2R - 48

REPORTS

DATE:

JAN 2002

MAXIM
TECHNOLOGIES INC

January 17, 2002

Mr. Mike Stubblefield
New Mexico Oil Conservation Division
District 2 Office
1301 W. Grand Avenue
Artesia, NM 88210

RE: Request for Site Closure
Cedar Lake Draw
Loco Hills, New Mexico
Maxim Project No. 2007215

Dear Mr. Stubblefield:

Accompanying this letter is a copy of a report detailing the soil remediation program and confirmatory sampling on November 27, 2001 at the site of a release in the Skelly Gathering System pipeline near Cedar Lake Draw, New Mexico..

In the report we provide details of actions that we implemented at the site and request that the OCD close the site and provide a letter to Conoco recommending no further action. If there are any questions regarding this report, please contact Dan Erskine with Maxim at (505) 237-8440.

Sincerely,
MAXIM TECHNOLOGIES, INC.

Daniel W. Erskine, Ph.D.
Senior Geochemist

ATTACHMENT

MAXIM TECHNOLOGIES INC®

10601 Lomas NE, Suite 106
Albuquerque, NM 87112
(505) 237-8440

January 17, 2002

Mr. Mike Stubblefield
New Mexico Oil Conservation Division
District 2 Office
1301 W. Grand Avenue
Artesia, NM 88210

RE: Request for Site Closure
Cedar Lake Draw
Loco Hills, New Mexico
Maxim Project No. 2007215

Dear Mr. Stubblefield:

Maxim Technologies, Inc. (Maxim) is submitting the following closure request letter on behalf of Conoco, Inc. (Conoco) for the site designated Cedar Lake Draw near Loco Hills, New Mexico (NW4 of Section 30, T17S, R31E). Maxim conducted a soil remediation program and confirmatory sampling on November 27, 2001. This request for closure is based on results of that program and sampling, New Mexico Oil Conservation Division (OCD) guidance regarding hydrocarbon releases as presented in *Guidelines for Remediation of Leaks, Spills and Releases, New Mexico Environmental Bureau, Oil Conservation Division, August 13, 1993*, and the OCD-approved remediation plan presented in Maxim's report, *Soil Investigation Cedar Lake Draw, New Mexico*, dated May 3, 2001. In implementing the remediation plan, Maxim complied with OCD conditions of approval.

The soil remediation program was designed to remediate approximately 16,000 cubic yards of soil impacted by a release in the Skelly Gathering System pipeline (Figure 1). Conoco estimated that approximately 15 barrels of condensate, oil, and water were released to the shallow soil. Conoco immediately removed 72 yards of affected soil to CRI, Inc., a soil landfill located near Hobbs, New Mexico.

SITE HISTORY

The release occurred adjacent to a dry playa at Cedar Lake Draw, which is a recognized watercourse. The watercourse was dry within the affected area, and the release point was approximately six feet below the surface. The bulk of the release moved to lower levels of the soil column under the effect of gravity, and there was very little impact to surface soils or the watercourse (Figure 2). Conoco removed 72 cubic yards of the most impacted surface soil from the site shortly after the leak was discovered and repaired.

The OCD has a record of a 1995 Texas-New Mexico Pipeline Company rupture found in the same area. The release of 150 barrels of sour crude affected an area of approximately 10,000 square feet. According to OCD files, the release was remediated as follows: "oil soaked earth covered with fresh

soils in the prospect of full remediation." Maxim believes that significant potential exists for this release to overprint soils in the area of the Conoco condensate release.

On January 24 and 25, 2001, Maxim installed ten soil borings to determine the vertical and horizontal extent of any residual hydrocarbon impacts (Figure 1). On February 15, 2001, a track hoe was employed to dig a test ditch approximately 60 feet to the east from the location of the pipeline release (Figure 1). Excavation was started approximately 15 feet north of the existing pipeline near the point of release. The ditch was excavated to a depth of approximately 6 feet and 12 soil samples were obtained from the excavated material at approximately 5-foot intervals to the east along the ditch. These investigations indicated that the impacted soils had a surface area of approximately 14,300 square feet and a total depth of approximately 30 feet. Therefore, the total volume of impacted soils is approximately 429,000 cubic feet or 15,889 cubic yards. Other pertinent observations include: soil types become increasingly impermeable with depth and soils below 22 feet are particularly impermeable; groundwater was not encountered during soil boring activities; and regional information suggests that groundwater is approximately 235 feet below ground surface in the area.

REMEDIATION PROGRAM

The migration of constituents to groundwater is unlikely at this location due to the thickness of the unsaturated zone. This assumption is supported by the fact that relatively impermeable caliche horizons were encountered during the installation of soil borings, and specifically, by the dense clay/caliche horizon encountered at a depth of 33 feet in boring B-10. At this horizon, photo-ionization detector (PID) readings decreased significantly, and it is assumed that migration of organic constituents did not continue beyond this zone.

The significant volume and depth of impacted soils at this location makes excavation and landfarming an impractical alternative for remediation at this site. As an alternative, Maxim proposed, and the OCD approved, a form of enhanced in-situ bioremediation to reduce concentrations of organic constituents in the soil. This process will also aid in the bioremediation of any remaining impacts from the historic Texas-New Mexico Pipeline Company release overprinting Conoco's condensate release.

Bioremediation occurs naturally in shallow soils with access to oxygen. However, organic materials in deeper soils quickly use up all the available oxygen and the system becomes anaerobic (oxygen depleted) causing bioremediation to slow down. While oxygen is the electron acceptor with the most powerful affinity for electrons in the oxidation of organic material, nitrate is also an electron acceptor. Nitrate's affinity for electrons is only slightly less than that of oxygen and serves as a substitute for oxygen in the bioremediation process.

The topsoil (the upper two feet of soil) at the site was removed and stockpiled. Subsequently solid nitrate fertilizer was mixed with soil in the remaining upper two feet of the soil column overlying the delineated horizontal extent of the condensate release to support microbial degradation of organic material. During storm infiltration events some nitrate and associated nutrients (phosphorous, etc.) will dissolve and be transported to deeper levels of the soil profile.

