Basin Environmental Service Technologies
Effective Solutions
PO Box 2948 | Hobbs, NM 88241 | Phone 575.393.2967

June 14, 2018

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

RE: **Investigation and Characterization Plan (ICP)**
Rice Operating Company – BD SWD System
BD Jct. K-20-2 (1R426-10): UL/K, Sec. 20, T21S, R37E

Mr. Billings:

RICE Operating Company (ROC) has retained Basin Environmental Service Technologies (BEST) to address potential environmental concerns at the above-referenced site in the BD Salt Water 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.

For all such environmental projects, ROC will choose the path forward that:

- Protects public health,
- Provides the greatest net environmental benefit,
- Complies with NMOCD Rules, and
- Is supported by good science.

Each site shall generally have three submissions:

1. This Investigation and Characterization Plan (ICP) is proposed for gathering data and site characterization and assessment.

2. Upon evaluating the data and results from the ICP, a recommended remedy will be submitted in a Corrective Action Plan (CAP), if warranted.

3. Finally, after implementing the remedy, a Termination Request with final documentation will be submitted.

June 14, 2018

Background and Previous Work

The site is located approximately 2.5 miles northwest of Eunice, New Mexico at UL/K, Sec. 20, T21S, R37E as shown on the Geographical Location Map and the Area Map. NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 99 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 K-20-2 junction box. The site was delineated using a backhoe to form a 24 ft x 24 ft x 12 ft deep excavation and soil samples were screened at regular intervals for hydrocarbons and chlorides. From the excavation, a sidewall composite sample and a bottom composite sample were sent to a commercial laboratory for analysis. The sidewall composite returned a chloride reading of 1,180 mg/kg and a Gasoline Range Organics (GRO) reading non-detect, a Diesel Range Organics (DRO) reading of non-detect, and BTEX readings of non-detect. The bottom composite sample returned a chloride reading of 567 mg/kg, a GRO reading of non-detect, a DRO reading of non-detect, and BTEX readings of non-detect. The excavation was backfilled and contoured to the surrounding area. A new water-tight junction box was installed 35 feet northwest of the site.

ROC proposes additional investigative work at the site to determine if there is potential for groundwater degradation from residual constituents at the site.

Proposed Work Elements

1. Conduct vertical and lateral delineation of residual chlorides and hydrocarbons from samples taken using a drill rig, hand augur and/or backhoe.
    a. Vertical sampling will be conducted until of the following criteria are met in the field.
        i. Three samples in which the chloride concentration decreases, and the third sample has a chloride concentration of $\leq$ 600 ppm; and,
        ii. Three samples in which PID readings decrease and the third sample has a PID reading of $\leq$ 100 ppm; or,
        iii. The sampling reaches the capillary fringe.
    b. Lateral sampling will be conducted until the following criteria are met in the field.
        i. A decrease is observed in chloride concentrations between lateral bores at similar depths; and,
        ii. A chloride concentration of $\leq$ 600 ppm is observed in a lateral surface sample; or,
        iii. Safety concerns impede further lateral delineation.
2. If warranted, install a monitor well to provide direct measurement of the potential groundwater impact at the site. (All monitor wells will be installed by EPA, NMOCD, and industry standards.)

June 14, 2018

3. Evaluate the risk of groundwater impact based on the information obtained.

If the evaluation of the site shows no threat to groundwater from residual constituents, then only a vadose zone remedy will be undertaken. However, if groundwater shows impact from residual chlorides, a CAP will be developed to address these concerns.

Please contact me at (505) 920-4965 or Katie Jones Davis at (575) 393-9174 if you have any questions or wish to discuss this site. Thank you for your time and consideration.

