## **GW - 294**

## UIC Class V Injection Wells



**Susana Martinez** 

Governor

**David Martin**Cabinet Secretary

Brett F. Woods, Ph.D. Deputy Cabinet Secretary Jami Bailey Division Director Oil Conservation Division



May 14, 2014

Ms. Camille J. Bryant Plains All American Pipeline, L.P. 2530 State Highway 214 Denver City, Texas 79323

Re: Discharge Plan Renewal Permit GW-294

Plain's Pipeline Townsend Remediation Site

Lea County, New Mexico

Dear Ms. Bryant:

The Oil Conservation Division (OCD) has received Plain's Pipeline request and initial fee to renew GW-294 for their Townsend Remediation Site located in the SE/4 of the SE/4 of Section 11, Township 16 South, Range 35 East, NMPM, Lea County, New Mexico. The initial submittal provided the required information in order to deem the application "administratively" complete.

Therefore, the Water Quality Control Commission regulations (WQCC) notice requirements of 20.6.2.3108 NMAC must be satisfied and demonstrated to OCD. OCD will provide public notice pursuant to the WQCC notice requirements of 20.6.2.3108 NMAC to determine if there is any public interest.

If there are any questions regarding this matter, please do not hesitate to contact me at (505) 476-3492 or <a href="leonard.lowe@state.nm.us">leonard.lowe@state.nm.us</a>. On behalf of the staff of the NMOCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Leonard Lowe

**Environmental Engineer** 

LRL/lrl

xc: OCD District I Office, Hobbs





## State of New Mexico ENER MINERALS and NATURAL RESOURES DEPARTMENT Santa Fe, New Mexico 87505



#### MEMORANDUM OF MEETING OR CONVERSATION

Telephone	Personal	Time 1550		Date 4/28/98
	Originating Party	•		Other Parties
Bill Olson	- Environmental	Bureau	Jih.	Mosely - KEI
			(51	12) 272 - 5305
Subject		- 7) T		<u> </u>
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Conclusions or	Agreements			
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			Pu	W Wen
Laura Price	- OCD Hobbs			
70.71.00	- "			



5309 Wurzbach, Suite 100 San Antonio, Texas 78238 (210) 680-3767 (210) 680-3763 FAX

April 21, 1998

Mr. Roger C. Anderson
OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, New Mexico 87505

Re: Townsend Site, TNM-97-04
Ground Water Remediation Project
Lovington, New Mexico
Job No. 710016

Dear Mr. Anderson:

This letter is in response to the Temporary Discharge Authorization addressed to Mr. Tony Savoie with Texas - New Mexico Pipe Line Company (TNMPL) dated January 29, 1998. Per your letter, TNMPL is required to submit a monitoring report to your office by May 1, 1998. Some of the required information in your letter includes:

- The total volume of fluid pumped from the recovery well.
- The total volume of product recovered in the treatment system.
- The total volume of treated effluent reinjected.

The treatment system has not been operational but is scheduled to begin by May 1, 1998. Therefore, KEI requests an extension for the monitoring report until August 21, 1998. By extending the deadline, approximately 90 days worth of ground water treatment system data could be presented in the monitoring report.

Verbal approved to Michael Hawthorne

on 5/20/98, 1320 hrs

Please contact me at (210) 680-3767 if you have any questions or comments.

Respectfully,

J. Michael Hawthorne, PG, REM

Theresa Rix for

cc: OCD Hobbs Office Tony Savoie, TNMPL Marc Oler; TTTI

tin\p:\tnmpl\710016\cextens1.doc

#### Affidavit of Publication

STATE OF NEW MEXICO	)
	) :
COUNTY OF LEA	)

Joyce Clemens being first duly sworn on oath deposes and says that he is Adv. Director of THE LOVINGTON DAILY LEADER, a daily newspaper of peneral paid circulation published in the English language at Lovington, Lea County, New Mexico; that said newspaper has been so published in such county continuously and uninterruptedly for a period in excess of Twenty-six (26) consecutive weeks next prior to the first publication of the notice hereto attached as hereinafter shown; and that said newspaper is in all things duly qualified to publish legal notices within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico.

That the notice which is hereto attached, entitled
Legal Notice
Notice of Publication
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXX XX XXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
entire issue of THE LOVINGTON DAILY LEADER and
not in any supplement thereof, XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
February 4 , 19.98
and ending with the issue of
February 4 , 19 98
And that the cost of publishing said notice is the
sum of \$52.80
which sum has been (Paid) (Assessed) as Court Costs
Subscribed and sworn to before me this 10th

Mes

Notary Public, Lea County, New Mexico

My Commission Expires Sept. 28 19 98

#### RECEIVED

FEB 1 6 1997

Environmental Bureau
Oli Conservation Division

LEGAL NOTICE
NOTICE OF
PUBLICATION
STATE OF
NEW MEXICO
ENERGY, MINERALS
AND
NATURAL RESOURCES
DEPARTMENT
OIL CONSERVATION
DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission (WQCC) Regulations, the following discharge plan application has been submitted to the Director of the Oil Conservation Division, 2040 South Pacheco, Santa Fe, New Mexico 87540, Telephone (505) 827-7132:

(GW-294) - Texas-New Mexico Pipe Line Company, Tony Savole. P.O. Box 1030, Jal, New Mexico 88252, has submitted a discharge plan application for remediation of contaminated ground water at the Townsend Remediation Site located in the NE 1/4, SE 1/4 of Section 11. Township 16 South, Range 35 East NMPM, County, New Mexico. The application addresses discharges to ground water associated with the remediation of petroleum contaminated ground water. Approximately 30 galions per minute of contaminated ground water is proposed to be processed through a treatment system to remove contaminants to below WQCC Ground water standards prior to reinjection in an inflitration gallery. groundwater most likely to be affected by an accidental discharge is at a depth of approximately 53 feet with a total dissolved solids concentration of approximately 426 to 574 mg/l. The discharge plan addresses system operation and monitoring and how spills, leaks, and other accidental discharges to the surface will be managed.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan applications may be viewed at the above address between 8:00 a.m. and 4:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and a public hearing may be requested by any interested person. Requests for a public hearing shall set forth the reasons why a hearing should beheld. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the plan based on information available. If a public hearing is held, the director will approve the plan based on information in the plan application and information presented at the hear-

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 27th day of January, 1998.
STATE OF
NEW MEXICO
OIL CONSERVATION
DIVISION
KATHLEEN GARLAND
Acting Director

SEAL
Published in the
Lovington Daily Leader
February 4, 1998.

## The Santa Fe New Mexican

#### Since 1849. We Read You.

NM OCD

ATTN: SALLY MARTINEZ 2040 S. PACHECO ST. SANTA FE, NM 87505

AD NUMBER: 10234

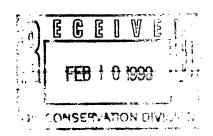
ACCOUNT: 56689

LEGAL NO:

62977

P.O. #:

98-199-00257



177	LINES_	ONCE	at\$	70.80	
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Total:			\$	80.80	

#### NOTICE OF **PUBLICATION**

**STATE OF NEW MEXICO ENERGY, MINERALS AND** NATURAL RESOURCES DEPARTMENT OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission (WQCC) Regulations, the following discharge plan application has been submitted to the Director of the Oil Conservation Division, 2040 South Pacheco, Santa Fe, New Mexico 87505, Telephone (505) 827-7132:

(GW-294) - Texas-New Mexico Pipe Line Company, Tony Savole, P.O. Box 1030, Jai, New Mexico 88252, has submitted a discharge plan application for remediation of contaminated ground water at the Townsend Remediation Site located in the NE 14, SE 14 of Section 11, Township 16 South, Range 35 East NMPM, Lea County, New Mexico. The application addresses discharges to ground water associated with the remediation of petroleum contaminated ground water. Approximately 30 gallons per minute of contaminated ground water is proposed to be processed through a treatment system to remove contaminants to below WQCC ground water standards prior to reinjection in an infiltration gallery. Groundwater most likely to be affected by an accidental discharge is at a depth of approximately 53 feet with a total dissolved solids concentration of approximately 426 to 574 mg/l. The discharge plan addresses system operation and monitoring and how spills, leaks,

#### and other accidental discharges to the surface will be managed.

vision and may submit writcharge plan or its modificaof this notice during which person. Requests for a public hearing shall set forth the be held. A hearing will be held if the Director deter vit. mines there is significant /S/public interest.

If no public hearing is held, information available. If a public hearing is held, the Director will approve the plan based on the information in the plan and information presented at the hearing.

GIVEN under the Seal of **New Mexico Oil Conservation** Commission at Santa Fe, New Mexico, on this 27th day of January 1998.

STATE OF NEW MEXICO OIL CONSERVATION DIVISION KATHLEEN A. GARLAND, **Acting Director** 

Legal #62977

#### AFFIDAVIT OF PUBLICATION

Any interested person may STATE OF NEW MEXICO obtain further information from the Oil Conservation Di-

ten comments to the Director I, BETSY PERNER being first duly sworn declare and sion at the address given say that I am Legal Advertising Representative of THE SANTA above. The discharge plan applications may be viewed FE NEW MEXICAN, a daily news paper published in the English at the above address between language, and having a general circulation in the Counties of 8:00 a.m. and 4:00 p.m., Mon- language, and having a general circulation in the countries of day through Friday. Prior to Santa Fe and Los Alamos, State of New Mexico and being a Newsruling on any proposed dis paper duly qualified to publish legal notices and advertisetion, the Director of the Oil ments under the provisions of Chapter 167 on Session Laws of Conservation Division shall 1937; that the publication # 62977 a copy of which is allow at least thirty (30) days after the date of publication hereto attached was published in said newspaper once each for \_\_ONE \_\_ consecutive week(s) and that the no-WEEK comments may be submitted was published in the newspaper proper and not in any requested by any interested supplement; the first publication being on the 4 day of 1998 and that the undersigned has personal \_EEBRUARY reasons why a hearing should knowledge of the matter and things set forth in this affida-LEGAL ADVERTISEMENT

the Director will approve or disapprove the plan based on Subscribed and sworn to before me on this day of <u>FEBRUARY</u>

Notary

Commission /Expires



OFFICIAL SEAL B. MATHIE MOTARY PUBLIC

STATE OF NEW MEXICO

20 Commission Expires

Attachment

OIL CONSERVATION DIVISION 2040 South Pacheco Street Santa Fe, New Mexico 87505 (505) 827-7131

January 29, 1998	-
Lovington Daily Leader	
Attention: Advertising Manager	
Post Office Box 1717	
Lovington, New Mexico 88260	
Re: Notice of Publication	
	- - -
Dear Sir/Madam:	
Please publish the attached notice proofread carefully, as any error invalidate the entire notice.	one time immediately on receipt of this request. Please r in a land description or in a key word or phrase can
Immediately upon completion of p	publication, please send the following to this office:
1. Publisher's affidavit in	duplicate.
2. Statement of cost (also	
3. Certified invoices for p	<del>-</del>
We should have these immediate available for the hearing which it receiving payment.	ly after publication in order that the legal notice will be advertises, and also so that there will be no delay in your
Please publish the notice no later	thanFebruary 5, 1998
Sincerely,	•
Sully Marting Sally Martinez	
Administrative Secretary	

P 269 262 836

	US Postal Service  Receipt for Cer  No Insurance Coverage I  Do not use for Internation	Provided.
	Sent to	
	Post Office State; 9219 Cod	
	Postage Lovington.	PW 88590
	Certified Fee	
į	Special Delivery Fee	
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800	TOTAL Postage & Fees	\$
PS Form <b>3800</b> , April 1995	Postmark or Date	

January 29, 1998

The New Mexican Attention: Betsy Perner 202 East Marcy Santa Fe, New Mexico 87501

Notice of Publication Re: PO # 98-199-00257

Dear Ms. Perner:

Please publish the attached notice one time immediately on receipt of this request. Please proofread carefully, as any error in a land description or in a key word or phrase can invalidate the entire notice.

Immediately upon completion of publication, please send the following to this office:

- 1. Publisher's affidavit.
- 2. Invoices for prompt payment.

We should have these immediately after publication in order that the legal notice will be available for the hearing which it advertises, and also so that there will be no delay in your receiving payment.

Please publish the notice no later than \_ Wednesday, February 4, 1998

Sincerely,

Administrative Secretary

Attachment

#### NOTICE OF PUBLICATION

## STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission (WQCC) Regulations, the following discharge plan application has been submitted to the Director of the Oil Conservation Division, 2040 S. Pacheco, Santa Fe, New Mexico 87540, Telephone (505) 827-7132:

(GW-294) - Texas-New Mexico Pipe Line Company, Tony Savoie, P.O. Box 1030, Jal, New Mexico 88252, has submitted a discharge plan application for remediation of contaminated ground water at the Townsend Remediation Site located in the NE 1/4, SE 1/4 of Section 11, Township 16 South, Range 35 East NMPM, Lea County, New Mexico. The application addresses discharges to ground water associated with the remediation of petroleum contaminated ground water. Approximately 30 gallons per minute of contaminated ground water is proposed to be processed through a treatment system to remove contaminants to below WQCC ground water standards prior to reinjection in an infiltration gallery. Groundwater most likely to be affected by an accidental discharge is at a depth of approximately 53 feet with a total dissolved solids concentration of approximately 426 to 574 mg/l. The discharge plan addresses system operation and monitoring and how spills, leaks, and other accidental discharges to the surface will be managed.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan applications may be viewed at the above address between 8:00 a.m. and 4:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. Request for public hearing shall set forth the reasons why a hearing shall be held. A hearing will be held if the Director determines that there is significant public interest.

If no hearing is held, the Director will approve or disapprove the plan based on the information available. If a public hearing is held, the Director will approve the plan based on the information in the plan and information presented at the hearing.

GIVEN under the Seal of New Mexico Conservation Commission at Santa Fe, New Mexico, on this 27th day of January, 1998.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

KATHLEEN GARLAND, Acting Director

SEAL



#### STATE OF NEW MEXICO

#### ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

#### OIL CONSERVATION DIVISION

2040 S. PACHECO SANTA FE, NEW MEXICO 87505 (505) 827-7131

January 29, 1998

#### CERTIFIED MAIL RETURN RECEIPT NO. Z-235-437-221

Mr. Tony Savoie Texas-New Mexico Pipe Line Company P.O. Box 1030 Jal, New Mexico 88252

RE: TEMPORARY DISCHARGE AUTHORIZATION
TOWNSEND SITE GROUND WATER REMEDIATION PROJECT
LEA COUNTY, NEW MEXICO

Dear Mr. Savoie:

The New Mexico Oil Conservation Division (OCD) has reviewed Texas-New Mexico Pipe Line Company's (TNMPLC) January 27, 1998 "DISCHARGE PLAN, TEXAS - NEW MEXICO PIPE LINE COMPANY, TNM-97-04 (AKA TOWNSEND REMEDIATION SITE), LOVINGTON, NEW MEXICO, KEI JOB NO. 710016-1" which was submitted on behalf of TNMPLC by their consultant KEI. This document contains a request for temporary discharge authorization for a pump and treat system for remediation of contaminated ground water during consideration of TNMPLC's January 20, 1998 discharge plan application (GW-294).

The request for temporary discharge authorization, as presented in the above referenced document is approved and pursuant to New Mexico Water Quality Control Commission (WQCC) Regulation 3106.B. you are hereby authorized to discharge without an approved discharge plan until May 29, 1998 under the conditions contained in the enclosed attachment.

This temporary authorization is issued because of the necessity to protect ground water at the site and to allow the OCD time to process the plan under the WQCC discharge plan regulations. The OCD is currently issuing a public notice of the plan as required under WQCC regulation 3108.

Mr. Tony Savoie January 29, 1998 Page 2

Please be advised that OCD approval does not relieve TNMPLC of liability if the remediation plan fails to adequately remediate ground water contamination related to TNMPLC's activities. In addition, OCD approval does not relieve TNMPLC of responsibility for compliance with any other federal, state or local laws and regulations.

If you have any questions, please contact William Olson of my staff at (505) 827-5885.

Sincerely,

Roger C. Anderson

Environment Bureau Chief

Attachment

xc:

OCD Hobbs District Office

Michael Hawthorne, KEI

Z 235 437 221

**US Postal Service** 

**Receipt for Certified Mail** 

No Insurance Coverage Provided.
Do not use for International Mail (See reverse)

Sent to

Street & Number

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Certified Fee

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Restricted Delivery Fee

Return Receipt Showing to Whom, Date, & Addressee's Address

TOTAL Postage & Fees

Postmark or Date

PS Form **3800**, A

#### January 29, 1998

## TEMPORARY DISCHARGE APPROVAL CONDITIONS TEXAS-NEW MEXICO PIPE LINE COMPANY TOWNSEND GROUND WATER REMEDIATION PROJECT

#### 1. Discharge Quality

Effluent from the air stripper which is reinjected into the infiltration gallery will meet the WQCC ground water standards as found in WQCC regulation 3103.

#### 2. Below Grade Piping

Any below grade piping used to convey contaminated fluids to the treatment system will be pressure tested to three psi above operating pressure prior to operation.

#### 3. Treatment System Sampling Schedule

Effluent from the air stripper will be sampled and analyzed using appropriate EPA methods and quality assurance/quality control (QA/QC) according to the following schedule:

Initially	Weekly (for 1st Month)	Monthly
BTEX PAH's WQCC Metals	BTEX PAH's	BTEX PAH's

#### 4. Monitor Well Sampling Schedule

Ground water from monitor wells which do not contain free phase product will be sampled and analyzed using appropriate EPA methods according to the following schedule:

Initially	Quarterly	Annually
BTEX PAH's	BTEX PAH's	BTEX PAH's
WQCC Metals	ran's	WQCC metals

#### 5. Monitoring Report

A monitoring report will be submitted to the OCD Santa Fe Office on May 1, 1998 with a copy provided to the OCD Hobbs District Office. The report will contain the following information:

- a. A summary of the laboratory analytic results of water quality sampling of monitor wells and the treatment system including the laboratory analytical data and associated QA/QC. The summary data from each monitoring point will be presented in tabular form and will list all past and present sampling results.
- b. A product thickness map based on the thickness of free phase product on ground water in all monitor and recovery wells.
- c. Isoconcentration maps for contaminants of concern (ie. BTEX, etc.)
- d. The total volume of fluid pumped from the recovery well.
- e. The total volume of product recovered in the treatment system.
- f. The total volume of treated effluent reinjected.
- g. As built construction details of the recovery and injection system.
- h. The results of any below grade line testing.

#### 8. Product and Waste Disposal

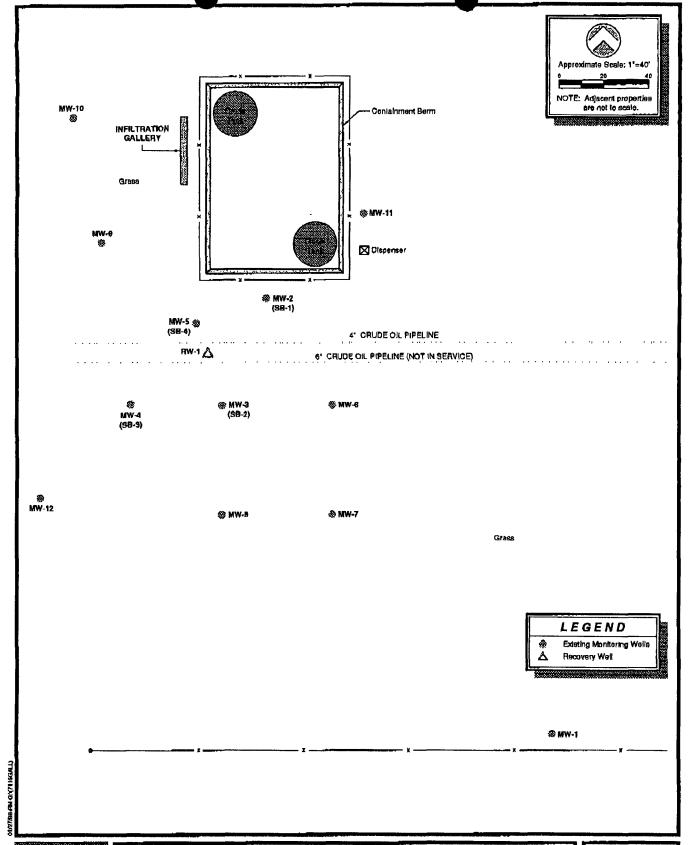
All recovered product, waste filters, recovery system or treatment system waste products will be recycled and/or disposed of at an OCD approved facility.

#### 9. <u>Tank Berming</u>

All above ground tanks used to contain fluids other than non-contaminated fresh water will be bermed such that they can contain one and one-third times the volume of the largest tank or all interconnected tanks.

#### 10. Notification

TNMPLC will notify the OCD Santa Fe Office at least one week in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples.





INFILTRATION GALLERY LOCATION

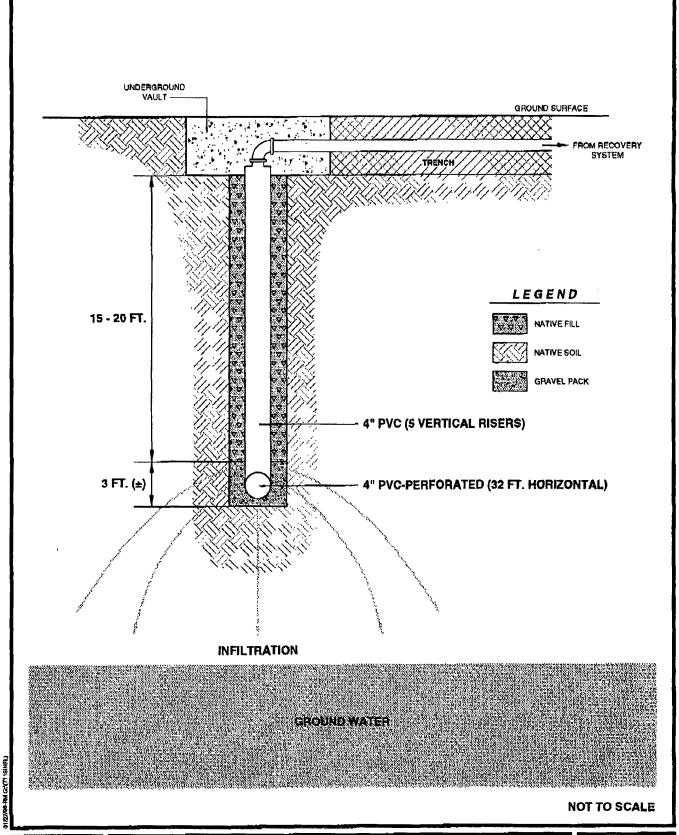
TEXAS - NEW MEXICO PIPE LINE COMPANY

TNM-97-04

LOVINGTON, NEW MEXICO

710016

FIG 1



kei

INFILTRATION GALLERY DETAILS

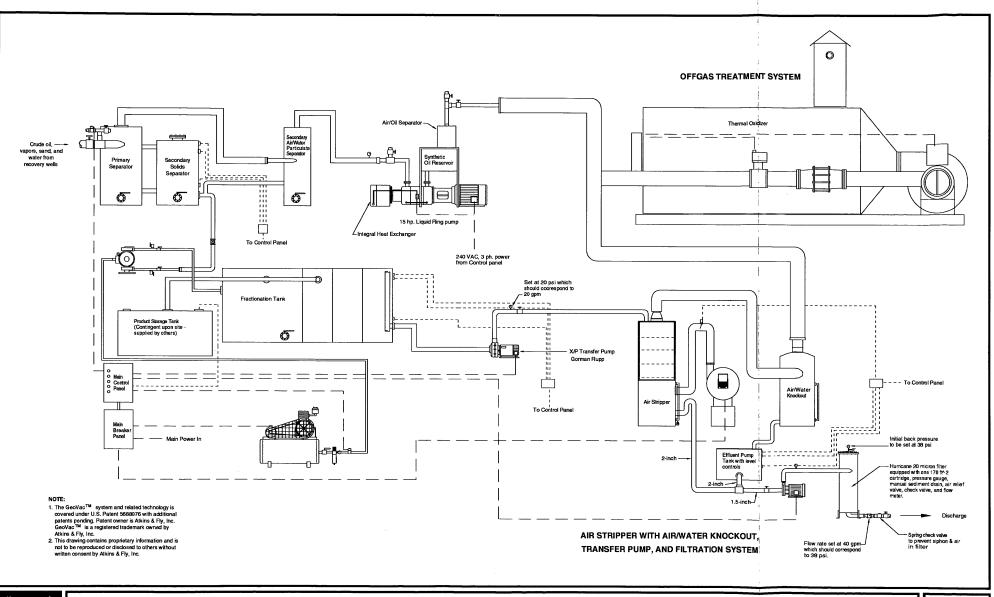
TEXAS-NEW MEXICO PIPE LINE COMPANY 7

TMN-97-04

LOVINGTON, NEW MEXICO

710016

FIG 2



ke-i

GENERALIZED SYSTEM SCHEMATIC

**TEXAS - NEW MEXICO PIPELINE COMPANY** 

TNM-97-04

LOVINGTON, NEW MEXICO

710016

FIG 6

#### **Affidavit of Publication**

State of New Mexico, County of Lea.

> I, DANIEL RUSSELL PUBLISHER

of the Hobbs News-Sun, a
newspaper published at Hobbs, New
Mexico, do solemnly swear that the
clipping attached hereto was
published in the regular and entire
issue of said newspaper, and not a
supplement thereof for a period

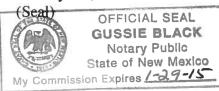
of 1 issue(s).
Beginning with the issue dated
May 24, 2014
and ending with the issue dated
May 24, 2014

**PUBLISHER** 

Sworn and subscribed to before me this 27th day of May, 2014

**Notary Public** 

My commission expires January 29, 2015



This newspaper is duly qualified to publish legal notices or advertisments within the meaning of Section 3, Chapter 167, Laws of 1937 and payment of fees for said publication has been made.

#### **LEGAL NOTICE**MAY 24, 2014

Plains Pipeline, L.P., Camille Bryant, Remediation Coordinator, 2530 State Highway 214, Denver City, Texas 79323, has submitted a renewal application for the previously approved discharge plan (GW-294) for the Plains Pipeline Townsend Site, located in Unit Letter P of Section 11, Township 16 South, Range 35 East, NMPM, Lea County, New Mexico approximately two miles southwest of Lovington, New Mexico. Up to 5 barrels of crude oil and 86,000 barrels of hydrocarbon-impacted groundwater are generated on site annually. Liquids enter a "pump and treat system" where crude oil is separated, collected and temporarily stored in containment vessels prior to transport and disposal at an NMOCD-approved facility. Effluent groundwater is treated on site and re-injected to the groundwater table. Effluent groundwater is sampled monthly to ensure compliance with New Mexico Oil Conservation Division and New Mexico Water Quality Control Commission standards. Groundwater most likely to be affected by a spill, leak or accidental discharge is at a depth of approximately 50 feet below ground surface, with a total dissolved solids concentration of approximately 500 to 1,000 mg/L. The discharges to the surface will be managed in order to protect fresh water. Any interested person may obtain information; submit comments or request to be placed on a facility specific malling list for future notices by contacting Mr. Leonard Lowe at the New Mexico OCD at 1220 South St. Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3492. The OCD will accept comments and statements of interest regarding the renewal and will create a facility-specific mailing list for persons who wish to receive future notices. #29072

67104350 00136773 PLAINS PIPELINE, LP 2530 STATE HWY. 214 DENVER CITY, TX 79323

## **GW - 294**

# **Enhanced Product Recovery System Start-Up Report**

June 2, 2011



June 2, 2011

Mr. Jim Griswold New Mexico Oil Conservation Division 1220 South St. Francis Drive Santa Fe. New Mexico 87505

RE:

Plains Pipeline, L.P. TNM 97-04 Site NMOCD Reference # GW-0294

Unit Letter P of Section 11, Township 16 South, Range 35 East

Lea County, New Mexico

Dear Mr. Griswold:

Plains Pipeline, L.P. is pleased to submit the attached *Enhanced Product Recovery System Start-Up Report*, dated May 2011, for the above referenced site. This document provides details regarding the installation and operation of the groundwater remediation system that is currently being utilized at the subject site.

Should you have any questions or comments, please contact me at (575) 441-1099.

Sincerely,

Jason Henry

Remediation Coordinator

Plains Pipeline, L.P.

CC:

Geoff Leking, NMOCD, Hobbs Office

**Enclosure** 



### ENHANCED PRODUCT RECOVERY SYSTEM START-UP REPORT

TNM 97-04 SE ¼, SE ¼, SECTION 11, TOWNSHIP 16 SOUTH, RANGE 35 EAST LEA COUNTY, NEW MEXICO PLAINS SRS NUMBER: TNM 97-04 NMOCD Reference GW-0294



Prepared for:

Plains Marketing, L.P. 333 Clay Street, Suite 1600 Houston, Texas 77002

Prepared by:

NOVA Safety and Environmental 2057 Commerce Drive Midland, Texas 79703

May 2011

Ronald K. Rounsaville Senior Project Manager Brittan K. Byerly, P.G. President

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Appen	dix B:	Boring Logs and Well Details including Well Drillers Reports Laboratory Analytical Reports NMOCD C-141 Form		

#### 1.0 INTRODUCTION AND PURPOSE

On behalf of Plains Marketing, L.P. (Plains), NOVA Safety and Environmental (NOVA) has prepared this Enhanced Product Recovery System Start-Up Report for the groundwater treatment system at TNM 97-04 Townsend Site (the site). The purpose of this report is to summarize the system start-up activities involved with the abatement process and provide current treated groundwater discharge and laboratory analytical data to Plains and the New Mexico Oil Conservation Division (NMOCD). The two part remediation system air sparges the down gradient edge of the dissolved phase hydrocarbon plume while a pump and treat system recovers groundwater and phase separated hydrocarbons from the central plume area. The recovered groundwater is then treated by sparging and granulated activated carbon and returned to the subsurface through an infiltration gallery located up gradient of the plume.

The site, which was formerly the responsibility of Texas New Mexico Pipe Line Company (TNM), is now the responsibility of Plains. The site is located in the SE 1/4 of the SE 1/4 of Section 11, Township 16 South, Range 35 East in Lea County, New Mexico, approximately four miles west of Lovington, New Mexico on Gill Road. A Site Location Map is included as Figure 1.

Fourteen monitor wells (MW-2 through MW-7 and MW-9 through MW-16) and one recovery well (RW-1) were located at the site to delineate and remediate the hydrocarbon plume. In March 2009, eight air sparging wells and three additional recovery wells were installed at the site. A Site Details Map featuring the system layout with the air sparging and recovery well locations is included as Figure 2; Figure 3 illustrates the remediation system layout.

#### 2.0 SYSTEM INSTALLATION AND OPERATION

Eight air-sparging wells (AS-1 through AS-8) were installed in March 2009, each to a depth of approximately 65 feet below ground surface (bgs) along the southern and eastern edges of the PSH plume and spaced approximately 20 feet apart (please refer to figure 2 for the location of the sparge wells and Appendix A for geologic logs of the sparging wells). Each sparging well was constructed with 60 feet of 2-inch diameter schedule 40 PVC casing and 2 feet of 0.020 inch slotted screen. The upper 7 feet of the sparging wells consisted of 2-inch diameter galvanized steel piping as the manifold for the compressed air tubing (please refer to Figure 4 for a schematic of sparging well completions).

Three recovery wells (RW-2 through RW-4) were installed in March 2009, within the central area of the PSH plume to a depth of 65 feet bgs and constructed with 40 feet of 2-inch diameter schedule 40 PVC casing and 25 feet of 0.010 inch slotted screen. As per the approved system installation proposal, soil samples were not collected and analyzed during the installation activities of the sparging and recovery wells. Soil boring logs with well construction details along with State of New Mexico well drillers reports are included in Appendix A.

The enhanced recovery system utilizes compressed air generated by a trailer mounted blower to provide air to the eight air-sparging wells at approximately four to six pounds per square inch (psi). The blower makes excess pressure which is either utilized to aerate a water holding tank in

the pump-and-treat system or vented to atmosphere. The sparging system operates 24 hours a day in an effort to aerate the groundwater on the down gradient edge of the hydrocarbon plume, as well as creating a rise in the water table along the axis of the sparging wells. Monitor wells MW-13 and MW-15 will be used to quantify the effectiveness of the sparging system in reducing the dissolved phase hydrocarbons.

Total fluid pumps were placed in recovery wells RW-1, RW-2, RW-3 and RW-4 to lower the groundwater in the central plume area to capture phase separated hydrocarbons and are powered by compressed air generated by a compressor located in the mechanical shed on the east side of the site (please refer to Figure 2 for the location of the mechanical shed). The total fluid pumps operate at a pumping rate of approximately 2-3 gallons per minute (gpm) from each recovery well with a combined pumping rate of 8-12 gpm. Recovered oil and water is then passed through an oil-water separator with the oil transferred to a 550 gallon poly tank for staging and later transport off site. Recovered groundwater is pumped to a large poly aeration tank to allow for volatilization of the hydrocarbons. Air is injected into this tank by the trailer mounted blower. Groundwater is then transferred through a two bag particulate filter system prior to being pumped through two-500 lbs. carbon filtration canisters plumbed in sequence. The treated groundwater is sampled from post carbon sampling ports on a monthly basis. The treated groundwater is then discharged continually, under Discharge Permit GW-294, to an infiltration gallery located upgradient of the release point (Please see Figure 2 for the location of the treatment system, air sparging and recovery wells and Figure 3 for an operational schematic of the system).

A NMOCD permitted injection/infiltration system was installed prior to Plains assuming operational responsibilities in 2004. Plains rehabilitated the existing infiltration gallery for the acceptance of the treated groundwater by over-excavating the existing gallery to a depth of 35 feet bgs and replacement of the gallery piping and filter media in accordance with Discharge Permit GW-294. The average daily pumping volume for the four recovery wells is approximately 29 bbls per day. The average monthly pumping volume is approximately 962 bbls. Flow meter readings indicated approximately 26,378 barrels of treated groundwater have been discharged through the infiltration gallery since system start up on September 2, 2010. Discharge Flow Meter Readings for 2010-2011 are presented as Table 1. Approximately 108 gallons of PSH have been recovered since system start up.

#### 3.0 LABORATORY RESULTS

Treated groundwater samples are collected from a sampling port located after the second carbon filter (post carbon) installed between the second carbon vessel and the header for the infiltration gallery. As per permit requirements, samples are collected from the system effluent and analyzed according to the following schedule:

Initial - weekly basis for the first month of operation BTEX and PAH concentrations, Method 8270, WQCC Metals

Monthly – BTEX and PAH concentrations, Method 8270

Treated groundwater samples obtained from the post carbon sampling port were delivered to Trace Analysis, Inc. in Midland, Texas for determination of Benzene, Toluene, Ethylbenzene and Xylene (BTEX) constituent concentrations by EPA Method 8021B, Polynuclear Aromatic Hydrocarbons (PAH) by EPA method 8270 and WQCC Metals by EPA method 6010C. A listing of Post Carbon effluent BTEX constituent concentrations is summarized in Table 2, PAH constituent concentrations are summarized in Table 3 and the WQCC Metal concentrations are listed in Table 4. Copies of the laboratory reports generated for the Post Carbon Effluent initial and monthly sampling events are provided in Appendix A.

Initial weekly system sampling events were conducted on September 2, September 10, September 16 and September 23, 2010 followed by monthly sampling events beginning in October 2010. Post carbon effluent analytical results on samples collected during the initial start up event and subsequent monthly sampling events indicate BTEX constituent concentrations were below laboratory method detection limits (MDLs) and the NMOCD regulatory standards, with the exception of the February 28, 2011 sampling event. The February 28, 2011 post carbon effluent sample exhibited a benzene concentration of 0.0319 mg/L. Upon receipt of the February 28, 2011 laboratory results, the system was turned off and the carbon filter media within the two vessels was replaced. Additional analytical results on post carbon effluent groundwater samples indicated PAH and WQCC metals concentrations to be below regulatory limits.

#### 4.0 SUMMARY

This report documents the installation, start up activities and operations of the Enhanced Product Recovery System at the Plains TNM 97-04 site. The recovery system consists of eight air sparging wells utilizing compressed air operating at approximately 4-6 psi from a trailer mounted blower. Four recovery wells powered by compressed air, operating at a combined rate of 8-12 gpm, supply oil and impacted groundwater to a trailer mounted groundwater treatment system consisting of an oil/water separator, three poly holding tanks, two particulate bag filters and two-500 lbs. carbon filter canisters prior to discharge into an infiltration gallery under discharge permit GW-294. To date, approximately 26,378 barrels of treated groundwater have been discharged through the infiltration gallery. Currently, the system is operating normally with the most recent laboratory analytical results indicating the post carbon groundwater concentrations of BTEX constituents to be below laboratory method detection limits.

Future monitoring of dissolved phase hydrocarbon concentration in downgradient monitor wells MW-13 and MW-15 will be evaluated in forthcoming quarterly status update reports.

#### 5.0 LIMITATIONS

NOVA has prepared this *Enhanced Product Recovery System Initial Start Up Report* to the best of its ability. No other warranty, expressed or implied, is made or intended. NOVA has examined and relied upon documents referenced in the report and has relied on oral statements made by certain individuals. NOVA has not conducted an independent examination of the facts contained in referenced materials and statements. We have presumed the genuineness of the

documents and that the information provided in documents or statements is true and accurate. NOVA has prepared this report, in a professional manner, using the degree of skill and care exercised by similar environmental consultants. NOVA also notes that the facts and conditions referenced in this report may change over time and the conclusions and recommendations set forth herein are applicable only to the facts and conditions as described at the time of this report. This report has been prepared for the benefit of Plains. The information contained in this report, including all exhibits and attachments, may not be used by any other party without the express consent of NOVA and/or Plains.

#### 6.0 DISTRIBUTION

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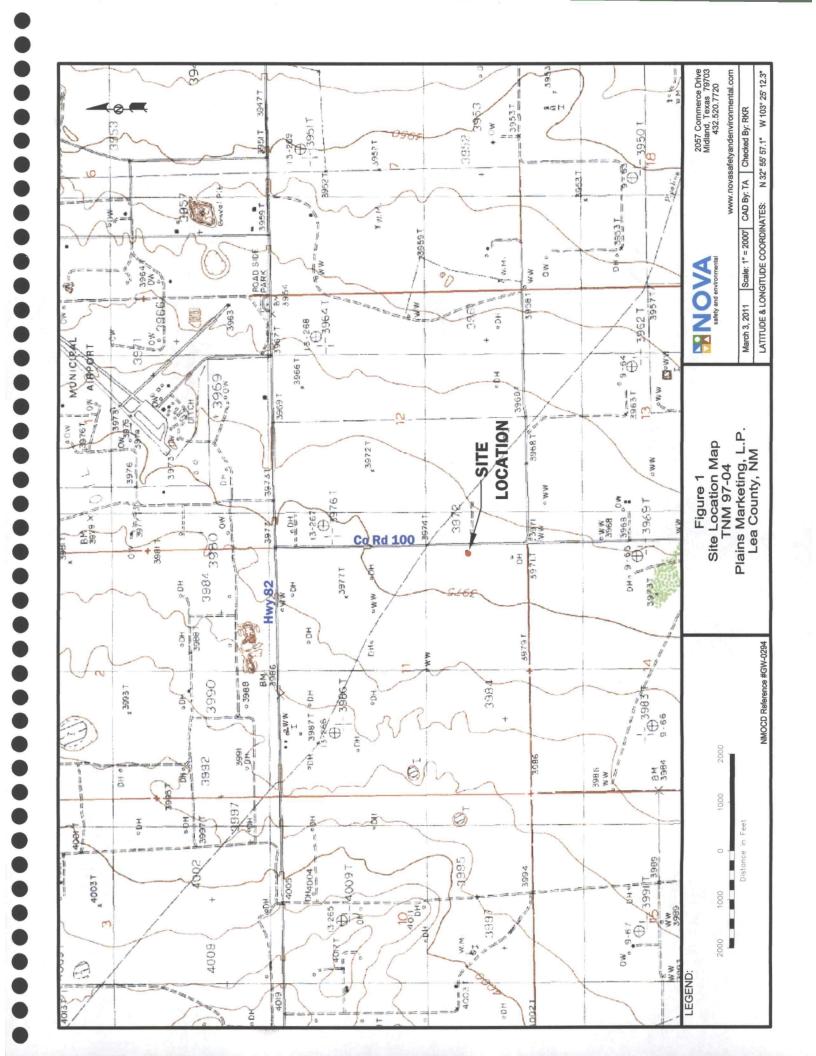
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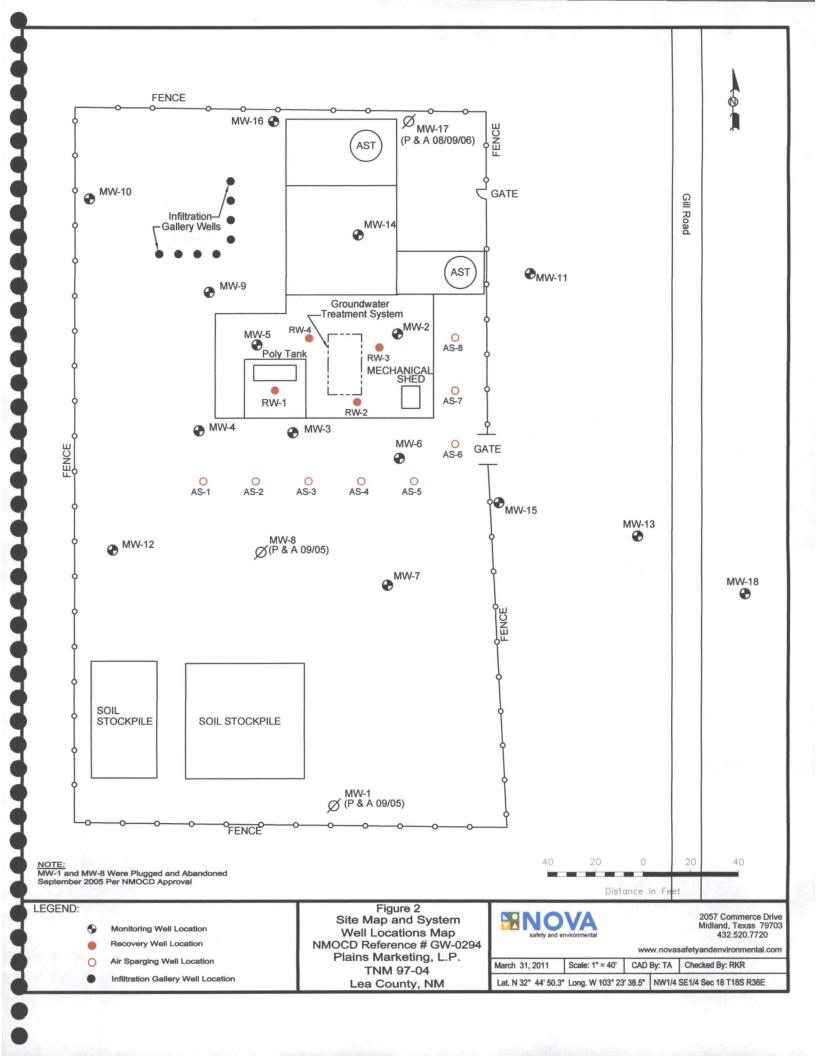
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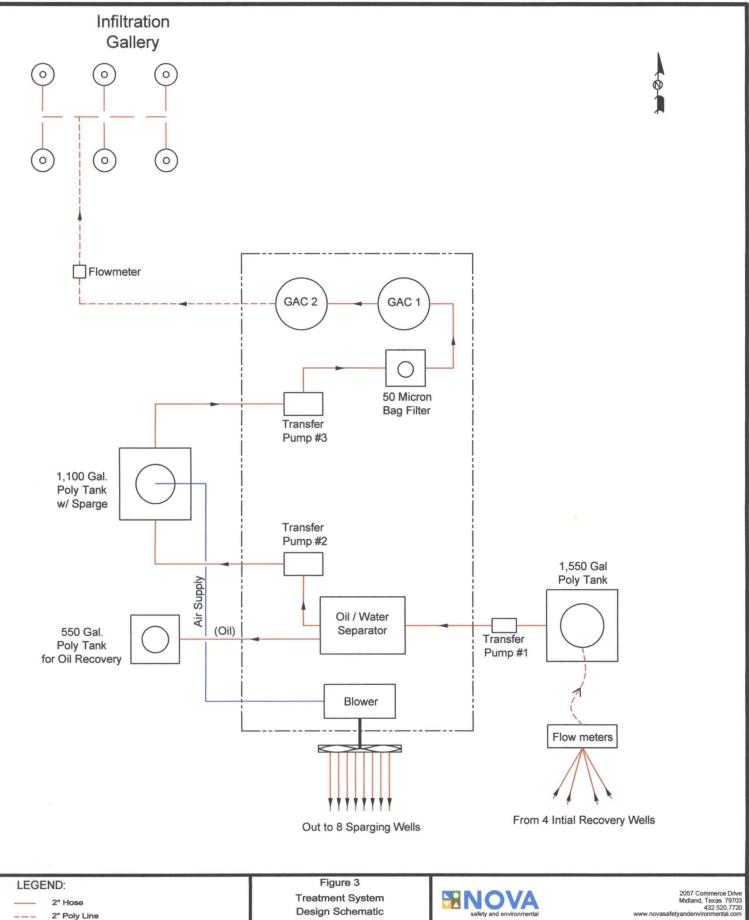
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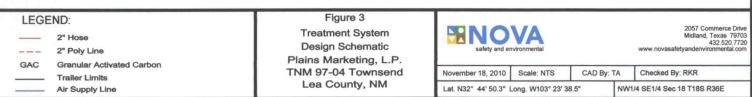
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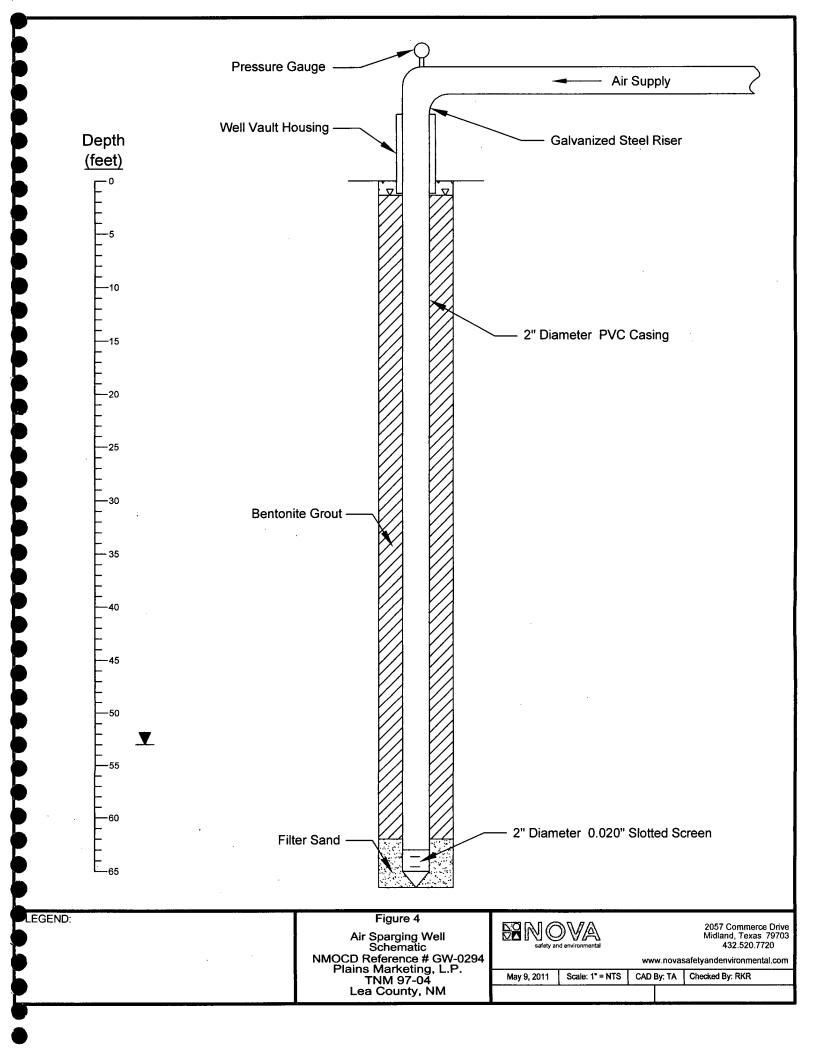
**FIGURES** 

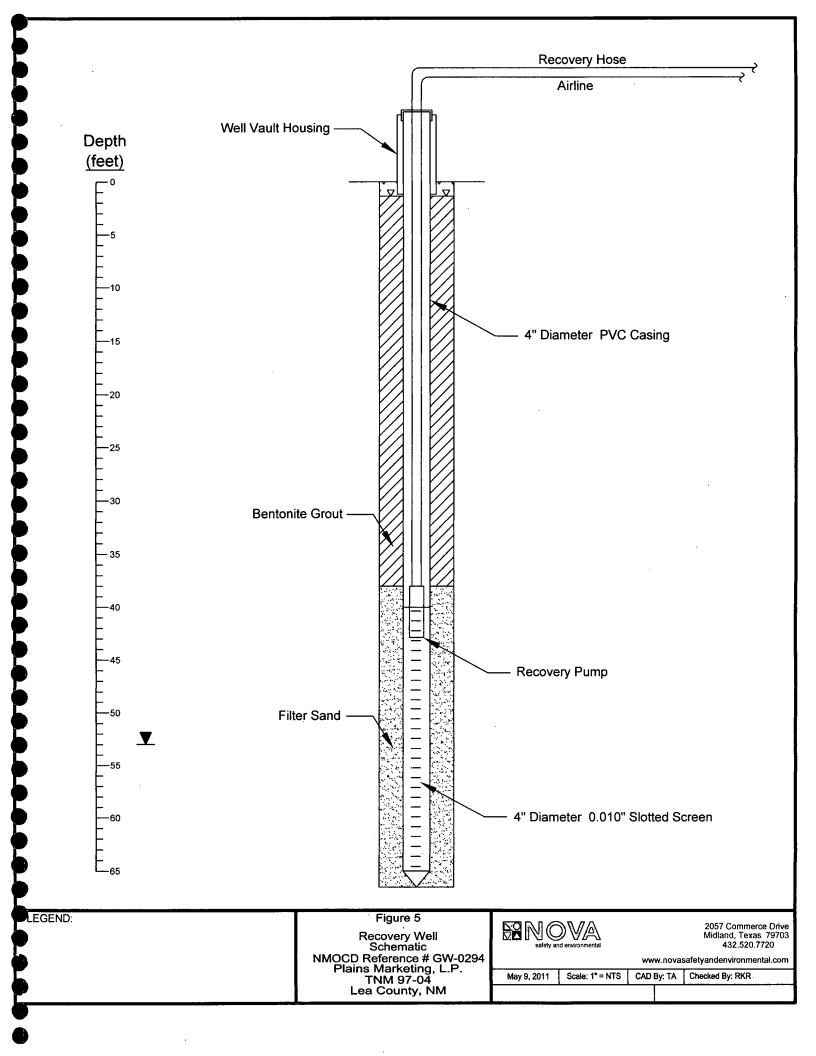


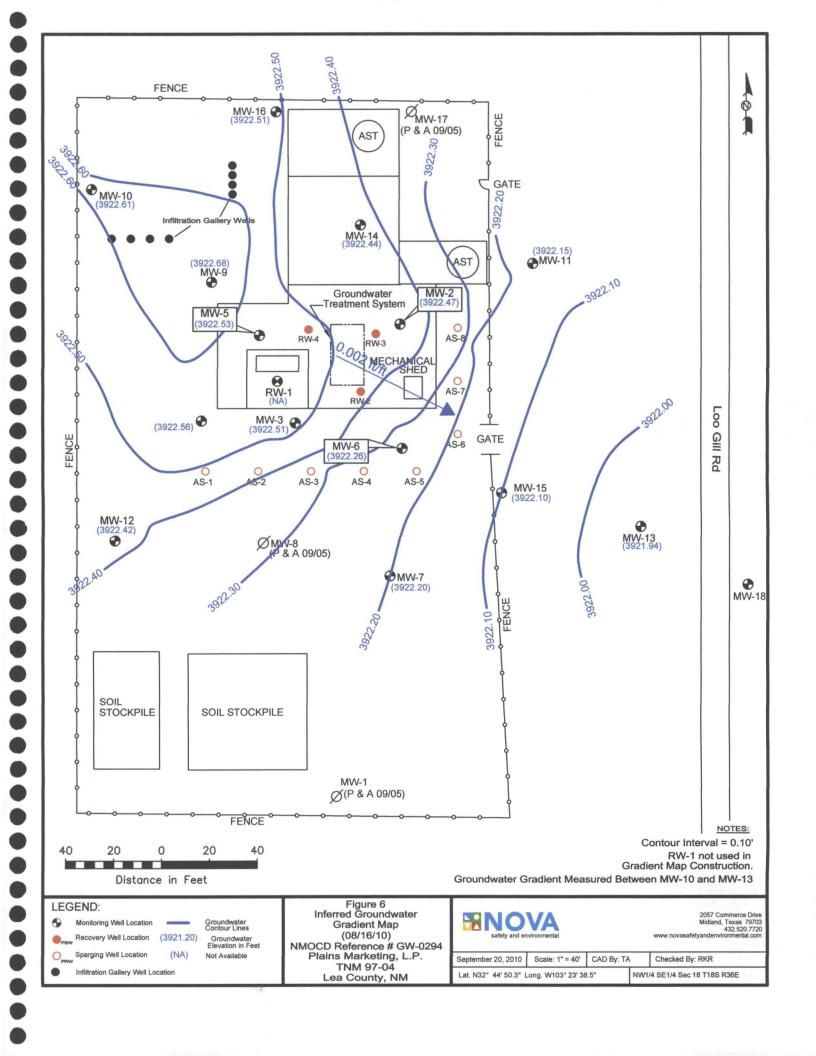


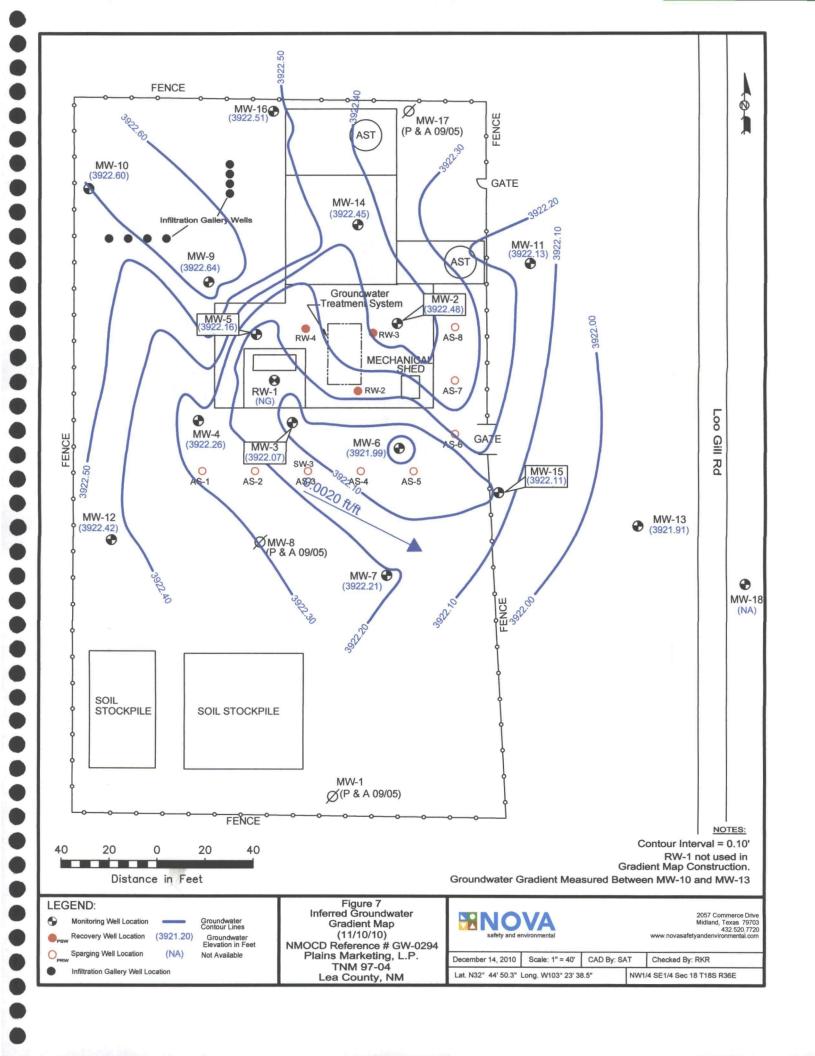


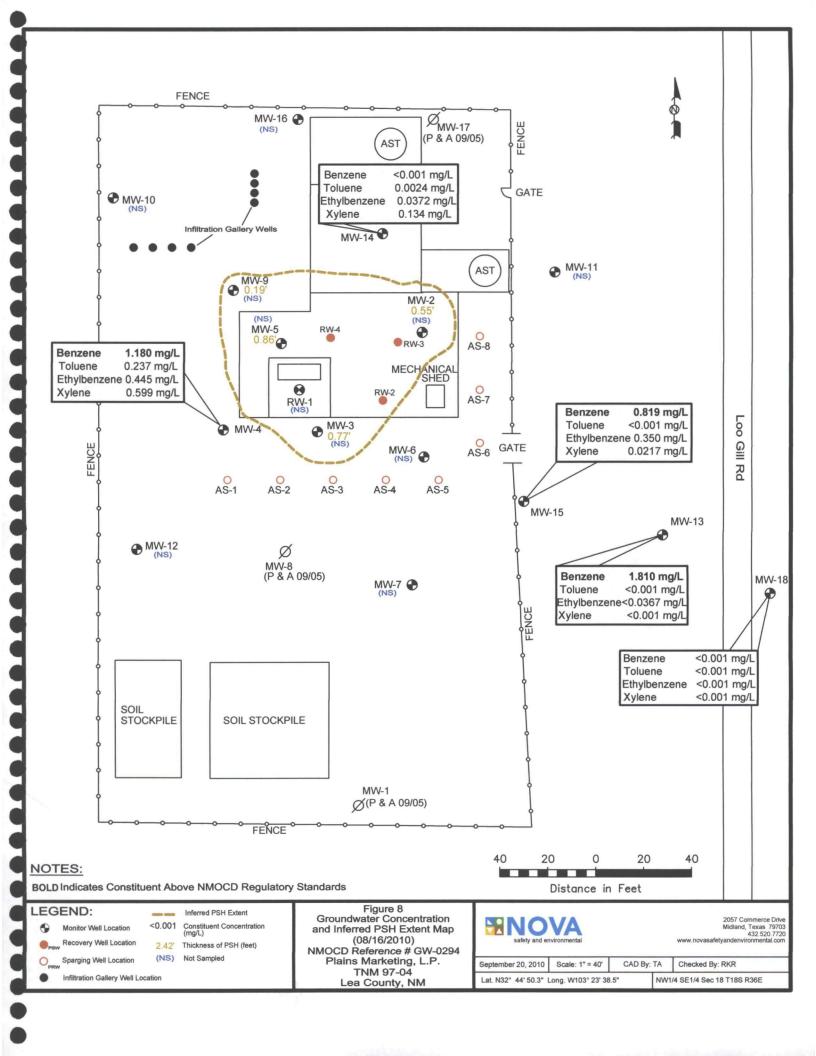


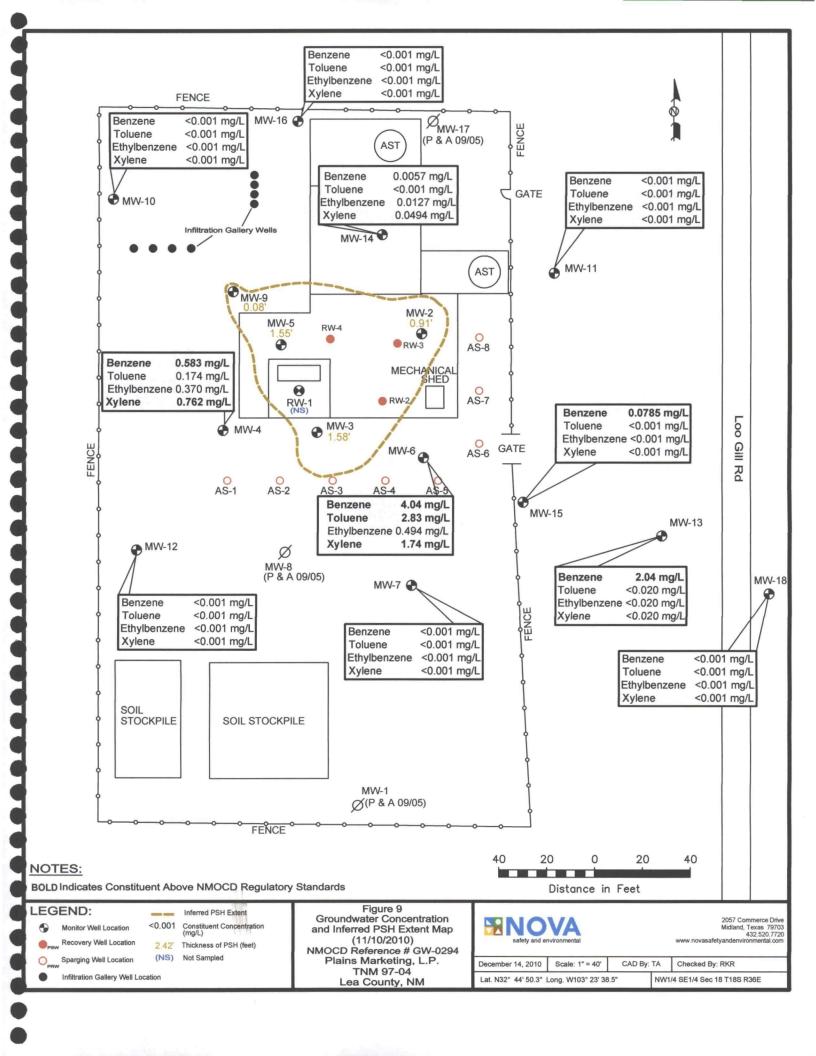












**TABLES** 

						MONTHLY		Average	Max One	Min One
WELL	DATE MEASURED	BEFORE	Current Reading	GALLONS	BARRELS PUMPED	TOTAL (BARRELS)	Days per month	BBLS per day	Day Volume	Day Volume
RW-1	9/2/2010	101742	132397	30655	729.88	729.88	1	364.9405		
RW-1	9/8/2010	132397	165285	32888	783.05	1512.93	1	130.5079		
RW-1	9/16/2010	165285	192590	27305	650.12	2163.05	. 1	92.8741		
RW-1	9/22/2010	192590	211350	18760	446.67	2609.71	1	74.4444		
RW-1	9/23/2010	211350	213530	2180	51.90	2661.62	1	51.9048		
RW-1	9/28/2010	213530	218020	4490	106.90	2768.52	1	21.3810		
RW-1	9/30/2010	218020	218020	0	0.00	2768.52	0	0.0000		
September Totals	- Totals			116278	2768.52	100 mg				
RW-1	10/7/2010	218020	234540	16520	393.33	3161.86	1	56.1905		
RW-1	10/14/2010	234540	241090	6550	155.95	3317.81	1	22.2789		
RW-1	10/19/2010	241090	256090	15000	357.14	3674.95	1	71.4286		
RW-1	10/21/2010	256090	261890	2800	138.10	3813.05	1	69.0476		
RW-1	10/28/2010	261890	278460	16570	394.52	4207.57	1	56.3605		
October Totals	als			60440	>1439.05 ≈		1			
RW-1	11/1/2010	278460	290210	11750	279.76	4487.33	1	69.9405		
RW-1	11/2/2010	290210	293150	2940	70.00	4557.33	1	70.0000		
RW-1	11/4/2010	293150	299270	6120	145.71	4703.05	1	72.8571		
RW-1	11/8/2010	299270	309260	0666	237.86	4940.90	1	59.4643		
RW-1	11/12/2010	309260	312070	2810	66.90	5007.81	1	16.7262		
RW-1	11/16/2010	312070	312980	910	21.67	5029.48	1	5.4167		
RW-1	11/23/2010	312980	317210	4230	100.71	5130.19	-	12.5893		
RW-1	11/29/2010	317210	321520	4310	102.62	5232.81	-	17.1032		
November Totals	otals			43060	1025.24					
RW-1	12/1/2010	321520	321850	330	7.86	5240.67	-	3.9286		
RW-1	12/2/2010	321850	321990	140	3.33	5244.00	1	3.3333		
RW-1	12/22/2010	321990	322190	200	4.76	5248.76		0.2381		
December Totals	otals 💮 💮			670	15.95			1,000		
										おお かいまか

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Min One Day																													
Max One Day	2 III														No. of the second														
Average BBLS per	day 1000	605.5000	136.9571	136.9388	122.8968	51.6667	30.3571	0.0000		142.9252	27.4490	132.4762	206.1905	110.7483		88.0357	95.7143	102.1429	83.9286	21.2500	5.8333	24.9107	18.8889		4.5238	3.3333			
Days per	,	1	-	1	l l	Į į	1	0		1	1	ļ	1	1		1	1	1	1	1	1	1			-	-			
MONTHLY TOTAL	(בשויויים)	605.50	1290.29	2248.86	2986.24	3037.90	3159.33	3159.33		4159.81	4351.95	5014.33	5426.71	6201.95		6554.10	6649.81	6854.10	7189.81	7274.81	7298.14	7497.43	7610.76		7619.81	7623.14	7628.86		
BARRELS		605.50	684.79	958.57	737.38	51.67	121.43	00.0	315933	1000.48	192.14	662.38	412.38	775.24	3042.62	352.14	95.71	204.29	335.71	85.00	23.33	199.29	113.33	1408.81	90.6	3.33	5.71	. 18.10	
GALLONS		25431	28761	40260	02608	2170	5100	0	132692	42020	0208	27820	17320	32560	127790	14790	4020	0858	14100	3570	086	8370	4760	. 91/69	088	140	240	. 094	
Current	Gunnavi	293869	322630	362890	393860	396030	401130	401130		443150	451220	479040	496360	528920		543710	547730	556310	57.0410	573980	574960	583330	588090		588470	588610	588850		$\mathbb{T}^{-1}$
0 0 0 0	מבו מער	268438	293869	322630	362890	393860	396030	401130		401130	443150	451220	479040	496360		528920	543710	547730	556310	570410	573980	574960	583330		588090	588470	588610		
DATE	MEASONED	9/2/2010	9/8/2010	9/16/2010	9/22/2010	9/23/2010	9/28/2010	9/30/2010	otals	10/7/2010	10/14/2010	10/19/2010	10/21/2010	10/28/2010	IIS SI	11/1/2010	11/2/2010	11/4/2010	11/8/2010	11/12/2010	11/16/2010	11/23/2010	11/29/2010	otals	12/1/2010	12/2/2010	12/22/2010	tals	
WELL	FOCALION	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	September Totals	RW-2	RW-2	RW-2	RW-2	RW-2	October Totals	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	November Totals	RW-2	RW-2	RW-2	December Totals	

