296	CI=6,800 GRO=<<10 DRO=<<10 EXT DRO=<<10	0.0	GM-tan, very fine grained sand with gravels of sandstone, no odor		
25 ft	4,842		0.0	SM-tan, very fine grained sand, no odor		
30 ft	4,459		0.3	SM-Same as above (SAA)		
35 ft	4,544		0.0	SM-SAA		
40 ft	4,489		0.0	SM-SAA		

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
45 ft	3,789		0.0	SM-SAA		
50 ft	3,110		0.0	SM-tan, very fine grained sand with coarse sandstone grains, no odor		
55 ft	2,499		0.0	GM-tan, very fine grained sand with coarse sandstone grains, no odor		
60 ft	1,982		1.5	SM-tan, very fine grained sand, no odor		
65 ft	1,871		0.0	SM-SAA		
70 ft	2,208		0.0	SM-SAA		
75 ft	2,324		0.2	SM-SAA		
80 ft	1,660	CI=1,810	0.6	SM-SAA		
		GRO=<10				
		DRO=<10				
		EXT DRO=<10				

Logger: Nick Kopiasz  
 Driller: HCI Drilling  
 Drilling Method: 6" Air Rotary  
 Start Date: 7/18/2018  
 End Date: 7/18/2018



Company: Rice Operating Company  
 Project Name: BD I-18 EOL Well ID: SB-5  
 Project Consultant: Tasman

Comments: Soil samples were collected from drill cuttings at specified intervals. SB-5 is approximately 15 feet South of the source area.  
 DRAFTED BY: Nick Kopiasz  
 TD = 40' GW = ~100'

Location: Unit I, Section 18, T21S, R37E  
 Lat: 32.477295 County: Lea  
 Long: -103.197057 (NAD83) State: NM

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
SS	266		0.6	SW-brown, very fine grained sand with coarse caliche grains, no odor		Bentonite Seal
5 ft	423		0.0	SW-tan, very fine grained sand with coarse caliche grains, no odor		
10 ft	1,485		0.0	SW-reddish tan, very fine grained sand with coarse caliche grains, no odor		
15 ft	502		0.0	SM-reddish tan, very fine grained sand with occasional coarse caliche grains, no odor		
20 ft	2,858		0.0	SM-tan, very fine grained sand with occasional coarse caliche grains, no odor		
25 ft	3,329	Cl=4,080 GRO=<10 DRO=<10 EXT DRO=<10	0.0	SM-Same as above (SAA)		
30 ft	919		0.0	SM-light tan, very fine grained sand with occasional coarse caliche grains, no odor		
35 ft	360		0.0	SM-SAA		
40 ft	233	Cl=192 GRO=<10 DRO=<10 EXT DRO=<10	0.0	SM-SAA		



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

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July 24, 2018

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD I-18 EOL

Enclosed are the results of analyses for samples received by the laboratory on 07/19/18 8:40.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive style with a large, flowing "C" and "K".

Celey D. Keene

Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	07/19/2018	Sampling Date:	07/17/2018
Reported:	07/24/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB #1 @ 40' (H801969-01)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>4640</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	196	98.1	200	0.715	
<b>DRO &gt;C10-C28*</b>	<b>47.4</b>	10.0	07/20/2018	ND	219	109	200	1.18	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>86.3 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>94.5 %</i>	<i>37.6-147</i>							

**Sample ID: SB #1 @ 80' (H801969-02)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>2240</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	196	98.1	200	0.715	
DRO >C10-C28*	<10.0	10.0	07/20/2018	ND	219	109	200	1.18	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>102 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>106 %</i>	<i>37.6-147</i>							

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	07/19/2018	Sampling Date:	07/17/2018
Reported:	07/24/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB #2 @ 10' (H801969-03)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>2680</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	196	98.1	200	0.715	
DRO >C10-C28*	<10.0	10.0	07/20/2018	ND	219	109	200	1.18	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>109 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>114 %</i>	<i>37.6-147</i>							

**Sample ID: SB #2 @ 80' (H801969-04)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>880</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	196	98.1	200	0.715	
DRO >C10-C28*	<10.0	10.0	07/20/2018	ND	219	109	200	1.18	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>101 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>105 %</i>	<i>37.6-147</i>							

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	07/19/2018	Sampling Date:	07/18/2018
Reported:	07/24/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB #3 @ 15' (H801969-05)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>6530</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	211	106	200	1.92	
DRO >C10-C28*	<10.0	10.0	07/20/2018	ND	207	104	200	2.24	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>104 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>92.6 %</i>	<i>37.6-147</i>							

**Sample ID: SB #3 @ 80' (H801969-06)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>976</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	211	106	200	1.92	
DRO >C10-C28*	<10.0	10.0	07/20/2018	ND	207	104	200	2.24	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>104 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>94.3 %</i>	<i>37.6-147</i>							

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	07/19/2018	Sampling Date:	07/18/2018
Reported:	07/24/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB #4 @ 20' (H801969-07)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>6800</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	211	106	200	1.92	
DRO >C10-C28*	<10.0	10.0	07/20/2018	ND	207	104	200	2.24	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>99.8 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>89.3 %</i>	<i>37.6-147</i>							

**Sample ID: SB #4 @ 80' (H801969-08)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>1810</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	211	106	200	1.92	
DRO >C10-C28*	<10.0	10.0	07/20/2018	ND	207	104	200	2.24	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>113 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>102 %</i>	<i>37.6-147</i>							

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	07/19/2018	Sampling Date:	07/18/2018
Reported:	07/24/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB #5 @ 25' (H801969-09)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>4080</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	211	106	200	1.92	
DRO >C10-C28*	<10.0	10.0	07/20/2018	ND	207	104	200	2.24	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>102 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>90.3 %</i>	<i>37.6-147</i>							

**Sample ID: SB #5 @ 40' (H801969-10)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>192</b>	16.0	07/23/2018	ND	432	108	400	3.77	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	07/20/2018	ND	211	106	200	1.92	
DRO >C10-C28*	<10.0	10.0	07/20/2018	ND	207	104	200	2.24	
EXT DRO >C28-C36	<10.0	10.0	07/20/2018	ND					
<i>Surrogate: 1-Chlorooctane</i>	<i>101 %</i>	<i>41-142</i>							
<i>Surrogate: 1-Chlorooctadecane</i>	<i>90.0 %</i>	<i>37.6-147</i>							

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Celey D. Keene, Lab Director/Quality Manager



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Notes and Definitions

- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- \*\* Samples not received at proper temperature of 6°C or below.
- \*\*\* Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C  
Samples reported on an as received basis (wet) unless otherwise noted on report