The fertilizer applied consisted of 1,400 pounds of 42% nitrogen, 4% potassium, and 5% phosphorous fertilizer. Potassium and phosphorous are necessary nutrients for growth of bacteria required to mediate decomposition of hydrocarbons. This application is designed to deliver 500 milligrams per liter (mg/L) of nitrate to the hydrocarbon-impacted soil for a period of five years.

The advantage of nitrate is that, unlike oxygen, it has a high solubility in water, making it possible to get large concentrations of electron acceptor in contact with deeper organic material. At Cedar Lake Draw, soluble nitrate will be distributed to deeper zones by infiltration of precipitation. Subsequent infiltration events will leach more nitrate and replenish the supply of electron acceptors at depth. We know the depths to which infiltration will supply nitrate because the caliche zones are records of the depth attained by previous infiltration events. These are the same caliche zones that provide a barrier to downward migration of organic constituents.

ENGINEERED CONTROL

Distribution of fertilizer in the upper part of the soil column beneath the topsoil ensures that fertilizer will not blow away or provide a source of nitrate to overland flow at the site. It also provides for optimal leachability of nitrate.

After fertilizer was mixed with soils, stockpiled topsoil was replaced and graded such that overland flow of precipitation from the site is captured in a low area just south of the release area (Figure 3). The low area is entirely above the bottom of the playa, and runoff that may be ponded in it during storm events will not drain to the playa and mix with surface water that results from periodic flooding of the playa bottom. This engineering control ensures that any residual organic constituents and any fertilizer inadvertently left near the soil surface will not constitute a source of contamination to periodic surface water in the playa. Surface water ponded in this depression will infiltrate into the soil or will evaporate to the air.

CONFIRMATORY SAMPLING

After topsoil was replaced, soil samples were taken to confirm that this material meets OCD standards. Four composite samples were taken from the area of disturbed soil (Figure 3). Each composite sample consisted of four grab samples taken at 40-foot intervals on an east to west traverse across the site. The traverses were spaced 30 feet apart in the north-south direction (Figure 3).

A composite background sample was also taken from undisturbed soil approximately 250 feet upgradient of the release area and 30 to 60 feet south of the pipeline right-of-way (Figure 3). The area of the background sample showed no visible evidence of any contamination; however, there are abundant indications that a number of companies have used the entire area for oil and gas exploration, recovery, and transportation. In addition, the area is clearly used for cattle grazing (cow manure is a nitrogen source).

The results of confirmatory sampling presented in Table 1 demonstrate that, after background concentrations are subtracted out, mean concentrations of constituents in soil are below OCD-recommended remediation action levels for soils contaminated with petroleum hydrocarbons.

Table 1. Results of Confirmatory Sampling

	Diesel-Range Organics	Gasoline-Range Organics	Nitrogen as Nitrate	Nitrogen as Nitrite	Nitrogen as Ammonia
Composite Sample 1	230	ND	6.5	ND	16.9
Composite Sample 2	29	ND	8.6	ND	ND
Composite Sample 3	180	ND	ND	ND	ND
Composite Sample 4	67	ND	6	ND	7.3
Mean of Composite Samples	**126.5**	**ND**	**7.03**	**ND**	**12.1**
Composite Sample 5 (Background)	75	ND	5.8	ND	ND
Mean of Composite Samples Minus Background	**51.5**	**0**	**1.2**	**0**	**12.1**
All concentrations reported in milligrams per kilogram (mg/kg)					

CONCLUSIONS

In its acceptance of the remediation plan, the OCD stipulated that "engineering controls shall be installed to prevent water contaminants from leaving the site during flooding conditions, or design the system where the top soils (top two feet) initially meet OCD guidelines, or demonstrate that contaminated top soils will not cause fresh water to be impacted in the playa lake during wetting events". The remediation system that was put in place at the site meets all these stipulations.

Based on the installed bioremediation system, engineering control of the site, and results of the confirmatory sampling, Conoco and Maxim respectfully request that the OCD close the site and provide a letter to Conoco recommending no further action. If there are any questions regarding this letter report, please contact Dan Erskine with Maxim at (505) 237-8440.

Sincerely,

MAXIM TECHNOLOGIES, INC.

Daniel W. Erskine

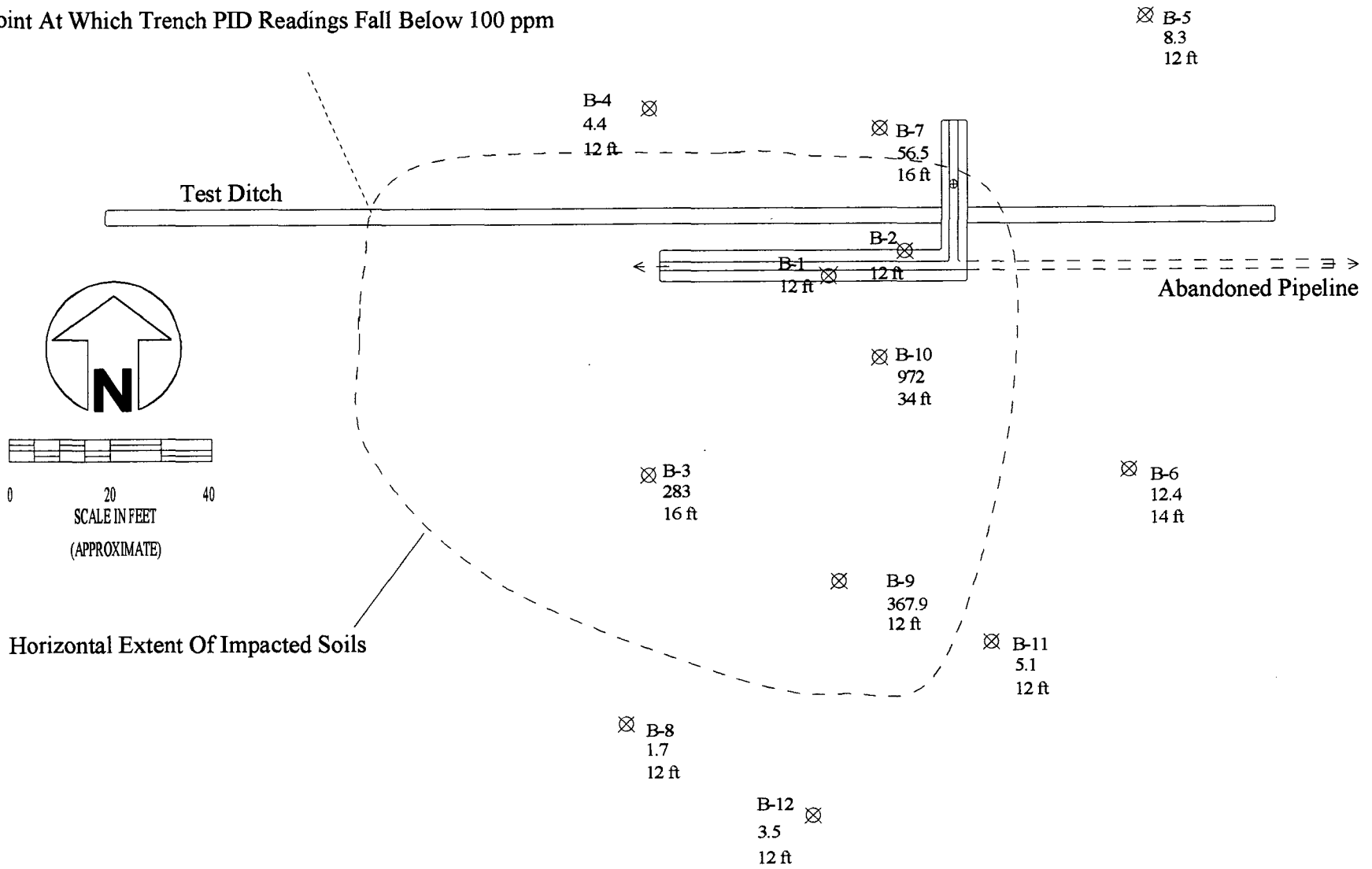
Daniel W. Erskine, Ph.D.
Senior Geochemist