Sincerely,

Edward J. Hansen

Edward J. Hansen
Senior Hydrologist
BEST

enclosures

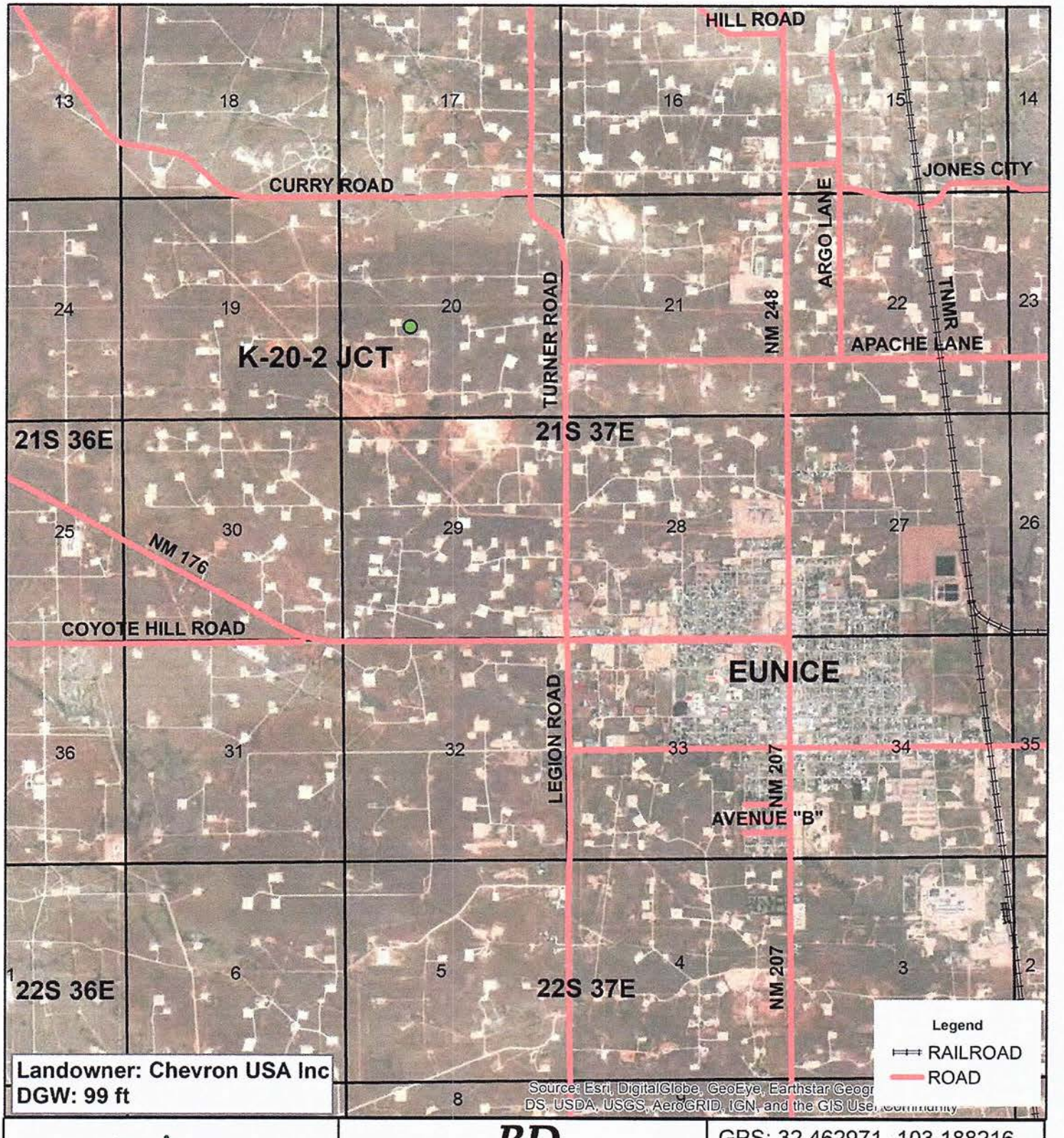
Figures

Basin Environmental Service Technologies (BEST)