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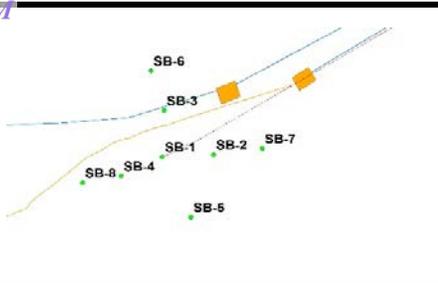
*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager





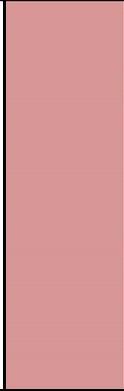
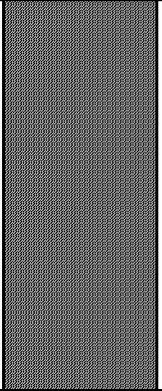
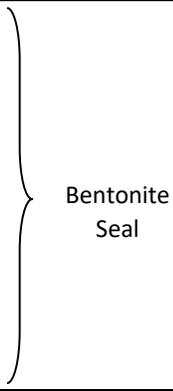
Logger: Nick Kopiasz  
 Driller: HCI Drilling  
 Drilling Method: 6" Air Rotary  
 Start Date: 8/31/2018  
 End Date: 8/31/2018



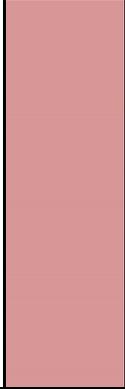
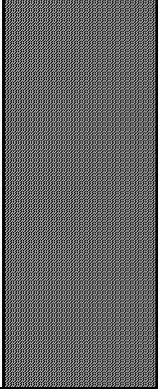
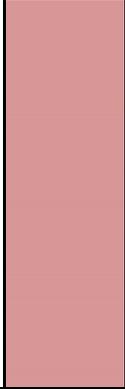
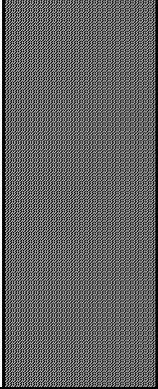
Company: Rice Operating Company  
 Project Name: BD I-18 EOL Well ID: SB-7  
 Project Consultant: Tasman  
 Location: Unit I, Section 18, T21S, R37E  
 Lat: 32.477390 County: Lea  
 Long: -103.196951 (NAD83) State: NM

Comments: Soil samples were collected from drill cuttings at specified intervals.  
 SB-7 is approximately 20 feet East of SB-2.  
 DRAFTED BY: Nick Kopiasz  
 TD = 50' GW = ~100'

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
SS	139		0.0	SW-light brown, well graded sand, caliche		Bentonite Seal
5 ft	898		0.0	SW-Same as above (SAA)		
10 ft	4,602	CI=5,200 GRO=<10 DRO=<10 EXT DRO=<10	0.0	SM-reddish tan, very fine sand, trace caliche		
15 ft	3,848		0.0	SM-SAA		
20 ft	3,686		0.0	SM-tan, very fine sand		
25 ft	3,764		0.0	SM-light tan, very fine sand		
30 ft	3,575		0.0	SM-SAA		
35 ft	2,576		0.0	SM-SAA		
40 ft	2,605		0.0	SM-SAA		

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
45 ft	1,006		0.0	SM-SAA		 <div style="display: flex; align-items: center; justify-content: center;">  </div>
				SM-SAA		
50 ft	283	Cl=192	0.0	SM-SAA		
		GRO=<10		SM-SAA		
		DRO=<10		SM-SAA		
		EXT DRO=<10		SM-SAA		
		Total BTEX=<0.3		SM-SAA		



Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
45 ft	594		0.0	SM-SAA		 } Bentonite Seal
50 ft	422	CI=320	0.0	SM-SAA		 } Bentonite Seal
		GRO=<10				
		DRO=<10				
	EXT DRO=<10					
	Total BTEX=<0.3					



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September 06, 2018

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD I-18 EOL

Enclosed are the results of analyses for samples received by the laboratory on 08/31/18 16:30.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	08/31/2018	Sampling Date:	08/30/2018
Reported:	09/06/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NONE GIVEN		

**Sample ID: SOIL BORE 6 @ 5' (H802484-01)**

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>1100</b>	16.0	09/05/2018	ND	432	108	400	3.64	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	09/04/2018	ND	194	96.9	200	0.137	
DRO >C10-C28*	<10.0	10.0	09/04/2018	ND	188	94.2	200	10.8	
EXT DRO >C28-C36	<10.0	10.0	09/04/2018	ND					
Surrogate: 1-Chlorooctane	92.8 %	41-142							
Surrogate: 1-Chlorooctadecane	89.7 %	37.6-147							

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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	08/31/2018	Sampling Date:	08/30/2018
Reported:	09/06/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NONE GIVEN		

**Sample ID: SOIL BORE 6 @ 35' (H802484-02)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	09/05/2018	ND	2.11	106	2.00	0.309	
Toluene*	<0.050	0.050	09/05/2018	ND	2.07	104	2.00	0.461	
Ethylbenzene*	<0.050	0.050	09/05/2018	ND	2.04	102	2.00	0.412	
Total Xylenes*	<0.150	0.150	09/05/2018	ND	5.84	97.4	6.00	0.0760	
Total BTEX	<0.300	0.300	09/05/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID) 98.8 % 69.8-142

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	272	16.0	09/05/2018	ND	432	108	400	3.64	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	09/04/2018	ND	194	96.9	200	0.137	
DRO >C10-C28*	<10.0	10.0	09/04/2018	ND	188	94.2	200	10.8	
EXT DRO >C28-C36	<10.0	10.0	09/04/2018	ND					

Surrogate: 1-Chlorooctane 104 % 41-142

Surrogate: 1-Chlorooctadecane 100 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	08/31/2018	Sampling Date:	08/31/2018
Reported:	09/06/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NONE GIVEN		

**Sample ID: SOIL BORE 7 @ 10' (H802484-03)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>5200</b>	16.0	09/05/2018	ND	432	108	400	3.64	
TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	09/04/2018	ND	194	96.9	200	0.137	
DRO >C10-C28*	<10.0	10.0	09/04/2018	ND	188	94.2	200	10.8	
EXT DRO >C28-C36	<10.0	10.0	09/04/2018	ND					
Surrogate: 1-Chlorooctane	104 %	41-142							
Surrogate: 1-Chlorooctadecane	98.2 %	37.6-147							

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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	08/31/2018	Sampling Date:	08/31/2018
Reported:	09/06/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NONE GIVEN		