Attachments

CC: Neal Goates, Conoco Remediation Technology/Houston, TX
Joyce M. Miley, Conoco C&GP/Houston, TX
Mark Bishop, Conoco C&GP/Hobbs, NM
Wayne Price, OCD/Santa Fe, NM

ATTACHMENT 1

FIGURES



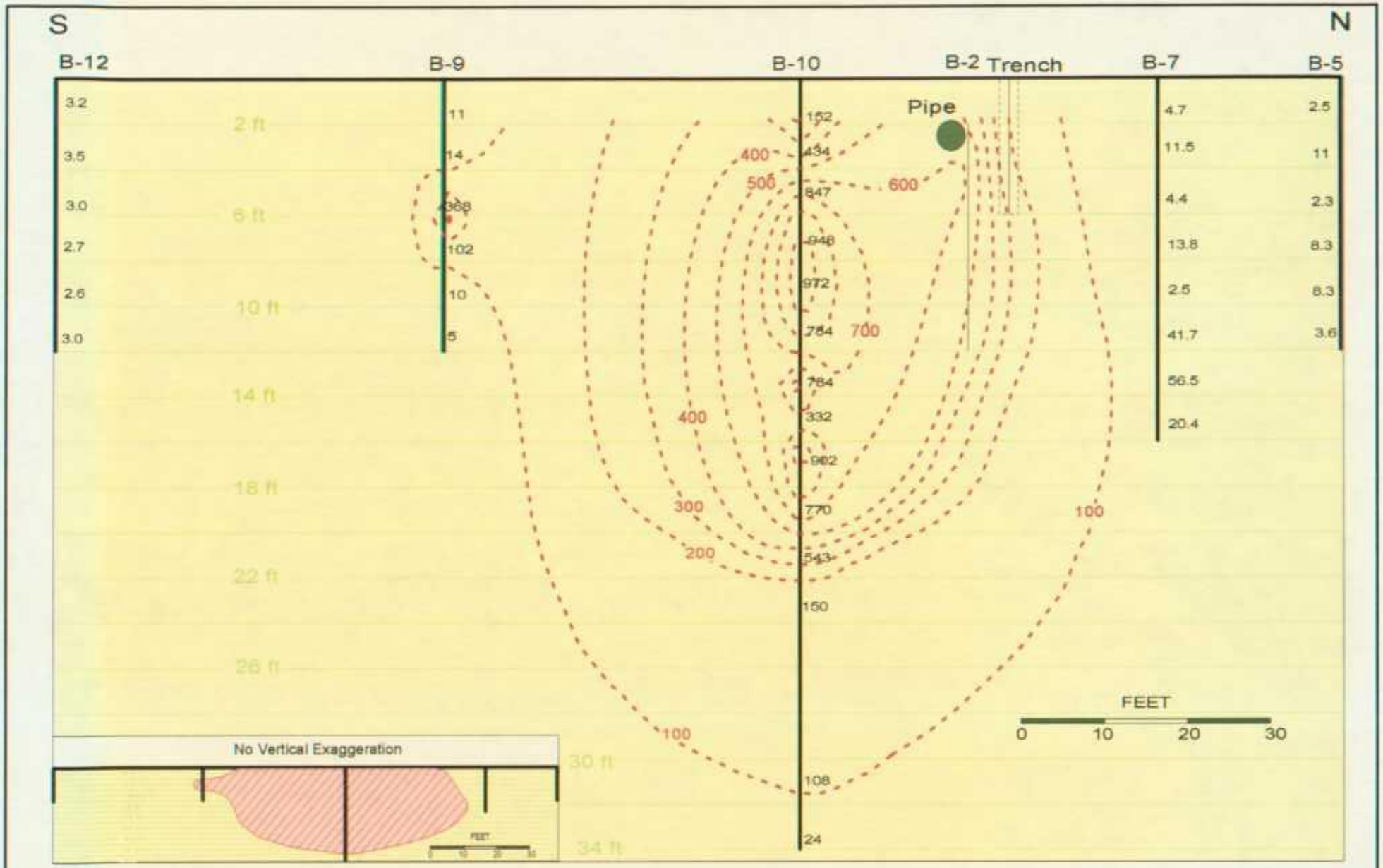
MAXIM TECHNOLOGIES INC

B-1 Soil Boring ID
1.7 Highest PID Value Observed In Boring
12 ft Total Depth of Boring

Figure 1. Horizontal Extent of Impacted Soil

Project No. 2007215	Drawing By: DWE	Date: 12/27/01
File Name:Closure Fig 1.dsf	Checked By: DWE	Date: 12/27/01

CONOCO Cedar Lake Draw
Loco Hills, New Mexico.