P.O. Box 2948, Hobbs, NM 88241

Phone: 575-393-2967

Geographic Location



Basin Environmental Service Technologies
Effective Solutions

BD

K-20-2 JCT

1R426-10

UL K SECTION 20
T-21-S R-37-E
LEA COUNTY, NM

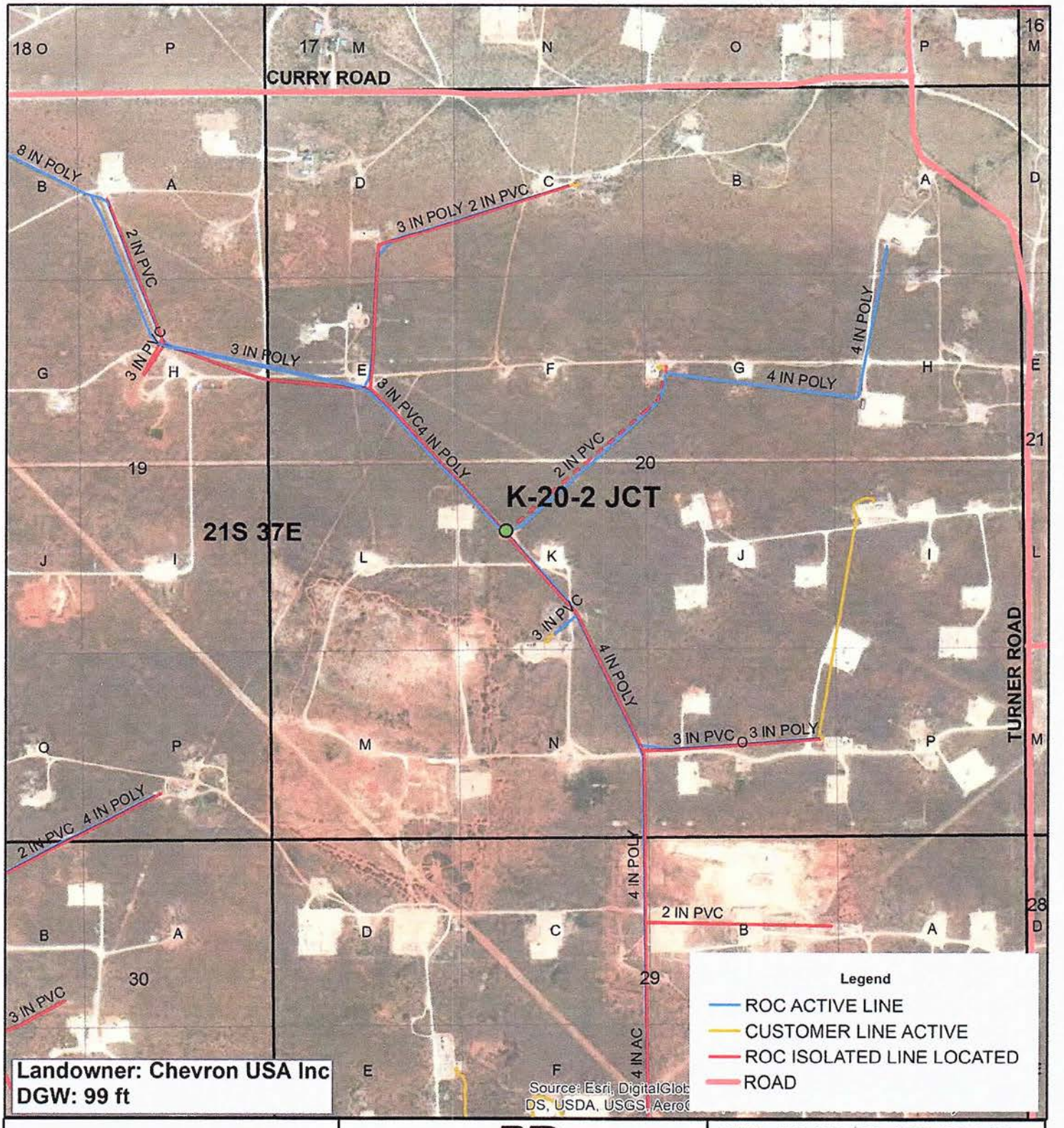
GPS: 32.462971 -103.188216

0 0.5 1 Miles

N W E S

Drawing date: 5/29/18
Drafted by: T. Grieco

Area Map



Basin Environmental Service Technologies
Effective Solutions

BD

K-20-2 JCT

1R426-10

UL K SECTION 20
T-21-S R-37-E