**Sample ID: SOIL BORE 7 @ 50' (H802484-04)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	09/05/2018	ND	2.11	106	2.00	0.309	
Toluene*	<0.050	0.050	09/05/2018	ND	2.07	104	2.00	0.461	
Ethylbenzene*	<0.050	0.050	09/05/2018	ND	2.04	102	2.00	0.412	
Total Xylenes*	<0.150	0.150	09/05/2018	ND	5.84	97.4	6.00	0.0760	
Total BTEX	<0.300	0.300	09/05/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.1 % 69.8-142

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	09/05/2018	ND	432	108	400	3.64	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	09/04/2018	ND	194	96.9	200	0.137	
DRO >C10-C28*	<10.0	10.0	09/04/2018	ND	188	94.2	200	10.8	
EXT DRO >C28-C36	<10.0	10.0	09/04/2018	ND					

Surrogate: 1-Chlorooctane 103 % 41-142

Surrogate: 1-Chlorooctadecane 96.1 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	08/31/2018	Sampling Date:	08/31/2018
Reported:	09/06/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NONE GIVEN		

**Sample ID: SOIL BORE 8 @ 20' (H802484-05)**

**Chloride, SM4500Cl-B** **mg/kg** **Analyzed By: AC**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>4320</b>	16.0	09/05/2018	ND	432	108	400	3.64	

**TPH 8015M** **mg/kg** **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	09/04/2018	ND	194	96.9	200	0.137	
DRO >C10-C28*	<10.0	10.0	09/04/2018	ND	188	94.2	200	10.8	
EXT DRO >C28-C36	<10.0	10.0	09/04/2018	ND					

Surrogate: 1-Chlorooctane 99.6 % 41-142

Surrogate: 1-Chlorooctadecane 92.8 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	08/31/2018	Sampling Date:	08/31/2018
Reported:	09/06/2018	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NONE GIVEN		

**Sample ID: SOIL BORE 8 @ 50' (H802484-06)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	09/05/2018	ND	2.11	106	2.00	0.309	
Toluene*	<0.050	0.050	09/05/2018	ND	2.07	104	2.00	0.461	
Ethylbenzene*	<0.050	0.050	09/05/2018	ND	2.04	102	2.00	0.412	
Total Xylenes*	<0.150	0.150	09/05/2018	ND	5.84	97.4	6.00	0.0760	
Total BTEX	<0.300	0.300	09/05/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.5 % 69.8-142

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	320	16.0	09/05/2018	ND	432	108	400	3.64	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	09/04/2018	ND	194	96.9	200	0.137	
DRO >C10-C28*	<10.0	10.0	09/04/2018	ND	188	94.2	200	10.8	
EXT DRO >C28-C36	<10.0	10.0	09/04/2018	ND					

Surrogate: 1-Chlorooctane 102 % 41-142

Surrogate: 1-Chlorooctadecane 94.6 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



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Notes and Definitions

- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- \*\* Samples not received at proper temperature of 6°C or below.
- \*\*\* Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C  
Samples reported on an as received basis (wet) unless otherwise noted on report

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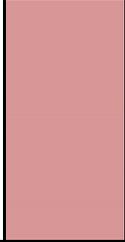
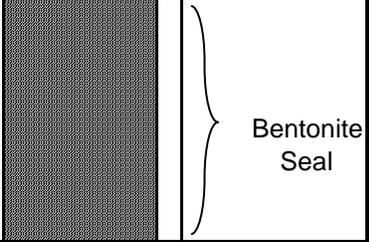
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*Celey D. Keene*

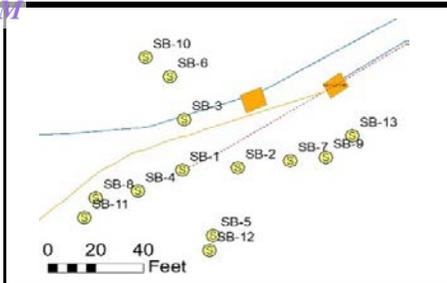
Celey D. Keene, Lab Director/Quality Manager





Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
45 ft	245	Cl=240	1.2	SM-light tan, silty sand, some caliche chunks		
		GRO=<10				
		DRO=<10				
	EXT DRO=<10					
	Total BTEX=<0.3					

**Logger:** Nick Kopiasz  
**Driller:** HCI Drilling  
**Drilling Method:** 6" Air Rotary  
**Start Date:** 4/23/2019  
**End Date:** 4/23/2019



**Company:** Rice Operating Company  
**Project Name:** BD I-18 EOL  
**Well ID:** SB-10  
**Project Consultant:** Tasman

**Comments:** Soil samples were collected from drill cuttings at specified intervals. SB-10 is approximately 15 feet North of SB-6.  
**DRAFTED BY:** Nick Kopiasz  
 TD = 35'      GW = ~100'

**Location:** Unit I, Section 18, T21S, R37E  
**Lat:** 32.477524      **County:** Lea  
**Long:** -103.197146 (NAD83)      **State:** NM

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
SS	1,628		0.3	SM-tan, silty sand, trace caliche		Bentonite Seal
5 ft	685		0.2	GM-light brown, silty gravel, caliche cobbles		
10 ft	791		0.0	SM-tan, silty sand		
15 ft	1,055		0.0	SM-tan, silty sand, some caliche chunks		
20 ft	1,693		0.0	SM-Same As Above (SAA)		
25 ft	2,530	CI=592 GRO=<10 DRO=<10 EXT DRO=<10 Total BTEX=<0.3	0.4	SM-light tan, silty fine sand, some caliche chunks		
30 ft	1,766		0.4	SM-SAA		
35 ft	205	CI=144 GRO=<10 DRO=<10 EXT DRO=<10 Total BTEX=<0.3	0.4	SM-SAA		







Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
45 ft	2,195		0.9	SM-tan, silty fine sand		
50 ft	959		1.0	SM-tan, silty fine sand, sandstone with calcic cement		
55 ft	616		0.7	SM-tan, silty sand, some sandstone chunks		
60 ft	212	Cl=192	0.2	SM-SAA		
		GRO=<10				
		DRO=<10				
		EXT DRO=<10				
		Total BTEX=<0.3				

Bentonite Seal



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April 30, 2019

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD I-18 EOL

Enclosed are the results of analyses for samples received by the laboratory on 04/26/19 16:40.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	04/26/2019	Sampling Date:	04/23/2019
Reported:	04/30/2019	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB 9 @ 15' (H901510-01)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 98.3 % 73.3-129

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	4080	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 92.5 % 41-142

Surrogate: 1-Chlorooctadecane 86.5 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	04/26/2019	Sampling Date:	04/23/2019
Reported:	04/30/2019	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB 9 @ 45' (H901510-02)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 98.1 % 73.3-129