MAXIM TECHNOLOGIES INC

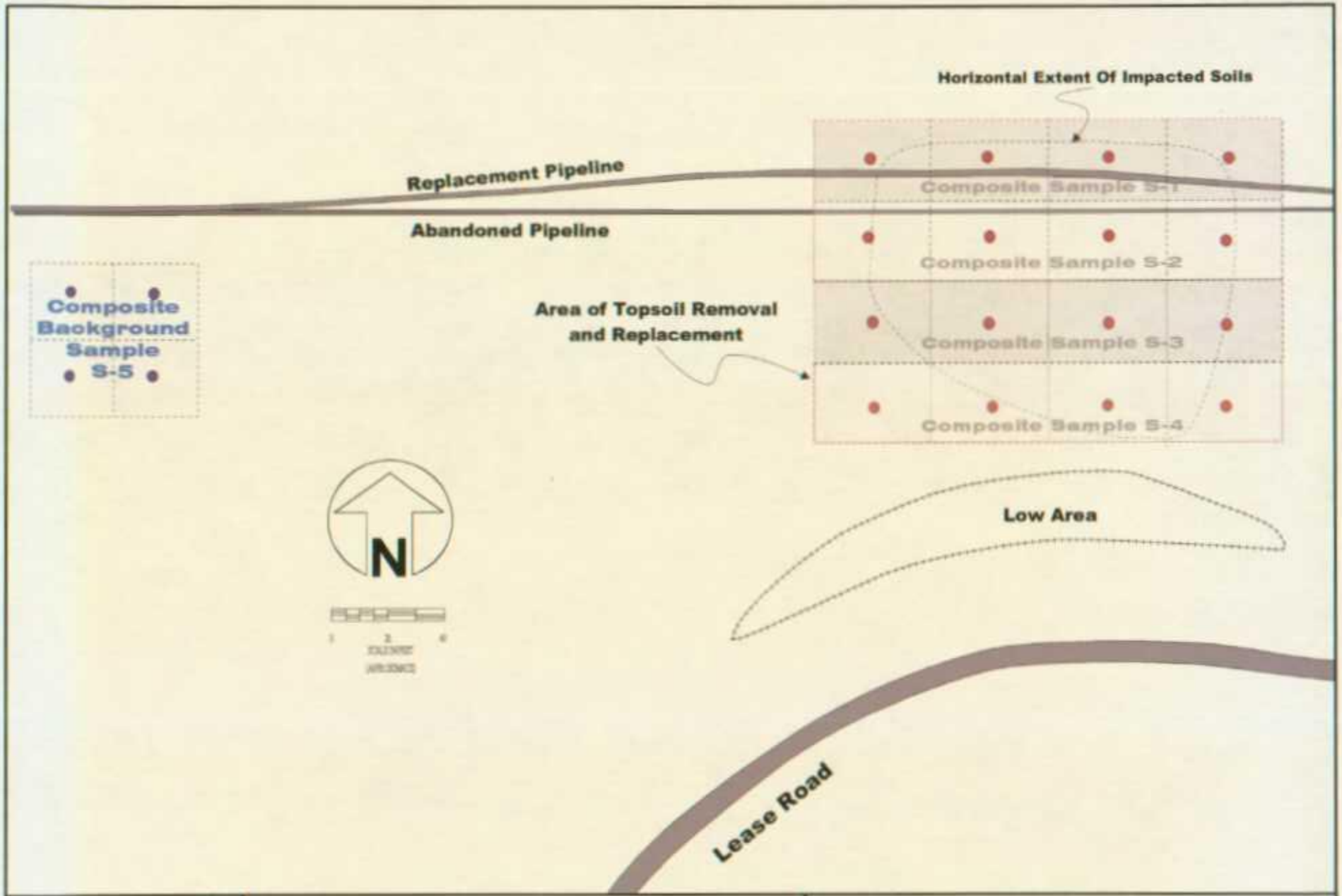
56.5 PID Value

B-9 Soil Boring ID

200 PID value isopleth (ppm)

Project No. 2007215	Drawing By: DWE	Date: 02/22/01
File Name: Figure 2.dsf	Checked By: DWE	Date: 02/22/01

Figure 2. Cross section showing contours of PID readings, Cedar Lake Draw, New Mexico.



MAXIM TECHNOLOGIES INC

- Soil Sampling Location
- Background Soil Sampling Location

Project No. 2007215	Drawing By: DWE	Date: 12/27/01
File Name:Closure Fig 3.dsf	Checked By: DWE	Date: 12/27/01

Figure 3. Confirmatory Sampling Locations

CONOCO Cedar Lake Draw
Loco Hills, New Mexico.

ATTACHMENT 2

LABORATORY REPORT

Certificate of Analysis

STL Austin
14046 Summit Drive
Austin, Texas 78728

Tel: 512 244 0855
Fax: 512 244 0160
www.stl-inc.com

SEVERN TRENT SERVICES
STL Austin

ANALYTICAL REPORT

PROJECT NO. CEDAR LAKE, NM

NG00003 Skelly Pipeline/C.L.

Lot #: I1K290201

Dan Erskine

Maxim Technologies
10601 Lomas NE Ste 106
Albuquerque, NM 87112

SEVERN TRENT LABORATORIES, INC.

Carla M. Butler
Project Manager

December 14, 2001

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories

STL Austin is a part of Severn Trent Laboratories, Inc.

CASE NARRATIVE

I1K290201

Samples received in good condition within acceptable cooler temperature. The DRO collections were shipped to STL LA located at 1721 South Grand Avenue, Santa Ana, California, 92705 for analysis at that facility.

Recoveries of GRO were outside limits for the Matrix Spike/Matrix Spike Duplicate of sample 001.

Recoveries outside limits for the Matrix Spike/Matrix Spike Duplicate of non-project specific QC samples are not discussed in this case narrative.