LEA COUNTY, NM

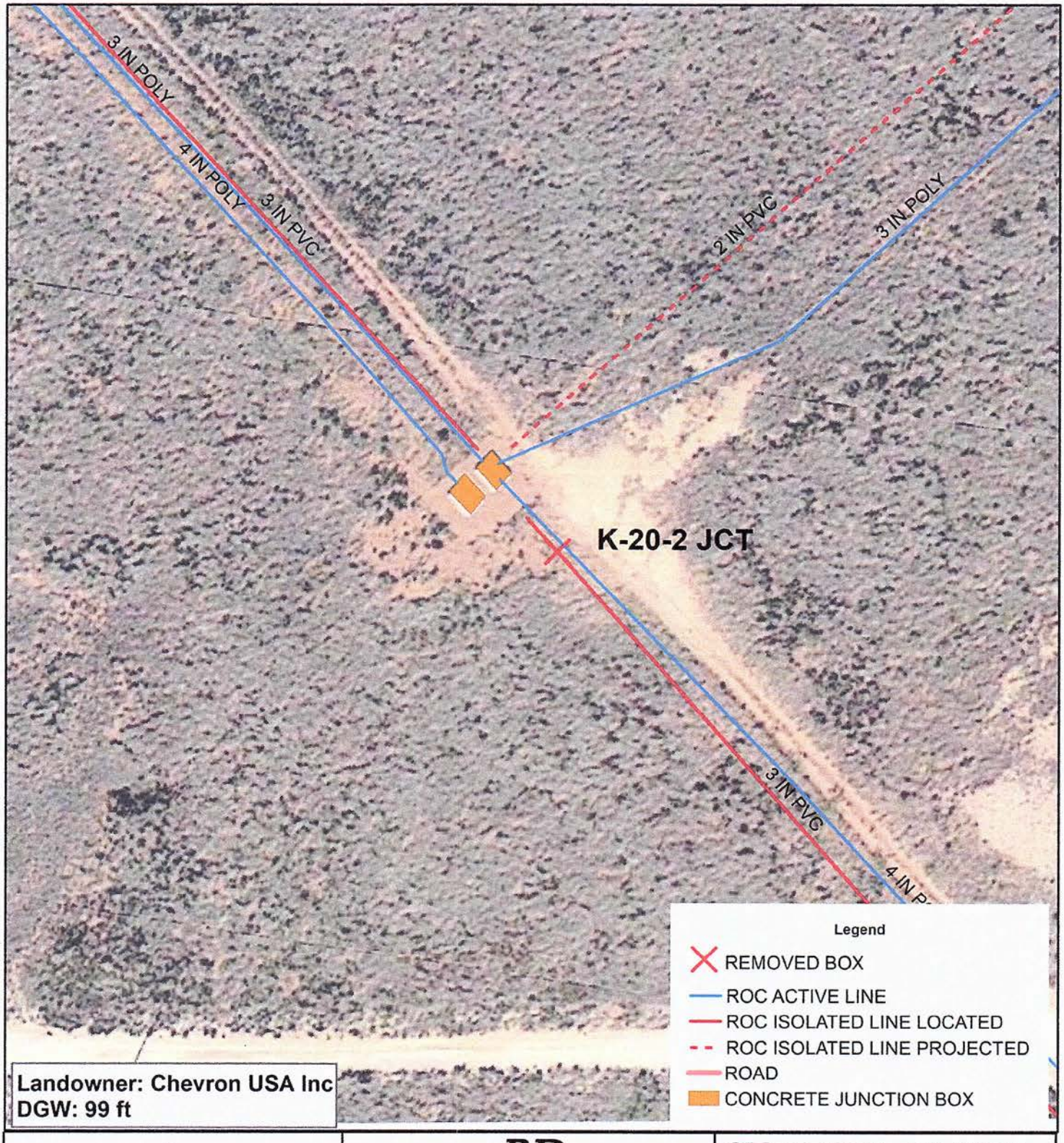
GPS: 32.462971-103.188216

0 500 1,000 Feet

Drawing date: 5/29/18
Drafted by: T. Grieco

N W E S

Base Map



Basin Environmental Service Technologies
Effective Solutions

BD

K-20-2 JCT

1R426-10

UL K SECTION 20
T-21-S R-37-E
LEA COUNTY, NM

GPS: 32.462971 -103.188216

0 25 50 Feet

N W E S

Drawing date: 5/29/18
Drafted by: T. Grieco

Disclosure Report

Basin Environmental Service Technologies (BEST)