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<b>240</b>	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 91.0 % 41-142

Surrogate: 1-Chlorooctadecane 85.8 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received: 04/26/2019  
 Reported: 04/30/2019  
 Project Name: BD I-18 EOL  
 Project Number: NONE GIVEN  
 Project Location: NONE GIVEN

Sampling Date: 04/23/2019  
 Sampling Type: Soil  
 Sampling Condition: \*\* (See Notes)  
 Sample Received By: Tamara Oldaker

**Sample ID: SB 10 @ 25' (H901510-03)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 98.0 % 73.3-129

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	592	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 85.0 % 41-142

Surrogate: 1-Chlorooctadecane 78.3 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	04/26/2019	Sampling Date:	04/23/2019
Reported:	04/30/2019	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB 10 @ 35' (H901510-04)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 95.9 % 73.3-129

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	144	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 83.9 % 41-142

Surrogate: 1-Chlorooctadecane 78.7 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	04/26/2019	Sampling Date:	04/23/2019
Reported:	04/30/2019	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB 11 @ 15' (H901510-05)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 94.1 % 73.3-129

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3760	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 86.5 % 41-142

Surrogate: 1-Chlorooctadecane 82.1 % 37.6-147

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	04/26/2019	Sampling Date:	04/23/2019
Reported:	04/30/2019	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB 11 @ 30' (H901510-06)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 96.6 % 73.3-129

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	416	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 94.4 % 41-142

Surrogate: 1-Chlorooctadecane 89.0 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	04/26/2019	Sampling Date:	04/24/2019
Reported:	04/30/2019	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB 12 @ 5' (H901510-07)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 95.0 % 73.3-129

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>1120</b>	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 92.2 % 41-142

Surrogate: 1-Chlorooctadecane 86.6 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	04/26/2019	Sampling Date:	04/24/2019
Reported:	04/30/2019	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB 12 @ 25' (H901510-08)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 98.1 % 73.3-129

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	384	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 89.8 % 41-142

Surrogate: 1-Chlorooctadecane 85.1 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	04/26/2019	Sampling Date:	04/24/2019
Reported:	04/30/2019	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB 13 @ 15' (H901510-09)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 106 % 73.3-129

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3560	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 87.5 % 41-142

Surrogate: 1-Chlorooctadecane 83.7 % 37.6-147

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
 KATIE JONES  
 112 W. Taylor  
 Hobbs NM, 88240  
 Fax To: (575) 397-1471

Received:	04/26/2019	Sampling Date:	04/25/2019
Reported:	04/30/2019	Sampling Type:	Soil
Project Name:	BD I-18 EOL	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

**Sample ID: SB 13 @ 60' (H901510-10)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/29/2019	ND	1.84	92.2	2.00	0.724	
Toluene*	<0.050	0.050	04/29/2019	ND	1.97	98.4	2.00	2.01	
Ethylbenzene*	<0.050	0.050	04/29/2019	ND	1.89	94.6	2.00	2.12	
Total Xylenes*	<0.150	0.150	04/29/2019	ND	5.92	98.6	6.00	1.57	
Total BTEX	<0.300	0.300	04/29/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 96.4 % 73.3-129

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	04/30/2019	ND	400	100	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	04/29/2019	ND	215	108	200	0.819	
DRO >C10-C28*	<10.0	10.0	04/29/2019	ND	208	104	200	0.102	
EXT DRO >C28-C36	<10.0	10.0	04/29/2019	ND					

Surrogate: 1-Chlorooctane 90.8 % 41-142

Surrogate: 1-Chlorooctadecane 85.5 % 37.6-147

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Notes and Definitions

- QR-03 The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.
ND Analyte NOT DETECTED at or above the reporting limit
RPD Relative Percent Difference
\*\* Samples not received at proper temperature of 6°C or below.
\*\*\* Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C
Samples reported on an as received basis (wet) unless otherwise noted on report

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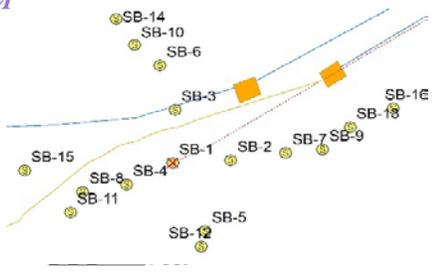
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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager



**Logger:** Nick Kopiasz  
**Driller:** HCI Drilling  
**Drilling Method:** 6" Air Rotary  
**Start Date:** 6/24/2019  
**End Date:** 6/24/2019



**Company:** Rice Operating Company  
**Project Name:** BD I-18 EOL  
**Well ID:** SB-14  
**Project Consultant:** Tasman  
**Location:** Unit I, Section 18, T21S, R37E  
**Lat:** 32.477556  
**Long:** -103.197170 (NAD83)  
**County:** Lea  
**State:** NM

**Comments:** Soil samples were collected from drill cuttings at specified intervals.  
 SB-14 is approximately 15 feet North of of SB-10.  
**DRAFTED BY:** Nick Kopiasz  
 TD = 15' GW = ~100'

Depth (feet)	Chloride field tests	LAB (mg/kg)	PID (ppm)	Description	Lithology	Well Construction
SS	147		0.5	SW-brown, well graded, coarse sands with silt		Bentonite Seal
5 ft	855	CI=1,060 GRO=<10 DRO=<10 EXT DRO=<10 Total BTEX=<0.3	1.4	SM-light brown, silty sand, occasional coarse caliche grains		
10 ft	533		0.8	SM-reddish tan, silty sand		
15 ft	392	CI=320 GRO=<10 DRO=<10 EXT DRO=<10 Total BTEX=<0.3	0.6	SM-Same As Above (SAA)		







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July 01, 2019

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD I-18 EOL

Enclosed are the results of analyses for samples received by the laboratory on 06/26/19 16:26.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/ga/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/ga/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Total Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
--	--	------------------------------

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SB-14 @ 5'	H902193-01	Soil	24-Jun-19 13:20	26-Jun-19 16:26
SB-14 @ 15'	H902193-02	Soil	24-Jun-19 13:30	26-Jun-19 16:26
SB-15 @ 5'	H902193-03	Soil	24-Jun-19 14:20	26-Jun-19 16:26
SB-15 @ 15'	H902193-04	Soil	24-Jun-19 14:30	26-Jun-19 16:26
SB-16 @ 20'	H902193-05	Soil	25-Jun-19 09:30	26-Jun-19 16:26
SB-16 @ 30'	H902193-06	Soil	25-Jun-19 09:40	26-Jun-19 16:26

The wrong COC was attached to the first report sent 07/01/19. This is the revised report with the correct COC attached. This report will replace the one sent earlier today, 07/01/19.