EXECUTIVE SUMMARY - Detection Highlights

I1K290201

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
S-1 11/28/01 08:40 001				
Diesel Range Organics (C10-C25)	230	10	mg/kg	SW846 8015B
Nitrate	6.5	5.0	mg/kg	MCAWW 300.0A
Percent Moisture	3.3	0.50	%	ASTM D 2216-90
Nitrogen, as Ammonia	16.9	5.0	mg/kg	MCAWW 350.1
S-2 11/28/01 08:53 002				
Diesel Range Organics (C10-C25)	29	10	mg/kg	SW846 8015B
Nitrate	8.6	5.0	mg/kg	MCAWW 300.0A
Percent Moisture	4.0	0.50	%	ASTM D 2216-90
S-3 11/28/01 09:01 003				
Diesel Range Organics (C10-C25)	180	10	mg/kg	SW846 8015B
Percent Moisture	3.3	0.50	%	ASTM D 2216-90
S-4 11/28/01 09:15 004				
Diesel Range Organics (C10-C25)	67	10	mg/kg	SW846 8015B
Nitrate	6.0	5.0	mg/kg	MCAWW 300.0A
Percent Moisture	3.8	0.50	%	ASTM D 2216-90
Nitrogen, as Ammonia	7.3	5.0	mg/kg	MCAWW 350.1
S-5 11/28/01 09:25 005				
Diesel Range Organics (C10-C25)	75	10	mg/kg	SW846 8015B
Nitrate	5.8	5.0	mg/kg	MCAWW 300.0A
Percent Moisture	3.5	0.50	%	ASTM D 2216-90

ANALYTICAL METHODS SUMMARY

I1K290201

PARAMETER	ANALYTICAL METHOD
Extractable Petroleum Hydrocarbons	SW846 8015B
Method for Determination of Water Content of Soil	ASTM D 2216-90
Nitrate as N	MCAWW 300.0A
Nitrite as N	MCAWW 300.0A
Nitrogen, Ammonia	MCAWW 350.1
Volatile Petroleum Hydrocarbons	SW846 8015B

References:

ASTM Annual Book Of ASTM Standards.

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

METHOD / ANALYST SUMMARY

I1K290201

ANALYTICAL METHOD	ANALYST	ANALYST ID
ASTM D 2216-90	David A. Tocher	800002
MCAWW 300.0A	Cynthia A. Anderson	034090
MCAWW 350.1	Robert D. O'Keefe	038036
SW846 8015B	Elvie Concepcion	356074
SW846 8015B	Lili Ao	400784

References:

ASTM Annual Book Of ASTM Standards.

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

I1K290201

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
EPM6H	001	S-1	11/28/01	08:40
EPM7M	002	S-2	11/28/01	08:53
EPM7Q	003	S-3	11/28/01	09:01
EPM7R	004	S-4	11/28/01	09:15
EPM7T	005	S-5	11/28/01	09:25

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

CONOCO, INC.

Client Sample ID: S-1

GC Semivolatiles

Lot-Sample #...: I1K290201-001	Work Order #...: EPM6H1AD	Matrix.....: SOLID	
Date Sampled...: 11/28/01 08:40	Date Received..: 11/29/01		
Prep Date.....: 12/03/01	Analysis Date..: 12/04/01		
Prep Batch #...: 1337324			
Dilution Factor: 1			
% Moisture.....: 3.3	Method.....: SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Diesel Range Organics (C10-C25)	**230**	**10**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Benzo(a)pyrene	80	(60 - 130)

NOTE(S):

The pattern is unknown hydrocabons. C range-C16 to beyond C25.

CONOCO, INC.

Client Sample ID: S-1

GC Volatiles

Lot-Sample #...: I1K290201-001	**Work Order #...:** EPM6H1AA	**Matrix.....:** SOLID	
Date Sampled...: 11/28/01 08:40	**Date Received..:** 11/29/01		
Prep Date.....: 12/12/01	**Analysis Date..:** 12/12/01		
Prep Batch #...: 1346576			
Dilution Factor: 0.98			
% Moisture.....: 3.3	**Method.....:** SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics	ND	98	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	42	(14 - 165)

CONOCO, INC.

Client Sample ID: S-2

GC Semivolatiles

Lot-Sample #...: I1K290201-002	Work Order #...: EPM7M1AD		Matrix.....: SOLID
Date Sampled...: 11/28/01 08:53	Date Received..: 11/29/01		
Prep Date.....: 12/03/01	Analysis Date..: 12/04/01		
Prep Batch #...: 1337324			
Dilution Factor: 1			
% Moisture.....: 4.0	Method.....: SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Diesel Range Organics (C10-C25)	**29**	**10**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Benzo(a)pyrene	77	(60 - 130)

NOTE(S):

The pattern is unknown hydrocabons. C range-C16 to beyond C25.

CONOCO, INC.

Client Sample ID: S-2

GC Volatiles

Lot-Sample #...: I1K290201-002	**Work Order #...:** EPM7M1AA	**Matrix.....:** SOLID	
Date Sampled...: 11/28/01 08:53	**Date Received..:** 11/29/01		
Prep Date.....: 12/10/01	**Analysis Date..:** 12/11/01		
Prep Batch #...: 1345321			
Dilution Factor: 0.92			
% Moisture.....: 4.0	**Method.....:** SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics	ND	92	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	21	(14 - 165)

CONOCO, INC.

Client Sample ID: S-3

GC Semivolatiles

Lot-Sample #...: I1K290201-003	Work Order #...: EPM7Q1AD	Matrix.....: SOLID	
Date Sampled...: 11/28/01 09:01	Date Received..: 11/29/01		
Prep Date.....: 12/03/01	Analysis Date..: 12/04/01		
Prep Batch #...: 1337324			
Dilution Factor: 1			
% Moisture.....: 3.3	Method.....: SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Diesel Range Organics (C10-C25)	**180**	**10**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Benzo(a)pyrene	85	(60 - 130)

NOTE(S):

The pattern is unknown hydrocabons. C range-C16 to beyond C25.

CONOCO, INC.

Client Sample ID: S-3

GC Volatiles

Lot-Sample #...: I1K290201-003	**Work Order #...:** EPM7Q1AA	**Matrix.....:** SOLID	
Date Sampled...: 11/28/01 09:01	**Date Received..:** 11/29/01		
Prep Date.....: 12/10/01	**Analysis Date..:** 12/11/01		
Prep Batch #...: 1345321			
Dilution Factor: 0.86			
% Moisture.....: 3.3	**Method.....:** SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics	ND	86	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	14	(14 - 165)

CONOCO, INC.