NA MEASURED         BEFORE         Reading         PUNMPED         PUNMPED	WFI	DATE		Current	GALLONS	BARRELS	MONTHLY	Davs per	Average BBLS per	Max One Day	Min One Dav
1/2010         196740         199635         3895         92.74         92.74         1           1/2010         199635         202476         2841         67.64         160.38         1         1           5/2010         202476         2841         67.64         160.38         1         1           5/2010         202476         205770         2150         51.19         238.81         1         1           2/2010         207920         277920         2150         0         0         290.00         0           9/2010         207920         207920         970         23.10         313.10         1           9/2010         20890         0         0         0         0         0         0           9/2010         20890         0         0         0         0         0         0           9/2010         212730         21450         490         11.43         404.52         1         1           9/2010         214570         490         14.73         448.33         1         2           1/2010         214570         214570         0         0         0         0         0	TION	MEASURED	BEFORE	Reading	PUMPED	PUMPED	(BARRELS)	month	day	Volume	Volume
172010         199635         202476         2841         67.64         160.38         1         1           562010         202476         205770         3294         78.43         238.81         1         1           202010         202476         205770         2150         51.19         290.00         1           322010         207920         207920         970         23.10         313.10         0           882010         207920         208890         0         0.00         290.00         0           982010         208890         2102730         313.10         313.10         1           902010         210890         210280         0.00         313.10         1           742010         208890         210450         448.33         1         1           912010         214570         490         11.67         448.33         1         2           912010         214570         20760         6190         147.38         595.71         1         4           912010         214570         20760         6190         147.38         595.71         1         4           912010         225026         1670	V-3	9/2/2010	195740	199635	3895	92.74	92.74	1	92.7381		
612010         202476         205770         3294         78.43         238.81         1         1           212010         205770         207920         2150         51.19         290.00         1           212010         207920         207920         0.00         290.00         0           312010         207920         208890         970         23.10         313.10         0           812010         208890         208890         0         0.00         313.10         0           812010         208890         212730         3840         91.43         404.52         1           712010         208890         212730         3340         91.43         404.52         1           712010         212730         214570         40         0.00         448.33         1           912010         214570         40         0.00         448.33         1         448.33           112010         214570         40         147.38         595.71         1         4           112010         220760         22050         186.90         148.33         1         1         4           122010         22130         11670	۷-3	9/8/2010	199635	202476	2841	67.64	160.38	1	13.5286		
2/2010         205770         207920         2150         51.19         290.00         1           3/2010         207920         207920         0         0         290.00         0         0           8/2010         207920         20890         970         23.10         313.10         1           8/2010         20890         20890         0         0         0         313.10         0           0/2010         20890         208890         0         0         0         0         0         0           0/2010         20890         212730         313.10         0	۷-3	9/16/2010	202476	205770	3294	78.43	238.81	1	11.2041		
3/2010         207920         0         0.00         290.00         0           8/2010         207920         208890         970         23.10         313.10         1           9/2010         208890         208890         0         0.00         313.10         0           9/2010         208890         208890         0         0.00         313.10         0           7/2010         208890         212730         3840         91.43         404.52         1           7/2010         212730         214080         1350         32.14         436.67         1           9/2010         214570         490         11.67         448.33         0         448.33           1/1/2010         214570         0         0.00         448.33         0         448.33           21/2010         220760         6190         147.38         595.71         1         4           2/2010         230250         1670         39.76         821.67         1         4           2/2010         235840         710         16.90         954.76         1         1           2/2010         235840         716.7         76.7         144.35.7	N-3	9/22/2010	205770	207920	2150	51.19	290.00	1	8.5317		
9/2010         207920         208890         970         23.10         313.10         1           9/2010         208890         0         0.00         313.10         0           7/2010         208890         212730         3840         91.43         404.52         1           7/2010         208890         212730         3840         91.43         404.52         1           7/2010         214570         214570         0         0.00         448.33         1           9/2010         214570         0         0.00         448.33         0         1           8/2010         214570         0         0.00         448.33         0         1           8/2010         214570         0         0.00         448.33         1         2           8/2010         214570         0         0.00         448.33         1         2           8/2010         214570         0         0.00         448.33         1         2           8/2010         228580         1670         39.76         821.67         1         3           8/2010         235840         710         16.93         16.43         16.93 <td< td=""><td>N-3</td><td>9/23/2010</td><td>207920</td><td>207920</td><td>0</td><td>0.00</td><td>290.00</td><td>0</td><td>0.0000</td><td></td><td></td></td<>	N-3	9/23/2010	207920	207920	0	0.00	290.00	0	0.0000		
00/2010         208890         0         0.00         313.10         0           13150         13150         313.10         1.7           12010         208890         212730         3840         91.43         404.52         1           12010         212730         214680         1350         32.14         436.67         1           12010         212730         214670         0         0         0.00         448.33         1           21/2010         214570         214570         0         0.00         448.33         0         1           21/2010         214570         214670         0         0.00         448.33         0         1           21/2010         214570         220760         6190         147.38         595.71         1         2           21/2010         228580         760         186.19         781.67         1         4           21/2010         236920         1680         16.90         954.76         1         3           21/2010         236920         23690         70.00         166.90         1         4           21/2010         236920         2360         76.67         11	N-3	9/28/2010	207920	208890	970	23.10	313.10	1	4.6190		
712010         208890         212730         3840         91.43         404.52         1           712010         208890         212730         3840         91.43         404.52         1           742010         212730         214600         1350         32.14         436.67         1           9/2010         214570         490         11.67         448.33         0           1/2010         214570         0         0.00         448.33         0           1/2010         214570         214570         0         0.00         448.33         0           1/2010         214570         20760         6190         147.38         595.71         1         2           1/2010         228580         228580         7820         186.19         781.90         1         4           2/2010         228580         7820         1670         39.76         821.67         1         5           2/2010         23540         710         16.90         954.76         1         1           2/2010         23540         70.00         1066.90         1         1           2/2010         240550         243770         247.86	N-3	9/30/2010	208890	208890	0	00.0	313.10	0	0.0000		
10/1/2010         208890         212730         3840         91.43         404.52         1           10/14/2010         212730         214080         1350         32.14         436.67         1           10/19/2010         214570         214570         490         11.67         448.33         0           10/2/2010         214570         220760         6190         147.38         595.71         1           10/2/2010         214570         220760         6190         147.38         595.71         1           11/1/2010         214570         220760         228580         7820         186.19         781.90         1           11/1/2010         228580         230250         1670         39.76         821.67         1         3           11/1/2/2010         23540         710         16.90         954.76         1         5           11/12/2010         235840         236920         1080         25.71         980.48         1         5           11/1/2/2010         235840         236920         1080         25.71         980.48         1         1           11/2/2010         235840         240550         2340         70.00	mberoT	otals			10.00	313.10					
10/14/2010         212730         214080         1350         32.14         436.67         1           10/19/2010         214080         214570         490         11.67         448.33         1           10/21/2010         214570         214570         0         0.00         448.33         0           10/21/2010         214570         220760         6190         147.38         595.71         1           11/1/2010         220760         228580         7820         186.19         781.90         1           11/1/2010         228580         230250         1670         39.76         821.67         1           11/1/2010         230250         1670         39.76         821.67         1         5           11/1/2010         235840         710         16.90         954.76         1         5           11/16/2010         235840         710         16.43         996.90         1         1           11/16/2010         236920         1080         25.71         980.48         1         1           11/16/2010         240550         2340         70.00         1066.90         1         1           11/2/2010         240550	N-3	10/7/2010	208890	212730	3840	91.43	404.52	1	13.0612		
10/19/2010         214680         214570         490         11.67         448.33         1           10/21/2010         214570         214570         0         0.00         448.33         0           10/21/2010         214570         220760         6190         147.38         595.71         1           10/28/2010         214570         220760         6190         147.38         595.71         1           11/1/2010         220760         228580         7820         186.19         781.00         1           11/1/2010         228580         230250         1670         39.76         821.67         1           11/14/2010         235130         235840         710         16.90         954.76         1         5           11/12/2010         235840         710         16.90         954.76         1         5           11/12/2010         235840         710         16.90         954.76         1         1           11/16/2010         235840         70.00         16.43         996.90         1         1           11/29/2010         240550         24370         240.00         16.43         1150.00         1           12/1/2010<	N-3	10/14/2010	212730	214080	1350	32.14	436.67	1	4.5918		
10/21/2010         214570         214570         0         0.00         448.33         0           10/28/2010         214570         220760         6190         147.38         595.71         1           10/28/2010         214570         220760         6190         147.38         595.71         1           11/1/2010         220760         228580         7820         186.19         781.90         1         4           11/1/2010         228580         235630         1670         39.76         821.67         1         3           11/14/2010         230250         23540         710         16.90         954.76         1         5           11/18/2010         235840         236920         1080         25.71         980.48         1         5           11/12/2010         236920         2360         16.30         96.90         1         1           11/12/2010         236920         2940         70.00         1066.90         1         1           11/29/2010         240550         2940         70.00         1066.90         1         1           11/29/2010         244040         244040         270         6.43         1150.00	N-3	10/19/2010	214080	214570	490	11.67	448.33	1	2.3333		
10/28/2010         214570         220760         6190         147.38         595.71         1         2           11/1/2010         220760         228580         7820         186.19         781.90         1         4           11/1/2010         220760         228580         7820         186.19         781.90         1         4           11/1/2010         228580         230250         1670         39.76         821.67         1         3           11/14/2010         23650         23540         710         16.90         954.76         1         5           11/18/2010         235840         236920         1080         25.71         980.48         1         5           11/16/2010         235920         237610         690         16.43         996.90         1         1           11/12/2010         236920         237610         690         16.43         1066.90         1         1           11/23/2010         240550         24050         70.00         1066.90         1         1         1           11/29/2010         244040         270         6.43         1150.00         1         1         1           12/22/2010	N-3	10/21/2010	214570	214570	0	0.00	448.33	0	0.0000		
11/1/2010         228560         7820         186.19         781.90         1         4           11/1/2010         228580         7820         186.19         781.90         1         4           11/2/2010         228580         230250         1670         39.76         821.67         1         3           11/2/2010         228580         23620         1670         39.76         1         3           11/8/2010         235130         235840         710         16.90         954.76         1         5           11/16/2010         235840         236920         1080         25.71         980.48         1         5           11/16/2010         235920         237610         690         16.43         996.90         1         1           11/16/2010         236920         237610         690         16.43         996.90         1         1           11/23/2010         240550         2940         70.00         1066.90         1         1           11/29/2010         244040         244040         270         6.43         1152.38         1           12/2/2010         244040         244320         180         4.29         1156.67	N-3	10/28/2010	214570	220760	6190	147.38	595.71	-	21.0544		
11/1/2010         220760         228580         7820         186.19         781.90         1         4           11/2/2010         228580         230250         1670         39.76         821.67         1         3           11/2/2010         235530         4880         116.19         937.86         1         5           11/8/2010         235130         235840         710         16.30         954.76         1         5           11/16/2010         235840         236920         1080         25.71         980.48         1         5           11/16/2010         235920         237610         690         16.43         996.90         1         1           11/23/2010         236920         237610         690         16.43         996.90         1         1           11/23/2010         240550         2940         70.00         1066.90         1         1           11/29/2010         240560         232010         547.86         76.67         1143.57         1         1           12/2/2010         244040         270         6.43         1150.00         1         1           12/22/2010         244040         24320         180	ser Tota	ls .			11870	282.62		1			
12/2010         228580         230250         1670         39.76         821.67         1         3           14/2010         230250         235130         4880         116.19         937.86         1         5           18/2010         235130         235840         710         16.90         954.76         1         5           12/2010         235840         710         16.90         954.76         1         5           12/2010         235840         710         16.90         954.76         1         1           12/2010         235840         236920         1080         25.71         980.48         1         1           23/2010         236920         2340         70.00         16.43         1         1         1           23/2010         240550         243770         3220         76.67         1143.57         1         1           7/2010         244040         270         6.43         1150.00         1         1           22/2010         244140         100         2.38         1152.38         1         1           22/2010         244140         244320         180         4.29         1156.67 <t< td=""><td>N-3</td><td></td><td>220760</td><td>228580</td><td>7820</td><td>186.19</td><td>781.90</td><td>1</td><td>46.5476</td><td></td><td></td></t<>	N-3		220760	228580	7820	186.19	781.90	1	46.5476		
44/2010         230250         235130         4880         116.19         937.86         1         5           8/2010         235130         235840         710         16.90         954.76         1	N-3	11/2/2010	228580	230250	1670	39.76	821.67	1	39.7619		
/8/2010         235130         235840         710         16.90         954.76         1           12/2010         235840         236920         1080         25.71         980.48         1           16/2010         235820         237610         690         16.43         996.90         1           23/2010         237610         2940         70.00         1066.90         1         1           29/2010         237610         2940         70.00         1066.90         1         1           29/2010         240550         243770         3220         76.67         1143.57         1         1           1/2010         244040         270         6.43         1150.00         1         1           2/2010         244040         244140         100         2.38         1152.38         1           2/2010         244140         180         4.29         1156.67         1         1           2/2010         24320         180         4.29         1156.67         1         1	N-3	11/4/2010	230250	235130	4880	116.19	937.86	1	58.0952		
12/2010         235840         236920         1080         25.71         980.48         1           16/2010         236920         237610         690         16.43         996.90         1           23/2010         237610         240550         2940         70.00         1066.90         1           29/2010         240550         24056         76.67         1143.57         1         1           1/2010         240560         24040         270         6.43         1150.00         1           1/2010         244040         244140         100         2.38         1152.38         1           22/2010         244140         180         4.29         1156.67         1         1           22/2010         244140         180         4.29         1156.67         1         1	N-3	11/8/2010	235130	235840	710	16.90	954.76	1	4.2262		
16/2010         236920         237610         690         16.43         996.90         1           23/2010         237610         240550         2940         70.00         1066.90         1           29/2010         240560         243770         3220         76.67         1143.57         1           11/2010         240560         243770         2700         6.43         1150.00         1           11/2010         244040         270         6.43         1150.00         1         1           22/2010         244140         100         2.38         1152.38         1         1           22/2010         244140         180         4.29         1156.67         1         1           22/2010         24320         180         4.29         1156.67         1         1	W-3	11/12/2010	235840	236920	1080	25.71	980.48	ļ	6.4286		
23/2010         237610         240550         2940         70.00         1066.90         1           29/2010         240550         243770         3220         76.67         1143.57         1         1           1/1/2010         243770         244040         270         6.43         1150.00         1         1           22/2010         244140         100         2.38         1152.38         1         1           22/2010         244140         180         4.29         1156.67         1         1           550         13:10         13:10         1         1         1         1	N-3	11/16/2010	236920	237610	690	16.43	996.90	1	4.1071		
29/2010         240550         243770         3220         76.67         1143.57         1         1           1/2010         243770         244040         270         6.43         1150.00         1         1           22/2010         244140         100         2.38         1152.38         1         1           22/2010         244140         180         4.29         1156.67         1         1           550         13:10         3.310         3.310         3.310         3.310         3.310         3.310	N-3	11/23/2010	237610	240550	2940	70.00	1066.90	1	8.7500		
1/1/2010         24040         270         6.43         1150.00         1           1/2010         244040         270         6.43         1150.00         1           22/2010         244040         244140         100         2.38         1152.38         1           22/2010         244140         180         4.29         1156.67         1           25/2010         244140         180         4.29         1156.67         1	N-3	11/29/2010	240550	243770	3220	76.67	1143.57	1	12.7778		
/1/2010         243770         244040         270         6.43         1150.00         1           /2/2010         244040         244140         100         2.38         1152.38         1           22/2010         244140         180         4.29         1156.67         1           550         13.10         550         13.10         8	mber Tc	otals 🔭		T. C.	23010	547.86			F2.4		
72/2010         244040         244140         100         2.38         1152.38         1           22/2010         244140         244320         180         4.29         1156.67         1           550         13:10         550         13:10         6         6	N-3	12/1/2010	243770	244040	270	6.43	1150.00	1	3.2143		
22/2010         244140         244320         180         4.29         1156.67         1           550         13:10         550         13:10         6         6         6	N-3	12/2/2010	244040	244140	100	2.38	1152.38	1	2.3810		
	N-3	12/22/2010	244140	244320	180	4.29	1156.67	1	0.2143		
(1) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nber⁻Tc	otals 🗀 🐇			550	13:10					
						1 1 T					

Min One Day Volume																											大きなない 一大の大の大き
Max One Day Volume														To the second	1												是如果在西班牙里
Average BBLS per dav	309.1190	89.2476	74.7959	60.4365	43.3333	22.8571	0.0000		55.7483	20.8163	66.0952	59.2857	48.0952		57.0238	46.6667	33.0952	11.3095	7.9762	3.3333	2.5298	5.8730		2.9762	0.4762	0.1667	The second second
Days per month	_	1	1	1	1	1	0		1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	<b>海域形成为</b>
MONTHLY TOTAL (BARRELS)	309.12	755.36	1278.93	1641.55	1684.88	1799.17	1799.17		2189.40	2335.12	2665.60	2784.17	3120.83		3348.93	3395.60	3461.79	3507.02	3538.93	3552.26	3572.50	3607.74		3613.69	3614.17	3617.50	· · · · · · · · · · · · · · · · · · ·
BARRELS	309.12	446.24	523.57	362.62	43.33	114.29	0.00	1799.17	390.24	145.71	330.48	118.57	336.67	1321.67	228.10	46.67	66.19	45.24	31.90	13.33	20.24	35.24	486.90	5.95	0.48	3.33	9 2 b
GALLONS	12983	18742	21990	15230	1820	4800	0	75565	16390	6120	13880	4980	14140	55510	9580	1960	2780	1900	1340	560	850	1480	20450	250	20	140	410
Current	225398	244140	266130	281360	283180	287980	287980		304370	310490	324370	329350	343490		353070	355030	357810	359710	361050	361610	362460	363940		364190	364210	364350	
BEFORE	212415	225398	244140	266130	281360	283180	287980		287980	304370	310490	324370	329350		343490	353070	355030	357810	359710	361050	361610	362460		363940	364190	364210	
DATE	9/2/2010	9/8/2010	9/16/2010	9/22/2010	9/23/2010	9/28/2010	9/30/2010	otals	10/7/2010	10/14/2010	10/19/2010	10/21/2010	10/28/2010	ls	11/1/2010	11/2/2010	11/4/2010	11/8/2010	11/12/2010	11/16/2010	11/23/2010	11/29/2010	otals	12/1/2010	12/2/2010	12/22/2010	itals
WELL	RW-4	RW4	RW-4	RW-4	RW-4	RW-4	RW-4	September Totals	RW-4	FW-4	RW-4	RW-4	RW4	October Totals	RW-4	RW-4	RW-4	RW-4	RW-4	RW-4	RW-4	RW-4	November Totals	RW-4	RW-4	RW-4	December Totals

						MONTHLY		Average	Max One	Min One
WELL	DATE MEASURED	BEFORE	Current Reading	GALLONS	BARRELS PUMPED	TOTAL (BARRELS)	Days per month	BBLS per day	Day Volume	Day Volume
IFM	9/2/2010	208014	280978	72964	1737.24	1737.24	1	1737.2381		
IFM	9/8/2010	280978	364210	83232	1981.71	3718.95	1	396.3429		
IFM	9/16/2010	364210	643300	279090	6645.00	10363.95	1	949.2857		
IFM	9/22/2010	643300	681400	38100	907.14	11271.10	1	151.1905		
IFM	9/23/2010	681400	00/989	5300	126.19	11397.29	1	126.1905		
ΡM	9/28/2010	00/989	006989	200	4.76	11402.05	1	0.9524		
IFM	9/30/2010	006989	700400	13500	321.43	11723.48	1	160.7143		
September Totals	otals			492386	11723.48					
IFM	10/7/2010	700400	723600	23200	552.38	12275.86	1	78.9116		
IFM	10/14/2010	723600	742700	19100	454.76	12730.62	1	64.9660		
IFM	10/19/2010	742700	000922	33300	792.86	13523.48	1	158.5714		
IFM	10/21/2010	000922	786600	10600	252.38	13775.86	1	126.1905		
IFM	10/28/2010	009987	818800	32200	766.67	14542.52	1	109.5238		
October Totals	ils:		40.0	118400	2819:05					
IFM	11/1/2010	818800	859500	40700	969.05	15511.57	1	242.2619		
IFM	11/2/2010	859500	869200	9700	230.95	15742.52	1	230.9524		
IFM	11/4/2010	869200	887200	18000	428.57	16171.10	1	214.2857		
IFM	11/8/2010	887200	902800	15600	371.43	16542.52	1	92.8571		
IFM	11/12/2010	902800	904700	1900	45.24	16587.76	-	11.3095		
IFM	11/16/2010	904700	908000	3300	78.57	16666.33	1	19.6429		
IFM	11/23/2010	908000	911500	3500	83.33	16749.67	1	10.4167		
IFM	11/29/2010	911500	923200	11700	278.57	17028.24	1	46.4286		
November Totals	otals			104400	2485:71					<b>"林"的一个写著</b>
IFM	12/1/2010	923200	923773	573	13.64	17041.88	0	13.6429		
IFM	12/2/2010	923773	924671	898	21.38	17063.26	0	21.3810		
IFM	12/22/2010	924671	925590	919	21.88	17085.14	0	1.0940		
December Totals	otals			2390	56.90		100			

Min One	Day	Volume		`																							
Max One	Day	Volume				1122		7																			
Average	BBLS per	day	6.31	3.57	65.95	a the second	4.31		20.92		7.41	4.05	306.90		96.9		18.08		5.34	3.10	55.48		4.69		0.70		
	Days per	month	1.00	2.00	3.00		1.00		1.00		1.00	2.00	3.00		1.00		1.00		1.00	2.00	3.00		1.00		1.00		
MONTHLY	TOTAL	(BARRELS)	88.33	91.90	157.86		172.38		439.29		103.81	107.86	414.76		278.57		379.76		74.76	77.86	133.33		187.62	1	14.76		
	BARRELS	PUMPED	88.33	3.57	96.39	157.86	172.38	172,38	439.29	439.29	103.81	4.05	306.90	414:76	278.57	278:57	379.76	379.76	74.76	3.10	55.48	133.33	187.62	187.62	14.76	14.76	
	GALLONS	PUMPED	3,710	150	2,770	<b>.</b>	7,240	7,240	18,450	18,450	4,360	170	12,890	17,420	11,700	11,700	15,950	15,950	3,140	130	2,330	2,600	7,880	7,880	620		
	Current	Reading	325,900	326,050	328,820	160	7,240		25,690		593,210	593,380	606,270		11,700		27,650		247,460	247,590	249,920		7,880		8,500		
		BEFORE	322,190	325,900	326,050	<b>Fotals</b>	0	<b>Totals</b>	7,240	otals	588,850	593,210	593,380	Totals -	0	<b>Totals</b>	11,700	otals	244,320	247,460	247,590	Totals 💀	0	Totals	7,880	otals	
	DATE	MEASURED	1/5/2011	1/6/2011	1/7/2011	January Total	2/16/2011	February Tota	3/9/2011	. March Totals	1/5/2011	1/6/2011	1/7/2011	January Total	2/16/2011	February Tota	3/9/2011	March Total	1/5/2011	1/6/2011	1/7/2011	January Total	2/16/2011	February Tota	3/9/2011	. March Totals	
	WELL	LOCATION	RW-1	RW-1	RW-1		RW-1**		RW-1		RW-2	RW-2	RW-2		RW-2**		RW-2		RW-3	RW-3	RW-3		RW-3**		RW-3		

NMOCD REFERENCE NUMBER GW-0294 LEA COUNTY, NEW MEXICO PLAINS MARKETING, L.P. **TNM-9704 TOWNSEND** 

	DATE		Current	CALLONS	BARRELS	MONTHLY	Days per	Average BBLS per	Max One Day	Min One Day
	MEASURED	BEFORE	Reading	PUMPED	PUMPED	(BARRELS)	month	day	Volume	Volume
	1/5/2011	364,350	367,210	2,860	68.10	68.10	1.00	4.86		
,	1/6/2011	367,210	367,320	110	2.62	70.71	2.00	2.62		
	1/7/2011	367,320	369,500	2,180	51.90	122.62	3.00	51.90		
	January Total	Totals		5,150	122.62					
1	2/16/2011	0	270,210	270,210	6,433.57	6,433.57	1.00	160.84		
18 3	February Total	Totals		270,210	6,433.57			100		
_	3/9/2011	270,210	293,550	23,340	555.71	555.71	1.00	555.71		
100 M	March Totals	otals		23,340	555:71					
TOWN.				48.0						
	1/5/2011	0	054,77	054,77	1,851.19	1,851.19	1.00	132.23		
	1/6/2011	77,750	77,820	02	1.67	1,852.86	2.00	1.67		
	1/7/2011	77,820	085,08	2,710	64.52	1,917.38	3.00	64.52		
100	January Total	Totals		<b>80,530</b>	1,917,38			100		
	2/16/2011	80,530	069'26	17,160	408.57	408.57	1.00	10.21		
198	February Total	Totals		17,160	408.57	The second				
	3/9/2011	92,690	159,050	61,360	1,460.95	1,460.95	1.00	69.57		
	* March Totals	otals		61,360	1,460.95	100				
ľ										

<sup>\*</sup> Flow Meter identified as IFM was replaced on January 3, 2011 \*\* Flow Meters for RW-1 through RW-4 were replaced on February 15, 2011

### TABLE 2

# BTEX CONCENTRATIONS IN EFFLUENT GROUNDWATER

PLAINS MARKETING, L.P.
TNM 97-04 TOWNSEND
LEA COUNTY, NEW MEXICO
NMOCD REFERENCE NUMBER GW-0294

Results and Regulatory Limits in mg/L

Sample Date	Sample Location	Benzene	Toluene	Ethylbenzene	Xylenes	Total BTEX
NMOCD Re	NMOCD Regulatory Limits	0.010	0.75	0.75	0.62	•
09/02/10	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
09/10/10	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
06/16/10	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
09/23/10	Post Carbon	<0.001	<0.001	< 0.001	<0.001	<0.001
10/25/10	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
11/23/10	Post Carbon	0.0047	<0.001	<0.001	< 0.001	0.0047
01/28/11	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
02/28/11	Post Carbon	0.0319	0.037	0.0338	0.0992	0.2019
03/18/11	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001

TABLE 3

# POLYNUCLEAR AROMATIC HYDROCARBON CONCENTRATIONS IN EFFLUENT GROUNDWATER

	Dibenzoluran		<0.000184		<0.000186		<0.000200	200	<0.000190		<0.000186		<0.000184		<0.000183		<0.000188		<0.000190		<0.000183
	Z-Methyinaphthalene		<0.000184		<0.000186	<b>经验证据</b>	<0.000200		0.00272		<0.000186		<0.000184		<0.000183		<0.000188		<0.000190	· · · · · · · · · · · · · · · · · · ·	<0.000183
	I-Methylnaphthalene	J\3m £0.0	<0.000184		<0.000186		<0.000200	<b>"我是否是</b>	0.0106		<0.000186		<0.000184		<0.000183		<0.000188		<0.000190		<0.000183
	Марћсћајеве		<0.000184		<0.000186		<0.000200		0.00856		<0.000186		<0.000184		<0.000183		<0.000188		<0.000190		<0.000183
	Ругепе		<0.000184		<0.000186	100 CONT. 100 CONT.	<0.000200	10 M	<0.000190		<0.000186		<0.000184		<0.000183		<0.000188		<0.000190		<0.000183
	Ріспапсілгеле	<del>-</del>	<0.000184		<0.000186		<0.000200	· · · · · · · · · · · · · · · · · · ·	<0.000190		<0.000186		<0.000184	_	<0.000183		<0.000188		<0.000190	2 2 Y 2 2	<0.000183
	9n91kq(b2-6,2,1]on9bn1	.T\gm \$000.0	<0.000184		<0.000186	100	<0.000200		<0.000190		<0.000186	97.47	<0.000184	74.00	<0.000183		<0.000188		<0.000190	100	<0.000183
	Fluorene		<0.000184		<0.000186		<0.000200		<0.000190		<0.000186		<0.000184		<0.000183		<0.000188		< 0.000190		<0.000183
, 3510	Fluoranthene		<0.000184		<0.000186		<0.000200		<0.000190		<0.000186		<0.000184	-	<0.000183		<0.000188		<0.000190		<0.000183
EPA SW846-8270C,	Dibenz[a,h]anthracene	J\zm £000.0	<0.000184		<0.000186		<0.000200		<0.000190		<0.000186		<0.000184	_	<0.000183		<0.000188		<0.000190		<0.000183
EPA SV	Chrysene	J\zm £000.0	<0.000184		<0.000186	The second second	<0.000200	100	<0.000190		<0.000186		<0.000184		<0.000183		<0.000188	第二 第1	<0.000190	40 Km	<0.000183
	Benzo[k]fluoranthene	J\zm £000.0	<0.000184		<0.000186		<0.000200		<0.000190		<0.000186		<0.000184		<0.000183		<0.000188		<0.000190		<0.000183
	Benzo[g,h,i]perylene		<0.000184		<0.000186	A STATE OF THE STA	<0.000200		<0.000190		<0.000186		<0.000184		<0.000183		<0.000188		<0.000190	<b>FE 18.6</b> 5	<0.000183
	Benzo[b]Auoranthene	.1\3m £000.0	<0.000184		<0.000186		<0.000200		<0.000190	2000年	<0.000186		<0.000184		<0.000183		<0.000188		<0.000190		<0.000183
	Benzo[a]pyrene	J\3m 7000.0	<0.000184	(1)	<0.000186		<0.000200 <0.000200 <0.00020		<0.000190 <0.000190 <0.000190 <0.000190 <0.000190		<0.000186 < 0.000186 < 0.000188 < 0.000186 < 0.000186		<0.000184		<0.000183		<0.000188		<0.000190 <0.000190 <0.00019		<0.000183 <0.000183 <0.00018
	Вепхо[я]япійтасепе	J\3m 1000.0	<0.000184		<0.000186		<0.000200		<0.000190		<0.000186		<0.000184		<0.000183		<0.000188		<0.000190		
	Anthracene	<del></del>	<0.000184		<0.000186		<0.000200 <0.000200		<0.000190		<0.000186		<0.000184 <0.000184		<0.000183		<0.000188		<0.000190 <0.000190	2.963/2	<0.000183 <0.000183
	Асепарісіјуїепе		<0.000184		<0.000186						<0.000186		<0.000184	-	<0.000183	dia.	<0.000188		<0.000190		<0.000183
	Acensphthene		<0.000184		<0.000186		<0.000200		<0.000190		<0.000186		<0.000184		<0.000183		<0.000188		<0.000190		<0.000183
	SAMPLE DATE	ntaminant IM ing water tions 1- -103.A.	09/05/10		01/01/60		01/91/60		09/23/10		10/25/10		11/23/10		12/23/10		01/28/11		02/28/11		03/18/11
	SAMPLE LOCAPION	Maximum Contaminant Levels from NM WQCC Drinking water standards Sections 1- 101.UU and 3-103.A.	Post Carbon		Post Carbon		Post Carbon		Post Carbon	900m	Post Carbon		Post Carbon		Post Carbon		Post Carbon		Post Carbon		Post Carbon

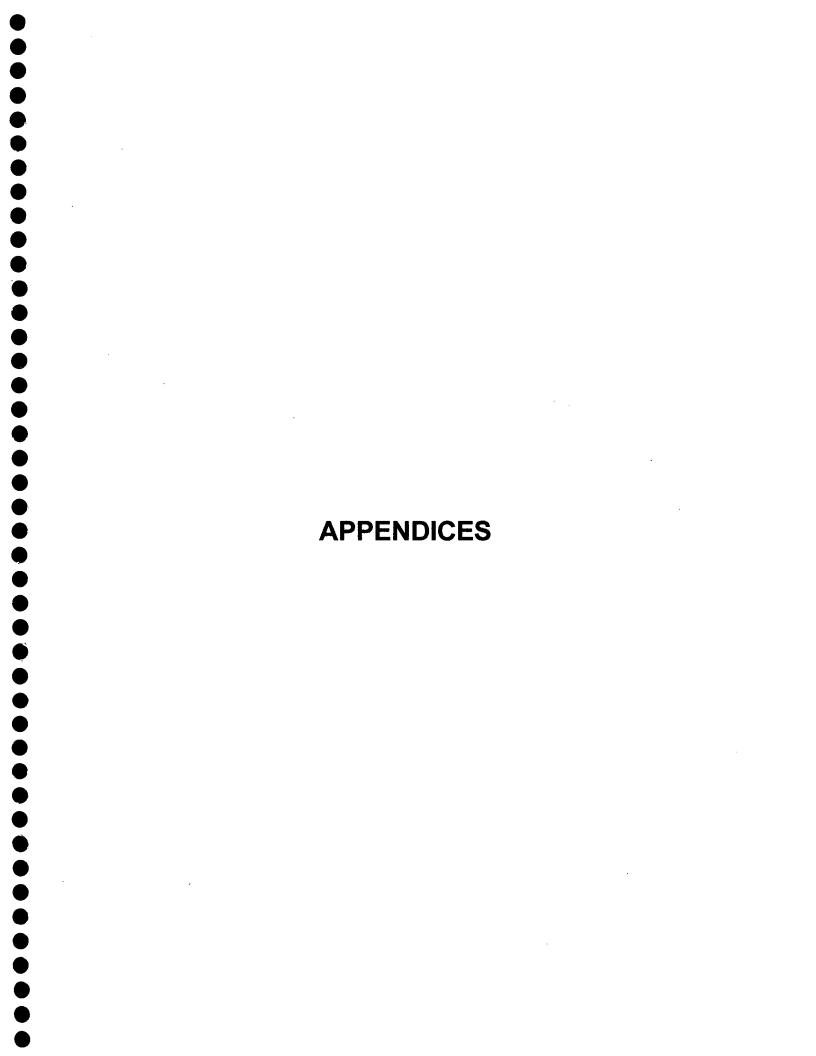
TABLE 4

## WQCC METALS CONCENTRATIONS IN EFFLUENT GROUNDWATER

PLAINS MARKETING, L.P.
TINM 97-04 TOWNSEND
LEA COUNTY, NEW MEXICO
NMOCD REFERENCE NUMBER GW-0294

All water concentrations are reported in mg/L

					_	10.15		17565		
١	Total Zinc	J\ളമ്പ 0J	0.01		<0.005		0.01	<b>新光彩</b>	0.015	
	Total Silver	J\gm 20.0	<0.005	<b>建筑建筑</b>	<0.005		<0.005		<0.005	
	muinələ2 latoT	J\gm č0.0	<0.020	12 C. L. S.	<0.020	Sec. 1	<0.020		<0.020	
	рвэ <b>Л івзоТ</b>	J\gm 20.0	0.005		<0.005		<0.005		<0.005	
	Total Mercury	J\gm £00.0	<0.0002		<0.0002		<0.0002		<0.0002	
	muimord) IstoT	J\gm 20.0	<0.005		<0.010	PH 1	<0.010		<0.010	
	muimbaD ta3oT	J\zm 10.0	<0.005	#140 Co.	<0.005		<0.005		<0.005	
	тиітвЯ ІвэоТ	J\gm 0.1	0.171		0.243		0.28		0.194	
	oinserA AstoT	. J\gm I.0	<0.010		<0.010		<0.010		<0.010	
	Total Nickel	J/gm 2.0	<0.005		<0.010	是这些一个	<0.010		<0.010	
	munsbdyloM la3oT	വ∕ളണ 0.1	<0.010		<0.050	10 THE	<0.050	1000	<0.050	
	эгэпвдявМ івзоТ	J\gm £.0	0.197	数型的数	0.091	<b>C.C. A. S. S.</b>	0.101		0.034	
	nord fatoT	J/3m 0,1	0.119	10 COM	0.177	<b>300-10</b>	0.044	<b>对于"新疆"</b>	0.311	
	Total Copper	J\2m 0.1	<0.005		<0.005		0.005	<b>赞</b> 美工艺术	<0.005	
	Total Cobalt	J\gm 20.0	<0.005		<0.005	_	<0.005		<0.005	
	norod latoT	J\gm 27.0	0.105		0.168		0.216		0.112	
	munimulA 1830T	J\gm 0.2	0.533	1000-000	<0.050	4	0.057		0.053	
	SAMPLE	ontaminant NM king water ctions 1- F103.A.	09/05/10		09/10/10		01/91/60	15年1月1日	09/23/10	
	SAMPLE	Maximum Co Levels from I WQCC Drini standards See 101.UU and 3	Post Carbon		Post Carbon		Post Carbon		Post Carbon	
	Total Aluminum Total Boron Total Copatt Total Copper Total Manganese Total Molybdenum Total Mickel Total Arsenic Total Arsenic	J\\gm 27.0  J\\gm 20.0  J\\gm 0.1  J\\gm 0.1  J\\gm 0.1  J\\gm 0.1  J\\gm 1.0  J\\gm 1.0  J\\gm 1.0  J\\gm 10.0	09/02/10		09/10/10		09/16/10 0.057 0.216 <0.005 0.005 0.004 0.101 <0.050 <0.010 <0.010 0.28 <0.005 <0.010		09/23/10 0.053 0.112 0.005 0.005 0.311 0.034 0.050 0.010 0.010 0.194 0.006 0.000 0.00 0.000	



APPENDIX A:
Boring Logs & Well Details

## Soil Description

Depth (feet

Columns

- 0 5' Caliche, greyish white, sandy
- 5 10' Sand, brown, caliche, greyish white 10-23' - Sand, brown, sandsastone, interbedded
- 23 29' Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

saturated with depth 53 - 65' - Sand, brown, very fine grained

### Depth of PVC Well\_ Date Drilled\_ Ground Water Elevation Depth of Exploratory Well\_ Length of PVC Well Screen\_ Thickness of Bentonite Seal\_ Depth to Groundwater 65 Ft 60 Ft 65 Ft 53 Ft 2 Ft

Monitor Well Details

44 Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on N

Indicates the groundwater level measured on 3/26/09

Head-space reading in ppm obtained with a photo-ionization detector. Indicates samples selected for Laboratory Analysis

P

### Completion Notes

- The monitor well was installed on date using air rotary drilling techniques.
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- The well is protected with a locked stick up steel cover and a compression cap.
- boundaries. Actual transitions may be gradual. The lines between material types shown on the profile log represent approximate
- The depths indicated are referenced from below ground surface. (bgs)



NOVA Safety and Environmental

Drawn By: TA May 9, 2009 Checked By: RKR

TNM 97-04 Lea County, New Mexico Air Sparging Well AS-1 Plains Marketing, L.P.

**Boring Log And Monitor Well Details** 



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

		POD NUMBER	-	•					OSE FILE NUM	MBER(S)			
	5	TNM 97-0		<u> </u>						· ·			
	3	WELL OWNER							PHONE (OPTIC	ONAL)			
	<u>š</u> ļ	PLAINS M											
1.	ונר	WELL OWNER			1600				CITY	N1	STATE	7-	ZIP
	\$	333 CLAT	SIKE	ET, SUITE					HOUSTO	N	TX		7078
::		WELL			DEGREES	MINUTES	SECO						
	1	LOCATION	LAT	TITUDE	32	55	5	7.00 N	* ACCURACY	REQUIRED: ONE TEN	TH OF A SEC	COND	
	GENERAL AND WELL LOCATION	(FROM GPS)	) LOI	NGITUDE	103	25	1.	4.00 W	* DATUM REC	QUIRED: WGS 84			
ij	S 5	DESCRIPTION	N RELATIN	G WELL LOCATION	ON TO STREET ADDRES	SS AND COM	MON LANDA	MARKS					
- ;		GILLS RC	AD, LO	OVINGTON	NM, LEA CO								
$\Rightarrow$	4												
		(2.5 ACRE)		(10 ACRE)	(40 ACRE)	(160 /	ACRE)	SECTION		TOWNSHIP	NORTH	RANGE	Z EAST
	Ž	. 1/4		1/4	1/4		1/4		-		South	\	☐ WEST
	2	SUBDIVISION	NAME					LOT NUM	IBER	BLOCK NUMBER		UNIT/TRA	CT
	OPTIONAL	10/000000	· · · · · · · · · · · · · · · · · · ·					J		A A B AUT A D C D		TDACTA	
- !	7	HYDROGRAPI	HIC SUKV	EY						MAPNUMBER		TRACT N	JMBEK
												<u> </u>	
		LICENSE NUM		NAME OF LICE						NAME OF WELL DR			
1	ļ	WD14			STRAUB JR			,		STRAUB CO			
		DRILLING STA		DRILLING END	-		L (FT)	BORE HO	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	ITERED (FT)	
	DRILLING INFORMATION	3-23-		3-23-09		65		İ	65	CTATIC WATER ( C)	VEL IN COM	DI ETED WE	11 (1995)
İ	<b>E</b>	COMPLETED	WELL IS:	ARTESIAN	DRY HOLE	<b>√</b> SHA	LLOW (UNC	ONFINED)		STATIC WATER LE	VEL IN COM N/A		. LL(FI)
i	M. M.											·	
	NFC PFC	DRILLING FL	UID:	<b>✓</b> AIR	MUD	ADE	OITIVES - SPE	CIFY:					
	ပ္သ	DRILLING ME	ETHOD:	✓ ROTARY	HAMMER	CAB	LE TOOL	ОТНІ	ER - SPECIFY:		·		
	<u>ב</u>	DEPTH	(FT)	BORE HOL	E (	CASING		CON	NECTION	INSIDE DIA.	CASING	G WALL	SLOT
	Z	FROM	то	DIA. (IN)	M	ATERIAL		TYPE	(CASING)	CASING (IN)	THICKN	NESS (IN)	SIZE (IN)
	3. I	65	63	6	SCH 40 P\	/C .020 S	CREEN		BE	2	0.	154	.020
		63	7 .	6		PVC RI			BE	2	0.	154	RISER
		7	+43	6	SCH 40 GA	LVANIZE	D STEEL		NPT	2	ļ		
L				<u></u>				<u> </u>		<u> </u>	<u> </u>		
		DEPTH	(FT)	THICKNES	S F					ATER-BEARING S			YIELD
-	BEARING STRATA	FROM	TO	(FT)		(INCLUI	DE WATER	-BEARING	CAVITIES O	R FRACTURE ZON	IES)		(GPM)
	TR			<u> </u>									
	S S					<del></del>							
1	RI												
	BE.A												
	ER			<u> </u>				· <del></del>					<u></u> _
	WATER	METHOD US	ED TO EST	IMATE YIELD OF	WATER-BEARING STR	ATA				TOTAL ESTIMATED	O WELL YIEI	LD (GPM)	
	4. S									}			
•		FOR OSE I	NTERNA	L USE						WELL RECO		(Version 6	/9/08)
;		FILE NUM	IBER	<u> </u>		P	OD NUMBI	ER	<u> </u>	TRN NUMBE	ER	-	
		LOCATIO	N						•			PAGE 1	OF 2

UMP	TYPE OF	PUMP:	☐ SUBMER☐ TURBINI		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED☐ OTHER – SPECIFY:			
SEAL-AND PUMP	ANNU	JLAR	DEPTH FROM	TO	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH( PLACE	
EAL	SEAL	AND	65	60	6	2 BAGS OF 8/16 SAND		TOPL	.OAD
5.S	GRAVE	L PACK	60	11	6	9 BAGS OF 3/8 PLUG		TOPL	.OAD
			11	0	6	2 BAGS OF CEMENT		TOPL	.OAD
	DEPT	H (FT)	THICK	NESS		COLOR AND TYPE OF MATERIAL ENCOUN	TERED .	WA	ΓER
	FROM	то	(F7	Γ)	(INCL	UDE WATER-BEARING CAVITIES OR FRACT	URE ZONES)	BEAR	
	0	3	3		LIG	HT BROWN CLAYEY SAND WITH (	CALICHE	☐ YES	☑ NO
	3	6	3			CALICHE		☐ YES	☑ NO
	6	10	4			TAN SANDY CLAY		☐ YES	□ NO
	10	65	58	5		TAN SAND		☐ YES	□NO
T	TD	65						☐ YES	□NO
WEL	-							☐ YES	□ NO
OF								YES	□ NO
00.								☐ YES	□NO
10.1								YES	□ NO
907				•				☐ YES	□ NO
GEOLOGIC LOG OF WELL								☐ YES	□ NO
9								YES	□NO
								☐ YES	□ NO
:								☐ YES	□ NO
								☐ YES	□ NO
		_						☐ YES	□ NO
								☐ YES	□ NO
			ATTACH	ADDITION	IAL PAGES AS NI	EEDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL		
			METHOD:	BAILE	R PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			
AL INFO	WELL	. TEST				DATA COLLECTED DURING WELL TESTING, AND DRAWDOWN OVER THE TESTING PER		ME, END TI	ME,
NO NO	ADDITION	NAL STATE	MENTS OR EXPL	ANATIONS:					
7. TEST & ADDITION									
IQY									
N T								•	
TES									
, ·									
	THE UN	IDERSIGN	ED HEREBY	CERTIFIES	ТНАТ, ТО ТНЕ В	EST OF HIS OR HER KNOWLEDGE AND BELI	EF, THE FOREGOING I	S A TRUE A	ND
URE	CORRECT THE PE	CT RECOF BMIT HOL	RD OF THE AE LDER WITHIN	BOVE DESC I 20 DAYS A	RIBED HOLE AN FTER COMPLET	D THAT HE OR SHE WILL FILE THIS WELL R ION OF WELL DRILLING:	ECORD WITH THE STA	ATE ENGINE	ER AND
NAT	1	/		1	Λ				
SIGNATURE	1/4	mon	d Str	aule	y1.	4-20-09			
86		-	SIGNATU	RE OF DR	Ler	DATE			

	FOR OSE INTERNAL USE		WELL RECORD & LOG	(Version 6/9/08)
1	FILE NUMBER	POD NUMBER	TRN NUMBER	
	LOCATION			PAGE 2 OF 2

•••••••••••••

## Soil Description

Columns

Depth (feet) 0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

Date Drilled	3-24-09
Thickness of Bentonite Seal	60 Ft
Lenath of PVC Well Screen	2 Ft
Depth of PVC Well	65 Ft
Depth of Exploratory Well	65 Ft
Depth to Groundwater	53 Ft
Ground Water Elevation	

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

Ž

Indicates samples selected for Laboratory Analysis

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- 1. The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- 5. The depths indicated are referenced from below ground surface. (bgs)

Safety and environmental

## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA

May 9, 2009

TNM 97-04 Lea County, New Mexico Boring Log And Monitor Well Details

Air Sparging Well AS-2

Plains Marketing, L.P.



FOR OSE INTERNAL USE

FILE NUMBER

LOCATION

<del></del>						····							
NO	TNM 97	•							OSE FILE NUM	ABER(S)			
OCATI	WELL OWN PLAINS			ING LP					PHONE (OPTIO	ONAL)	·	· · · · · · · · · · · · · · · · · · ·	
GENERAL AND WELL LOCATION	WELL OWN			ADDRESS ET, SUITE	1600				CITY HOUSTO	Ņ	STATE TX	77	ZIP 7078
9			=		DEGREES	MINUTES	SECOND	S					
ALAN	LOCATION	ОИ	LAT	ITUDE	32	55		00 и		REQUIRED: ONE TEN	TH OF A SEC	COND	
ER	(FROM G	PS)	LON	GITUDE	103	25	13.0	00 W	* DATUM REC	QUIRED: WGS 84			
1. GEN					ON TO STREET ADDI	RESS AND COMMON LA	ANDMAR	RKS					
-	(2.5 ACF	lE)		(10 ACRE)	(40 ACRE)	(160 ACRE)	5	SECTION		TOWNSHIP	NORTH	RANGE	✓ EAST
7	,	4		1/4	1/4	1/4	ĺ				✓ SOUTH		west
NO.	SUBDIVISI	ON NAM	E				1	OT NUM	BER	BLOCK NUMBER		UNIT/TRA	
OPTIONAL													
2.0	HYDROGR	APHIC ST	URVE	Y	· · · · · · · · · · · · · · · · · · ·					MAP NUMBER		TRACT NU	JMBER
+	LICENSE N	UMBER	$\equiv$	NAME OF LICE	ENSED DRILLER					NAME OF WELL DR	ILLING CON	APANY	
	<u> </u>	1478			STRAUB JR			4.5	- "."	STRAUB COI			
	DRILLING	**	D	DRILLING EN		OMPLETED WELL (FT)	F		LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOÙN	TERED (FT)	
Z	3-2	4-09		3-24-09	<u>'                                    </u>	65			65				
DRILLING INFORMATION	COMPLETI	ED WELL	. IS:	ARTESIAN	DRY HO	LE SHALLOW (	(UNCONF	TNED)		STATIC WATER LE	VEL IN COM N/A		LL (FT)
FOR	DRILLING	FLUID:		<b>✓</b> AIR	MUD	ADDITIVES	- SPECIF	7Y:					
CIN	DRILLING	метно	D:	<b>✓</b> ROTARY	Пнамме	R CABLE TOO	or [	ОТНЕ	R – SPECIFY:				
	DEPT	H (FT)		BORE HOL	.E	CASING		COND	NECTION	INSIDE DIA.	CASING	G WALL	SLOT
RIL	FROM	TO		DIA. (IN)	Į.	MATERIAL	1		(CASING)	CASING (IN)		NESS (IN)	SIZE (IN)
3. D	65	63	3	6	SCH 40	PVC .020 SCREE	ΞN		BE	2	0.	154	.020
!	63	6		6	SCH	40 PVC RISER			BE	2	0.	154	RISER
	6	+4:	3	6	SCH 40 G	ALVANIZED STE	EEL	1	VPT	2			
	DEPT	H (FT)		THICKNES	ss	FORMATION DESC	CRIPTIO	ON OF P	RINCIPAL W	ATER-BEARING S	TRATA		YIELD
ΓĀ	FROM	то		(FT)						R FRACTURE ZON			(GPM)
ξ										1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
SST													
Ž									····				
BEARING STRATA												<del></del>	
R B						· <del>- · · · · · · · · · · · · · · · · · ·</del>	<del></del>			· · · · · · · · · · · · · · · · · · ·	· .	····	
4. WATER	METHOD	USED TO	ESTI	MATE YIELD OF	WATER-BEARING S	TRATA				TOTAL ESTIMATE	O WELL YIEI	LD (GPM)	
	FOR OS	E INTE	== RNA	L USE	·					WELL RECO	RD & LOC	(Version 6	6/9/08)

POD NUMBER

TRN NUMBER

PAGE 1 OF 2

MP	TYPE O	PUMP:	SUBMER TURBINI		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED ☐ OTHER – SPECIFY:			
SEAL AND PUMP	ANNI	II A D	DEPTH FROM	(FT)	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH PLACE	
A:L.	ANN! SEAL		65	60	6	2 BAGS OF 8/16 SAND	-   · · · · · · · · · · · · · · · · · ·	TOPL	OAD
5. SE	GRAVE	L PACK	60	10	6	14 BAGS OF 3/8 PLUG		TOPL	
			10	0	6	2 BAGS OF CEMENT		TOPL	.OAD
	DEPT	H (FT)	THICK	NESS		COLOR AND TYPE OF MATERIAL ENCOUN	TERED	WA	TER
	FROM	то	(F7	<u> </u>	(INCLI	JDE WATER-BEARING CAVITIES OR FRACT	TURE ZONES)	BEAR	ING?
	0	20	20			CALICHE WITH SILICATED LAYE	RS	☐ YES	☑ NO
	20	65	45	5	LIG	HT TAN SAND WITH SANDSTONE	LAYERS	YES	☑ NO
	TD	65						☐ YES	□ NO
	<u> </u>			<del></del>				YES	□ NO
ZL.							····	YES	□ NO
W.								YES	□ NO
3 01								☐ YES	□ №
10								YES	ОИ
GEOLOGIC LOG OF WELL								☐ YES	□ NO
010								YES	□ №
								☐ YES	□ NO
9								☐ YES	□ NO
						· · · · · · · · · · · · · · · · · · ·		☐ YES	□ NO
								☐ YES	□ NO
:								☐ YES	□ NO
	Ĺ							☐ YES	□ NO
								☐ YES	□ NO
:	<u></u>	<del>.</del>	ATTACH	ADDITION	AL PAGES AS NE	EDED TO FULLY DESCRIBE THE GEOLOGI	C LOG OF THE WELL		
			METHOD:	BAILE	R PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			-,1-2-
TEST & ADDITIONAL INFO	WELL	. TEST				PATA COLLECTED DURING WELL TESTING AND DRAWDOWN OVER THE TESTING PER		ME, END TI	МЕ,
NAI	LDDITIO		<u> </u>			AND DRAWDOWN OVER THE TESTING TER	300.		
TIO	ODOR		MENTS OR EXPL	ANATIONS:					
Iga	OBOIL	7,							
A AS									
EST									
7.7									
<u> </u>	701.5	DESCRIPTION	CD HERES	appropries :	TILLY TO THE ST	COT OF THE OR HER VAIOUR STORE AND SEL	ICE THE PORTONIA	C A TOUR	ND
RE	CORRE	CT RECOR	RD OF THE AE	<b>SOVE DESC</b>	RIBED HOLE AN	EST OF HIS OR HER KNOWLEDGE AND BEL D THAT HE OR SHE WILL FILE THIS WELL I	RECORD WITH THE ST	ATE ENGINE	EER AND
ATL	THE PE	RMHT HOL	DER WITHIN	20 DAYS A	FTER COMPLETI	ON OF WELL DRILLING:			
SIGNATURE	1	/ U Mon	Atten	. f s ().	1	4-20-09			
S.S		TITOR		RE OF PRIL	LER	DATE			
<u> </u>		<del></del>							

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER
LOCATION		PAGE 2 OF 2

## Soil Description

Columns

Depth (feet) 0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

### Monitor Well Details

60 Ft 2 Ft 65 Ft 65 Ft 53 Ft Length of PVC Well Screen\_ Thickness of Bentonite Seal Depth of Exploratory Well Ground Water Elevation Depth to Groundwater Depth of PVC Well, Date Drilled\_

DD

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

111

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

¥

Indicates samples selected for Laboratory Analysis.

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belled end joint, schedule 40 PVC pipe.

1

- The well is protected with a locked stick up steel cover and a compression cap. 6
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual
- 5. The depths indicated are referenced from below ground surface. (bgs)



## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA

May 9, 2009

TNM 97-04 Lea County, New Mexico Air Sparging Well AS-3

Plains Marketing, L.P.

**Boring Log And Monitor Well Details** 



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

<del>- :-</del>														
•	POD NUMB			BER)			·			OSE FILE NUM	(BER(S)			
ŏ	TNM 97	-04 A	·S-3		•									
Υ	WELL OWN									PHONE (OPTIO	ONAL)			
00	PLAINS	MAR	KETIN	NG LP										
1	WELL OWN	NER MAII	LING AD	DRESS	_					CITY		STATE		ZIP
νEι	333 CLA	AY ST	REET	, SUITE	1600					HOUSTO	N ·	TX	77	7078
20	WELL	<del></del>			DEGREES	М	INUTES	SECONE	OS .					
¥	LOCATION			10.5	32		55	57	00 N	* ACCURACY	REQUIRED: ONE TEN	NTH OF A SEC	COND	
1. GENERAL AND WELL LOCATION	(FROM G	-·· _	LATITU							* DATUM REC	UIRED: WGS 84			
NE	<u></u>		LONGIT		103		25		00 W					
5					ON TO STREET ADI		ND COMMON	LANDMA	RKS					
:-	GILLS	ROAD,	, LOV	INGTON	NM, LEA CO	)						•		
<del>-</del>	(2.5 ACR	RE)	(10	ACRE)	(40 ACRE)	<del></del>	(160 ACRE)	T	SECTION		TOWNSHIP		RANGE	
د	,	4		1/4	1/4		1/4					NORTH		Z EAST
N V	SUBDIVISION		E						LOT NUM	BER	BLOCK NUMBER	✓ souru	UNIT/TRA	.CT wiest
OPTIONAL			_							,			•	
o.	HYDROGR.	APHIC SU	URVEY								MAP NUMBER		TRACT N	JMBER
7		,												
+													1	
İ	LICENSE N		1		NSED DRILLER	_					NAME OF WELL DI			
		1478		45	STRAUB JI									
	DRILLING	STARTEI 4-09	טן ט	RILLING END 3-24-09	1		TED WELL (FT) 5	' ·		LE DEPTH (FT)	DEPTH WATER FII	CST ENCOUN	IEKED(FI)	
DRILLING INFORMATION	3-24	4-09		3-24-03			<del></del>				STATIC WATER LE		DI CTED WE	I.I. (Phys.)
ATI	COMPLETE	én äver r	1e. F	ARTESIAN	DRY H	JI F	✓ SHALLOW	V (I INCON	FINED)		STATIC WATER LE	VEL IN COM N/A		LL(FT)
.¥.			. 10.										·	
[ ]	DRILLING	FLUID:	[	✓ AIR	☐ MUD		ADDITIVE	ES - SPECI	FY:					
C	DRILLING	METHOD	D: [	ROTARY	П намм!	ER	CABLE TO	OOL	ОТНЕ	R - SPECIFY:				
	DEPT	H (FT)		BORE HOL	E	CAS	ING		CON	NECTION	INSIDE DIA.	CASING	G WALL	SLOT
RIL	FROM	то		DIA. (IN)			ERIAL			(CASING)	CASING (IN)		ESS (IN)	SIZE (IN)
3. D	65	63		6	SCH 40	PVC	.020 SCRE	EN		BE	2	0.	154	.020
	63	6		6	SCI	1 40 P	VC RISER			BE	2	0.	154	RISER
	6	+43	3	6	SCH 40	GALV	ANIZED ST	TEEL		VPT	2			
	DEPT	H (FT)	=	THICKNES	25	FORM	MATION DE	SCRIPTI	ON OF P	RINCIPAL W	ATER-BEARING S	STRATA		YIELD
Y	FROM	то	,	(FT)	,3						R FRACTURE ZO			(GPM)
STRATA				·····				<del></del>						
ST				<del></del>						·				
Z	-	-	_				<del></del>							
AR		<del>                                     </del>								***		<del></del>	***********	
BE	ļ ·	<del> </del>			<del></del>							<del></del>		
TE	LASTRION			TC VIEL D OF	WATER READING	CTDATA					TOTAL ESTIMATE	DWELL VIEL	D (GBM)	
WATER BEARING	METHOD	USED TO	ESTIMA	ILE TIELD OF	WATER-BEARING	AIAAIC					TOTAL ESTIMATE	D WELL TIEL	D (OFM)	
4							<del> </del>				<u> </u>			
•	FOR OS			JSE			DOD 3	II IM (DED			WELL RECO		i (Version 6	·/9/08)
-	FILENU				·		עלתטא	UMBER			TRN NUMB	CK	DAGE:	052
	LOCATI	ON											PAGE 1	UF2 I

F			SUBMER	SIBI F	☐ JET	☐ NO PUMP – WELL NOT EQUIPPED			
<u>4</u>	TYPE O	F PUMP:	☐ TURBINI		CYLINDER	OTHER - SPECIFY:			
P.		<del></del>				Gottler-Steeling		<del></del>	
SEAL AND PUMP	A NINI	JLAR	DEPTI- FROM	TO	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH PLACE	
AL	SEAL	, AND	65	60	6	3 BAGS OF 8/16 SAND		TOPL	.OAD
5. SF	GRAVE	L PACK	60	10	6	10 BAGS OF 3/8 PLUG		TOPL	OAD
			10	0	6	2 BAGS OF CEMENT		TOPL	.OAD
	DEPT	H (FT)	THICK	NESS	I	COLOR AND TYPE OF MATERIAL ENCOUNT	FRED	WA	rep
	FROM	то	(F7		i	JDE WATER-BEARING CAVITIES OR FRACTI		BEAR	
[ . ]	0	2	2			DARK BROWN SILTY CLAYEY SA	ND	☐ YES	Ø NO
	2	10	8			CALICHE (DENSE HARD LAYER	S)	☐ YES	Ø NO
	10	65	55	5		BROWN SILTY SAND		☐ YES	☑ NO
	TD	65						☐ YES	□NO
1				<del>,</del>	_			☐ YES	□NO
VEL								☐ YES	□NO
OF V								☐ YES	□NO
90	<u> </u>							☐ YES	□NO
CL								☐ YES	□ NO
00	ļ							YES	□ NO
6: GEOLOGIC LOG OF WELL					<del> </del>			☐ YES	□ NO
6. G								☐ YES	□ NO
					<del> </del>			☐ YES	□ NO
								☐ YES	□NO
							······································	☐ YES	□ NO
								YES	□NO
	<b></b>	ļ						YES	□NO
		l	ATTACH	ADDITION	IAL PAGES AS NE	EDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL		
==	<u> </u>		METHOD:	BAILE	R 🔽 PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			
AL INFO	WELL	_ TEST	TEST RESU	ILTS - ATTA	CH A COPY OF D	DATA COLLECTED DURING WELL TESTING,	INCLUDING START T	IME, END TI	ME,
IAL			AND A TAI	BLE SHOWI	NG DISCHARGE	AND DRAWDOWN OVER THE TESTING PERI	OD.		
Į į	ADDITIO	NAL STATE	MENTS OR EXPL	ANATIONS:		•			
7. TEST & ADDITION									
K Al	ĺ								
ST	}								
TE	İ								
	<u> </u>								
ы	THE UN	IDERSIGN	ED HEREBY	CERTIFIES	THAT, TO THE BI	EST OF HIS OR HER KNOWLEDGE AND BELII D THAT HE OR SHE WILL FILE THIS WELL RI	EF, THE FOREGOING	IS A TRUE A	ND EFR AND
8. SIGNATURE	THE PE	RMIT HOL	DER WITHIN	20 DAYS A	FTER COMPLETI	ON OF WELL DRILLING:			
GNA	of	<i>/</i>	A. PA	10	)_	4-20-09			
8. SI	1 April	MRON	SIGNATURE	RE OF BRIL	FR -				
			SIGNATUI	KE OF <b>W</b> KIL	LLK	DATE			

FOR OSE INTERNAL USE		WELL RECORD & LOG	(Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER	
LOCATION			PAGE 2 OF 2

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••••••••••••••

## Soil Description

Columns

Depth (feet) 0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

3-24-09 2 Ft 65 Ft 65 Ft 53 Ft 60 Ft Length of PVC Well Screen\_ Thickness of Bentonite Seal Depth of Exploratory Well. Ground Water Elevation Depth to Groundwater Depth of PVC Well\_ Date Drilled

DD

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen 

Indicates the PSH level measured on

Indicates the groundwater level measured on

Indicates samples selected for Laboratory Analysis.

3/26/09

Z

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual
- The depths indicated are referenced from below ground surface. (bgs) 5.



TNM 97-04 Lea County, New Mexico

Plains Marketing, L.P.

**Boring Log And Monitor Well Details** Air Sparging Well AS-4

## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA

May 9, 2009



LOCATION

### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

-					<del></del>						
	POD NUMB		•				OSE FILE NUM	MBER(S)			
Ŏ.	TNM 97	-04 AS	i <b>-4</b>								
ΑTI	WELL OWN	IER NAME	(S)				PHONE (OPTIO	ONAL)			
<u>oc</u>	PLAINS	MARK	ETING LP								
LL	WELL OWN	VER MAILI	NG ADDRESS				CITY		STATE	·	ZIP
EL.	333 CLA	Y STR	EET, SUITE	1600			ноизто	N	TX	77	7078
× 0					<del>,</del>						
AN	WELL	.		DEGREES	MINUTES SECO						
AL.	LOCATIO	تــا	ATITUDE	32	55 5	7.00 <sub>N</sub>		REQUIRED: ONE TEN	ITH OF A SEC	COND	
ER	(FROM G	PS)	ONGITUDE	103	25 13	3.00 W	• DATUM REC	QUIRED: WGS 84			
I. GENERAL AND WELL LOCATION	DESCRIPTI	ION RELAT	ING WELL LOCATI	ION TO STREET ADDRE	SS AND COMMON LANDM	IARKS	<del></del>				
1.0				NM, LEA CO	, , , , , , , , , , , , , , , , , , , ,						
:	(2.5 ACR	(E)	(10 ACRE)	(40 ACRE)	(160 ACRE)	SECTION		TOWNSHIP	NORTH	RANGE	✓ EAST
7	· /	4	1/4	1/4	1/4				✓ SOLUL		WEST
OPTIONAL	SUBDIVISION	ON NAME			I <del>.</del>	LOT NUM	BER	BLOCK NUMBER		UNIT/TRA	
Ţ										ļ	
2. 01	HYDROGRA	APHIC SUR	VEY			l		MAP NUMBER		TRACT N	JMBER
7											
<u> </u>				· · · · · · · · · · · · · · · · · · ·	·					<u></u>	
:	LICENSE N		1	ENSED DRILLER				NAME OF WELL DR			
i	WD.	1478	RAYMONI	D STRAUB JR				STRAUB CO	RPORAT	ION	
i	DRILLING		DRILLING EN	1	PLETED WELL (FT)	i	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	TERED (FT)	
Z	3-24	4-09	3-24-09	9	65		65				
Ţ					F-3			STATIC WATER LE	VEL IN COM	PLETED WEI	LL (FT)
Ψ¥	COMPLETE	ED-WELL IS	S: ARTESIAI	N DRY HOLE	SHALLOW (UNCO	NFINED)		·	N/A	•	
DRILLING INFORMATION	DRILLING	FLIBD:	<b>√</b> AIR	MUD	ADDITIVES - SPE	CIFY:					
Z			✓ ROTARY		CABLE TOOL		D ODDOLEY		·	·	
Z S	DRILLING	METHOD:		HAMMER		OLHE	R - SPECIFY:		<del></del>	-	
1	DEPT	H (FT)	BORE HOI	- 1	CASING	1	NECTION	INSIDE DIA.	1	3 WALL	SLOT
DRI	FROM	TO	DIA. (IN)	) M	ATERIAL	TYPE	(CASING)	CASING (IN)	THICKN	IESS (IN)	SIZE (IN)
ω,	65	63	6	SCH 40 P	VC .020 SCREEN		BE	2	0.1	154	.020
	63	6	6	SCH 4	0 PVC RISER		BE	2	0.1	154	RISER
:	6	+43	6	SCH 40 GA	LVANIZED STEEL	1	VPT	2			
i									L		. =
-	DEPT	H (FT)	THICKNE	99 F	ORMATION DESCRIP	TION OF P	RINCIPAL W	ATER-BEARING S	TRATA		YIELD
<b>*</b>	FROM	то	(FT)		(INCLUDE WATER						(GPM)
. A.1	110111	10			·			· ·			
STI		<del> </del>							<del></del>		
S									<del></del>		
BEARING STRATA	<del> </del>	<del> </del>									
	-	<del>                                     </del>	·				·····	<del></del>			
WATER		l									<u> </u>
AT	METHOD	USED TO E	STIMATE YIELD OF	F WATER-BEARING STR	ATA			TOTAL ESTIMATE	O WELL YIEL	.D (GPM)	
3.											
· •	ì							L			
4	<u> </u>										
- 4	FOR OS	E INTERI	NAL USE					WELL RECO	RD & LOG	(Version 6	/9/08)

PAGE I OF 2

							·		
MP	TYPE OF	PUMP:	☐ SUBMER ☐ TURBINI		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED☐ OTHER – SPECIFY:			
SEAL AND PUMP	431311	17.40	DEPTH FROM	TO	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METHO PLACE	
AL,	ANNU SEAL	AND	65	60	6	2 BAGS OF 8/16 SAND		TOPL	.OAD
S. SE	GRAVE	L PACK	60	10	6	12 BAGS OF 3/8 PLUG		TOPL	.OAD
			10	0	6	2 BAGS OF CEMENT		TOPL	.OAD
	DEPT	H (FT) TO	THICK (FT		1	COLOR AND TYPE OF MATERIAL ENCOUN JDE WATER-BEARING CAVITIES OR FRAC		WA <sup>2</sup> BEAR	
	0	1	1			DARK BROWN CLAYEY SANI	 )	☐ YES	☑ NO
	1	10	9			CALICHE (DENSE LAYERS)		☐ YES	☑ NO
	10	62	52	2		TAN CALCIFIED SAND SANDSTO	ONE	☐ YES	Ø NO
	62	65	3			TAN SAND		☐ YES	☑ NO
ادا	TD	65						☐ YES	□ NO
/ELI								☐ YES	□NO
JF W								☐ YES	 □ NO
96 (				<del></del>				☐ YES	□ NO
CE						·		YES	□ NO
6. GEOLOGIC LOG OF WELL								YES	□ NO
EOL								☐ YES	□ NO
6: G								☐ YES	□ NO
	_						,	☐ YES	 □ NO
						A		☐ YES	□NO
					,			YES	□ NO
								YES	□ NO
		<del> </del>					1	☐ YES	□ NO
		<u> </u>	ATTACH	ADDITION	IAL PAGES AS N	EEDED TO FULLY DESCRIBE THE GEOLOGI	C LOG OF THE WELL	<u> </u>	
<b> </b>									
5 G	WELL	_ TEST	METHOD:	BAILE		☐ AIR LIFT ☐ OTHER - SPECIFY:	DICK LIDING STADT T	ME END T	
TEST & ADDITIONAL INFO	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					DATA COLLECTED DURING WELL TESTING AND DRAWDOWN OVER THE TESTING PER	,	IME, END II	ME,
or	[		MENTS OR EXPL	ANATIONS:					
Ligg	ODOR	50.							
×									
ST	}								
7. TE									
	<u> </u>								
ä	CORRE	CT RECO	RD OF THE A	BOVE DESC	RIBED HOLE AN	EST OF HIS OR HER KNOWLEDGE AND BEL D THAT HE OR SHE WILL FILE THIS WELL I	IEF, THE FOREGOING I RECORD WITH THE ST	S A TRUE A ATE ENGINI	ND ER AND
T.	THE PE	вміт но	LDER WITHIN	20 DAYS	AFTER COMPLET	ON OF WELL DRILLING:			
SIGNATURE	1	/	114	1.0		4-12 26			•
8. SI	Tay	Morle	SICHARI	RE OF ORIL	Z-L	<u> </u>			
		·····	SIGNATU	KE UFØKIL	.LEK	DATE			
-									

FOR OSE INTERNAL USE		WELL RECORD & LOG	(Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER	
LOCATION			PAGE 2 OF 2

### Soil Description

Columns

Depth (feet) 0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

	3-24-03
Thickness of Bentonite Seal 60	60 Ft
enath of PVC Well Screen 2	2 Ft
	65 Ft
y Well	65 Ft
	53 Ft

Grout Surface Seal



Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

¥

Indicates samples selected for Laboratory Analysis.

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- 5. The depths indicated are referenced from below ground surface. (bgs)

Safety and environmental

## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA

May 9, 2009

TNM 97-04 Lea County, New Mexico **Boring Log And Monitor Well Details** 

Air Sparging Well AS-5

Plains Marketing, L.P.



<u> </u>																<del></del>
	POD NUMB	ER (WE	LL NL	IMBER)							0.9	SE FILE NUN	1BER(S)			
NO O	TNM 97	-04 A	\S-5	<b>;</b>												
E	WELL OWN	VER NAN	1E(S)							<del></del>	PF	HONE (OPTIC	ONAL)			
: <u> </u>	<b>PLAINS</b>	MAR	ΚE	TING LP							1					
	WELL OWN										+-	ITY		STATE		ZIP
E				ET, SUITE	1600						- 1	OUSTO	N	TX	7	7078
3	000 017		1 11		1000		<del>- ; -</del>									
	WELL	.			DEG	REES	MIN	UTES	SECO	NDS						
1	LOCATIO	ON	LAT	TTUDE		32		55	5	7.00 N	•	ACCURACY	REQUIRED; ONE TE	NTH OF A SE	COND	
ER	(FROM G	PS)	LON	IGITUDE		103		25	1:	3.00 W	۱• ا	DATUM REC	UIRED: WGS 84			
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FOR OSE INTERNAL USE			WELL RECORD & LOC	(Version 6/9/08)
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1 10 9 CALICHE (DENSE LAYERS)										
DEPTH (FT)  10 0 6 2 BAGS OF CEMENT TOPLOAD  DEPTH (FT)  THICKNESS  COLOR AND TYPE OF MATERIAL ENCOUNTERED  WATER BEARING  0 1 1 1 DARK BROWN SANDY CLAY  1 10 0 9 CALICHE (DENSE LAYERS)  10 25 15 TAN CALICHE (DENSE LAYERS)  25 65 40 TAN SANDSTONE PYES 2  25 65 40 TAN SANDSTONE (SOFT)  TD 65  TD 65  TAN SANDSTONE (SOFT)  YES 2  YES 2  YES 3  YES 4  YES 5  ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL  WELL TEST  METHOD BAILER PUMP AIR LIFT OTHER SPECIFY:  TEST RESULTS. ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.  THE PURP STATE HEADOW DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:	JMP	TYPE OI	PUMP:							
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DEPTH (FT) THICKNESS COLOR AND TYPE OF MATERIAL ENCOUNTERED WATER FROM TO (FT) (INCLUDE WATER BEARING CAVITIES OR FRACTURE ZONES) BEARING (PT) (INCLUDE WATER BEARING CAVITIES OR FRACTURE ZONES) BEARING (PT) (INCLUDE WATER BEARING CAVITIES OR FRACTURE ZONES) PER BEARING (PT) (INCLUDE WATER BEARING CAVITIES OR FRACTURE ZONES) PER BEARING (PT) (INCLUDE WATER BEARING CAVITIES OR FRACTURE ZONES) PER BEARING (PT) (INCLUDE WATER BEARING CAVITIES OR FRACTURE ZONES) PER BEARING (PT) (PT) (PT) (PT) (PT) (PT) (PT) (PT)		GRAVE	L PACK	60	10	6	10 BAGS OF 3/8 PLUG		TOPL	OAD
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1 10 9 CALICHE (DENSE LAYERS)		0	1	1	-		DARK BROWN SANDY CLAY		☐ YES	☑ NO
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WELL TEST  METHOD: BAILER IPUMP AIR LIFT OTHER-SPECIFY:  TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.  ADDITIONAL STATEMENTS OR EXPLANATIONS:  ODOR 50'  THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND SHEW THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING.	OF V								<del> </del>	□ NO
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WELL TEST  METHOD: BAILER IPUMP AIR LIFT OTHER-SPECIFY:  TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.  ADDITIONAL STATEMENTS OR EXPLANATIONS:  ODOR 50'  THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND SHEW THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  **HAMMEN AND ASSOCIATED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING.	EOL			<u> </u>					<del></del>	□NO
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ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL    METHOD   BAILER   PUMP   AIR LIFT   OTHER - SPECIFY:   TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.    ADDITIONAL STATEMENTS OR EXPLANATIONS:   ODOR 50'						.,,		<del> </del>	<del> </del>	□NO
ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL    YES						<del>                                     </del>			<del></del>	□ NO
ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL    YES									<del></del>	□ NO
ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL    WELL TEST								<del></del>	<del> </del>	□ NO
ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL    METHOD:   BAILER   PUMP   AIR LIFT   OTHER - SPECIFY:   TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.    ADDITIONAL STATEMENTS OR EXPLANATIONS: ODOR 50'		<u> </u>							<del> </del>	□ NO
WELL TEST    METHOD:   BAILER   PUMP   AIR LIFT   OTHER - SPECIFY:		<del> </del>		ATTACH	ADDITION	IAL PAGES AS NEI	EDED TO FULLY DESCRIBE THE GEOLOGIC	L OG OF THE WELL	L 163	
WELL TEST  TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.  ADDITIONAL STATEMENTS OR EXPLANATIONS:  ODOR 50'  THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER ATTHE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  ###################################		<u> </u>						- EOG OF THE WELL	<del></del>	
THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AT THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  4-20-09	INFO	WELL	. TEST	TEST RESU	LTS - ATTA	ACH A COPY OF DA	ATA COLLECTED DURING WELL TESTING,	INCLUDING START TI	ME, END TI	ме,
THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AT THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  4-20-09	NAL	I DOUTION	141.07170			TO DISCHARGE A	NO DRAWDOWN OVER THE TESTING LEAD			
THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AT THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  4-20-05	& ADDITIO	1		MENTS OR EXPL	ANATIONS:					
CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AT THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:  4-20-09	7. TEST							200		
SIGNATURE OF DRILLER DATE	IGNATURE	CORRE	CT RECOR	RD OF THE AE	<b>BOVE DESC</b>	RIBED HOLE AND	THAT HE OR SHE WILL FILE THIS WELL R ON OF WELL DRILLING:	EF, THE FOREGOING I ECORD WITH THE STA	S A TRUE A ATE ENGINE	ND EER AND
	8. S	19	HATCH	SIGNATUR	RE OF DRIL	LER	DATE			
	<u> </u>	<u> </u>								

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER
LOCATION		PAGE 2 OF 2
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### Soil Description

Columns

Depth (feet) 0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

### Monitor Well Details

Thickness of Bentonite Seal 60 Ft  Length of PVC Well Screen 2 Ft  Depth of PVC Well 65 Ft  Depth of Exploratory Well 65 Ft  Control of Control	Date Drilled	3-24-09
	hickness of Bentonite Seal_	60 Ft
	enath of PVC Well Screen	2 Ft
	Septh of PVC Well	65 Ft
	epth of Exploratory Well	65 Ft
	Depth to Groundwater	53 Ft

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

Indicates samples selected for Laboratory Analysis.

3/26/09

Ϋ́

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- The monitor well was installed on date using air rotary drilling techniques.
- The well was constructed with 2" ID, 0.020 inch factory slotted, belled end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- The depths indicated are referenced from below ground surface. (bgs) 5

NOW safety and environmental

NOVA Safety and Environmental

Checked By: RKR Drawn By: TA

May 9, 2009

TNM 97-04 Lea County, New Mexico **Boring Log And Monitor Well Details** Air Sparging Well AS-6 Plains Marketing, L.P.