P.O. Box 2948, Hobbs, NM 88241

Phone: 575-393-2967

RICE OPERATING COMPANY
JUNCTION BOX DISCLOSURE* REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
BD	jct. K-20-2	K	20	21 S	37 E	Lea	Moved 36 ft northwest		

LAND TYPE: BLM _____ STATE _____ FEE LANDOWNER Millard Deck OTHER _____

Depth to Groundwater 99 feet NMOCD SITE ASSESSMENT RANKING SCORE: 10

Date Started 5/12/2003 Date Completed 8/6/2003 OCD Witness No

Soil Excavated 256 cubic yards Excavation Length 24 Width 24 Depth 12 feet

Soil Disposed 0 cubic yards Offsite Facility n/a Location n/a

FINAL ANALYTICAL RESULTS: **Sample Date** 5/15/2003 **Sample Depth** 12 ft bgs

Procure 5-point composite sample of bottom and 4-point composite sample of sidewalls. TPH, BTEX and Chloride laboratory test results completed by using an approved lab and testing procedures pursuant to NMOCD guidelines.

Sample Location	Benzene mg/kg	Toluene mg/kg	Ethyl Benzene mg/kg	Total Xylenes mg/kg	GRO mg/kg	DRO mg/kg	Chloride mg/kg
SIDEWALLS	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	1180
BOTTOM	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	567

General Description of Remedial Action: Although chloride impact decreased slightly with depth, lateral delineation yielded consistent chloride concentrations. TPH concentrations remained well below NMOCD guidelines. The 24 x 24 x 12 ft deep excavation was backfilled and the location identified for further consideration at a later date. A new watertight junction box has been built 35 ft northwest of this location.

ADDITIONAL EVALUATION IS *LOW* PRIORITY.

cc: lab results, chloride graph, photos

CHLORIDE FIELD TESTS

LOCATION	DEPTH (ft)	ppm
Vertical	10	1450
	12	1100
	14	800
10 ft North	wall comp.	1100
10 ft South	wall comp.	1100
10 ft East	wall comp.	1000
10 ft West	wall comp.	900
4 Wall Comp.	n/a	1000
Bottom Comp.	12	1300

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATE 8/7/2003 PRINTED NAME Kristin Farris

SIGNATURE Kristin Farris TITLE Project Scientist

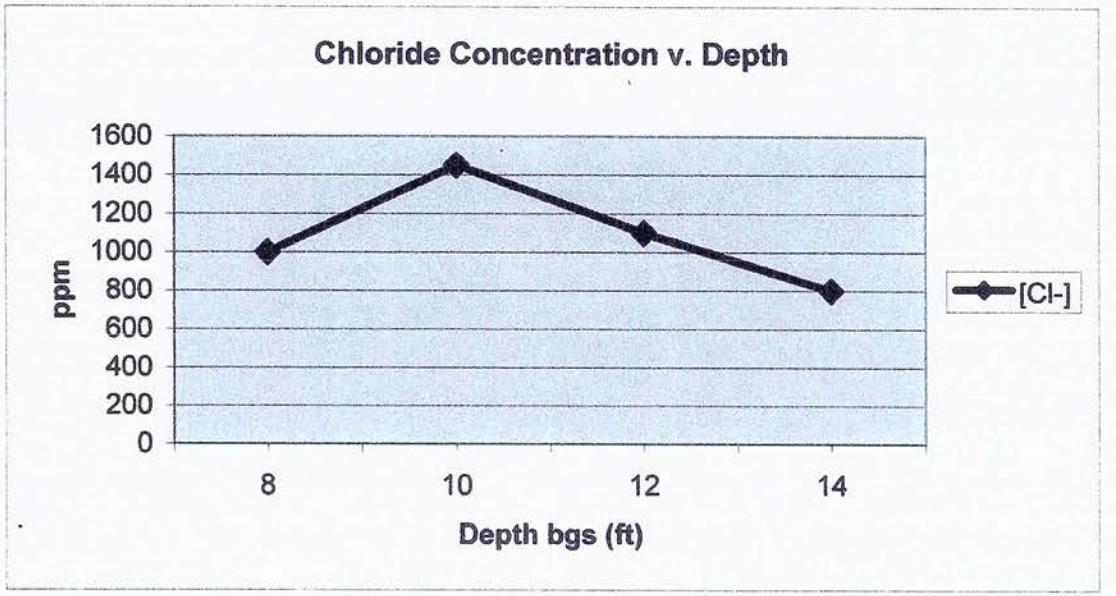
**** This site is a "DISCLOSURE." It will be placed on a prioritized list of similar sites for further consideration.***