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**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**SB-14 @ 5'  
H902193-01 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Inorganic Compounds**

<b>Chloride</b>	<b>1060</b>		16.0	mg/kg	4	9062714	AC	27-Jun-19	4500-Cl-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9062702	BF	27-Jun-19	8021B	
<b>Toluene*</b>	<b>0.070</b>		0.050	mg/kg	50	9062702	BF	27-Jun-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9062702	BF	27-Jun-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9062702	ms	27-Jun-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9062702	ms	27-Jun-19	8021B	
Surrogate: 4-Bromofluorobenzene (PID)			103 %	73.3-129		9062702	ms	27-Jun-19	8021B	

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9062708	MS	28-Jun-19	8015B	
DRO >C10-C28*	<10.0		10.0	mg/kg	1	9062708	MS	28-Jun-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9062708	MS	28-Jun-19	8015B	
Surrogate: 1-Chlorooctane			80.6 %	41-142		9062708	MS	28-Jun-19	8015B	
Surrogate: 1-Chlorooctadecane			83.9 %	37.6-147		9062708	MS	28-Jun-19	8015B	

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**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**SB-14 @ 15'  
H902193-02 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**

**Inorganic Compounds**

Chloride	320		16.0	mg/kg	4	9062714	AC	27-Jun-19	4500-CI-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9062807	ms	28-Jun-19	8021B	
Toluene*	<0.050		0.050	mg/kg	50	9062807	ms	28-Jun-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9062807	ms	28-Jun-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9062807	ms	28-Jun-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9062807	ms	28-Jun-19	8021B	

Surrogate: 4-Bromofluorobenzene (PID)			105 %		73.3-129	9062807	ms	28-Jun-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
DRO >C10-C28*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	

Surrogate: 1-Chlorooctane			89.6 %		41-142	9062809	MS	28-Jun-19	8015B	
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Surrogate: 1-Chlorooctadecane			93.1 %		37.6-147	9062809	MS	28-Jun-19	8015B	
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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**SB-15 @ 5'**  
**H902193-03 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**

**Inorganic Compounds**

<b>Chloride</b>	<b>96.0</b>		16.0	mg/kg	4	9062714	AC	27-Jun-19	4500-CI-B	
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**Volatile Organic Compounds by EPA Method 8021**

**S-04**

Benzene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
<b>Toluene*</b>	<b>0.070</b>		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9062701	BF	27-Jun-19	8021B	

<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			131 %		73.3-129	9062701	BF	27-Jun-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
DRO >C10-C28*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	

<i>Surrogate: 1-Chlorooctane</i>			99.5 %		41-142	9062809	MS	28-Jun-19	8015B	
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<i>Surrogate: 1-Chlorooctadecane</i>			103 %		37.6-147	9062809	MS	28-Jun-19	8015B	
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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**SB-15 @ 15'  
H902193-04 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**

**Inorganic Compounds**

Chloride	16.0		16.0	mg/kg	4	9062714	AC	27-Jun-19	4500-CI-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Toluene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9062701	BF	27-Jun-19	8021B	

Surrogate: 4-Bromofluorobenzene (PID)			111 %		73.3-129	9062701	BF	27-Jun-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
DRO >C10-C28*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	

Surrogate: 1-Chlorooctane			97.6 %		41-142	9062809	MS	28-Jun-19	8015B	
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Surrogate: 1-Chlorooctadecane			101 %		37.6-147	9062809	MS	28-Jun-19	8015B	
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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**SB-16 @ 20'**  
**H902193-05 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**

**Inorganic Compounds**

<b>Chloride</b>	<b>1150</b>		16.0	mg/kg	4	9062714	AC	27-Jun-19	4500-CI-B	
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**Volatile Organic Compounds by EPA Method 8021**

**S-04**

Benzene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
<b>Toluene*</b>	<b>0.062</b>		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9062701	BF	27-Jun-19	8021B	

<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			130 %		73.3-129	9062701	BF	27-Jun-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
DRO >C10-C28*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	

<i>Surrogate: 1-Chlorooctane</i>			98.9 %		41-142	9062809	MS	28-Jun-19	8015B	
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<i>Surrogate: 1-Chlorooctadecane</i>			102 %		37.6-147	9062809	MS	28-Jun-19	8015B	
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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**SB-16 @ 30'**  
**H902193-06 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**

**Inorganic Compounds**

<b>Chloride</b>	<b>368</b>		16.0	mg/kg	4	9062714	AC	27-Jun-19	4500-CI-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Toluene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9062701	BF	27-Jun-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9062701	BF	27-Jun-19	8021B	

<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			108 %		73.3-129	9062701	BF	27-Jun-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
DRO >C10-C28*	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9062809	MS	28-Jun-19	8015B	

<i>Surrogate: 1-Chlorooctane</i>			101 %		41-142	9062809	MS	28-Jun-19	8015B	
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<i>Surrogate: 1-Chlorooctadecane</i>			105 %		37.6-147	9062809	MS	28-Jun-19	8015B	
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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**Inorganic Compounds - Quality Control**

**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 9062714 - 1:4 DI Water</b>										
<b>Blank (9062714-BLK1)</b>										
Prepared & Analyzed: 27-Jun-19										
Chloride	ND	16.0	mg/kg							
<b>LCS (9062714-BS1)</b>										
Prepared & Analyzed: 27-Jun-19										
Chloride	416	16.0	mg/kg	400		104	80-120			
<b>LCS Dup (9062714-BSD1)</b>										
Prepared & Analyzed: 27-Jun-19										
Chloride	416	16.0	mg/kg	400		104	80-120	0.00	20	

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**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**Volatile Organic Compounds by EPA Method 8021 - Quality Control**

**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 9062701 - Volatiles**

<b>Blank (9062701-BLK1)</b>			Prepared & Analyzed: 27-Jun-19							
Benzene	ND	0.050	mg/kg							
Toluene	ND	0.050	mg/kg							
Ethylbenzene	ND	0.050	mg/kg							
Total Xylenes	ND	0.150	mg/kg							
Total BTEX	ND	0.300	mg/kg							
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>	0.107		mg/kg	0.100		107	73.3-129			

<b>LCS (9062701-BS1)</b>			Prepared & Analyzed: 27-Jun-19							
Benzene	1.80	0.050	mg/kg	2.00		90.2	72.2-131			
Toluene	1.79	0.050	mg/kg	2.00		89.5	71.7-126			
Ethylbenzene	1.70	0.050	mg/kg	2.00		85.0	68.9-126			
Total Xylenes	5.15	0.150	mg/kg	6.00		85.8	71.4-125			
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>	0.101		mg/kg	0.100		101	73.3-129			