NO	POD NUMB			•					OSE FILE NUM				
OCAT	WELL OWN PLAINS			ING LP					PHONE (OPTIO	ONAL)			
GENERAL AND WELL LOCATION	333 CLA			ADDRESS ET, SUITE	1600				CITY HOUSTO	N	STATE TX	77	ZIP 7078
AND	WELL				DEGREES	MINUTES	SECO						
AL	LOCATIO	1	LAT	TUDE	32	55	57	7.00 N		REQUIRED: ONE TEN	TH OF A SEC	COND	
NER	(FROM G	PS)	LON	GITUDE	103	25	13	3.00 W	* DATUM REC	QUIRED: WGS 84	<del></del>		
I. GE	ţ.				ON TO STREET ADDRE	SS AND COMMON L	ANDM	IARKS			· · · · · ·		
1	(2.5 ACR	E)		(10 ACRE)	(40 ACRE)	(160 ACRE)		SECTION		TOWNSHIP	NORTH	RANGE	[] EAST
AL		4		1/4	1/4	1/4					Sourn		west
OPTIONAL	SUBDIVISION	ON NAM	E					LOT NUM	BER	BLOCK NUMBER		UNIT/TRA	СТ
2. OP	HYDROGR	APHIC S	URVE	Y				<u> </u>		MAP NUMBER		TRACT NU	JMBER
_		. 1.,											
	LICENSE N				NSED DRILLER					NAME OF WELL DR			
		1478		· · · · · · · · · · · · · · · · · · ·	STRAUB JR	IN CASE DIGIT (CAS)		Lagravia	E DESCRIPTION	STRAUB COF			
_	DRILLING:	STARTE 5-09	.U	3-25-09		PLETED WELL (FT)		ł	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	TEKED (FI)	
ĮŽ.		<del></del>						L		STATIC WATER LE	VEL IN COM	PLETED WEI	LL (FT)
DRILLING INFORMATION	COMPLETE	D WELI	L 1S:	ARTESIAN	DRY HOLE	SHALLOW	(UNCC	NFINED)			N/A		
NFO	DRILLING	FLUID:		✓ AIR	MUD	ADDITIVES	S – SPE	CIFY:				<u>.</u> .	
S	DRILLING	метно	D:	✓ ROTARY	HAMMER	CABLE TO	OL	OTHE	R - SPECIFY:				
ILLI	<del></del>	H (FT)		BORE HOL		CASING		1	NECTION	INSIDE DIA. CASING (IN)	II.	G WALL IESS (IN)	SLOT SIZE (IN)
3. DR	FROM 65	TC		DIA. (IN)		IATERIAL VC .020 SCREI	ENI	L	(CASING) BE	2	ļ	154	.020
т.	63	6		6		0 PVC RISER	LIN	<u> </u>	BE	2		154	RISER
!	6	+4		6		LVANIZED ST	EEL	<b></b>	NPT	2	-		
<u>.</u>													
	DEPT	H (FT)		THICKNES	SS F	ORMATION DES	CRIP	TION OF P	RINCIPAL W	ATER-BEARING S	TRATA		YIELD
4TA	FROM	TC	)	(FT)		(INCLUDE WA	ATER-	BEARING	CAVITIES O	R FRACTURE ZON	IES)		(GPM)
STR													
SC	-												<u> </u>
ARI										<del></del>		<del></del>	
R BE						·····		<del></del>					
WATER BEARING STRATA	METHOD (	JSED TO	ESTI	MATE YIELD OF	WATER-BEARING STR	ATA				TOTAL ESTIMATE	D WELL YIE	LD (GPM)	
4. W.											<del></del>		
:	FOR OSI	E INTE	RNA	L USE						WELL RECO	RD & LOC	G (Version 6	/9/08)

POD NUMBER

TRN NUMBER

PAGE 1 OF 2

FILE NUMBER

LOCATION

			SUBMER	CIDI E	□ JET	D NO BUMB. WELL NOT FOURDED			
16	TYPE O	PUMP:	☐ TURBIN		☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED ☐ OTHER – SPECIFY:			
V.V.					CYLINDER	U OTHEK - SPECIFY:			
SEAL AND PUMP	ANNI	JLAR	DEPTH FROM	TO	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH PLACE	OD OF MENT
EAL	SEAL	AND	65	60	6	2 .5 BAGS OF 8/16 SAND		TOPL	.OAD
5. SI	GRAVE	L PACK	60	10	6	12 BAGS OF 3/8 PLUG		TOPL	.OAD
			10	0	6	2 BAGS OF CEMENT		TOPL	OAD
	DEPT	H (FT)	THICK	NESS		COLOR AND TYPE OF MATERIAL ENCOUNT	ERED	IVA:	FED
	FROM	то	(F1			UDE WATER-BEARING CAVITIES OR FRACTI		BEAR	
	0	1	1			DARK BROWN SANDY CLAY		YES	Ø NO
	1	9	8			CALICHE (DENSE LAYERS)		☐ YES	☑ NO
	9	20	1	1		HARD SILICATED CALICHE		☐ YES	Ø NO
	20	62	42	2		TAN CALCIFIED SANDSTONE		☐ YES	☑ NO
۱	62	65	3			TAN SAND		☐ YES	☑ NO
VEL	TD	65					<del></del>	☐ YES	□ №
JR V			<u> </u>					☐ YES	NO
90								☐ YES	□ NO
GEOLOGIC LOG OF WELL								YES	□ NO
5	ļ							+	
000								YES	□ NO
				············				YES	□ NO
٥								YES	□ NO
	ļ		<u> </u>					☐ YES	□ NO
		·						☐ YES	□ NO
							···	☐ YES	□ NO
								☐ YES	□ NO
								☐ YES	□ио
			ATTACH	ADDITION	IAL PAGES AS NE	EEDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL		
	Ī		METHOD:	BAILE	R 🖸 PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:		<del></del>	
INFO	WELL	. TEST	TEST RESU	LTS - ATTA	ACH A COPY OF D	DATA COLLECTED DURING WELL TESTING, AND DRAWDOWN OVER THE TESTING PERIO	NCLUDING START T	IME, END T	ME,
VAL					NG DISCHARGE	AND DRAWDOWN OVER THE TESTING FERM			
l Ö	ADDITIO	NAL STATE	MENTS OR EXPL	ANATIONS:					
7. TEST & ADDITION									
K A									:
TS.	ĺ						•		
7. T									
	<u> </u>			<u></u>					
8. SIGNATURE	CORRE	CT RECO	ED OF THE A	BOVE DESC	RIBED HOLE AN	EST OF HIS OR HER KNOWLEDGE AND BELII D THAT HE OR SHE WILL FILE THIS WELL RI ION OF WELL DRILLING:	EF, THE FOREGOING ECORD WITH THE ST	IS A TRUE A ATE ENGINI	ND EER AND
ΥĀΤ	1	l lion	0 11	. /	7 .	ion of wass sussine.			
5	Las	MAN	Hottsan		<i>l</i> <sub>1</sub> .	4-20-09			
80	47	HERVEL	SIGNATUI	RE OF DOLL	LER	DATE	•		
<u> </u>	<del></del>			······································					

FOR OSE INTERNAL USE

FILE NUMBER

POD NUMBER

WELL RECORD & LOG (Version 6/9/08)

TRN NUMBER

LOCATION

PAGE 2 OF 2

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### Soil Description

Columns

Depth (feet) 0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

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### Monitor Well Details

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Thickness of Bentonite Seal	60 Ft
Lenath of PVC Well Screen	2 Ft
Depth of PVC Well	65 Ft
Depth of Exploratory Well	65 Ft
Depth to Groundwater	53 Ft
Ground Water Elevation	

Bentonite Pellet Seal

Grout Surface Seal



Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

Z Z

Indicates samples selected for Laboratory Analysis

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- The monitor well was installed on date using air rotary drilling techniques.
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- 5. The depths indicated are referenced from below ground surface. (bgs)



## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA

May 9, 2009

TNM 97-04 Lea County, New Mexico

Plains Marketing, L.P.

Boring Log And Monitor Well Details Air Sparging Well AS-7



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

NO	TNM 97		L NUMBER) S-7					OSE FILE NUM	ABER(S)			
GENERAL AND WELL LOCATION	WELL OWN		E(S) KETING LP					PHONE (OPTIO	ONAL)			
: <u>-</u>	WELL OWN	ER MAIL	ING ADDRESS					CITY	<del></del>	STATE		ZIP
EL	333 CLA	Y STE	REET, SUITE 1	1600				HOUSTO	N	TX	77	7078
≩								1100010		1/		
Z	WELL			DEGREES	MINUTES	SECO	NDS	]				
	LOCATIO	ON	LATITUDE	32	55	5 57	7.00 N	* ACCURACY	REQUIRED: ONE TEN	TH OF A SEC	COND	
ા∄	(FROM G	_	LATITODE	400				* DATUM REC	QUIRED: WGS 84			
E Z			LONGITUDE	103	25		3.00 W	<u></u>				
GE	DESCRIPT	ON RELA	TING WELL LOCATION	ON TO STREET ADDRES	SS AND COM	MON LANDM	ARKS					
	GILLS F	ROAD,	LOVINGTON	NM, LEA CO								
$\pm \neg$	(2.5 ACR	E)	(10 ACRE)	(40 ACRE)	(160	ACRE)	SECTION		TOWNSHIP		RANGE	
ا دا	<i>'</i>	,	1/4	1/4		<b>1/4</b>				NORTH		Z EAST
Z Z	SUBDIVISION			74		74	LOTATION	1050		✓ south	LINETTO	west
2	2080141211	UN NAMI	=				LOT NUM	IBEK	BLOCK NUMBER		UNIT/TRA	CI
OPTIONAL					_							
2, 0	HYDROGR	APHIC SU	IRVEY						MAPNUMBER		TRACT NU	MBER
		v*)										
╧╾			1 22245 051 105	NORO DAN COR					l			
!	LICENSE N		NAME OF LICE						NAME OF WELL DR			
	WD.	1478	RAYMONL	STRAUB JR	-				STRAUB COF	RPORAI	ION	
1	DRILLING	STARTEC	DRILLING END	ED DEPTH OF COM	PLETED WE	LL (FT)	BORE HO	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	TERED (FT)	
z	3-24	4-09	3-24-09		65			65				
DRILLING INFORMATION	COMPLETE	D WELL	IS: ARTESIAN	DRY HOLE	✓ sh⁄	ALLOW (UNCO	NFINED)		STATIC WATER LEV	EL IN COM		.L (FT)
OR			✓ AIR	MUD		D			L			
Z	DRILLING	FLUID:				DITIVES - SPE	CIFY:					
္ခ်င္	DRILLING	METHOD	: ✓ ROTARY	HAMMER	L CAI	BLE TOOL	ОТНЕ	R - SPECIFY:				
בו	DEPT	H (FT)	BORE HOL	E (	CASING		CON	NECTION	INSIDE DIA.	CASINO	WALL	SLOT
1112	FROM	то	DIA. (IN)		ATERIAL			(CASING)	CASING (IN)		ESS (IN)	SIZE (IN)
3. DI	65	63		SCH 40 P\	/C .020 S	CREEN		BE	2	0.	154	.020
	63	6	6	SCH 40	PVC RI	SER		BE	2	0.1	154	RISER
	6	+43	6	SCH 40 GA	LVANIZE	D STEEL		NPT	2			
=				<del></del>		<del></del>						
ا ۾ اِا		H (FT)	THICKNES	S F					ATER-BEARING S			YIELD
STRATA	FROM	то	(FT)		(INCLU	DE WATER-	BEARING	CAVITIES	R FRACTURE ZON	ES)		(GPM)
2												
Z												
A.												
BE:				_		<del> </del>			·			
WATER BEARING	ļ	L										
AT	METHOD I	JSED TO	ESTIMATE YIELD OF	WATER-BEARING STR	ATA				TOTAL ESTIMATED	WELL YIEL	D (GPM)	
	1					•						
4	<u>l</u>				<u></u>				<u> </u>			
:		_										
:			RNAL USE		<del></del>				WELL RECO		(Version 6	/9/08)
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	LOCATI	ON									PAGE I	OF 2

JMP	TYPE O	F PUMP:	SUBMER TURBINI		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED ☐ OTHER – SPECIFY:			
SEAL AND PUMP	ANNI	JLAR	DEPTH FROM	TO	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH PLACE	
EAL	SEAL	AND	65	60	6	2 .5 BAGS OF 8/16 SAND		TOPL	.OAD
5. S.	GRAVE	L PACK	60	10	6	10 BAGS OF 3/8 PLUG		TOPL	.OAD
			10	0	6	2 BAGS OF CEMENT		TOPL	.OAD
	DEPT	H (FT)	THICK	NESS		COLOR AND TYPE OF MATERIAL ENCOUNT	ERED	WA	TER
	FROM	то	(F7	<b>r</b> )	(INCL	UDE WATER-BEARING CAVITIES OR FRACT	URE ZONES)	BEAR	ING?
	0	1	1			DARK BROWN SANDY CLAY		☐ YES	☑ NO
	1	10	9	)		CALICHE (DENSE LAYERS)		☐ YES	☑ NO
	10	26	16	3		CALCIFIED SANDSTONE		☐ YES	☑ NO
	26	65	23	3		TAN SAND		☐ YES	☑ NO
ا بــ	TD	65						☐ YES	□ NO
VEL	<del></del>			<del></del>			· · · · · · · · · · · · · · · · · · ·	☐ YES	□NO
OF \				···-				☐ YES	□ №
90								☐ YES	□ №
ICL							· · · · · · · · · · · · · · · · · · ·	YES	□ NO
507								☐ YES	□ №
GEOLOGIC LOG OF WELL								☐ YES	□NO
6.6								☐ YES	□NO
								☐ YES	□NO
	-							☐ YES	□NO
				<del></del>				☐ YES	□NO
				· ··			······································	☐ YES	□NO
							····	☐ YES	□NO
		<u> </u>	ATTACH	ADDITION	IAL PAGES AS N	EEDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL		
			METHOD:	☐ BAILE	ER 🗹 PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			
INFO	WELI	_ TEST	TEST RESU	LTS - ATTA	ACH A COPY OF E	DATA COLLECTED DURING WELL TESTING, AND DRAWDOWN OVER THE TESTING PERI		ME, END TI	ме,
NAL					ING DISCHARGE	AND DRAWDOWN OVER THE TESTING LERI	<del>ор</del> .		
TEST & ADDITION	ADDITIO	NAL STATE	MENTS OR EXPL	ANATIONS:					l
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7. T									
	L				THAT TO THE D	COT OF HIS OF HER WHOM FOCE AND DELL	THE CORPORATE	C A TOUE A	
R E	CORRE	CT RECOR	RD OF THE A	BOVE DESC	RIBED HOLE AN	EST OF HIS OR HER KNOWLEDGE AND BELII D THAT HE OR SHE WILL FILE THIS WELL R	ECORD WITH THE STA	ATE ENGINE	ER AND
ATT.	THE PE	RMIT HOI	DER WITHIN	120 DAYS A	AFTER COMPLET	ON OF WELL DRILLING:			
SIGNATURE	1	/ 4.4 m.a. a. a	D. He	1,2	1 .	4-20-09			
8. SI	AR	HINTK	SIGNATII	RE OF DRIL	LER	DATE			
<u> </u>			5,5,7,7,0,						

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER
LOCATION		PAGE 2 OF 2

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### Soil Description

Columns

Depth (feet) 0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

Date Drilled	3-24-09
Thickness of Bentonite Seal	60 Ft
Lenath of PVC Well Screen	2 Ft
Depth of PVC Well	65 Ft
Depth of Exploratory Well	65 Ft
Depth to Groundwater	53 Ft
Ground Water Elevation	

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates samples selected for Laboratory Analysis

Indicates the groundwater level measured on

3/26/09

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Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- The monitor well was installed on date using air rotary drilling techniques.
- The well was constructed with 2" ID, 0.020 inch factory slotted, belled end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- 5. The depths indicated are referenced from below ground surface. (bgs)

Safety and environmental

## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA

May 9, 2009

TNM 97-04 Lea County, New Mexico

Plains Marketing, L.P.

**Boring Log And Monitor Well Details** Air Sparging Well AS-8



LOCATION

### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

									<u> </u>			
	POD NUMBE		•				OSE FILE NUM	MBER(S)				
ő	TNM 97-											
Y.	WELL OWN	•	•				PHONE (OPTIC	ONAL)				
			ETING LP									
:1	WELL OWN						CITY		STATE		ZIP	
WE	333 CLA	YSIR	EET, SUITE 1	600			HOUSTON TX 77078				7078	
N N	WELL			DEGREES	EGREES MINUTES SECONDS							
L'A	LOCATIO	N L	ATITUDE	32	55 5	7.00 <sub>N</sub>	ACCURACY REQUIRED: ONE TENTH OF A SECOND					
GENERAL AND WELL LOCATION	(FROM GP	PS)	ONGITUDE	103	25 1	3.00 W	* DATUM REC	QUIRED: WGS 84				
EN	DESCRIPTION	ON RELAT	ING WELL LOCATIO	N TO STREET ADDRES			<u> </u>					
1. (	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS GILLS ROAD, LOVINGTON NM, LEA CO											
† 7	(2.5 ACRI	E)	(10 ACRE)	(40 ACRE)	(160 ACRE)	SECTION		TOWNSHIP	NORTH	RANGE	Z HAST	
J.	1/4		1/4	1/4	1/4				SOUTH		west	
ON	SUBDIVISIO	N NAME	<u> </u>			LOT NUM	MBER	BLOCK NUMBER		UNIT/TRA	СТ	
OPTIONAL												
2.0	HYDROGRA	PHIC SUR	VEY					MAPNUMBER		TRACT NU	JMBER	
	LICENSE NU	MBER	NAME OF LICEN	SED DRILLER			· · · · · · · · · · · · · · · · · · ·	NAME OF WELL DR	ILLING CON	1PANY		
	WD1	478	RAYMOND	STRAUB JR				STRAUB COF	RPORAT	TION		
i	DRILLING S	. W	DRILLING END	ED DEPTH OF COM	BORE HO	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	TERED (FT)			
Z	3-25	5-09	3-25-09		<u> </u>	65						
DRILLING INFORMATION	COMPLETE	D WELL IS	: ARTESIAN	DRY HOLE	ONFINED)	STATIC WATER LEVEL IN COMPLETED WELL (FT)  N/A				LL (FT)		
FOI	DRILLING F	LUID:	✓ AIR	MUD	ADDITIVES - SPI	ECIFY:						
N S	DRILLING	METHOD:	<b>✓</b> ROTARY	HAMMER	CABLE TOOL	П отн	ER - SPECIFY:					
Ž	DEPTI	H (FT)	BORE HOLE		CASING	CON	NECTION	INSIDE DIA.	CASING	G WALL	SLOT	
RIL	FROM	ТО	DIA. (IN)		CASING CONI			CASING (IN)		IESS (IN)	SIZE (IN)	
3. D	65	63	6	SCH 40 P\	/C .020 SCREEN	1	BE	2	0.	154	.020	
	63	6	, 6	SCH 40	PVC RISER		BE	2	0.	154	RISER	
	6	+43	6	SCH 40 GA	LVANIZED STEEL		NPT	2				
								<u> </u>	<u> </u>			
	DEPT	H (FT)	THICKNESS	S F	ORMATION DESCRIP	TION OF	PRINCIPAL W	ATER-BEARING S	TRATA		YIELD	
TA	FROM	TO	(FT)		(INCLUDE WATER	L-BEARING	CAVITIES O	R FRACTURE ZON	IES)		(GPM)	
R A												
G S.												
Z									,			
3E.A												
ER E											<u> </u>	
4. WATER BEARING STRATA	METHOD (	SED TO E	STIMATE YIELD OF	WATER-BEARING STR	ATA	*		TOTAL ESTIMATED	WELL YIE	LD (GPM)		
4. ¥												
:	FOR OUT	INTERN	IAI IICE			-		WELL RECO	RD & 1 OC	(Version 6	./9/08)	
:	FOR OSE		IAL USE		POD NUMB	ER .		TRN NUMBI			, ,, ,, ,	
:	LOCATION							1		PAGE I	OF 2	

ď	TYPE O	F PUMP:	☐ SUBMER		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED ☐ OTHER – SPECIFY:			
SEAL AND PUMP			DEPTH (FT)		BORE HOLE	MATERIAL TYPE AND SIZE	AMOUNT	метне	
( Y		JLAR	FROM	TO	DIA. (IN)		(CUBIC FT)	PLACE	
SEA	SEAL GRAVE		65	60	6	2 BAGS OF 8/16 SAND	<u> </u>	TOPL	
νĠ		•	60 10	10 0	6	12 BAGS OF 3/8 PLUG		TOPL	
			<u> </u>		6	1 BAGS OF CEMENT		TOPL	.UAD
	DEPTH (FT) FROM TO		THICKI (FT		1	COLOR AND TYPE OF MATERIAL ENCOUNT JDE WATER-BEARING CAVITIES OR FRACT		WA <sup>2</sup> BEAR	
	0 1		1			DARK BROWN SILTY CLAY		☐ YES	☑ NO
	1	20	19	)		CALICHE (DENSE LAYERS)	<del></del>	☐ YES	☑ NO
	20	64	44			TAN CALCIFIED SANDSTONE		☐ YES	☑ NO
;	64	65	1			TAN SAND	· ·	YES	☑ NO
ا د	TD	65						☐ YES	☑ NO
VEL						· · · · · · · · · · · · · · · · · · ·		☐ YES	□NO
OF V				-				☐ YES	□ NO
90								☐ YES	□ NO
1C L							<del> </del>	YES	□ NO
GEOLOGIC LOG OF WELL		-						☐ YES	□ NO
EO			<u> </u>					☐ YES	□NO
9.6		-						☐ YES	□NO
					:			☐ YES	□NO
:	· · · · · · ·						· · · · · · · · · · · · · · · · · · ·	☐ YES	□NO
				······································				☐ YES	□ NO
	<u> </u>							☐ YES	□ NO
								YES	□ NO
		·	ATTACH	ADDITION	IAL PAGES AS NE	EDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL	•	
			METHOD:	□BAILE	R PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			
INFO	WELL	. TEST	TEST RESU	LTS - ATTA	ACH A COPY OF D	PATA COLLECTED DURING WELL TESTING,	INCLUDING START TI	ME, END TI	ME,
TEST & ADDITIONAL IN			<u> </u>		NG DISCHARGE	AND DRAWDOWN OVER THE TESTING PERI	OD.		
Į	ADDITIO	NAL STATE	MENTS OR EXPL	ANATIONS:					
D D									
K A							•		
EST						•			
7. T									
=	I				TILL TO TO THE TOTAL THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE	COT OF USE OF USE OF USE	DR THE PARTS OF IT	0.4.001	
- X	CORRE	CT RECOR	RD OF THE AB	OVE DESC	RIBED HOLE AN	EST OF HIS OR HER KNOWLEDGE AND BELI D THAT HE OR SHE WILL FILE THIS WELL R	EF, THE FOREGOING I ECORD WITH THE STA	S A TRUE A ATE ENGINI	ND EER AND
TT	THE PE	RMIT HOI 1	DER WITHIN	20 DAYS A	AFTER COMPLETI	ON OF WELL DRILLING:			
8. SIGNATURE	1	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0. H.	1.0.		4-20-09			
∞. S.	1 THE	IYN THA	SIGNATUR	E OF DRIL	LER	DATE			
<u></u>			2.0	7 5.00					

FOR OSE INTERNAL USE		WELL RECORD & LOC	(Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER	
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# Recovery Well RW-2

## Soil Description

Columns

Depth (feet) 0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

Monitor Well Details 25 Ft 53 Ft 33 Ft 65 Ft 65 Ft Length of PVC Well Screen\_ Thickness of Bentonite Seal, Bentonite Pellet Seal Grout Surface Seal Depth of Exploratory Well Ground Water Elevation Depth to Groundwater Depth of PVC Well, Sand Pack Date Drilled

Completion Notes

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Head-space reading in ppm obtained with a photo-ionization detector.

Indicates samples selected for Laboratory Analysis.

Indicates the groundwater level measured on

3/26/09

Ϋ́

Indicates the PSH level measured on

Screen

. The monitor well was installed on date using air rotary drilling techniques.

 The well was constructed with 2" ID, 0.020 inch factory slotted, belled end joint, schedule 40 PVC pipe. 3. The well is protected with a locked stick up steel cover and a compression cap.

 The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.

5. The depths indicated are referenced from below ground surface. (bgs)

boundanes. Actual dansillons may be gradual.

5. The deputs indicated are referenced from bolow ground surface



NOVA Safety and Environmental

Drawn By: TA Checked By: RKR May 9, 2009

Boring Log And Monitor Well Details Recovery Well RW-2 TNM 97-04 Lea County, New Mexico Plains Marketing, L.P.



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

TLAC	ZIP 77078  NGE
GILLS ROAD, LOVINGTON NM, LEA CO  (2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP NORTH SOUTH SUBDIVISION NAME  LOT NUMBER BLOCK NUMBER UNIT	77078  NGE
GILLS ROAD, LOVINGTON NM, LEA CO  (2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP NORTH SOUTH SUBDIVISION NAME  LOT NUMBER BLOCK NUMBER UNIT	77078  NGE
GILLS ROAD, LOVINGTON NM, LEA CO  (2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP NORTH SOUTH SUBDIVISION NAME  LOT NUMBER BLOCK NUMBER UNIT	77078  NGE
GILLS ROAD, LOVINGTON NM, LEA CO  (2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP NORTH SOUTH SUBDIVISION NAME  LOT NUMBER BLOCK NUMBER UNIT	NGE Z EAST  WEST  T/TRACT
GILLS ROAD, LOVINGTON NM, LEA CO  (2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP NORTH SOUTH SOUTH VALUE OF A DIVISION NAME  LOT NUMBER BLOCK NUMBER UNIT	✓ EAST  WEST  T/TRACT
GILLS ROAD, LOVINGTON NM, LEA CO  (2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP NORTH SOUTH SUBDIVISION NAME  LOT NUMBER BLOCK NUMBER UNIT	✓ EAST  WEST  T/TRACT
GILLS ROAD, LOVINGTON NM, LEA CO  (2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP NORTH SOUTH SOUTH VALUE OF A DIVISION NAME  LOT NUMBER BLOCK NUMBER UNIT	✓ EAST  WEST  T/TRACT
GILLS ROAD, LOVINGTON NM, LEA CO  (2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP NORTH SOUTH SUBDIVISION NAME  LOT NUMBER BLOCK NUMBER UNIT	✓ EAST  WEST  T/TRACT
GILLS ROAD, LOVINGTON NM, LEA CO  (2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP NORTH SOUTH SUBDIVISION NAME  LOT NUMBER BLOCK NUMBER UNIT	✓ EAST  WEST  T/TRACT
(2.5 ACRE)	✓ EAST  WEST  T/TRACT
SUBDIVISION NAME  LOT NUMBER  BLOCK NUMBER  UNY  WARREN  WARRE	✓ EAST  WEST  T/TRACT
SUBDIVISION NAME  LOT NUMBER  BLOCK NUMBER  UNIT	T/TRACT
	T/TRACT
	.CT NUMBER
	CT NUMBER
LICENSE NUMBER NAME OF LICENSED DRILLER NAME OF WELL DRILLING COMPANY	,
WD1478 RAYMOND STRAUB JR STRAUB CORPORATION	l
DRULLING STARTED DRILLING ENDED DEPTH OF COMPLETED WELL (FT) BORE HOLE DEPTH (FT) DEPTH WATER FIRST ENCOUNTERED	)(FT)
z 3-25-09 3-26-09 65 65	
STATIC WATER LEVEL IN COMPLETE	D WELL (FT)
SHALLOW (UNCONFINED)  N/A	
STATIC WATER LEVEL IN COMPLETE   COMPLETED WELL IS:	
DRILLING METHOD: ROTARY HAMMER CABLE TOOL OTHER - SPECIFY:	
DEPTH (FT) BORE HOLE CASING CONNECTION INSIDE DIA. CASING WA	LL SLOT
FROM TO DIA (IN) MATERIAL TYPE (CASING) CASING (IN) THICKNESS (	
65 40 7 SCH 40 PVC .010 SCREEN FJ 4 0.154	0.10
40 +43 7 SCH 40 PVC RISER FJ 4 0.154	RISER
DEPTH (FT) THICKNESS FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA	YIELD
	(GPM)
\frac{1}{2}   \frac{1}{2}	
[S]	
RIN	
JE A	
38 S	
FROM TO (FT) (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)  WETHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA  TOTAL ESTIMATED WELL YIELD (GP)	M)
*	

FOR OSE INTERNAL USE	WELL RECORD & LOG (Version					
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LOCATION				PAGE 1 OF 2		

d	TYPE O	F PUMP:	SUBMER		☐ JET	☐ NO PUMP – WELL NOT EQUIPPED					
I M			TURBINI	<u> </u>	CYLINDER	OTHER – SPECIFY:					
SEAL AND PUMP	A NINI	JLAR	DEPTH FROM	(FT)	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH PLACE			
SAL	SEAL	AND	65	37	7	11 BAGS 20/40 SAND		TOPL	OAD		
5. SI	GRAVE	L PACK	37	2	7	7 BAGS OF 3/8 PLUG		TOPL	OAD		
			2	0	7	1 BAGS OF CEMENT		TOPLOAD			
	DEPT		THICKNESS (FT)		l	COLOR AND TYPE OF MATERIAL ENCOUNTERED			WATER BEARING?		
	FROM	TO			(INCL)	(INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)					
	0	1	1			DARK BROWN SILTY CLAY		☐ YES	☑ NO		
	1	12	11			DENSE CALICHE LAYERS		☐ YES	☑ NO		
	12 20 8 SILICATED CALICHE LAYERS						☐ YES	☑ NO			
	20	65	45	5		TAN CALCIFIED SAND		☐ YES	Ø NO		
-	TD	65						☐ YES	□ NO		
WE								☐ YES	□ NO		
OF								☐ YES	□NO		
500								☐ YES	□NO		
IC I								☐ YES	□NO		
GEOLOGIC LOG OF WELL								☐ YES	□ NO		
EO								☐ YES	□ NO		
6.0								☐ YES	□NO		
								☐ YES	□NO		
								☐ YES	□NO		
								YES	□NO		
								☐.YES	□NO		
			<u> </u>					☐ YES	□ NO		
		L	ATTACH	ADDITION	AL PAGES AS NE	EDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL	L <del></del>			
<u> </u>											
INFO	WELL	TEST	METHOD:	BAILE		☐ AIR LIFT ☐ OTHER - SPECIFY:	LOLUDDIO OD LODO				
			AND A TAB	LIS - ATTA	NG DISCHARGE	ATA COLLECTED DURING WELL TESTING, II AND DRAWDOWN OVER THE TESTING PERIO	D.	ME, END 11 	ме, 		
TEST & ADDITIONAL	ŀ		MENTS OR EXPL	ANATIONS:							
DIT	HYDR	OCARB	ON 50'			•					
AD											
ST &											
TE											
7.											
(c)	THE UN	DERSIGN	ED HEREBY (	CERTIFIES T	THAT, TO THE BE	ST OF HIS OR HER KNOWLEDGE AND BELIE	F, THE FOREGOING IS	A TRUE A	ND		
] E						D THAT HE OR SHE WILL FILE THIS WELL RE ON OF WELL DRILLING:	CORD WITH THE STA	TE ENGINE	ER AND		
8. SIGNATURE		,	0 11	, 0		,					
SIG	Jan	nouk	Strace	ch) I	٠	4-20-09					
×	·./	- p - <del> p - p +</del>	SIGNATUR	E OF RILI	ER	DATE					
		-									

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)				
FILE NUMBER	POD NUMBER	TRN NUMBER				
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# Recovery Well RW-3

## Soil Description

Columns

Depth (feet) Monitor Well Details

25 Ft 65 Ft 65 Ft 53 Ft

33 Ft

Thickness of Bentonite Seal, Length of PVC Well Screen\_

Date Drilled

Depth of Exploratory Well.

Depth of PVC Well,

Ground Water Elevation Depth to Groundwater

0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

Bentonite Pellet Seal Sand Pack

Grout Surface Seal

DD

Screen

Indicates the PSH level measured on

3/26/09

ž

Indicates the groundwater level measured on

Indicates samples selected for Laboratory Analysis.

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

53 - 65' - Sand, brown, very fine grained, saturated with depth

- The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- 5. The depths indicated are referenced from below ground surface. (bgs)

TNM 97-04 Lea County, New Mexico Boring Log And Monitor Well Details Plains Marketing, L.P. Recovery Well RW-3



## NOVA Safety and Environmental

Checked By: RKR May 9, 2009 Drawn By: TA



FILE-NUMBER

LOCATION

### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

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<u> </u>											4				
	POD NUMB	-		•		· · · · · · · · · · · · · · · · · · ·					OSE FILE NUM	MBER(S)		<del></del>	
NO.	TNM 97		_ •	3											
ZAT	WELL OWN										PHONE (OPTIONAL)				
07				TING LP											
T	WELL OWN				4000						CITY		STATE		ZIP
WE	333 CLA	17 51	KE	ET, SUITE	1600	) 					HOUSTON TX 770			7078	
SN	WELL				DE	GREES MINUTES SECONDS									
AL.	LOCATIO	L L	LAT	ITUDE		32		55	57.	.00 N		REQUIRED: ONE TEN	TH OF A SEC	COND	
GENERAL AND WELL LOCATION	(FROM GPS)		LON	GITUDE		103		25	13	.00 W	* DATUM REC	QUIRED: WGS 84			
GE	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS														
<b>-</b> -	GILLS ROAD, LOVINGTON NM, LEA CO														
	(2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP RANGE														
دا							02011011		70,111,51,111	NORTH	10000	Ø HAST			
A N	SUBDIVISION NAME							LOT NUM	BER	BLOCK NUMBER	✓ south	UNIT/TRA	CT WEST		
OPTIONAL	SUBDIVISION NAME														
2.01	HYDROGRA	APHIC S	URVE	Y					l			MAPNUMBER		TRACT NU	JMBER
<del>-</del>	LICENSE N	UMBER		NAME OF LICE	ENSED	DRILLER						NAME OF WELL DR	ILLING CON	APANY	
i	WD.	1478	l	RAYMONI	D ST	RAUB JR					STRAUB CORPORATION				
	DRILLING	STARTE	D	DRILLING EN	DED	DEPTH OF COM	PLETED	WELL (FT)		BORE HOL	DLE DEPTH (FT) DEPTH WATER FIRST ENCOUNTERED (FT)				
z	3-2	5-09		3-26-09	9	65 65			CTATIONATED LOUIS IN COLUMN STEEL WAS A						
\TIC								(Divide)	STATIC WATER LEVEL IN COMPLETED WELL (FT)						
RM,	COMPLETED WELL IS: ARTESIAN DRY HOLE SHALLOW (UNCONFINED)									N/A					
INFORMATION	DRILLING	FLUID:		<b>✓</b> AIR		MUD	$\Box$	ADDITIVES	S – SPEC	IFY:	·				
Ş	DRILLING METHOD:			HAMMER CABLE TOOL OTHE			HER - SPECIFY:								
<u> </u>	DEPT	H (FT)		BORE HOI	LE	CASING			CONNECTION		INSIDE DIA.	CASIN	G WALL	SLOT	
DRILLING	FROM	TC	)	DIA. (IN)	) [	MATERIAL			TYPE	(CASING)	CASING (IN)	THICKN	ESS (IN)	SIZE (IN)	
ا	65	40	)	7		SCH 40 PVC .010 SCREEN				FJ	4	<del> </del>	154	0.10	
	40	+4	3	7		SCH 4	PVC	RISER			FJ	4	0.	154	RISER
		<u> </u>											-		
	<u> </u>	l			l							L	<u></u>		L
		H (FT)		THICKNE (FT)	ss	F						ATER-BEARING S R FRACTURE ZON			YIELD (GPM)
STRATA	FROM	TC		. (61)		<del></del>	(INC	LUDE WA	A I EK-E	DEAIGING	CAVITIES O	K FRACTORE ZON			(01 141)
BEARING											<del></del>				
A.R.													<u> </u>	· · · · · · · · · · · · · · · · · · ·	
BE						<u></u>									
WATER	METHODI	USED TO	FSTI	MATE VIELD OF	WATE	R-BEARING STR.	ATA					TOTAL ESTIMATE	O WELL YIE	LD (GPM)	L
*			,,,											- ·•	
4	<u></u>											L			
	FOR OS	E INTF	RNA	L USE								WELL RECO	RD & LOC	G (Version 6	5/9/08)
	FOR OSE INTERNAL USE  FILE-NUMBER  POD NUMBER  WELL RECORD & LOG (Version 6/9/08  TRN NUMBER														

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<u>a</u>	TYPEO	F PUMP;	SUBMER		☐ JET	☐ NO PUMP – WELL NOT EQUIPPED						
SEAL AND PUMP			TURBINI		CYLINDER	OTHER – SPECIFY:						
9 02			DEPTH	(FT)	BORE HOLE	MATERIAL TYPE AND SIZE	AMOUNT	METH				
L.A.		JLAR	FROM	TO	DIA. (IN)		(CUBIC FT)	PLACE				
SEA	SEAL GRAVE		65	37	7	11 BAGS 20/40 SAND		TOPL				
vi.			37	0	7 8 BAGS OF 3/8 PLUG 7 1 BAGS OF CEMENT			TOPLOAD TOPLOAD				
				U	<del>                                     </del>	1 BAGS OF CEMENT		TOPL	.UAD			
	DEPT	<del></del>	THICK		1	COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)						
	FROM	ТО	(FT	, 	(INCLE							
	0	1	1	<del></del>	<u> </u>	DARK BROWN SILTY CLAY		YES	☑ NO			
	1	9	8			CALICHE		YES	☑ NO			
	9	18	9			SILICATED CALICHE		☐ YES	☑ NO			
	18	65	47	<del></del>		TAN SAND		YES	☑ NO			
רר	TD	65						☐ YES	☑ NO			
WE								☐ YES	☑ NO			
, OF								☐ YES	☑ NO			
707								☐ YES	☑ NO			
GIC								YES	☑ NO			
GEOLOGIC LOG OF WELL							·	☐ YES	☑ NO			
GEC								☐ YES	Ø NO			
و ا								☐ YES	☑ NO			
								☐ YES	☑ NO			
								☐ YES	☑ NO			
								☐ YES	☑ NO			
								☐ YES	□ NO			
								☐ YES	□NO			
	ATTACH ADDITION				IAL PAGES AS NE							
		-	METHOD:	BAIL	ER PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:						
INFO	WELI	TEST		. — —		ATA COLLECTED DURING WELL TESTING, I	NCLUDING START T	ME, END TI	ME.			
						ND DRAWDOWN OVER THE TESTING PERIO	• •					
NO NO	ADDITIO	NAL STATE	MENTS OR EXPL	ANATIONS:								
TEST & ADDITIONAL	ADDITIONAL STATEMENTS OR EXPLANATIONS: HYDROCARBON 50'											
k AD			•									
ST.8												
.7.	<u> </u>			_ <del></del> -								
	THE UN	DERSIGN	ED HEREBY (	CERTIFIES	THAT, TO THE BE	ST OF HIS OR HER KNOWLEDGE AND BELIE	F, THE FOREGOING I	S A TRUE A	ND			
8. SIGNATURE	THE PE	CT KECOF RMI <b>J</b> CHOI	DER WITHIN	20 DAYS	KIBED HOLE AND AFTER COMPLETION	) THAT HE OR SHE WILL FILE THIS WELL RE ON OF WELL DRILLING:	COKD WITH THE STA	ALE ENGINE	EK AND			
Y Z	1		1/1	- 1		,						
SIG	Xa	ymor	A Stra	uli	Ja	1-20-09						
∞		7	SÍĞNATUR	RE OF DR	ZER	DATE						

FOR OSE INTERNAL USE	<u> </u>	WELL RECORD & LOG (Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER
LOCATION		PAGE 2 OF 2

# Recovery Well RW-4

## Soil Description

Columns

Depth (feet) 0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

Date Drilled	3-25-09
Thickness of Bentonite Seal	33 Ft
Length of PVC Well Screen	25 Ft
Depth of PVC Well	65 Ft
Depth of Exploratory Well	65 Ft
Depth to Groundwater	53 Ft
Ground Water Elevation	

DD

Grout Surface Seal



Sand Pack

Screen

111

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

Ž

Indicates samples selected for Laboratory Analysis

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- 1. The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual
- 5. The depths indicated are referenced from below ground surface. (bgs)



## NOVA Safety and Environmental

Checked By: RKR

May 9, 2009

TNM 97-04 Lea County, New Mexico Plains Marketing, L.P.

Boring Log And Monitor Well Details Recovery Well RW-4



FOR OSE INTERNAL USE

FILE NUMBER

LOCATION

<del></del>							· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·				
	POD NUMB	-	•				OSE FILE NUI	MBER(S)				
O	TNM 97-	.04 RW	<i>l</i> -4					·		•		
٩ŢĨ	WELL OWN	ER NAME	(S)	-			PHONE (OPTI	ONAL)				
OC	<b>PLAINS</b>	MARK	ETING LP									
LL	WELL OWN	ER MAILI	NG ADDRESS				CITY		STATE	·	ZIP	
EL	333 CLA	Y STR	REET, SUITE	1600			HOUSTO	N	TX	77	7078	
W C												
N	WELL	1		DEGREES		SECONDS		ACCURACY REQUIRED: ONE TENTH OF A SECOND				
Ţ.	LOCATIO	ו אכ	ATITUDE	32	55	57.00 N		-	TH OF A SEC	COND		
ER	(FROM GI	PS)	ONGITUDE	103	25	13.00 W	* DATUM RE	QUIRED: WGS 84				
GENERAL AND WELL LOCATION	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS											
1. Č	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS  GRILL ROAD											
:												
	(2.5 ACR	E)	(10 ACRE)	(40 ACRE)	(160 ACRE)	SECTION	l	TOWNSHIP		RANGE		
ابا	<i>y</i> .	.	1/4	1/4	1/4				☐ MORTH		✓ EAST  west	
N.	SUBDIVISIO				L	LOT NU	MBER	BLOCK NUMBER	<u> </u>	UNIT/TRA		
OPTIONAL					r	ļ						
Ö	HYDROGRA	APHIC SUI	RVEY					MAP NUMBER		TRACT NU	JMBER	
7												
<u> </u>	l									<u> </u>		
	LICENSE N		I	ENSED DRILLER				NAME OF WELL DI				
;	WD <sup>2</sup>	1478	RAYMON	D STRAUB JR			STRAUB CORPORATION					
:	DRILLING S		DRILLING EN	ł	PLETED WELL (FT)	BORE H	LE DEPTH (FT) DEPTH WATER FIRST ENCOUNTERED (FT)					
Z	3-26	5-09	3-26-09	9	65		65					
TIC					STATIC WATER LEVEL IN COMPLETED WELL (FT)				LL (FT)			
MA	COMPLETED WELL IS: ARTESIAN DRY HOLE SHALLOW (UNCONFINED)											
DRILLING INFORMATION	DRILLING FLUID: AIR MUD ADDITIVES - SPECIFY:											
Z	DRILLING FLUID: AIR MUD ADDITIVES - SPECIFY:											
ပ္ခ	DRILLING METHOD: ROTARY HAMMER CABLE TOOL OTHER - SPECIFY:											
[ : ]	DEPT	H (FT)	BORE HO	LE	CASING CON			INSIDE DIA.		G WALL	SLOT	
IR.	FROM	TO	DIA. (IN	) M	ATERIAL	TYPI	E (CASING)	CASING (IN)	THICK	VESS (IN)	SIZE (IN)	
3.1	65	40	7	SCH 40 P	VC .010 SCREE	EN	FJ	4	0.	154	0.10	
;	40	+43	7	SCH 4	0 PVC RISER		FJ	4	0.	154	RISER	
									}			
:				·								
	DEPT	H (FT)	THICKNE	cc F	OPMATION DESC	CDIDTION OF	DDINCIDAL W	ATER-BEARING S	TRATA		YIELD	
4	FROM	ТО	(FT)	33 '				R FRACTURE ZO			(GPM)	
STRATA	FROM	10			(							
STR		-										
9												
8	ļ	<u></u>										
BE.4												
R.											L <u></u>	
ATI	METHOD	JSED TO E	ESTIMATE YIELD O	F WATER-BEARING STR	ATA		<del></del>	TOTAL ESTIMATE	D WELL YIE	LD (GPM)		
4. WATER BEARING								1				
4	<u> </u>							<u> </u>				
	EUD US	E INTED	NAL USE					WELL RECO	ORD & L.O.C	G (Version 6	/9/08)	
	LUA UA										<del> ,</del>	

POD NUMBER

TRN NUMBER

PAGE 1 OF 2

MP	TYPE O	F PUMP:	☐ SUBMEF		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED ☐ OTHER – SPECIFY:			
SEAL AND PUMP			DEPTH FROM	<del></del>	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH: PLACE	
AL.A		JLAR AND	65	37	7	11 BAGS 20/40 SAND	(cobie i i)	TOPL	
	1	L PACK	37	2	7	9 BAGS OF 3/8 PLUG		TOPLOAD	
vá.			2	0	7	1 BAGS OF CEMENT		TOPL	
	DEPT	H (FT)	TUICE	CKNESS COLOR AND TYPE OF MATERIAL ENCOUNTERED		· · · · · · · · · · · · · · · · · · ·			
	FROM	то	(F)		1	UDE WATER-BEARING CAVITIES OR FRACTI		WA' BEAR	
	0	1	1		D/	ARK BROWN SILTY CLAY WITH CO	BBLES	☐ YES	☑ NO
	1	18	17	7 .		DENSE CALICHE		☐ YES	☑ NO
	18	40	22	2		TAN SAND		☐ YES	☑ NO
	40	65	25	5		TAN SAND ( SOFT SANDSTONE	)	☐ YES	☑ NO
ر ا	TD	65					·	☐ YES	□ NO
NEI.						-		☐ YES	□NO
040								☐ YES	□NO
90	<del>-</del>			<del></del>				☐ YES	□NO
101								☐ YES	□·NO
903						· · · · · · · · · · · · · · · · · · ·		☐ YES	□NO
GEOLOGIC LOG OF WELL								☐ YES	□NO
6.0								☐ YES	□NO
								☐ YES	□ NO
								☐ YES	□NO
							*	☐ YES	□NO
								☐ YES	□NO
								☐ YES	□NO
		J	ATTACH	ADDITION	IAL PAGES AS NI	EEDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL	1	
			METHOD:	BAILE	R 🖸 PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			-
AL INFO	WELI	_ TEST	TEST RESU	JLTS - ATTA	CH A COPY OF I	DATA COLLECTED DURING WELL TESTING, AND DRAWDOWN OVER THE TESTING PERI		ME, END TI	IME,
	ADDITIO	NAI STATE	MENTS OR EXPL					·	
TEST & ADDITION	1		ON 18-40 (						
7. Ti									
8. SIGNATURE	CORRE	CT RECO	RD OF THE AIL LDER WITHIN	BOVE DESC 1 20 DAYS A	RIBED HOLE AN AFTER COMPLET	EST OF HIS OR HER KNOWLEDGE AND BELI D THAT HE OR SHE WILL FILE THIS WELL R ION OF WELL DRILLING:  4-20-09	EF, THE FOREGOING I ECORD WITH THE STA	S A TRUE A ATE ENGIN	ND EER AND
×6			SIGNATU	RE OF ARIL	LER	DATE			
	<del></del>								

FOR OSE INTERNAL USE	WELL RECORD & LOG (Version 6/9/08)		
FILE NUMBER	POD NUMBER	TRN NUMBER	
LOCATION			PAGE 2 OF 2

APPENDIX C: NMOCD C-141 Form

DISTRICT I P.O. BOX 1980, HOBBS, NM 88241-1980

SUBMIT 2 COPIES TO APPROPRIATE DISTRICT OFFICE IN ACCORDANCE WITH RULE 116 PRINTED ON BACK SIDE OF FORM

### OIL CONSERVATION DIVISION

DISTRICT II F.O. DRAWER DD, ARTESIA, NM 88211-0719

P.O. Box 2088 Santa Fe. New Mexico 87504-2088 Initial Report

DISTRICT III
1000 Rie Bruzos Rd, Aztro, NM 87410 SPILLS, LEAKS, AND BLOWOUTS

*			ADDRESS				TELEPHONE (915) 947-9000
REPORT	FIRE	BREAK	P. O. Box 6002 SPILL	LEAK X	BLOWOUT	OTHER	
of Type of	DRLG	PROD	TANK	PIPE LINEX	GASO PLANT	OIL RFY	OTHER.
FACILITY	WELL	WELL	BIRI	א פוושו ו	or 1 & Lorse	1.4	and the second second
FACILITY N	AMZ: 4" gather	rus rme	18. A 18. A 18.	SEC.	TWP.	RCE.	COUNTY
Otr/Otr Sec. o	OF FACILITY or Footage, SW/	48W/4 9 8/	4 5E/4	10- 11	113- 167	35E	Lea
DISTANCE A	NO DIRECTION	FROM NEARE	ST mest of Lovington	i. Ki di selatan mengera a meng	gran t	en en en en en en en en en en en en en e	<u></u>
DATE AND H	IOUR		IDATI	AND HOUR	April 16, 1997	4:00 p.m.	
OF OCCURR WAS IMMED	ENCE Unknown	YES !	O NOTE	B- 11	YES.		
NOTICE GIV	ZN?		्रिणस	DX I	O WHOM Wayne DATE AND H	OUR	
BY WHOM BI	) Charman (repor	ed that quantity r	nay be more than 10	berrels)	April 25, 1997	9:00 a.m.	New York of the Company of the Compa
TYPE OF	are-ja	a a	QUANTITY OF LOSS	1,000		VOLUME RECOVERED	None
FLUID LOST	Sweet Crude	State and the	NO	QUANTITY			
DID ANY FLI A WATERCO	UIDS REACH	YES	X			<u> </u>	
		TEW AND REA	EDIAL ACTION	AKEN**			
DYSCRIBE C	AUSE OF PROB	THOUSE NO CO. TOWN.					
	AUSE OF PROP						
External Corro	sion. Leak succes	sfully clamped of				<u> </u>	
External Corro DESCRIBE A	REA AFFECTE	sfully clamped of D AND CLEANT cland. Will rem	f. TP ACTION TAKE Ediate on site.	NA®.	lssped when quanti	y is determined.	
External Corro DESCRIBE A Approximately *Originally est DESCRIPTIO	REA AFFECTS 1500 sq.ft. pastur	sfully clamped of D AND CLEANT cland. Will rem	P ACTION TAKE  diate on site.  gation. An amended  GRAZING	NA®.	issued when quanti	y is determined.	
External Corro DESCRIBE A Approximately *Originally est DESCRIPTIO OF AREA	REA AFFECTS 1500 sq.ft. pastur	sfully clamped off D AND CLEANT c land. Will remains.	PACTION TAKE  diate on site.  gation. An amended	report will be	ROCKY	y is determined.	DRY SNO
External Corro DESCRIBE A Approximately Originally es DESCRIPTIO OF AREA SURFACE	REA AFFECTS  1500 sq.ft. pastur  imated at 10 barre  ON	afully clamped off  AND CLEAN  cland. Will remails. Under investil  FARMING  SANDY	pation. An amended GRAZING X SANDY LOAM	report will be URBAN	ROCKY	WET	
External Corro DESCRIBE A Approximately *Originally est DESCRIPTIO OF AREA SURFACE CONDITION	PEA AFFECTS  1500 sq.ft. pastur  imated at 10 barre  N. L. CONI	ofully clamped of D AND CLEANUC land. Will remails. Under investing FARMING SANDY	Ediate on site.  gention. An amended  GRAZING  X	report will be URBAN CLAY ATURE, FRE	ROCKY X CIPITATION, ET	C.)**	DRY SNC

\*SPECIFY
State Corp. Commission Pipe Line Division

Hazardous Waste Section

NM Environmental Improvement Div.

TNM-97-04



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E. 5002 Basin Street, Suite A1 6015 Harris Parkway, Suite 110

Lubbock, Texas 79424 El Paso, Texas 79922 Midland, Texas 79703 Ft. Worth, Texas 76132

800 • 378 • 1296 888 • 588 • 3446 806 • 794 • 1296 915 • 585 • 3443 432 • 689 • 6301

FAX 806 • 794 • 1298 FAX 915 - 585 - 4944 - FAX 432 • 689 • 6313

817 \* 201 \* 5260

E-Mail: lab@traceanalysis.com

### Certifications

WBENC:

237019

HUB:

1752439743100-86536

**DBE:** VN 20657

NCTRCA

WFWB38444Y0909

### **NELAP Certifications**

Lubbock:

T104704219-08-TX

LELAP-02003

Kansas E-10317

El Paso: T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

### Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: September 16, 2010

Work Order:

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
243703	Post-Carbon	water	2010-09-02	13:30	2010-09-03

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 28 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

### Standard Flags

 $\boldsymbol{B}\,$  - The sample contains less than ten times the concentration found in the method blank.

### Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-09-03 and assigned to work order 10090707. Samples for work order 10090707 were received intact without headspace and at a temperature of 3.7 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	$\operatorname{Prep}$	QC	Analysis
Test	Method	Batch	Date	Batch	Date
Ag, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Al, Total	$S_{010C}$	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
As, Total	$S_{010C}$	62910	2010-09-09 at 08:12	73359	2010-09-09 at $13:59$
Ba, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
BTEX	S 8021B	62854	2010-09-07 at 07:58	73276	2010-09-07 at $07:58$
B, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Cd, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Co, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Cr, Total	S 6010C	62910	2010-09-09 at $08:12$	73359	2010-09-09 at $13:59$
Cu, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Fe, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Hg, Total	S 7470A	62883	2010-09-08 at 09:41	73330	2010-09-08 at 14:11
Mn, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Mo, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Ni, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
PAH	S 8270D	63094	2010-09-09 at 15:00	73544	2010-09-15 at 23:44
Pb, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Se, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Zn, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10090707 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend

Page Number: 4 of 28 Lovington, NM

### **Analytical Report**

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch:

Al, Total

73359

Prep Batch: 62910

Analytical Method:

S 6010C

Date Analyzed: 2010-09-09 Sample Preparation: 2010-09-09

Prep Method: Analyzed By:

S 3010A RRPrepared By: KV

RL

Parameter	Flag	Result	Units	Dilution	RL
Total Aluminum		0.533	mg/L	1	0.0500

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch:

B, Total 73359

Analytical Method: Date Analyzed: Prep Batch: 62910

S 6010C 2010-09-09 Sample Preparation: 2010-09-09 Prep Method: S 3010A Analyzed By: RRPrepared By: KV

RL

Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\operatorname{RL}$
Total Boron		0.105	m mg/L	1	0.0100

Sample: 243703 - Post-Carbon

Laboratory:

Lubbock

BTEX Analysis: QC Batch: 73276 Prep Batch: 62854

Analytical Method: Date Analyzed:

S 8021B 2010-09-07 Sample Preparation: 2010-09-07 Prep Method: S 5030B Analyzed By: ER

Prepared By: ER

RL

Parameter	Flag	Result	Units	Dilution	RL
Benzene		< 0.00100	mg/L	1	0.00100
Toluene		< 0.00100	m mg/L	1	0.00100
Ethylbenzene		< 0.00100	m mg/L	1	0.00100
Xylene		< 0.00100	m mg/L	1	0.00100

					Spike	$\operatorname{Percent}$	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0931	mg/L	1	0.100	93	78.4 - 113
4-Bromofluorobenzene (4-BFB)		0.0977	$\mathrm{mg/L}$	1	0.100	98	81.5 - 121

Report Date: September 16, 2010 TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend

Page Number: 5 of 28 Lovington, NM

Sample: 243703 - Post-Carbon

Laboratory: Analysis:

QC Batch:

Prep Batch:

Lubbock

Co, Total 73359

62910

Analytical Method: Date Analyzed:

S 6010C 2010-09-09 2010-09-09 Prep Method: Analyzed By:

S 3010A RRPrepared By: KV

RL

Sample Preparation:

Parameter Flag Result Units Dilution RLTotal Cobalt 0.00500 < 0.00500 mg/L

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: Cu, Total QC Batch: 73359

Analytical Method:

Date Analyzed:

S 6010C 2010-09-09 Prep Method: S 3010A

Analyzed By: RRPrepared By: KV

Prep Batch: 62910

RT

		1 (12			
Parameter	Flag	Result	Units	Dilution	RL
Total Copper		<0.00500	mg/L	1	0.00500

Sample Preparation: 2010-09-09

Sample: 243703 - Post-Carbon

Laboratory:

Lubbock

Fe, Total Analysis: QC Batch: 73359 Prep Batch: 62910

Analytical Method: Date Analyzed:

S 6010C 2010-09-09 Sample Preparation: 2010-09-09 Prep Method: S 3010A Analyzed By:

RRPrepared By: KV

KV

RLParameter Flag Result Units Dilution RLTotal Iron 0.1190.0100 mg/L

Sample: 243703 - Post-Carbon

Laboratory:

Lubbock

Analysis: Mn, Total QC Batch: 73359 Prep Batch: 62910

Analytical Method: Date Analyzed:

S 6010C 2010-09-09 Sample Preparation: 2010-09-09 Prep Method: S 3010A Analyzed By: RR

Prepared By:

RL

Parameter RLFlag Result Units Dilution 0.1970.00250Total Manganese mg/L

TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend

Page Number: 6 of 28

Lovington, NM

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch: Mo, Total 73359

Analytical Method: Date Analyzed:

S 6010C 2010-09-09 Prep Method: Analyzed By:

1

S 3010A RR

Prep Batch:

62910

Sample Preparation:

2010-09-09

Prepared By: KV

RL

Parameter Total Molybdenum Flag Result < 0.0100

UnitsDilution mg/L

RL

0.0100

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch: Ni, Total 73359

Analytical Method:

S 6010C 2010-09-09 Prep Method: S 3010A

RR

Prep Batch: 62910

Date Analyzed: Sample Preparation: 2010-09-09

Analyzed By: KVPrepared By:

RL

Parameter Total Nickel Flag Result < 0.00500

Units mg/L Dilution 1

RL0.00500

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: PAH QC Batch: 73544

Prep Batch: 63094

Analytical Method: Date Analyzed:

S 8270D 2010-09-15 Sample Preparation: 2010-09-09 Prep Method: Analyzed By:

S 3510C MN

Prepared By:

MN

RT

		1/LL			
Parameter	Flag	Result	Units	Dilution	RL
Naphthalene		< 0.000184	$_{ m mg/L}$	0.922	0.000200
2-Methylnaphthalene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
1-Methylnaphthalene		< 0.000184	m mg/L	0.922	0.000200
Acenaphthylene		< 0.000184	m mg/L	0.922	0.000200
Acenaphthene		< 0.000184	m mg/L	0.922	0.000200
Dibenzofuran		< 0.000184	m mg/L	0.922	0.000200
Fluorene		< 0.000184	$_{ m mg/L}$	0.922	0.000200
Anthracene		< 0.000184	m mg/L	0.922	0.000200
Phenanthrene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
Fluoranthene		< 0.000184	$_{ m mg/L}$	0.922	0.000200
Pyrene		< 0.000184	${ m mg/L}$	0.922	0.000200
Benzo(a)anthracene		< 0.000184	${ m mg/L}$	0.922	0.000200
Chrysene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
Benzo(b)fluoranthene		< 0.000184	m mg/L	0.922	0.000200

continued ...

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sample 243703 continued ...

		$\mathrm{RL}$			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Benzo(k)fluoranthene		< 0.000184	mg/L	0.922	0.000200
Benzo(a)pyrene		< 0.000184	$\mathrm{mg/L}$	0.922 -	0.000200
Indeno(1,2,3-cd)pyrene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
Dibenzo(a,h)anthracene		< 0.000184	m mg/L	0.922	0.000200
Benzo(g,h,i)perylene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200

					Spike	$\operatorname{Percent}$	Recovery
Surrogate	Flag	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Nitrobenzene-d5		0.0515	mg/L	0.922	0.0800	64	10 - 111
2-Fluorobiphenyl		0.0569	m mg/L	0.922	0.0800	71	10 - 92.7
Terphenyl-d14		0.0576	$\mathrm{mg/L}$	0.922	$0.0800^{\circ}$	72	35.9 - 107

### Sample: 243703 - Post-Carbon

Lubbock Laboratory:

Total 8 Metals Analytical Method: Analysis: Prep Method: S 7470A N/AQC Batch: 73330 Date Analyzed: 2010-09-08 Analyzed By: TPPrep Batch: 62883 Sample Preparation: 2010-09-08 Prepared By: TP

Laboratory: Lubbock

Total 8 Metals Analysis: Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73359 Date Analyzed: 2010-09-09 Analyzed By: RRPrep Batch: 62910 Sample Preparation: 2010-09-09 Prepared By: KV

		$\mathrm{RL}$			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\mathrm{RL}$
Total Silver		< 0.00500	${ m mg/L}$	1	0.00500
Total Arsenic		< 0.0100	$_{ m mg/L}$	1	0.0100
Total Barium		0.171	$\mathrm{mg/L}$	1	0.0100
Total Cadmium		< 0.00500	$\mathrm{mg/L}$	1	0.00500
Total Chromium		< 0.00500	$\mathrm{mg/L}$	1	0.00500
Total Mercury		< 0.000200	${ m mg/L}$	1	0.000200
Total Lead		0.00500	mg/L	1	0.00500
Total Selenium		< 0.0200	$\mathrm{mg/L}$	1	0.0200

### Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Prep Method: S 3010A Analysis: Zn, Total Analytical Method: S 6010C QC Batch: 73359 Analyzed By: RRDate Analyzed: 2010-09-09 Prep Batch: 62910 Sample Preparation: 2010-09-09 Prepared By: KV

Report Date: September 16, 2010 TNM 97-04

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'ownsend	Lovington, NM
	0 ,

		RL	_			
Parameter	Flag	Result	Units	Dilut	RL	
Total Zinc		0.0100	mg/L		1	0.00500
Method Blank (1)	QC Batch: 73276					
QC Batch: 73276		v	2010-09-07		Analyz	
Prep Batch: 62854		QC Preparation:	2010-09-07		Prepar	ed By: ER
			MDL			
Parameter	Flag		esult	Units		RL
Benzene	•	< 0.00		mg/L		0.001
Toluene		< 0.00		mg/L		0.00
Ethylbenzene		<0.00		mg/L		0.001
Xylene		< 0.00	0379	mg/L		0.001
				Spike	Percent	Recovery
Surrogate	Flag	Result Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0983 mg/L	1	0.100	98	78.4 - 113
4-Bromofluorobenzene (	4-BFB)	0.104 mg/L	1	0.100	104	81.5 - 123
Method Blank (1)  QC Batch: 73330  Prep Batch: 62883	QC Batch: 73330	v	2010-09-08 2010-09-08		Analyz Prepar	•
			MDL			
Parameter	Flag	R	Result	Units		RL
Total Mercury		< 0.000	00388	mg/L		0.0002
Method Blank (1)	QC Batch: 73359					
QC Batch: 73359			2010-09-09		Analyz	
Prep Batch: 62910		QC Preparation:	2010-09-09	٠	Prepar	ed By: KV
	•		MDL			
Parameter	Flag		Result	Uni		RL
Total Aluminum		<0	.00404	mg/	'L	0.03

Report Date: Septemb TNM 97-04	er 16, 2010	2010 Work Order: 10090707 TNM 97-04 Townsend			Page Number: 9 of Lovington, N		
Method Blank (1)	QC Batch: 73359						
QC Batch: 73359 Prep Batch: 62910		v	010-09-09 010-09-09		Analyzed By: Prepared By:	RR KV	
Parameter	Flag	MI Resi		Units		m RL	
Total Boron		<0.001		mg/L		0.01	
Method Blank (1)	QC Batch: 73359						
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-09-09 QC Preparation: 2010-09-09			Analyzed By: Prepared By:	RR KV	
Parameter	Flag	MI Resu	ılt	Units		RL	
Total Cobalt		< 0.002	47	mg/L	<del></del>	0.005	
Method Blank (1)	QC Batch: 73359						
QC Batch: 73359 Prep Batch: 62910			010-09-09 010-09-09		Analyzed By: Prepared By:	RR KV	
Parameter	$\operatorname{Flag}$	MI Res	ult	Units		RL	
Total Copper		<0.002	205	mg/L		0.005	
Method Blank (1)	QC Batch: 73359						
QC Batch: 73359 Prep Batch: 62910			010-09-09 010-09-09		Analyzed By: Prepared By:	RR KV	
Parameter	Flag	MD Resu	ılt	Units		RL	
Total Iron		< 0.0030	00	mg/L	-	0.01	
Method Blank (1)	QC Batch: 73359						
QC Batch: 73359 Prep Batch: 62910		v	010-09-09 010-09-09		Analyzed By: Prepared By:	RR KV	

Report Date: September 16, 2010 TNM 97-04

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		MDL		•
Parameter	Flag	Result	Units	$\mathrm{RL}$
Total Manganese		< 0.00170	$_{ m mg/L}$	0.0025
		•		
Method Blank (1)	QC Batch: 73359			
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-09-09 QC Preparation: 2010-09-09		Analyzed By: RR Prepared By: KV
		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Total Molybdenum		< 0.00356	mg/L	0.01
Method Blank (1)	QC Batch: 73359			
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-09-09 QC Preparation: 2010-09-09		Analyzed By: RR Prepared By: KV
		MDL		
Parameter Total Nickel	Flag	Result <0.00274	$\frac{\rm Units}{\rm mg/L}$	RL 0.005
Method Blank (1)	QC Batch: 73359			
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-09-09 QC Preparation: 2010-09-09		Analyzed By: RR Prepared By: KV
		$\operatorname{MDL}$		
Parameter	Flag	Result	Units	RL
Total Zinc		< 0.00204	mg/L	0.005
Method Blank (1)	QC Batch: 73359			
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-09-09 QC Preparation: 2010-09-09		Analyzed By: RR Prepared By: KV
		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Total Silver		<0.00131	mg/L	0.003 0.01
Total Arsenic Total Barium		<0.00540 <0.00730	$_{ m mg/L}$ $_{ m mg/L}$	0.01
Total Cadmium		<0.00209	mg/L	0.00
2000 Cadman		20100200	***************************************	continued

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method blank continued . . .

		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	$\mathbf{Result}$	Units	RL
Total Chromium		< 0.000873	mg/L	0.005
Total Lead		< 0.00494	${ m mg/L}$	0.005
Total Selenium		< 0.0140	$\mathrm{mg/L}$	0.02

Method Blank (1)

QC Batch: 73544

QC Batch: 73544

44 Date Analyzed:

Analyzed By: MN

Prep Batch: 63094

Date Analyzed: 2010-09-15 QC Preparation: 2010-09-09

Prepared By: MN

MDL

		1411717		
Parameter	Flag	$\operatorname{Result}$	Units	RL
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	$\mathrm{mg/L}$	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	$\mathrm{mg/L}$	0.0002
Acenaphthene		< 0.0000617	$\mathrm{mg/L}$	0.0002
Dibenzofuran		< 0.0000952	$\mathrm{mg/L}$	0.0002
Fluorene		< 0.000134	$\mathrm{mg/L}$	0.0002
Anthracene		< 0.000441	mg/L	0.0002
Phenanthrene		< 0.000435	m mg/L	0.0002
Fluoranthene		< 0.000476	m mg/L	0.0002
Pyrene		< 0.000590	$\mathrm{mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	$\mathrm{mg/L}$	0.0002
Chrysene		< 0.0000766	${ m mg/L}$	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	${ m mg/L}$	0.0002
Benzo(a)pyrene		< 0.000132	$\mathrm{mg/L}$	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	$\mathrm{mg/L}$	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	${ m mg/L}$	0.0002

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0243	mg/L	1	0.0800	30	10 - 111
2-Fluorobiphenyl		0.0270	mg/L	1	0.0800	34	10 - 92.7
Terphenyl-d14		0.0385	mg/L	1	0.0800	48	35.9 - 107

### Laboratory Control Spike (LCS-1)

QC Batch: 73276 Prep Batch: 62854 Date Analyzed: 2010-09-07 QC Preparation: 2010-09-07 Analyzed By: ER Prepared By: ER

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Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.0985	mg/L	1	0.100	< 0.000371	98	79.8 - 112
Toluene	0.0984	mg/L	1	0.100	< 0.000400	98	76.9 - 116
Ethylbenzene	0.0980	mg/L	1	0.100	< 0.000430	98	78.1 - 116
Xylene	0.292	mg/L	1	0.300	< 0.000379	97	80.1 - 113

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Benzene	0.0984	mg/L	1	0.100	< 0.000371	98	79.8 - 112	0	20
Toluene	0.0985	mg/L	1	0.100	< 0.000400	98	76.9 - 116	0	20
Ethylbenzene	0.0986	mg/L	1	0.100	< 0.000430	99	78.1 - 116	1	20
Xylene	0.294	mg/L	1	0.300	< 0.000379	98	80.1 - 113	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	0.0933	0.0967	mg/L	1	0.100	93	97	75.8 - 111
4-Bromofluorobenzene (4-BFB)	0.0923	0.0968	mg/L	1	0.100	92	. 97	71.9 - 111

### Laboratory Control Spike (LCS-1)

QC Batch:

73330

Prep Batch: 62883

Date Analyzed:

2010-09-08

QC Preparation: 2010-09-08

Analyzed By: TP

Prepared By: TP

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Mercury	0.00413	mg/L	1	0.00400	< 0.0000388	103	91.4 - 111

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$_{ m Limit}$
Total Mercury	0.00404	mg/L	1	0.00400	< 0.0000388	101	91.4 - 111	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Prep Batch: 62910

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prepared By: KV

LCS Rec. Spike Matrix Dil. Limit Param Result Units Amount Result Rec. Total Aluminum < 0.00404 105 85 - 115 1.05 mg/L 1 1.00

QC Preparation: 2010-09-09

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Aluminum	1.04	mg/L	1	1.00	< 0.00404	104	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Boron	0.0490	mg/L	1	0.0500	< 0.00146	98	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		$\operatorname{Rec}$ .		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0500	mg/L	1	0.0500	< 0.00146	100	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Prep Batch: 62910

Date Analyzed:

QC Preparation:

2010-09-09

2010-09-09

Analyzed By: RR

Prepared By: KV

LCS Spike Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit Total Cobalt 0.2520.250 < 0.00247 10185 - 115 mg/L 1

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param .	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Cobalt	0.251	mg/L	1	0.250	< 0.00247	100	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Prep Batch: 62910

73359

Date Analyzed: QC Preparation:

2010-09-09

2010-09-09

Analyzed By: RR

Prepared By: KV

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	$\operatorname{Rec}$ .	$\operatorname{Limit}$
Total Copper	0.131	mg/L	1	0.125	< 0.00205	105	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	$\mathbf{A}$ mount	Result	Rec.	Limit	RPD	Limit
Total Copper	0.131	$\mathrm{mg/L}$	1	0.125	< 0.00205	105	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\mathbf{Limit}$
Total Iron	0.508	mg/L	1	0.500	< 0.00300	102	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Iron	0.510	mg/L	1	0.500	< 0.00300	102	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

•	LCS			$_{ m Spike}$	Matrix		Rec.
Param .	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Manganese	0.253	mg/L	1	0.250	< 0.00170	101	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit	RPD	Limit
Total Manganese	0.252	mg/L	1	0.250	< 0.00170	101	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

Report Date: September 16, 2010 TNM 97-04

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	LCS			Spike	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Molybdenum	0.540	m mg/L	1	0.500	< 0.00356	108	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Molybdenum	0.540	mg/L	1	0.500	< 0.00356	108	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	$\mathrm{Rec}.$	Limit
Total Nickel	0.242	mg/L	1	0.250	< 0.00274	97	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Nickel	0.242	mg/L	1	0.250	< 0.00274	97	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Prep Batch: 62910

Date Analyzed:

QC Preparation:

2010-09-09

2010-09-09

Analyzed By: RR

Prepared By: KV

Spike LCS Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit Total Zinc 0.244 mg/L0.250 < 0.00204 98 85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Zinc	0.232	mg/L	1	0.250	< 0.00204	93	85 - 115	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

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Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Total Silver	0.126	mg/L	1	0.125	< 0.00131	101	85 - 115
Total Arsenic	0.494	$\frac{mg}{L}$	1	0.500	< 0.00540	99	85 - 115
Total Barium	1.03	mg/L	1	1.00	< 0.00730	103	85 - 115
Total Cadmium	0.250	mg/L	1	0.250	< 0.00209	100	85 - 115
Total Chromium	0.0980	$_{ m mg/L}$	1	0.100	< 0.000873	98	85 - 115
Total Lead	0.490	$_{ m mg/L}$	1	0.500	< 0.00494	98	85 - 115
Total Selenium	0.441	mg/L	1	0.500	< 0.0140	88	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	${ m Rec.}$	$\operatorname{Limit}$	RPD	Limit
Total Silver	0.127	mg/L	1	0.125	< 0.00131	102	85 - 115	1	20
Total Arsenic	0.489	mg/L	1	0.500	< 0.00540	98	85 - 115	1	20
Total Barium	1.03	mg/L	1	1.00	< 0.00730	103	85 - 115	0	20
Total Cadmium	0.251	mg/L	1	0.250	< 0.00209	100	85 - 115	0	20
Total Chromium	0.0960	${ m mg/L}$	1	0.100	< 0.000873	96	85 - 115	2	20
Total Lead	0.490	mg/L	1	0.500	< 0.00494	98	85 - 115	0	20
Total Selenium	0.445	mg/L	1	0.500	< 0.0140	89	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch: 73544 Prep Batch: 63094 Date Analyzed: 2010-09-15 QC Preparation: 2010-09-09 Analyzed By: MN Prepared By: MN

Param		LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Naphthalene		0.0600	mg/L	1	0.0800	<0.000784	75	32.2 - 80.3
2-Methylnaphthalene		0.0666		1	0.0800	< 0.0000747	83	34.8 - 87
• -			$_{ m mg/L}$	1		,		
1-Methylnaphthalene		0.0706	${ m mg/L}$	1	0.0800	< 0.0000575	88	36.9 - 89.6
Acenaphthylene		0.0684	$_{ m mg/L}$	1	0.0800	< 0.0000963	86	35 - 93.2
Acenaphthene		0.0673	mg/L	1	0.0800	< 0.0000617	84	35.8 - 92.9
Dibenzofuran		0.0532	mg/L	1	0.0800	< 0.0000952	66	35.3 - 85.1
Fluorene		0.0726	mg/L	1	0.0800	< 0.000134	91	43.4 - 101
Anthracene		0.0573	mg/L	1	0.0800	< 0.000441	72	44.8 - 92.4
Phenanthrene		0.0661	mg/L	1	0.0800	< 0.000435	83	44 - 93.7
Fluoranthene		0.0734	${ m mg/L}$	1	0.0800	< 0.000476	92	52.7 - 104
Pyrene		0.0631	mg/L	1	0.0800	< 0.000590	. 79	42.2 - 93.8
Benzo(a)anthracene		0.0584	$_{ m mg/L}$	1	0.0800	< 0.000118	73	40.4 - 91.9
Chrysene	1	0.0877	$_{ m mg/L}$	1	0.0800	< 0.0000766	110	44.4 - 107
Benzo(b)fluoranthene		0.0376	$_{ m mg/L}$	1	0.0800	< 0.000146	47	34.8 - 105
Benzo(k)fluoranthene		0.0507	m mg/L	1	0.0800	< 0.000141	63	50.2 - 158

 $continued \dots$ 

<sup>&</sup>lt;sup>1</sup>Spike analyte out of control limits. Results biased high. •

TNM 97-04

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control spikes continued . . .

•	LCS			$\operatorname{Spike}$	Matrix		· Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Benzo(a)pyrene	0.0504	mg/L	1	0.0800	< 0.000132	63	51.3 - 151
Indeno(1,2,3-cd)pyrene	0.0488	mg/L	1	0.0800	< 0.0000702	61	43.2 - 115
Dibenzo(a,h)anthracene	0.0702	mg/L	1	0.0800	< 0.0000534	88	43.9 - 115
Benzo(g,h,i)perylene	0.0451	mg/L	1	0.0800	< 0.0000473	56	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

•		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Naphthalene	2	0.0662	mg/L	1	0.0800	< 0.0000784	83	32.2 - 80.3	10	20
2-Methylnaphthalene	3	0.0746	mg/L	1	0.0800	< 0.0000747	93	34.8 - 87	11	20
1-Methylnaphthalene	4	0.0775	mg/L	1	0.0800	< 0.0000575	97	36.9 - 89.6	9	20
Acenaphthylene	5	0.0762	mg/L	1	0.0800	< 0.0000963	95	35 - 93.2	11	20
Acenaphthene		0.0740	mg/L	1	0.0800	< 0.0000617	92	35.8 - 92.9	10	20
Dibenzofuran		0.0586	mg/L	1	0.0800	< 0.0000952	73	35.3 - 85.1	10	20
Fluorene		0.0794	mg/L	1	0.0800	< 0.000134	99	43.4 - 101	9	20
Anthracene	6	0.0705	mg/L	1	0.0800	< 0.000441	88	44.8 - 92.4	21	20
Phenanthrene		0.0744	mg/L	1	0.0800	< 0.000435	93	44 - 93.7	12	20
Fluoranthene	7	0.0920	mg/L	1	0.0800	< 0.000476	115	52.7 - 104	22	20
Pyrene		0.0612	mg/L	1	0.0800	< 0.000590	76	42.2 - 93.8	3	20
Benzo(a)anthracene		0.0638	mg/L	1	0.0800	< 0.000118	80	40.4 - 91.9	9	20
Chrysene	8	0.0876	mg/L	1	0.0800	< 0.0000766	110	44.4 - 107	0	20
Benzo(b)fluoranthene	9	0.0510	mg/L	1	0.0800	< 0.000146	64	34.8 - 105	30	20
Benzo(k)fluoranthene	10	0.0710	mg/L	1	0.0800	< 0.000141	89	50.2 - 158	33	20
Benzo(a)pyrene		0.0589	mg/L	1	0.0800	< 0.000132	74	51.3 - 151	16	20
Indeno(1,2,3-cd)pyrene	11	0.0600	mg/L	1	0.0800	< 0.0000702	75	43.2 - 115	21	20
Dibenzo(a,h)anthracene	12	0.0864	mg/L	1	0.0800	< 0.0000534	108	43.9 - 115	21	20
Benzo(g,h,i)perylene	13	0.0574	mg/L	1	0.0800	< 0.0000473	72	45.1 - 115	24	20

	LCS	LCSD			$\mathbf{S}$ pike	LCS	LCSD	$\operatorname{Rec}$ .
Surrogate	$\operatorname{Result}$	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Nitrobenzene-d5	0.0607	0.0650	mg/L	1	0.0800	76	81	10 - 111
2-Fluorobiphenyl	0.0602	0.0665	mg/L	1	0.0800	75	83	10 - 92.7
Terphenyl-d14	0.0617	0.0578	mg/L	. 1	0.0800	77	72	35.9 - 107

<sup>&</sup>lt;sup>2</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

<sup>&</sup>lt;sup>3</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

<sup>&</sup>lt;sup>4</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occurred properly.