BD jct. K-20-2

T21S, R37E

Depth bgs (ft)	[Cl-] ppm
8	1000
10	1450
12	1100
14	800

Groundwater = 99 ft



BD jct. K-20-2

Excavation—5/12/2003

Final Excavation with New Box in Background—5/15/2003

Backfilled with New Box in Background (36 ft northwest)—8/6/2003

ID Plate At Backfilled Site

ANALYTICAL REPORT

Prepared for:

Kristin Farris
Rice Operating
122 W. Taylor
Hobbs, NM 88240

Project:	K-20-2
PO#:	
Order#:	G0306515
Report Date:	05/22/2003

Certificates
US EPA Laboratory Code TX00158

ENVIRONMENTAL LAB OF TEXAS

SAMPLE WORK LIST

Rice Operating
122 W. Taylor
Hobbs, NM 88240
505-397-1471

Order#: G0306515
Project:
Project Name: K-20-2
Location: BD

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

Lab ID:	Sample :	Matrix:	Date / Time Collected	Date / Time Received	Container	Preservative
0306515-01	Wall Comp.	SOIL	5/15/03 16:00	5/16/03 13:10	4 oz glass	Ice
	Lab Testing:	**Rejected:** No		**Temp:** 23 C		
	8015M 8021B/5030 BTEX Chloride					
0306515-02	5 pt. Bottom Comp. @ 12'	SOIL	5/15/03 16:00	5/16/03 13:10	4 oz glass	Ice
	Lab Testing:	**Rejected:** No		**Temp:** 23 C		
	8015M 8021B/5030 BTEX Chloride					

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

Kristin Farris
Rice Operating
122 W. Taylor
Hobbs, NM 88240

Order#: G0306515
Project:
Project Name: K-20-2
Location: BD

Lab ID: 0306515-01
Sample ID: Wall Comp.

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		5/16/03	1	1	CK	8015M

Parameter	Result mg/kg	RL
GRO, C6-C12	<10.0	10.0
DRO, >C12-C35	<10.0	10.0
TOTAL, C6-C35	<10.0	10.0

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	107%	70	130
1-Chlorooctadecane	89%	70	130

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0005613-02		5/21/03 21:03	1	25	CK	8021B

Parameter	Result mg/kg	RL
Benzene	<0.025	0.025
Toluene	<0.025	0.025
Ethylbenzene	<0.025	0.025
p/m-Xylene	<0.025	0.025
o-Xylene	<0.025	0.025

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	93%	80	120
Bromofluorobenzene	115%	80	120

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

Kristin Farris		**Order#:**	**G0306515**
Rice Operating		**Project:**	
122 W. Taylor		**Project Name:**	**K-20-2**
Hobbs, NM 88240		**Location:**	**BD**

Lab ID: 0306515-02
Sample ID: 5 pt. Bottom Comp. @ 12'

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		5/16/03	1	1	CK	8015M

Parameter	Result mg/kg	RL
GRO, C6-C12	**<10.0**	10.0
DRO, >C12-C35	**<10.0**	10.0
TOTAL, C6-C35	**<10.0**	10.0

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	**111%**	**70**	**130**
1-Chlorooctadecane	**90%**	**70**	**130**

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0005613-02		5/21/03 21:26	1	25	CK	8021B

Parameter	Result mg/kg	RL
Benzene	**<0.025**	0.025
Toluene	**<0.025**	0.025
Ethylbenzene	**<0.025**	0.025
p/m-Xylene	**<0.025**	0.025
o-Xylene	**<0.025**	0.025

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	**95%**	**80**	**120**
Bromofluorobenzene	**109%**	**80**	**120**

Approval: Celey D. Keene 05/23/03
Raland K. Tuttle, Lab Director, QA Officer — Date
Celey D. Keene, Org. Tech. Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biezugbe, Lab Tech.
Sara Molina, Lab Tech.