Client Sample ID: S-4

GC Semivolatiles

Lot-Sample #...: I1K290201-004	Work Order #...: EPM7R1AD	Matrix.....: SOLID	
Date Sampled...: 11/28/01 09:15	Date Received..: 11/29/01		
Prep Date.....: 12/03/01	Analysis Date..: 12/04/01		
Prep Batch #...: 1337324			
Dilution Factor: 1			
% Moisture.....: 3.8	Method.....: SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Diesel Range Organics (C10-C25)	67	10	mg/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Benzo(a)pyrene	86	(60 - 130)

NOTE(S):

The pattern is unknown hydrocabons. C range-C16 to beyond C25.

CONOCO, INC.

Client Sample ID: S-4

GC Volatiles

Lot-Sample #...:	I1K290201-004	**Work Order #...:**	EPM7R1AA	**Matrix.....:**	SOLID
Date Sampled...:	11/28/01 09:15	**Date Received..:**	11/29/01		
Prep Date.....:	12/10/01	**Analysis Date..:**	12/11/01		
Prep Batch #...:	1345321				
Dilution Factor:	0.83				
% Moisture.....:	3.8	**Method.....:**	SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics	ND	83	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
a,a,a-Trifluorotoluene (TFT)	90	(75 - 125)
Bromofluorobenzene	53	(14 - 165)

CONOCO, INC.

Client Sample ID: S-5

GC Semivolatiles

Lot-Sample #...:	I1K290201-005	Work Order #...:	EPM7T1AD	Matrix.....:	SOLID
Date Sampled...:	11/28/01 09:25	Date Received..:	11/29/01		
Prep Date.....:	12/03/01	Analysis Date..:	12/05/01		
Prep Batch #...:	1337324				
Dilution Factor:	1				
% Moisture.....:	3.5	Method.....:	SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Diesel Range Organics (C10-C25)	75	10	mg/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Benzo(a)pyrene	86	(60 - 130)

NOTE(S):

The pattern is unknown hydrocabons. C range-C16 to beyond C25.

CONOCO, INC.

Client Sample ID: S-5

GC Volatiles

Lot-Sample #...: I1K290201-005	**Work Order #...:** EPM7T1AA	**Matrix.....:** SOLID	
Date Sampled...: 11/28/01 09:25	**Date Received..:** 11/29/01		
Prep Date.....: 12/10/01	**Analysis Date..:** 12/11/01		
Prep Batch #...: 1345321			
Dilution Factor: 0.84			
% Moisture.....: 3.5	**Method.....:** SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics	ND	84	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	15	(14 - 165)

CONOCO, INC.

Client Sample ID: S-1

General Chemistry

Lot-Sample #...: I1K290201-001 Work Order #...: EPM6H Matrix.....: SOLID
Date Sampled...: 11/28/01 08:40 Date Received..: 11/29/01
% Moisture.....: 3.3

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrate	6.5	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339380
		Dilution Factor: 1				
Nitrite	ND	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339381
		Dilution Factor: 1				
Nitrogen, as Ammonia	16.9	5.0	mg/kg	MCAWW 350.1	11/30-12/04/01	1334406
		Dilution Factor: 1				
Percent Moisture	3.3	0.50	%	ASTM D 2216-90	12/03-12/04/01	1337309
		Dilution Factor: 1				

CONOCO, INC.

Client Sample ID: S-2

General Chemistry

Lot-Sample #...: I1K290201-002 **Work Order #...:** EPM7M **Matrix.....:** SOLID
Date Sampled...: 11/28/01 08:53 **Date Received..:** 11/29/01
% Moisture.....: 4.0

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrate	**8.6**	**5.0**	**mg/kg**	**MCAWW 300.0A**	**12/05-12/06/01**	**1339380**
		Dilution Factor: 1				
Nitrite	ND	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339381
		Dilution Factor: 1				
Nitrogen, as Ammonia	ND	5.0	mg/kg	MCAWW 350.1	11/30-12/04/01	1334406
		Dilution Factor: 1				
Percent Moisture	**4.0**	**0.50**	**%**	**ASTM D 2216-90**	**12/03-12/04/01**	**1337309**
		Dilution Factor: 1				

CONOCO, INC.

Client Sample ID: S-3

General Chemistry

Lot-Sample #...: I1K290201-003 Work Order #...: EPM7Q Matrix.....: SOLID
Date Sampled...: 11/28/01 09:01 Date Received..: 11/29/01
% Moisture.....: 3.3

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrate	ND	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339380
		Dilution Factor: 1				
Nitrite	ND	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339381
		Dilution Factor: 1				
Nitrogen, as Ammonia	ND	5.0	mg/kg	MCAWW 350.1	11/30-12/04/01	1334406
		Dilution Factor: 1				
Percent Moisture	3.3	0.50	%	ASTM D 2216-90	12/03-12/04/01	1337309
		Dilution Factor: 1				

CONOCO, INC.

Client Sample ID: S-4

General Chemistry

Lot-Sample #...: I1K290201-004 Work Order #...: EPM7R Matrix.....: SOLID
Date Sampled...: 11/28/01 09:15 Date Received..: 11/29/01
% Moisture.....: 3.8

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrate	6.0	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339380
		Dilution Factor: 1				
Nitrite	ND	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339381
		Dilution Factor: 1				
Nitrogen, as Ammonia	7.3	5.0	mg/kg	MCAWW 350.1	11/30-12/04/01	1334406
		Dilution Factor: 1				
Percent Moisture	3.8	0.50	%	ASTM D 2216-90	12/03-12/04/01	1337309
		Dilution Factor: 1				

CONOCO, INC.