<sup>&</sup>lt;sup>5</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

<sup>&</sup>lt;sup>6</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>7</sup>Spike analyte recovery and RPD out of control limits. Results biased high.

<sup>&</sup>lt;sup>8</sup>Spike analyte recovery out of control limits. Results biased high. •

<sup>&</sup>lt;sup>9</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>10</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>11</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>12</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>13</sup>RPD outside RPD control limits. Analyte not detected in samples.

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Lovington, NM

Matrix Spike (MS-1) Spiked Sample: 243638

QC Batch:

73276 Prep Batch: 62854 Date Analyzed:

2010-09-07

QC Preparation: 2010-09-07 Analyzed By: ER

Prepared By: ER

		MS			Spike	Matrix		Rec.
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene		0.0352	mg/L	1	0.100	0.0009	34	29.6 - 139
Toluene	14	0.0342	mg/L	1	0.100	0.0011	33	44.3 - 131
Ethylbenzene	15	0.0338	mg/L	1	0.100	< 0.000430	34	43.8 - 131
Xylene	16	0.105	mg/L	1	0.300	0.0043	34	48.8 - 126

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		MSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Benzene	17	0.0541	mg/L	1	0.100	0.0009	53	29.6 - 139	42	20
Toluene	18	0.0531	mg/L	1	0.100	0.0011	52	44.3 - 131	43	20
Ethylbenzene	19	0.0526	mg/L	1	0.100	< 0.000430	53	43.8 - 131	44	20
Xylene	20	0.161	$\mathrm{mg/L}$	1	0.300	0.0043	52	48.8 - 126	42	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	${f Amount}$	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0988	0.0923	mg/L	1	0.1	99	92	73.9 - 118
4-Bromofluorobenzene (4-BFB)	0.101	0.0953	mg/L	1	0.1	101	95	73.8 - 116

Matrix Spike (MS-1) Spiked Sample: 243703

QC Batch:

73330

Prep Batch: 62883

Date Analyzed:

2010-09-08

QC Preparation: 2010-09-08 Analyzed By: TP

Prepared By: TP

MSSpike Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit Total Mercury 0.00384 0.00400 < 0.0000388 96 75 - 122 mg/L

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Mercury	0.00389	mg/L	1	0.00400	< 0.0000388	97	75 - 122	1	20

<sup>&</sup>lt;sup>14</sup>Matrix spike recovery out of control limits. Use LCS/LCSD to demonstrate analysis is under control.

<sup>&</sup>lt;sup>15</sup>Matrix spike recovery out of control limits. Use LCS/LCSD to demonstrate analysis is under control.

<sup>&</sup>lt;sup>16</sup>Matrix spike recovery out of control limits. Use LCS/LCSD to demonstrate analysis is under control.

<sup>&</sup>lt;sup>17</sup>MS/MSD RPD out of RPD Limits. Use LCS/LCSD to demonstrate analysis is under control.

 $<sup>^{18}\</sup>mathrm{MS/MSD}$  RPD out of RPD Limits. Use LCS/LCSD to demonstrate analysis is under control.

<sup>&</sup>lt;sup>19</sup>MS/MSD RPD out of RPD Limits. Use LCS/LCSD to demonstrate analysis is under control.

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch: Prep Batch:

73359 62910 Date Analyzed:

2010-09-09

QC Preparation: 2010-09-09 Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Aluminum	0.875	mg/L	1	1.00	< 0.00404	88	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		$\operatorname{Rec}$ .		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Aluminum	0.963	mg/L	1	1.00	< 0.00404	96	75 - 125	10	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch: Prep Batch:

73359 62910

Date Analyzed:

QC Preparation:

2010-09-09 2010-09-09 Analyzed By: RR

Prepared By: KV

	MS			Spike		Rec.		
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	
Total Boron	0.0490	mg/L	1	0.0500	< 0.00146	98	75 - 125	

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0480	mg/L	1	0.0500	< 0.00146	96	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch:

62910

QC Preparation: 2010-09-09

Prepared By: KV

·	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Cobalt	0.236	${ m mg/L}$	1	0.250	< 0.00247	94	75 - 125

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Work Order: 10090707 TNM 97-04 Townsend

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Param	$_{ m MSD}$	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec.	RPD	$\begin{array}{c} \text{RPD} \\ \text{Limit} \end{array}$
Total Cobalt	0.238	mg/L	1	0.250	< 0.00247	95	75 - 125	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Copper	0.126	${ m mg/L}$	1	0.125	< 0.00205	101	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result.	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Copper	0.129	mg/L	1	0.125	< 0.00205	103	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	MS ·			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Iron	0.507	mg/L	1	0.500	< 0.00300	101	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Iron	0.507	mg/L	1	0.500	< 0.00300	101	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch:

62910

QC Preparation:

2010-09-09

Prepared By: KV

 $continued \dots$ 

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matrix spikes continued	m	atrix	spikes	continued			
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	MS			$\operatorname{Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
	MS			$\operatorname{Spike}$	Matrix		$\mathrm{Rec}.$
Param	Result	$_{ m Units}$	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Manganese	0.242	mg/L	1	0.250	< 0.00170	97	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Manganese	0.246	mg/L	1	0.250	< 0.00170	98	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch: 73359 Date Analyzed:

2010-09-09

Analyzed By: RR Prepared By: KV

Prep Batch: 62910

QC Preparation: 2010-09-09

	MS			Spike	Matrix		Rec.
Param	Result	. Units	Dil.	Amount	Result	Rec.	Limit
Total Molybdenum	0.498	m mg/L	1	0.500	< 0.00356	100	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Molybdenum	0.505	mg/L	1	0.500	< 0.00356	101	75 - 125	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Nickel	0.239	${ m mg/L}$	1	0.250	< 0.00274	96	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit.
Total Nickel	0.242	mg/L	1	0.250	< 0.00274	97	75 - 125	1	20

Report Date: September 16, 2010 TNM 97-04

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Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359 Prep Batch: 62910 Date Analyzed:

2010-09-09

QC Preparation: 2010-09-09

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix	•	$\mathrm{Rec}.$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Zinc	0.234	mg/L	1	0.250	< 0.00204	94	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	$\mathbf{A}$ mount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Zinc	0.234	mg/L	1	0.250	< 0.00204	94	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prepared By: KV

Prep Batch: 62910

QC Preparation: 2010-09-09

	MS			Spike	Matrix		$\mathrm{Rec}.$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Silver	0.126	mg/L	1	0.125	< 0.00131	101	75 - 125
Total Arsenic	0.499	$\mathrm{mg/L}$	1	0.500	< 0.00540	100	75 - 125
Total Barium	0.982	$\mathrm{mg/L}$	1	1.00	< 0.00730	98	75 - 125
Total Cadmium	0.232	$\mathrm{mg/L}$	1	0.250	< 0.00209	93	75 - 125
Total Chromium	0.0910	mg/L	1	0.100	< 0.000873	91	75 - 125
Total Lead	0.454	$\mathrm{mg/L}$	1	0.500	0.01	89	75 - 125
Total Selenium	0.448	mg/L	1	0.500	< 0.0140	90	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	MSD $     Result$	Units	Dil.	Spike Amount	$rac{ ext{Matrix}}{ ext{Result}}$	Rec.	$egin{array}{l} { m Rec.} \\ { m Limit} \end{array}$	RPD	$rac{ ext{RPD}}{ ext{Limit}}$
Total Silver	0.125	mg/L	1	0.125	< 0.00131	100	75 - 125	1	20
Total Arsenic	0.507	mg/L	1	0.500	< 0.00540	101	75 - 125	2	20
Total Barium	0.984	mg/L	1	1.00	< 0.00730	98	75 - 125	0	20
Total Cadmium	0.238	mg/L	1	0.250	< 0.00209	95	75 - 125	3	20
Total Chromium	0.0900	mg/L	1	0.100	< 0.000873	90	75 - 125	1	20
Total Lead	0.454	mg/L	1	0.500	0.01	89	75 - 125	0	20
Total Selenium	0.441	mg/L	1	0.500	< 0.0140	88	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (CCV-2)

QC Batch: 73276

Date Analyzed: 2010-09-07

Analyzed By: ER

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Param	$\operatorname{Flag}$	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0945	94	80 - 120	2010-09-07
Toluene		mg/L	0.100	0.0938	94	80 - 120	2010-09-07
Ethylbenzene		mg/L	0.100	0.0931	93	80 - 120	2010-09-07
Xylene		mg/L	0.300	0.280	93	80 - 120	2010-09-07

### Standard (CCV-3)

QC Batch: 73276

Date Analyzed: 2010-09-07

Analyzed By: ER

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0959	96	80 - 120	2010-09-07
Toluene		$\mathrm{mg/L}$	0.100	0.0946	95	80 - 120	2010-09-07
Ethylbenzene		mg/L	0.100	0.0939	94	80 - 120	2010-09-07
Xylene		mg/L	0.300	0.281	94	80 - 120	2010-09-07

### Standard (CCV-1)

QC Batch: 73330

Date Analyzed: 2010-09-08

Analyzed By: TP

			CCVs True	CCVs Found	$\begin{array}{c} { m CCVs} \\ { m Percent} \end{array}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00511	102	90 - 110	2010-09-08

### Standard (CCV-2)

QC Batch: 73330

Date Analyzed: 2010-09-08

Analyzed By: TP

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury	-	mg/L	0.00500	0.00512	102	90 - 110	2010-09-08

### Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

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Lovington, NM

			ICVs True	ICVs Found	ICVs Percent	Percent Recovery	Date
Param	Flag	Units	· Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		$_{ m mg/L}$	1.00	1.03	103	90 - 110	2010-09-09

### Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	·
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron	· -	$\mathrm{mg/L}$	1.00	1.02	102	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs True	${ m ICVs} \ { m Found}$	${f ICVs} \ {f Percent}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		mg/L	1.00	1.05	105	90 - 110	2010-09-09

## Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		mg/L	1.00	1.01	101	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	1.02	102	90 - 110	2010-09-09

#### Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

Report Date: September 16, 2010 TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend Page Number: 25 of 28 Lovington, NM

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		${ m mg/L}$	1.00	1.05	105	90 - 110	2010-09-09

### Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	1.03	103	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	1.06	106	90 - 110	2010-09-09

### Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	1.03	103	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Silver		mg/L	0.250	0.249	100	90 - 110	2010-09-09
Total Arsenic		${ m mg/L}$	2.00	2.02	101	95 - 105	2010-09-09
Total Barium		$\mathrm{mg/L}$	1.00	1.04	104	90 - 110	2010-09-09
Total Cadmium		mg/L	1.00	1.04	104	90 - 110	2010-09-09
Total Chromium		$\mathrm{mg/L}$	1.00	1.05	105	90 - 110	2010-09-09
Total Lead		mg/L	1.00	0.989	99	90 - 110	2010-09-09

continued ...

Report Date: September 16, 2010 TNM 97-04				k Order: 1009 M 97-04 Town	Page Number: 26 of 28 Lovington, NM		
standard continu	$ued \dots$			•			
			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Selenium		mg/L	1.00	0.986	99	90 - 110	2010-09-09
Standard (CC	V-1)						
QC Batch: 733	359		Date Analyze	ed: 2010-09-0	09	Anal	yzed By: RR
			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
		/т	1.00	1.02	102	90 - 110	2010-09-09
Total Aluminum  Standard (CC		mg/L	1.00				
Total Aluminum	V-1)	mg/L	Date Analyze	ed: 2010-09-	09	Anal	yzed By: RR
Total Aluminum	V-1)	mg/L	Date Analyze	ed: 2010-09-0	09 CCVs	Anal Percent	yzed By: RR
Total Aluminum  Standard (CC  QC Batch: 733	<b>V-1</b> ) 359		Date Analyze CCVs True	ed: 2010-09-0 CCVs Found	09 CCVs Percent	Anal Percent Recovery	yzed By: RR Date
Fotal Aluminum  Standard (CC  QC Batch: 733	V-1)	Units	Date Analyze  CCVs  True  Conc.	ed: 2010-09-0 CCVs Found Conc.	09 CCVs Percent Recovery	Anal Percent Recovery Limits	yzed By: RR Date Analyzed
Total Aluminum  Standard (CC  QC Batch: 733  Param  Total Boron	FV-1)  Flag		Date Analyze CCVs True	ed: 2010-09-0 CCVs Found	09 CCVs Percent	Anal Percent Recovery	yzed By: RR Date
Total Aluminum Standard (CC QC Batch: 733 Param Total Boron	FV-1)  Flag	Units	Date Analyze  CCVs  True  Conc.	ed: 2010-09-0 CCVs Found Conc.	09 CCVs Percent Recovery	Anal Percent Recovery Limits	yzed By: RR Date Analyzed
Total Aluminum Standard (CC QC Batch: 733 Param Total Boron Standard (CC)	Flag EV-1)	Units	Date Analyze  CCVs  True  Conc.	CCVs Found Conc. 0.993	CCVs Percent Recovery 99	Anal Percent Recovery Limits 90 - 110	yzed By: RR Date Analyzed
Total Aluminum Standard (CC QC Batch: 733 Param Total Boron Standard (CC)	Flag EV-1)	Units	Date Analyze  CCVs  True  Conc.  1.00  Date Analyze  CCVs	CCVs Found Conc. 0.993 ed: 2010-09-6	CCVs Percent Recovery 99  CCVs	Anal Percent Recovery Limits 90 - 110 Anal Percent	yzed By: RR  Date Analyzed 2010-09-09
Total Aluminum  Standard (CC  QC Batch: 733  Param  Total Boron  Standard (CC  QC Batch: 733	Flag Flag SV-1)	Units mg/L	Date Analyze  CCVs  True  Conc.  1.00  Date Analyze  CCVs  True	CCVs Found Conc. 0.993  ed: 2010-09-6	CCVs Percent Recovery 99  CCVs Percent	Anal Percent Recovery Limits 90 - 110 Anal Percent Recovery	yzed By: RR  Date Analyzed 2010-09-09
Total Aluminum  Standard (CC  QC Batch: 733	Flag EV-1)	Units	Date Analyze  CCVs  True  Conc.  1.00  Date Analyze  CCVs	CCVs Found Conc. 0.993 ed: 2010-09-6	CCVs Percent Recovery 99  CCVs	Anal Percent Recovery Limits 90 - 110 Anal Percent	yzed By: RR  Date Analyzed 2010-09-09

Standard	(CCX7.1)
Standard	100 <b>v-</b> 11

Flag

Units

mg/L

QC Batch: 73359

Param

Total Copper

QC Batch: 73359

Date Analyzed: 2010-09-09

Date Analyzed: 2010-09-09

 $\operatorname{CCVs}$ 

True

Conc.

1.00

 ${\rm CCVs}$ 

Found

 ${\rm Conc.}$ 

1.01

CCVs

Percent

Recovery

101

Analyzed By: RR

· Analyzed By: RR

Date

Analyzed

2010-09-09

Percent

 ${\bf Recovery}$ 

Limits

90 - 110

TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend

Page Number: 27 of 28

Lovington, NM

	,		CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		$\mathrm{mg/L}$	1.00	1.04	104	90 - 110	2010-09-09

## Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		${ m mg/L}$	1.00	1.01	101	90 - 110	2010-09-09

### Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	_
			$\operatorname{True}$	$\mathbf{Found}^{'}$	Percent	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	0.983	98	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	0.979	98	90 - 110	2010-09-09

### Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	D.
			$\operatorname{True}$	Found	$\operatorname{Percent}$	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	$\operatorname{Limits}$	Analyzed
Total Zinc		$\mathrm{mg/L}$	1.00	0.978	98	90 - 110	2010-09-09

### Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend Page Number: 28 of 28 Lovington, NM

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Silver		mg/L	0.125	0.126	101	90 - 110	2010-09-09
Total Arsenic		mg/L	1.00	0.953	95	90 - 110	2010-09-09
Total Barium		mg/L	1.00	1.00	100	90 - 110	2010-09-09
Total Cadmium		mg/L	1.00	0.968	97	90 - 110	2010-09-09
Total Chromium		mg/L	1.00	0.997	· 100	90 - 110	2010-09-09
Total Lead		mg/L	1.00	1.00	100	90 - 110	2010-09-09
Total Selenium		mg/L	1.00	0.956	96	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73544

Date Analyzed: 2010-09-15

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		${ m mg/L}$	60.0	58.4	97	80 - 120	2010-09-15
2-Methylnaphthalene		$_{ m mg/L}$	60.0	61.9	103	80 - 120	2010-09-15
1-Methylnaphthalene		${ m mg/L}$	60.0	61.7	103	80 - 120	2010-09-15
Acenaphthylene		${ m mg/L}$	60.0	56.5	94	80 - 120	2010-09-15
Acenaphthene		m mg/L	60.0	57.0	95	80 - 120	2010-09-15
Dibenzofuran		m mg/L	60.0	60.8	101	80 - 120	2010-09-15
Fluorene		mg/L	60.0	61.6	103	80 - 120	2010-09-15
Anthracene		${ m mg/L}$	60.0	52.7	88	80 - 120	2010-09-15
Phenanthrene		m mg/L	60.0	56.9	95	80 - 120	2010-09-15
Fluoranthene		${ m mg/L}$	60.0	54.5	91	80 - 120	2010-09-15
Pyrene ·		${ m mg/L}$	60.0	62.3	104	80 - 120	2010-09-15
Benzo(a)anthracene		mg/L	60.0	53.3	89	80 - 120	2010-09-15
Chrysene		mg/L	60.0	68.0	113	80 - 120	2010-09-15
Benzo(b)fluoranthene		mg/L	60.0	51.8	86	80 - 120	2010-09-15
Benzo(k)fluoranthene		mg/L	60.0	67.2	112	80 - 120	2010-09-15
Benzo(a)pyrene		$_{ m mg/L}$	60.0	60.8	101	80 - 120	2010-09-15
Indeno(1,2,3-cd)pyrene		${ m mg/L}$	60.0	56.3	94	80 - 120	2010-09-15
Dibenzo(a,h)anthracene		${ m mg/L}$	60.0	57.3	96	80 - 120	2010-09-15
Benzo(g,h,i)perylene		mg/L	60.0	59.5	99	80 - 120	2010-09-15

Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		61.9	mg/L	1	60.0	103	80 - 120
2-Fluorobiphenyl		60.8	$_{ m mg/L}$	1	60.0	101	80 - 120
Terphenyl-d14		63.3	mg/L	1 -	60.0	106	80 - 120

LAB Order ID # /0090707

TraceAnalysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue, Suite 9 Lubbock, Taxas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1296

5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313

200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (1915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443

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BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750

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Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.

CONCINENT CONT.

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Carrier # Conny



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E-Mail: lab@traceanalysis.com

# Certifications

**WBENC:** 237019

HUB:

1752439743100-86536

**DBE:** VN 20657

NCTRCA

WFWB38444Y0909

# **NELAP Certifications**

Lubbock:

T104704219-08-TX

LELAP-02003

Kansas E-10317

El Paso: T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

# Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: September 28, 2010

Work Order:

10091008

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
243988	Post-Carbon	water	2010-09-10	11:15	2010-09-10

## NOTE

Work Order 10091008: HNO3 bottle received with a pH above 2. Added HNO3 in Lubbock lab.

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 28 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

### Standard Flags

 ${f B}$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-09-10 and assigned to work order 10091008. Samples for work order 10091008 were received intact without headspace and at a temperature of 3.8 C.

Samples were analyzed for the following tests using their respective methods.

		$\operatorname{Prep}$	$\operatorname{Prep}$	$_{ m QC}$	Analysis
Test	Method	Batch	Date	Batch	Date
Ag, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Al, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at $10:47$
As, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Ba, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
BTEX	S 8021B	62959	2010-09-10 at $11:45$	73407	2010-09-10 at 12:49
B, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at $10:47$
Cd, Total	S 6010C	63010	2010-09-14 at $08:53$	73465	2010-09-14 at 10:47
Co, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Cr, Total	S 6010 $C$	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Cu, Total	S 6010C	63010	2010-09-14 at $08:53$	73465	2010-09-14 at 10:47
Fe, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Hg, Total	S 7470A	63181	2010-09-20 at 14:02	73659	2010-09-20 at 16:20
Mn, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Mo, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Ni, Total	S 6010C	63010	2010-09-14 at $08:53$	73465	2010-09-14 at 10:47
PAH	S 8270D	63356	2010-09-17 at 15:00	73832	2010-09-26 at 13:25
Pb, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Se, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Zn, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10091008 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10091008 TNM 97-04 Townsend

Page Number: 4 of 28 Lovington, NM

# **Analytical Report**

Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Analysis: Al, Total QC Batch: 73465 Prep Batch: 63010

Analytical Method:

S 6010C 2010-09-14 Prep Method: S 3010A Analyzed By: RR

Date Analyzed: Sample Preparation: 2010-09-14

Prepared By: KV

RL

	·				
Parameter	Flag	Result	Units	Dilution	RL
Total Aluminum		< 0.0500	mg/L	1	0.0500

Sample: 243988 - Post-Carbon

Laboratory: Lubbock

B. Total Analysis: QC Batch: 73465 Prep Batch: 63010

Analytical Method: Date Analyzed:

S 6010C 2010 - 09 - 14Sample Preparation: 2010-09-14

Prep Method: S 3010A

Analyzed By: RRPrepared By: KV

RL

Parameter	Flag	Result	Units	Dilution	RL
Total Boron		0.168	mg/L	1	0.0100

Sample: 243988 - Post-Carbon

Laboratory: Midland

Analysis: BTEX QC Batch: 73407 Prep Batch: 62959

Analytical Method: Date Analyzed:

S 8021B 2010-09-10 Sample Preparation: 2010-09-10 Prep Method: S 5030B

Analyzed By: AGPrepared By: AG

RL

Parameter	Flag	Result	Units	Dilution	m RL
Benzene		< 0.00100	mg/L	1	0.00100
Toluene		< 0.00100	m mg/L	1	0.00100
Ethylbenzene		< 0.00100	m mg/L	1	0.00100
Xylene		< 0.00100	mg/L	1	0.00100

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	$\operatorname{Limits}_{\_\_}$
Trifluorotoluene (TFT)		0.0975	$_{ m mg/L}$	1	0.100	98	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0522	${ m mg/L}$	1	0.100	52	51.1 - 128

Report Date: September 28, 2010 Work Order: 10091008 Page Number: 5 of 28 TNM 97-04 TNM 97-04 Townsend Lovington, NM Sample: 243988 - Post-Carbon Laboratory: Lubbock Analysis: Co, Total Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RRPrep Batch: 63010 Sample Preparation: Prepared By: KV 2010-09-14 RLParameter Flag Result Units Dilution RLTotal Cobalt < 0.00500 0.00500 mg/L Sample: 243988 - Post-Carbon Lubbock Laboratory:

Sample Preparation: 2010-09-14

S 6010C

2010-09-14

Prep Method:

Analyzed By:

Prepared By:

S 3010A

0.00500

RR

ΚV

Analytical Method:

Date Analyzed:

#### Sample: 243988 - Post-Carbon

Cu, Total

73465

63010

Analysis:

QC Batch:

Prep Batch:

Lubbock Laboratory: Analysis: Fe, Total Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73465 Analyzed By: RRDate Analyzed: 2010-09-14 Prep Batch: 63010 Sample Preparation: Prepared By: ΚV 2010-09-14 RL Flag Parameter Result Units Dilution RLTotal Iron 0.177mg/L 0.0100

#### Sample: 243988 - Post-Carbon

Total Manganese

Laboratory: Lubbock Analysis: Mn, Total Analytical Method: S 6010C Prep Method: S 3010A QC Batch: Date Analyzed: 73465 2010-09-14 Analyzed By: RRPrep Batch: 63010 Sample Preparation: 2010-09-14 Prepared By: KV RLResult RLParameter Units Dilution Flag

mg/L

0.0910

Report Date: September 28, 2010 TNM 97-04

Work Order: 10091008 TNM 97-04 Townsend

Page Number: 6 of 28 Lovington, NM

Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch: Mo, Total 73465

Analytical Method:

S 6010C

2010-09-14

Prep Method: Analyzed By:

S 3010A RR

Prep Batch:

63010

Date Analyzed: Sample Preparation: 2010-09-14

Prepared By:

KV

RL

Parameter Total Molybdenum Flag Result < 0.0500

Units mg/L Dilution

RL0.0500

Sample: 243988 - Post-Carbon

Laboratory:

Lubbock

Analysis: QC Batch: Ni, Total 73465

Analytical Method:

S 6010C 2010-09-14 Prep Method: S 3010A

Prep Batch:

63010

Date Analyzed: Sample Preparation: 2010-09-14

Analyzed By: Prepared By: KV

RR

RL

Parameter Total Nickel Flag Result < 0.0100 Units mg/L Dilution 1

RL0.0100

Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Prep Batch:

63356

Analysis: PAH QC Batch: 73832 Analytical Method: Date Analyzed:

Sample Preparation:

S 8270D 2010-09-26 2010-09-17 Prep Method:

S 3510C MN

Analyzed By: Prepared By:

MN

RL

Parameter	Flag	Result	Units	Dilution	RL
Naphthalene		< 0.000186	mg/L	0.93	0.000200
2-Methylnaphthalene		< 0.000186	m mg/L	0.93	0.000200
1-Methylnaphthalene		< 0.000186	m mg/L	0.93	0.000200
Acenaphthylene		< 0.000186	mg/L	0.93	0.000200
Acenaphthene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
Dibenzofuran		< 0.000186	mg/L	0.93	0.000200
Fluorene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
Anthracene		< 0.000186	mg/L	0.93	0.000200
Phenanthrene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
Fluoranthene		< 0.000186	mg/L	0.93	0.000200
Pyrene		< 0.000186	mg/L	-0.93	0.000200
Benzo(a)anthracene,		< 0.000186	mg/L	0.93	0.000200
Chrysene		< 0.000186	mg/L	0.93	0.000200
Benzo(b)fluoranthene		< 0.000186	mg/L	0.93	0.000200

continued ...

 $\rm TNM~97\text{-}04$ 

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#### sample 243988 continued ...

		$\mathrm{RL}$			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Benzo(k)fluoranthene		< 0.000186	mg/L	0.93	0.000200
Benzo(a)pyrene		< 0.000186	m mg/L	0.93	0.000200
Indeno(1,2,3-cd)pyrene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
${f Dibenzo(a,h)}$ anthracene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
Benzo(g,h,i)perylene		< 0.000186	m mg/L	0.93	0.000200

					$\operatorname{Spike}$	$\operatorname{Percent}$	$\operatorname{Recovery}$
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0203	mg/L	0.93	0.0800	25	10 - 111
2-Fluorobiphenyl		0.0239	$\mathrm{mg/L}$	0.93	0.0800	30	10 - 92.7
Terphenyl-d14		0.0451	${ m mg/L}$	0.93	0.0800	56	35.9 - 107

#### Sample: 243988 - Post-Carbon

Laboratory:	Lubbock

Analysis: Total 8 Metals Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RRPrep Batch: 63010 KVSample Preparation: 2010-09-14 Prepared By: Laboratory: Lubbock Analysis: Total 8 Metals Analytical Method: S 7470A Prep Method: N/A

Analysis: Total 8 Metals Analytical Method: S 7470A Prep Method: N/A QC Batch: 73659 Date Analyzed: 2010-09-20 Analyzed By: TP Prep Batch: 63181 Sample Preparation: 2010-09-20 Prepared By: TP

		$\mathrm{RL}$			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Total Silver		< 0.00500	mg/L	1	0.00500
Total Arsenic		< 0.0100	mg/L	1	0.0100
Total Barium		0.243	$\mathrm{mg/L}$	1	0.0100
Total Cadmium		< 0.00500	${ m mg/L}$	1	0.00500
Total Chromium		< 0.0100	$\mathrm{mg/L}$	1	0.0100
Total Mercury		< 0.000200	$\mathrm{mg/L}$	1	0.000200
Total Lead		< 0.00500	$\mathrm{mg/L}$	1	0.00500
Total Selenium		< 0.0200	${ m mg/L}$	1	0.0200

#### Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Analysis: Zn, Total Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR Prep Batch: 63010 Sample Preparation: 2010-09-14 Prepared By: KV

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Parameter	$\operatorname{Flag}$	$rac{ ext{RL}}{ ext{Result}}$	Units	Dilution	RL
Total Zinc		< 0.00500	${ m mg/L}$	1	0.00500

Method Blank (1) QC Batch: 73407

QC Batch: Analyzed By: AG 73407 Date Analyzed: 2010-09-10 Prep Batch: 62959 QC Preparation: 2010-09-10 Prepared By: AG

		MDL		
Parameter	$\operatorname{Flag}$	Result	Units	$\mathrm{RL}$
Benzene		< 0.000600	mg/L	0.001
Toluene		< 0.000600	${ m mg/L}$	0.001
Ethylbenzene		< 0.000800	${ m mg/L}$	0.001
Xylene		< 0.000767	m mg/L	0.001

					$_{ m Spike}$	$\operatorname{Percent}$	$\operatorname{Recovery}$
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0971	$_{ m mg/L}$	1	0.100	97	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.0541	mg/L .	1	0.100	54	47.3 - 116

Method Blank (1) QC Batch: 73465

Analyzed By: RR QC Batch: 73465Date Analyzed: 2010-09-14 Prepared By: KV Prep Batch: 63010 QC Preparation: 2010-09-14

MDL Units RLParameter Flag Result Total Aluminum < 0.00982 mg/L 0.05

Method Blank (1) QC Batch: 73465

QC Batch: 73465Date Analyzed: 2010-09-14 Analyzed By: RR Prep Batch: 63010 QC Preparation: 2010-09-14 Prepared By: KV

MDLUnits RLParameter Flag Result Total Boron < 0.00215 0.01 mg/L

Report Date: September TNM 97-04	er 28, 2010	Work Order: 100910 TNM 97-04 Townser		Page Number: 9 of 28 Lovington, NM
Method Blank (1)	QC Batch: 73465			
QC Batch: 73465 Prep Batch: 63010		Date Analyzed: 2010-09-14 QC Preparation: 2010-09-14		Analyzed By: RR Prepared By: KV
		MDL		•
Parameter	Flag	Result	Units	RL
Total Cobalt		< 0.00258	m mg/L	0.005
Method Blank (1)	QC Batch: 73465			
QC Batch: 73465		Date Analyzed: 2010-09-14		Analyzed By: RR
Prep Batch: 63010		QC Preparation: 2010-09-14		Prepared By: KV
		MDL		
Parameter	Flag	Result	Units	ho
Total Copper		<0.00313	$_{ m mg/L}$	0.005
Method Blank (1)  QC Batch: 73465  Prep Batch: 63010	QC Batch: 73465	Date Analyzed: 2010-09-14 QC Preparation: 2010-09-14		Analyzed By: RR Prepared By: KV
		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Total Iron		< 0.00273	mg/L	0.01
Method Blank (1)	QC Batch: 73465			
QC Batch: 73465 Prep Batch: 63010		Date Analyzed: 2010-09-14 QC Preparation: 2010-09-14		Analyzed By: RR Prepared By: KV
Parameter	Flag	MDL Result	Units	m RL
Total Manganese		< 0.00423	mg/L	0.005
Method Blank (1)	QC Batch: 73465			
QC Batch: 73465		Date Analyzed: 2010-09-14	•	Analyzed By: RR
Prep Batch: 63010		QC Preparation: 2010-09-14	-	Prepared By: KV

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Method Blank (1)

Work Order: 10091008 TNM 97-04 Townsend Page Number: 10 of 28 Lovington, NM

MDL Units RLParameter Flag Result Total Molybdenum < 0.00164 0.05 mg/L Method Blank (1) QC Batch: 73465 QC Batch: Analyzed By: RR 73465 Date Analyzed: 2010-09-14 Prep Batch: 63010 QC Preparation: 2010-09-14 Prepared By: KVMDL RLParameter Flag Result Units Total Nickel 0.01 < 0.00593 mg/L

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR
Prep Batch: 63010 QC Preparation: 2010-09-14 Prepared By: KV

Method Blank (1) QC Batch: 73465

QC Batch: 73465

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR
Prep Batch: 63010 QC Preparation: 2010-09-14 Prepared By: KV

MDLParameter Flag Result Units RLTotal Silver < 0.000469 mg/L 0.005 Total Arsenic mg/L 0.01 < 0.00465 Total Barium < 0.00418 mg/L 0.01 Total Cadmium 0.005 < 0.00232 mg/L Total Chromium 0.01< 0.00291 mg/L 0.005 Total Lead < 0.00303 mg/L Total Selenium 0.02< 0.00570 mg/L

Method Blank (1) QC Batch: 73659

QC Batch: 73659 Date Analyzed: 2010-09-20 Analyzed By: TP
Prep Batch: 63181 QC Preparation: 2010-09-20 Prepared By: TP

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		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	$_{ m L}$
Total Mercury		< 0.0000388	${ m mg/L}$	0.0002

Method Blank (1)

QC Batch: 73832

QC Batch:

73832

Date Analyzed:

2010 - 09 - 26

Analyzed By: MN

Prep Batch: 63356

QC Preparation: 2010-09-17

Prepared By: MN

		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	ho RL
Naphthalene		< 0.0000784	m mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	m mg/L	0.0002
1-Methylnaphthalene		< 0.0000575	m mg/L	0.0002
Acenaphthylene		< 0.0000963	$\mathrm{mg/L}$	0.0002
Acenaphthene		< 0.0000617	$\mathrm{mg/L}$	0.0002
Dibenzofuran		< 0.0000952	$\mathrm{mg/L}$	0.0002
Fluorene		< 0.000134	$\mathrm{mg/L}$	0.0002
Anthracene		< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	${ m mg/L}$	0.0002
Fluoranthene		< 0.000476	m mg/L	0.0002
Pyrene	,	< 0.000590	$\mathrm{mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	$\mathrm{mg/L}$	0.0002
Chrysene		< 0.0000766	m mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	${ m mg/L}$	0.0002
Benzo(a)pyrene		< 0.000132	$\mathrm{mg/L}$	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	$\mathrm{mg/L}$	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	$\mathrm{mg/L}$	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	$_{ m Units}$	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0285	mg/L	1	0.0800	36	10 - 111
2-Fluorobiphenyl		0.0281	mg/L	1	0.0800	35	10 - 92.7
Terphenyl-d14		0.0394	mg/L	1	0.0800	49	35.9 - 107

# Laboratory Control Spike (LCS-1)

QC Batch: 73407Prep Batch: 62959

Date Analyzed:

2010-09-10

QC Preparation: 2010-09-10

Analyzed By: AG

Prepared By: AG

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Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.0996	mg/L	1	0.100	< 0.000600	100	82.9 - 118
Toluene	0.0982	${ m mg/L}$	1	0.100	< 0.000600	98	82.7 - 117
Ethylbenzene	0.0969	mg/L	1	0.100	< 0.000800	97	78.8 - 116
Xylene	0.284	mg/L	1	0.300	< 0.000767	95	79.3 - 116

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

D.	LCSD	<b>.</b>	<b>5.</b>	Spike	Matrix		Rec.	nnn	RPD
Param	$\operatorname{Result}$	$_{ m Units}$	$\operatorname{Dil}$ .	Amount	$\operatorname{Result}$	${ m Rec.}$	$\operatorname{Limit}$	RPD	Limit
Benzene	0.105	mg/L	1	0.100	< 0.000600	105	82.9 - 118	5	20
Toluene	0.102	mg/L	1	0.100	< 0.000600	102	82.7 - 117	4	20
Ethylbenzene	0.101	mg/L	1	0.100	< 0.000800	101	78.8 - 116	4	20
Xylene	0.295	mg/L	1	0.300	< 0.000767	98	79.3 - 116	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$\mathbf{S}_{\mathbf{P}}$ ike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0996	0.104	mg/L	1	0.100	100	104	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.0865	0.0898	mg/L	1	0.100	86	90	68.2 - 134

#### Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR Prepared By: KV

Prep Batch: 63010

QC Preparation: 2010-09-14

LCS Spike Matrix Rec. Param Result Dil. Amount Result Limit Units Rec. Total Aluminum < 0.00982 103 85 - 115 1.03 mg/L 1 1.00

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Total Aluminum	1.02	mg/L	1	1.00	< 0.00982	102	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch: 73465 Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch:

63010

QC Preparation: 2010-09-14

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	$\operatorname{Limit}$
Total Boron	0.0490	mg/L	1	0.0500	< 0.00215	98	85 - 115

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		$\operatorname{Rec}$ .		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0510	mg/L	1	0.0500	< 0.00215	102	85 - 115	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-14

Spike

0.250

Analyzed By: RR

Prep Batch: 63010

Total Cobalt

TNM 97-04

QC Preparation:

mg/L

2010-09-14

Prepared By: KV

Param

LCS Result Units Dil. Amount

Matrix Result < 0.00258 Rec.

Rec. Limit 107 85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

0.268

	LCSD			Spike	Matrix		Rec.		RPD
Param	$\operatorname{Result}$	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Total Cobalt	0.263	mg/L	1	0.250	< 0.00258	105	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation:

2010-09-14

Prepared By: KV

	LCS			$\mathbf{S}_{\mathbf{P}i\mathbf{k}\mathbf{e}}$	Matrix		$\operatorname{Rec}$ .
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Copper	0.127	${ m mg/L}$	1	0.125	< 0.00313	102	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Copper	0.128	mg/L	1	0.125	< 0.00313	102	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch:

63010

QC Preparation:

2010-09-14

Prepared By: KV

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\mathbf{Limit}$
Total Iron	0.502	$\mathrm{mg/L}$	1	0.500	< 0.00273	100	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Total Iron	0.501	mg/L	1	0.500	< 0.00273	100	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	LCS			$\operatorname{Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Manganese	0.257	mg/L	1	0.250	< 0.00423	103	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Manganese	0.256	mg/L	1	0.250	< 0.00423	102	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73465

Prep Batch: 63010

Date Analyzed:

2010-09-14

QC Preparation: 2010-09-14

Analyzed By: RR

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	$\operatorname{Result}$	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit
Total Molybdenum	0.520	mg/L	1	0.500	< 0.00164	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Molybdenum	0.519	mg/L	1	0.500	< 0.00164	104	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

Prep Batch: 63010

73465

Date Analyzed:

2010-09-14

QC Preparation: 2010-09-14

Analyzed By: RR

Prepared By: KV

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Lovington, NM

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit
Total Nickel	0.268	mg/L	1	0.250	< 0.00593	107	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	$\mathbf{Limit}$	RPD	Limit
Total Nickel	0.264	$\overline{\mathrm{mg}}/\mathrm{L}$	1	0.250	< 0.00593	106	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73465 Prep Batch: 63010 Date Analyzed:

2010-09-14 QC Preparation: 2010-09-14

Analyzed By: RR

Prepared By: KV

	LCS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Zinc	0.259	mg/L	1	0.250	< 0.00178	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Zinc	0.253	mg/L	1	0.250	< 0.00178	101	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch: 73465 Prep Batch: 63010 Date Analyzed: QC Preparation: 2010-09-14

2010-09-14

Analyzed By: RR

Prepared By: KV

Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	${ m Rec.} \ { m Limit}$
Total Silver	0.135	mg/L	1	0.125	< 0.000469	108	85 - 115
Total Arsenic	0.534	mg/L	1	0.500	< 0.00465	107	85 - 115
Total Barium	1.05	mg/L	1	1.00	< 0.00418	105	85 - 115
Total Cadmium	0.271	mg/L	1	0.250	< 0.00232	108	85 - 115
Total Chromium	0.0910	mg/L	1	0.100	< 0.00291	91	85 - 115
Total Lead	0.543	mg/L	1	0.500	< 0.00303	109	85 - 115
Total Selenium	0.506	mg/L	1	0.500	< 0.00570	101	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Silver	0.135	mg/L	1	0.125	< 0.000469	108	85 - 115	0	20

 $continued \dots$ 

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control spikes continued . . .

	LCSD			$_{ m Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
Total Arsenic	0.524	mg/L	1	0.500	< 0.00465	105	85 - 115	2	20
Total Barium	1.01	$\mathrm{mg/L}$	1	1.00	< 0.00418	101	85 - 115	4	20
Total Cadmium	0.270	$\mathrm{mg/L}$	1	0.250	< 0.00232	108	85 - 115	0	20
Total Chromium	0.0880	mg/L	1	0.100	< 0.00291	88	85 - 115	3	20
Total Lead	0.536	mg/L	1	0.500	< 0.00303	107	85 - 115	1	20
Total Selenium	0.497	$\mathrm{mg/L}$	1	0.500	< 0.00570	99	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch: 73659 Date Analyzed: 2010-09-20

Analyzed By: TP Prepared By: TP

Prep Batch: 63181

QC Preparation: 2010-09-20

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Mercury	0.00404	$\mathrm{mg/L}$	1	0.00400	< 0.0000388	101	91.4 - 111

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	$_{ m Units}$	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Mercury	0.00405	$\mathrm{mg/L}$	1	0.00400	< 0.0000388	101	91.4 - 111	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 63356

73832

Date Analyzed: QC Preparation: 2010-09-17

2010-09-26

Analyzed By: MN Prepared By: MN

	LCS			Spike	Matrix		Rec.
Param	$\operatorname{Result}$	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Naphthalene	0.0624	mg/L	1	0.0800	< 0.0000784	78	32.2 - 80.3
2-Methylnaphthalene	0.0647	mg/L	1	0.0800	< 0.0000747	81	34.8 - 87
1-Methylnaphthalene	0.0686	mg/L	1	0.0800	< 0.0000575	86	36.9 - 89.6
Acenaphthylene	0.0721	mg/L	1	0.0800	< 0.0000963	90	35 - 93.2
Acenaphthene	0.0725	mg/L	1	0.0800	< 0.0000617	91	35.8 - 92.9
Dibenzofuran	0.0525	mg/L	1	0.0800	< 0.0000952	66	35.3 - 85.1
Fluorene	0.0722	mg/L	1	0.0800	< 0.000134	90	43.4 - 101
Anthracene	0.0615	mg/L	1	0.0800	< 0.000441	77	44.8 - 92.4
Phenanthrene	0.0657	mg/L	1	0.0800	< 0.000435	82	44 - 93.7
Fluoranthene	0.0739	mg/L	1	0.0800	< 0.000476	92	52.7 - 104
Pyrene	0.0698	mg/L	1	0.0800	< 0.000590	87	42.2 - 93.8

continued ...

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control spikes continued ...

		LCS			$_{ m Spike}$	Matrix		Rec.
Param		Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Benzo(a)anthracene		0.0565	mg/L	1	0.0800	< 0.000118	71	40.4 - 91.9
Chrysene	1	0.0954	mg/L	1	0.0800	< 0.0000766	119	44.4 - 107
Benzo(b)fluoranthene		0.0423	${ m mg/L}$	1	0.0800	< 0.000146	53	34.8 - 105
Benzo(k)fluoranthene		0.0654	$\mathrm{mg/L}$	1	0.0800	< 0.000141	82	50.2 - 158
Benzo(a)pyrene		0.0621	$\mathrm{mg/L}$	1	0.0800	< 0.000132	78	51.3 - 151
Indeno(1,2,3-cd)pyrene		0.0494	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	62	43.2 - 115
Dibenzo(a,h)anthracene		0.0696	mg/L	1	0.0800	< 0.0000534	87	43.9 - 115
$\mathrm{Benzo}(\mathrm{g,h,i})$ perylene		0.0504	$\mathrm{mg/L}$	1	0.0800	< 0.0000473	63	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Naphthalene	2	0.0689	mg/L	1	0.0800	< 0.0000784	86	32.2 - 80.3	10	20
2-Methylnaphthalene		0.0693	$\mathrm{mg/L}$	1	0.0800	< 0.0000747	87	34.8 - 87	7	20
1-Methylnaphthalene	3	0.0743	mg/L	1	0.0800	< 0.0000575	93	36.9 - 89.6	8	20
Acenaphthylene	4	0.0792	mg/L	1	0.0800	< 0.0000963	99	35 - 93.2	9	20
Acenaphthene	5	0.0805	mg/L	1	0.0800	< 0.0000617	101	35.8 - 92.9	10	20
Dibenzofuran		0.0573	$\mathrm{mg/L}$	1	0.0800	< 0.0000952	72	35.3 - 85.1	9	20
Fluorene		0.0770	$\mathrm{mg/L}$	1	0.0800	< 0.000134	96	43.4 - 101	6	20
Anthracene		0.0681	$\mathrm{mg/L}$	1	0.0800	< 0.000441	85	44.8 - 92.4	10	20
Phenanthrene		0.0735	${ m mg/L}$	1	0.0800	< 0.000435	92	44 - 93.7	11	20
Fluoranthene		0.0732	mg/L	1	0.0800	< 0.000476	92	52.7 - 104	1	20
Pyrene		0.0673	mg/L	1	0.0800	< 0.000590	84	42.2 - 93.8	4	20
Benzo(a)anthracene		0.0579	mg/L	1	0.0800	< 0.000118	72	40.4 - 91.9	$^2$	20
Chrysene	6	0.0964	$\mathrm{mg/L}$	1	0.0800	< 0.0000766	120	44.4 - 107	1	20
Benzo(b)fluoranthene		0.0462	$\mathrm{mg/L}$	1	0.0800	< 0.000146	58	34.8 - 105	9	20
Benzo(k)fluoranthene		0.0674	$\mathrm{mg/L}$	1	0.0800	< 0.000141	84	50.2 - 158	3	20
Benzo(a)pyrene		0.0565	$\mathrm{mg/L}$	1	0.0800	< 0.000132	71	51.3 - 151	9	20
Indeno(1,2,3-cd)pyrene		0.0497	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	62	43.2 - 115	1	20
Dibenzo(a,h)anthracene		0.0690	mg/L	1	0.0800	< 0.0000534	86	43.9 - 115	1	20
Benzo(g,h,i)pervlene		0.0536	mg/L	1	0.0800	< 0.0000473	67	45.1 - 115	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$\mathbf{S}_{\mathbf{p}i\mathbf{k}\mathbf{e}}$	LCS	LCSD	$\mathrm{Rec}.$
Surrogate	Result	Result	Units	Dil.	Amount	$\mathrm{Rec.}$	Rec.	$\operatorname{Limit}$
Nitrobenzene-d5	0.0511	0.0525	mg/L	1	0.0800	64	66	10 - 111
2-Fluorobiphenyl	0.0607	0.0673	mg/L	1	0.0800	76	84	10 - 92.7
Terphenyl-d14	0.0626	0.0605	mg/L	1	0.0800	78	76	35.9 - 107

<sup>&</sup>lt;sup>1</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>2</sup>Spike analyte out of control limits. Results biased high. •

 $<sup>^3\</sup>mathrm{Spike}$  analyte out of control limits. Results biased high.  $\bullet$ 

<sup>&</sup>lt;sup>4</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>5</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>6</sup>Spike analyte out of control limits. Results biased high. •

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Matrix Spike (MS-1) Spiked Sample: 243988

QC Batch: Prep Batch: 62959

73407

Date Analyzed:

2010-09-10

QC Preparation: 2010-09-10

Analyzed By: AG Prepared By: AG

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Benzene	0.0949	mg/L	1	0.100	< 0.000 600	95	77.9 - 114
Toluene	0.0913	$_{ m mg/L}$	1	0.100	< 0.000600	91	78.3 - 111
Ethylbenzene	0.0894	mg/L	1	0.100	< 0.000800	89	75.3 - 110
Xylene	0.266	$\mathrm{mg/L}$	1	0.300	< 0.000767	89	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene	0.0966	mg/L	1	0.100	< 0.000600	97	77.9 - 114	2	20
Toluene	0.0927	mg/L	1	0.100	< 0.000600	93	78.3 - 111	$^2$	20
Ethylbenzene	0.0901	mg/L	1	0.100	< 0.000800	90	75.3 - 110	1	20
Xylene	0.267	$\mathrm{mg/L}$	1	0.300	< 0.000767	89	75.7 - 109	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	$\mathbf{A}$ mount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0984	0.101	mg/L	1	0.1	98 ·	101	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.0854	0.0813	mg/L	1	0.1	85	81	60.1 - 135

Matrix Spike (MS-1) Spiked Sample: 243997

QC Batch: 73465

Prep Batch: 63010

Date Analyzed:

2010-09-14

QC Preparation: 2010-09-14

Analyzed By: RR Prepared By: KV

MS Spike Matrix Rec. Param Limit Result Units Dil. Result Amount Rec. Total Aluminum < 0.00982 75 - 125 1.02 mg/L 1 1.00 102

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Aluminum	1.05	mg/L	1	1.00	< 0.00982	105	75 - 125	-3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 243997

QC Batch: 73465 Prep Batch: 63010 Date Analyzed: 2010-09-14 QC Preparation: 2010-09-14

Analyzed By: RR Prepared By: KV

TNM 97-04

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	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Total Boron	0.0470	$\mathrm{mg/L}$	1	0.0500	< 0.00215	94	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0480	mg/L	1	0.0500	< 0.00215	96	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	$\operatorname{Rec}$ .	Limit
Total Cobalt	0.250	m mg/L	1	0.250	< 0.00258	100	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Cobalt	0.255	$\mathrm{mg/L}$	1	0.250	< 0.00258	102	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Spiked Sample: 243997 Matrix Spike (MS-1)

QC Batch: 73465 Prep Batch: 63010 Date Analyzed: 2010-09-14 QC Preparation: 2010-09-14

Analyzed By: RR Prepared By: KV

	MS			Spike	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Copper	0.125	mg/L	1	0.125	< 0.00313	100	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Copper	0.124	mg/L	1	0.125	< 0.00313	99	75 - 125	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 243997

QC Batch: 73465 Prep Batch: 63010 Date Analyzed: 2010-09-14 QC Preparation: 2010-09-14

Analyzed By: RR Prepared By: KV

TNM 97-04

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Lovington, NM

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Iron	1.47	m mg/L	1	0.500	1.03	88	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	$\operatorname{RPD}_{-}$	Limit
Total Iron	1.47	mg/L	1	0.500	1.03	88	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prepared By: KV

Prep Batch: 63010

QC Preparation: 2010-09-14

	MS			Spike	Matrix		${ m Rec.}$
Param	Result	· Units	Dil.	Amount	Result	Rec.	Limit
Total Manganese	0.254	mg/L	1	0.250	< 0.00423	102	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Manganese	0.262	mg/L	1	0.250	< 0.00423	105	75 - 125	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR Prepared By: KV

Prep Batch: 63010

QC Preparation: 2010-09-14

MS Rec. Spike Matrix Limit Units Dil. Result Param Result Amount Rec. Total Molybdenum 0.518 0.500 < 0.00164 104 75 - 125 mg/L

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	${ m Rec.}$	$_{ m Limit}$	RPD	Limit
Total Molybdenum	0.526	mg/L	1	0.500	< 0.00164	105	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch: 73465 Prep Batch: 63010 Date Analyzed: 2010-09-14 QC Preparation: 2010-09-14

Analyzed By: RR Prepared By: KV

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	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Nickel	0.251	${ m mg/L}$	1	0.250	< 0.00593	100	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Nickel	 0.246	mg/L	1	0.250	< 0.00593	98	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

TNM 97-04

QC Preparation: 2010-09-14

Prepared By: KV

MS Spike Matrix Rec. Param Limit Result Units Dil. Amount Result Rec. Total Zinc 0.252mg/L 0.250 < 0.00178 10175 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Zinc	0.257	mg/L	1	0.250	< 0.00178	103	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch: 73465 Prep Batch:

63010

Date Analyzed:

2010-09-14

QC Preparation: 2010-09-14

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Silver	0.134	mg/L	1	0.125	< 0.000469	107	75 - 125
Total Arsenic	0.542	mg/L	1	0.500	< 0.00465	108	75 - 125
Total Barium	1.02	$\mathrm{mg/L}$	1	1.00	< 0.00418	102	75 - 125
Total Cadmium	0.256	mg/L	1	0.250	< 0.00232	102	75 - 125
Total Chromium	0.100	mg/L	1	0.100	< 0.00291	100	75 - 125
Total Lead	0.524	${ m mg/L}$	1	0.500	< 0.00303	105	75 - 125
Total Selenium	0.503	mg/L	1	0.500	< 0.00570	101	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Silver	0.138	mg/L	1	0.125	< 0.000469	110	75 - 125	3	20

continued ...

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matrix spikes continued ... MSD Spike RPD Matrix Rec.

111010			Spine	.v.c.or 17c		1000.		101 12
Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
0.534	mg/L	1	0.500	< 0.00465	107	75 - 125	2	20
1.06	mg/L	1	1.00	< 0.00418	106	75 - 125	4	20
0.264	mg/L	1	0.250	< 0.00232	106	75 - 125	3	20
0.101	$\mathrm{mg/L}$	1	0.100	< 0.00291	101	75 - 125	1	20
0.532	mg/L	1	0.500	< 0.00303	106	75 - 125	<b>2</b>	20
0.506	mg/L	1	0.500	< 0.00570	101	75 - 125	1	20
	Result 0.534 1.06 0.264 0.101 0.532	Result Units  0.534 mg/L  1.06 mg/L  0.264 mg/L  0.101 mg/L  0.532 mg/L	$\begin{array}{cccc} Result & Units & Dil. \\ \hline 0.534 & mg/L & 1 \\ 1.06 & mg/L & 1 \\ 0.264 & mg/L & 1 \\ 0.101 & mg/L & 1 \\ 0.532 & mg/L & 1 \\ \end{array}$	Result         Units         Dil.         Amount           0.534         mg/L         1         0.500           1.06         mg/L         1         1.00           0.264         mg/L         1         0.250           0.101         mg/L         1         0.100           0.532         mg/L         1         0.500	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243988

QC Batch: 73659 Date Analyzed:

2010-09-20

Analyzed By: TP

Prep Batch: 63181

QC Preparation: 2010-09-20

Prepared By: TP

MS Rec. Spike Matrix Param Result Rec. Limit Result Units Dil. Amount Total Mercury 0.00381 0.00400 < 0.0000388 75 - 122 mg/L 95

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$_{ m Limit}$
Total Mercury	0.00378	mg/L	1	0.00400	< 0.0000388	94	75 - 122	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Standard (CCV-1)

QC Batch: 73407

Date Analyzed: 2010-09-10

Analyzed By: AG

•			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0951	95	80 - 120	2010-09-10
Toluene		${ m mg/L}$	0.100	0.0931	93	80 - 120	2010-09-10
Ethylbenzene		$\mathrm{mg/L}$	0.100	0.0892	89	80 - 120	2010-09-10
Xylene		m mg/L	0.300	0.263	88	80 - 120	2010-09-10

#### Standard (CCV-2)

QC Batch: 73407

Date Analyzed: 2010-09-10

Analyzed By: AG

Report Date: September 28, 2010 TNM 97-04

Param

Total Copper

Flag

Units

mg/L

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Recovery

Limits

90 - 110

Date

Analyzed

2010-09-14

11011 01 01				TIVE STORE LOWE	ischa		Lovington, 1111
			CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.102	102	80 - 120	2010-09-10
Toluene		${ m mg/L}$	0.100	0.0986	99	80 - 120	2010-09-10
Ethylbenzene		${ m mg/L}$	0.100	0.0963	96	80 - 120	2010-09-10
Xylene		mg/L	0.300	0.281	94	80 - 120	2010-09-10
Standard (ICV	-1)						
QC Batch: 7346	65		Date Analyz	zed: 2010-09-1	14	Anal	yzed By: RR
			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		mg/L	1.00	1.02	102	90 - 110	2010-09-14
QC Batch: 7346	35		Date Analyz	zed: 2010-09-	14	Anal	yzed By: RR
			ICVs	IOM	IOM	D	
			True	${ m ICVs} \ { m Found}$	ICVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron	Trag	mg/L	1.00	1.03	103	90 - 110	2010-09-14
Standard (ICV	(-1)		1.00		100	<i>50</i> 110	
QC Batch: 7340	•		Date Analyz	zed: 2010-09-	14	Anal	yzed By: RR
			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		$_{ m mg/L}$	1.00	1.00	100	90 - 110	2010-09-14
	_ ,						
Standard (ICV	,						
QC Batch: 7340	65		Date Analyz	zed: 2010-09-	14	Anal	yzed By: RR
			ICVs	ICVs	ICVs	Percent	

True

Conc.

1.00

Found

Conc.

1.02

Percent

Recovery

102

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Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

			IČVs	ICVs	ICVs <sup>-</sup>	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	1.01	101	90 - 110	2010-09-14

Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		$_{ m mg/L}$	1.00	1.01	101	90 - 110	2010-09-14

Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	•
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	1.01	101	90 - 110	2010-09-14

Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	1.02	102	90 - 110	2010-09-14

Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

			ICVs	ICVs	ICVs	$\operatorname{Percent}$	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	1.02	102	90 - 110	2010-09-14

TNM 97-04

Work Order: 10091008 TNM 97-04 Townsend Page Number: 25 of 28 Lovington, NM

Standard (ICV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

Param	$\operatorname{Flag}$	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Silver		mg/L	0.125	0.127	102	90 - 110	2010-09-14
Total Arsenic		mg/L	1.00	0.998	100	90 - 110	2010-09-14
Total Barium		mg/L	1.00	0.984	98	90 - 110	2010-09-14
Total Cadmium		mg/L	1.00	1.02	102	90 - 110	2010-09-14
Total Chromium		mg/L	1.00	1.00	100	90 - 110	2010-09-14
Total Lead		$\mathrm{mg/L}$	1.00	1.02	102	90 - 110	2010-09-14
Total Selenium		$\mathrm{mg/L}$	1.00	1.00	100	90 - 110	2010-09-14

Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			${ m CCVs} \ { m True}$	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		mg/L	1.00	1.01	101	90 - 110	2010-09-14

Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

Param	$\operatorname{Flag}$	$\mathbf{U}_{\mathbf{nits}}$	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
raram	rag	Ullius	Conc.	Conc.	recovery	Lillius	Analyzed
Total Boron		mg/L	1.00	0.983	98	90 - 110	2010-09-14

Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		mg/L	1.00	1.00	100	90 - 110	2010-09-14

Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

Work Order: 10091008 TNM 97-04 Townsend Page Number: 26 of 28 Lovington, NM

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			CCVs True	$\begin{array}{c} { m CCVs} \\ { m Found} \end{array}$	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		${ m mg/L}$	1.00	1.01	101	90 - 110	2010-09-14

#### Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	1.01	101	90 - 110	2010-09-14

#### Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		mg/L	1.00	1.01	101	90 - 110	2010-09-14

## Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	1.01	101	90 - 110	2010-09-14

### Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	<b>.</b>
			$\operatorname{True}$	Found	$\operatorname{Percent}$	$\operatorname{Recovery}$	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		$\mathrm{mg/L}$	1.00	1.01	101	90 - 110	2010-09-14

### Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

Work Order: 10091008

Page Number: 27 of 28 Lovington, NM

TNM 97-04

TNM 97-04 Townsend

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	1.01	101	90 - 110	2010-09-14

### Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	$\mathrm{CCVs}$	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Silver		mg/L	0.125	0.126	101	90 - 110	2010-09-14
Total Arsenic		$\mathrm{mg/L}$	1.00	0.992	99	90 - 110	2010-09-14
Total Barium		$_{ m mg/L}$	1.00	0.994	99	90 - 110	2010-09-14
Total Cadmium		$_{ m mg/L}$	1.00	1.01	101	90 - 110	2010-09-14
Total Chromium	•	$\mathrm{mg/L}$	1.00	0.992	99	. 90 - 110	2010-09-14
Total Lead		m mg/L	1.00	1.02	102	90 - 110	2010-09-14
Total Selenium		mg/L	1.00	0.998	100	90 - 110	2010-09-14

### Standard (CCV-1)

QC Batch: 73659

Date Analyzed: 2010-09-20

Analyzed By: TP

			CCVs	CCVs	CCVs	Percent	•
			True	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	$\mathbf{A}$ nalyzed
Total Mercury		mg/L	0.00500	0.00511	102	90 - 110	2010-09-20

# Standard (CCV-2)

QC Batch: 73659

Date Analyzed: 2010-09-20

Analyzed By: TP

•			CCVs True	${ m CCVs} \ { m Found}$	$rac{ ext{CCVs}}{ ext{Percent}}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00504	101	90 - 110	2010-09-20

## Standard (CCV-1)

QC Batch: 73832

Date Analyzed: 2010-09-26

Analyzed By: MN

Report Date: September 28, 2010 TNM 97-04

Dibenzo(a,h)anthracene

Benzo(g,h,i)perylene

Work Order: 10091008 TNM 97-04 Townsend Page Number: 28 of 28

Lovington, NM

2010-09-26

2010-09-26

CCVsCCVs **CCVs** Percent True Found Percent Recovery Date Flag Units Conc. Limits Analyzed Param Conc. Recovery 2010-09-26 Naphthalene 60.0 60.2 100 80 - 120 mg/L 2-Methylnaphthalene mg/L60.060.9 102 80 - 1202010-09-26 60.0 2010-09-26 1-Methylnaphthalene mg/L 60.5101 80 - 120 Acenaphthylene mg/L 60.059.9100 80 - 120 2010-09-26 Acenaphthene mg/L60.0 62.3 104 80 - 120 2010-09-26 Dibenzofuran 60.0 mg/L 59.3 99 80 - 120 2010-09-26 Fluorene mg/L 60.0102 80 - 120 61.32010-09-26 Anthracene mg/L60.0 55.292 80 - 120 2010-09-26 Phenanthrene mg/L60.056.694 80 - 120 2010-09-26 Fluoranthene mg/L 60.0 53.8 90 80 - 120 2010-09-26 Pyrene mg/L 60.0 60.9 102 80 - 1202010-09-26 Benzo(a)anthracene mg/L 60.048.2 80 80 - 120 2010-09-26 Chrysene 80 - 120 mg/L60.065.1108 2010-09-26 Benzo(b)fluoranthene 60.080 - 120 2010-09-26 mg/L 50.2 84 Benzo(k)fluoranthene mg/L 60.068.5114 80 - 120 2010-09-26 Benzo(a)pyrene mg/L 60.0 67.1112 80 - 120 2010-09-26 Indeno(1,2,3-cd)pyrene 60.0 mg/L 55.292 80 - 120 2010-09-26

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	$egin{array}{c}  ext{Recovery} \  ext{Limit} \end{array}$
Nitrobenzene-d5		68.4	mg/L	1	60.0	114	80 - 120
2-Fluorobiphenyl		60.4	$\mathrm{mg/L}$	1	60.0	101	80 - 120
Terphenyl-d14		54.5	mg/L	1	60.0	91	80 - 120

54.2

58.0

90

97

80 - 120

80 - 120

60.0

60.0

mg/L

mg/L

LAB Order 1D# 10091008

TraceAnalysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1296

5002 Basin Street, Suite A1 **Midland, Texas 79703** Tel (432) 689-6301 Fax (432) 689-6313

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BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750 200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443

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Submittal of samples constitutes agreement to Terms and Conditions list $\phi$ d on reverse side of C. O. C.



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E. 5002 Basin Street, Suite A1 6015 Harris Parkway, Suite 110 Lubbook, Texas 79424 El Paso, Texas 79022 Midland, Texas 79703

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Ft. Worth, Texas 76132

817 • 201 • 5260

E-Mail: lab@traceanalysis.com

# Certifications

**WBENC:** 237019

HUB:

1752439743100-86536

**DBE:** VN 20657

NCTRCA

WFWB38444Y0909

LELAP-02002

# **NELAP Certifications**

Lubbock: T104704219-08-TX

LELAP-02003

El Paso: T104704221-08-TX

Midland:

T104704392-08-TX

Kansas E-10317

# Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: September 28, 2010

Work Order: 10091705

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
244990	Post-Carbon	water	2010-09-16	12:30	2010-09-17

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 28 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abel

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

#### Standard Flags

 $\, B \,$  -  $\,$  The sample contains less than ten times the concentration found in the method blank.

## Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-09-17 and assigned to work order 10091705. Samples for work order 10091705 were received intact without headspace and at a temperature of 3.7 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	Prep	QC	Analysis
Test	Method	Batch	Date	$\operatorname{Batch}$	Date
Ag, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Al, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
As, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Ba, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
BTEX	S 8021B	63178	2010-09-17 at 16:00	73660	2010-09-18 at 09:57
B, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Cd, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Co, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Cr, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Cu, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Fe, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Hg, Total	S 7470A	63300	2010-09-24 at 08:43	73807	2010-09-24 at 13:22
Mn, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Mo, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Ni, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
PAH	S 8270 $D$	63356	2010-09-17 at 15:00	73832	2010-09-26 at $13:25$
Pb, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Se, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Zn, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10091705 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10091705 TNM 97-04 Townsend

Page Number: 4 of 28 Lovington, NM

# **Analytical Report**

Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Analysis: Al, Total QC Batch: 73754 Prep Batch: 63277

Analytical Method: Date Analyzed:

S 6010C

2010-09-23 2010-09-23 Prep Method: S 3010A

Analyzed By: RRPrepared By: KV

RL

Sample Preparation:

Parameter	Flag	Result	Units	Dilution	RL
Total Aluminum		0.0570	mg/L	1	0.0500

Sample: 244990 - Post-Carbon

Laboratory:

Lubbock

Analysis: B, Total QC Batch: 73754 Prep Batch: 63277

Analytical Method: Date Analyzed:

S 6010C 2010-09-23 Sample Preparation: 2010-09-23 Prep Method: S 3010A Analyzed By:

RRPrepared By:

RL

Parameter	Flag	Result	Units	Dilution	RL
Total Boron		0.216	mg/L	1	0.0100

Sample: 244990 - Post-Carbon

Laboratory:

Midland

Analysis: BTEX QC Batch: 73660 Prep Batch: 63178

Analytical Method: Date Analyzed:

S 8021B 2010-09-18 Sample Preparation: 2010-09-17 Prep Method: S 5030B Analyzed By:

AG Prepared By: AG

RLParameter Dilution RLFlag Units Result Benzene < 0.00100 mg/L 1 0.00100 Toluene 0.00100< 0.00100 mg/L 1 Ethylbenzene < 0.00100 mg/L 1 0.00100Xylene < 0.00100 mg/L 0.00100

					$\operatorname{Spike}$	$\operatorname{Percent}$	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)	*	0.0914	mg/L	1	0.100	91	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0593	mg/L	1	0.100	59	51.1 - 128

TNM 97-04 TNM 97-04 Townsend Lovington, NM Sample: 244990 - Post-Carbon Laboratory: Lubbock S 6010C Analysis: Co, Total Analytical Method: Prep Method: S 3010A QC Batch: 73754 Date Analyzed: Analyzed By: 2010-09-23 RRPrep Batch: 63277 Sample Preparation: 2010-09-23 Prepared By: KV RLDilution RLParameter Flag Result Units < 0.00500 0.00500Total Cobalt mg/L Sample: 244990 - Post-Carbon Laboratory: Lubbock Cu, Total Analytical Method: S 6010C Prep Method: S 3010A Analysis: QC Batch: 73754 Date Analyzed: 2010-09-23 Analyzed By: RRPrep Batch: 63277 Sample Preparation: Prepared By: KV 2010-09-23 RLDilution RLParameter Flag Result Units 0.00500 0.00500 Total Copper mg/L1 Sample: 244990 - Post-Carbon Lubbock Laboratory: Fe, Total S 3010A Analysis: Analytical Method: S 6010C Prep Method: QC Batch: 73754 RRDate Analyzed: 2010-09-23 Analyzed By: Prep Batch: 63277 Sample Preparation: 2010-09-23 Prepared By: KV RLParameter Flag Result Units Dilution RLTotal Iron 0.0440mg/L 0.0100 Sample: 244990 - Post-Carbon Laboratory: Lubbock S 3010A Analysis: Mn, Total Analytical Method: S 6010C Prep Method: QC Batch: 73754 Date Analyzed: 2010-09-23 Analyzed By: RRPrep Batch: 63277 Sample Preparation: 2010-09-23 Prepared By: KVRL

Work Order: 10091705

Page Number: 5 of 28

RL

0.00500

Report Date: September 28, 2010

Parameter

Total Manganese

Flag

Result

0.101

Units

mg/L

Dilution

TNM 97-04

Work Order: 10091705 TNM 97-04 Townsend

Page Number: 6 of 28 Lovington, NM

Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch: Mo, Total 73754

Analytical Method: Date Analyzed:

S 6010C

2010-09-23

Prep Method: S 3010A Analyzed By:

RR

Prep Batch: 63277

Sample Preparation:

2010-09-23

Prepared By:

KV

RL

Parameter Total Molybdenum Flag Result < 0.0500

Unitsmg/L Dilution

RL0.0500

Sample: 244990 - Post-Carbon

Laboratory:

Lubbock

Analysis: QC Batch:

Ni, Total 73754

Analytical Method:

S 6010C 2010-09-23 Prep Method: S 3010A

Prep Batch:

63277

Date Analyzed:

Analyzed By:

RR

Flag

Sample Preparation: 2010-09-23 Prepared By:

KV

RL

Parameter Total Nickel

Result < 0.0100 Units mg/L Dilution

1

RL

0.0100

Sample: 244990 - Post-Carbon

Laboratory:

Prep Batch:

Lubbock

63356

Analysis: PAH QC Batch: 73832 Analytical Method: Date Analyzed:

S 8270D

Prep Method:

S 3510C

Sample Preparation:

2010-09-26 2010-09-17

Analyzed By: Prepared By: MN

MN

RL

Parameter	Flag	Result	Units	Dilution	RL
Naphthalene		< 0.000200	mg/L	1	0.000200
2-Methylnaphthalene		< 0.000200	mg/L	1 .	0.000200
1-Methylnaphthalene		< 0.000200	$\mathrm{mg/L}$	1	0.000200
Acenaphthylene		< 0.000200	m mg/L	1	0.000200
Acenaphthene		< 0.000200	$_{ m mg/L}$	1	0.000200
Dibenzofuran		< 0.000200	m mg/L	1	0.000200
Fluorene		< 0.000200	mg/L	1	0.000200
Anthracene		< 0.000200	mg/L	1	0.000200
Phenanthrene		< 0.000200	mg/L	1	0.000200
Fluoranthene		< 0.000200	m mg/L	1	0.000200
Pyrene		< 0.000200	m mg/L	1	0.000200
Benzo(a)anthracene		< 0.000200	mg/L	1	0.000200
Chrysene		< 0.000200	m mg/L	1	0.000200
Benzo(b)fluoranthene		< 0.000200	mg/L	1	0.000200

 $continued \dots$ 

TNM 97-04

Work Order: 10091705 TNM 97-04 Townsend Page Number: 7 of 28 Lovington, NM

#### sample 244990 continued ...

		$\mathrm{RL}$			
Parameter	Flag	Result	Units	Dilution	RL
Benzo(k)fluoranthene		< 0.000200	m mg/L	1	0.000200
Benzo(a)pyrene		< 0.000200	mg/L	1	0.000200
Indeno(1,2,3-cd)pyrene		< 0.000200	mg/L	1	0.000200
Dibenzo(a,h)anthracene		< 0.000200	mg/L	1	0.000200
Benzo(g,h,i)perylene		< 0.000200	$\mathrm{mg/L}$	1	0.000200

					Spike	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0288	mg/L	1	0.0800	36	10 - 111
2-Fluorobiphenyl		0.0340	mg/L	1	0.0800	42	10 - 92.7
Terphenyl-d14		0.0413	mg/L	1	0.0800	52	35.9 - 107

#### Sample: 244990 - Post-Carbon

Laboratory: Lubbock

S 6010C Prep Method: S 3010A Analysis: Total 8 Metals Analytical Method: QC Batch: 73754 Date Analyzed: 2010-09-23 Analyzed By: RRPrep Batch: 63277 Sample Preparation: 2010-09-23 Prepared By: KV

Laboratory: Lubbock

Analysis: Total 8 Metals Analytical Method: S 7470A Prep Method: N/AQC Batch: 73807 Date Analyzed: 2010-09-24 Analyzed By: TP Prepared By: TPPrep Batch: 63300 Sample Preparation: 2010-09-24

RLParameter Flag Result Units Dilution RL0.00500 Total Silver < 0.00500 mg/L 1 Total Arsenic < 0.0100 1 0.0100 mg/LTotal Barium 1 0.0100 0.280mg/L Total Cadmium 0.00500 < 0.00500 mg/L1 Total Chromium 0.0100 < 0.0100 mg/L 1 Total Mercury 0.000200< 0.000200mg/L1 Total Lead < 0.00500 mg/L 1 0.00500Total Selenium < 0.0200 mg/L 1 0.0200

#### Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Zn, Total Analytical Method: S 6010C Prep Method: S 3010A Analysis: RRQC Batch: 73754 Date Analyzed: 2010-09-23 Analyzed By: Prep Batch: 63277 2010-09-23 Prepared By: KVSample Preparation:

Work Order: 10091705 TNM 97-04 Townsend Page Number: 8 of 28 Lovington, NM

Analyzed By: AG

Prepared By: AG

Analyzed By: RR

Prepared By: KV

TNM 97-04 TNM

		RL			
Parameter	Flag	Result	Units	Dilution	RL
Total Zinc		0.0100	mg/L	1	0.00500

Method Blank (1) QC Batch: 73660

QC Batch: 73660 Date Analyzed: 2010-09-18

Prep Batch: 63178 QC Preparation: 2010-09-17

MDL RLParameter Flag Result Units Benzene < 0.000600 mg/L 0.001 Toluene < 0.000600 mg/L 0.001 Ethylbenzene < 0.000800 mg/L 0.001Xylene < 0.000767 mg/L 0.001

					$_{ m Spike}$	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0887	$_{ m mg/L}$	1	0.100	89	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.0516	mg/L	1	0.100	52	47.3 - 116

Method Blank (1) QC Batch: 73754

QC Batch: 73754 Date Analyzed: 2010-09-23

Prep Batch: 63277 QC Preparation: 2010-09-23

Method Blank (1) QC Batch: 73754

QC Batch: 73754 Date Analyzed: 2010-09-23 Analyzed By: RR

Prep Batch: 63277 QC Preparation: 2010-09-23 Prepared By: KV

Report Date: September 28, 2010 TNM 97-04		Work Order: 10091705 TNM 97-04 Townsend		Page Number: 9 of 28 Lovington, NM		
Method Blank (1)	QC Batch: 73754		,			
QC Batch: 73754 Prep Batch: 63277		Date Analyzed:         2010-09-23           QC Preparation:         2010-09-23		Analyzed By: RR Prepared By: KV		
Parameter	Flag	MDL Result	Units	m RL		
Total Cobalt		< 0.00258	$\mathrm{mg}/\mathrm{L}$	0.005		
Method Blank (1)	QC Batch: 73754					
QC Batch: 73754 Prep Batch: 63277		Date Analyzed:         2010-09-23           QC Preparation:         2010-09-23		Analyzed By: RR Prepared By: KV		
Parameter	Flag	MDL Result	Units	$\operatorname{RL}$		
Total Copper		<0.00313	m mg/L	0.005		
Method Blank (1)	QC Batch: 73754					
QC Batch: 73754 Prep Batch: 63277		Date Analyzed: 2010-09-23 QC Preparation: 2010-09-23		Analyzed By: RR Prepared By: KV		
Parameter	Flag	MDL Result	Units	RL		
Total Iron		<0.00273	mg/L	0.01		
Method Blank (1)	QC Batch: 73754					
QC Batch: 73754 Prep Batch: 63277		Date Analyzed:         2010-09-23           QC Preparation:         2010-09-23		Analyzed By: RR Prepared By: KV		
Parameter	Flag	MDL Result	Units	m RL		
Total Manganese		< 0.00423	m mg/L	0.005		
Method Blank (1)	QC Batch: 73754					
QC Batch: 73754 Prep Batch: 63277		Date Analyzed: 2010-09-23 QC Preparation: 2010-09-23		Analyzed By: RR Prepared By: KV		

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		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Total Molybdenum		< 0.00164	mg/L	0.05

Method Blank (1)

QC Batch: 73754

QC Batch: Prep Batch: 63277

TNM 97-04

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prepared By: KV

MDI

		MDL		
Parameter	Flag	Result	Units	ho RL
Total Nickel		< 0.00593	mg/L	0.01

QC Preparation: 2010-09-23

Method Blank (1)

QC Batch: 73754

QC Batch: 73754Prep Batch: 63277 Date Analyzed: 2010-09-23 QC Preparation: 2010-09-23 Analyzed By: RR

Prepared By: KV

MDL

Parameter	Flag	Result	Units	RL
Total Zinc		< 0.00178	mg/L	0.005

Method Blank (1)

QC Batch: 73754

QC Batch: 73754 Prep Batch: 63277 Date Analyzed:

2010-09-23 QC Preparation: 2010-09-23 Analyzed By: RR

Prepared By: KV

	•	$\mathrm{MDL}$		
Parameter	Flag	Result	Units	$\mathrm{RL}$
Total Silver		< 0.000469	mg/L	0.005
Total Arsenic		< 0.00465	$_{ m mg/L}$	0.01
Total Barium		< 0.00418	m mg/L	0.01
Total Cadmium		< 0.00232	m mg/L	0.005
Total Chromium		< 0.00291	m mg/L	0.01
Total Lead		< 0.00303	m mg/L	0.005
Total Selenium		< 0.00570	mg/L	0.02

Method Blank (1)

QC Batch: 73807

QC Batch: 73807 Prep Batch: 63300 Date Analyzed: QC Preparation: 2010-09-24

2010-09-24

Analyzed By: TP Prepared By: TP Report Date: September 28, 2010 TNM 97-04

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		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	$\mathrm{RL}$
Total Mercury		< 0.0000388	m mg/L	0.0002

Method Blank (1)

QC Batch: 73832

QC Batch:

73832

Date Analyzed:

2010-09-26

Analyzed By: MN

Prep Batch: 63356

QC Preparation: 2010-09-17

Prepared By: MN

		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Naphthalene		< 0.0000784	m mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	mg/L	0.0002
1-Methylnaphthalene		< 0.0000575	m mg/L	0.0002
Acenaphthylene		< 0.0000963	mg/L	0.0002
Acenaphthene		< 0.0000617	$_{ m mg/L}$	0.0002
Dibenzofuran		< 0.0000952	$\mathrm{mg/L}$	0.0002
Fluorene		< 0.000134	m mg/L	0.0002
Anthracene		< 0.000441	$_{ m mg/L}$	0.0002
Phenanthrene		< 0.000435	m mg/L	0.0002
Fluoranthene		< 0.000476	$_{ m mg/L}$	0.0002
Pyrene		< 0.000590	m mg/L	0.0002
Benzo(a)anthracene		< 0.000118	$_{ m mg/L}$	0.0002
Chrysene		< 0.0000766	mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	mg/L	0.0002
Benzo(k)fluoranthene		< 0.000141	$\mathrm{mg/L}$	0.0002
Benzo(a)pyrene		< 0.000132	mg/L	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	mg/L	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

				•	$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Nitrobenzene-d5		0.0285	$_{ m mg/L}$	1	0.0800	36	10 - 111
2-Fluorobiphenyl		0.0281	$\mathrm{mg/L}$	1	0.0800	35	10 - 92.7
Terphenyl-d14		0.0394	$\mathrm{mg/L}$	1	0.0800	49	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch: 73660Prep Batch: 63178 Date Analyzed: 2010-09-18 QC Preparation: 2010-09-17

Analyzed By: AG Prepared By: AG

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Param	LCS Result	Units	Dil.	$\begin{array}{c} {\rm Spike} \\ {\rm Amount} \end{array}$	Matrix Result	Rec.	Rec. Limit
Benzene	0.0992	mg/L	1	0.100	< 0.000600	99	82.9 - 118
Toluene	0.0934	mg/L	1	0.100	< 0.000600	93	82.7 - 117
Ethylbenzene	0.0847	mg/L	1	0.100	< 0.000800	85	78.8 - 116
Xylene	0.239	mg/L	1	0.300	< 0.000767	80	79.3 - 116

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Benzene	0.0997	mg/L	1	0.100	< 0.000600	100	82.9 - 118	0	20
Toluene	0.0942	mg/L	1	0.100	< 0.000600	94	82.7 - 117	1	20
Ethylbenzene	0.0866	mg/L	1	0.100	< 0.000800	87	78.8 - 116	2	20
Xylene	0.245	mg/L	1	0.300	< 0.000767	82	79.3 - 116	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$_{ m Spike}$	LCS	LCSD	Rec.
Surrogate	$\operatorname{Result}$	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	0.0982	0.0988	mg/L	1	0.100	98	99	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.108	0.113	mg/L	1	0.100	108	113	68.2 - 134

#### Laboratory Control Spike (LCS-1)

QC Batch:

73754 Prep Batch: 63277

Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Aluminum	1.02	mg/L	1	1.00	< 0.00982	102	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Total Aluminum	1.02	mg/L	1	1.00	< 0.00982	102	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 63277

Date Analyzed:

2010-09-23

Analyzed By: RR

Prepared By: KV QC Preparation: 2010-09-23

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	$\mathrm{Rec}.$	Limit
Total Boron	0.0500	mg/L	1	0.0500	< 0.00215	100	85 - 115

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0490	mg/L	1	0.0500	< 0.00215	98	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation:

2010-09-23

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Cobalt	0.270	mg/L	1	0.250	< 0.00258	108	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Cobalt	0.267	mg/L	1	0.250	< 0.00258	107	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation:

2010-09-23

Prepared By: KV

LCS Spike Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit Total Copper 0.130 mg/L 0.125< 0.00313 104 85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		$\operatorname{Rec}$ .		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Copper	0.134	mg/L	1	0.125	< 0.00313	107	85 - 115	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prepared By: KV

Prep Batch: 63277

QC Preparation: 2010-09-23

TNM 97-04

Work Order: 10091705

TNM 97-04 Townsend

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	$\mathrm{Rec}.$	$\operatorname{Limit}$
Total Iron	0.537	mg/L	1	0.500	< 0.00273	107	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Iron	0.535	mg/L	1	0.500	< 0.00273	107	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73754 Prep Batch: 63277

Date Analyzed: 2010-09-23 QC Preparation: 2010-09-23

Analyzed By: RR Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Manganese	0.262	mg/L	1	0.250	< 0.00423	105	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		Rec.		$\operatorname{RPD}$
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	$_{ m Limit}$	RPD	Limit
Total Manganese	0.259	mg/L	1	0.250	< 0.00423	104	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73754 Prep Batch: 63277 Date Analyzed: QC Preparation: 2010-09-23

Analyzed By: RR 2010-09-23 Prepared By: KV

LCS Spike Rec. Matrix Param Result Units Dil. Amount Result Rec. Limit Total Molybdenum 0.530 0.500 < 0.00164 106 85 - 115 mg/L

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Molybdenum	0.530	mg/L	1	0.500	< 0.00164	106	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73754 Prep Batch: 63277 Date Analyzed: 2010-09-23 QC Preparation: 2010-09-23

Analyzed By: RR Prepared By: KV

Work Order: 10091705

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Nickel	0.269	mg/L	1	0.250	< 0.00593	108	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Nickel	0.267	mg/L	1	0.250	< 0.00593	107	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

TNM 97-04

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Zinc	0.257	mg/L	1	0.250	< 0.00178	103	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Zinc	0.258	mg/L	1	0.250	< 0.00178	103	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73754 Prep Batch: 63277

Date Analyzed: QC Preparation: 2010-09-23

2010-09-23

Analyzed By: RR Prepared By: KV

December		LCS	TI:4	D:I	Spike	Matrix	D.,	Rec.
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Silver		0.135	mg/L	1	0.125	< 0.000469	108	85 - 115
Total Arsenic		0.540	$_{ m mg/L}$	1	0.500	< 0.00465	108	85 - 115
Total Barium		1.04	mg/L	1	1.00	< 0.00418	104	85 - 115
Total Cadmium		0.272	mg/L	1	0.250	< 0.00232	109	85 - 115
Total Chromium		0.102	mg/L	1	0.100	< 0.00291	102	85 - 115
Total Lead		0.542	mg/L	1	0.500	< 0.00303	108	85 - 115
Total Selenium	•	0.492	mg/L	1	0.500	< 0.00570	98	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Silver	0.133	mg/L	1	0.125	< 0.000469	106	85 - 115	2	20

continued ...

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control spikes continued ...

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	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Arsenic	0.536	mg/L	1	0.500	< 0.00465	107	85 - 115	1	20
Total Barium	1.05	${ m mg/L}$	1	1.00	< 0.00418	105	85 - 115	1	20
Total Cadmium	0.269	mg/L	1	0.250	< 0.00232	108	85 - 115	1	20
Total Chromium	0.102	mg/L	1	0.100	< 0.00291	102	85 - 115	0	20
Total Lead	0.539	$\mathrm{mg/L}$	1	0.500	< 0.00303	108	85 - 115	1	20
Total Selenium	0.491	mg/L	_1	0.500	< 0.00570	98	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73807 Prep Batch: 63300 Date Analyzed: 2010-09-24 QC Preparation: 2010-09-24 Analyzed By: TP Prepared By: TP

	LCS			Spike	Matrix		$\mathrm{Rec}.$
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Mercury	0.00415	mg/L	1	0.00400	< 0.0000388	104	91.4 - 111

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

•	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Mercury	0.00413	mg/L	1 .	0.00400	< 0.0000388	103	91.4 - 111	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73832 Prep Batch: 63356 Date Analyzed: 2010-09-26 QC Preparation: 2010-09-17 Analyzed By: MN Prepared By: MN

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\operatorname{Limit}$
Naphthalene	0.0624	mg/L	1	0.0800	< 0.0000784	78	32.2 - 80.3
2-Methylnaphthalene	0.0647	${ m mg/L}$	1	0.0800	< 0.0000747	81	34.8 - 87
1-Methylnaphthalene	0.0686	mg/L	1	0.0800	< 0.0000575	86	36.9 - 89.6
Acenaphthylene	0.0721	mg/L	1	0.0800	< 0.0000963	90	35 - 93.2
Acenaphthene	0.0725	mg/L	1	0.0800	< 0.0000617	91	35.8 - 92.9
Dibenzofuran	0.0525	mg/L	1	0.0800	< 0.0000952	66	35.3 - 85.1
Fluorene	0.0722	mg/L	1	0.0800	< 0.000134	90	43.4 - 101
Anthracene	0.0615	mg/L	1	0.0800	< 0.000441	77	44.8 - 92.4
Phenanthrene	0.0657	mg/L	1	0.0800	< 0.000435	82	44 - 93.7
Fluoranthene	0.0739	$_{ m mg/L}$	1	0.0800	< 0.000476	92	52.7 - 104
Pyrene	0.0698	$_{ m mg/L}$	11	0.0800	< 0.000590	87	42.2 - 93.8

continued ...

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control spikes continued . . .

		LCS			Spike	Matrix		$\operatorname{Rec}$ .
Param		Result	Units	Dil.	Amount	Result	$\mathrm{Rec.}$	$\operatorname{Limit}$
Benzo(a)anthracene		0.0565	mg/L	1	0.0800	< 0.000118	71	40.4 - 91.9
Chrysene	1	. 0.0954	mg/L	1	0.0800	< 0.0000766	119	44.4 - 107
Benzo(b)fluoranthene		0.0423	$\mathrm{mg/L}$	1	0.0800	< 0.000146	53	34.8 - 105
Benzo(k)fluoranthene		0.0654	$\mathrm{mg/L}$	1	0.0800	< 0.000141	82	50.2 - 158
Benzo(a)pyrene		0.0621	mg/L	1	0.0800	< 0.000132	78	51.3 - 151
Indeno(1,2,3-cd)pyrene		0.0494	mg/L	1	0.0800	< 0.0000702	62	43.2 - 115
Dibenzo(a,h)anthracene		0.0696	mg/L	1	0.0800	< 0.0000534	87	43.9 - 115
$\mathrm{Benzo}(\mathrm{g,h,i})\mathrm{perylene}$		0.0504	$\mathrm{mg/L}$	1	0.0800	< 0.0000473	63	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Naphthalene	2	0.0689	mg/L	·1	0.0800	< 0.0000784	86	32.2 - 80.3	10	20
2-Methylnaphthalene		0.0693	mg/L	1	0.0800	< 0.0000747	87	34.8 - 87	7	20
1-Methylnaphthalene	3	0.0743	mg/L	1	0.0800	< 0.0000575	93	36.9 - 89.6	8	20
Acenaphthylene	4	0.0792	$\mathrm{mg/L}$	1	0.0800	< 0.0000963	99	35 - 93.2	9	20
Acenaphthene	5	0.0805	mg/L	1	0.0800	< 0.0000617	101	35.8 - 92.9	10	20
Dibenzofuran		0.0573	mg/L	1	0.0800	< 0.0000952	72	35.3 - 85.1	9	20
Fluorene		0.0770	mg/L	1	0.0800	< 0.000134	96	43.4 - 101	6	20
Anthracene		0.0681	$\mathrm{mg/L}$	1	0.0800	< 0.000441	85	44.8 - 92.4	10	20
Phenanthrene		0.0735	mg/L	1	0.0800	< 0.000435	92	44 - 93.7	11	20
Fluoranthene		0.0732	mg/L	1	0.0800	< 0.000476	92	52.7 - 104	1	20
Pyrene		0.0673	$\mathrm{mg/L}$	1	0.0800	< 0.000590	84	42.2 - 93.8	4	20
Benzo(a)anthracene		0.0579	$\mathrm{mg/L}$	1	0.0800	< 0.000118	72	40.4 - 91.9	2	20
Chrysene	6	0.0964	mg/L	1	0.0800	< 0.0000766	120	44.4 - 107	1	20
Benzo(b)fluoranthene		0.0462	$\mathrm{mg/L}$	1	0.0800	< 0.000146	58	34.8 - 105	9	20
Benzo(k)fluoranthene		0.0674	mg/L	1	0.0800	< 0.000141	84	50.2 - 158	3	20
Benzo(a)pyrene		0.0565	$\mathrm{mg/L}$	1	0.0800	< 0.000132	71	51.3 - 151	9	20
Indeno(1,2,3-cd)pyrene		0.0497	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	62	43.2 - 115	1	20
Dibenzo(a,h)anthracene		0.0690	mg/L	1	0.0800	< 0.0000534	86	43.9 - 115	1	20
Benzo(g,h,i)perylene		0.0536	mg/L	1	0.0800	< 0.0000473	67	45.1 - 115	6	20

	LCS	LCSD			$_{ m Spike}$	LCS	LCSD	$\operatorname{Rec}$ .
Surrogate	Result	Result	Units	Dil.	Amount	$\mathrm{Rec}.$	$\mathrm{Rec}.$	$\mathbf{Limit}$
Nitrobenzene-d5	0.0511	$0.05\overline{25}$	mg/L	1	0.0800	64	66	10 - 111
2-Fluorobiphenyl	0.0607	0.0673	mg/L	1	0.0800	76	84	10 - 92.7
Terphenyl-d14	0.0626	0.0605	${ m mg/L}$	1	0.0800	78	76	35.9 - 107

<sup>&</sup>lt;sup>1</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>2</sup>Spike analyte out of control limits. Results biased high. • <sup>3</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>4</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>5</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>6</sup>Spike analyte out of control limits. Results biased high. •

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Matrix Spike (MS-1)

Spiked Sample: 244806

QC Batch:

73660 Prep Batch: 63178 Date Analyzed:

2010-09-18

QC Preparation: 2010-09-17

Analyzed By: AG

Prepared By: AG

		MS			Spike	Matrix		Rec.
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit
Benzene		0.517	mg/L	5	0.500	0.045	94	77.9 - 114
Toluene		0.440	mg/L	5	0.500	< 0.00300	88	78.3 - 111
Ethylbenzene		0.398	mg/L	5	0.500	< 0.00400	80	75.3 - 110
Xylene	7	1.11	mg/L	5	1.50	0.0306	$\overline{72}$	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Benzene	0.542	mg/L	5	0.500	0.045	99	77.9 - 114	5	20
Toluene	0.466	mg/L	5	0.500	< 0.00300	93	78.3 - 111	6	20
Ethylbenzene	0.428	mg/L	5	0.500	< 0.00400	86	75.3 - 110	7	20
Xylene	1.20	$\mathrm{mg/L}$	5	1.50	0.0306	78	75.7 - 109	8	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			$_{ m Spike}$	MS	MSD	$\mathrm{Rec.}$
Surrogate	Result	Result	Units	Dil.	${f Amount}$	${ m Rec.}$	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	0.469	0.488	mg/L	5	0.5	94	98	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.503	0.540	mg/L	5	0.5	101	108	60.1 - 135

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754

Prep Batch: 63277

Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param ·	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Aluminum	1.03	mg/L	1	1.00	< 0.00982	103	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Aluminum	1.03	mg/L	1	1.00	< 0.00982	103	75 - 125	0	20

<sup>&</sup>lt;sup>7</sup>Matrix spike recovery out of control limits due to peak interference. Use LCS/LCSD to demonstrate analysis is under control.

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Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754 Prep Batch: 63277 Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	${f A}{f mount}$	Result	Rec.	$\operatorname{Limit}$
Total Boron	0.0520	mg/L	1	0.0500	< 0.00215	104	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		${ m Rec.}$		RPD
Param.	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0480	mg/L	1	0.0500	< 0.00215	96	75 - 125	8	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

Param

73754

Date Analyzed:

2010-09-23

0.250

Analyzed By: RR

102

75 - 125

Prep Batch: 63277

Total Cobalt

QC Preparation: 2010-09-23

mg/L

1

Prepared By: KV

Spike Matrix Rec. Units Dil. Amount Result Rec. Limit

< 0.00258

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

MS

Result

0.255

	MSD			$\operatorname{Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Cobalt	0.254	mg/L	1	0.250	< 0.00258	102	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Copper	0.130	${ m mg/L}$	1	0.125	< 0.00313	104	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Copper	0.130	mg/L	1	0.125	< 0.00313	104	75 - 125	0	20

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Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754 Prep Batch: 63277 Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Iron	0.468	mg/L	1	0.500	< 0.00273	94	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Iron	0.485	mg/L	1	0.500	< 0.00273	97	75 - 125	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

OC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	MS			Spike	Matrix		$\mathrm{Rec}.$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Manganese	0.246	${ m mg/L}$	1	0.250	< 0.00423	98	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	$MSD^{-}$			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Manganese	0.246	mg/L	1	0.250	< 0.00423	98	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	MS.			$_{ m Spike}$	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit_
Total Molybdenum	0.502	mg/L	1	0.500	< 0.00164	100	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	$\operatorname{Result}$	Units	Dil.	${f Amount}$	Result	Rec.	Limit	RPD	Limit
Total Molybdenum	0.507	mg/L	1	0.500	< 0.00164	101	75 - 125	1	20

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Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754 Prep Batch: 63277 Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR Prepared By: KV

MSSpike Rec. Matrix Param Units Dil. Amount Result Limit Result Rec. Total Nickel 0.250 75 - 125 0.249< 0.00593 100 mg/L

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Nickel	 0.268	mg/L	1	0.250	< 0.00593	107	75 - 125	7	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	MS			$_{ m Spike}$		$\mathrm{Rec}.$		
Param	Result	$_{ m Units}$	Dil.	Amount	$\operatorname{Result}$	Rec.	$_{ m Limit}$	
Total Zinc	0.260	mg/L	1	0.250	< 0.00178	104	75 - 125	

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Zinc	0.256	mg/L	1	0.250	< 0.00178	102	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch: 73754 Prep Batch: 63277 Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23 Analyzed By: RR

Prepared By: KV

MS Spike Matrix Rec. Limit Param Units Dil. Result Result Amount Rec. Total Silver < 0.000469 75 - 125 0.128mg/L 1 0.125102 75 - 125 Total Arsenic 0.501mg/L0.500< 0.00465 100 1 75 - 125Total Barium 1.01mg/L 1.00 < 0.00418 101 1 75 - 125 Total Cadmium < 0.00232 101 0.253mg/L 1 0.25075 - 125 Total Chromium 0.0970mg/L1 0.100< 0.00291 97 Total Lead 0.504mg/L1 0.500< 0.00303 101 75 - 125

 $continued \dots$ 

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matrix spikes continued . . .

	MS		_	Spike	Matrix		$\mathrm{Rec}.$
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	$\operatorname{Limit}$
Total Selenium	0.466	$\mathrm{mg/L}$	1	0.500	< 0.00570	93	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	$\operatorname{Limit}$
Total Silver	0.133	mg/L	1	0.125	< 0.000469	106	75 - 125	4	20
Total Arsenic	0.526	mg/L	1	0.500	< 0.00465	105	75 - 125	5	20
Total Barium	1.03	mg/L	1	1.00	< 0.00418	103	75 - 125	$^2$	20
Total Cadmium	0.265	mg/L	1	0.250	< 0.00232	106	75 - 125	5	20
Total Chromium	0.100	mg/L	1	0.100	< 0.00291	100	75 - 125	3	20
Total Lead	0.517	mg/L	1	0.500	< 0.00303	103	75 - 125	2	20
Total Selenium	0.484	mg/L	1	0.500	< 0.00570	97	75 - 125	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 244990

QC Batch:

73807

Date Analyzed:

2010-09-24

Analyzed By: TP

Prepared By: TP

Prep Batch: 63300

QC Preparation: 2010-09-24

	MS			Spike	Matrix		$\mathrm{Rec}.$
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Mercury	0.00387	mg/L	1	0.00400	< 0.0000388	97	75 - 122

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Mercury	0.00393	mg/L	1	0.00400	< 0.0000388	98	75 - 122	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Standard (CCV-2)

QC Batch: 73660

Date Analyzed: 2010-09-18

Analyzed By: AG

			CCVs	CCVs	CCVs	Percent	
		*	$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0969	97	80 - 120	2010-09-18
Toluene		mg/L	0.100	0.0905	90	80 - 120	2010-09-18
Ethylbenzene		$\mathrm{mg/L}$	0.100	0.0817	82	80 - 120	2010-09-18
Xylene		mg/L	0.300	0.240	80	80 - 120	2010-09-18

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Standard (CCV-3)

QC Batch: 73660

Date Analyzed: 2010-09-18

Analyzed By: AG

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0967	97	80 - 120	2010-09-18
Toluene		$\mathrm{mg/L}$	0.100	0.0898	90	80 - 120	2010-09-18
Ethylbenzene		$\mathrm{mg/L}$	0.100	0.0809	81	80 - 120	2010-09-18
Xylene		${ m mg/L}$	0.300	0.241	80	80 - 120	2010-09-18

Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	•
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		mg/L	1.00	0.963	96	90 - 110	2010-09-23

Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		m mg/L	1.00	1.02	102	90 - 110	2010-09-23

Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		$_{ m mg/L}$	1.00	0.989	99	90 - 110	2010-09-23

Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

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Param	Flag	${ m Units}$	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Copper	Flag	1.5	1.00	0.970	97	90 - 110	2010-09-23
Total Copper		mg/L	1.00	0.310	31	30 - 110	2010-03-20

#### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	0.971	97	90 - 110	2010-09-23

#### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		$_{ m mg/L}$	1.00	0.978	98	90 - 110	2010-09-23

#### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	0.990	99	90 - 110	2010-09-23

#### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	•
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	0.981	98	90 - 110	2010-09-23

#### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

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			ICVs	ICVs	ICVs	Percent	ъ.
			$\operatorname{True}$	Found	$\operatorname{Percent}$	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	Flag	$_{ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		$_{ m mg/L}$	1.00	0.980	98	90 - 110	2010-09-23

#### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Silver		m mg/L	0.125	0.121	97	90 - 110	2010-09-23
Total Arsenic		${ m mg/L}$	1.00	0.988	99	90 - 110	2010-09-23
Total Barium		m mg/L	1.00	0.976	98	90 - 110	2010-09-23
Total Cadmium		${ m mg/L}$	1.00	0.983	98	90 - 110	2010-09-23
Total Chromium		m mg/L	1.00	0.975	98	90 - 110	2010-09-23
Total Lead		${ m mg/L}$	1.00	0.990 .	99	90 - 110	2010-09-23
Total Selenium		$\mathrm{mg/L}$	1.00	0.996	100	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		$\mathrm{mg/L}$	1.00	0.999	100	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		mg/L	1.00	0.963	96	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Work Order: 10091705

Page Number: 26 of 28

TNM 97-04

TNM 97-04 Townsend

Lovington,	NM
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			CCVs	CCVs	$_{ m CCVs}$	Percent	<b>.</b>
			$\operatorname{True}$	Found	$\operatorname{Percent}$	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		mg/L	1.00	0.988	99	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		mg/L	1.00	0.978	98	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs True	CCVs Found	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	0.959	96	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			$_{ m CCVs}$	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		$\mathrm{mg/L}$	1.00	0.988	99	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	•
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		$\mathrm{mg/L}$	1.00	0.988	99	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Work Order: 10091705 TNM 97-04 Townsend

Page Number: 27 of 28 Lovington, NM

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	0.990	99	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

TNM 97-04

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	0.989	99	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

Param	$\operatorname{Flag}$	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Silver		mg/L	0.125	0.123	98	90 - 110	2010-09-23
Total Arsenic		mg/L	1.00	0.979	98	90 - 110	2010-09-23
Total Barium		mg/L	1.00	0.997	100	90 - 110	2010-09-23
Total Cadmium		mg/L	1.00	0.988	99	90 - 110	2010-09-23
Total Chromium		mg/L	1.00	0.986	99	90 - 110	2010-09-23
Total Lead		mg/L	1.00	0.991	99	90 - 110	2010-09-23
Total Selenium		$_{ m mg/L}$	1.00	0.991	99	90 - 110	2010-09-23

#### Standard (CCV-1)

QC Batch: 73807

Date Analyzed: 2010-09-24

Analyzed By: TP

			CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00500	100	90 - 110	2010-09-24

#### Standard (CCV-2)

QC Batch: 73807

Date Analyzed: 2010-09-24

Analyzed By: TP

Report Date: September 28, 2010 TNM 97-04

Work Order: 10091705 TNM 97-04 Townsend Page Number: 28 of 28 Lovington, NM

			0.00			_	
			$\mathrm{CCVs}$	$\mathrm{CCVs}$	$\mathrm{CCVs}$	$\operatorname{Percent}$	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		$_{ m mg/L}$	0.00500	0.00509	102	90 - 110	2010-09-24

### Standard (CCV-1)

QC Batch: 73832

Date Analyzed: 2010-09-26

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	60.2	100	80 - 120	2010-09-26
2-Methylnaphthalene		${ m mg/L}$	60.0	60.9	102	80 - 120	2010-09-26
1-Methylnaphthalene		mg/L	60.0	60.5	101	80 - 120	2010-09-26
${f Acenaphthylene}$		${ m mg/L}$	60.0	59.9	100	80 - 120	2010-09-26
Acenaphthene		mg/L	60.0	62.3	104	80 - 120	2010-09-26
Dibenzofuran		mg/L	60.0	59.3	99	80 - 120	2010-09-26
Fluorene		mg/L	60.0 .	61.3	102	80 - 120	2010-09-26
Anthracene		${ m mg/L}$	60.0	55.2	92	80 - 120	2010-09-26
Phenanthrene		mg/L	60.0	56.6	94	80 - 120	2010-09-26
Fluoranthene		${ m mg/L}$	60.0	53.8	90	80 - 120	2010-09-26
Pyrene		m mg/L	60.0	60.9	102	80 - 120	2010-09-26
Benzo(a)anthracene		m mg/L	60.0	48.2	80	80 - 120	2010-09-26
Chrysene .		${ m mg/L}$	60.0	65.1	108	80 - 120	2010-09-26
Benzo(b)fluoranthene		mg/L	60.0	50.2	84	80 - 120	2010-09-26
Benzo(k)fluoranthene		mg/L	60.0	68.5	114	80 - 120	2010-09-26
Benzo(a)pyrene		mg/L	60.0	67.1	112	80 - 120	2010-09-26
Indeno(1,2,3-cd)pyrene		${ m mg/L}$	60.0	55.2	92	80 - 120	2010-09-26
Dibenzo(a,h)anthracene		mg/L	60.0	54.2	90	80 - 120	2010-09-26
Benzo(g,h,i)perylene		mg/L	60.0	58.0	97	80 - 120	2010-09-26

					$\operatorname{Spike}$	$\operatorname{Percent}$	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	· Amount	Recovery	$\operatorname{Limit}$
Nitrobenzene-d5		68.4	mg/L	1	60.0	114	80 - 120
2-Fluorobiphenyl		60.4	mg/L	1	60.0	101	80 - 120
Terphenyl-d14		54.5	$\mathrm{mg/L}$	1	60.0	91	80 - 120

LAB Order ID #

Frace Analysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1296

5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313

BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750

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200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443

PIOH Check If Special Reporting しろ Zししばは Are Needed Turn Around Time if different from standard GALLW, EC, MO, ZN, AL Midlacel-Btx Na, Ca, Mg, K, TDS, EC or Specify Method CI, FI, 504, NO3, NO2, Alkalinity **ANALYSIS REQUEST** Moisture Content \* Kulykoch-Dry Weight Basis Required BOD, TSS, pH TRRP Report Required Pesticides 8081 / 608 PCB's 8082 / 608 GC/MS Semi. Vol. 8270 / 625 REMARKS CC/W2 A91 8560 / 624 RCI TCLP Pesticides TCLP Semi Volatiles Circle 7 Headspace Y(N/NA TCLP Volatiles LAB USE ONLY TCLP Metals Ag As Ba Cd Cr Pb Se Hg Log-in-Review Intact (Y N Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 2S9 10728 HA9 TPH 8015 GRO / DRO / TVHC TPH 418.1 / TX1005 / TX1005 Ext(C35) 0 81EX 80513 605 \ 8560 \ 654 OBS 3. MTBE INST 3. 429 / 8260 / 624 CORC OBS 3 COR INST INST OBS 1230 TIME SAMPLING Time: 50.00 Time: Olat **BATE** 5 17/13 PRESERVATIVE NONE METHOD ICE Fax#: 520-770/ E-mail: Phone #: Sampler Signature **HOBN** Company: STARCE. ompany: Company: OS<sup>z</sup>H Project Name: HNO3 マ HCI SCUDGE Received by: MATRIX Received by ЯІА TIOS **A**3TAW 分:1 13. E. InnomA \ emuloV Time: Time: 10 # CONTAINERS 9117116 01/11 Date: Sylvere トンを記る (If different from above) FIELD CODE 12-12-12-12 Company: Company: Company Project Location (including state): City, Zip) ALC) TRACE Relinquished by: Relinquished by: £ Relinquished b) Company Name: Contact Person: 24490 LAB USE invoice to: Project #: Address: LAB# と言う

XXXXX

Carrier #

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E. 5002 Basin Street, Suite A1 6015 Harris Parkway, Suite 119

Lubbook, Texas 79424 El Paso, Texas 79922 Midland, Texas 79703 Ft. Worth, Texas 76132

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432 • 689 • 6301

817 • 201 • 5260

E-Mail: lab@traceanalysis.com

# Certifications

WBENC: 237019 HUB:

1752439743100-86536

DBE:

VN 20657

NCTRCA WFWB38444Y0909

NELAP Certifications

Lubbock: T104704219-08-TX

LELAP-02003

Kansas E-10317

El Paso:

T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

# Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: September 29, 2010

Work Order:

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	111116	Date
Sample	Description	Matrix	Taken	Taken	Received
245804	Post-Carbon	water	2010-09-23	09:45	2010-09-23

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 28 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

#### Standard Flags

 ${\bf B}$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-09-23 and assigned to work order 10092419. Samples for work order 10092419 were received intact without headspace and at a temperature of 3.8 C.

Samples were analyzed for the following tests using their respective methods.

		$\operatorname{Prep}$	$\operatorname{Prep}$	QC	Analysis
Test	Method	Batch	Date	Batch	Date
Ag, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Al, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
As, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Ba, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
BTEX	S 8021B	63437	2010-09-28 at 14:27	73924	2010-09-28 at 14:27
B, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
Cd, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
Co, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Cr, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
Cu, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
Fe, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Hg, Total	S 7470A	63447	2010-09-29 at 08:45	73961	2010-09-29 at 14:18
Mn, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Mo, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Ni, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
PAH	S 8270D	63353	2010-09-24 at 15:00	73828	2010-09-26 at 13:19
Pb, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Se, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Zn, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10092419 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10092419 TNM 97-04 Townsend

Page Number: 4 of 28 Lovington, NM

# **Analytical Report**

Sample: 245804 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch: Al, Total 73942

Analytical Method: Date Analyzed:

S 6010C

2010-09-29

Prep Method: Analyzed By:

S 3010A RR

Prep Batch:

63446

Sample Preparation:

2010-09-29

Prepared By:

KV

RL

Parameter Flag Result Dilution RLUnits 0.05300.0500 Total Aluminum mg/L

Sample: 245804 - Post-Carbon

Laboratory:

Lubbock

Analysis: B, Total 73942

Analytical Method:

S 6010C 2010-09-29 Prep Method:

S 3010A

QC Batch:

Date Analyzed:

Analyzed By:

RR

Prep Batch:

63446

Sample Preparation: 2010-09-29 Prepared By:

KV

RL

Parameter Flag Result Units Dilution RLTotal Boron 0.112mg/L 0.0100

Sample: 245804 - Post-Carbon

Laboratory:

Lubbock

Analysis: QC Batch:

Prep Batch:

BTEX 73924 63437

Analytical Method: Date Analyzed:

Sample Preparation:

RL

S 8021B 2010-09-28 Prep Method:

S 5030B

Analyzed By: Prepared By:

 $\operatorname{ER}$ ER

Parameter Flag Result Units Dilution RL< 0.00100 0.00100 Benzene mg/L 1 0.00100 Toluene < 0.00100 mg/L 1 0.00100 Ethylbenzene < 0.00100 mg/L 1 0.00100Xylene < 0.00100 mg/L 1

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0893	mg/L	1	0.100	89	78.4 - 113
4-Bromofluorobenzene (4-BFB)		0.0964	mg/L	1	0.100	96	81.5 - 121

Report Date: September 29, 2010 Work Order: 10092419 Page Number: 5 of 28 TNM 97-04 TNM 97-04 Townsend Lovington, NM Sample: 245804 - Post-Carbon Laboratory: Lubbock Analysis: Co, Total Analytical Method: Prep Method: S 3010A S 6010C QC Batch: 73942 Date Analyzed: 2010-09-29 Analyzed By: RRPrep Batch: 63446 Sample Preparation: 2010-09-29 Prepared By: KV RLParameter Flag Result Units Dilution RLTotal Cobalt < 0.00500 mg/L 0.00500 Sample: 245804 - Post-Carbon Laboratory: Lubbock Cu, Total Analysis: Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73942 Date Analyzed: 2010-09-29 Analyzed By: RRKV Prep Batch: 63446 Sample Preparation: 2010-09-29 Prepared By: RLParameter Flag Result Units Dilution RLTotal Copper < 0.00500 0.00500 mg/L Sample: 245804 - Post-Carbon Laboratory: Lubbock

		RL	•		
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Total Iron		0.311	mg/L	1	0.0100

S 6010C

2010-09-29

2010-09-29

mg/L

Prep Method:

Analyzed By:

Prepared By:

S 3010A

0.00500

RR

KV

Analytical Method:

Sample Preparation:

0.0340

Date Analyzed:

Analysis:

QC Batch:

Prep Batch:

Total Manganese

Fe, Total

73942

63446

# Sample: 245804 - Post-Carbon

Laboratory: Lubbock Analysis: Mn, Total Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73942 Date Analyzed: Analyzed By: RR2010-09-29 Prep Batch: 63446 Sample Preparation: 2010-09-29 Prepared By: KV RLParameter Dilution RLFlag Result Units

TNM 97-04

Work Order: 10092419 TNM 97-04 Townsend

Page Number: 6 of 28 Lovington, NM

Sample: 245804 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch: Mo, Total 73942

Analytical Method: Date Analyzed:

S 6010C

2010-09-29 Sample Preparation: 2010-09-29 Prep Method: S 3010A

Analyzed By: RRPrepared By: KV

RL

Parameter Total Molybdenum

Prep Batch: 63446

Flag Result < 0.0500

Units mg/L Dilution

RL0.0500

Sample: 245804 - Post-Carbon

Laboratory:

Lubbock

Analysis: Ni, Total QC Batch: 73942Prep Batch: 63446

Analytical Method: Date Analyzed:

S 6010C 2010-09-29 Sample Preparation: 2010-09-29 Prep Method: S 3010A Analyzed By:

RR

Prepared By:

KV

RL

Parameter Total Nickel Flag

Result < 0.0100

Units mg/L Dilution 1

RL0.0100

Sample: 245804 - Post-Carbon

Laboratory:

Lubbock

Analysis: PAH QC Batch: 73828 Prep Batch: 63353 Analytical Method: Date Analyzed:

S 8270D 2010-09-26 Sample Preparation: 2010-09-24 Prep Method:

S 3510C MN

Analyzed By: Prepared By:

MN

RI

		RL			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\operatorname{RL}$
Naphthalene		0.00856	mg/L	0.952	0.000200
2-Methylnaphthalene		0.00272	mg/L	0.952	0.000200
1-Methylnaphthalene		0.00106	$\mathrm{mg/L}$	0.952	0.000200
Acenaphthylene		< 0.000190	mg/L	0.952	0.000200
Acenaphthene		< 0.000190	mg/L	0.952	0.000200
Dibenzofuran		< 0.000190	mg/L	0.952	0.000200
Fluorene		< 0.000190	mg/L	0.952	0.000200
Anthracene	•	< 0.000190	mg/L	0.952	0.000200
Phenanthrene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Fluoranthene		< 0.000190	mg/L	0.952	0.000200
Pyrene		< 0.000190	mg/L	0.952	0.000200
Benzo(a)anthracene		< 0.000190	m mg/L	0.952	0.000200
Chrysene		< 0.000190	mg/L	0.952	0.000200
Benzo(b)fluoranthene		< 0.000190	m mg/L	0.952	0.000200

 $continued \dots$ 

TNM 97-04

Work Order: 10092419 TNM 97-04 Townsend Page Number: 7 of 28 Lovington, NM

#### sample 245804 continued ...

		$\mathrm{RL}$			
Parameter	Flag	Result	Units	Dilution	RL
Benzo(k)fluoranthene		< 0.000190	mg/L	0.952	0.000200
Benzo(a)pyrene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Indeno(1,2,3-cd)pyrene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Dibenzo(a,h)anthracene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Benzo(g,h,i)perylene		< 0.000190	mg/L	0.952	0.000200

		•			$\mathbf{S}_{\mathbf{P}i\mathbf{k}\mathbf{e}}$	$\operatorname{Percent}$	$\operatorname{Recovery}$
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0453	mg/L	0.952	0.0800	57	10 - 111
2-Fluorobiphenyl		0.0595	mg/L	0.952	0.0800	74	10 - 92.7
Terphenyl-d14		0.0592	${ m mg/L}$	0.952	0.0800	74	35.9 - 107

#### Sample: 245804 - Post-Carbon

Laboratory: Lubbock

Analysis: Total 8 Metals S 6010C Prep Method: S 3010A Analytical Method: QC Batch: 73942 Analyzed By: Date Analyzed: 2010-09-29 RRPrep Batch: 63446 Sample Preparation: 2010-09-29 Prepared By: KVLaboratory: Lubbock

Analysis: Total 8 Metals Analytical Method: S 7470A Prep Method: N/AQC Batch: 73961 Date Analyzed: 2010-09-29 Analyzed By: TP Prep Batch: 63447 Sample Preparation: 2010-09-29 Prepared By: TP

RLParameter Flag Result Units Dilution RLTotal Silver 0.00500 < 0.00500 mg/L 1 Total Arsenic < 0.0100 mg/L 1 0.0100 Total Barium 0.0100 0.194mg/L 1 Total Cadmium 0.00500 1 < 0.00500 mg/L Total Chromium 0.0100< 0.0100 mg/L 1 Total Mercury 0.000200 < 0.000200 mg/L1 Total Lead 0.00500 mg/L1 < 0.00500 Total Selenium 0.0200< 0.0200 mg/L1

#### Sample: 245804 - Post-Carbon

Laboratory: Lubbock

S 3010A Analysis: Zn, Total Analytical Method: S 6010C Prep Method: QC Batch: 73942 Analyzed By: RRDate Analyzed: 2010-09-29 Prep Batch: 63446 Sample Preparation: 2010-09-29 Prepared By: KV

TNM 97-04

Work Order: 10092419 TNM 97-04 Townsend Page Number: 8 of 28 Lovington, NM

		RL			
Parameter	Flag.	Result	Units	Dilution	ho
Total Zinc		0.0150	mg/L	1	0.00500
Method Blank (1)	QC Batch: 7	3828			
QC Batch: 73828		Date Analyzed	: 2010-09-26		Analyzed By: MN
Prep Batch: 63353		QC Preparatio			Prepared By: MN
			MDL		
Parameter		$\operatorname{Flag}$	Result	Units	hoRL
Naphthalene			< 0.0000784	mg/L	0.0002
2-Methylnaphthalene			< 0.0000747	m mg/L	0.0002
1-Methylnaphthalene			< 0.0000575	m mg/L	0.0002
Acenaphthylene			< 0.0000963	m mg/L	0.0002
Acenaphthene			< 0.0000617	m mg/L	0.0002
Dibenzofuran			< 0.0000952	m mg/L	0.0002
Fluorene			< 0.000134	m mg/L	0.0002
Anthracene			< 0.000441	mg/L	0.0002
Phenanthrene			< 0.000435	m mg/L	0.0002
Fluoranthene			< 0.000476	m mg/L	0.0002
Pyrene			< 0.000590	mg/L	0.0002
Benzo(a)anthracene			< 0.000118	$\mathrm{mg/L}$	0.0002
Chrysene			< 0.0000766	mg/L	0.0002
Benzo(b)fluoranthene			< 0.000146	mg/L	0.0002
Benzo(k)fluoranthene			< 0.000141	m mg/L	0.0002
Benzo(a)pyrene			< 0.000132	$_{ m mg/L}$	0.0002
Indeno(1,2,3-cd)pyrene			< 0.0000702	$_{ m mg/L}$	0.0002
Dibenzo(a,h)anthracene			< 0.0000534	mg/L	0.0002
Benzo(g,h,i)perylene			< 0.0000473	$_{ m mg/L}$	0.0002

					$\operatorname{Spike}$	$\operatorname{Percent}$	Recovery
Surrogate	Flag	Result	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0333	mg/L	1	0.0800	42	10 - 111
2-Fluorobiphenyl		0.0280	mg/L	1	0.0800	35	10 - 92.7
Terphenyl-d14		0.0397	mg/L	1	0.0800	50	35.9 - 107

Method Blank (1) QC Batch: 73924

QC Batch: 73924 Prep Batch: 63437 Date Analyzed: 2010-09-28 QC Preparation: 2010-09-28 Analyzed By: ER Prepared By: ER

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		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	Result	Units	RL
Benzene		< 0.000371	mg/L	0.001
Toluene		< 0.000400	${ m mg/L}$	0.001
Ethylbenzene		< 0.000430	${ m mg/L}$	0.001
Xylene		< 0.000379	$\mathrm{mg/L}$	0.001

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)		0.102	mg/L	. 1	0.100	102	78.4 - 113
4-Bromofluorobenzene (4-BFB)		0.107	mg/L	1	0.100	107	81.5 - 121

Method Blank (1)

QC Batch: 73942

QC Batch: 73942 Date Analyzed:

2010-09-29

Analyzed By: RR Prepared By: KV

Prep Batch: 63446

QC Preparation: 2010-09-29

MDL

Parameter	$\operatorname{Flag}$	Result	Units	RL
Total Aluminum		< 0.00982	mg/L	0.05

Method Blank (1)

QC Batch: 73942

QC Batch: 73942

2010-09-29

Analyzed By: RR

Prep Batch: 63446

Date Analyzed: QC Preparation: 2010-09-29

Prepared By: KV

MDLFlag

Units RLParameter Result Total Boron < 0.00215 mg/L 0.01

Method Blank (1)

QC Batch: 73942

QC Batch: 73942 Prep Batch: 63446

Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29 Analyzed By: RR Prepared By: KV

MDL

Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	$\mathrm{RL}_{\_}$
Total Cobalt		< 0.00258	mg/L	0.005

Report Date: Septemb TNM 97-04	er 29, 2010	Work Order: 10092419 TNM 97-04 Townsend		Page Number: 10 of 28 Lovington, NM			
Method Blank (1)	QC Batch: 73942						
QC Batch: 73942 Prep Batch: 63446		Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29	Analyzed By Prepared By				
		$\operatorname{MDL}$					
Parameter	Flag	Result	Units	RL			
Total Copper		< 0.00313	${ m mg/L}$	0.005			
Method Blank (1)	QC Batch: 73942						
QC Batch: 73942		Date Analyzed: 2010-09-29	Analyzed B	y: RR			
Prep Batch: 63446		QC Preparation: 2010-09-29	Prepared B				
		MDL					
Parameter	Flag	Result	Units	RL			
Total Iron		< 0.00273	mg/L	0.01			
Method Blank (1)	QC Batch: 73942						
		Data Applicate 2010 00 20	Analyzad D	v: RR			
QC Batch: 73942 Prep Batch: 63446		Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29	Analyzed B Prepared B				
		$\mathrm{MDL}$					
Parameter	Flag	Result	Units	RL			
Total Manganese		< 0.00423	mg/L	0.005			
26 (1. 1.73)	000 0000						
Method Blank (1)	QC Batch: 73942						
QC Batch: 73942		Date Analyzed: 2010-09-29	Analyzed B	y: RR			
Prep Batch: 63446		QC Preparation: 2010-09-29	Prepared B	y: KV			
		MDL					
Parameter	Flag	Result	Units	RL			
Total Molybdenum		< 0.00164	mg/L	0.05			
Method Blank (1)	QC Batch: 73942						
QC Batch: 73942		Date Analyzed: 2010-09-29	Analyzed B	y: RR			
Prep Batch: 63446		QC Preparation: 2010-09-29	Prepared B				

Report Date: September 29, 2010 TNM 97-04

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		$\operatorname{MDL}$		
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	RL
Total Nickel		< 0.00593	${ m mg/L}$	0.01

Method Blank (1)

QC Batch: 73942

QC Batch: 73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

MDL

Parameter Flag Result Units RLTotal Zinc < 0.00178 0.005 mg/L

Method Blank (1)

QC Batch: 73942

QC Batch: Prep Batch: 63446

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prepared By: KV

		$\mathrm{MDL}$			
Parameter	Flag	Result	Units	RL	
Total Silver		< 0.000469	mg/L	0.005	
Total Arsenic		< 0.00465	${ m mg/L}$	0.01	
Total Barium		< 0.00418	${ m mg/L}$	0.01	
Total Cadmium		< 0.00232	${ m mg/L}$	0.005	
Total Chromium		< 0.00291	$_{ m mg/L}$	0.01	
Total Lead		< 0.00303	m mg/L	0.005	
Total Selenium		< 0.00570	$\mathrm{mg/L}$	0.02	

QC Preparation: 2010-09-29

Method Blank (1)

QC Batch: 73961

QC Batch:

73961

Date Analyzed:

2010-09-29

Analyzed By: TP

Prep Batch: 63447

QC Preparation: 2010-09-29

Prepared By: TP

MDL

RLParameter Flag Result Units 0.0002 < 0.0000388 Total Mercury mg/L

Laboratory Control Spike (LCS-1)

QC Batch:

73828

Date Analyzed:

2010-09-26

Analyzed By: MN

Prep Batch: 63353

QC Preparation:

2010-09-24

Prepared By: MN

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	LCS			Spike	Matrix		Rec.
Param	$\operatorname{Result}$	Units	Dil.	Amount	$\operatorname{Result}$	${ m Rec.}$	$\operatorname{Limit}$
Naphthalene	0.0615	mg/L	1	0.0800	< 0.0000784	77	32.2 - 80.3
2-Methylnaphthalene	0.0618	$\mathrm{mg/L}$	1	0.0800	< 0.0000747	77	34.8 - 87
1-Methylnaphthalene	0.0661	mg/L	1	0.0800	< 0.0000575	83	36.9 - 89.6
Acenaphthylene	0.0678	$\mathrm{mg/L}$	1	0.0800	< 0.0000963	85	35 - 93.2
Acenaphthene	0.0696	$\mathrm{mg/L}$	1	0.0800	< 0.0000617	87	35.8 - 92.9
Dibenzofuran	0.0490	mg/L	1	0.0800	< 0.0000952	61	35.3 - 85.1
Fluorene	0.0689	${ m mg/L}$	1	0.0800	< 0.000134	86	43.4 - 101
Anthracene	0.0629	$\mathrm{mg/L}$	1	0.0800	< 0.000441	79	44.8 - 92.4
Phenanthrene	0.0648	mg/L	1	0.0800	< 0.000435	81	44 - 93.7
Fluoranthene	0.0691	mg/L	1	0.0800	< 0.000476	86	52.7 - 104
Pyrene	0.0695	mg/L	1	0.0800	< 0.000590	87	42.2 - 93.8
Benzo(a)anthracene	0.0586	mg/L	1	0.0800	< 0.000118	73	40.4 - 91.9
Chrysene	0.0929	mg/L	1	0.0800	< 0.0000766	116	44.4 - 107
Benzo(b)fluoranthene	0.0387	mg/L	1	0.0800	< 0.000146	48	34.8 - 105
Benzo(k)fluoranthene	0.0592	mg/L	1	0.0800	< 0.000141	74	50.2 - 158
Benzo(a)pyrene	0.0488	mg/L	1	0.0800	< 0.000132	61	51.3 - 151
Indeno(1,2,3-cd)pyrene	0.0423	mg/L	1	0.0800	< 0.0000702	53	43.2 - 115
Dibenzo(a,h)anthracene	0.0567	mg/L	1	0.0800	< 0.0000534	71	43.9 - 115
Benzo(g,h,i)perylene	0.0438	mg/L	1	0.0800	< 0.0000473	55	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Naphthalene	2	0.0687	mg/L	1	0.0800	< 0.0000784	86	32.2 - 80.3	11	20
2-Methylnaphthalene		0.0689	mg/L	1	0.0800	< 0.0000747	86	34.8 - 87	11	20
1-Methylnaphthalene	3	0.0753	$\mathrm{mg/L}$	1	0.0800	< 0.0000575	94	36.9 - 89.6	13	20
Acenaphthylene	4	0.0769	mg/L	1	0.0800	< 0.0000963	96	35 - 93.2	13	20
Acenaphthene	5	0.0753	mg/L	1	0.0800	< 0.0000617	94	35.8 - 92.9	8	20
Dibenzofuran		0.0556	mg/L	1	0.0800	< 0.0000952	70	35.3 - 85.1	13	20
Fluorene		0.0743	$\mathrm{mg/L}$	1	0.0800	< 0.000134	93	43.4 - 101	8	20
Anthracene		0.0640	$\mathrm{mg/L}$	1	0.0800	< 0.000441	80	44.8 - 92.4	2	20
Phenanthrene		0.0679	mg/L	1	0.0800	< 0.000435	85	44 - 93.7	5	20
Fluoranthene		0.0754	${ m mg/L}$	1	0.0800	< 0.000476	94	52.7 - 104	9	20
Pyrene		0.0667	$\mathrm{mg/L}$	1	0.0800	< 0.000590	83	42.2 - 93.8	4	20
Benzo(a)anthracene		0.0572	$\mathrm{mg/L}$	1	0.0800	< 0.000118	72	40.4 - 91.9	2	20
Chrysene	6	0.0966	$\mathrm{mg/L}$	1	0.0800	< 0.0000766	121	44.4 - 107	4	20
Benzo(b)fluoranthene		0.0377	mg/L	1	0.0800	< 0.000146	47	34.8 - 105	3	20
Benzo(k)fluoranthene		0.0664	mg/L	1	0.0800	< 0.000141	83	50.2 - 158	12	20
Benzo(a)pyrene		0.0562	mg/L	1	0.0800	< 0.000132	70	51.3 - 151	14	20

continued . . .

<sup>&</sup>lt;sup>1</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>2</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly. <sup>3</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

<sup>&</sup>lt;sup>4</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

<sup>&</sup>lt;sup>5</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occurred properly.

<sup>&</sup>lt;sup>6</sup>Spike analyte out of control limits. Results biased high.

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control spikes continued . . .

	LCSD			$\operatorname{Spike}$	Matrix		$\mathrm{Rec}.$		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
$\overline{\text{Indeno}(1,2,3\text{-cd})}$ pyrene	0.0426	mg/L	1	0.0800	< 0.0000702	53	43.2 - 115	1	20
Dibenzo(a,h)anthracene	0.0592	mg/L	. 1	0.0800	< 0.0000534	74	43.9 - 115	4	20
Benzo(g,h,i)perylene	0.0461	mg/L	1	0.0800	< 0.0000473	58	45.1 - 115	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$_{ m Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	${ m Rec.}$	Rec.	Limit
Nitrobenzene-d5	0.0675	0.0783	mg/L	1	0.0800	84	98	10 - 111
2-Fluorobiphenyl	0.0580	0.0643	${ m mg/L}$	1	0.0800	72	80	10 - 92.7
Terphenyl-d14	0.0615	0.0595	${ m mg/L}$	1	0.0800	77	74	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch:

73924 Prep Batch: 63437 Date Analyzed: QC Preparation:

2010-09-28 2010-09-28

Analyzed By: ER

Prepared By: ER

LCS Spike Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit Benzene 0.101 < 0.000371 79.8 - 112 mg/L 0.100 101 1 Toluene 0.101mg/L 1 0.100< 0.000400 101 76.9 - 116Ethylbenzene 78.1 - 116 0.103 mg/L 0.100< 0.000430 103 1 80.1 - 113Xylene 0.308 mg/L0.300< 0.000379 102 1

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene	0.102	mg/L	1	0.100	< 0.000371	102	79.8 - 112	0	20
Toluene	0.102	mg/L	1	0.100	< 0.000400	102	76.9 - 116	1	20
Ethylbenzene	0.104	mg/L	1	0.100	< 0.000430	104	78.1 - 116	1	20
Xylene	0.310	mg/L	1	0.300	< 0.000379	103	80.1 - 113	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	0.0992	0.0900	mg/L	1	0.100	99	90	75.8 - 111
4-Bromofluorobenzene (4-BFB)	0.0988	0.0901	mg/L	1	0.100	99	90	71.9 - 111

#### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Prepared By: KV

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

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		LCS			Spike	Matrix		Rec.
Param	ı	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit
Total Aluminum		0.936	mg/L	1	1.00	< 0.00982	94	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Aluminum	0.913	mg/L	1	1.00	< 0.00982	91	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Boron	0.0520	mg/L	1	0.0500	< 0.00215	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
Total Boron	0.0520	mg/L	1	0.0500	< 0.00215	104	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	$\operatorname{Rec}$ .	$\operatorname{Limit}$
Total Cobalt	0.259	mg/L	1	0.250	< 0.00258	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Cobalt	0.262	mg/L	1	0.250	< 0.00258	105	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Copper	0.127	mg/L	1	0.125	< 0.00313	102	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Copper	0.126	mg/L	1	0.125	< 0.00313	101	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73942 Prep Batch: 63446 Date Analyzed:

2010-09-29 QC Preparation: 2010-09-29 Analyzed By: RR

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Iron	0.464	mg/L	1	0.500	<0.00273	93	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Iron	0.469	mg/L	1	0.500	< 0.00273	94	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prepared By: KV

Prep Batch: 63446 QC Preparation: 2010-09-29

LCS Spike Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit Total Manganese 0.259mg/L0.250< 0.00423 104 85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$_{ m Limit}$
Total Manganese	0.253	mg/L	1	0.250	< 0.00423	101	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73942 Prep Batch: 63446 Date Analyzed:

2010-09-29 QC Preparation: 2010-09-29 Analyzed By: RR Prepared By: KV

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Molybdenum	0.457	mg/L	1	0.500	< 0.00164	91	85 - 115

Percent recovery is based on the spike result: RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		$\mathrm{Rec}.$		RPD
Param	$\operatorname{Result}$	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Molybdenum	0.539	mg/L	1	0.500	< 0.00164	108	85 - 115	16	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	$_{ m Limit}$
Total Nickel	0.266	mg/L	1	0.250	< 0.00593	106	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Nickel	0.260	mg/L	1	0.250	< 0.00593	104	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prepared By: KV

Prep Batch: 63446

QC Preparation: 2010-09-29

	LCS			$\operatorname{Spike}$	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	$\operatorname{Rec}$ .	Limit
Total Zinc	0.262	mg/L	1	0.250	< 0.00178	105	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Zinc	0.253	mg/L	1	0.250	< 0.00178	101	85 - 115	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73942 Prep Batch: 63446 Date Analyzed:

2010-09-29

QC Preparation: 2010-09-29

Analyzed By: RR

Prepared By: KV

TNM 97-04

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Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
		Omis	וועו.	<del> </del>			
Total Silver	0.125	$\mathrm{mg/L}$	1	0.125	< 0.000469	100	85 - 115
Total Arsenic	0.498	$_{ m mg/L}$	1	0.500	< 0.00465	100	85 - 115
Total Barium	1.05	${ m mg/L}$	1	1.00	< 0.00418	105	85 - 115
Total Cadmium	0.265	mg/L	1	0.250	< 0.00232	106	85 - 115
Total Chromium	0.104	mg/L	1	0.100	< 0.00291	104	85 - 115
Total Lead	0.517	mg/L	1	0.500	< 0.00303	103	85 - 115
Total Selenium	0.449	$\mathrm{mg/L}$	1	0.500	< 0.00570	90	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$_{ m Limit}$	RPD	$\operatorname{Limit}$
Total Silver	0.123	mg/L	1	0.125	< 0.000469	98	85 - 115	2	20
Total Arsenic	0.491	${ m mg/L}$	1	0.500	< 0.00465	98	85 - 115	1	20
Total Barium	1.04	mg/L	1	1.00	< 0.00418	104	85 - 115	1	20
Total Cadmium	0.260	${ m mg/L}$	1	0.250	< 0.00232	104	85 - 115	2	20
Total Chromium	0.0990	${ m mg/L}$	1	0.100	< 0.00291	99	85 - 115	5	20
Total Lead	0.517	mg/L	1	0.500	< 0.00303	103	85 - 115	0	20
Total Selenium	0.450	mg/L	1	0.500	< 0.00570	90	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73961 Prep Batch: 63447 Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29 Analyzed By: TP Prepared By: TP

	LCS			Spike	Matrix	$\operatorname{Rec}$ .
Param	Result	Units	Dil.	Amount	Result Rec.	$\operatorname{Limit}$
Total Mercury	0.00390	${ m mg/L}$	1	0.00400	<0.0000388 98	91.4 - 111

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

•	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	$\operatorname{Limit}$
Total Mercury	0.00389	mg/L	1	0.00400	< 0.0000388	97	91.4 - 111	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 246001

QC Batch: 73924 Prep Batch: 63437 Date Analyzed: 2010-09-28 QC Preparation: 2010-09-28 Analyzed By: ER Prepared By: ER

continued ...

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matrix spikes continued . . .

•	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene	0.118	mg/L	1	0.100	0.0186	99	29.6 - 139
Toluene	0.134	${ m mg/L}$	1	0.100	0.0313	103	44.3 - 131
Ethylbenzene	0.109	mg/L	1	0.100	0.0054	104	43.8 - 131
Xylene	0.342	mg/L	1	0.300	0.0362	102	48.8 - 126

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Benzene	0.114	mg/L	1	0.100	0.0186	95	29.6 - 139	3	20
Toluene	0.131	mg/L	1	0.100	0.0313	100	44.3 - 131	2	20
Ethylbenzene	0.106	mg/L	1	0.100	0.0054	101	43.8 - 131	3	20
Xylene	0.333	mg/L	1	0.300	0.0362	99	48.8 - 126	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0886	0.0870	mg/L	1	0.1	89	87	73.9 - 118
4-Bromofluorobenzene (4-BFB)	0.0902	0.0885	${ m mg/L}$	1	0.1	90	88	73.8 - 116

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch: 73942 Prep Batch: 63446 Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29

Analyzed By: RR Prepared By: KV

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Aluminum	0.914	mg/L	1	1.00	0.053	86	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\mathbf{Spike}$	Matrix		$\mathrm{Rec}.$		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Aluminum	0.967	mg/L	1	1.00	0.053	91	75 - 125	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch: 73942 Prep Batch: 63446 Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29 Analyzed By: RR Prepared By: KV Report Date: September 29, 2010 TNM 97-04

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	MS			Spike	Matrix		Rec.
Param	Result	$_{ m Units}$	Dil.	${f Amount}$	Result	Rec.	Limit
Total Boron	0.163	mg/L	1	0.0500	0.112	102	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.159	mg/L	1	0.0500	0.112	94	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch: 73942 Prep Batch: 63446 Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29

Analyzed By: RR Prepared By: KV

MSSpike Matrix Rec. Param Result Units Dil. Result Rec. Limit Amount Total Cobalt 0.239 96 75 - 125 mg/L0.250< 0.00258

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
Total Cobalt	0.239	mg/L	1	0.250	< 0.00258	96	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch: 73942 Prep Batch: 63446 Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29

Analyzed By: RR Prepared By: KV

MS Spike Matrix Rec. Param Units Result Rec. Limit Result Dil. Amount Total Copper 0.1240.125< 0.00313 99 75 - 125 mg/L

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		$\operatorname{Rec}$ .		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Copper	0.118	mg/L	1	0.125	< 0.00313	94	75 - 125	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch: 73942 Prep Batch: 63446 Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29

Analyzed By: RRPrepared By: KV

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	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Iron	0.765	$\mathrm{mg/L}$	1	0.500	0.311	91	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Iron	0.746	mg/L	1	0.500	0.311	87	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245804

QC Batch: 73942 Date Analyzed: 2010-09-29 Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	MS			$\operatorname{Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Manganese	0.276	$\mathrm{mg/L}$	1	0.250	0.034	97	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Manganese	0.265	mg/L	1	0.250	0.034	92	75 - 125	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245804

QC Batch: Prep Batch: 63446

73942

Date Analyzed:

2010-09-29

QC Preparation: 2010-09-29

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Molybdenum	0.494	mg/L	1	0.500	0.003	98	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Molybdenum	0.483	mg/L	1	0.500	0.003	96	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245804

QC Batch: 73942 Prep Batch: 63446 Date Analyzed: QC Preparation: 2010-09-29

2010-09-29 Analyzed By: RR Prepared By: KV

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MS Rec. Spike Matrix Units Limit Param Result Dil. Amount Result Rec. Total Nickel 75 - 125 0.237 0.250 95 mg/L< 0.00593

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

RPD**MSD** Spike Matrix Rec. Dil. RPD Param Result Units Amount Result Rec. Limit Limit 0.239 Total Nickel mg/L 0.250 < 0.00593 96 75 - 125 20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245804

QC Batch: 73942 Date Analyzed: 2010-09-29

Analyzed By: RR

Prep Batch: 63446

TNM 97-04

QC Preparation: 2010-09-29

Prepared By: KV

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Zinc	0.244	$_{ m mg/L}$	. 1	0.250	0.015	92	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		$\operatorname{Rec.}$		RPD
Param	Result	Units	Dil.	${f A}{f m}{f o}{f u}{f n}{f t}$	Result	Rec.	Limit	RPD	Limit
Total Zinc	0.248	$\overline{\mathrm{mg}}/\mathrm{L}$	1	0.250	0.015	93	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245804

QC Batch: 73942 Prep Batch: 63446 Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29

Analyzed By: RR Prepared By: KV

Rec. MS Spike Matrix Param Result Units Dil. Result Rec. Limit Amount Total Silver 0.114mg/L < 0.000469 91 75 - 125 1 0.125Total Arsenic 75 - 125 0.451mg/L 1 0.500< 0.00465 90 Total Barium 75 - 125 1.07mg/L 1 1.00 0.19488 Total Cadmium 0.240mg/L 1 0.250< 0.00232 96 75 - 125Total Chromium 0.0920 < 0.00291 92 75 - 125mg/L 1 0.100Total Lead 75 - 1250.480mg/L 1 0.500< 0.00303 96 Total Selenium 0.500 < 0.00570 87 75 - 1250.436mg/L1

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Silver	0.116	mg/L	1	0.125	< 0.000469	93	75 - 125	2	20

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matrix spikes continued . . .

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	${ m Rec.}$	${f Limit}$	RPD	Limit
Total Arsenic	0.456	mg/L	1	0.500	< 0.00465	91	75 - 125	1	20
Total Barium	1.06	mg/L	1	1.00	0.194	87	75 - 125	1	20
Total Cadmium	0.244	mg/L	1	0.250	< 0.00232	98	75 - 125	2	20
Total Chromium	0.0900	mg/L	1	0.100	< 0.00291	90	75 - 125	2	20
Total Lead	0.467	mg/L	1	0.500	< 0.00303	93	75 - 125	3	20
Total Selenium	0.448	mg/L	1	0.500	< 0.00570	90	75 - 125	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245634

QC Batch: 73961 Date Analyzed: 2010-09-29 Analyzed By: TP

Prep Batch: 63447

QC Preparation: 2010-09-29

Prepared By: TP

	MS			$\operatorname{Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit
Total Mercury	0.00349	mg/L	1	0.00400	< 0.0000388	87	75 - 122

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Mercury	0.00356	mg/L	1	0.00400	< 0.0000388	89	75 - 122	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Standard (CCV-1)

QC Batch: 73828

Date Analyzed: 2010-09-26

Analyzed By: MN

•			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	60.2	100	80 - 120	2010-09-26
2-Methylnaphthalene		mg/L	60.0	60.9	102	80 - 120	2010-09-26
1-Methylnaphthalene		${ m mg/L}$	60.0	61.4	102	80 - 120	2010-09-26
Acenaphthylene		${ m mg/L}$	60.0	59.4	99	80 - 120	2010-09-26
Acenaphthene		${ m mg/L}$	60.0	61.8	103	80 - 120	2010-09-26
Dibenzofuran		${ m mg/L}$	60.0	58.7	. 98	80 - 120	2010-09-26
Fluorene		mg/L	60.0	61.6	103	80 - 120	2010-09-26
Anthracene		mg/L	60.0	56.6	94	80 - 120	2010-09-26
Phenanthrene		mg/L	60.0	56.3	94	80 - 120	2010-09-26
Fluoranthene		mg/L	60.0	60.6	101	80 - 120	2010-09-26
Pyrene		mg/L	60.0	61.5	102	80 - 120	2010-09-26
Benzo(a)anthracene		mg/L	60.0	48.0	80	80 - 120	2010-09-26

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			CCVs	CCVs	CCVs	$\operatorname{Percent}$	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chrysene		mg/L	60.0	68.8	115	80 - 120	2010-09-26
Benzo(b)fluoranthene		${ m mg/L}$	60.0	54.9	92	80 - 120	2010-09-26
Benzo(k)fluoranthene		$\mathrm{mg/L}$	60.0	71.3	119	80 - 120	2010-09-26
Benzo(a)pyrene		${ m mg/L}$	60.0	62.2	104	80 - 120	2010-09-26
Indeno(1,2,3-cd)pyrene		$\mathrm{mg/L}$	60.0	53.7	90	80 - 120	2010-09-26
Dibenzo(a,h)anthracene		mg/L	60.0	49.0	82	80 - 120	2010-09-26
Benzo(g,h,i)perylene		$\mathrm{mg/L}$	60.0	52.7	88	80 - 120	2010-09-26

					$\operatorname{Spike}$	$\operatorname{Percent}$	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	$\operatorname{Limit}$
Nitrobenzene-d5		69.1	mg/L	1	60.0	115	80 - 120
2-Fluorobiphenyl		59.3	mg/L	1	60.0	99	80 - 120
Terphenyl-d14		53.5	$\mathrm{mg/L}$	1	60.0	89	80 - 120

### Standard (CCV-1)

QC Batch: 73924

Date Analyzed: 2010-09-28

Analyzed By: ER

			CCVs True	$\begin{array}{c} { m CCVs} \\ { m Found} \end{array}$	CCVs Percent	Percent Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.100	.100	80 - 120	2010-09-28
Toluene		mg/L	0.100	0.100	100	80 - 120	2010-09-28
Ethylbenzene		m mg/L	0.100	0.101	101	80 - 120	2010-09-28
Xylene		$\mathrm{mg/L}$	0.300	0.302	101	80 - 120	2010-09-28

# Standard (CCV-2)

QC Batch: 73924

Date Analyzed: 2010-09-28

Analyzed By: ER

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.100	100	80 - 120	2010-09-28
Toluene		$\mathrm{mg/L}$	0.100	0.100	100	80 - 120	2010-09-28
Ethylbenzene		m mg/L	0.100	0.102	102	80 - 120	2010-09-28
Xylene		$\mathrm{mg/L}$	0.300	0.303	101	80 - 120	2010-09-28

# Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

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Param	$\operatorname{Flag}$	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Aluminum		$\mathrm{mg/L}$	1.00	0.985	98	90 - 110	2010-09-29
Standard (ICV-1)	)						
QC Batch: 73942			Date Analyz	zed: 2010-09-	29	Anal	yzed By: RR
Param	Flag	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Boron	rag	$\frac{\rm mg/L}{}$	1.00	1.03	103	90 - 110	2010-09-29
QC Batch: 73942			Date Analyz	zed: 2010-09-	29	Anal	yzed By: RR
QC Batch: 73942			ICVs	ICVs	ICVs	Percent	
	Di.	TI ::	ICVs True	ICVs Found	ICVs Percent	Percent Recovery	Date
	Flag	Units mg/L	ICVs	ICVs	ICVs	Percent	Date Analyzed
Param			ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits 90 - 110	Date Analyzed
Param Total Cobalt Standard (ICV-1)			ICVs True Conc.	ICVs Found Conc. 1.01	ICVs Percent Recovery	Percent Recovery Limits 90 - 110	Date Analyzed 2010-09-29

# Standard (ICV-1)

Flag

Units

mg/L

Param

Total Iron

QC Batch: 73942

Date Analyzed: 2010-09-29

**ICVs** 

Found

Conc.

1.01

ICVs

Percent

Recovery

101

Percent

Recovery

Limits

90 - 110

 ${\rm ICVs}$ 

True

Conc.