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

Kristin Farris
Rice Operating
122 W. Taylor
Hobbs, NM 88240

Order#: G0306515
Project:
Project Name: K-20-2
Location: BD

Lab ID: 0306515-01
Sample ID: Wall Comp.

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Chloride	1180	mg/kg	1	20	9253	5/19/03	CK

Lab ID: 0306515-02
Sample ID: 5 pt. Bottom Comp. @ 12'

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Chloride	567	mg/kg	1	20	9253	5/19/03	CK

Approval: Celey D. Keene 05/23/03
Date

Raland K. Tuttle, Lab Director, QA Officer
Celey D. Keene, Org. Tech. Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biczugbe, Lab Tech.
Sara Molina, Lab Tech.

RL = Reporting Limit N/A = Not Applicable

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

8015M

Order#: G0306515

BLANK SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
TOTAL, C6-C35-mg/kg	0005553-02			<10.0		
CONTROL SOIL	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
TOTAL, C6-C35-mg/kg	0005553-03		952	1200	126.1%	
CONTROL DUP SOIL	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
TOTAL, C6-C35-mg/kg	0005553-04		952	1200	126.1%	0.%
SRM SOIL	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
TOTAL, C6-C35-mg/kg	0005553-05		1000	1120	112.%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

8021B/5030 BTEX

Order#: G0306515

BLANK SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Benzene-mg/kg	0005613-02			<0.025		
Toluene-mg/kg	0005613-02			<0.025		
Ethylbenzene-mg/kg	0005613-02			<0.025		
p/m-Xylene-mg/kg	0005613-02			<0.025		
o-Xylene-mg/kg	0005613-02			<0.025		
MS SOIL	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Benzene-mg/kg	0306546-01	0	0.1	0.103	103.%	
Toluene-mg/kg	0306546-01	0	0.1	0.101	101.%	
Ethylbenzene-mg/kg	0306546-01	0	0.1	0.096	96.%	
p/m-Xylene-mg/kg	0306546-01	0	0.2	0.198	99.%	
o-Xylene-mg/kg	0306546-01	0	0.1	0.091	91.%	
MSD SOIL	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Benzene-mg/kg	0306546-01	0	0.1	0.110	110.%	6.6%
Toluene-mg/kg	0306546-01	0	0.1	0.110	110.%	8.5%
Ethylbenzene-mg/kg	0306546-01	0	0.1	0.102	102.%	6.1%
p/m-Xylene-mg/kg	0306546-01	0	0.2	0.211	105.5%	6.4%
o-Xylene-mg/kg	0306546-01	0	0.1	0.098	98.%	7.4%
SRM SOIL	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Benzene-mg/kg	0005613-05		0.1	0.109	109.%	
Toluene-mg/kg	0005613-05		0.1	0.106	106.%	
Ethylbenzene-mg/kg	0005613-05		0.1	0.098	98.%	
p/m-Xylene-mg/kg	0005613-05		0.2	0.203	101.5%	
o-Xylene-mg/kg	0005613-05		0.1	0.094	94.%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

Test Parameters

Order#: G0306515

BLANK SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Chloride-mg/kg	0005575-01			<20.0		
MS SOIL	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Chloride-mg/kg	0306487-02	8510	10000	18200	96.9%	
MSD SOIL	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Chloride-mg/kg	0306487-02	8510	10000	18200	96.9%	0.%
SRM SOIL	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Chloride-mg/kg	0005575-04		5000	5050	101.%	

Environmental Lab of Texas I, Ltd.