<b>LCS Dup (9062701-BSD1)</b>			Prepared & Analyzed: 27-Jun-19							
Benzene	1.76	0.050	mg/kg	2.00		88.0	72.2-131	2.40	6.91	
Toluene	1.75	0.050	mg/kg	2.00		87.3	71.7-126	2.48	7.12	
Ethylbenzene	1.69	0.050	mg/kg	2.00		84.6	68.9-126	0.508	7.88	
Total Xylenes	5.15	0.150	mg/kg	6.00		85.8	71.4-125	0.0404	7.46	
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>	0.103		mg/kg	0.100		103	73.3-129			

**Batch 9062702 - Volatiles**

<b>Blank (9062702-BLK1)</b>			Prepared & Analyzed: 27-Jun-19							
Benzene	ND	0.050	mg/kg							
Toluene	ND	0.050	mg/kg							
Ethylbenzene	ND	0.050	mg/kg							
Total Xylenes	ND	0.150	mg/kg							
Total BTEX	ND	0.300	mg/kg							
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>	0.105		mg/kg	0.100		105	73.3-129			

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Rice Operating Company  
112 W. Taylor  
Hobbs NM, 88240

Project: BD I-18 EOL  
Project Number: NONE GIVEN  
Project Manager: KATIE JONES  
Fax To: (575) 397-1471

Reported:  
01-Jul-19 13:35

**Volatile Organic Compounds by EPA Method 8021 - Quality Control****Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 9062702 - Volatiles****LCS (9062702-BS1)**

Prepared &amp; Analyzed: 27-Jun-19

Benzene	2.04	0.050	mg/kg	2.00		102	72.2-131			
Toluene	2.08	0.050	mg/kg	2.00		104	71.7-126			
Ethylbenzene	1.94	0.050	mg/kg	2.00		96.9	68.9-126			
Total Xylenes	5.95	0.150	mg/kg	6.00		99.1	71.4-125			
Surrogate: 4-Bromofluorobenzene (PID)	0.102		mg/kg	0.100		102	73.3-129			

**LCS Dup (9062702-BSD1)**

Prepared &amp; Analyzed: 27-Jun-19

Benzene	2.02	0.050	mg/kg	2.00		101	72.2-131	0.644	6.91	
Toluene	2.07	0.050	mg/kg	2.00		103	71.7-126	0.380	7.12	
Ethylbenzene	1.91	0.050	mg/kg	2.00		95.7	68.9-126	1.34	7.88	
Total Xylenes	5.84	0.150	mg/kg	6.00		97.4	71.4-125	1.78	7.46	
Surrogate: 4-Bromofluorobenzene (PID)	0.101		mg/kg	0.100		101	73.3-129			

**Batch 9062807 - Volatiles****Blank (9062807-BLK1)**

Prepared &amp; Analyzed: 28-Jun-19

Benzene	ND	0.050	mg/kg							
Toluene	ND	0.050	mg/kg							
Ethylbenzene	ND	0.050	mg/kg							
Total Xylenes	ND	0.150	mg/kg							
Total BTEX	ND	0.300	mg/kg							
Surrogate: 4-Bromofluorobenzene (PID)	0.106		mg/kg	0.100		106	73.3-129			

**LCS (9062807-BS1)**

Prepared &amp; Analyzed: 28-Jun-19

Benzene	1.93	0.050	mg/kg	2.00		96.3	72.2-131			
Toluene	1.93	0.050	mg/kg	2.00		96.7	71.7-126			
Ethylbenzene	1.85	0.050	mg/kg	2.00		92.6	68.9-126			
Total Xylenes	5.60	0.150	mg/kg	6.00		93.3	71.4-125			
Surrogate: 4-Bromofluorobenzene (PID)	0.104		mg/kg	0.100		104	73.3-129			

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**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**Volatile Organic Compounds by EPA Method 8021 - Quality Control**

**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 9062807 - Volatiles**

**LCS Dup (9062807-BSD1)**

Prepared & Analyzed: 28-Jun-19

Benzene	1.88	0.050	mg/kg	2.00		93.8	72.2-131	2.58	6.91	
Toluene	1.90	0.050	mg/kg	2.00		95.1	71.7-126	1.70	7.12	
Ethylbenzene	1.82	0.050	mg/kg	2.00		91.1	68.9-126	1.64	7.88	
Total Xylenes	5.51	0.150	mg/kg	6.00		91.9	71.4-125	1.49	7.46	
Surrogate: 4-Bromofluorobenzene (PID)	0.104		mg/kg	0.100		104	73.3-129			

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company  
112 W. Taylor  
Hobbs NM, 88240

Project: BD I-18 EOL  
Project Number: NONE GIVEN  
Project Manager: KATIE JONES  
Fax To: (575) 397-1471

Reported:  
01-Jul-19 13:35

**Petroleum Hydrocarbons by GC FID - Quality Control****Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 9062708 - General Prep - Organics****Blank (9062708-BLK1)**

Prepared &amp; Analyzed: 27-Jun-19

GRO C6-C10	ND	10.0	mg/kg							
DRO >C10-C28	ND	10.0	mg/kg							
EXT DRO >C28-C36	ND	10.0	mg/kg							
Surrogate: 1-Chlorooctane	47.7		mg/kg	50.0		95.3	41-142			
Surrogate: 1-Chlorooctadecane	50.5		mg/kg	50.0		101	37.6-147			

**LCS (9062708-BS1)**

Prepared &amp; Analyzed: 27-Jun-19

GRO C6-C10	214	10.0	mg/kg	200		107	76.5-133			
DRO >C10-C28	228	10.0	mg/kg	200		114	72.9-138			
Total TPH C6-C28	442	10.0	mg/kg	400		111	78-132			
Surrogate: 1-Chlorooctane	50.8		mg/kg	50.0		102	41-142			
Surrogate: 1-Chlorooctadecane	52.7		mg/kg	50.0		105	37.6-147			

**LCS Dup (9062708-BSD1)**

Prepared &amp; Analyzed: 27-Jun-19

GRO C6-C10	212	10.0	mg/kg	200		106	76.5-133	1.29	20.6	
DRO >C10-C28	226	10.0	mg/kg	200		113	72.9-138	0.919	20.6	
Total TPH C6-C28	438	10.0	mg/kg	400		109	78-132	1.10	18	
Surrogate: 1-Chlorooctane	50.3		mg/kg	50.0		101	41-142			
Surrogate: 1-Chlorooctadecane	51.2		mg/kg	50.0		102	37.6-147			