1.00

Analyzed By: RR

Date

Analyzed

2010-09-29

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			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		mg/L	1.00	1.01	101	90 - 110	2010-09-29

#### Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	1.02	102	90 - 110	2010-09-29

#### Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	1.01	101	90 - 110	2010-09-29

### Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	1.01	101	90 - 110	2010-09-29

### Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs True	ICVs Found	ICVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Silver		mg/L	0.125	0.125	100	90 - 110	2010-09-29
Total Arsenic ·		mg/L	1.00	1.02	102	90 - 110	2010-09-29
Total Barium		$_{ m mg/L}$	1.00	1.00	100	90 - 110	2010-09-29
Total Cadmium		$_{ m mg/L}$	1.00	1.02	102	90 - 110	2010-09-29
Total Chromium		$_{ m mg/L}$	1.00	1.02	102	90 - 110	2010-09-29
Total Lead		$_{ m mg/L}$	1.00	1.01	101	90 - 110	2010-09-29

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			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Selenium		mg/L	1.00	1.02	102	90 - 110	2010-09-29

### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	_
			$\operatorname{True}$	$\operatorname{Found}$	$\operatorname{Percent}$	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum	-	$\mathrm{mg/L}$	1.00	1.01	101	90 - 110	2010-09-29

### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		mg/L	1.00	1.01	101	90 - 110	2010-09-29

### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

		•	CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		mg/L	1.00	1.03	103	90 - 110	2010-09-29

### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
		•	$\operatorname{True}$	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		mg/L	1.00	1.02	102	90 - 110	2010-09-29

### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

TNM 97-04

Work Order: 10092419 TNM 97-04 Townsend

Page Number: 27 of 28

Lovington, NM

			CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	$_{ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	1.03	103	90 - 110	2010-09-29

## Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			CCVs True	CCVs Found	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		$_{ m mg/L}$	1.00	1.04	104	90 - 110	2010-09-29

### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			CCVs True	${ m CCVs} \ { m Found}$	CCVs Percent	Percent Recovery	Date
			riue	round	1 ercent	recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	1.04	104	90 - 110	2010-09-29

## Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			$^{\circ}\mathrm{CCVs}$	$\mathrm{CCVs}$	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	1.03	103	90 - 110	2010-09-29

### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Zinc		mg/L	1.00	1.03	103	90 - 110	2010-09-29

### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

TNM 97-04

Work Order: 10092419 TNM 97-04 Townsend

Page Number: 28 of 28 Lovington, NM

Param	$\operatorname{Flag}$	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Silver		mg/L	0.125	0.127	102	90 - 110	2010-09-29
Total Arsenic		$\mathrm{mg/L}$	1.00	1.04	104	90 - 110	2010-09-29
Total Barium		m mg/L	1.00	1.02	102	90 - 110	2010-09-29
Total Cadmium		mg/L	1.00	1.05	105	90 - 110	2010-09-29
Total Chromium		mg/L	1.00	1.05	105	90 - 110	2010-09-29
Total Lead		mg/L	1.00	1.03	103	90 - 110	2010-09-29
Total Selenium		mg/L	1.00	1.04	104	90 - 110	2010-09-29

# Standard (CCV-1)

QC Batch: 73961

Date Analyzed: 2010-09-29

Analyzed By: TP

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00519	104	90 - 110	2010-09-29

# Standard (CCV-2)

QC Batch: 73961

Date Analyzed: 2010-09-29

Analyzed By: TP

			CCVs	$\mathrm{CCVs}_{\cdot}$	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		${ m mg/L}$	0.00500	0.00525	105	90 - 110	2010-09-29

10092419 # LAB Order ID

TraceAnalysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue. Suite 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 724-1298 1 (800) 378-1298

432-530-7730

Phone #:

Fax #:

(Street, City, Zip) M. Aland

Company Name:

CMM CMCC. Brain

Contact Person:

432-530-170

5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313

₫

Page

BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750 200 East Sunset Rd., Suite E El Paso, Texas 79922
Tel (915) 585-3443
Fax (915) 585-3443
1 (888) 586-3443

**ANALYSIS REQUEST** 

er specify Wested to Na, Ca, Mg, K. TDS, EC CI' EI' 204' NO3' NO5' YIKalinity Pesticides 8081 / 608 Circle

Turn Around Time if different from standard

METRIS

GC/MS Semi. Vol. 8270 / 625 CC/W2 API 8560 / 624 BCI TCLP Pesticides TCLP Semi Volatiles TCLP Volatiles TCLP Metals Ag As Ba Cd Cr Pb Se Hg Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 6AH 8270√ 625 TPH 8015 GRO / DRO / TVHC TPH 418.1 / TX1005 / TX1005 Ext(C35)

BIEX 8054 / 602 / 8260 / 624

SAMPLING

PRESERVATIVE

METHOD

MATRIX

101 5 5 CH (111)

Sampler Signature:

Project Location (including state):

(If different from above)

Project #:

Invoice to:

Project Name:

PCB's 8082 / 608

Moisture Content BOD, TSS, pH

PIOH

20DW>

\$021 / 602 / 8260 / 624

**BATM** 

**BMIT** 

**DATE** 

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HCI **SCUDGE** ЯIА

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FIELD CODE

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1/88/10 න ප Ma Company:

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O.

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S-NA Log-in-Review Carrier #

10 <u>0</u>

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Company: 10 K Company

Received by:

Time:

Date:

Company:

Relinquished by

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· 6 C Headspace Y/N/NA

Intact N

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1:20 OBS 1.

9.24-10 Date:

المحدد

TRRP Report Required

Check If Special Reporting Limits Are Needed

2K482149

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ASK-Libert

REMARKS JEX X

LAB USE

ONLY

SES80

INST

Time:

15'40 COR

923/10

Tale

# NMOCD - Analytical Parameters for Initial Groundwater Sampling (3-12-08)

### Field Parameters

specific conductance

pН

temperature

depth to water

PAH- L Liter Amber

## General Chemistry

Calcium

Magnesium

Potassium

Sodium

Chloride

Sulfate

Bicarbonate Alkalinity

Carbonate Alkalinity

Nitrate

Phosphate

Fluoride

Cital plantic Cations | Awions | Auxalinity

### RCRA Metals

Arsenic

Barium

Cadmium

Chromium

Lead

Mercury

Selenium

Silver

# Additional WQCC Metals

Copper

Iron

Manganese

Zinc

Aluminum

Boron

Cobalt

Molybdenum

Nickel

plastic Nitaic



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road: Suite E 5002 Basin Street, Suite A1

Lubbook, Texas 79424 El Paso, Texas 79922 Midland, Texas 79703 .800 • 378 • 1296 688 • 588 • 3443 806 • 794 • 1296 FAX 806 • 794 • 1298 915 • 585 • 3443 FAX 915 • 585 • 4944 482 • 689 • 6301,

817 \* 201 \* 5260

FAX 432 • 689 • 6313

6015 Harris Parkway, Suite 110

Ft. Worth, Texas 76132

E-Mail: lab@traceanalysis.com

# Certifications

**WBENC:** 237019

HUB:

1752439743100-86536

DBE:

VN 20657

NCTRCA

WFWB38444Y0909.

# **NELAP Certifications**

Lubbock: T104704219-08-TX

LELAP-02003

Kansas E-10317

El Paso: T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

# **Analytical and Quality Control Report**

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: November 16, 2010

Work Order:

10102928

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
249154	Post-Carbon	water	2010-10-25	13:00	2010-10-29

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

# Standard Flags

B - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-10-29 and assigned to work order 10102928. Samples for work order 10102928 were received intact without headspace and at a temperature of 2.8 C.

Samples were analyzed for the following tests using their respective methods.

		$\operatorname{Prep}$	$\operatorname{Prep}$	$_{ m QC}$	Analysis
Test	Method	$\operatorname{Batch}$	Date	Batch	Date
$\overline{\mathrm{BTEX}}$	S 8021B	64291	2010-11-01 at 09:00	74939	2010-11-01 at 09:48
PAH	S 8270D	64659	2010-11-01 at $15:00$	75374	2010-11-16 at 10:59

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10102928 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Report Date: November 16, 2010 Work Order: 10102928 Page Number: 4 of 10 TNM 97-04 Townsend Lovington, NM

# **Analytical Report**

#### Sample: 249154 - Post-Carbon

Laboratory: Midland

Analysis: BTEX Analytical Method: S 8021B Prep Method: QC Batch: 74939 Date Analyzed: 2010-11-01 Analyzed By: Prep Batch: 64291 Sample Preparation: 2010-11-01 Prepared By:

RLParameter Flag Result Dilution RLUnits 0.00100 Benzene < 0.00100 mg/L 1 Toluene 1 0.00100< 0.00100 mg/L Ethylbenzene 1 0.00100 < 0.00100 mg/L Xylene < 0.00100 1 0.00100mg/L

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)		0.115	mg/L	1	0.100	115	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.112	${ m mg/L}$	1	0.100	112	51.1 - 128

#### Sample: 249154 - Post-Carbon

Laboratory: Lubbock

Analysis: PAH Analytical Method: S 8270D Prep Method: S 3510C Analyzed By: QC Batch: 75374 Date Analyzed: 2010-11-16 MN Prep Batch: 64659 Sample Preparation: Prepared By: MN2010-11-01

RLParameter Flag Result Units Dilution RLNaphthalene 0.000200 < 0.000186 mg/L 0.93 2-Methylnaphthalene < 0.000186 mg/L 0.93 0.000200 1-Methylnaphthalene 0.93 0.000200 < 0.000186 mg/L 0.000200 Acenaphthylene < 0.000186 mg/L 0.93Acenaphthene 0.93 0.000200 < 0.000186 mg/L Dibenzofuran 0.930.000200 < 0.000186 mg/L Fluorene < 0.000186 mg/L 0.930.000200Anthracene < 0.000186 mg/L 0.930.0002000.000200 Phenanthrene < 0.000186 mg/L 0.93Fluoranthene 0.93 0.000200 < 0.000186 mg/L Pyrene < 0.000186 mg/L 0.93 0.0002000.000200 Benzo(a)anthracene < 0.000186 mg/L 0.93Chrysene < 0.000186 mg/L 0.930.000200 Benzo(b)fluoranthene < 0.000186 mg/L 0.930.000200Benzo(k)fluoranthene 0.93 0.000200 < 0.000186 mg/L 0.000200Benzo(a)pyrene < 0.000186 mg/L 0.93

 $continued \dots$ 

S 5030B

AG

AG

Report Date: November 16, 2010

TNM 97-04

Work Order: 10102928 TNM 97-04 Townsend

Page Number: 5 of 10 Lovington, NM

sample 249154 continued ...

		$^{\cdot}$ RL			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Indeno(1,2,3-cd)pyrene		< 0.000186	mg/L	0.93	0.000200
Dibenzo(a,h)anthracene		< 0.000186	m mg/L	0.93	0.000200
Benzo(g,h,i)perylene		< 0.000186	m mg/L	0.93	0.000200
			Spike	Percent	Recovery

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	$egin{array}{c}  ext{Recovery} \  ext{Limits} \end{array}$
Nitrobenzene-d5		0.0562	mg/L	0.93	0.0800	70	10 - 111
2-Fluorobiphenyl		0.0412	mg/L	0.93	0.0800	52	10 - 92.7
Terphenyl-d14		0.0579	mg/L	0.93	0.0800	72	35.9 - 107

Method Blank (1)

QC Batch: 74939

Flag

QC Batch: 74939 Date Analyzed: 2010 - 11 - 01

Analyzed By: AG Prepared By: AG

0.001

Prep Batch: 64291

Parameter

Ethylbenzene

Benzene

Toluene

Xylene

QC Preparation: 2010-11-01

> MDLUnits RLResult 0.001 < 0.000600 mg/L< 0.000600 mg/L 0.001< 0.000800 mg/L 0.001

> > mg/L

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)		0.112	${ m mg/L}$	1	0.100	112	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.108	${ m mg/L}$	1	0.100	108	47.3 - 116

< 0.000767

Method Blank (1)

QC Batch: 75374

QC Batch: 75374 Prep Batch: 64659 Date Analyzed: 2010-11-16 QC Preparation: 2010-11-01 Analyzed By: MN Prepared By: MN

		•		
		$\operatorname{MDL}$		
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	RL
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	$\mathrm{mg/L}$	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	m mg/L	0.0002
Acenaphthene		< 0.0000617	mg/L	0.0002
Dibenzofuran .		< 0.0000952	m mg/L	0.0002
				son time ad

continued ...

Report Date: November 16, 2010 TNM 97-04 Work Order: 10102928 TNM 97-04 Townsend Page Number: 6 of 10 Lovington, NM

method blank continued . . .

		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	RL
Fluorene		< 0.000134	$\mathrm{mg/L}$	0.0002
Anthracene		< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	$\mathrm{mg/L}$	0.0002
Fluoranthene		< 0.000476	$\mathrm{mg/L}$	0.0002
Pyrene		< 0.000590	$\mathrm{mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	$\mathrm{mg/L}$	0.0002
Chrysene		< 0.0000766	$\mathrm{mg/L}$	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	$\mathrm{mg/L}$	0.0002
Benzo(a)pyrene		< 0.000132	$\mathrm{mg/L}$	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	$\mathrm{mg/L}$	0.0002
${f Dibenzo(a,h)}$ anthracene		< 0.0000534	${ m mg/L}$	0.0002
Benzo(g,h,i)perylene		< 0.0000473	${ m mg/L}$	0.0002

Surrogate	Flag	Result	Units	Dilution	$rac{ ext{Spike}}{ ext{Amount}}$	Percent Recovery	Recovery Limits
	1 148		Onros	Dilucion			
Nitrobenzene-d5		0.0500	m mg/L	1	0.0800	62	10 - 111
2-Fluorobiphenyl		0.0303	$\mathrm{mg/L}$	1	0.0800	38	10 - 92.7
Terphenyl-d14		0.0483	$\mathrm{mg/L}$	1	0.0800	60	35.9 - 107

### Laboratory Control Spike (LCS-1)

QC Batch: 74939 Prep Batch: 64291 Date Analyzed: 2010-11-01 QC Preparation: 2010-11-01 Analyzed By: AG Prepared By: AG

Param	LCS Result	Units	Dil.	$\begin{array}{c} {\rm Spike} \\ {\rm Amount} \end{array}$	$rac{ m Matrix}{ m Result}$	Rec.	$egin{array}{c} { m Rec.} \\ { m Limit} \end{array}$
Benzene	0.0987	mg/L	1	0:100	< 0.000600	99	82.9 - 118
Toluene	0.0993	mg/L	1	0.100	< 0.000600	99	82.7 - 117
Ethylbenzene	0.0997	mg/L	1	0.100	< 0.000800	100	78.8 - 116
Xylene ·	0.300	mg/L	1	0.300	< 0.000767	100	79.3 - 116

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	Lo	CSD		Spike	Matrix		Rec.		RPD
Param	Re	esult Un	its Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene	0.	101 mg	/L 1	0.100	< 0.000600	101	82.9 - 118	2	20
Toluene	0.1	0998 mg	/L 1	0.100	< 0.000600	100	82.7 - 117	0	20
Ethylbenzene	. 0	$101  ext{ mg}$	/L 1	0.100	< 0.000800	101	78.8 - 116	1	. 20
Xylene	. 0	.303 mg	/L 1	0.300	< 0.000767	101	79.3 - 116	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Report Date: November 16, 2010

TNM 97-04

Work Order: 10102928 TNM 97-04 Townsend

Page Number: 7 of 10 Lovington, NM

Surrogate	$rac{ ext{LCS}}{ ext{Result}}$	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0966	0.105	mg/L	1	0.100	97	105	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.0976	0.106	mg/L	1	0.100	98	106	68.2 - 134

#### Laboratory Control Spike (LCS-1)

QC Batch:

75374

Date Analyzed:

2010-11-16

Analyzed By: MN Prepared By: MN

Prep Batch: 64659

QC Preparation: 2010-11-01

LCS Matrix Rec. Spike Param Units Limit Result Dil. Amount Result Rec. Naphthalene 32.2 - 80.3 0.0452mg/L0.0800 < 0.0000784 56 2-Methylnaphthalene 34.8 - 87 0.0433mg/L 1 54 0.0800< 0.0000747 1-Methylnaphthalene 0.0482mg/L 0.0800 < 0.0000575 60 36.9 - 89.61 Acenaphthylene 0.0532mg/L 1 0.0800 < 0.0000963 66 35 - 93.2Acenaphthene 0.0530mg/L < 0.0000617 66 35.8 - 92.91 0.0800Dibenzofuran 0.0395 mg/L 1 0.0800 < 0.0000952 49 35.3 - 85.1 Fluorene 0.0519mg/L 1 0.0800< 0.00013465 43.4 - 101 Anthracene 82 44.8 - 92.4 0.0660mg/L 1 0.0800< 0.000441 Phenanthrene 0.0513mg/L 1 0.0800< 0.000435 64 44 - 93.7Fluoranthene 0.0572mg/L 1 0.0800< 0.000476 72 52.7 - 104Pyrene 75 0.0602 mg/L 1 0.0800 < 0.000590 42.2 - 93.8Benzo(a)anthracene 0.0438mg/L0.0800< 0.000118 55 40.4 - 91.9 1 Chrysene 103 44.4 - 107 0.0825mg/L 1 < 0.0000766 0.0800Benzo(b)fluoranthene 0.0318 mg/L 1 0.0800 < 0.000146 40 34.8 - 105Benzo(k)fluoranthene 0.0582mg/L 1 0.0800 < 0.000141 73 50.2 - 158Benzo(a)pyrene 0.0441mg/L 1 0.0800 < 0.000132 55 51.3 - 151 Indeno(1,2,3-cd)pyrene 0.0431 mg/L< 0.0000702 43.2 - 115 1 0.080054 Dibenzo(a,h)anthracene 0.0532mg/L66 43.9 - 115 1 0.0800< 0.0000534 mg/L Benzo(g,h,i)perylene 64 45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

0.0513

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	${\operatorname{Rec}}.$	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Naphthalene	0.0448	mg/L	1	0.0800	< 0.0000784	56	32.2 - 80.3	1	20
2-Methylnaphthalene	0.0433	mg/L	1	0.0800	< 0.0000747	54	34.8 - 87	0	20
1-Methylnaphthalene	0.0490	mg/L	1	0.0800	< 0.0000575	61	36.9 - 89.6	2	20
Acenaphthylene	0.0528	mg/L	1	0.0800	< 0.0000963	66	35 - 93.2	1	20
Acenaphthene	0.0534	mg/L	1	0.0800	< 0.0000617	67	35.8 - 92.9	1	20
Dibenzofuran	0.0396	mg/L	1	0.0800	< 0.0000952	50	35:3 - 85.1	0	20
Fluorene	0.0524	mg/L	1	0.0800	< 0.000134	66	43.4 - 101	1	20
Anthracene	0.0624	mg/L	1	0.0800	< 0.000441	78	44.8 - 92.4	6	20
Phenanthrene	0.0506	mg/L	1	0.0800	< 0.000435	63	44 - 93.7	1	20
Fluoranthene	0.0567	mg/L	1	0.0800	< 0.000476	71	52.7 - 104	1	20
Pyrene	0.0531	mg/L	1	0.0800	< 0.000590	66	42.2 - 93.8	12	20

1

0.0800

< 0.0000473

Work Order: 10102928 TNM 97-04 Townsend Page Number: 8 of 10 Lovington, NM

control spikes continued . . .

•		LCSD			$_{ m Spike}$	Matrix		$\mathrm{Rec}.$		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Benzo(a)anthracene		0.0503	mg/L	1	0.0800	< 0.000118	63	40.4 - 91.9	14	20
Chrysene		0.0837	${ m mg/L}$	1	0.0800	< 0.0000766	105	44.4 - 107	1	20
Benzo(b)fluoranthene		0.0341	$\mathrm{mg/L}$	1	0.0800	< 0.000146	43	34.8 - 105	7	20
Benzo(k)fluoranthene		0.0502	mg/L	1	0.0800	< 0.000141	63	50.2 - 158	15	20
Benzo(a)pyrene	1	0.0550	$\mathrm{mg/L}$	1	0.0800	< 0.000132	69	51.3 - 151	22	20
Indeno(1,2,3-cd)pyrene		0.0440	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	55	43.2 - 115	$^2$	20
Dibenzo(a,h)anthracene		0.0507	$\mathrm{mg/L}$	1	0.0800	< 0.0000534	63	43.9 - 115	5	20
Benzo(g,h,i)perylene		0.0500	mg/L	1	0.0800	< 0.0000473	62	45.1 - 115	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS ·	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Nitrobenzene-d5	0.0475	0.0463	mg/L	1	0.0800	59	58	10 - 111
2-Fluorobiphenyl	0.0461	0.0450	mg/L	1	0.0800	58	56	10 - 92.7
Terphenyl-d14	0.0538	0.0534	${ m mg/L}$	1	0.0800	67	67	35.9 - 107

Matrix Spike (MS-1) Spiked Sample: 249154

QC Batch: 74939 Prep Batch: 64291 Date Analyzed: 2010-11-01 QC Preparation: 2010-11-01

Analyzed By: AG Prepared By: AG

	MS			Spike	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	${ m Amount}$	Result	Rec.	Limit
Benzene	0.0993	mg/L	· 1	0.100	< 0.000600	99	77.9 - 114
Toluene	0.0989	mg/L	1	0.100	< 0.000600	99	78.3 - 111
Ethylbenzene	0.0994	$\mathrm{mg/L}$	1	0.100	< 0.000800	99	75.3 - 110
Xylene	0.299	mg/L	1	0.300	< 0.000767	100	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	$rac{ ext{MSD}}{ ext{Result}}$	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	$egin{array}{c}  ext{RPD} \  ext{Limit} \end{array}$
Benzene	0.104	· mg/L	1	0.100	< 0.000600	104	77.9 - 114	5	20
Toluene	0.104	mg/L	1	0.100	< 0.000600	104	78.3 - 111	5	20
Ethylbenzene	0.104	mg/L	1	0.100	< 0.000800	104	75.3 - 110	4	20
Xylene	0.314	mg/L	1	0.300	< 0.000767	105	75.7 - 109	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

<sup>&</sup>lt;sup>1</sup>RPD out of RPD Limits. Analye not detected in sample. •

Work Order: 10102928 TNM 97-04 Townsend Page Number: 9 of 10 Lovington, NM

matrix spikes continued									
•		MS	MSD			Spike	MS	MSD	${ m Rec.}$
Surrogate		Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
		MS	MSD			Spike	MS	MSD	Rec.
Surrogate		Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	2 3	0.127	0.109	mg/L	1	0.1	127	109	68.3 - 107
4-Bromofluorobenzene (4-BFB)		0.128	0.112	mg/L	1	0.1	128	112	60.1 - 135

### Standard (CCV-1)

QC Batch: 74939

Date Analyzed: 2010-11-01

Analyzed By: AG

			CCVs True	CCVs Found	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0993	99	80 - 120	2010-11-01
Toluene		${ m mg/L}$	0.100	0.0999	100	80 - 120	2010-11-01
Ethylbenzene		${ m mg/L}$	0.100	0.105	105	80 - 120	2010-11-01
Xylene		${ m mg/L}$	0.300	0.316	105	80 - 120	2010-11-01

### Standard (CCV-2)

QC Batch: 74939

Date Analyzed: 2010-11-01

Analyzed By: AG

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		$_{ m mg/L}$	0.100	0.103	103	80 - 120	2010-11-01
Toluene		mg/L	0.100	0.103	103	80 - 120	2010-11-01
Ethylbenzene		mg/L	0.100	0.103	103	80 - 120	2010-11-01
Xylene_		m mg/L	0.300	0.311	104	80 - 120	2010-11-01

### Standard (CCV-1)

QC Batch: 75374

Date Analyzed: 2010-11-16

Analyzed By: MN

		CCVs	CCVs	$\mathrm{CCVs}$	Percent	
		$\operatorname{True}$	Found	Percent	Recovery	Date
$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
	mg/L	60.0	60.4	101	80 - 120	2010-11-16
	${ m mg/L}$	60.0	63.1	105	80 - 120	2010-11-16
	mg/L	60.0	62.5	104	80 - 120	2010-11-16
	Flag	mg/L mg/L	$\begin{array}{ccc} & & & & & \\ & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & & \\ & &$	$\begin{array}{c cccc} & & & True & Found \\ \hline Flag & Units & Conc. & Conc. \\ & mg/L & 60.0 & 60.4 \\ & mg/L & 60.0 & 63.1 \end{array}$	Flag         Units         Conc.         Found Conc.         Percent Recovery           mg/L         60.0         60.4         101           mg/L         60.0         63.1         105	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

<sup>&</sup>lt;sup>2</sup>High surrogate recovery due to peak interference.

<sup>&</sup>lt;sup>3</sup>High surrogate recovery due to peak interference.

Report Date: November 16, 2010 TNM 97-04

Work Order: 10102928 TNM 97-04 Townsend Page Number: 10 of 10 Lovington, NM

standara	$l\ continued$	٠.	

			$\mathrm{CCVs}$	CCVs	$\mathrm{CCVs}$	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Acenaphthylene		mg/L	60.0	59.5	99	80 - 120	2010-11-16
Acenaphthene		mg/L	60.0	60.9	102	80 - 120	2010-11-16
Dibenzofuran		$_{ m mg/L}$	60.0	62.4	104	80 - 120	2010-11-16
Fluorene		mg/L	60.0	64.6	108	80 - 120	2010-11-16
Anthracene		mg/L	60.0	61.8	103 .	80 - 120	2010-11-16
Phenanthrene		$\mathrm{mg/L}$	60.0	53.4	89	80 - 120	2010-11-16
Fluoranthene		$\mathrm{mg/L}$	60.0	49.5	82	80 - 120	2010-11-16
Pyrene		m mg/L	60.0	61.0	102	80 - 120	2010-11-16
Benzo(a)anthracene		$\mathrm{mg/L}$	60.0	49.6	83	80 - 120	2010-11-16
Chrysene		$\mathrm{mg/L}$	60.0	66.9	112	80 - 120	2010-11-16
Benzo(b)fluoranthene		m mg/L	60.0	50.0	83	80 - 120	2010-11-16
Benzo(k)fluoranthene		mg/L	60.0	64.8	108	80 - 120	2010-11-16
Benzo(a)pyrene		${ m mg/L}$	60.0	67.5	112	80 - 120	2010-11-16
Indeno(1,2,3-cd)pyrene		${ m mg/L}$	60.0	53.7	90	80 - 120	2010-11-16
Dibenzo(a,h)anthracene		mg/L	60.0	55.2	92	80 - 120	2010-11-16
Benzo(g,h,i)perylene		mg/L	60.0	61.2	102	80 - 120	2010-11-16

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result ·	Units	Dilution	Amount	Recovery	Limit
Nitrobenzene-d5		70.3	mg/L	1	60.0	117	80 - 120
2-Fluorobiphenyl		61.0	mg/L	1 .	60.0	102	80 - 120
Terphenyl-d14		58.9	$\mathrm{mg/L}$	1	60.0	98	80 - 120

LAB Order ID # 1010 2928

TraceAnalysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1296

5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313

200 East Sunset Rd., Suite E El Paso, Texas 79922
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750

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FAX 806 • 794 • 1298 FAX 915 • 585 • 4944 FAX 432 • 689 • 6313

817 • 201 • 5260

E-Mail: lab@traceanalysis.com

# Certifications

WBENC: 237019 HUB:

1752439743100-86536

DBE:

VN 20657

NCTRCA WFWB38444Y0909

# **NELAP Certifications**

T104704219-08-TX Lubbock:

LELAP-02003

Kansas E-10317

El Paso: T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

# **Analytical and Quality Control Report**

Ron Rounsaville Nova Safety & Environmental

Report Date: December 8, 2010

2057 Commerce St. Midland, TX, 79703

Work Order:

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
251405	Townsend Post-Carbon	water	2010-11-23	13:00	2010-11-24

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abel

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

### Standard Flags

 ${\bf B}\,$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-11-24 and assigned to work order 10112414. Samples for work order 10112414 were received intact without headspace and at a temperature of 3.5 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	$\operatorname{Prep}$	QC	Analysis
$\operatorname{Test}$	Method	Batch	Date	Batch	Date
$\overline{\mathrm{BTEX}}$	S 8021B	64941	2010-11-29 at 09:00	75706	2010-11-29 at 15:41
PAH	S 8270D	65157	2010-11-24 at 14:00	75971	2010-12-07 at 16:00

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10112414 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10112414 TNM 97-04 Townsend Page Number: 4 of 10 Lovington, NM

# **Analytical Report**

#### Sample: 251405 - Townsend Post-Carbon

Laboratory: Midland

Analysis: BTEX QC Batch: 75706 Prep Batch: 64941 Analytical Method: S 8021B
Date Analyzed: 2010-11-29
Sample Preparation: 2010-11-29

Prep Method: S 5030B Analyzed By: AG Prepared By: AG

		RL				
Parameter	Flag	Result	Units	Dilution	$\operatorname{RL}$	
Benzene		0.00470	mg/L	1	0.00100	
Toluene		< 0.00100	mg/L	1	0.00100	
Ethylbenzene		< 0.00100	${ m mg/L}$	1	0.00100	
Xylene		< 0.00100	m mg/L	1	0.00100	

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)		0.101	mg/L	1	0.100	101	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.102	mg/L	1	0.100	102	51.1 - 128

#### Sample: 251405 - Townsend Post-Carbon

Laboratory: Lubbock

Analysis: PAH QC Batch: 75971 Prep Batch: 65157 Analytical Method: S 8270D Date Analyzed: 2010-12-07 Sample Preparation: 2010-11-24

8270D Prep Method: S 3510C 10-12-07 Analyzed By: MN 10-11-24 Prepared By: MN

		$\mathrm{RL}$ .			
Parameter	Flag	Result	Units	Dilution	$\mathbf{RL}_{\cdot}$
Naphthalene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
2-Methylnaphthalene		< 0.000184	mg/L	0.922	0.000200
1-Methylnaphthalene		< 0.000184	m mg/L	0.922	0.000200
Acenaphthylene		< 0.000184	m mg/L	0.922	0.000200
Acenaphthene		< 0.000184	mg/L	0.922	0.000200
Dibenzofuran		< 0.000184	mg/L	0.922	0.000200
Fluorene		< 0.000184	m mg/L	0.922	0.000200
Anthracene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
Phenanthrene		< 0.000184	mg/L	0.922	0.000200
Fluoranthene		< 0.000184	mg/L	0.922	0.000200
Pyrene		< 0.000184	mg/L	0.922	0.000200
Benzo(a)anthracene		< 0.000184	mg/L	0.922	0.000200
Chrysene		< 0.000184	m mg/L	0.922	0.000200
Benzo(b)fluoranthene		< 0.000184	m mg/L	0.922	0.000200
Benzo(k)fluoranthene	1	< 0.000184	mg/L	0.922	0.000200

 $continued \dots$ 

<sup>&</sup>lt;sup>1</sup>Concentration biased low.

TNM 97-04

Work Order: 10112414 TNM 97-04 Townsend

Page Number: 5 of 10

Lovington, NM

sample 251405 continued ...

		$\mathrm{RL}$	•		
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Benzo(a)pyrene	2	< 0.000184	mg/L	0.922	0.000200
Indeno(1,2,3-cd)pyrene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
Dibenzo(a,h)anthracene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
Benzo(g,h,i)perylene		< 0.000184	mg/L	0.922	0.000200

Surrogate	Flag	Result	Units	Dilution	${ m Spike} \ { m Amount}$	$egin{array}{c}  ext{Percent} \  ext{Recovery} \end{array}$	$egin{array}{c}  ext{Recovery} \  ext{Limits} \end{array}$
Nitrobenzene-d5		0.0168	mg/L	0.922	0.0800	21	10 - 111
2-Fluorobiphenyl		0.0247	mg/L	0.922	0.0800	31	10 - 92.7
Terphenyl-d14		0.0445	$\mathrm{mg/L}$	0.922	0.0800	56	35.9 - 107

Method Blank (1)

QC Batch: 75706

QC Batch: 75706 Date Analyzed: 2010-11-29 Analyzed By: AG

Prep Batch: 64941

QC Preparation: 2010-11-29

Prepared By: AG

		$\overline{ ext{MDL}}$		
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	$\operatorname{RL}$
Benzene		< 0.000600	mg/L	0.001
Toluene		< 0.000600	m mg/L	0.001
Ethylbenzene		< 0.000800	m mg/L	0.001
Xvlene		< 0.000767	mg/L	0.001

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0953	mg/L	1	0.100	95	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.0981	$\mathrm{mg/L}$	1	0.100	98	47.3 - 116

Method Blank (1) QC Batch: 75971

QC Batch: 75971 Prep Batch: 65157

Date Analyzed:

2010-12-07

Analyzed By: MN

QC Preparation: 2010-11-24

Prepared By: MN

		$\mathrm{MDL}$		•
Parameter	Flag	Result	Units	RL
Naphthalene		< 0.0000784	$_{ m mg/L}$	0.0002
2-Methylnaphthalene		< 0.0000747	${ m mg/L}$	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	$\mathrm{mg/L}$	0.0002

 $\overline{continued}$  ...

<sup>&</sup>lt;sup>2</sup>Concentration biased low.

TNM 97-04

Work Order: 10112414 TNM 97-04 Townsend Page Number: 6 of 10 Lovington, NM

method blank continued . . .

		$\mathrm{MDL}$	,	
Parameter	Flag	Result	Units	RL
Acenaphthene		< 0.0000617	mg/L	0.0002
Dibenzofuran		< 0.0000952	$\mathrm{mg/L}$	0.0002
Fluorene		< 0.000134	$\mathrm{mg/L}$	0.0002
Anthracene		< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	$\mathrm{mg/L}$	0.0002
Fluoranthene		< 0.000476	$\mathrm{mg/L}$	0.0002
Pyrene		< 0.000590	$\mathrm{mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	$\mathrm{mg/L}$	0.0002
Chrysene		< 0.0000766	$\mathrm{mg/L}$	0.0002
Benzo(b)fluoranthene		< 0.000146	mg/L	0.0002
Benzo(k)fluoranthene	,	< 0.000141	$\mathrm{mg/L}$	0.0002
Benzo(a)pyrene		< 0.000132	${ m mg/L}$	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	$\mathrm{mg/L}$	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	$\mathrm{mg/L}$	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

<b>a</b>	771	<b>7</b> 0. 1.	77 1	D.1.	Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Result}$	Units	Dilution	$\mathbf{A}\mathbf{m}\mathbf{o}\mathbf{u}\mathbf{n}\mathbf{t}$	Recovery	Limits
Nitrobenzene-d5		0.0446	mg/L	1	0.0800	56	10 - 111
2-Fluorobiphenyl		0.0451	${ m mg/L}$	1	0.0800	56	10 - 92.7
Terphenyl-d14		0.0400	$\mathrm{mg/L}$	1	0.0800	50	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch: 75706 Prep Batch: 64941 Date Analyzed: 2010-11-29 QC Preparation: 2010-11-29 Analyzed By: AG Prepared By: AG

	LCS			$\operatorname{Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene	0.0938	mg/L	1	0.100	< 0.000600	94	82.9 - 118
Toluene	0.0936	mg/L	1	0.100	< 0.000600	94	82.7 - 117
Ethylbenzene	0.0960	mg/L	1	0.100	< 0.000800	96	78.8 - 116
Xylene	0.291	mg/L	1	0.300	< 0.000767	97	79.3 - 116

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene	0.103	mg/L	1	0.100	< 0.000600	103	82.9 - 118	9	20
Toluene	0.102	mg/L	1	0.100	< 0.000600	102	82.7 - 117	9	20
Ethylbenzene	0.101	mg/L	1	0.100	< 0.000800	101	78.8 - 116	5	20
Xylene	0.306	mg/L	1	0.300	< 0.000767	102	79.3 - 116	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

TNM 97-04

Work Order: 10112414

TNM 97-04 Townsend

Page Number: 7 of 10 Lovington, NM

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.102	0.0950	mg/L	1	0.100	102	95	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.102	0.0998	mg/L	1	0.100	102	100	68.2 - 134

### Laboratory Control Spike (LCS-1)

QC Batch:

75971

Date Analyzed:

2010-12-07

Analyzed By: MN

Prep Batch: 65157

QC Preparation: 2010-11-24

Prepared By: MN

		LCS			Spike	Matrix		Rec.
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Naphthalene		0.0342	mg/L	1	0.0800	< 0.0000784	43	32.2 - 80.3
2-Methylnaphthalene		0.0335	mg/L	1	0.0800	< 0.0000747	42	34.8 - 87
1-Methylnaphthalene		0.0344	$\mathrm{mg/L}$	1	0.0800	< 0.0000575	43	36.9 - 89.6
Acenaphthylene		0.0460	${ m mg/L}$	1	0.0800	< 0.0000963	58	35 - 93.2
Acenaphthene		0.0454	mg/L	1	0.0800	< 0.0000617	57	35.8 - 92.9
Dibenzofuran		0.0429	mg/L	1	0.0800	< 0.0000952	54	35.3 - 85.1
Fluorene		0.0559	$\mathrm{mg/L}$	1	0.0800	< 0.000134	70	43.4 - 101
Anthracene		0.0492	$\mathrm{mg/L}$ .	1	0.0800	< 0.000441	62	44.8 - 92.4
Phenanthrene		0.0547	$\mathrm{mg/L}$	1	0.0800	< 0.000435	68	44 - 93.7
Fluoranthene		0.0575	mg/L	1	0.0800	< 0.000476	72	52.7 - 104
Pyrene		0.0411	${ m mg/L}$	1	0.0800	< 0.000590	51	42.2 - 93.8
Benzo(a)anthracene		0.0512	mg/L	1	0.0800	< 0.000118	64	40.4 - 91.9
Chrysene		0.0782	mg/L	1	0.0800	< 0.0000766	98	44.4 - 107
Benzo(b)fluoranthene		0.0351	mg/L	1	0.0800	< 0.000146	44	34.8 - 105
Benzo(k)fluoranthene	3	0.0327	mg/L	1 .	0.0800	< 0.000141	41	50.2 - 158
Benzo(a)pyrene	4	0.0386	mg/L	1	0.0800	< 0.000132	48	51.3 - 151
Indeno(1,2,3-cd)pyrene		0.0412	$_{ m mg/L}$	1	0.0800	< 0.0000702	52	43.2 - 115
Dibenzo(a,h)anthracene		0.0560	mg/L	1	0.0800	< 0.0000534	70	43.9 - 115
Benzo(g,h,i)perylene		0.0391	mg/L	1	0.0800	< 0.0000473	49	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Naphthalene	0.0350	mg/L	1	0.0800	< 0.0000784	44	32.2 - 80.3	2	20
2-Methylnaphthalene	0.0332	$\mathrm{mg/L}$	1	0.0800	< 0.0000747	42	34.8 - 87	1	20
1-Methylnaphthalene	0.0339	mg/L	1	0.0800	< 0.0000575	42	36.9 - 89.6	2 .	20
Acenaphthylene	0.0480	mg/L	1	0.0800	< 0.0000963	60	35 - 93.2	4	20
Acenaphthene	0.0468	mg/L	1	0.0800	< 0.0000617	58	35.8 - 92.9	3	20
Dibenzofuran	0.0444	$\mathrm{mg/L}$	1	0.0800	< 0.0000952	56	35.3 - 85.1	3	20
Fluorene	0.0580	mg/L	1	0.0800	< 0.000134	72	43.4 - 101	4	20
Anthracene	0.0511	mg/L	1	0.0800	< 0.000441	64	44.8 - 92.4	4	20

continued ...

<sup>&</sup>lt;sup>3</sup>Spike recovery outside control limits. Concentration biased low. •

<sup>&</sup>lt;sup>4</sup>Spike recovery outside control limits. Concentration biased low. •

TNM 97-04

Work Order: 10112414 TNM 97-04 Townsend

Page Number: 8 of 10 Lovington, NM

control spikes continued.	ontrol	spikes	continued		
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		LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Phenanthrene		0.0570	mg/L	1	0.0800	< 0.000435	71	44 - 93.7	4	20
Fluoranthene		0.0573	$\mathrm{mg/L}$	1	0.0800	< 0.000476	72	52.7 - 104	0	20
Pyrene		0.0426	mg/L	1	0.0800	< 0.000590	53	42.2 - 93.8	4	20
Benzo(a)anthracene		0.0529	mg/L	1	0.0800	< 0.000118	66	40.4 - 91.9	3	20
Chrysene		0.0842	mg/L	1	0.0800	< 0.0000766	105	44.4 - 107	7.	20
Benzo(b)fluoranthene		0.0364	$\mathrm{mg/L}$	1	0.0800	< 0.000146	46	34.8 - 105	4	20
Benzo(k)fluoranthene	5	0.0326	mg/L	1	0.0800	< 0.000141	41	50.2 - 158	0	20
$\operatorname{Benzo}(\operatorname{a})$ pyrene	6	0.0402	$\mathrm{mg/L}$	1	0.0800	< 0.000132	50	51.3 - 151	4	20
Indeno $(1,2,3\text{-cd})$ pyrene		0.0420	$\mathrm{mg/L}$	1	0:0800	< 0.0000702	52	43.2 - 115	2	20
Dibenzo(a,h)anthracene		0.0577	mg/L	1	0.0800	< 0.0000534	72	43.9 - 115	3	20
Benzo(g,h,i)perylene		0.0404	mg/L	1	0.0800	< 0.0000473	50	45.1 - 115	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$_{ m Spike}$	LCS	LCSD	Rec.
Surrogate .	Result	Result	$_{ m Units}$	Dil.	Amount	$\operatorname{Rec}$ .	Rec.	Limit
Nitrobenzene-d5	0.0412	0.0450	mg/L	1	0.0800	52	56	10 - 111
2-Fluorobiphenyl	0.0440	0.0465	${ m mg/L}$	1	0.0800	55	58	10 - 92.7
Terphenyl-d14	0.0519	0.0544	${ m mg/L}$	1	0.0800	65	68	35.9 - 107

Matrix Spike (MS-1) Spiked Sample: 251472

QC Batch:

75706 Prep Batch: 64941 Date Analyzed:

2010-11-29 QC Preparation: 2010-11-29 Analyzed By: AG Prepared By: AG

Param	$rac{ ext{MS}}{ ext{Result}}$	Units	Dil.	$\begin{array}{c} {\rm Spike} \\ {\rm Amount} \end{array}$	Matrix Result	Rec.	$egin{array}{c} { m Rec.} \\ { m Limit} \end{array}$
Benzene	20.7	mg/L	200	20.0	2.0561	93	77.9 - 114
Toluene	20.8	mg/L	200	20.0	2.6625	91	78.3 - 111
Ethylbenzene	20.5	$_{ m mg/L}$	200	20.0	3.0643	87	75.3 - 110
Xylene	62.0	${ m mg/L}$	200	60.0	9.495	88	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$	RPD	Limit
Benzene	19.4	mg/L	200	20.0	2.0561	87	77.9 - 114	6	20
Toluene	19.4	mg/L	200	20.0	2.6625	84	78.3 - 111	7	20
Ethylbenzene	19.1	mg/L	200	20.0	3.0643	80	75.3 - 110	7	20
Xylene	57.7	mg/L	200	60.0	9.495	80	75.7 - 109	7	· 20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

<sup>&</sup>lt;sup>5</sup>Spike recovery outside control limits. Concentration biased low. •

<sup>&</sup>lt;sup>6</sup>Spike recovery outside control limits. Concentration biased low. •

TNM 97-04

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Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD  Rec.	Rec. Limit
Trifluorotoluene (TFT)	19.9	19.7	mg/L	200	20	100	98	68.3 - 107
4-Bromofluorobenzene (4-BFB)	21.0	21.4	mg/L	200	20	105	107	60.1 - 135

#### Standard (CCV-1)

QC Batch: 75706

Date Analyzed: 2010-11-29

Analyzed By: AG

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0899	90	80 - 120	2010-11-29
Toluene		mg/L	0.100	0.0893	89	80 - 120	2010-11-29
Ethylbenzene		$_{ m mg/L}$	0.100	0.0888	89	80 - 120	2010-11-29
Xylene		mg/L	0.300	0.270	90	80 - 120	2010-11-29

### Standard (CCV-2)

QC Batch: 75706

Date Analyzed: 2010-11-29

Analyzed By: AG

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$_{ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0880	88	80 - 120	2010-11-29
Toluene		$\mathrm{mg/L}$	0.100	0.0874	87	80 - 120	2010-11-29
Ethylbenzene		$\mathrm{mg/L}$	0.100	0.0871	87	80 - 120	2010-11-29
Xylene		mg/L	0.300	0.264	88	80 - 120	2010-11-29

### Standard (CCV-1)

QC Batch: 75971

Date Analyzed: 2010-12-07

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$_{ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	50.9	85	80 - 120	2010-12-07
2-Methylnaphthalene		mg/L	60.0	51.6	86	80 - 120	2010-12-07
1-Methylnaphthalene		mg/L	60.0	49.0	82	80 - 120	2010-12-07
Acenaphthylene		$_{ m mg/L}$	60.0	51.7	86	80 - 120	2010-12-07
Acenaphthene		mg/L	60.0	50.9	85	80 - 120	2010-12-07
Dibenzofuran		mg/L	60.0	54.8	91	80 - 120	2010-12-07
Fluorene		mg/L	60.0	55.6	93	80 - 120	2010-12-07
Anthracene		mg/L	60.0	47.9	80	80 - 120	2010-12-07
Phenanthrene		mg/L	60.0	51.8	86	80 - 120	2010-12-07

continued ...

Work Order: 10112414

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TNM 97-04 Townsend

Page Number: 10 of 10 Lovington, NM

$standard\ continued\ \dots$				~			
			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Fluoranthene		mg/L	60.0	52.5	88	80 - 120	2010-12-07
Pyrene		${ m mg/L}$	60.0	59.1	98	80 - 120	2010-12-07
Benzo(a)anthracene		${ m mg/L}$	60.0	53.0	88	80 - 120	2010-12-07
Chrysene		${ m mg/L}$	60.0	48.2	80	80 - 120	2010-12-07
Benzo(b)fluoranthene		mg/L	60.0	52.1	87	80 - 120	2010-12-07
Benzo(k)fluoranthene	7	${ m mg/L}$	60.0	42.1	70	80 - 120	2010-12-07
Benzo(a)pyrene		${ m mg/L}$	60.0	48.6	81	80 - 120	2010-12-07
Indeno(1,2,3-cd)pyrene		$\mathrm{mg/L}$	60.0	51.7	86	80 - 120	2010-12-07
Dibenzo(a,h)anthracene		$\mathrm{mg/L}$	60.0	52.0	87	80 - 120	2010-12-07
Benzo(g,h,i)perylene		${ m mg/L}$	60.0	52.9	88	80 - 120	2010-12-07

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		64.4	mg/L	1	60.0	107	80 - 120
2-Fluorobiphenyl		53.8	mg/L	1	60.0	90	80 - 120
Terphenyl-d14		61.6	$\mathrm{mg/L}$	1	60.0	103	80 - 120

<sup>&</sup>lt;sup>7</sup>Analyte recovery outside CCV control limits. Concentration biased low. •

BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750 ð & Midlewd-BTEX or openity Reflect No. Stubbock - PAH Na, Ca, Mg, K, TDS, EC CI, FI, S04, NO3, NO2, Alkalinity **ANALYSIS REQUEST** Moisture Content Dry Weight Basis Required Check If Special Reporting Limits Are Needed Hq ,22T ,008 TRRP Report Required Pesticides 8081 / 608 PCB's 8082 / 608 200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443 GC/MS Semi. Vol. 8270 / 625 REMARKS CC/W2 AOI: 8560 / 624 **BCI** TCLP Pesticides TCLP Semi Volatiles Circle K. TCLP Volatiles LAB USE ONLY TCLP Metals Ag As Ba Cd Cr Pb Se Hg Log-in-Review\_ Intact 1 N Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313 253 \ 0758 £1A9 TPH 8015 GRO / DRO / TVHC 0883.5 °C TPH 418.1 / TX1005 / TX1005 Ext(C35) AMCORA 3° BTEX 8021 602 / 8260 / 624 11.30.10 9.20 0882.4 8021 / 602 / 8260 / 624 MTBE INST OBS 1300 SAMPLING TIME 11 [24] 10 10;00 452-520-7720 Time: 432-520 -770 Time: QUUNS CIND 11-72-10 6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1298 **DATE** PRESERVATIVE A NONE Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C. METHOD ICE Sampler Signature: HOBN 7000 Company: Company: Company °OS<sup>z</sup>H Project Name: F EONH Phone #: X HCI CHANG. SCUDGE Received by Received by Received by: MATRIX Frace Analysis, Inc. ЯIA TIOS let h **A**3TAW email: lab@traceanalysis.com 8:71 Volume / Amount Time: 1-24-10 930 Time: ONDECC # CONTAINERS 01-)22-A160A Date: トーAB Order ID # 101/1941イ 10/cm 2001 FIELD CODE **添**る Company: Company Project Location (including state): (Street, City, Zip) ) ごろう Ron E 100/ DVINOTON 10W1Ser (If different from above) Relinquished by: Relinquished.by Ralinguished by Company Name: Contact Person (LAB USE) 27405 Invoice to: Project #: LAB# Address:

2K73620C

 $S_{1}$ 

LAMA

Carrier #

ALCO TEMPONO

Turn Around Time if different from standard



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E 5002 Basin Street, Suite A1

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6015 Harris Parkway, Suite 110

ft. Worth, Texas 76132

E-Mail: lab@traceanalysis.com

# Certifications

WBENC: 237019 HUB:

1752439743100-86536

DBE: VN 20657

NCTRCA WFWB38444Y0909

## **NELAP Certifications**

Lubbock: T104704219-08-TX

LELAP-02003

Kansas E-10317

El Paso: T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

# Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: February 10, 2011

Work Order: 11012828

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Dave	11110	Dace
Sample	Description	Matrix	Taken	Taken	Received
256496	Post-Carbon	water	2011-01-28	11:30	2011-01-28

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 9 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abel

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

## Standard Flags

 ${\bf B}$  - The sample contains less than ten times the concentration found in the method blank.

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2011-01-28 and assigned to work order 11012828. Samples for work order 11012828 were received intact without headspace and at a temperature of 3.3 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	Prep	QC	Analysis
Test	Method	$\operatorname{Batch}$	Date	Batch	Date
BTEX	S 8021B	66260	2011-01-28 at 16:30	77248	2011-01-29 at 06:01
PAH	S 8270D	66487	2011-02-02 at 15:00	77510	2011-02-10 at 08:25

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11012828 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

# **Analytical Report**

#### Sample: 256496 - Post-Carbon

Laboratory: Midland

Analysis: BTEX QC Batch: 77248 Prep Batch: 66260 Analytical Method: S 8021B
Date Analyzed: 2011-01-29
Sample Preparation: 2011-01-28

Prep Method: S 5030B Analyzed By: AG Prepared By: AG

		$\mathrm{RL}$			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\mathrm{RL}$
Benzene		< 0.00100	mg/L	1	0.00100
Toluene		< 0.00100	mg/L	1	0.00100
Ethylbenzene		< 0.00100	$\mathrm{mg/L}$	1	0.00100
Xylene		< 0.00100	${ m mg/L}$	1	. 0.00100

·					$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	· Units	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)		0.109	mg/L	1	0.100	109	75.4 - 119.4
4-Bromofluorobenzene (4-BFB)		0.0998	mg/L	1	0.100	100	78.6 - 122.8

#### Sample: 256496 - Post-Carbon

Laboratory: Lubbock

Analysis: PAH Analytical Method: S 8270D QC Batch: 77510 Date Analyzed: 2011-02-10 Prep Batch: 66487 Sample Preparation: 2011-02-02

Prep Method: S 3510C Analyzed By: MN Prepared By: MN

		m RL			
Parameter	Flag	Result	Units	Dilution	RL
Naphthalene		< 0.000188	mg/L	0.939	0.000200
2-Methylnaphthalene		< 0.000188	${ m mg/L}$	0.939	0.000200
1-Methylnaphthalene		< 0.000188	m mg/L	0.939	0.000200
Acenaphthylene		< 0.000188	m mg/L	0.939	0.000200
Acenaphthene		< 0.000188	$\mathrm{mg/L}$	0.939	0.000200
Dibenzofuran	1	< 0.000188	m mg/L	0.939	0.000200
Fluorene		< 0.000188	m mg/L	0.939	0.000200
Anthracene		< 0.000188	m mg/L	0.939	0.000200
Phenanthrene		< 0.000188	m mg/L	0.939	0.000200
Fluoranthene		< 0.000188	m mg/L	0.939	0.000200
Pyrene		< 0.000188	m mg/L	0.939	0.000200
Benzo(a)anthracene		< 0.000188	m mg/L	0.939	0.000200
Chrysene .		< 0.000188	m mg/L	0.939	0.000200
Benzo(b)fluoranthene		< 0.000188	m mg/L	0.939	0.000200
Benzo(k)fluoranthene		< 0.000188	mg/L	0.939	0.000200
		-		continued	

 $continued \dots$ 

<sup>&</sup>lt;sup>1</sup>Concentration biased low.

Report Date: February 10, 2011 TNM 97-04

Work Order: 11012828 TNM 97-04 Townsend

Page Number: 5 of 9 Lovington, NM

sample 256496 continued ...

m RL									
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL				
Benzo(a)pyrene		< 0.000188	mg/L	0.939	0.000200				
Indeno(1,2,3-cd)pyrene		< 0.000188	$_{ m mg/L}$	0.939	0.000200				
Dibenzo(a,h)anthracene		< 0.000188	mg/L	0.939	0.000200				
Benzo(g,h,i)perylene		< 0.000188	m mg/L	0.939	0.000200				

					$\operatorname{Spike}$	$\operatorname{Percent}$	$\operatorname{Recovery}$
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0350	mg/L	0.939	0.0800	44	10 - 111
2-Fluorobiphenyl		0.0390	${ m mg/L}$	0.939	0.0800	49	10 - 92.7
Terphenyl-d14		0.0523	${ m mg/L}$	0.939	0.0800	65	35.9 - 107

Method Blank (1)

QC Batch: 77248

QC Batch: 77248

Date Analyzed: 2011-01-29 Analyzed By: AG

Prep Batch: 66260

QC Preparation: 2011-01-28

Prepared By: AG

		$_{\cdot}$ MDL		•
Parameter	$\operatorname{Flag}$	Result	Units	RL
Benzene		< 0.000400	mg/L	0.001
Toluene		< 0.000300	${ m mg/L}$	0.001
Ethylbenzene		< 0.000300	m mg/L	0.001
Xylene		< 0.000333	${ m mg/L}$	0.001

					$\operatorname{Spike}$	$\operatorname{Percent}$	$\operatorname{Recovery}$
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.103	$\mathrm{mg/L}$	1	0.100	103	70.8 - 117.4
4-Bromofluorobenzene (4-BFB)		0.0963	${ m mg/L}$	1	0.100	96	79 - 113.4

Method Blank (1)

QC Batch: 77510

QC Batch:

77510

Date Analyzed:

2011-02-10

Analyzed By: MN

Prep Batch: 66487

QC Preparation: 2011-02-02

Prepared By: MN

MDLParameter Units RLFlag Result Naphthalene mg/L 0.0002 < 0.0000784 2-Methylnaphthalene mg/L 0.0002< 0.00007471-Methylnaphthalene 0.0002mg/L < 0.0000575 0.0002Acenaphthylene < 0.0000963 mg/L Acenaphthene 0.0002< 0.0000617mg/L

 $continued \dots$ 

Report Date: February 10, 2011

Work Order: 11012828

TNM 97-04

TNM 97-04 Townsend

Page Number: 6 of 9 Lovington, NM

method	blank	continued			
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		$\operatorname{MDL}$		
Parameter	$\operatorname{Flag}$	Result	Units	$\mathrm{RL}$
Dibenzofuran		0.00427	mg/L	0.0002
Fluorene		< 0.000134	m mg/L	0.0002
Anthracene		< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	$\mathrm{mg/L}$	0.0002
Fluoranthene		< 0.000476	$\mathrm{mg/L}$	0.0002
Pyrene		< 0.000590	$\mathrm{mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	$\mathrm{mg/L}$	0.0002
Chrysene		< 0.0000766	mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	mg/L	0.0002
Benzo(a)pyrene		< 0.000132	$\mathrm{mg/L}$	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	$\mathrm{mg/L}$	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	m mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

			•		Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0402	mg/L	1	0.0800	50	10 - 111
2-Fluorobiphenyl		0.0426	mg/L	1	0.0800	53	10 - 92.7
Terphenyl-d14		0.0406	m mg/L	1	0.0800	51	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch: 77248Prep Batch: 66260 Date Analyzed: QC Preparation: 2011-01-28

2011-01-29

Analyzed By: AG

Prepared By: AG

	LCS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Benzene	0.0918	mg/L	1	0.100	< 0.000400	92	76.8 - 110.3
Toluene	0.0919	mg/L	1	0.100	< 0.000300	92	81 - 108.2
Ethylbenzene	0.101	mg/L	1	0.100	< 0.000300	101	78.8 - 111
Xylene	0.303	$\mathrm{mg/L}$	1	0.300	< 0.000333	101	80.3 - 111.4

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene	0.0925	mg/L	1	0.100	< 0.000400	92	76.8 - 110.3	1	20
Toluene	0.0933	mg/L	1	0.100	< 0.000300	93	81 - 108.2	2	20
Ethylbenzene	0.104	mg/L	1	0.100	< 0.000300	104	78.8 - 111	3	20
Xylene	0.314	mg/L	1	0.300	< 0.000333	105	80.3 - 111.4	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

TNM 97-04

Work Order: 11012828 TNM 97-04 Townsend

Page Number: 7 of 9 Lovington, NM

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	${ m Rec.} \ { m Limit}$
Trifluorotoluene (TFT)	0.102	0.102	mg/L	1	0.100	102	102	66.6 - 114.5
4-Bromofluorobenzene (4-BFB)	0.0980	0.0993	mg/L	1	0.100	98	99	77.1 - 114.4

### Laboratory Control Spike (LCS-1)

QC Batch: 77510 Date Analyzed:

2011 - 02 - 10

Analyzed By: MN

Prep Batch: 66487

QC Preparation: 2011-02-02

Prepared By: MN

Param		LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Naphthalene		0.0527	mg/L	1	0.0800	< 0.0000784	66	32.2 - 80.3
•				-		• • • • • • •	67	34.8 - 87
2-Methylnaphthalene		0.0539	mg/L	1	0.0800	< 0.0000747	- '	
1-Methylnaphthalene		0.0508	m mg/L	1	0.0800	< 0.0000575	64	36.9 - 89.6
Acenaphthylene		0.0601	$_{ m mg/L}$	1	0.0800	< 0.0000963	75	35 - 93.2
Acenaphthene		0.0551	${ m mg/L}$	1	0.0800	< 0.0000617	69	35.8 - 92.9
Dibenzofuran	2	0.0258	mg/L	1	0.0800	0.00427	27	35.3 - 85.1
Fluorene		0.0660	$\mathrm{mg/L}$	1	0.0800	< 0.000134	82	43.4 - 101
Anthracene		0.0486	mg/L	1	0.0800	< 0.000441	61	44.8 - 92.4
Phenanthrene		0.0598	$_{ m mg/L}$	1	0.0800	< 0.000435	75	44 - 93.7
Fluoranthene		0.0683	$\mathrm{mg/L}$	1	0.0800	< 0.000476	85	52.7 - 104
Pyrene		0.0581	$_{ m mg/L}$	1	0.0800	< 0.000590	73	42.2 - 93.8
Benzo(a)anthracene		0.0668	mg/L	1	0.0800	< 0.000118	84	40.4 - 91.9
Chrysene		0.0809	mg/L	1	0.0800	< 0.0000766	101	44.4 - 107
Benzo(b)fluoranthene		0.0433	mg/L	1	0.0800	< 0.000146	54	34.8 - 105
Benzo(k)fluoranthene		0.0493	mg/L	1	0.0800	< 0.000141	62	50.2 - 158
Benzo(a)pyrene		0.0460	mg/L	1	0.0800	< 0.000132	58	51.3 - 151
Indeno(1,2,3-cd)pyrene		0.0526	mg/L	1	0.0800	< 0.0000702	66	43.2 - 115
Dibenzo(a,h)anthracene		0.0621	mg/L	1	0.0800	< 0.0000534	78	43.9 - 115
Benzo(g,h,i)perylene		0.0455	mg/L	1	0.0800	< 0.0000473	57	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param		LCSD Result	Units	Dil.	Spike Amount	$rac{ m Matrix}{ m Result}$	Rec.	Rec. Limit	RPD	RPD Limit
Naphthalene		0.0605	mg/L	1	0.0800	< 0.0000784	76	32.2 - 80.3	14	20
2-Methylnaphthalene		0.0611	mg/L	1	0.0800	< 0.0000747	76	34.8 - 87	12	20
1-Methylnaphthalene		0.0565	mg/L	1	0.0800	< 0.0000575	71	36.9 - 89.6	11	. 20
Acenaphthylene		0.0692	mg/L	1	0.0800	< 0.0000963	86	35 - 93.2	14	20
Acenaphthene		0.0636	mg/L	1	0.0800	< 0.0000617	80	35.8 - 92.9	14	20
Dibenzofuran	3	0.0295	mg/L	1	0.0800	0.00427	32	35.3 - 85.1	13	20
Fluorene		0.0766	mg/L	1	0.0800	< 0.000134	96	43.4 - 101	15	20
Anthracene		0.0553	mg/L	1	0.0800	< 0.000441	69	44.8 - 92.4	13	20

 $continued \dots$ 

 $<sup>^2{\</sup>rm Spike}$  analyte out of control limits. Results biased low.  $\bullet$ 

<sup>&</sup>lt;sup>3</sup>Spike analyte out of control limits. Results biased low. •

Work Order: 11012828 TNM 97-04 Townsend Page Number: 8 of 9 Lovington, NM

control spikes continued	control	spikes	continued			
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		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Phenanthrene		0.0675	mg/L	1	0.0800	< 0.000435	84	44 - 93.7	12	20
Fluoranthene		0.0776	${ m mg/L}$	1	0.0800	< 0.000476	97	52.7 - 104	13	20
Pyrene		0.0673	${ m mg/L}$	1	0.0800	< 0.000590	84	42.2 - 93.8	15	20
Benzo(a)anthracene	4	0.0766	${ m mg/L}$	1	0.0800	< 0.000118	96	40.4 - 91.9	14	20
Chrysene	5	0.0932	${ m mg/L}$	1	0.0800	< 0.0000766	116	44.4 - 107	14	20
Benzo(b)fluoranthene	6	0.0533	$\mathrm{mg/L}$	1	0.0800	< 0.000146	67	34.8 - 105	21	20
Benzo(k)fluoranthene		0.0543	${ m mg/L}$	1	0.0800	< 0.000141	68	50.2 - 158	10	20
Benzo(a)pyrene		0.0529	${ m mg/L}$	1	0.0800	< 0.000132	66	51.3 - 151	14	20
Indeno(1,2,3-cd)pyrene		0.0612	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	76	43.2 - 115	15	20
Dibenzo(a,h)anthracene		0.0716	${ m mg/L}$	1	0.0800	< 0.0000534	90	43.9 - 115	14	20
Benzo(g,h,i)perylene		0.0548	mg/L	1	0.0800	< 0.0000473	68	45.1 - 115_	18	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	${ m Rec.}$	Limit
Nitrobenzene-d5	0.0405	0.0473	mg/L	1	0.0800	51	59	10 - 111
2-Fluorobiphenyl	0.0430	0.0500	$\mathrm{mg/L}$	1	0.0800	54	62	10 - 92.7
Terphenyl-d14	0.0424	0.0491	$\mathrm{mg/L}$	1	0.0800	53	61	35.9 - 107

#### Standard (CCV-1)

QC Batch: 77248

Date Analyzed: 2011-01-29

Analyzed By: AG

			CCVs True	CCVs Found	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	$\operatorname{Flag}$	$\mathbf{U}$ nits	$\operatorname{Conc.}$	Conc.	$\operatorname{Recovery}$	$\operatorname{Limits}$	${ m Analyzed}$
Benzene		$\mathrm{mg/L}$	0.100	0.0978	98	80 - 120	2011-01-29
Toluene		$\mathrm{mg/L}$	0.100	0.0971	97	80 - 120	2011-01-29
Ethylbenzene		mg/L	0.100	0.104	104	80 - 120	2011-01-29
Xylene		mg/L	0.300	0.316	105	80 - 120	2011-01-29

#### Standard (CCV-2)

QC Batch: 77248

Date Analyzed: 2011-01-29

Analyzed By: AG

			$\mathrm{CCVs}$	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		$\mathrm{mg/L}$	0.100	0.0927	93	80 - 120	2011-01-29
Toluene		$\mathrm{mg/L}$	0.100	0.0938	94	80 - 120	2011-01-29

continued ...

<sup>6</sup>RPD out of RPD Limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>4</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

<sup>&</sup>lt;sup>5</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

Report Date: February 10, 2011

 $\rm TNM~97\text{-}04$ 

Work Order: 11012828 TNM 97-04 Townsend Page Number: 9 of 9 Lovington, NM

			CCVs True	${ m CCVs} \ { m Found}$	CCVs Percent	Percent Recovery	Date
	****	TT 1				•	
Param	$\operatorname{Flag}$	Units	$\operatorname{Conc.}$	Conc.	Recovery	Limits	Analyzed ,
Ethylbenzene		$\mathrm{mg/L}$	0.100	0.103	103	80 - 120	2011-01-29
Xylene		${ m mg/L}$	0.300	0.313	104	80 - 120	2011-01-29

### Standard (CCV-1)

QC Batch: 77510

Date Analyzed: 2011-02-10

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	•
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	53.8	90	80 - 120	2011-02-10
2-Methylnaphthalene		${ m mg/L}$	60.0	62.3	104	80 - 120	2011-02-10
1-Methylnaphthalene		$\mathrm{mg/L}$	60.0	56.8	95	80 - 120	2011-02-10
Acenaphthylene		mg/L	60.0	57.5	96	80 - 120	2011-02-10
Acenaphthene		mg/L	60.0	55.4	92	80 - 120	2011-02-10
Dibenzofuran		${ m mg/L}$	60.0	64.5	108	80 - 120	2011-02-10
Fluorene		mg/L	60.0	64.9	108	80 - 120	2011-02-10
Anthracene		mg/L	60.0	54.9	92	80 - 120	2011-02-10
Phenanthrene		mg/L	60.0	60.5	101	80 - 120	2011-02-10
Fluoranthene		mg/L	60.0	66.7	111	80 - 120	2011-02-10
Pyrene		$\mathrm{mg/L}$	60.0	69.6	116	80 - 120	2011-02-10
Benzo(a)anthracene		mg/L	60.0	60.5	101	80 - 120	2011-02-10
Chrysene		${ m mg/L}$	60.0	57.0	95	80 - 120	2011-02-10
Benzo(b)fluoranthene		$\mathrm{mg/L}$	60.0	58.2	97	80 - 120	2011-02-10
Benzo(k)fluoranthene		$\mathrm{mg/L}$	60.0	59.0	98	80 - 120	2011-02-10
Benzo(a)pyrene		mg/L	60.0	54.5	91	80 - 120	2011-02-10
Indeno(1,2,3-cd)pyrene		mg/L	60.0	64.7	108	80 - 120	2011-02-10
Dibenzo(a,h)anthracene		mg/L	60.0	64.1	107	80 - 120	2011-02-10
Benzo(g,h,i)perylene		${ m mg/L}$	60.0	62.0	103	80 - 120	2011-02-10

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	$_{ m Units}$	Dilution	Amount	Recovery	$_{ m Limit}$
Nitrobenzene-d5		54.5	mg/L	1	60.0	91	80 - 120
2-Fluorobiphenyl		53.5	mg/L	1	60.0	89	80 - 120
Terphenyl-d14		67.6	mg/L	$^{1}$	60.0	113	80 - 120

LAB Order ID # 11:01:2828

TraceAnalysis, Inc.

email: lab@traceanalysis.com

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BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750

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Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.

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Carrier #



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432 • 689 • 6301 817 \* 201 \* 5260

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E-Mail: lab@traceanalysis.com

## Certifications

**WBENC:** 237019

HUB:

1752439743100-86536

**DBE:** VN 20657

NCTRCA WFWB38444Y0909

# **NELAP** Certifications

Lubbock: T104704219-08-TX

LELAP-02003

Kansas E-10317

El Paso: T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

# Analytical and Quality Control Report

E-mail Reports Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: March 15, 2011

Work Order:

11030109

Project Location: Lovington, NM Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
259117	Post-Carbon	water	2011-02-28	15:00	2011-03-01

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael about

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

#### Standard Flags

 $\boldsymbol{B}\,$  -  $\,$  The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2011-03-01 and assigned to work order 11030109. Samples for work order 11030109 were received intact without headspace and at a temperature of 3.8 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	Prep	$_{ m QC}$	Analysis
Test	Method	Batch	Date	Batch	Date
BTEX	S 8021B	67068	2011-03-04 at 08:44	79032	2011-03-04 at 08:44
PAH	S 8270D	67198	2011-03-09 at 15:00	79210	2011-03-12 at $10:52$

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11030109 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 11030109 TNM 97-04 Townsend

Page Number: 4 of 10 Lovington, NM

# **Analytical Report**

Sample: 259117 - Post-Carbon

Laboratory: Midland

Analysis: BTEX QC Batch: 79032 Prep Batch: 67068

Analytical Method: S 8021B Date Analyzed:

2011-03-04 Sample Preparation: 2011-03-04 Prep Method: S 5030B Analyzed By: MEPrepared By: ME

RL

		1442			
Parameter	$\operatorname{Flag}$	Result	$\operatorname{Units}$	Dilution	$\mathrm{RL}$
Benzene		0.0319	mg/L	5	0.00100
Toluene		0.0370	${ m mg/L}$	5	0.00100
Ethylbenzene		0.0338	m mg/L	5	0.00100
Xylene		0.0992	${ m mg/L}$	5	0.00100

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.498	mg/L	5	0.500	100	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.478	m mg/L	5	0.500	96	51.1 - 128

Sample: 259117 - Post-Carbon

Laboratory: Lubbock

Analysis: PAH QC Batch: 79210 Prep Batch: 67198 Analytical Method: Date Analyzed:

Sample Preparation:

S 8270D 2011-03-12 2011-03-09 Prep Method: S 3510C Analyzed By: MNPrepared By:

MN

		$\mathrm{RL}$			
Parameter	Flag	Result	Units	Dilution	RL
Naphthalene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
2-Methylnaphthalene		< 0.000190	${ m mg/L}$	0.952	0.000200
1-Methylnaphthalene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Acenaphthylene		< 0.000190	${ m mg/L}$	0.952	0.000200
Acenaphthene		< 0.000190	${ m mg/L}$	0.952	0.000200
Dibenzofuran		< 0.000190	${ m mg/L}$	0.952	0.000200
Fluorene		< 0.000190	${ m mg/L}$	0.952	0.000200
Anthracene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Phenanthrene		< 0.000190	$_{ m mg/L}$	0.952	0.000200
Fluoranthene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Pyrene		< 0.000190	${ m mg/L}$	0.952	0.000200
Benzo(a)anthracene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Chrysene		< 0.000190	${ m mg/L}$	0.952	0.000200
Benzo(b)fluoranthene		< 0.000190	$_{ m mg/L}$	0.952	0.000200
Benzo(k)fluoranthene		< 0.000190	m mg/L	0.952	0.000200
Benzo(a)pyrene		< 0.000190	$_{ m mg/L}$	0.952	0.000200

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Report Date: March 15, 2011 TNM 97-04 Work Order: 11030109 TNM 97-04 Townsend Page Number: 5 of 10 Lovington, NM

sample	259117	continued			
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				RL		•	
Parameter		Flag	Res	ult	Units	Dilution	RL
$\overline{\text{Indeno}(1,2,3\text{-cd})}$ pyre	ne		< 0.000	190	mg/L	0.952	0.000200
Dibenzo(a,h)anthrac	ene		< 0.0001	190	mg/L	0.952	0.000200
Benzo(g,h,i)perylene			< 0.0001	190	mg/L	0.952	0.000200
					Spike	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0369	mg/L	0.952	0.0800	46	10 - 111
2-Fluorobiphenyl		0.0403	${ m mg/L}$	0.952	0.0800	50	10 - 92.7
Terphenyl-d14		0.0510	m mg/L	0.952	0.0800	64	35.9 - 107
						<del></del>	

Method Blank	(1)	OC Batch:	70022
Method Blank	(   )	OU Batch	79032

QC Batch:	79032	Date Analyzed:	2011-03-04	•	Analyzed By:	ME
Prep Batch:	67068	OC Preparation:	2011-03-04		Prepared By:	ME

		$\mathrm{MDL}$		
Parameter .	Flag	Result	$\mathbf{U}_{\mathbf{nits}}$	RL
Benzene		< 0.000400	mg/L	0.001
Toluene		< 0.000300	m mg/L	0.001
Ethylbenzene		< 0.000300	m mg/L	0.001
Xylene		< 0.000333	m mg/L	0.001

					Spike	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0880	mg/L	1	0.100	88	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.0857	${ m mg/L}$	1	0.100	86	47.3 - 116

Method	Dlank (	′1 \	OC Batch:	70910
Method	Blank (	11	OC Batch	79210

QC Batch:	79210	Date Analyzed:	2011-03-12	•	Analyzed By:	MN
Prep Batch:	67198	QC Preparation:	2011-03-09		Prepared By:	MN

		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	$\mathrm{mg/L}$	0.0002
1-Methylnaphthalene		< 0.0000575	m mg/L	0.0002
Acenaphthylene		< 0.0000963	$\mathrm{mg/L}$	0.0002
Acenaphthene		< 0.0000617	m mg/L	0.0002
Dibenzofuran		< 0.0000952	${ m mg/L}$	0.0002

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Report Date: March 15, 2011 TNM 97-04 Work Order: 11030109 TNM 97-04 Townsend Page Number: 6 of 10 Lovington, NM

#### $method\ blank\ continued\ \dots$

		MDL		
Parameter	Flag	Result	Units	RL
Fluorene		< 0.000134	mg/L	0.0002
Anthracene	•	< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	$\mathrm{mg/L}$	0.0002
Fluoranthene		< 0.000476	$\mathrm{mg/L}$	0.0002
Pyrene		< 0.000590	m mg/L	0.0002
Benzo(a)anthracene		< 0.000118	mg/L	0.0002
Chrysene		< 0.0000766	mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	mg/L	0.0002
Benzo(k)fluoranthene		< 0.000141	m mg/L	0.0002
Benzo(a)pyrene		< 0.000132	m mg/L	0.0002
Indeno $(1,2,3-cd)$ pyrene		< 0.0000702	$\mathrm{mg/L}$	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	$\mathrm{mg/L}$	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		0.0425	mg/L	1	0.0800	53	10 - 111
2-Fluorobiphenyl		0.0451	${ m mg/L}$	1	0.0800	56	10 - 92.7
Terphenyl-d14		0.0573	mg/L	1	0.0800	72	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch: 79032 Prep Batch: 67068 Date Analyzed: 2011-03-04 QC Preparation: 2011-03-04 Analyzed By: ME Prepared By: ME

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Benzene	0.0946	mg/L	1	0.100	< 0.000400	95	82.9 - 108
Toluene	0.0938	$_{ m mg/L}$	1	0.100	< 0.000300	94	82.7 - 107
Ethylbenzene	0.0916	mg/L	1	0.100	< 0.000300	92	78.8 - 106
Xylene	0.277	mg/L	1	0.300	< 0.000333	92	79.3 - 106

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	R.PD	Limit
Benzene	0.0935	mg/L	1	0.100	< 0.000400	94	82.9 - 108	1	20
Toluene	0.0922	mg/L	1	0.100	< 0.000300	92	82.7 - 107	2	20
Ethylbenzene	0.0904	mg/L	1	0.100	< 0.000300	90	78.8 - 106	1	20
Xylene	0.276	mg/L	1	0.300	< 0.000333	92	79.3 - 106	. 0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

TNM 97-04

Work Order: 11030109 TNM 97-04 Townsend

Page Number: 7 of 10 Lovington, NM

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0931	0.0912	mg/L	1	0.100	93	91	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.0938	0.0956	mg/L	1	0.100	94	96	68.2 - 124

#### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 67198

79210

Date Analyzed:

2011-03-12 QC Preparation: 2011-03-09 Analyzed By: MN Prepared By: MN

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$
Naphthalene	0.0341	mg/L	1	0.0800	< 0.0000784	43	32.2 - 80.3
2-Methylnaphthalene	0.0398	mg/L	1	0.0800	< 0.0000747	50	34.8 - 87
1-Methylnaphthalene	0.0374	$\mathrm{mg/L}$	1	0.0800	< 0.0000575	47	36.9 - 89.6
Acenaphthylene	0.0449	m mg/L	1	0.0800	< 0.0000963	56	35 - 93.2
Acenaphthene	0.0417	mg/L	1	0.0800	< 0.0000617	52	35.8 - 92.9
Dibenzofuran	0.0405	m mg/L	1	0.0800	< 0.0000952	51	35.3 - 85.1
Fluorene	0.0542	$\mathrm{mg/L}$	1	0.0800	< 0.000134	68	43.4 - 101
Anthracene	0.0523	mg/L	1	0.0800	< 0.000441	65	44.8 - 92.4
Phenanthrene	0.0569	$\mathrm{mg/L}$	1	0.0800	< 0.000435	71	44 - 93.7
Fluoranthene	0.0705	$\mathrm{mg/L}$	1 .	0.0800	< 0.000476	88	52.7 - 104
Pyrene	0.0633	$\mathrm{mg/L}$	1	0.0800	< 0.000590	79	42.2 - 93.8
Benzo(a)anthracene	0.0681	$\mathrm{mg/L}$	1	0.0800	< 0.000118	85	40.4 - 91.9
Chrysene	0.0827	$\mathrm{mg/L}$	1	0.0800	< 0.0000766	103	44.4 - 107
Benzo(b)fluoranthene	0.0464	$\mathrm{mg/L}$	1	0.0800	< 0.000146	58	34.8 - 105
Benzo(k)fluoranthene	0.0532	mg/L	1	0.0800	< 0.000141	66	50.2 - 158
Benzo(a)pyrene	0.0482	mg/L	1	0.0800	< 0.000132	60	51.3 - 151
Indeno(1,2,3-cd)pyrene	0.0525	mg/L	1	0.0800	< 0.0000702	66	43.2 - 115
Dibenzo(a,h)anthracene	0.0609	mg/L	1	0.0800	< 0.0000534	76	43.9 - 115
Benzo(g,h,i)perylene	0.0482	mg/L	1	0.0800	< 0.0000473	60	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	R.esult	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Naphthalene	0.0352	mg/L	1	0.0800	< 0.0000784	44	32.2 - 80.3	3	20
2-Methylnaphthalene	0.0424	mg/L	1	0.0800	< 0.0000747	53	34.8 - 87	6	20
1-Methylnaphthalene	0.0390	mg/L	1	0.0800	< 0.0000575	49	36.9 - 89.6	4	20
Acenaphthylene	0.0460	mg/L	1	0.0800	< 0.0000963	58	35 - 93.2	2	20
Acenaphthene	0.0427	mg/L	1	0.0800	< 0.0000617	53	35.8 - 92.9	$^2$	20
Dibenzofuran	0.0422	$\mathrm{mg/L}$	1	0.0800	< 0.0000952	53	35.3 - 85.1	4	20
Fluorene	$0.0556^{\circ}$	mg/L	1	0.0800	< 0.000134	70	43.4 - 101	3	20
Anthracene	0.0532	mg/L	1	0.0800	< 0.000441	66	44.8 - 92.4	2	20
Phenanthrene	0.0581	mg/L	1	0.0800	< 0.000435	73	44 - 93.7	$^2$	20
Fluoranthene	0.0725	mg/L	1	0.0800	< 0.000476	91	52.7 - 104	3	20
Pyrene	0.0651	mg/L	1	0.0800	< 0.000590	81	42.2 - 93.8	3	20

continued ...