12600 West I-20 East
Odessa, Texas 79763
Phone: 915-563-1800
Fax: 915-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Kristin Farris
Company Name: Rice Operating
Company Address: 122 W Taylor
City/State/Zip: Hobbs, NM 88241
Telephone No: _____ Fax No: _____
Sampler Signature: _____

Project Name: K-20-2
Project #: _____
Project Loc: BD
PO #: _____

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	Preservative: HNO_3	Preservative: HCl	Preservative: NaOH	Preservative: H_2SO_4	Preservative: None	Preservative: Other (Specify)	Matrix: Water	Matrix: Sludge	Matrix: Soil	Matrix: Other (specify):	Analyze For: TCLP: TPH: 418.1 / 8015M / 1005 / 1006	Analyze For: TOTAL: TPH: 418.1 / 8015M / 1005 / 1006	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	SAR / ESP / CEC	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030	RCI	N.O.R.M.	Total Gamma				RUSH TAT (Pre-Schedule)	Standard TAT
0306515																																
01	Wall Comp	5-15-03	4:00P	1	X									X		X			X				X									
02	5pt. Bottom Comp @ 12'	5-15-03	4:00P	1	X									X		X			X				X									

Special Instructions: Fax to Rice

Sample Containers Intact? Y N
Temperature Upon Receipt: Rec 23°C
Laboratory Comments:

Relinquished by:	Date	Time	Received by:	Date	Time
	5-15-03	5:30P	Tami Anderson		
Tami Anderson			R.L. CK/Lm	5-16-03	1310

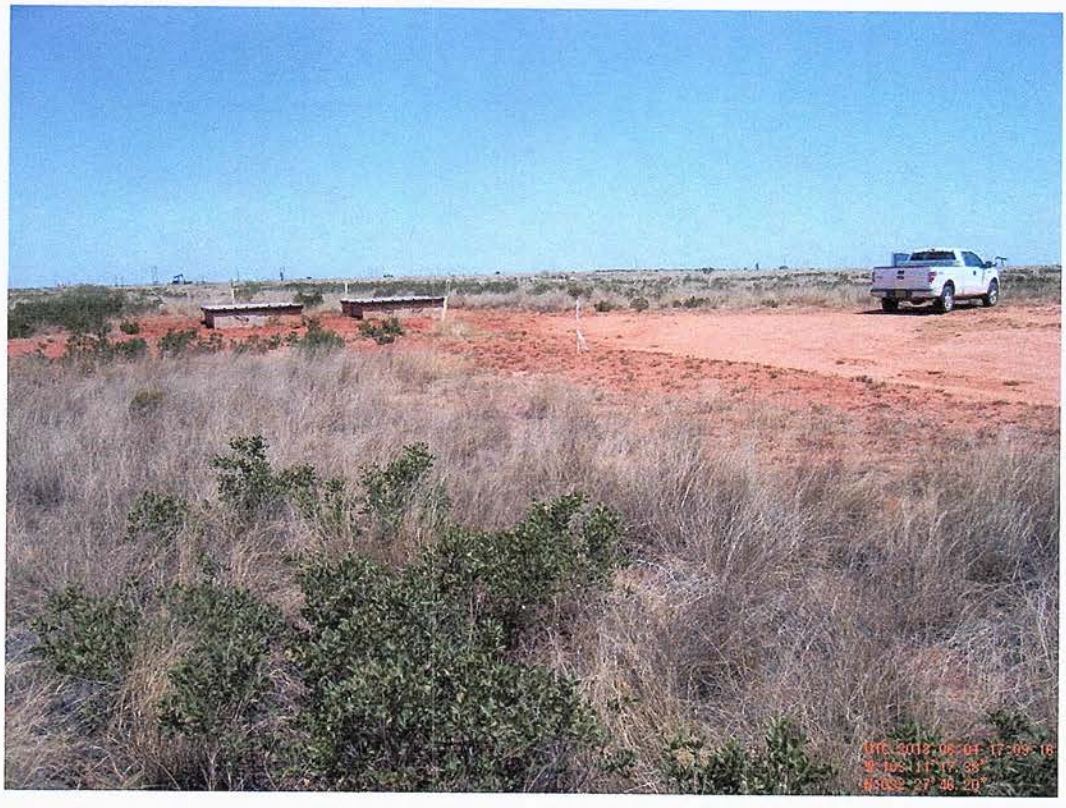
Current Photodocumentation

Basin Environmental Service Technologies (BEST)

P.O. Box 2948, Hobbs, NM 88241

Phone: 575-393-2967

BD Jct. K-20-2 (1R426-10): UL/K, Sec. 20, T21S, R37E



Facing north

6-1-18

Facing east

6-1-18