**Batch 9062809 - General Prep - Organics****Blank (9062809-BLK1)**

Prepared &amp; Analyzed: 28-Jun-19

GRO C6-C10	ND	10.0	mg/kg							
DRO >C10-C28	ND	10.0	mg/kg							
EXT DRO >C28-C36	ND	10.0	mg/kg							
Surrogate: 1-Chlorooctane	56.2		mg/kg	50.0		112	41-142			
Surrogate: 1-Chlorooctadecane	58.6		mg/kg	50.0		117	37.6-147			

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Rice Operating Company 112 W. Taylor Hobbs NM, 88240	Project: BD I-18 EOL Project Number: NONE GIVEN Project Manager: KATIE JONES Fax To: (575) 397-1471	Reported: 01-Jul-19 13:35
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**Petroleum Hydrocarbons by GC FID - Quality Control**

**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 9062809 - General Prep - Organics**

**LCS (9062809-BS1)**

Prepared & Analyzed: 28-Jun-19

GRO C6-C10	203	10.0	mg/kg	200		102	76.5-133			
DRO >C10-C28	198	10.0	mg/kg	200		99.1	72.9-138			
Total TPH C6-C28	402	10.0	mg/kg	400		100	78-132			
Surrogate: 1-Chlorooctane	61.3		mg/kg	50.0		123	41-142			
Surrogate: 1-Chlorooctadecane	62.5		mg/kg	50.0		125	37.6-147			

**LCS Dup (9062809-BSD1)**

Prepared & Analyzed: 28-Jun-19

GRO C6-C10	200	10.0	mg/kg	200		99.8	76.5-133	1.94	20.6	
DRO >C10-C28	191	10.0	mg/kg	200		95.6	72.9-138	3.56	20.6	
Total TPH C6-C28	391	10.0	mg/kg	400		97.7	78-132	2.74	18	
Surrogate: 1-Chlorooctane	59.3		mg/kg	50.0		119	41-142			
Surrogate: 1-Chlorooctadecane	60.7		mg/kg	50.0		121	37.6-147			

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Celey D. Keene, Lab Director/Quality Manager



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Notes and Definitions

- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- \*\* Samples not received at proper temperature of 6°C or below.
- \*\*\* Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C  
Samples reported on an as received basis (wet) unless otherwise noted on report

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*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



**CARDINAL LABORATORIES**

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603  
 (505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325) 673-7020

**CHAIN-OF-CUSTODY AND ANALYSIS REQUEST**

Company Name: Rice Operating				<b>BILL TO</b>				<b>ANALYSIS REQUEST</b>																						
Project Manager: Katie Jones / Kyle Norman				P.O. #:				Chlorides TPH 8015 M Ext BTEX Texas TPH Complete Cations/Anions TDS																						
Address:				Company:																										
City:		State:		Zip:		Attn:																								
Phone #:		Fax #:		Address:																										
Project #:		Project Owner:		City:																										
Project Name: BD I-18 EOL				State:		Zip:																								
Project Location:				Phone #:																										
Sampler Name: Nick Kopiasz				Fax #:																										
FOR LAB USE ONLY																														
Lab I.D.		Sample I.D.				# CONTAINERS	MATRIX		PRESERV.		SAMPLING																			
						(G)RAB OR (C)OMP.	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID/BASE:	ICE / COOL	OTHER:	DATE	TIME													
H902193						G	1		✓				✓			6/24/19	13:20	✓	✓	✓										
1		SB-14 @ 5'				G	1		✓				✓			6/24/19	13:30	✓	✓	✓										
2		SB-14 @ 15'				G	1		✓				✓			6/24/19	14:20	✓	✓	✓										
3		SB-15 @ 5'				G	1		✓				✓			6/24/19	14:30	✓	✓	✓										
4		SB-15 @ 15'				G	1		✓				✓			6/24/19	14:30	✓	✓	✓										
5		SB-16 @ 20'				G	1		✓				✓			6/25/19	09:30	✓	✓	✓										
6		SB-16 @ 30'				G	1		✓				✓			6/25/19	09:40	✓	✓	✓										

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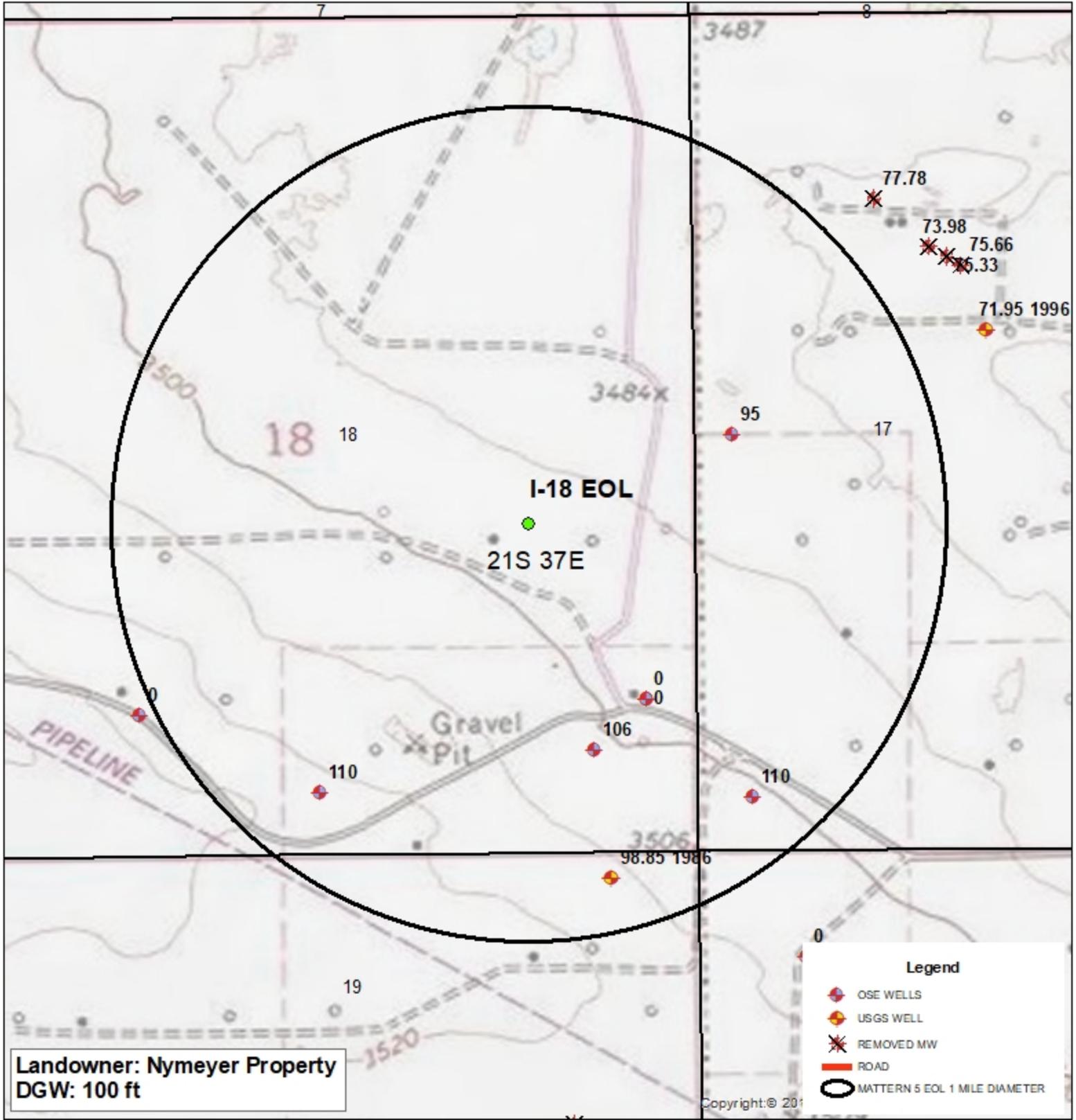
Relinquished By:		Date: 6/26/19		Received By:		Phone Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Add'l Phone #:	
Time: 1626						Fax Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Add'l Fax #:	
Relinquished By:		Date:		Received By:		REMARKS:			
Time:						email results: kjones@riceswd.com; knorman@tasman-geo.com; tgrieco@basinenv.com; nkopiasz@tasman-geo.com			
Delivered By: (Circle One) Sampler - UPS - Bus - Other: - 0.9c #97				Sample Condition Cool Intact <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		CHECKED BY: (Initials) TO			