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Work Order: 11030109 TNM 97-04 Townsend

Page Number: 8 of 10 Lovington, NM

control spikes continued . . .

•	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzo(a)anthracene	0.0695	mg/L	1	0.0800	< 0.000118	87	40.4 - 91.9	2	20
Chrysene	0.0843	${ m mg/L}$	1	0.0800	< 0.0000766	105	44.4 - 107	2	20
Benzo(b)fluoranthene	0.0515	$\mathrm{mg/L}$	1	0.0800	< 0.000146	64	34.8 - 105	10	20
Benzo(k)fluoranthene	0.0563	$\mathrm{mg/L}$	1	0.0800	< 0.000141	70	50.2 - 158	6	20
Benzo(a)pyrene	0.0541	$\mathrm{mg/L}$	1	0.0800	< 0.000132	68	51.3 - 151	12	20
Indeno $(1,2,3\text{-cd})$ pyrene	0.0536	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	67	43.2 - 115	2	20
Dibenzo(a,h)anthracene	0.0626	mg/L	1	0.0800	< 0.0000534	78	43.9 - 115	3	20
Benzo(g,h,i)perylene	0.0498	mg/L	1	0.0800	< 0.0000473	62	45.1 - 115	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Nitrobenzene-d5	0.0311	0.0306	mg/L	1	0.0800	39	38	10 - 111
2-Fluorobiphenyl	0.0362	0.0376	${ m mg/L}$	1	0.0800	45	47	10 - 92.7
Terphenyl-d14	0.0574	0.0584	m mg/L	1	0.0800	72	73	35.9 - 107

Matrix Spike (MS-1) Spiked Sample: 259115

QC Batch: Prep Batch: 67068

79032

Date Analyzed:

2011-03-04 QC Preparation: 2011-03-04

Analyzed By: ME Prepared By: ME

Param	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	2.61	mg/L	5	0.500	2.1558	91	77.9 - 114
Toluene	0.447	mg/L	5	0.500	< 0.00150	89	78.3 - 111
Ethylbenzene	0.444	mg/L	5	0.500	0.0426	80	75.3 - 110
Xylene	1.30	$\mathrm{mg/L}$	5	1.50	< 0.00166	87	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}^{'}$	RPD	Limit
Benzene	2.67	mg/L	5	0.500	2.1558	103	77.9 - 114	2	20
Toluene	0.462	mg/L	. 5	0.500	< 0.00150	92	78.3 - 111	3	20
Ethylbenzene	0.462	mg/L	5	0.500	0.0426	84	75.3 - 110	4	20
Xylene	1.36	mg/L	5	1.50	< 0.00166	91	75.7 - 109	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

0	MS	MSD	TT	<b>D</b>	Spike	MS	MSD	Rec.
Surrogate	Result	Result	$_{ m Units}$	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	0.466	0.487	${ m mg/L}$	5	0.5	93	97	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.500	0.520	$_{ m mg/L}$	5	0.5	100	104	60.1 - 135

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Standard (CCV-2)

QC Batch: 79032

Date Analyzed: 2011-03-04

Analyzed By: ME

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0928	93	80 - 120	2011-03-04
Toluene ·		m mg/L .	0.100	0.0909	91	80 - 120	2011-03-04
Ethylbenzene	•	$\mathrm{mg/L}$	0.100	0.0875	88	80 - 120	2011-03-04
Xylene		$\mathrm{mg/L}$	0.300	0.266	89	80 - 120	2011-03-04_

Standard (CCV-3)

QC Batch: 79032

Date Analyzed: 2011-03-04

Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0948	95	80 - 120	2011-03-04
Toluene		$_{ m mg/L}$	0.100	0.0933	93	80 - 120	2011-03-04
Ethylbenzene		mg/L	0.100	0.0902	90	80 - 120	2011-03-04
Xylene		mg/L	0.300	0.272	91	80 - 120	2011-03-04

Standard (CCV-1)

QC Batch: 79210

Date Analyzed: 2011-03-12

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	${\rm Analyzed}\_$
Naphthalene		mg/L	60.0	53.2	89	80 - 120	2011-03-12
2-Methylnaphthalene		${ m mg/L}$	60.0	64.7	108	80 - 120	2011-03-12
1-Methylnaphthalene		${ m mg/L}$	60.0	57.7	96	80 - 120	2011-03-12
Acenaphthylene		m mg/L	60.0	56.3	94	80 - 120	2011-03-12
Acenaphthene		${ m mg/L}$	60.0	53.8	90	80 - 120	2011-03-12
Dibenzofuran		$ m mg/L^{-1}$	60.0	62.1	104	80 - 120	2011-03-12
Fluorene		${ m mg/L}$	60.0	60.8	101	80 - 120	2011-03-12
Anthracene		$_{ m mg/L}$	60.0	54.6	91	80 - 120	2011-03-12
Phenanthrene		${ m mg/L}$	60.0	60.2	100	80 - 120	2011-03-12
Fluoranthene		mg/L	60.0	69.3	116	80 - 120	2011-03-12
Pyrene		$\mathrm{mg/L}$	60.0	63.8	106	80 - 120	2011-03-12
Benzo(a)anthracene		${ m mg/L}$	60.0	60.4	101	80 - 120	2011-03-12
Chrysene		m mg/L	60.0	56.7	94	80 - 120	2011-03-12
Benzo(b)fluoranthene		m mg/L	60.0	57.9	96	80 - 120	2011-03-12
Benzo(k)fluoranthene		mg/L	60.0	61.6	103	80 - 120	2011-03-12

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Report Date: March 15, 2011 TNM 97-04

Work Order: 11030109 TNM 97-04 Townsend

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			$\mathrm{CCVs}$	$\mathrm{CCVs}$	$\mathrm{CCVs}$	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzo(a)pyrene		mg/L	60.0	57.3	96	80 - 120	2011-03-12
Indeno $(1,2,3$ -cd)pyrene		${ m mg/L}$	60.0	56.9	95	80 - 120	2011-03-12
Dibenzo(a,h)anthracene		${ m mg/L}$	60.0	56.6	94	80 - 120	2011-03-12
Benzo(g,h,i)perylene		${ m mg/L}$	60.0	54.8	91	80 - 120	2011-03-12

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	$_{ m Units}$	Dilution	Amount	Recovery	Limit
Nitrobenzene-d5		56.0	$_{ m mg/L}$	1	60.0	93	80 - 120
2-Fluorobiphenyl	•	56.0	mg/L	1	60.0	93	80 - 120
Terphenyl-d14		62.0	mg/L	1	60.0	103	80 - 120

LAB Order 10# \(\(\text{1030\gamma}\)

TraceAnalysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue, Suite 9 **Lubbock, Texas 79424**Tel (806) 794-1296
Fax (806) 794-1298
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5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313

200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (915) 585-3443 Fax (915) 585-494 1 (888) 588-3443

BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750

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Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.

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Carrier #



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817 • 201 • 5260

E-Mail: lab@nageanalyşisl.com

## Certifications

**WBENC:** 237019

HUB: **NCTRCA** 

1752439743100-86536 WFWB38444Y0909

**DBE:** VN 20657

**NELAP Certifications** 

Lubbock: T104704219-08-TX

LELAP-02003 Kansas E-10317

El Paso: T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

# Analytical and Quality Control Report

E-mail Reports Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: March 24, 2011

Work Order:

11032107

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
261152	TPC	water	2011-03-18	12:00	2011-03-21

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abol

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

#### Standard Flags

 $\, B \,$  - The sample contains less than ten times the concentration found in the method blank.

## Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2011-03-21 and assigned to work order 11032107. Samples for work order 11032107 were received intact without headspace and at a temperature of 21.3 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	Prep	$_{ m QC}$	Analysis
Test	Method	Batch	Date	Batch	Date
BTEX	S 8021B	67576	2011-03-21 at 14:22	79654	2011-03-21 at 14:22
PAH	S 8270D	67618	2011-03-22 at 15:00	79704	2011-03-23 at $10:05$

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11032107 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Work Order: 11032107

TNM 97-04

TNM 97-04 Townsend

Page Number: 4 of 10 Lovington, NM

# **Analytical Report**

Sample: 261152 - TPC

Laboratory: Midland

Analysis: BTEXQC Batch: 79654 Prep Batch: 67576

Analytical Method: Date Analyzed:

S 8021B 2011-03-21 Sample Preparation: 2011-03-21 Prep Method: S 5030B

Analyzed By: MEPrepared By: ME

RL

		17.17			
Parameter	Flag	Result	Units	Dilution	RL
Benzene		< 0.00100	mg/L	1	0.00100
Toluene		< 0.00100	${ m mg/L}$	1	0.00100
Ethylbenzene		< 0.00100	$\mathrm{mg/L}$	1	0.00100
Xylene		< 0.00100	${ m mg/L}$	1	0.00100

					Spike	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.113	mg/L	1	0.100	113	67.8 - 129
4-Bromofluorobenzene (4-BFB)	1 .	0.129	$\mathrm{mg/L}$	1	0.100	129	51.1 - 128

Sample: 261152 - TPC

Laboratory: Lubbock

Analysis: PAH QC Batch: 79704 Prep Batch: 67618

Analytical Method: Date Analyzed:

S 8270D 2011-03-23 Sample Preparation: 2011-03-22 Prep Method: S 3510C Analyzed By: Prepared By:

MNMN

RI.

		$\mathbf{n}$			
Parameter	Flag	Result	Units	Dilution	RL
Naphthalene		< 0.000183	mg/L	0.913	0.000200
2-Methylnaphthalene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
1-Methylnaphthalene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Acenaphthylene		< 0.000183	m mg/L	0.913	0.000200
Acenaphthene		< 0.000183	m mg/L	0.913	0.000200
Dibenzofuran		< 0.000183	m mg/L	0.913	0.000200
Fluorene		< 0.000183	m mg/L	0.913	0.000200
Anthracene		< 0.000183	${ m mg/L}$	0.913	0.000200
Phenanthrene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Fluoranthene		< 0.000183	m mg/L	0.913	0.000200
Pyrene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Benzo(a)anthracene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Chrysene		< 0.000183	m mg/L	0.913	0.000200
Benzo(b)fluoranthene		< 0.000183	mg/L	0.913	0.000200
Benzo(k)fluoranthene ·		< 0.000183	m mg/L	0.913	0.000200
Benzo(a)pyrene		< 0.000183	m mg/L	0.913	0.000200

<sup>&</sup>lt;sup>1</sup>High surrogate recovery. Sample non-detect, result bias high. .

continued ...

Report Date: March 24, 2011 TNM 97-04 Work Order: 11032107 TNM 97-04 Townsend Page Number: 5 of 10 Lovington, NM

sample	261152	continued		
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				RL			
Parameter		$\mathbf{Flag}$	Res	sult	Units	Dilution	RL
Indeno(1,2,3-cd)pyre	< 0.000183		mg/L	0.913	0.000200		
Dibenzo(a,h)anthrac	ene		< 0.000183		$\mathrm{mg/L}$	0.913	0.000200
Benzo(g,h,i)perylene			< 0.000183		m mg/L	0.913	0.000200
					Spike	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	$\operatorname{Limits}$
Nitrobenzene-d5		0.0319	m mg/L	0.913	0.0800	40	10 - 111
2-Fluorobiphenyl		0.0354	${ m mg/L}$	0.913	0.0800	44	10 - 92.7
Terphenyl-d14		0.0464	${ m mg/L}$	0.913	0.0800	58	35.9 - 107

Method Blank (1)

QC Batch: 79654

QC Batch: 79654 Prep Batch: 67576 Date Analyzed: 2011-03-21 QC Preparation: 2011-03-21

Analyzed By: ME Prepared By: ME

MDLParameter Flag Result Units RLBenzene < 0.000400 mg/L 0.001 Toluene < 0.000300 mg/L0.001Ethylbenzene < 0.000300 mg/L 0.001Xylene < 0.000333 mg/L 0.001

					Spike	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0916	mg/L	1	0.100	92	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.109	$\mathrm{mg/L}$	1	0.100	109	47.3 - 116

Method Blank (1)

QC Batch: 79704

QC Batch: 79704 Prep Batch: 67618

Date Analyzed: 2011-03-23 QC Preparation: 2011-03-22 Analyzed By: MN Prepared By: MN

		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	m mg/L	0.0002
1-Methylnaphthalene		< 0.0000575	m mg/L	0.0002
Acenaphthylene		< 0.0000963	m mg/L	0.0002
Acenaphthene		< 0.0000617	${ m mg/L}$	0.0002
Dibenzofuran		< 0.0000952	m mg/L	0.0002

 $\overline{continued}$  . . .

Report Date: March 24, 2011 Work Order: 11032107 Page Number: 6 of 10 TNM 97-04 Townsend Lovington, NM

method blank continued				
		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Fluorene		< 0.000134	m mg/L	0.0002
Anthracene		< 0.000441	${ m mg/L}$	0.0002
Phenanthrene		< 0.000435	m mg/L	0.0002
Fluoranthene		< 0.000476	m mg/L	0.0002
Pyrene		< 0.000590	$\mathrm{mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	${ m mg/L}$	0.0002
Chrysene		< 0.0000766	m mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	m mg/L	0.0002
Benzo(a)pyrene		< 0.000132	m mg/L	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	m mg/L	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	${ m mg/L}$	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

				•	Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0199	mg/L	1	0.0800	25	10 - 111
2-Fluorobiphenyl		0.0207	mg/L	1	0.0800	26	10 - 92.7
Terphenyl-d14		0.0378	${ m mg/L}$	1	0.0800	47	35.9 - 107

### Laboratory Control Spike (LCS-1)

QC Batch: 79654 Date Analyzed: 2011-03-21 Analyzed By: ME Prep Batch: 67576 QC Preparation: 2011-03-21 Prepared By: ME

Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Réc.	Rec. Limit
Benzene	0.0925	mg/L	1	0.100	< 0.000400	92	76.8 - 110
Toluene	0.0997	mg/L	1	0.100	< 0.000300	100	81 - 108
Ethylbenzene	. 0.112	mg/L	1	0.100	< 0.000300	112	78.8 - 118
Xylene	0.340	mg/L	1	0.300	< 0.000333	113	80.3 - 119

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Benzene	0.0979	mg/L	1	0.100	< 0.000400	98	76.8 - 110	6	20
Toluene	0.106	mg/L	1	0.100	< 0.000300	106	81 - 108	6	20
Ethylbenzene.	0.116	mg/L	1	0.100	< 0.000300	116	78.8 - 118	4	20
Xylene	0.358	mg/L	1	0.300	< 0.000333	119	80.3 - 119	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

TNM 97-04

Work Order: 11032107 TNM 97-04 Townsend

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Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0974	0.0863	mg/L	1	0.100	97	86	66.6 - 114
4-Bromofluorobenzene (4-BFB)	0.122	0.109	mg/L	1	0.100	122	109	68.2 - 124

#### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 67618

79704

Date Analyzed:

2011-03-23 QC Preparation: 2011-03-22 Analyzed By: MN Prepared By: MN

LCS Spike Matrix Rec. Param Result Dil. Units Result Limit Amount Rec. Naphthalene 0.0317 mg/L 0.0800 < 0.0000784 40 32.2 - 80.3 2-Methylnaphthalene 0.0353mg/L 1 0.0800< 0.000074744 34.8 - 87 1-Methylnaphthalene 0.0333mg/L 0.0800 36.9 - 89.61 < 0.0000575 42Acenaphthylene 0.0411mg/L 1 51 35 - 93.2 0.0800< 0.0000963 Acenaphthene 0.0395mg/L 1 49 35.8 - 92.90.0800< 0.0000617 Dibenzofuran 0.0361mg/L 1 0.0800< 0.0000952 45 35.3 - 85.1Fluorene 0.0521mg/L 1 0.0800 < 0.000134 65 43.4 - 101 0.0436 54 44.8 - 92.4 Anthracene mg/L 1 0.0800< 0.000441 Phenanthrene 0.0512mg/L1 0.0800< 0.000435 64 44 - 93.7Fluoranthene 0.0633 mg/L1 0.080079 52.7 - 104< 0.000476 0.069687 Pyrene mg/L 1 0.0800< 0.00059042.2 - 93.8Benzo(a)anthracene 0.062678 mg/L 1 0.0800< 0.000118 40.4 - 91.9 0.090544.4 - 107 Chrysene mg/L 1 0.0800< 0.0000766 113 Benzo(b)fluoranthene 0.0350mg/L 1 0.0800< 0.000146 44 34.8 - 105 Benzo(k)fluoranthene 0.053367 50.2 - 158 mg/L 1 0.0800< 0.000141 Benzo(a)pyrene 0.0453mg/L 1 0.080057 51.3 - 151 < 0.000132Indeno(1,2,3-cd)pyrene 0.0430mg/L 0.080054 43.2 - 115 1 < 0.0000702Dibenzo(a,h)anthracene 0.0476mg/L 1 0.0800 60 43.9 - 115 < 0.0000534 Benzo(g,h,i)perylene 0.0369 mg/L 1 0.0800< 0.0000473 46 45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Naphthalene	0.0361	$\mathrm{mg/L}$	1	0.0800	< 0.0000784	45	32.2 - 80.3	13	20
2-Methylnaphthalene	0.0398	mg/L	1	0.0800	< 0.0000747	50	34.8 - 87	12	20
1-Methylnaphthalene	0.0380	mg/L	1	0.0800	< 0.0000575	48	36.9 - 89.6	13	20
Acenaphthylene	0.0459	mg/L	1	0.0800	< 0.0000963	57	35 - 93.2	11	20
Acenaphthene	0.0447	mg/L	1	0.0800	< 0.0000617	56	35.8 - 92.9	12	20
Dibenzofuran	0.0405	mg/L	1	0.0800	< 0.0000952	51	35.3 - 85.1	12	20
Fluorene	0.0582	mg/L	1	0.0800	< 0.000134	73	43.4 - 101	11	20
Anthracene	0.0505	mg/L	1	0.0800	< 0.000441	63	44.8 - 92.4	15	20
Phenanthrene	0.0599	mg/L	1	0.0800	< 0.000435	75	44 - 93.7	16	20

 $continued \dots$ 

<sup>&</sup>lt;sup>2</sup>Spike analyte out of control limits. Results biased high. •

Report Date: March 24, 2011

TNM 97-04

Work Order: 11032107 TNM 97-04 Townsend

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control spikes continued . . .

		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Fluoranthene		0.0744	mg/L	1	0.0800	< 0.000476	93	52.7 - 104	16	20
Pyrene	3	0.0774	${ m mg/L}$	1	0.0800	< 0.000590	97	42.2 - 93.8	11	20
Benzo(a)anthracene		0.0710	${ m mg/L}$	1	0.0800	< 0.000118	89	40.4 - 91.9	13	20
Chrysene	4	0.0916	mg/L	1	0.0800	< 0.0000766	114	44.4 - 107	1	20
Benzo(b)fluoranthene		0.0363	mg/L	1	0.0800	< 0.000146	45	34.8 - 105	4	20
Benzo(k)fluoranthene		0.0585	$\mathrm{mg/L}$	1	0.0800	< 0.000141	73	50.2 - 158	9	20
Benzo(a)pyrene		0.0447	mg/L	1	0.0800	< 0.000132	56	51.3 - 151	1	20
Indeno $(1,2,3-cd)$ pyrene		0.0488	mg/L	1	0.0800	< 0.0000702	61	43.2 - 115	13	20
Dibenzo(a,h)anthracene		0.0555	mg/L	1	0.0800	< 0.0000534	69	43.9 - 115	15	20
Benzo(g,h,i)perylene		0.0430	$\mathrm{mg/L}$	1	0.0800	< 0.0000473	54	45.1 - 115	15 ·	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Nitrobenzene-d5	0.0300	0.0330	${ m mg/L}$	1	0.0800	38	41	10 - 111
2-Fluorobiphenyl	0.0369	0.0413	${ m mg/L}$	1	0.0800	46	52	10 - 92.7
Terphenyl-d14	0.0720	0.0806	${ m mg/L}$	1	0.0800	90	101	35.9 - 107

Matrix Spike (MS-1) Spiked Sample: 260125

QC Batch: 79654 Prep Batch: 67576

Date Analyzed: QC Preparation: 2011-03-21

2011-03-21

Analyzed By: ME Prepared By: ME

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene	11.0	mg/L	50	5.00	5.7675	105	77.9 - 114
Toluene	5.15	${ m mg/L}$	50	5.00	< 0.0150	103	78.3 - 111
Ethylbenzene	6.20	mg/L	50	5.00	0.7803	108	75.3 - 110
Xylene	17.1	$_{ m mg/L}$	50	15.0	0.9691	108	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		MSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene		11.2	mg/L	50	5.00	5.7675	109	77.9 - 114	2	20
Toluene		5.27	mg/L	50	5.00	< 0.0150	105	78.3 - 111	2	20
Ethylbenzene		6.28	mg/L	50	5.00	0.7803	110	75.3 - 110	1	20
Xylene	5	17.4	mg/L	50	15.0	0.9691	110	75.7 - 109	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

<sup>&</sup>lt;sup>3</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>4</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>5</sup>MSD analyte out of range. MS/MSD has a RPD within limits. Therfore, MS shows extraction occured properly.

Report Date: March 24, 2011

TNM 97-04

Work Order: 11032107 TNM 97-04 Townsend Page Number: 9 of 10 Lovington, NM

Surrogato	MS . Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Surrogate					Amount			
Trifluorotoluene (TFT)	4.96	5.00	mg/L	50	5	99	100	68.3 - 107
4-Bromofluorobenzene (4-BFB)	5.91	5.91	${ m mg/L}$	50	5	. 118	118	60.1 - 135

### Standard (CCV-1)

QC Batch: 79654

Date Analyzed: 2011-03-21

Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0989	99	80 - 120	2011-03-21
Toluene		$_{ m mg/L}$	0.100	0.105	105	80 - 120	2011-03-21
Ethylbenzene		$_{ m mg/L}$	0.100	0.118	118	80 - 120	2011-03-21
Xylene		mg/L	0.300	0.359	120	80 - 120	2011-03-21

### Standard (CCV-2)

QC Batch: 79654

Date Analyzed: 2011-03-21

Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0898	90	80 - 120	2011-03-21
Toluene		mg/L	0.100	0.0960	96	80 - 120	2011-03-21
Ethylbenzene		mg/L	0.100	0.106	106	80 - 120	2011-03-21
Xylene		mg/L	0.300	0.322	107	80 - 120	2011-03-21

### Standard (CCV-1)

QC Batch: 79704

Date Analyzed: 2011-03-23

Analyzed By: MN

			CCVs	$\mathrm{CCVs}$	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units .	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	52.4	87	80 - 120	2011-03-23
2-Methylnaphthalene		${ m mg/L}$	60.0	61.4	102	80 - 120	2011-03-23
1-Methylnaphthalene		${ m mg/L}$	60.0	55.2	92	80 - 120	2011-03-23
Acenaphthylene		$_{ m mg/L}$	60.0	55.3	92	80 - 120	2011-03-23
Acenaphthene		${ m mg/L}$	60.0	53.8	90	80 - 120	2011-03-23
Dibenzofuran		${ m mg/L}$	60.0	65.0	108	80 - 120	2011-03-23
Fluorene		$\mathrm{mg/L}$	60.0	63.2	105	80 - 120	2011-03-23
Anthracene		$\mathrm{mg/L}$	60.0	54.0	90	80 - 120	2011-03-23
Phenanthrene		$\mathrm{mg/L}$	60.0	59.1	98	80 - 120	2011-03-23

 $continued \dots$ 

Report Date: March 24, 2011 TNM 97-04

Work Order: 11032107 TNM 97-04 Townsend Page Number: 10 of 10 Lovington, NM

standard continued							
			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Fluoranthene		mg/L	60.0	69.4	116	80 - 120	2011-03-23
Pyrene		${ m mg/L}$	60.0	69.0	115	80 - 120	2011-03-23
Benzo(a)anthracene		${ m mg/L}$	60.0	58.2	97	80 - 120	2011-03-23
Chrysene		${ m mg/L}$	60.0	56.4	94	80 - 120	2011-03-23
Benzo(b)fluoranthene		${ m mg/L}$	60.0	52.4	87	80 - 120	2011-03-23
Benzo(k)fluoranthene		$\mathrm{mg/L}$	60.0	68.2	114	80 - 120	2011-03-23
Benzo(a)pyrene		$_{ m mg/L}$	60.0	61.3	102	80 - 120	2011-03-23
Indeno(1,2,3-cd)pyrene	•	$\mathrm{mg/L}$	60.0	53.1	88	80 - 120	2011-03-23
Dibenzo(a,h)anthracene		$_{ m mg/L}$	60.0	53.9	90	80 - 120	2011-03-23
Benzo(g,h,i)perylene		$\mathrm{mg/L}$	60.0	49.4	82	80 - 120	2011-03-23

					$\operatorname{Spike}$	$\operatorname{Percent}$	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limit
Nitrobenzene-d5		53.1	mg/L	1	60.0	88	80 - 120
2-Fluorobiphenyl		54.3	${ m mg/L}$	1	60.0	90	80 - 120
Terphenyl-d14		68.8	${ m mg/L}$	1	60.0	115	80 - 120

LAB Order ID #

TraceAnalysis, Inc.

email: lab@traceanalysis.com

Company Name:

6701 Aberdeen Avenue, Suite 9 **Lubbock, Texas 79424**Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296

Phone #

5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313

BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750

₽

200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443

Turn Around Time if different from standard or Specify Method No.) Na, Ca, Mg, K, TDS, EC CI' EI' 204' NO3' NO5' YIK9Iiuity **ANALYSIS REQUEST** Moisture Content TRRP Report Required
Check If Special Reporting
Limits Are Needed Dry Weight Basis Required REMARKS: Grand BOD, TSS, pH Pesticides 8081 / 608 3 1785 X PCB's 8082 / 608 GC/MS Semi: Vol. 8270 / 625 **CC/W2 AOI** 8560 / 624 **BCI** TCLP Pesticides TCLP Semi Volatiles Circle TCLP Volatiles LAB USE TCLP Metals Ag As Ba Cd Cr Pb Se Hg ONLY Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 PAH 8270 / 625 TPH 8015 GRO / DRO / TVHC 088 4.0 cc COR 3.9 cc TPH 418.1 / TX1005 / TX1005 Ex(C35) BTEX 8021 / 802 / 8260 / 624 OBS21.3 5:30 COR 213 8021 / 602 / 8260 / 624 **38TM** INST SOS INST OBS 38 SAMPLING **TIME** Time: Time: **DATE** -772 11/8/1/2 Date: PRESERVATIVE NONE ICE METHOD Sampler Signature: 520 HOSN Company: 126 Company Company OS<sup>z</sup>H Project Name: <sup>€</sup>ONH C 432 25.263 E-mail: HCI Grand Ubs Received by: SCUDGE Received by MATRIX Received by ЯIA SOIF **A3TAW** Volume / Amount 7 10/AND Time: Time: Time: # CONTAINERS t Date: Date: Date Commence FIELD CODE Company: Сотрапу: Project Location (including spate): Company Nou A (Street, City, Zip) 2078MD ROW ROUNDAVILLE (If different from above) Relinquished by: Relinquished by 2057 Contact Person: Project #: 🗸 46 152 LAB USE) Invoice to: Address: LAB#

Submittal of earmples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.

8

J

Carrier #

### **GW - 294**

### **Enhanced Product Recovery System Start-Up Report**

June 2, 2011



June 2, 2011

Mr. Jim Griswold New Mexico Oil Conservation Division 1220 South St. Francis Drive Santa Fe. New Mexico 87505

RE:

Plains Pipeline, L.P. TNM 97-04 Site

NMOCD Reference # GW-0294

Unit Letter P of Section 11, Township 16 South, Range 35 East

Lea County, New Mexico

Dear Mr. Griswold:

Plains Pipeline, L.P. is pleased to submit the attached *Enhanced Product Recovery System Start-Up Report*, dated May 2011, for the above referenced site. This document provides details regarding the installation and operation of the groundwater remediation system that is currently being utilized at the subject site.

Should you have any questions or comments, please contact me at (575) 441-1099.

Sincerely,

Jason Henry

Remediation Coordinator

Plains Pipeline, L.P.

CC: Geoff Leking, NMOCD, Hobbs Office

**Enclosure** 



### ENHANCED PRODUCT RECOVERY SYSTEM START-UP REPORT

TNM 97-04
SE ¼, SE ¼, SECTION 11, TOWNSHIP 16 SOUTH, RANGE 35 EAST
LEA COUNTY, NEW MEXICO
PLAINS SRS NUMBER: TNM 97-04
NMOCD Reference GW-0294



Prepared for:

Plains Marketing, L.P. 333 Clay Street, Suite 1600 Houston, Texas 77002

Prepared by:

NOVA Safety and Environmental 2057 Commerce Drive Midland, Texas 79703

May 2011

Ronald K. Rounsaville Senior Project Manager Brittan K. Byerly, P.G.

President

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### 1.0 INTRODUCTION AND PURPOSE

On behalf of Plains Marketing, L.P. (Plains), NOVA Safety and Environmental (NOVA) has prepared this Enhanced Product Recovery System Start-Up Report for the groundwater treatment system at TNM 97-04 Townsend Site (the site). The purpose of this report is to summarize the system start-up activities involved with the abatement process and provide current treated groundwater discharge and laboratory analytical data to Plains and the New Mexico Oil Conservation Division (NMOCD). The two part remediation system air sparges the down gradient edge of the dissolved phase hydrocarbon plume while a pump and treat system recovers groundwater and phase separated hydrocarbons from the central plume area. The recovered groundwater is then treated by sparging and granulated activated carbon and returned to the subsurface through an infiltration gallery located up gradient of the plume.

The site, which was formerly the responsibility of Texas New Mexico Pipe Line Company (TNM), is now the responsibility of Plains. The site is located in the SE 1/4 of the SE 1/4 of Section 11, Township 16 South, Range 35 East in Lea County, New Mexico, approximately four miles west of Lovington, New Mexico on Gill Road. A Site Location Map is included as Figure 1

Fourteen monitor wells (MW-2 through MW-7 and MW-9 through MW-16) and one recovery well (RW-1) were located at the site to delineate and remediate the hydrocarbon plume. In March 2009, eight air sparging wells and three additional recovery wells were installed at the site. A Site Details Map featuring the system layout with the air sparging and recovery well locations is included as Figure 2; Figure 3 illustrates the remediation system layout.

### 2.0 SYSTEM INSTALLATION AND OPERATION

Eight air-sparging wells (AS-1 through AS-8) were installed in March 2009, each to a depth of approximately 65 feet below ground surface (bgs) along the southern and eastern edges of the PSH plume and spaced approximately 20 feet apart (please refer to figure 2 for the location of the sparge wells and Appendix A for geologic logs of the sparging wells). Each sparging well was constructed with 60 feet of 2-inch diameter schedule 40 PVC casing and 2 feet of 0.020 inch slotted screen. The upper 7 feet of the sparging wells consisted of 2-inch diameter galvanized steel piping as the manifold for the compressed air tubing (please refer to Figure 4 for a schematic of sparging well completions).

Three recovery wells (RW-2 through RW-4) were installed in March 2009, within the central area of the PSH plume to a depth of 65 feet bgs and constructed with 40 feet of 2-inch diameter schedule 40 PVC casing and 25 feet of 0.010 inch slotted screen. As per the approved system installation proposal, soil samples were not collected and analyzed during the installation activities of the sparging and recovery wells. Soil boring logs with well construction details along with State of New Mexico well drillers reports are included in Appendix A.

The enhanced recovery system utilizes compressed air generated by a trailer mounted blower to provide air to the eight air-sparging wells at approximately four to six pounds per square inch (psi). The blower makes excess pressure which is either utilized to aerate a water holding tank in

the pump-and-treat system or vented to atmosphere. The sparging system operates 24 hours a day in an effort to aerate the groundwater on the down gradient edge of the hydrocarbon plume, as well as creating a rise in the water table along the axis of the sparging wells. Monitor wells MW-13 and MW-15 will be used to quantify the effectiveness of the sparging system in reducing the dissolved phase hydrocarbons.

Total fluid pumps were placed in recovery wells RW-1, RW-2, RW-3 and RW-4 to lower the groundwater in the central plume area to capture phase separated hydrocarbons and are powered by compressed air generated by a compressor located in the mechanical shed on the east side of the site (please refer to Figure 2 for the location of the mechanical shed). The total fluid pumps operate at a pumping rate of approximately 2-3 gallons per minute (gpm) from each recovery well with a combined pumping rate of 8-12 gpm. Recovered oil and water is then passed through an oil-water separator with the oil transferred to a 550 gallon poly tank for staging and later transport off site. Recovered groundwater is pumped to a large poly aeration tank to allow for volatilization of the hydrocarbons. Air is injected into this tank by the trailer mounted blower. Groundwater is then transferred through a two bag particulate filter system prior to being pumped through two-500 lbs. carbon filtration canisters plumbed in sequence. The treated groundwater is sampled from post carbon sampling ports on a monthly basis. The treated groundwater is then discharged continually, under Discharge Permit GW-294, to an infiltration gallery located upgradient of the release point (Please see Figure 2 for the location of the treatment system, air sparging and recovery wells and Figure 3 for an operational schematic of the system).

A NMOCD permitted injection/infiltration system was installed prior to Plains assuming operational responsibilities in 2004. Plains rehabilitated the existing infiltration gallery for the acceptance of the treated groundwater by over-excavating the existing gallery to a depth of 35 feet bgs and replacement of the gallery piping and filter media in accordance with Discharge Permit GW-294. The average daily pumping volume for the four recovery wells is approximately 29 bbls per day. The average monthly pumping volume is approximately 962 bbls. Flow meter readings indicated approximately 26,378 barrels of treated groundwater have been discharged through the infiltration gallery since system start up on September 2, 2010. Discharge Flow Meter Readings for 2010-2011 are presented as Table 1. Approximately 108 gallons of PSH have been recovered since system start up.

### 3.0 LABORATORY RESULTS

Treated groundwater samples are collected from a sampling port located after the second carbon filter (post carbon) installed between the second carbon vessel and the header for the infiltration gallery. As per permit requirements, samples are collected from the system effluent and analyzed according to the following schedule:

Initial - weekly basis for the first month of operation BTEX and PAH concentrations, Method 8270, WQCC Metals

Monthly – BTEX and PAH concentrations, Method 8270

Treated groundwater samples obtained from the post carbon sampling port were delivered to Trace Analysis, Inc. in Midland, Texas for determination of Benzene, Toluene, Ethylbenzene and Xylene (BTEX) constituent concentrations by EPA Method 8021B, Polynuclear Aromatic Hydrocarbons (PAH) by EPA method 8270 and WQCC Metals by EPA method 6010C. A listing of Post Carbon effluent BTEX constituent concentrations is summarized in Table 2, PAH constituent concentrations are summarized in Table 3 and the WQCC Metal concentrations are listed in Table 4. Copies of the laboratory reports generated for the Post Carbon Effluent initial and monthly sampling events are provided in Appendix A.

Initial weekly system sampling events were conducted on September 2, September 10, September 16 and September 23, 2010 followed by monthly sampling events beginning in October 2010. Post carbon effluent analytical results on samples collected during the initial start up event and subsequent monthly sampling events indicate BTEX constituent concentrations were below laboratory method detection limits (MDLs) and the NMOCD regulatory standards, with the exception of the February 28, 2011 sampling event. The February 28, 2011 post carbon effluent sample exhibited a benzene concentration of 0.0319 mg/L. Upon receipt of the February 28, 2011 laboratory results, the system was turned off and the carbon filter media within the two vessels was replaced. Additional analytical results on post carbon effluent groundwater samples indicated PAH and WQCC metals concentrations to be below regulatory limits.

### 4.0 SUMMARY

This report documents the installation, start up activities and operations of the Enhanced Product Recovery System at the Plains TNM 97-04 site. The recovery system consists of eight air sparging wells utilizing compressed air operating at approximately 4-6 psi from a trailer mounted blower. Four recovery wells powered by compressed air, operating at a combined rate of 8-12 gpm, supply oil and impacted groundwater to a trailer mounted groundwater treatment system consisting of an oil/water separator, three poly holding tanks, two particulate bag filters and two-500 lbs. carbon filter canisters prior to discharge into an infiltration gallery under discharge permit GW-294. To date, approximately 26,378 barrels of treated groundwater have been discharged through the infiltration gallery. Currently, the system is operating normally with the most recent laboratory analytical results indicating the post carbon groundwater concentrations of BTEX constituents to be below laboratory method detection limits.

Future monitoring of dissolved phase hydrocarbon concentration in downgradient monitor wells MW-13 and MW-15 will be evaluated in forthcoming quarterly status update reports.

### 5.0 LIMITATIONS

NOVA has prepared this *Enhanced Product Recovery System Initial Start Up Report* to the best of its ability. No other warranty, expressed or implied, is made or intended. NOVA has examined and relied upon documents referenced in the report and has relied on oral statements made by certain individuals. NOVA has not conducted an independent examination of the facts contained in referenced materials and statements. We have presumed the genuineness of the

documents and that the information provided in documents or statements is true and accurate. NOVA has prepared this report, in a professional manner, using the degree of skill and care exercised by similar environmental consultants. NOVA also notes that the facts and conditions referenced in this report may change over time and the conclusions and recommendations set forth herein are applicable only to the facts and conditions as described at the time of this report. This report has been prepared for the benefit of Plains. The information contained in this report, including all exhibits and attachments, may not be used by any other party without the express consent of NOVA and/or Plains.

### 6.0 DISTRIBUTION

Copy 1: Jim Griswold

New Mexico Oil Conservation Division

Environmental Bureau

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New Mexico Oil Conservation Division (District 1)

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Plains Pipeline, L.P. 2530 State Highway 214 Denver City, Texas 79323

jhenry@paalp.com

Copy 4: Jeff Dann

Plains Pipeline, L.P.

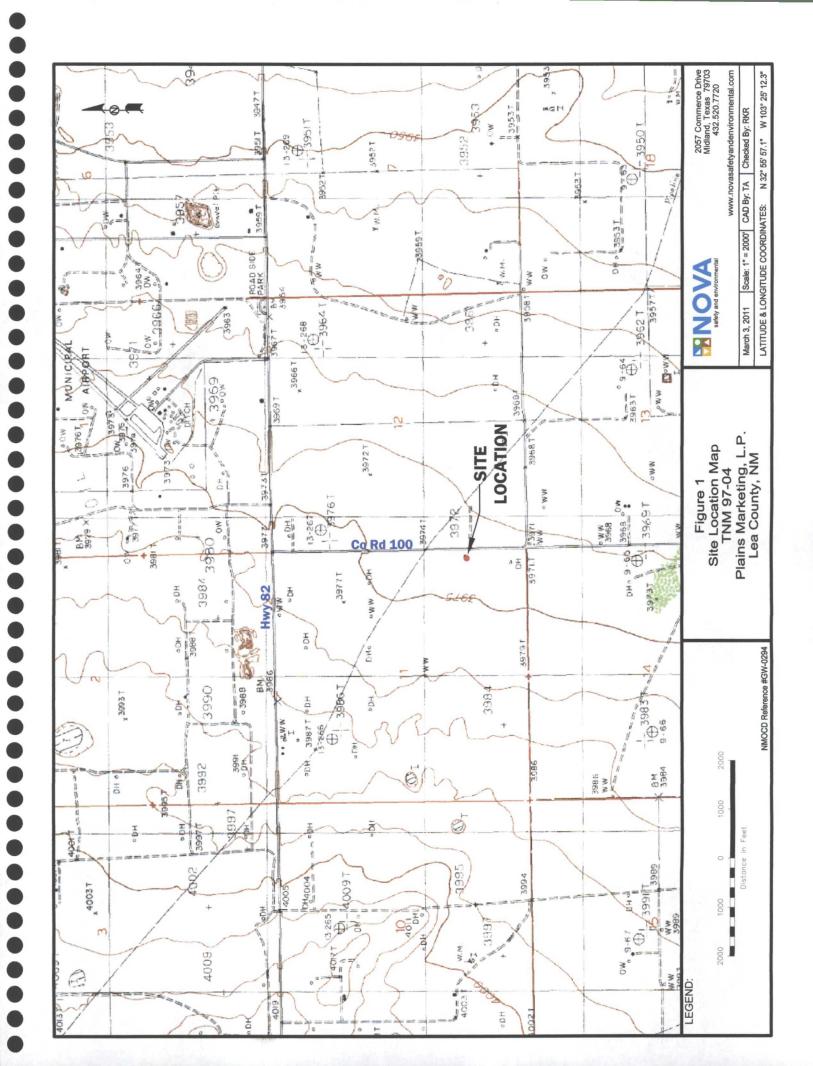
333 Clay Street, Suite 1600 Houston, Texas 77002 jpdann@paalp.com

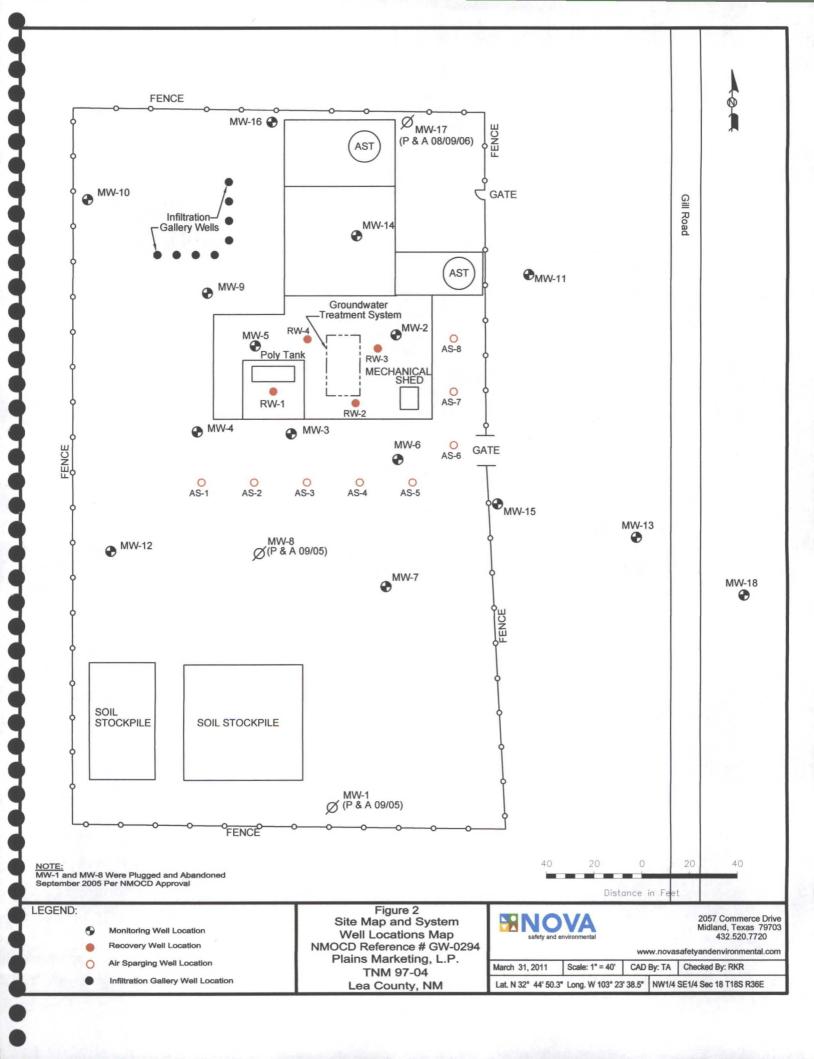
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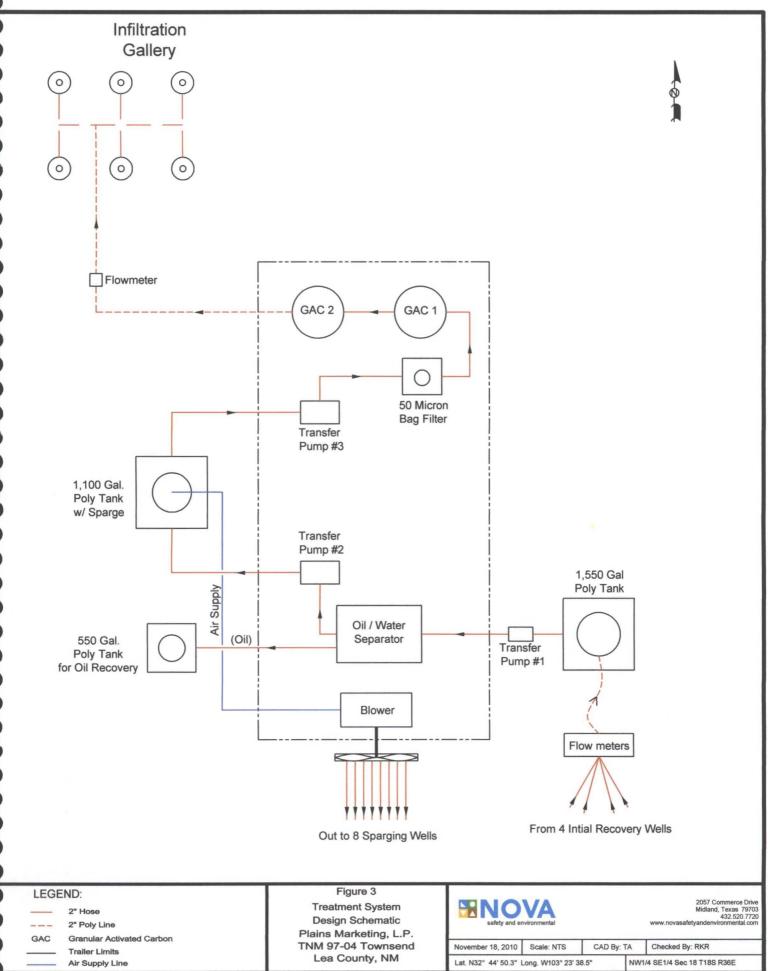
2057 Commerce Drive Midland, Texas 79703

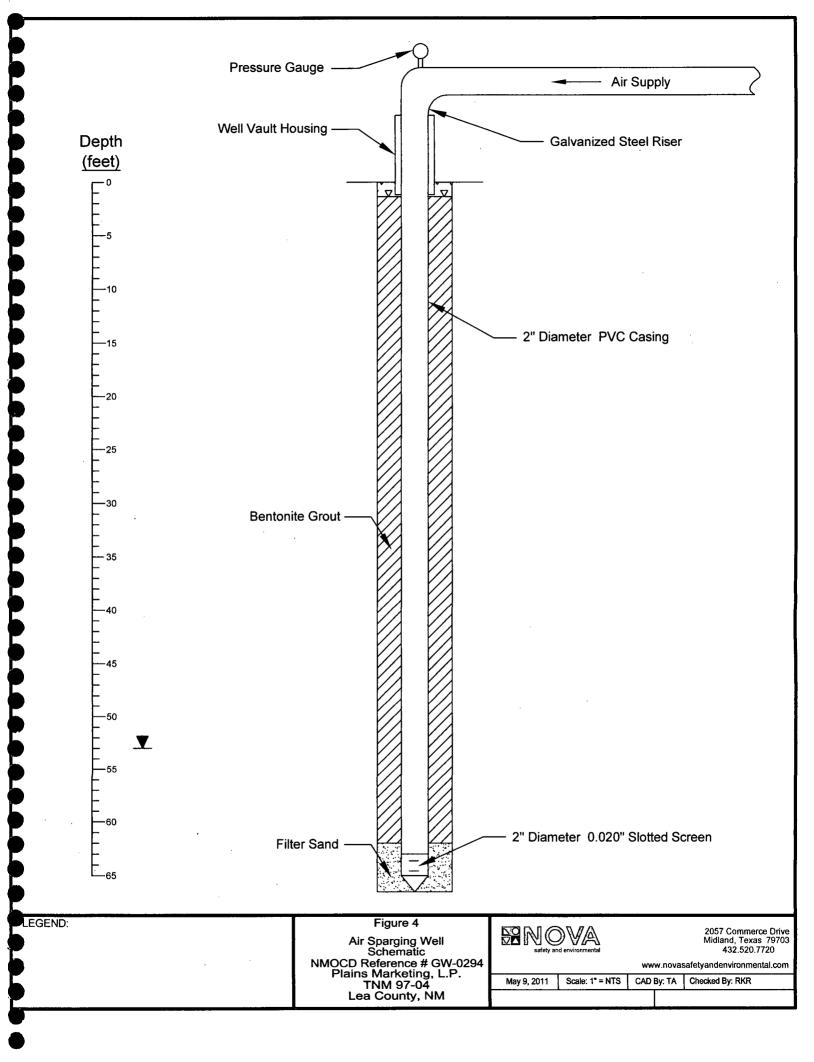
rrounsaville@novatraining.cc

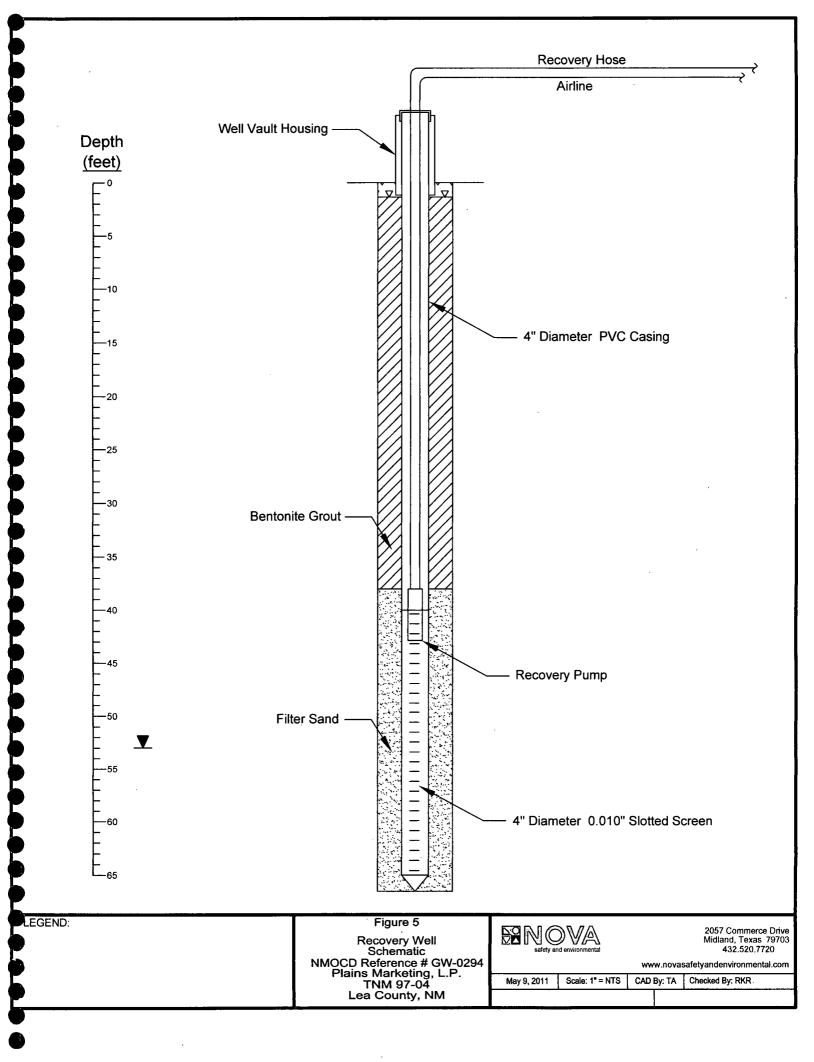


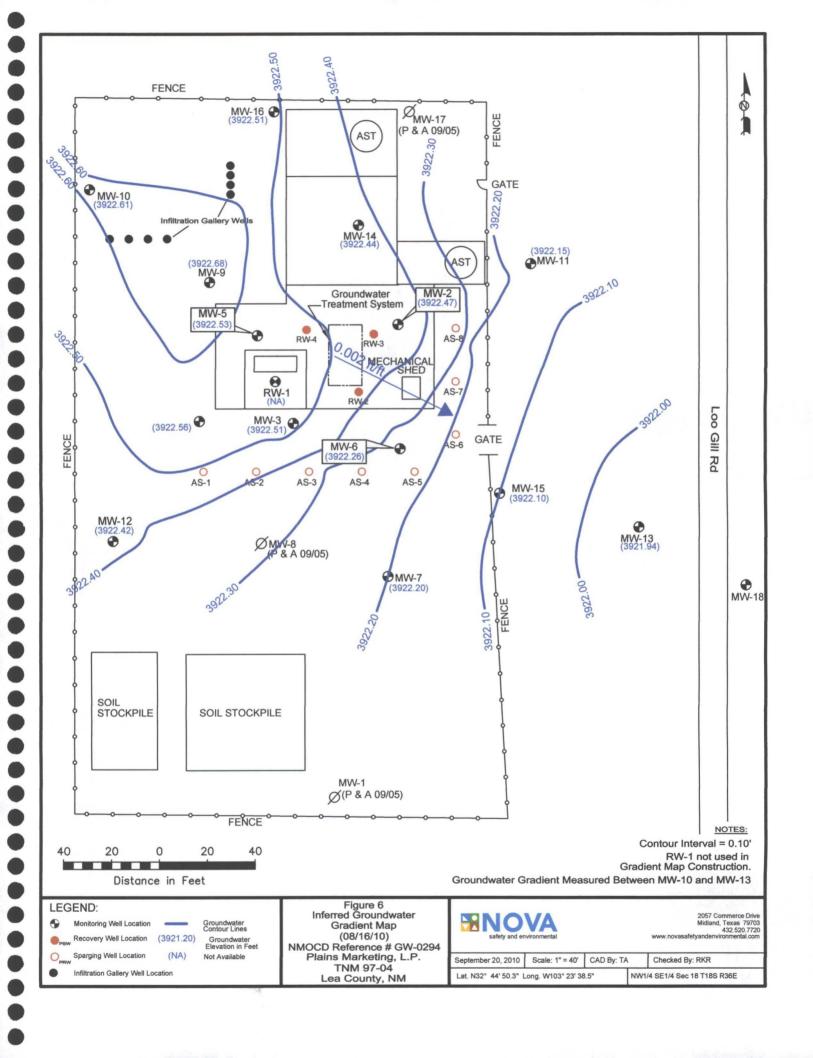


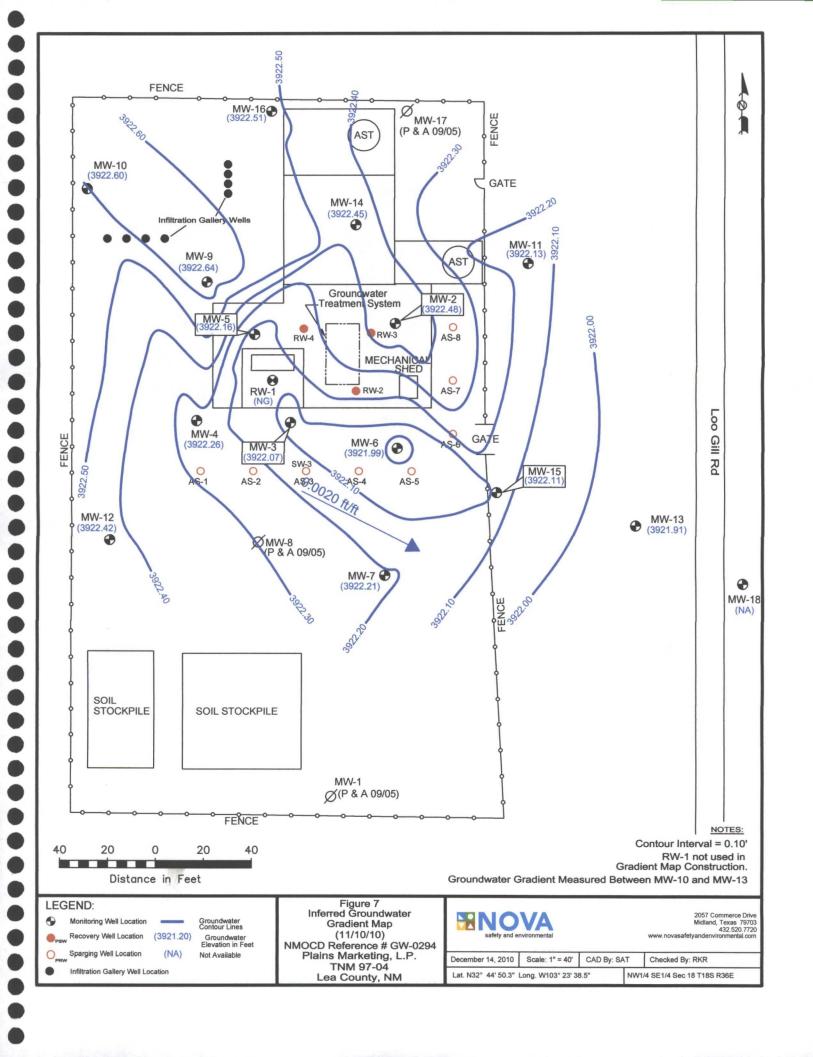


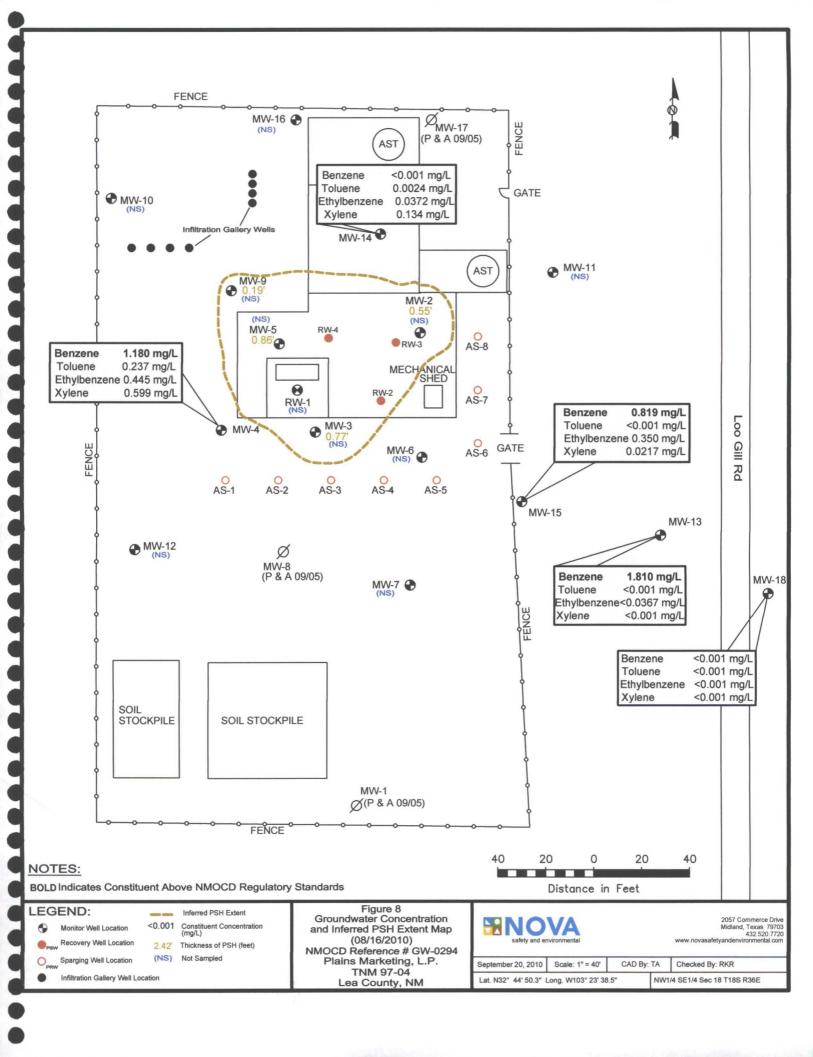


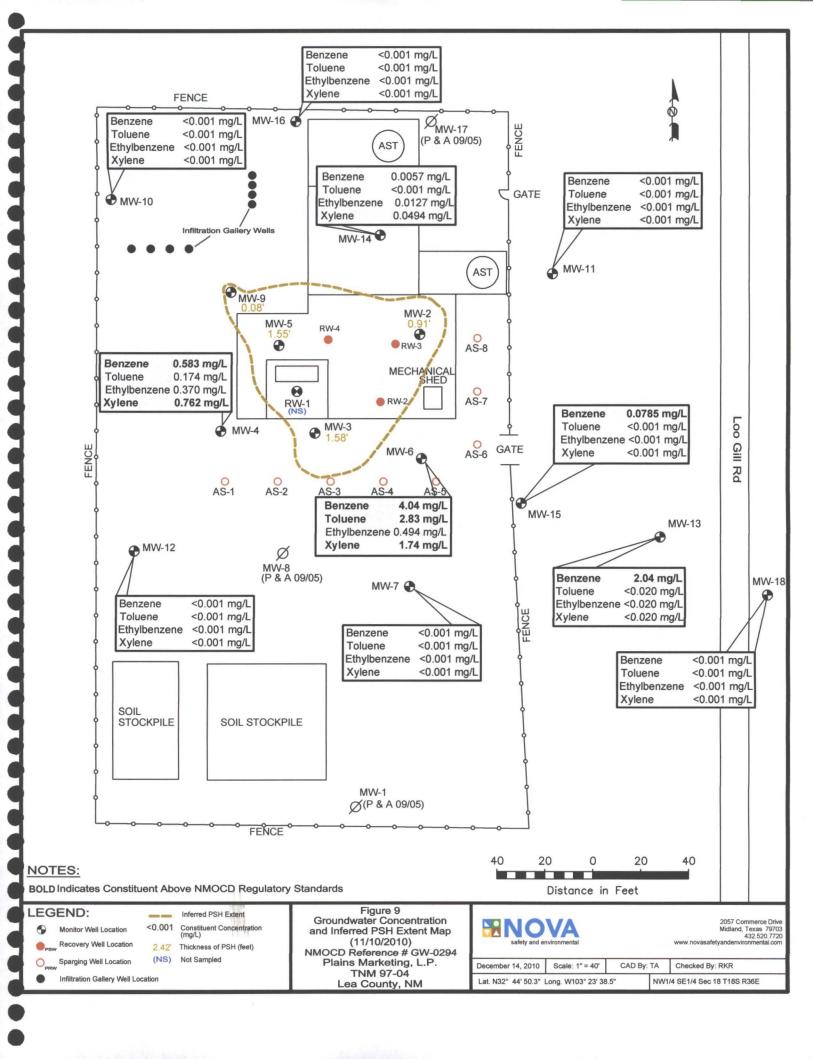












Min One	Day																													4
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Max One	Day				:																									<b>建设的 建筑</b>
Average	BBLS per	- Gan	364.9405	130.5079	92.8741	74.4444	51.9048	21.3810	0.0000		56.1905	22.2789	71.4286	69.0476	56.3605		69.9405	70.0000	72.8571	59.4643	16.7262	5.4167	12.5893	17.1032		3.9286	3.3333	0.2381		
	Days per		1	1	-	1	1	1	0		-	-	1	l l	<del>-</del>		1	1	1	l l	1	1	1	1		1	1		7.5	
MONTHLY	TOTAL		729.88	1512.93	2163.05	2609.71	2661.62	2768.52	2768.52		3161.86	3317.81	3674.95	3813.05	4207.57		4487.33	4557.33	4703.05	4940.90	5007.81	5029.48	5130.19	5232.81		5240.67	5244.00	5248.76		
	BARRELS		729.88	783.05	650.12	446.67	51.90	106.90	00.0	27.68.52	393.33	155.95	357.14	138.10	394.52	1439.05	279.76	70.00	145.71	237.86	06.99	21.67	100.71	102.62	1025.24	7.86	3.33	4.76	15.95	
	GALLONS		30655	32888	27305	18760	2180	4490	0	116278	16520	6550	15000	2800	16570	60440	11750	2940	6120	0666	2810	910	4230	4310	43060	330	140	200	029	10 H. T.
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	BEEOBE		101742	132397	165285	192590	211350	213530	218020		218020	234540	241090	256090	261890		278460	290210	293150	299270	309260	312070	312980	317210		321520	321850	321990		
	DATE	WEASONED	9/2/2010	9/8/2010	9/16/2010	9/22/2010	9/23/2010	9/28/2010	9/30/2010	otals	10/7/2010	10/14/2010	10/19/2010	10/21/2010	10/28/2010	S	11/1/2010	11/2/2010	11/4/2010	11/8/2010	11/12/2010	11/16/2010	11/23/2010	11/29/2010	itals 💮	12/1/2010	12/2/2010	12/22/2010	itals 💮	
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PLAINS MARKETING, L.P.
TNM-9704 TOWNSEND
LEA COUNTY, NEW MEXICO

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	Min One	Day	Volume										!																		
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NMOCD REFERENCE NUMBER GW-0294	MONTHLY	TOTAL	(BARRELS)	605.50	1290.29	2248.86	2986.24	3037.90	3159.33	3159.33		4159.81	4351.95	5014.33	5426.71	6201.95		6554.10	6649.81	6854.10	7189.81	7274.81	7298.14	7497.43	7610.76	1.0	7619.81	7623.14	7628.86		
RENCE NUM		BARRELS	PUMPED	605.50	684.79	958.57	737.38	51.67	121.43	00.00	3159'33	1000.48	192.14	662.38	412.38	775.24	3042.62	352.14	95.71	204.29	335.71	85.00	23.33	199.29	113.33	7408.81	9.05	3.33	5.71	18.10	
MOCD REFE		GALLONS	PUMPED	25431	28761	40260	30970	2170	5100	0	132692	42020	8070	27820	17320	32560	127790	14790	4020	8580	14100	3570	. 980	8370	4760	59170	380	140	240	760	
_		Current	Reading	593869	322630	362890	393860	396030	401130	401130		443150	451220	479040	496360	528920		543710	547730	556310	57.0410	573980	574960	583330	588090		588470	588610	588850		
			BEFORE	268438	293869	322630	362890	393860	396030	401130		401130	443150	451220	479040	496360		528920	543710	547730	556310	570410	573980	574960	583330		588090	588470	588610		
		DATE	MEASURED	9/2/2010	9/8/2010	9/16/2010	9/22/2010	9/23/2010	9/28/2010	9/30/2010	otals	10/7/2010	10/14/2010	10/19/2010	10/21/2010	10/28/2010	ıls	11/1/2010	11/2/2010	11/4/2010	11/8/2010	11/12/2010	11/16/2010	11/23/2010	11/29/2010	otals	12/1/2010	12/2/2010	12/22/2010	otals	
		WELL	LOCATION	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	September Totals	RW-2	RW-2	RW-2	RW-2	RW-2	October Totals	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	November Totals	RW-2	RW-2	RW-2	December Totals	

WELL	DATE		Current	GALLONS	BARRELS	MONTHLY	Days per	Average BBLS per	Max One Day	Min One Day
LOCATION	MEASURED	BEFORE	Reading	PUMPED	PUMPED	(BARRELS)	month	day	Volume	Volume
	9/2/2010	195740	199635	3895	92.74	92.74	1	92.7381		
RW-3	9/8/2010	199635	202476	2841	67.64	160.38	1	13.5286		
RW-3	9/16/2010	202476	205770	3294	78.43	238.81	1	11.2041		
RW-3	9/22/2010	205770	207920	2150	51.19	290.00	1	8.5317		
RW-3	9/23/2010	207920	207920	0	00.0	290.00	0	0.0000		
RW-3	9/28/2010	207920	208890	970	23.10	313.10	1	4.6190		
RW-3	9/30/2010	208890	208890	0	00.0	313.10	0	0.0000		
er T	September/Totals			13150 🤏	313.10					
RW-3	10/7/2010	208890	212730	3840	91.43	404.52	-	13.0612		
RW-3	10/14/2010	212730	214080	1350	32.14	436.67	1	4.5918		
RW-3	10/19/2010	214080	214570	490	11.67	448.33	1	2.3333		
RW-3	10/21/2010	214570	214570	0	00:00	448.33	0	0.0000		
RW-3	10/28/2010	214570	220760	6190	147.38	595.71	1	21.0544		
October Totals				11870	282:62		1			
RW-3	11/1/2010	220760	228580	7820	186.19	781.90	1	46.5476		
RW-3	11/2/2010	228580	230250	1670	39.76	821.67	1	39.7619		
RW-3	11/4/2010	230250	235130	4880	116.19	98.786	1	58.0952		
RW-3	11/8/2010	235130	235840	710	16.90	954.76	1	4.2262		
RW-3	11/12/2010	235840	236920	1080	25.71	980.48	1	6.4286		
RW-3	11/16/2010	236920	237610	069	16.43	996.90	1	4.1071		
RW-3	11/23/2010	237610	240550	2940	70.00	1066.90	1	8.7500		
RW-3	11/29/2010	240550	243770	3220	76.67	1143.57	1	12.7778		
November Totals			1	23010	247.86					
RW-3	12/1/2010	243770	244040	270	6.43	1150.00	. 1	3.2143		
RW-3	12/2/2010	244040	244140	100	2.38	1152.38	1	2.3810		
RW-3	12/22/2010	244140	244320	180	4.29	1156.67	1	0.2143		
December Totals	itals			. 250	13:10			3		
					17.14					