Client Sample ID: S-5

General Chemistry

Lot-Sample #...: I1K290201-005 Work Order #...: EPM7T Matrix.....: SOLID
Date Sampled...: 11/28/01 09:25 Date Received..: 11/29/01
% Moisture.....: 3.5

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrate	**5.8**	**5.0**	**mg/kg**	**MCAWW 300.0A**	**12/05-12/06/01**	**1339380**
		Dilution Factor: 1				
Nitrite	ND	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339381
		Dilution Factor: 1				
Nitrogen, as Ammonia	ND	5.0	mg/kg	MCAWW 350.1	11/30-12/04/01	1334406
		Dilution Factor: 1				
Percent Moisture	**3.5**	**0.50**	**%**	**ASTM D 2216-90**	**12/03-12/04/01**	**1337309**
		Dilution Factor: 1				

QC DATA ASSOCIATION SUMMARY

I1K290201

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	SOLID	MCAWW 300.0A		1339380	1339187
	SOLID	MCAWW 300.0A		1339381	1339188
	SOLID	SW846 8015B		1337324	1337164
	SOLID	SW846 8015B		1346576	1346309
	SOLID	ASTM D 2216-90		1337309	1338229
	SOLID	MCAWW 350.1		1334406	1334196
002	SOLID	MCAWW 300.0A		1339380	1339187
	SOLID	MCAWW 300.0A		1339381	1339188
	SOLID	SW846 8015B		1337324	1337164
	SOLID	SW846 8015B		1345321	1345213
	SOLID	ASTM D 2216-90		1337309	1338229
	SOLID	MCAWW 350.1		1334406	1334196
003	SOLID	MCAWW 300.0A		1339380	1339187
	SOLID	MCAWW 300.0A		1339381	1339188
	SOLID	SW846 8015B		1337324	1337164
	SOLID	SW846 8015B		1345321	1345213
	SOLID	ASTM D 2216-90		1337309	1338229
	SOLID	MCAWW 350.1		1334406	1334196
004	SOLID	MCAWW 300.0A		1339380	1339187
	SOLID	MCAWW 300.0A		1339381	1339188
	SOLID	SW846 8015B		1337324	1337164
	SOLID	SW846 8015B		1345321	1345213
	SOLID	ASTM D 2216-90		1337309	1338229
	SOLID	MCAWW 350.1		1334406	1334196
005	SOLID	MCAWW 300.0A		1339380	1339187
	SOLID	MCAWW 300.0A		1339381	1339188
	SOLID	SW846 8015B		1337324	1337164
	SOLID	SW846 8015B		1345321	1345213
	SOLID	ASTM D 2216-90		1337309	1338229
	SOLID	MCAWW 350.1		1334406	1334196

METHOD BLANK REPORT

GC Semivolatiles

Client Lot #...: I1K290201 Work Order #...: EPTR51AA Matrix.....: SOLID
MB Lot-Sample #: E1L030000-324

Prep Date.....: 12/03/01
Analysis Date..: 12/04/01 Prep Batch #...: 1337324
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Diesel Range Organics (C10-C25)	ND	10	mg/kg	SW846 8015B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Benzo(a)pyrene	85	(60 - 130)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

The surrogate recoveries for C10-C25-10.654 ppm=85.2%

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: I1K290201 Work Order #...: EP96F1AA Matrix.....: SOLID
MB Lot-Sample #: I1L110000-321
Prep Date.....: 12/10/01
Analysis Date..: 12/11/01 Prep Batch #...: 1345321
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Gasoline Range Organics	ND	100	ug/kg	SW846 8015B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
a,a,a-Trifluorotoluene (TFT)	99	(75 - 125)
Bromofluorobenzene	83	(14 - 165)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: I1K290201 Work Order #...: EQEAR1AA Matrix.....: SOLID
MB Lot-Sample #: I1L120000-576

Prep Date.....: 12/12/01
Analysis Date..: 12/12/01 Prep Batch #...: 1346576
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Gasoline Range Organics	ND	100	ug/kg	SW846 8015B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	72	(14 - 165)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: I1K290201 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrate		Work Order #: EP04P1AA		MB Lot-Sample #:	I1L050000-380	
	ND	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339380
		Dilution Factor: 1				
Nitrite		Work Order #: EP04V1AA		MB Lot-Sample #:	I1L050000-381	
	ND	5.0	mg/kg	MCAWW 300.0A	12/05-12/06/01	1339381
		Dilution Factor: 1				
Nitrogen, as Ammonia		Work Order #: EPQDQ1AA		MB Lot-Sample #:	I1K300000-406	
	ND	5.0	mg/kg	MCAWW 350.1	11/30-12/04/01	1334406
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #...: I1K290201 Work Order #...: EPTR51AC Matrix.....: SOLID
LCS Lot-Sample#: E1L030000-324
Prep Date.....: 12/03/01 Analysis Date..: 12/04/01
Prep Batch #...: 1337324
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
TPH (as Diesel)	**76**	**(55 - 130)**	**SW846 8015B**
Diesel Range Organics (C10-C25)	**75**	**(55 - 130)**	**SW846 8015B**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Benzo(a)pyrene	80	(60 - 130)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

The surrogate recoveries for C10-C25-9.9556 ppm=79.65%

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: I1K290201 Work Order #...: EP96F1AC Matrix.....: SOLID
LCS Lot-Sample#: I1L110000-321
Prep Date.....: 12/10/01 Analysis Date..: 12/10/01
Prep Batch #...: 1345321
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
Gasoline Range Organics	**87**	**(70 - 134)**	**SW846 8015B**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	120	(14 - 165)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: I1K290201 Work Order #...: EQEAR1AC Matrix.....: SOLID
LCS Lot-Sample#: I1L120000-576
Prep Date.....: 12/12/01 Analysis Date..: 12/12/01
Prep Batch #...: 1346576
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
Gasoline Range Organics	93	(70 - 134)	SW846 8015B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	120	(14 - 165)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: I1K290201 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrate		Work Order #: EP04P1AC LCS Lot-Sample#: I1L050000-380			
	96	(80 - 120)	MCAWW 300.0A	12/05-12/06/01	1339380
		Dilution Factor: 1			
Nitrite		Work Order #: EP04V1AC LCS Lot-Sample#: I1L050000-381			
	93	(80 - 120)	MCAWW 300.0A	12/05-12/06/01	1339381
		Dilution Factor: 1			
Nitrogen, as Ammonia		Work Order #: EPQDQ1AC LCS Lot-Sample#: I1K300000-406			
	89	(80 - 120)	MCAWW 350.1	11/30-12/04/01	1334406
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #...:	I1K290201	**Work Order #...:**	EPRDF1A4-MS	**Matrix.....:**	SOLID
MS Lot-Sample #:	E1K300329-001		EPRDF1A5-MSD		
Date Sampled...:	11/30/01 14:00	**Date Received..:**	11/30/01		
Prep Date.....:	12/03/01	**Analysis Date..:**	12/04/01		
Prep Batch #...:	1337324				
Dilution Factor:	1	**% Moisture.....:**	0.0		