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

# Depth to Groundwater

**RICE Operating Company**  
112 West Taylor, Hobbs, NM 88240  
Phone 575.393.9174

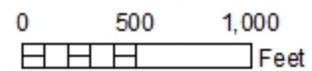
# Depth to Groundwater



**BD**  
**I-18 EOL**  
1R426-13

ULI SECTION 18  
T-21-S R-37-E  
LEA COUNTY, NM

GPS: 32.477379 -103.197098  
(MARKING PLATE)  
NAD 83 STATE PLANE PROJECTION  
NM EAST ZONE



Drawing date: 12/1/21  
Drafted by: T. Grieco



C-141

**RICE Operating Company**  
112 West Taylor, Hobbs, NM 88240  
Phone 575.393.9174

Incident ID	nAPP2109856086
District RP	1R426-13
Facility ID	fEEM0432440158
Application ID	pEEM0432442802

## Site Assessment/Characterization

*This information must be provided to the appropriate district office no later than 90 days after the release discovery date.*

What is the shallowest depth to groundwater beneath the area affected by the release?	___100___ (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas <b>not</b> on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

**Characterization Report Checklist:** *Each of the following items must be included in the report.*

- Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- Field data
- Data table of soil contaminant concentration data
- Depth to water determination
- Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- Boring or excavation logs
- Photographs including date and GIS information
- Topographic/Aerial maps
- Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

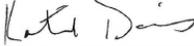
State of New Mexico  
Oil Conservation Division

Page 4

Incident ID	nAPP2109856086
District RP	1R426-13
Facility ID	fEEM0432440158
Application ID	pEEM0432442802

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Katie Davis Title: Environmental Manager

Signature:  Date: 3/14/2023

email: kjones@riceswd.com Telephone: (575) 393-9174

**OCD Only**

Received by: Jocelyn Harimon Date: 03/14/2023

Incident ID	nAPP2109856086
District RP	1R426-13
Facility ID	fEEM0432440158
Application ID	pEEM0432442802

## Remediation Plan

**Remediation Plan Checklist:** Each of the following items must be included in the plan.

- Detailed description of proposed remediation technique
- Scaled sitemap with GPS coordinates showing delineation points
- Estimated volume of material to be remediated
- Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

**Deferral Requests Only:** Each of the following items must be confirmed as part of any request for deferral of remediation.

- Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.
- Extents of contamination must be fully delineated.
- Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Katie Davis Title: Environmental Manager

Signature:  Date: 3/14/2023

email: kjones@riceswd.com Telephone: (575) 393-9174

**OCD Only**

Received by: Jocelyn Harimon Date: 03/14/2023

- Approved       Approved with Attached Conditions of Approval       Denied       Deferral Approved
- See text box below - NV

Signature:  Date: 07/10/2023

**Remediation Plan is approved on the following conditions;**

**1. Liner installation is approved as written. 2. OCD does not approve the sampling plan for excavated soils to be used as backfilled. 3. Variance requested is voided since the applicable closure standards beyond 4 feet (ft.) below ground surface (bgs) is for groundwater greater than 50 ft. bgs. 4. Rice Operating has 90-days (Remediation Due date: 10/10/2023) to submit a final closure report or time extension request along with furnishing an up-to-date status of the remediation being conducted.**

BD I-18 EOL (1R426-13)  
Unit I, Section 18, T21S, R37E



Facing North

5/26/2021

**District I**  
 1625 N. French Dr., Hobbs, NM 88240  
 Phone:(575) 393-6161 Fax:(575) 393-0720

**District II**  
 811 S. First St., Artesia, NM 88210  
 Phone:(575) 748-1283 Fax:(575) 748-9720

**District III**  
 1000 Rio Brazos Rd., Aztec, NM 87410  
 Phone:(505) 334-6178 Fax:(505) 334-6170

**District IV**  
 1220 S. St Francis Dr., Santa Fe, NM 87505  
 Phone:(505) 476-3470 Fax:(505) 476-3462

**State of New Mexico**  
**Energy, Minerals and Natural Resources**  
**Oil Conservation Division**  
**1220 S. St Francis Dr.**  
**Santa Fe, NM 87505**

CONDITIONS

Action 196835

**CONDITIONS**

Operator: RICE OPERATING COMPANY 122 W Taylor Hobbs, NM 88240	OGRID: 19174
	Action Number: 196835
	Action Type: [C-141] Release Corrective Action (C-141)

**CONDITIONS**

Created By	Condition	Condition Date
nvez	Remediation Plan is approved under the following conditions; 1. Liner installation is approved as written. 2. OCD does not approve the sampling plan for excavated soils to be used as backfilled. 3. Variance requested is voided since the applicable closure standards beyond 4 feet (ft.) below ground surface (bgs) is for groundwater greater than 50 ft. bgs. 4. Rice Operating has 90-days (Remediation Due date: 10/10/2023) to submit a final closure report or time extension request along with furnishing an up-to-date status of the remediation being conducted.	7/10/2023