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
TPH (as Diesel)	**82**	**(55 - 130)**			**SW846 8015B**
	80	**(55 - 130)**	**2.2**	**(0-35)**	**SW846 8015B**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Benzo(a)pyrene	85	(60 - 130)
	86	(60 - 130)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: I1K290201 Work Order #...: EPM6H1AH-MS Matrix.....: SOLID
MS Lot-Sample #: I1K290201-001 EPM6H1AJ-MSD
Date Sampled...: 11/28/01 08:40 Date Received..: 11/29/01
Prep Date.....: 12/12/01 Analysis Date..: 12/12/01
Prep Batch #...: 1346576
Dilution Factor: 0.94 % Moisture.....: 3.3

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Gasoline Range Organics	**41 a,MSC**	**(70 - 134)**			**SW846 8015B**
	45 a,MSC	**(70 - 134)**	**10**	**(0-30)**	**SW846 8015B**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	63	(14 - 165)
	96	(14 - 165)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

MSC The percent recovery of this analyte in the associated laboratory control sample is within control limits.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: I1K290201 Work Order #...: EPM8R1AF-MS Matrix.....: SOLID
MS Lot-Sample #: I1K290210-001 EPM8R1AG-MSD
Date Sampled...: 11/27/01 12:00 Date Received..: 11/29/01
Prep Date.....: 12/10/01 Analysis Date..: 12/11/01
Prep Batch #...: 1345321
Dilution Factor: 0.95 % Moisture.....: 3.4

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Gasoline Range Organics	**61 a,MSC**	**(70 - 134)**			**SW846 8015B**
	55 a,MSC	**(70 - 134)**	**11**	**(0-30)**	**SW846 8015B**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	101	(14 - 165)
	91	(14 - 165)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a *Spiked analyte recovery is outside stated control limits.*

MSC The percent recovery of this analyte in the associated laboratory control sample is within control limits.

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: I1K290201 **Matrix.....:** SOLID
Date Sampled...: 11/27/01 10:00 **Date Received..:** 11/27/01

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrate		WO#: EPQ7P1C4-MS/EPQ7P1C5-MSD				MS Lot-Sample #: I1K300311-003	
	113	(75 - 125)			MCAWW 300.0A	12/05-12/06/01	1339380
	113	(75 - 125)	0.18	(0-20)	MCAWW 300.0A	12/05-12/06/01	1339380
		Dilution Factor: 10					
Nitrite		WO#: EPQ7P1C6-MS/EPQ7P1C7-MSD				MS Lot-Sample #: I1K300311-003	
	96	(75 - 125)			MCAWW 300.0A	12/05-12/06/01	1339381
	97	(75 - 125)	0.95	(0-20)	MCAWW 300.0A	12/05-12/06/01	1339381
		Dilution Factor: 10					
Nitrogen, as Ammonia		WO#: EPM7Q1AH-MS/EPM7Q1AJ-MSD				MS Lot-Sample #: I1K290201-003	
	86	(80 - 120)			MCAWW 350.1	11/30-12/04/01	1334406
	85	(80 - 120)	0.82	(0-20)	MCAWW 350.1	11/30-12/04/01	1334406
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: I1K290201 **Matrix.....:** SOLID
Date Sampled...: 11/27/01 10:00 **Date Received..:** 11/27/01

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Nitrate		WO#: EPQ7P1C4-MS/EPQ7P1C5-MSD				MS Lot-Sample #: I1K300311-003	
	113	(75 - 125)			MCAWW 300.0A	12/05-12/06/01	1339380
	113	(75 - 125)	0.18	(0-20)	MCAWW 300.0A	12/05-12/06/01	1339380
		Dilution Factor: 10					
Nitrite		WO#: EPQ7P1C6-MS/EPQ7P1C7-MSD				MS Lot-Sample #: I1K300311-003	
	96	(75 - 125)			MCAWW 300.0A	12/05-12/06/01	1339381
	97	(75 - 125)	0.95	(0-20)	MCAWW 300.0A	12/05-12/06/01	1339381
		Dilution Factor: 10					
Nitrogen, as Ammonia		WO#: EPM7Q1AH-MS/EPM7Q1AJ-MSD				MS Lot-Sample #: I1K290201-003	
	86	(80 - 120)			MCAWW 350.1	11/30-12/04/01	1334406
	85	(80 - 120)	0.82	(0-20)	MCAWW 350.1	11/30-12/04/01	1334406
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

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[redacted]

Chain of Custody Record

I1K290201

SEVERN TRENT SERVICES

I1K290201 69161

Severn Trent Laboratories, Inc.

STL4149 (0700)

Client: Maxim Technologies	Project Manager: Dan Erskine	Date: 11/28/01	Page 1 of 1
Address: 10601 Lomas NE	Telephone Number (Area Code)/Fax Number: 505-237-8440/505-237-8656	Lab Location: STL Austin	
City: Albuquerque	State: NM	Zip Code: 87112	Site Contact: Dan Erskine
Project Number/Name: NG00003 Skelly Pipeline/Cedar Lake			Carrier/Waybill Number:
Contract/Purchase Order/Quote Number: Cedar Lake Remediation			

Sample I.D. Number and Description	Date	Time	Sample Type	Containers: Volume	Containers: Type	Containers: No.	Preservative	Condition on Receipt/Comments	Analysis: 8015B GRO	Analysis: 8015B DRO	Analysis: 352.3 Ammonia	Analysis: 353.2 Nitrate
S-1	11/28	840	Soil	4 oz	glass	2	cold	4.6°C 11-29-01 JT Good	X	X	X	X
S-2		853				2						
S-3		901				2						
S-4		915				2						
S-5		925				2						

Special Instructions

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: [X] Normal [ ] Rush [ ] Other _____

QC Level: [ ] I. [ ] II. [ ] III.

Project Specific Requirements (Specify):

	Date	Time		Date	Time
1. Relinquished By: Daniel W Erskine	11/28/01	1300	1. Received By:	11-29-01	0945
2. Relinquished By:			2. Received By:		
3. Relinquished By:			3. Received By:		

Comments

DISTRIBUTION: WHITE - Stays with the Sample CANARY - Returned to Client with Report: PINK - Field Copy