FLOW METER READINGS - 2010

						MONTH! Y		Average	May One	Min One
WELL	DATE	BEFORE	Current	GALLONS	BARRELS	TOTAL (BARRELS)	Days per month	BBLS per	Day Volume	Day Volume
RW-4	9/2/2010	212415	225398	12983	309.12	309.12	-	309.1190		
RW4	9/8/2010	225398	244140	18742	446.24	755.36	1	89.2476		
RW-4	9/16/2010	244140	266130	21990	523.57	1278.93	1	74.7959		
RW-4	9/22/2010	266130	281360	15230	362.62	1641.55	1	60,4365		
RW-4	9/23/2010	281360	283180	1820	43.33	1684.88	1	43.3333		
RW-4	9/28/2010	283180	287980	4800	114.29	1799.17	1	22.8571		
RW4	9/30/2010	287980	287980	0	00.00	1799.17	0	0.0000		
nber	September Totals!			75565	1799.17					
RW-4	10/7/2010	287980	304370	16390	390.24	2189.40	1	55.7483		
RW-4	10/14/2010	304370	310490	6120	145.71	2335.12	1	20.8163		
RW-4	10/19/2010	310490	324370	13880	330.48	2665.60	1	66.0952		
RW-4	10/21/2010	324370	329350	4980	118.57	2784.17	1	59.2857		
RW4	10/28/2010	329350	343490	14140	336.67	3120.83	1	48.0952		
er Tot	October Totals				1321.67		1			
RW-4	11/1/2010	343490	353070	9580	228.10	3348.93	1	57.0238		
RW-4	11/2/2010	353070	355030	1960	46.67	3395.60	1	46.6667		
RW-4	11/4/2010	355030	357810	2780	66.19	3461.79	1	33.0952		
RW-4	11/8/2010	357810	359710	1900	45.24	3507.02	1	11.3095		
RW-4	11/12/2010	359710	361050	1340	31.90	3538.93	1	7.9762		
RW-4	11/16/2010	361050	361610	560	13.33	3552.26	1	3.3333		
RW-4	11/23/2010	361610	362460	850	20.24	3572.50	1	2.5298		
RW-4	11/29/2010	362460	363940	1480	35.24	3607.74	-	5.8730		
<b>November Totals</b>	otals			. 20450	486.90		1			
RW-4	12/1/2010	363940	364190	250	5.95	3613.69	1	2.9762		
RW-4	12/2/2010	364190	364210	20	0.48	3614.17	1	0.4762		
RW-4	12/22/2010	364210	364350	140	3.33	3617.50	1	0.1667		
December Totals	otals.			410	9.76					

FLOW METER READINGS - 2010

						MONTHLY		Average	Max One	Min One
WELL	DATE		Current	GALLONS	BARRELS	TOTAL	Days per	BBLS per	Day	Day
LOCATION	MEASURED	BEFORE	Reading	PUMPED	PUMPED	(BARRELS)	month	day	Volume	Volume
IFM	9/2/2010	208014	280978	72964	1737.24	1737.24	1	1737.2381		
IFM	9/8/2010	280978	364210	83232	1981.71	3718.95	1	396.3429		
IFM	9/16/2010	364210	643300	279090	6645.00	10363.95	1	949.2857		
IFM	9/22/2010	643300	681400	38100	907.14	11271.10	1	151.1905		
IFM	9/23/2010	681400	686700	5300	126.19	11397.29	1	126.1905		
IFM	9/28/2010	686700	006989	200	4.76	11402.05	1	0.9524		
IFM	9/30/2010	006989	700400	13500	321.43	11723.48	1	160.7143		
September Totals	otals			492386	11723.48	3.0				
IFM	10/7/2010	700400	723600	23200	552.38	12275.86	1	78.9116		
IFM	10/14/2010	723600	742700	19100	454.76	12730.62	1	64.9660		
IFM	10/19/2010	742700	776000	33300	792.86	13523.48	1	158.5714		
IFM	10/21/2010	776000	009982	10600	252.38	13775.86	1	126.1905	•	
IFM	10/28/2010	786600	818800	32200	766.67	14542.52	1	109.5238		
October Totals	ils		1. F. W.	118400	2819.05	142	. 1			
IFM	11/1/2010	818800	005658	40700	90.696	15511.57	1	242.2619		
IFM	11/2/2010	859500	869200	9200	230.95	15742.52	1	230.9524		
IFM	11/4/2010	869200	887200	18000	428.57	16171.10	1	214.2857		
IFM	11/8/2010	887200	902800	15600	371.43	16542.52	1	92.8571		
IFM	11/12/2010	902800	904700	1900	45.24	16587.76	1	11.3095		
IFM	11/16/2010	904700	908000	3300	78.57	16666.33	1	19.6429		
IFM	11/23/2010	908000	911500	3500	83.33	16749.67	1	10.4167		
IFM	11/29/2010	911500	923200	11700	278.57	17028.24	1	46.4286		
November Totals	otals			104400	2485.71					
IFM	12/1/2010	923200	923773	573	13.64	17041.88	0	13.6429		
IFM	12/2/2010	923773	924671	898	21.38	17063.26	0	21.3810		
IFM	12/22/2010	924671	925590	919	21.88	17085.14	0	1.0940		
December Totals	otals 🛴			2390	56.90		100			

Min One Day Volume		`				nati																					
Min Oi Day Volun																_											
Max One Day Volume																		9								*	
Average BBLS per day	6.31	3.57	65.95		4.31		20.92			7.41	4.05	306.90		96'9		18.08			5.34	3.10	55.48		4.69		0.70		
Days per month	1.00	2.00	3.00		1.00		1.00			1.00	2.00	3.00		1.00		1.00			1.00	2.00	3.00		1.00		1.00		
MONTHLY TOTAL (BARRELS)	88.33	91.90	157.86	Section 1	172.38		439.29			103.81	107.86	414.76		278.57		379.76			74.76	77.86	133.33		187.62		14.76	100	
BARRELS	88.33	3.57	65.95	157.86	172.38	172.38	439.29	439.29		103.81	4.05	306.90	414:76	278.57	278.57	379.76	379.76		74.76	3.10	55.48	133.33	187.62	187.62	14.76	14:76	
GALLONS	3,710	150	2,770	0:9'9	7,240	7,240	18,450	18,450		4,360	170	12,890	17,420	11,700	11,700	15,950	15,950		3,140	130	2,330	2,600	7,880	7,880[==	620	620	
Current	325,900	326,050	328,820		7,240		25,690		10 A 10 A 10 A 10 A 10 A 10 A 10 A 10 A	593,210	593,380	606,270		11,700		27,650			247,460	247,590	249,920		7,880		8,500	100	
BEFORE	322,190	325,900	326,050	Totals	0	Totals	7,240	otals		588,850	593,210	593,380	Totals 🕒	0	Totals 🖖	11,700	otals 💸		244,320	247,460	247,590	Totals 🕓	0	Totals	7,880	otals	
DATE	1/5/2011	1/6/2011	1/7/2011	January Totals	2/16/2011	February Tota	3/9/2011	March Totals		1/5/2011	1/6/2011	1/7/2011	January Total	2/16/2011	February Tota	3/9/2011	March Totals		1/5/2011	1/6/2011	1/7/2011	January Total	2/16/2011	February Tota	3/9/2011	- March Totals	
WELL	RW-1	RW-1	RW-1		RW-1**		RW-1	4.1		RW-2	RW-2	RW-2	***	RW-2**		RW-2			RW-3	RW-3	RW-3		RW-3**		RW-3		

WELL	DATE MEASURED	BEFORE	Current Reading	GALLONS	BARRELS	MONTHLY TOTAL (BARRELS)	Days per month	Average BBLS per day	Max One Day Volume	Min One Day Volume
RW-4	1/5/2011	364,350	367,210	2,860	68.10	68.10	1.00	4.86		
RW4	1/6/2011	367,210	367,320	110	2.62	70.71	2.00	29:2		
RW-4	1/7/2011	367,320	369,500	2,180	51.90	122.62	3.00	51.90		
	January Total	Totals		5,150	1,22.62					
RW-4**	2/16/2011	0	270,210	270,210	6,433.57	6,433.57	1.00	160.84		
144	February Tota	Totals		70,210	6,433.57					
RW4	3/9/2011	270,210	293,550	23,340	555.71	555.71	1.00	555.71		
	March Totals	otals		23,340	555.71					
	(1)									
!FM*	1/5/2011	0	77,750	77,750	1,851.19	1,851.19	1.00	132.23		
IFM	1/6/2011	052'22	77,820	70	1.67	1,852.86	2.00	1.67		
IFM	1/7/2011	77,820	80,530	2,710	64.52	1,917.38	3.00	64.52		
	January Total	Totals		80,530	1,917,38			100		
IFM	2/16/2011	085,08	97,690	17,160	408.57	408.57	1.00	10.21		
	February Tota	Totals		17,160	408.57			100		
IFM	3/9/2011	069'26	159,050	61,360	1,460.95	1,460.95	1.00	25'69		
	- March Totals	otals		61,360	1,460.95					

<sup>\*</sup> Flow Meter identified as IFM was replaced on January 3, 2011

<sup>\*\*</sup> Flow Meters for RW-1 through RW-4 were replaced on February 15, 2011

## BTEX CONCENTRATIONS IN EFFLUENT GROUNDWATER

PLAINS MARKETING, L.P. TNM 97-04 TOWNSEND LEA COUNTY, NEW MEXICO NMOCD REFERENCE NUMBER GW-0294

Results and Regulatory Limits in mg/L

Sampl	le Date	Sample Date   Sample Location	Benzene	Toluene	Ethylbenzene	Xylenes	Total BTEX
NM	OCD Re	NMOCD Regulatory Limits	0.010	0.75	0.75	0.62	
0/60	09/05/10	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
09/1	09/10/10	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
09/1	01/91/60	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
09/2	09/23/10	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
10/2	10/25/10	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
11/2	11/23/10	Post Carbon	0.0047	<0.001	<0.001	<0.001	0.0047
01/2	01/28/11	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001
02/2	02/28/11	Post Carbon	0.0319	0.037	0.0338	0.0992	0.2019
03/1	03/18/11	Post Carbon	<0.001	<0.001	<0.001	<0.001	<0.001

# POLYNUCLEAR AROMATIC HYDROCARBON CONCENTRATIONS IN EFFLUENT GROUNDWATER PLAINS MARKETING, L.P. TNM 97-04 TOWNSEND LEA COUNTY, NEW MEXICO

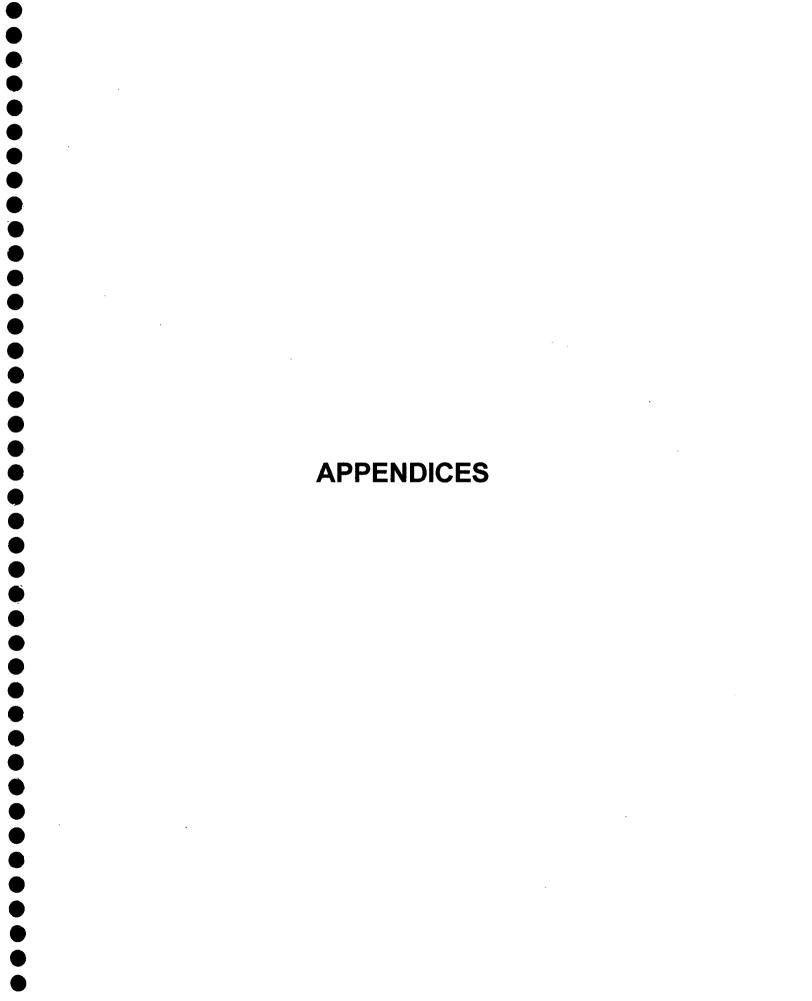
All water concentrations are reported in mg/L

NMOCD REFERENCE NUMBER GW-0294

	Dibenzoluran		<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	<0.000184		<0.000183		<0.000188	があるいの	<0.000190		<0.000183	
	S-Methylnaphthalene		<0.000184		<0.000186		<0.000200		0.00272		<0.000186	<0.000184	機能が変数	<0.000183		<0.000188		<0.000190	<b>建设的"支</b>	<0.000183	
	1-Methylnaphthalene	J\gm £0.0	<0.000184	的影響的	<0.000186		<0.000200		0.0106		<0.000186	<0.000184		<0.000183		<0.000188		<0.000190	學的學習	<0.000183	
	Иарћећајеве		<0.000184		>0.000186		<0.000200		0.00856	数型的数据	<0.000186	<0.000184		<0.000183		<0.000188		<0.000190	2000年2000年8月	<0.000183	
	Pyrene	<del></del>	<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	<0.000184		<0.000183		<0.000188		<0.000190	表示的理点	<0.000183	
	Бреизисичене	<del>-</del>	<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	<0.000184		<0.000183		<0.000188		<0.000190		<0.000183	
	Indeno[1,2,3-cd)pyrene	J\zm \$000.0	<0.000184		<0.000186		<0.000200		<0.000190	10.87	<0.000186	<0.000184		<0.000183	100	<0.000188		<0.000190		<0.000183	
	Fluorene	<del>-</del>	< 0.000184	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	<0.000186		<0.000200	<b>建石 建</b> 基	<0.000190		<0.000186	< 0.000184		< 0.000183	7112	<0.000188		< 0.000190		<0.000183	
3510	Fluoranthene		<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	 <0.000184	10 mg	<0.000183		<0.000188		<0.000190		<0.000183	
EPA SW846-8270C, 3510	Dibenz[a,h]anthracene	J\3m £000.0	<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	<0.000184		<0.000183		<0.000188		<0.000190		<0.000183	
EPA S	Сһгузепе	J\gm \$000.0	<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	<0.000184		<0.000183		<0.000188		<0.000190		<0.000183	
	Benzo[k]fluoranthene	J\gm £000.0	<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	<0.000184	<b>建筑</b> 化放子	<0.000183		<0.000188		<0.000190		<0.000183	
	Benzo[g,h,i]perylene		<0.000184		<0.000186	S. Carlotte	<0.000200		<0.000190		<0.000186	<0.000184	44	<0.000183		<0.000188		<0.000190		<0.000183	
	Benzo{b fluoranthene	J\3m £000.0	<0.000184		<0.000186		<0.000200		<0.000190	10 To 10 To	<0.000186	< 0.000184		<0.000183		<0.000188		<0.000190		<0.000183	
	Benzo[a]pyrene	J\3m 7000.0	<0.000184	<b>阿纳斯</b>	<0.000186		<0.000200		<0.000190		<0.000186	< 0.000184		<0.000183 <0.000183		<0.000188		<0.000190		<0.000183	
	Вепго[а]апthтасепе	J\2m 1000.0	<0.000184		<0.000186		<0.000200	100	<0.000190		<0.000186	< 0.000184	2.78	<0.000183	12.00	<0.000188		<0.000190		<0.000183	
	Anthracene	<del></del>	<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	<0.000184		<0.000183		<0.000188		<0.000190		<0.000183	
	Асепярћіћујепе		<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	< 0.000184		<0.000183		<0.000188		<0.000190	e1010	<0.000183	
	Acensphthene		<0.000184		<0.000186		<0.000200		<0.000190		<0.000186	<0.000184		<0.000183		<0.000188		<0.000190		<0.000183	
	SAMPLE	ntaminant M ing water fions 1- 103.A.	09/05/10		06/10/10		01/91/60		09/23/10		10/25/10	11/23/10		12/23/10		01/28/11		02/28/11		03/18/11	
	SAMPLE !	Maximum Contaminant Levels from NM WQCC Drinking water standards Sections 1- 101.UU and 3-103.A.	Post Carbon		Post Carbon		Post Carbon		Post Carbon		Post Carbon	Post Carbon		Post Carbon	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Post Carbon		Post Carbon		Post Carbon	

## WQCC METALS CONCENTRATIONS IN EFFLUENT GROUNDWATER PLAINS MARKETING, L.P. TNM 97-04 TOWNSEND LEA COUNTY, NEW MEXICO NMOCD REFERENCE NUMBER GW-0294

Total Zinc	J\3m 01	0.01	<b>新花</b>	<0.005		0.01		0.015	
Total Silver	J\gm 20.0	<0.005	<b>持续</b>	<0.005		<0.005		<0.005	
muinələ2 fatoT	J\gm č0.0	<0.020	24.4	<0.020		<0.020		<0.020	
basA latoT	J\3m 20.0	0.005	C	<0.005		<0.005		<0.005	
Total Mercury	A\zm 200.0	<0.0002	WITH STATE	<0.0002		<0.0002		<0.0002	
muimordO la3oT	J\zm 20.0	<0.005		<0.010	機能等了機能	<0.010	1063	<0.010	
muimbaO lesoT	J\zm 10.0	<0.005	<b>经</b> 联系统	\$00.0>		<0.005		<0.005	
mui188 l830T	J\gm 0.1	0.171	<b>3</b> 52335 <b>3</b>	0.243	The second	0.28		0.194	
oinserA latoT	. J\gm I.0	<0.010	100	<0.010	<b>第二次是</b>	010.0>		<0.010	
Total Nickel	J\\3m 2.0	<0.005	<b>提供等限等</b>	<0.010	Sec. 1823	<0.010		<0.010	
Total Molybdenum	J\8m 0.1	<0.010		<0.050	<b>第二十四</b>	<0.050		<0.050	
esonegaeM latoT	J\gm £.0	0.197	数型制度	0.091	Contract Contract	0.101	<b>为</b> 的关系是数	0.034	
noril fatoT	J\\3m 0.1	0.119	<b>第二十二章</b>	0.177		0.044	<b>独开兴发动</b>	0.311	
Тоғаі Соррег	J\gm 0.1	<0.005		<0.005		0.005	经海上活动	<0.005	
Total Cobalt	J\gm 20.0	\$00.0>	<b>建设的</b>	<0.005		<0.005		<0.005	
novou laioT	J\gm 27.0	0.105		0.168		0.216		0.112	
munimulA la3oT	J\gm 0.2	0.533	100 CO	<0.050		0.057		0.053	
SAMPLE	ontaminant NM Ging water trions 1-	09/05/10		09/10/10		01/91/60	12.50	09/23/10	
SAMPLE	Maximum Contaminant Levels from NM WQCC Drinking water standards Sections 1- 101.UU and 3-103.A.	Post Carbon		Post Carbon		Post Carbon		Post Carbon	



APPENDIX A:
Boring Logs & Well Details

## Soil Description

Depth (feet)

Columns

0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white 10-23' - Sand, brown, sandsastone, interbedded

very fine grained 23 - 29' - Sand, tan with some caliche fragments

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

### Monitor Well Details

Depth of PVC Well\_ Ground Water Elevation Depth to Groundwater Depth of Exploratory Well\_ Length of PVC Well Screen. Thickness of Bentonite Seal\_ Date Drilled 60 Ft 65 Ft 65 Ft 53 Ft 2 Ft



Grout Surface Seal

Bentonite Pellet Seal



Screen

Indicates the PSH level measured on NA A

Indicates the groundwater level measured on

3/26/09

Indicates samples selected for Laboratory Analysis

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- The monitor well was installed on date using air rotary drilling techniques.
- N The well was constructed with 2" ID, 0.020 inch factory slotted, belled end joint, schedule 40 PVC pipe.
- The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- The depths indicated are referenced from below ground surface. (bgs)



## NOVA Safety and Environmental

Drawn By: TA Checked By: RKR

May 9, 2009

TNM 97-04 Lea County, New Mexico Plains Marketing, L.P

**Boring Log And Monitor Well Details** Air Sparging Well AS-1



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

<u></u> -													
_	POD NUMBE			•					OSE FILE NU	MBER(S)			
<u>o</u>	TNM 97-			•						· t			
ΑT	WELL OWNE								PHONE (OPT)	ONAL)			
Ö	PLAINS I	MARKE	TING LP										
ָר רי	WELL OWNE	R MAILIN	G ADDRESS						CITY	······································	STATE		ZIP
Œ	333 CLA	Y STRE	ET, SUITE	1600					HOUSTO	N	TX	77	7078
D	<del></del>			DEGREES		MINUTES	SECO	MIDE					
Z	WELL	j							* ACCUBACY	REQUIRED: ONE TEN	TU OE A SE	COND	
AL	LOCATION	L.A	TITUDE	32		55		7.00 N		•	VIII OF A SEC	COND	
ER	(FROM GPS) LONGITUDE 103 25 14.00 W **DATUM REQUIRED: WGS 84												
GENERAL AND WELL LOCATION	DESCRIPTIO	ON RELATI	NG WELL LOCATI	ON TO STREET	ADDRESS	S AND COMMO	ON LANDA	MARKS					
-	GILLS R	OAD, L	OVINGTON	NM, LEA	CO								
<del>-</del>	(2 S ACRE) (10 ACRE) (40 ACRE) (50 ACRE) SECTION TOWNSHIP PANCE												
											Z EAST		
AL.	. 1/4	1	1/4	4	4		1/4				✓ sourn	}	WEST
OPTIONAL	SUBDIVISIO	N NAME						LOT NUM	IBER	BLOCK NUMBER		UNIT/TRA	CT
E													
2.0	HYDROGRA	PHIC SURV	/EY				<del></del>	J		MAP NUMBER		TRACT N	JMBER
	7												
=	LICENSE NU	IMRER	NAME OF LICE	NSED DRILLER						NAME OF WELL DE	RILLING CON	APANY	
	1	UCENSE NUMBER NAME OF LICENSED DRILLER  WD1478 RAYMOND STRAUB JR							NAME OF WELL DRILLING COMPANY STRAUB CORPORATION				
									IOLE DEPTH (FT) DEPTH WATER FIRST ENCOUNTERED (FT)			<del></del>	
	DRILLING STARTED DRILLING ENDED DEPTH OF CO					65	,F1)	BOKE HO	65	DEFIN WATER FIR	(3) ENCOUN	TEKED(F1)	*
ŏ	3-23		3-23-08	<u></u>				ļ		CTATIC WATER LE	VEL IN COM	DI CTCD WE	I (PT)
DRILLING INFORMATION	COMPLETED WELL IS: ARTESIAN DRY HOLE SHALLOW (UNCONFINED)									STATIC WATER LEVEL IN COMPLETED WELL (FT)  N/A			
R.M	COMILETE									L		<b>`</b>	
E	DRILLING F	LUID:	<b>✓</b> AIR	Шмυ	D	ADDIT	IVES – SPE	ECIFY:					
\ \frac{1}{5}	DRILLING M	IETHOD:	<b>✓</b> ROTARY	П на	MMER	CABLE	TOOL	ОТНІ	HER – SPECIFY:				
Ž	DEPTI	1 (ET)	BORE HOL	c l				COM	JECTION	INCIDE DIA	CACINI	7 11/41 1	CLOT
I∃	FROM	TO	DIA. (IN)	Į.		TERIAL		1	NECTION (CASING)	INSIDE DIA. CASING (IN)		G WALL IESS (IN)	SLOT SIZE (IN)
	<b></b>	63	6			C .020 SC	DEEN	<del> </del>	BE	2	<del></del>	154	.020
, w	65	7 .	6			PVC RISE			BE	2		154	RISER
	7	+43	6			VANIZED		ļ	NPT	2	<del>  0.</del>	154	RISER
:		+43		SCH 2	40 GAL	VAINIZED	SIEEL	<u> </u>	NF I		· · · · · · · · · · · · · · · · · · ·		
<u> </u>								<del></del>		<u> </u>	<u> </u>		
	DEPTH	l (FT)	THICKNE	SS	FO					ATER-BEARING S			YIELD
<u> </u>	FROM	TO	(FT)			(INCLUDE	WATER	-BEARING	CAVITIES O	R FRACTURE ZOI	NES)		(GPM)
E E													
CS										**			
Z			7										
FROM TO (FT) (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)  WETHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA  TOTAL ESTIMATED WELL YIELD (GPM)													
TE	METHOD III	SED TO FS	TIMATE YIELD OF	WATER-BEARI	NG STRA	TA				TOTAL ESTIMATE	D WELL YIFI	D (GPM)	
×	merriod 0.					· - · •							
4										<u> </u>			
													· · · · · · · · · · · · · · · · · · ·
			AL USE					ED.		WELL RECO		(Version 6	/9/08)
	FOR OSE INTERNAL USE  FILE NUMBER  POD NUMBER  WELL RECORD & LOG (Version 6/9/08)  TRN NUMBER												

IMP	TYPE OF	PUMP:	☐ SUBMER		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED☐ OTHER – SPECIFY:	·		
SEAL AND PUMP	ANNL	JLAR.	DEPTH FROM	(FT)	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH(	
EAL	SEAL	AND	65	60	6	2 BAGS OF 8/16 SAND		TOPL	.OAD
5. S	GRAVE	L PACK	60	11	6	9 BAGS OF 3/8 PLUG		TOPL	.OAD
			11	0	6	2 BAGS OF CEMENT		TOPL	.OAD
	DEPTI FROM	H (FT)	THICK (F)	_	ŀ	COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)			
1 :	0	3	3		<del></del>	HT BROWN CLAYEY SAND WITH (		☐ YES	☑ NO
	3	6	3		LiG		ALICHE	☐ YES	☑ NO
			<u> </u>			CALICHE	<del></del>	<del> </del>	
	6	10	4			TAN SANDY CLAY		YES	□NO
	10 65 55 TAN SAND TD 65							YES	□ NO
ZTT.	10	65	ļ					YES	□ NO
.w				<del></del>				☐ YES	□ NO
100								☐ YES	□ NO
2							<del></del>	☐ YES	□ NO
GIC								YES	□.NO
GEOLOGIC LOG OF WELL								☐ YES	□ио
GEC								☐ YES	□ NO
٥	Ī							☐ YES	□ NO
								☐ YES	□ NO
1:			÷					☐ YES	□NO
								☐ YES	□ №
								☐ YES	□ №
								☐ YES	□NO
		L	ATTACH	ADDITION	IAL PAGES AS NI	EEDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL	<u>'</u>	
	Ī		METHOD:	BAILE	R PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			
L INFO	WELL	TEST				PATA COLLECTED DURING WELL TESTING, AND DRAWDOWN OVER THE TESTING PERI		ME, END TI	ME,
NA.	ADDITION	LAI STATE	MENTS OR EXPL	<u> </u>					
1 2	ADDITION	NAL STATE	MENTS OK EAPL	ANATIONS:					
TEST & ADDITIONA									
अ									
EST									
7. T									:
	Turn	DEDO	ED REBERN	OPPTIPIPE !	TUAT TO THE P	SET OF THE OB THE ANOMI EDGE VAID BELL	EF THE EODECODIC	C A TRILL A	ND
1	CORRE	CT RECO	RD OF THE A	<b>BOVE DESC</b>	RIBED HOLE AN	EST OF HIS OR HER KNOWLEDGE AND BELI D THAT HE OR SHE WILL FILE THIS WELL R	ECORD WITH THE STA	ATE ENGINE	ER AND
1 2	THE PE	MIT HO	DER WITHIN	I 20 DAYS A	FTER COMPLET	ON OF WELL DRILLING:			
SIGNATURE	I do	4.464	f/ V4		0,	4-20-09			
8. ST	1 1/2	MININ	EL SIGNATUR	RE OF DRIE	150				
			SIGNATU	E OF DIGE	LEK	DATE			
			•						

FOR OS	E INTERNAL USE		WELL RECORD & LO	G (Version 6/9/08)
FILE N	JMBER	POD NUMBER	TRN NUMBER	
LOCAT	ION			PAGE 2 OF 2

### Soil Description

Columns

0 - 5' - Caliche, greyish white, sandy

10-23' - Sand, brown, sandsastone, interbedded 5 - 10' - Sand, brown, caliche, greyish white

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

3-24-09 65 Ft 60 Ft 2 Ft 65 Ft 53 Ft Thickness of Bentonite Seal\_ Length of PVC Well Screen\_ Depth of Exploratory Well. Ground Water Elevation Depth to Groundwater Depth of PVC Well\_

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

Indicates samples selected for Laboratory Analysis.

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- 5. The depths indicated are referenced from below ground surface. (bgs)

Safety and environmental

TNM 97-04 Lea County, New Mexico

Plains Marketing, L.P.

Boring Log And Monitor Well Details

Air Sparging Well AS-2

## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

	POD NUMB	•	•				OSE FILE NUI	MBER(S)				
	TNM 97							• •				
GENERAL AND WELL LOCATION	WELL OWN						PHONE (OPT)	ONAL)				
07			TING LP									
ן בו			G ADDRESS	1000			CITY		STATE		ZIP	
WE	333 CLA		EET, SUITE	16UU 			HOUSTO	<u>i</u>	TX		7078	
	WELL			DEGREES	MINUTES SE	CONDS						
\ \frac{1}{2} \	LOCATIO	ON LA	TITUDE	32	55	57.00 N	ACCURACY	ACCURACY REQUIRED: ONE TENTH OF A SECOND				
ER	(FROM G	PS)	ONGITUDE	103	25	13.00 W	* DATUM REG	QUIRED: WGS 84				
E E	DESCRIPTI	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS										
	GILLS ROAD, LOVINGTON NM, LEA CO											
			(10.1000)							· · · · · · · · · · · · · · · · · · ·		
	(2.5 ACR		(10 ACRE)	(40 ACRE)	(160 ACRE)	SECTION		TOWNSHIP	NORTH	RANGE	✓ EAST	
NA.	SUBDIVISIO		1/4		1/4	107.17	(DED	D1 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	✓ south		west	
OPTIONAL	20BDIA1216	JN NAME				LOT NU	мвек	BLOCK NUMBER		UNIT/TRA	IC1	
	HYDROGR	A PHIC SLIP	VEY					MAP NUMBER		TRACT NU	IMREP	
7	HYDROGRAPHIC SURVEY							MAI NOMBER		TRACTIC	SWIDLK	
		·/-	T : : ::::::::::::::::::::::::::::::::							<u> </u>		
	LICENSE N		ŀ	NSED DRILLER				NAME OF WELL DE				
		1478			TRAUB JR			DEPTH (FT) DEPTH WATER FIRST ENCOUNTERED (FT)			·	
	DRILLING STARTED DRILLING ENDED DEPTH OF COMPLETED WELL (FT) BORE  3-24-09 3-24-09 65					BOREHO	OLE DEPTH (FT)	DEPTH WATER FIR	IST ENCOUN	TERED (FT)		
NOI	STATIC WATER LEVEL IN COMPLETED WELL (FT)											
DRILLING INFORMATION	COMPLETED WELL IS: ARTESIAN DRY HOLE SHALLOW (UNCONFINED)								CC(FT)			
S. S.		<del></del>						L			<del></del>	
F	DRILLING	FLUID:	✓ AIR	MUD	ADDITIVES - S	SPECIFY:						
S	DRILLING	METHOD:	✓ ROTARY	HAMMER	CABLE TOOL	отн	ER – SPECIFY:					
123	DEPT	H (FT)	BORE HOL	į.	CASING		NECTION	INSIDE DIA.	1	WALL	SLOT	
DRI	FROM	то	DIA. (IN)		ATERIAL		(CASING)	CASING (IN)		ESS (IN)	SIZE (IN)	
l m	65	63	6		VC .020 SCREEN		BE	2		54	.020	
	63	6	6		0 PVC RISER		BE	2	0.1	154	RISER	
	6	+43	6	SCH 40 GA	LVANIZED STEE	<u>-                                     </u>	NPT	2				
			<u>.                                    </u>									
		H (FT)	THICKNES (FT)	is F	ORMATION DESCR			ATER-BEARING S R FRACTURE ZON			YIELD (GPM)	
AT/	FROM	TO	(F1)		(INCLUDE WATI	EK-BEAKING	CAVITIES	R FRACTURE ZUP	(ES)		(GFM)	
STR	 	<u> </u>	1							<del></del>		
S			<del> </del>				<del></del>	<del></del>				
ARI												
4. WATER BEARING STRATA												
LER								I moral communication		D (CD) ()	<u> </u>	
METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA  TOTAL ESTIMATED WELL YIELD (GPM)							.D (GPM)					
4												
İ		E INTERN	AL USE	<del> </del>	DOD MUN	IDED		TRN NUMBI		(Version 6		
	FILE NU		•	<b>.</b>	POD NUM	IDER		I KIN NOMBI		DACE:	OE 2	
LOCATION PAGE 1 C									Or Z			

Jiels	TYPE OF I	PUMP:	☐ SUBMEF		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUII☐ OTHER – SPECIFY:	PPED			
SEAL AND FUNIT			DEPTH FROM	f (FT)	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)		OD OF	
A:L: /	ANNUL SEAL A		65	60	6	2 BAGS OF 8/16 SAND	(555.61.1)		OAD	
	GRAVEL		60	10	6	14 BAGS OF 3/8 PLUG			OAD	
;			10	. 0	6	2 BAGS OF CEMENT			OAD	
	DEPTH	(FT)	THICK	NESS	COLOR AND TYPE OF MATERIAL ENCOUNTERED				WATER	
	FROM	то	(FT)		(INCLU	(INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)				
	0	20	20			CALICHE WITH SILICATED L	AYERS	☐ YES	☑ NO	
	20	65	4:	5	LIGH	☐ YES	☑ NO			
	TD	65						☐ YES	□NO	
								☐ YES	□ NO	
								☐ YES	□ NO	
								☐ YES	□ NO	
								☐ YES	□NO	
								☐ YES	□NO	
								☐ YES	□NO	
								☐ YES	□NO	
6. GEOLOGIC 1.0G OF WELL								☐ YES	□ NO	
								☐ YES	□NO	
								☐ YES	□ NO	
						***************************************		☐ YES	□ NO	
						The British Control of the Control o		☐ YES	□ NO	
								☐ YES	□NO	
								YES	□ NO	
	L		ATTACH	ADDITION	IAL PAGES AS NE	EDED TO FULLY DESCRIBE THE GEOR	LOGIC LOG OF THE WELL			
_			METHOD:	BAILE	ER 🗹 PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY	···	· · · · · · · · · · · · · · · · · · ·		
2	WELLT	TEST				ATA COLLECTED DURING WELL TEST		ΓIME. END T	ME.	
7. LEST & ADDITIONAL IN	ADDITIONA ODOR 4		AND A TAR		NG DISCHARGE A	ND DRAWDOWN OVER THE TESTING	PERIOD.			
8. SIGNATURE	CORRECT	RECOR	RD OF THE AR LDER WITHIN	BOVE DESC	CRIBED HOLE AND AFTER COMPLETION	ST OF HIS OR HER KNOWLEDGE AND THAT HE OR SHE WILL FILE THIS WIDN OF WELL DRILLING:	BELIEF, THE FOREGOING ELL RECORD WITH THE S	IS A TRUE A	ND EER AND	
	FOR OSE	INTERN	IAL USE				WELL RECORD & LOC	G (Version 6/9/		
	FILE NUM					POD NUMBER	TRN NUMBER	(		
	LOCATIO	)NI					PAGE 2 OF 2			

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)			
FILE NUMBER	POD NUMBER	TRN NUMBER			
LOCATION			PAGE 2 OF 2		

## Soil Description

Columns

(feet)

0 - 5' - Caliche, greyish white, sandy

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53 - 65' - Sand, brown, very fine grained, saturated with depth



3-24-09 65 Ft 2 Ft 65 Ft 60 Ft Thickness of Bentonite Seal\_ Length of PVC Well Screen Depth of Exploratory Well. Ground Water Elevation Depth to Groundwater Depth of PVC Well\_

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

Indicates samples selected for Laboratory Analysis

3/26/09

Š

Head-space reading in ppm obtained with a photo-ionization detector.

Completion Notes

- The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
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- 5. The depths indicated are referenced from below ground surface. (bgs)

Safety and environmental

## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA

May 9, 2009

TNM 97-04 Lea County, New Mexico **Boring Log And Monitor Well Details** Air Sparging Well AS-3 Plains Marketing, L.P.



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

NO	POD NUMB	•	•				OSE FILE NUM	MBER(S)	<del> </del>					
GENERAL AND WELL LOCATION	WELL OWN		E(S) ETING LP				PHONE (OPTIO	ONAL)						
<u> </u>	WELL OWN	ED MAN	ING ADDRESS				CITY		CTATE		710			
. II				200					STATE		ZIP			
₩.	333 CLA	NY SIF	REET, SUITE 16	500			HOUSTO	N	TX	//	7078			
ie F				DEGREES	EGREES MINUTES SECONDS									
₹	WELL			32		57.00 N	* ACCURACY REQUIRED: ONE TENTH OF A SECOND							
AL.	LOCATION LATITUDE 32 55 57.00 N						<del>-</del>							
ER	(FROM G	PS)	LONGITUDE	103	25	13.00 W	DATUM REC	QUIRED: WGS 84						
E S	DESCRIPTI	ONRELA	TING WELL LOCATION	TO STREET ADDRES	S AND COMMON LAND	MARKS								
			LOVINGTON N		oo madaa da da da da da da da da da da da da		•							
	OILLO I	IOAD,	LOVINGTON	IVI, LLA OO										
1	(2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP									RANGE				
,									NORTH		Z EAST			
. AL	<u></u>		1/4	1/4	<b>1/4</b>				✓ soutu		west			
Ó	SUBDIVISIO	ON NAME				LOT NUM	IBER	BLOCK NUMBER		UNIT/TRA	CT			
PT	THE SUBDIVISION NAME  SUBDIVISION NAME  LOT NUMBER  BLOCK NUMBER  UNIT/TRACT  HYDROGRAPHIC SURVEY  MAP NUMBER  TRACT NUMBER													
0	HYDROGRAPHIC SURVEY MAP NUMBER TRACT NUMBER TRACT NUMBER									JMBER				
7														
	LICENSE N	UMBER	NAME OF LICENS	SED DRILLER				NAME OF WELL DR	ILLING COM	IPANY				
	WD.	1478	RAYMOND	STRAUB JR				STRAUB COP	RPORAT	ION				
							LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	TERED (FT)				
	3-24	4-09	3-24-09		65		65							
Ó								STATIC WATER LEV	/EL IN COM	PI ETED WEI	I (ST)			
DRILLING INFORMATION	COMPLETED WELL IS: ARTESIAN DRY HOLE SHALLOW (UNCONFINED)							STATIC WATER LEVEL IN COMPLETED WELL (FT)  N/A			JC (F1)			
RM	COMILETE	D WELL	a. LJAKICSIAN		E_1 STATEBOW (GIV			<u> </u>	19/74					
F0	DRILLING	FLUID:	<b>✓</b> AIR	MUD	ADDITIVES - S	PECIFY:								
Z						Поти	SD SDEOLEN							
l Z	DRILLING	METHOD:	V ROTARY	HAMMER	CABLE TOOL	Oini	ER - SPECIFY:		,					
	DEPT	H (FT)	BORE HOLE	(	CASING CON			INSIDE DIA.		WALL	SLOT.			
- E	FROM	TO	DIA. (IN)	M	ATERIAL	TYPE	(CASING)	CASING (IN)	THICKN	ESS (IN)	SIZE (IN)			
3. [	65	63	6	SCH 40 P\	/C .020 SCREEN		BE	2	0.1	154	.020			
	63	6	6	SCH 4	PVC RISER		BE	2	0.	154	RISER			
	6	+43	6		LVANIZED STEEI	_	NPT	2						
	-		<del>-  </del>			<del> </del>		177						
				<del>_</del>	···				I					
	DEPT	H (FT)	THICKNESS	F	ORMATION DESCR						YIELD			
ΤĀ	FROM	то	(FT)		(INCLUDE WATE	R-BEARING	CAVITIES O	R FRACTURE ZON	IES)		(GPM)			
RA			·											
ST														
NG					<del></del>	···-								
									<del></del>					
レーフィ	SEA													
BEA				1										
CR BEAL						METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA  TOTAL ESTIMATED WELL YIELD (GPM)								
TER BEAL	METHOD	JSED TO	ESTIMATE YIELD OF W	ATER-BEARING STR	ATA			TOTAL ESTIMATED	WELL YIEL	.D (GPM)				
WATER BEAL	метнор (	JSED TO I	ESTIMATE YIELD OF W	ATER-BEARING STR	ATA			TOTAL ESTIMATED	WELL YIEL	.D (GPM)				
4. WATER BEARING STRATA	метнор (	JSED TO I	ESTIMATE YIELD OF W	ATER-BEARING STR	ATA		· · · · · ·	TOTAL ESTIMATED	WELL YIEL	.D (GPM)				
4. WATER BEAI	метнорі	JSED TO I	ESTIMATE YIELD OF W	ATER-BEARING STR	ATA			TOTAL ESTIMATED	WELL YIEL	.D (GPM)				
4. WATER BEAI			ESTIMATE YIELD OF W	ATER-BEARING STR	ATA			WELL RECO			/9/08)			
4. WATER BEAL		E INTER		ATER-BEARING STR	POD_NUM	3ER			RD & LOC		/9/08)			

ا نه	TYPE OF	PUMP:	SUBMER		☐ JET	□ NO PUMP – WELL NOT EQUIPPED					
N C			TURBINE		CYLINDER	OTHER – SPECIFY:					
SEAL AND PUMP			DEPTH		BORE HOLE	MATERIAL TYPE AND SIZE	AMOUNT		OD OF		
L'A]	ANNL		FROM	TO	DIA. (IN)		(CUBIC FT)	PLACE			
SEA	SEAL GRAVEI		65	60	6	3 BAGS OF 8/16 SAND		TOPL			
vi.			60	10 0	6	10 BAGS OF 3/8 PLUG 2 BAGS OF CEMENT		TOPL			
			10 1		6 Z BAGS OF CEMENT			TOPL	-UAD		
	DEPTI		THICKNESS (FT)		(NOL)	WATER BEARING?					
	FROM	то			(INCLU	DARK BROWN SILTY CLAYEY SAI					
.	0	2	2			YES	☑ NO				
	2	10	8		<u> </u>	YES	☑ NO				
	10 65 55					BROWN SILTY SAND		☐ YES	☑ NO		
:	TD	TD 65						☐ YES	□ NO		
1 1								☐ YES	□NO		
WE								☐ YES	□ NO		
OF								☐ YES	□ NO		
507								☐ YES	□ NO		
31C	6: GEOLOGIC LOG OF WELL							☐ YES	□ NO		
TOC								☐ YES	□ NO		
GEO								☐ YES	□ NO		
9.9								☐ YES	□NO		
								☐ YES	□ NO		
• •								☐ YES	□NO		
								☐ YES	□ NO		
								☐ YES	□NO		
						: .		YES	□NO		
			ATTACH	ADDITION	NAL PAGES AS NE	EDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL	<del></del>			
<b>=</b>	<u> </u>		METHOD:	BAILE	ER 🔽 PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:					
INFO	WELL	. TEST				ATA COLLECTED DURING WELL TESTING, I	NCLUDING START T	ME END T	MF		
	)					AND DRAWDOWN OVER THE TESTING PERIC		ML, LIVE II	1 <b>41 L.</b> ,		
7. TEST & ADDITIONAL	ADDITION	NAL STATE	MENTS OR EXPL	ANATIONS:							
ITIO	}										
A D	1						•				
T.	)										
TES											
7											
	THE UN	DERSIGN	ED HEREBY (	CERTIFIES	THAT, TO THE BE	ST OF HIS OR HER KNOWLEDGE AND BELIE	F, THE FOREGOING I	S A TRUE A	ND		
SIGNATURE	THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:										
VAT	THE PERMIT HOLDER WITHIN 20 DATS AT TEX COMPLETION OF WEED DIMEDING.										
SiG	TIL	wnon	VAlla	ul S	4.	4-20-09					
86	1100		SIGNATUR	RE OF BRIL	LER	DATE					
	<del>'</del>										

FOR OSE INTERNAL USE WELL RECORD & LOG (							
FILE NUMBER	POD NUMBER	TRN NUMBER					
LOCATION			PAGE 2 OF 2				

## Soil Description

Columns

0 - 5' - Caliche, greyish white, sandy

10-23' - Sand, brown, sandsastone, interbedded 5 - 10' - Sand, brown, caliche, greyish white

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth



Thickness of Bentonite Seal 60 Ft ength of PVC Well Screen 2 Ft Depth of PVC Well 65 Ft Bepth of Exploratory Well 65 Ft Senth to Groundwater 53 Ft	Date Drilled	3-24-09
	Thickness of Bentonite Seal	60 Ft
	enath of PVC Well Screen	2 Ft
y Well	Depth of PVC Well	65 Ft
	Depth of Exploratory Well	65 Ft
	Depth to Groundwater	53 Ft

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Head-space reading in ppm obtained with a photo-ionization detector. Indicates samples selected for Laboratory Analysis.

3/26/09

Indicates the groundwater level measured on

X Y

### Completion Notes

- 1. The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- 5. The depths indicated are referenced from below ground surface. (bgs)

NOVA Safety and Environmental

Checked By: RKR Drawn By: TA

May 9, 2009

TNM 97-04 Lea County, New Mexico

Plains Marketing, L.P.

**Boring Log And Monitor Well Details** Air Sparging Well AS-4



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

	POD NUMBE	•	•				OSE FILE NU	MBER(S)			
Į į	TNM 97-	04 AS-	4								
ÄT	WELL OWNE	•	•				PHONE (OPTI	ONAL)			
roc	PLAINS I										
רו	WELL OWNE			1000			CITY		STATE		ZIP
WE	333 CLA	YSIRE	ET, SUITE	1600			HOUSTO	N	TX	77	7078
QN	WELL			DEGREES	MINUTES S	ECONDS			·		
\L.A	LOCATIO	N LA	TITUDE	32	55	57.00 <sub>N</sub>			TH OF A SE	COND	
ER	(FROM GP	s) Lo	NGITUDE	103	103 25 13.00 W		• DATUM RE	QUIRED: WGS 84			
GENERAL AND WELL LOCATION	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS										
-	GILLS R	OAD, L	OVINGTON	NM, LEA CO	•						
							-				
	(2.5 ACRE	5)	(10 ACRE)	(40 ACRE)	(160 ACRE)	SECTION		TOWNSHIP	NORTH	RANGE	✓ EAST
VAL	1/4		1/4	1/4	1/4				🗸 ѕогла		west
OPTIONAL	SUBDIVISIO	N NAME				LOT NUN	1BER	BLOCK NUMBER		UNIT/TRA	ict
	HYDROGRA	DUIC SUBV	,EV		<u> </u>		MAP NUMBER		TRACT NO	NADEB.	
2.	HIDROGKA	Friic SUKV	C1					MAFINOMBER		IRACINO	JMBCK
<u> </u>		·.*								<u> </u>	
	LICENSE NU		1	ENSED DRILLER	"			NAME OF WELL DE			
	WD1		<u> </u>	O STRAUB JR	ADLETTED MELL (CT)	L BORE HO	I C D CDT(I (CT)	STRAUB CO			
	DRILLING ST 3-24		3-24-09	1	MPLETED WELL (FT)  65	BOKE HO	OLE DEPTH (FT) DEPTH WATER FIRST ENCOUNTERED (FT)  65				
NO.	3-27	00	0-24-00	<u></u>				STATIC WATER LE	VEL IN COM	PI ETED WEI	II (FT)
DRILLING INFORMATION	COMPLETED WELL IS: ARTESIAN DRY HOLE SHALLOW (UNCONFINED)  STATIC WATER LEVEL IN COMPLETED WELL (FT)  N/A										
FO	DRILLING FLUID: AIR MUD ADDITIVES – SPECIFY:										
S	DRILLING M	ETHOD:	<b>✓</b> ROTARY	HAMMER	HAMMER CABLE TOOL OTH						
	DEPTH	I (FT)	BORE HOL	.E	CASING		NECTION	INSIDE DIA.	CASING	G WALL	SLOT
RIL	FROM	TO	DIA. (IN)	1	MATERIAL	1	(CASING)	CASING (IN)		IESS (IN)	SIZE (IN)
3. D	65	63	6	SCH 40 P	VC .020 SCREE	N	BE	2	0.	154	.020
	63	6	6	SCH 4	40 PVC RISER		BE	2	0.	154	RISER
	6	+43	6	SCH 40 GA	ALVANIZED STE	EL	NPT	2			
	DEPTH	H (FT)	THICKNE	SS	FORMATION DESC	RIPTION OF	PRINCIPAL W	ATER-BEARING S	TRATA		YIELD
T.	FROM	то	(FT)		(INCLUDE WAT	rer-bearing	CAVITIES O	R FRACTURE ZON	NES)		(GPM)
T.					<u> </u>						
CS											
R.								<del></del>		-	
BEA						<del></del>	·····				ļ
ER	<u> </u>		<u> </u>								<u> </u>
4. WATER BEARING STRATA	метнор и	SED TO ES	TIMATE YIELD OF	WATER-BEARING ST	RATA			TOTAL ESTIMATE	D WELL YIE	LD (GPM)	
4								1			
	•										
:	FOR OSE		AL USE		POD NUI	APED		WELL RECO		(Version 6	5/9/08)

PAGE I OF 2

				_							
	TYPE OI	C DI IMAD:	SUBMER	RSIBLE	☐ JET	☐ NO PUMP – WELL NOT EQUIPPED		<del>.</del>	*****		
JMP	11760	FUMP.	☐ TURBINI	E	CYLINDER	☐ OTHER – SPECIFY:					
SEAL AND PUMP			DEPTH	I (FT)	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH PLACE			
L A	ANNI SEAL		FROM 65	60	6	2 BAGS OF 8/16 SAND	(CODIC 11)	TOPL			
SEA	GRAVE		60	10	6	12 BAGS OF 3/8 PLUG		TOPL			
1/4			10	0	6	2 BAGS OF CEMENT		TOPL			
	DEDT	H (FT)	1	NEGG.	<del> </del>		FEREN	WA			
	FROM	то	THICK (F7		1	COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)					
	0	1	1	<del></del>		☐ YES	☑ NO				
	1	10	9			☐ YES	☑ NO				
	10	62	52	2		CALICHE (DENSE LAYERS) TAN CALCIFIED SAND SANDSTO	DNE	☐ YES	Ø NO		
	62 65 3 TAN SAND							☐ YES	☑ NO		
L L	TD 65							☐ YES	□ NO		
VEL	·							YES	□NO		
OF.			<u> </u>		.,			☐ YES	□ NO		
50,	····							☐ YES	□ NO		
101								YES	□ NO		
GEOLOGIC LOG OF WELL								☐ YES	□ NO		
SEO								☐ YES	□NO		
39								☐ YES	□ NO		
								☐ YES	□ NO		
				·.				☐ YES	□ NO		
								☐ YES	□ NO		
ŀ								☐ YES	□ NO		
								☐ YES	□ №		
			ATTACH	ADDITION	NAL PAGES AS NE	EDED TO FULLY DESCRIBE THE GEOLOGI	C LOG OF THE WELL				
			METHOD:	☐ BAILI	ER PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:					
TEST & ADDITIONAL INFO	WELI	L TEST				ATA COLLECTED DURING WELL TESTING ND DRAWDOWN OVER THE TESTING PER		ME, END TI	МЕ,		
NA.	ADDITIO	NAL STATE	MENTS OR EXPL	ANATIONS:							
) E	ODOR										
ADD					•						
જ્ઞ											
TES											
7											
	THE UN	NDERSIGN	ED HEREBY	CERTIFIES	THAT, TO THE BE	ST OF HIS OR HER KNOWLEDGE AND BEL	IEF, THE FOREGOING I	S A TRUE A	ND .		
URE	CORRE	CT RECO	RD OF THE AI LDER WITHIN	BOVE DESC N 20 DAYS /	CRIBED HOLE AND AFTER COMPLETION	THAT HE OR SHE WILL FILE THIS WELL FOR OF WELL DRILLING:	RECORD WITH THE STA	ATE ENGINE	EER AND		
SIGNATURE	THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:										
SIG	Kay	mon	Strac	ule }	4.	4-20-09					
× ×	'7		SIGNATU	RE OF ORIL	LLER	DATE		<u> </u>			
				, <del></del>							

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER
LOCATION		PAGE 2 OF 2

:

## Soil Description

Columns

(feet)

0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

Date Drilled	3-24-09
Thickness of Bentonite Seal	60 Ft
Length of PVC Well Screen	2 Ft
Depth of PVC Well	65 Ft
Depth of Exploratory Well	65 Ft
Depth to Groundwater	53 Ft
Ground Water Elevation	

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

Indicates samples selected for Laboratory Analysis

3/26/09

¥

Head-space reading in ppm obtained with a photo-ionization detector.

Completion Notes

The monitor well was installed on date using air rotary drilling techniques.

The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.

3. The well is protected with a locked stick up steel cover and a compression cap.

The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.

The depths indicated are referenced from below ground surface. (bgs) 5.

> TNM 97-04 Lea County, New Mexico **Boring Log And Monitor Well Details** Air Sparging Well AS-5 Plains Marketing, L.P.



## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

															<u> </u>
:	POD NUMB			•							OSE FILE NU	MBER(S)			
<u>o</u>	TNM 97	-04 A	\S-5	· · ·											
ÄT	WELL OWN										PHONE (OPT	ONAL)			
07	PLAINS														
11	WELL OWN										CITY STATE			ZIP	
WE	333 CLA	YSI	REI	ET, SUITE	1600						HOUSTO	N	TX	77	7078
S	WELL				DEC	GREES	МІ	NUTES	SECO	NDS					
\L.	LOCATIO	NC	LAT	ITUDE		32		55	5	7.00 N	• ACCURAC				
ER	(FROM G	PS)	LON	GITUDE		103 25 13.00 W					DATUM RE	QUIRED: WGS 84			
GENERAL AND WELL LOCATION	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS														
	GILLS F	ROAD	, LC	VINGTON	NM,	LEA CO									
<del></del>														· · · · · · · · · · · · · · · · · · ·	
:	(2.5 ACR	.E)		(10 ACRE)	(	(40 ACRE)		(160 ACF	RE)	SECTION		TOWNSHIP	NORTH	RANGE	✓ EAST
AL	'/	1		1/4		1/4	<u> </u>		<u>¼</u>				/ south		west
Į.	SUBDIVISIO	ON NAM	1E							LOT NUM	1BER	BLOCK NUMBER		UNIT/TRA	ict
OPTIONAL								L		MAP NUMBER		TRACT N	IIADED.		
HYDROGRAPHIC SURVEY								MAFNOMBER		IKACIN	- DINIBER				
_		711												<u> </u>	_==
	LICENSE N	имвек 14.78		NAME OF LICE RAYMONI								STRAUB CO			
	DRILLING			DRILLING EN		DEPTH OF COM	ADI ET	ED WELL	ET)	LBOBERO	LE DEPTH (FT)	DEPTH WATER FIL			<del></del>
_		4-09	.U	3-24-09		DEFIN OF COM	6		F1)	BOKERO	65	DEFIN WATER III	KST ENCOUN	TERED(FI)	
Į.	02			02100		<u>, , , , , , , , , , , , , , , , , , , </u>		<del></del>		L		STATIC WATER LE	VEL IN COM	PLETED WE	LL (FT)
DRILLING INFORMATION	COMPLETE	D WELI	L IS:	ARTESIA	N	DRY HOLE	: {	SHALL	OW (UNC	ONFINED)	N/A				
FOR	DRILLING	FLUID:		✓ AIR		MUD		ADDITI	IVES - SPE	CIFY:					
N. N.	DRILLING	метно	D:	ROTARY		HAMMER		CABLE	TOOL	Потн	ER - SPECIFY:				
Ž		H (FT)		BORE HOL	Е		CAS					DISIDE DIA	CACINI	CWALL	SLOT
RILI	FROM	TC		DIA. (IN)				RIAL			NECTION (CASING)	INSIDE DIA. CASING (IN)		G WALL NESS (IN)	SIZE (IN)
3. Di	65	63		6		SCH 40 P	VC.	.020 SCF	REEN		BE	2	0.	154	.020
	63	6		6		SCH 4	10 P	VC RISE	R		BE	2	· 0.	154	RISER
	6	+4	3	6		SCH 40 GA	ALV/	ANIZED	STEEL		NPT	2			
	DEPT	H (FT)		THICKNES	ss	F	ORN	ATION I	DESCRIP	TION OF I	PRINCIPAL V	ATER-BEARING	STRATA		YIELD
T.	FROM	TC	)	(FT)	ı		[]	NCLUDE	WATER	-BEARING	CAVITIES	R FRACTURE ZO	NES)		(GPM)
I.R.															
CS															
N. N.															
BE.A														<del> </del>	
ER		ļ													
WATER BEARING STRATA	METHOD I	JSED TO	EST	MATE YIELD OF	WATE	R-BEARING STR	RATA					TOTAL ESTIMATE	D WELL YIE	LD (GPM)	
2.															
<del></del>	<u> </u>														
į	FOR OS			L USE							<del></del>	WELL RECO		G (Version 6	5/9/08)
1	FILE NUMBER POD NUMBER TRN NUMBER									ER	ŁК	_			

						: .	• •		
JMP	TYPE OF	PUMP:	☐ SUBMER☐ TURBINI		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED☐ OTHER – SPECIFY:			
SEAL AND PUMP		0.45	DEPTH (FT) FROM TO		BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH PLACE	OD OF MENT
EAL:	ANNU SEAL GRAVE	AND	65	60	6	2 BAGS OF 8/16 SAND		TOPL	-OAD
.v.	GRAVE	LIACK	60	10	6	10 BAGS OF 3/8 PLUG 2 BAGS OF CEMENT		TOPL	OAD OAD
	10 0				T			<u> </u>	
	FROM TO THICKNESS (FT)				1	COLOR AND TYPE OF MATERIAL ENCOUNT DE WATER-BEARING CAVITIES OR FRACT		BEAR	TER UNG?
	0	1	1			DARK BROWN SANDY CLAY		☐ YES	☑ NO
	1	10	9			CALICHE (DENSE LAYERS)		☐ YES	☑ NO
	10	25	15	5		TAN CALCIFIED SANDSTONE		☐ YES	✓ NO
	25	65	40	)		TAN SANDSTONE (SOFT)		☐ YES	Ø NO
LL	TD	65						☐ YES	□ NO
GEOLOGIC LOG OF WELL							<del></del>	☐ YES	□ NO
3 OF								☐ YES	□ NO
70								☐ YES	□ NO
GIC								YES	□ №
070					ļ			YES	□ NO
								YES	□ NO
. ف								YES	□ NO
			,					YES	□ NO
								YES	□ NO
		- :						YES	□ NO
		•						☐ YES	□ NO
ļ !			ATTACH	ADDITION	IAL PAGES AS NE	EDED TO FULLY DESCRIBE THE GEOLOGIC	C LOG OF THE WELL	☐ YES	□ №
			METHOD:	BAILE		☐ AIR LIFT ☐ OTHER – SPECIFY:			
Ĺ INFC	WELL	TEST				ATA COLLECTED DURING WELL TESTING, IND DRAWDOWN OVER THE TESTING PERI		ME, END TI	МЕ,
7. TEST & ADDITIONÂL ÎNFO	ADDITION ODOR		I MENTS OR EXPL	ANATIONS:					
8. SIGNATURE	CORREC	T RECOR	DOF THE AE DER WITHIN	SOVE DESC	RIBED HOLE AND AFTER COMPLETIO	ST OF HIS OR HER KNOWLEDGE AND BELI O THAT HE OR SHE WILL FILE THIS WELL R ON OF WELL DRILLING:	EF, THE FOREGOING I ECORD WITH THE STA	S A TRUE A	ND EER AND

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)				
FILE NUMBER	 POD NUMBER	TRN NUMBER				
LOCATION			PAGE 2 OF 2			
•						
	• • • • • • • • • • • • • • • • • • • •					

## Soil Description

Columns

(feet)

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10-23' - Sand, brown, sandsastone, interbedded

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Lenath of PVC Well Screen	2 Ft
Depth of PVC Well	65 Ft
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Ground Water Elevation	

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

Ž

Indicates samples selected for Laboratory Analysis.

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- The depths indicated are referenced from below ground surface. (bgs)

TNM 97-04 Lea County, New Mexico **Boring Log And Monitor Well Details** Air Sparging Well AS-6 Plains Marketing, L.P.



## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

	POD NUMB			,						OSE FILE NUM	(BER(S)			
GENERAL AND WELL LOCATION	TNM 97	-04 A	S-6											
ΑT	WELL OWN									PHONE (OPTI	ONAL)			
00	PLAINS	MAR	KET	ING LP										
17	WELL OWN	ER MAII	LING	ADDRESS						CITY		STATE		ZIP
Æ	333 CLA	Y ST	REE	ET, SUITE	1600	)				ноизто	N	TX	77	7078
D V			DEGREES MINUTES SECONDS										<del></del>	
A.	WELL				DL	32				* ACCUBACY	REQUIRED: ONE TEN	TU OE A CEO	COND	
ZAL	LOCATIO		LATI	TUDE		32	55	o	7.00 <sub>N</sub>	<u> </u>				
B	(FROM GPS) LONGITUDE 103 25 13.00 W * DATUM REQUIRED: WGS 84													
GE	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS													
-	GILLS R	ROAD	, LO	VINGTON	NM,	LEA CO								
	(2.5 ACR	.E)	(	10 ACRE)		(40 ACRE)	(160 ACR	E)	SECTION		TOWNSHIP	NORTH	RANGE	✓ EAST
ĀĽ	\ \ \ \ \ \	4		1/4		1/4	7	4				Sourn		west
OPTIONAL	SUBDIVISIO	MAN NC	E						LOT NUM	IBER	BLOCK NUMBER		UNIT/TRA	СТ
I d									Ì				1	
2.0										MAP NUMBER		TRACT NU	JMBER	
		١.,										•	ļ	
$\dot{+}$	LICENSE NI			NAME OF LICE	NSED	DRILLER	· · · · · · · · · · · · · · · · · · ·				NAME OF WELL DE	RILLING CON	APANY	
	WD			RAYMONI							STRAUB CO			
	DRILLINGS	esti-	1	DRILLING EN	· · ·	DEPTH OF COM	DI CTED WELL /	т\	Leoberio	LE DEPTH (FT)	DEPTH WATER FIL			
ļ		5-09	١	3-25-09		DEFINORCOM	65	1)	BOKE HO	65	DEPIH WATER FIL	(3) ENCOUN	II CKED (FI)	
NO	J-2.	<del></del>		J-20-08					<u></u>		OTATIO WATER LE	VEL 131 0014	DI ETER ME	L APP
DRILLING INFORMATION	COMPLETE	m.weri	10.	ARTESIAN	J	DRY HOLE	SHALLO	W/UNC	ONGINEDA		STATIC WATER LE	VEL IN COM N/A		LL(FI)
R.W.	CONTEST		. 10.		•			W (ONC)				19/7	·	
FO	DRILLING	FLUID:		✓ AIR		☐ MUD	ADDITIV	/ES – SPE	ECIFY:					
E S	DRILLING	метног	D:	ROTARY		HAMMER	CABLE?	TOOL	ОТНЕ	R - SPECIFY:				
Z	DEPT	H (FT)		BORE HOL	c		CASING			UCCTION	INCIDE DIA	CARINI	234411	CI OT
E I	FROM	TO		DIA. (IN)			ATERIAL			NECTION (CASING)	INSIDE DIA. CASING (IN)	ı	G WALL NESS (IN)	SLOT SIZE (IN)
3. D	65	63		6			/C .020 SCR	EEN	-	BE	2		154	.020
		6					D PVC RISE		<del> </del>	BE	2	+	154	RISER
	63			6					ļ		<del></del>	<u>U.</u>	154	KISEK
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ANNULAR   SEAL AND   GRAVEL PACK   FROM   TO   DIA. (IN)   MATERIAL TYPE AND SIZE   (CUBIC FT)   PLACE	·
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The undersigned hereby certifies that, to the best of his or her knowledge and belief, the foregoing is a true a correct record of the above described hole and that he or she will file this well record with the state engine the fermit holder within 20 days after completion of well drilling:    The undersigned hereby certifies that, to the best of his or her knowledge and belief, the foregoing is a true a correct record of the above described hole and that he or she will file this well record with the state engine the fermit holder within 20 days after completion of well drilling:   Author Althur   Author   Author Althur   Author   Author Althur	Ø NO
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FOR OSE INTERNAL USE		WELL RECORD & LOG	(Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER	
LOCATION	3		PAGE 2 OF 2

## Soil Description

Columns

(feet)

0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

### Monitor Well Details

2 Ft 65 Ft 65 Ft 53 Ft 60 Ft Length of PVC Well Screen\_ Thickness of Bentonite Seal\_ Depth of Exploratory Well. Ground Water Elevation Depth to Groundwater Depth of PVC Well,

DD

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

Indicates samples selected for Laboratory Analysis

3/26/09

AN

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

- The monitor well was installed on date using air rotary drilling techniques.
- The well was constructed with 2" ID, 0.020 inch factory slotted, belled end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- The depths indicated are referenced from below ground surface. (bgs)

TNM 97-04 Lea County, New Mexico **Boring Log And Monitor Well Details** Air Sparging Well AS-7 Plains Marketing, L.P.



## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

NOI	TNM 97	-04 AS	S-7					OSE FILE NUI	MBER(S)			2 22 22 27 27
GENERAL AND WELL LOCATION	WELL OWN PLAINS		E(S) KETING LP					PHONE (OPT)	ONAL)			
	WELL OWN	ER MAIL	ING ADDRESS					CITY		STATE		ZIP
WEI	333 CLA	Y STF	REET, SUITE	1600				HOUSTO	N	TX	77	7078
Z	WELL DEGREES MINUTES SECONDS											
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VER	(FROM G		LONGITUDE	103	:	25 1	3.00 W	* DATUM REG	QUIRED: WGS 84			
E G	DESCRIPT	ON RELA	TING WELL LOCATION	ON TO STREET ADDRE	SS AND C	OMMON LAND	MARKS					
1	GILLS F	ROAD,	LOVINGTON	NM, LEA CO		· · · · · · · · · · · · · · · · · · ·						
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OPTIONAL												
2. C	HYDROGRA	APHIC SU	RVEY			<u> </u>			MAP NUMBER		TRACT NU	MBER
		V <sup>*</sup> *						<del>-</del>			<u> </u>	
	LICENSE NUMBER NAME OF LICENSED DRILLER NAME OF WELL DRILLING COMPANY											
	WD <sup>2</sup>	1478	RAYMONE	STRAUB JR	-				STRAUB COF	RPORAT	ΓΙΟΝ	
•	DRILLING		1	l.		WELL (FT)	BORE HO	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	TERED (FT)	
NO	3-24	4-09	3-24-09		65		<u></u>	65				
DRILLING INFORMATION	COMPLETE	D WELL	IS: ARTESIAN	DRY HOLE	<b>V</b> :	SHALLOW (UNC	ONFINED)	STATIC WATER LEVEL IN COMPLETED WELL (FI			.L (FT)	
FOR	DRILLING	FLUID:	✓ AIR	MUD		ADDITIVES – SP	ECIFY:					
<u>  Z</u>	DRILLING	METHOD	✓ ROTARY	HAMMER		CABLE TOOL	Отн	ER - SPECIFY:				
Z	DEPT	H (FT)	BORE HOL	E	CASING	·	CON	NECTION	INSIDE DIA.	CASIN	G WALL	SLOT
RIL	FROM	то	DIA. (IN)		ATERIA			(CASING)	CASING (IN)	1	NESS (IN)	SIZE (IN)
3.0	65	63	6	SCH 40 P\	/C .020	SCREEN		BE	2	0.	154	.020
	63	6	6	SCH 4	0 PVC	RISER		BE	2	0.	154	RISER
	6	+43	6	SCH 40 GA	LVANI	ZED STEEL		NPT	2			
<u> </u>						·-··	<u> </u>			L		
	DEPT	H (FT)	THICKNES	S F	ORMAT	TON DESCRI	PTION OF I	PRINCIPAL W	ATER-BEARING S	TRATA		YIELD
STRATA	FROM	то	(FT)		(INCI	LUDE WATER	-BEARING	CAVITIES O	R FRACTURE ZON	ES)		(GPM)
STR												
			· ·			<del></del>		·				
\RI					<u></u>							_
BE												
ATER BEARING									T			
4. WA	METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA  TOTAL ESTIMATED WELL YIELD (GPM)											
4	4											
:	EOD OC	INTER	NAL USE						WELL RECO	RD & LOC	(Version 6	/9/08\
	FILE NU		HAL OUR			POD NUME	ER		TRN NUMBE		- ( + 0131011 0	, ,, ,, ,
	LOCATI					1			<del></del> !		PAGE 1	OF 2
									<del></del>			

UMP	TYPE OI	F PUMP:	☐ SUBMER		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED ☐ OTHER – SPECIFY:			
SEAL AND PUMP			DEPTH FROM	(FT)	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH PLACE	
EAL			65	60	6	2 .5 BAGS OF 8/16 SAND		TOPL	OAD
.S. S.			60	10	6	10 BAGS OF 3/8 PLUG		TOPLOAD	
			10	0	6	6 2 BAGS OF CEMENT		TOPLOAD	
	DEPT	DEPTH (FT) THICKNESS		NESS		COLOR AND TYPE OF MATERIAL ENCOUNTERED			
	FROM	TO (FT)			(INCL	UDE WATER-BEARING CAVITIES OR FRACT	URE ZONES)	BEAR BEAR	
	0	1	1			DARK BROWN SANDY CLAY		☐ YES	☑ NO
	1	10	9			CALICHE (DENSE LAYERS)		☐ YES	☑ NO
	10	26	16	3		CALCIFIED SANDSTONE		☐ YES	✓ NO
	26	65	23	3		TAN SAND		☐ YES	☑ NO
1,	TD	65						☐ YES	□ NO
WEI								☐ YES	□NO
6. GEOLOGIC LOG OF WELL								☐ YES	□NO
00								☐ YES	□NO
וכו					•			☐ YES	□ NO
100								☐ YES	□ NO
3EO								☐ YES	□NO
9. (			İ					☐ YES	□ NO
								☐ YES	□ио
								☐ YES	□NO
								☐ YES	□NO
								☐ YES	□NO
							, , , , , , , , , , , , , , , , , , ,	☐ YES	□NO
			ATTACH	ADDITION	IAL PAGES AS NE	EEDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL		
	1		METHOD:	BAILE	R PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			
AL INFO	WELI	_ TEST	TEST RESU	LTS - ATTA	CH A COPY OF E	DATA COLLECTED DURING WELL TESTING, AND DRAWDOWN OVER THE TESTING PERI		ME, END TI	ме,
	ADDITIO	NAL STATE	MENTS OR EXPL	ANATIONS:					
TEST & ADDITION									
ADD	ļ								
ઝ									
LES									i
7									
	THELIN	IDERSIGN	ED HERERY	CERTIFIES	THAT TO THE BI	EST OF HIS OR HER KNOWLEDGE AND BELLI	EF. THE FOREGOING I	S A TRUE A	ND
JR E	THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND								
IT A	THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:								
SIGNATURE	Was	Unin	f Stran	1/1/2		4-20-09			
80.0	A M	71.100.54	SIGNATUI	RE OF DRIL	LER	DATE			
<u> </u>	<u> </u>								

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)		
FILE NUMBER	POD NUMBER	TRN NUMBER		
LOCATION		PAGE 2 OF 2		

## Soil Description

Columns

(feet)

0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

/C Well ScreenC Well Screen	Date Drilled	3-24-09
	Thickness of Bentonite Seal	60 Ft
	anath of PVC Well Screen	2 Ft
y Well	epth of PVC Well	65 Ft
	epth of Exploratory Well	65 Ft
	Depth to Groundwater	53 Ft

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

A

Head-space reading in ppm obtained with a photo-ionization detector. Indicates samples selected for Laboratory Analysis

### Completion Notes

- The monitor well was installed on date using air rotary drilling techniques.
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- 5. The depths indicated are referenced from below ground surface. (bgs)

TNM 97-04 Lea County, New Mexico Boring Log And Monitor Well Details Air Sparging Well AS-8 Plains Marketing, L.P.



## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

	POD NUMBI			•						OSE FILE NUM	MBER(S)			
NO	TNM 97-	04 A	S-8	•										
-EV	WELL OWN	ER NAM	E(S)							PHONE (OPTIC	ONAL)			
GENERAL AND WELL LOCATION	PLAINS	MARI	KET	ING LP										
רו	WELL OWN	ER MAII	JING /	ADDRESS					.,	CITY		STATE	<del> </del>	ZIP
ÆL	333 CLA	Y ST	REE	T, SUITE	1600					HOUSTO	N	TX	77	078
Δ		<del></del>			DEC	REES	MINUTES	SECC	NIDE					
A.	WELL				DEG	32		55 57.00 N			* ACCURACY REQUIRED: ONE TENTH OF A SECOND			
Z.	LOCATIO (FROM GI	L	LATI	TUDE						* DATUM REQUIRED: WGS 84				
E	(I KOM G	3,	LONG	GITUDE	i.	103	25	1	3.00 W	Ditt oil the				
GE	DESCRIPTI	ON REL	ATINO	WELL LOCATI	ON TO S	TREET ADDRE	SS AND COMMO	N LAND	MARKS					· .
	GILLS R	OAD,	, LO	VINGTON	NM, I	LEA CO								
++							I TOURISHIP		L BANICE					
	(2.5 ACR		(	10 ACRE)	(4	10 ACRE)	SECTION		TOWNSHIP	NORTH	RANGE	✓ HAST		
AL.				1/4		1/4				✓ soattii		west		
OPTIONAL	SUBDIVISIO	NAM	E				LOT NUM	1BER	BLOCK NUMBER		UNIT/TRA	СТ		
TAC				0.0			<u> </u>							
2.0	HYDROGRA	APHIC SU	JRVE	Y							MAPNUMBER		TRACT NU	IMBER
		٠.												
	LICENSE N	JMBER		NAME OF LICE	ENSED D	RILLER			•	* *	NAME OF WELL DR	ILLING CON	<b>APANY</b>	
	WD <sup>2</sup>	1478	.	RAYMON	O STF	RAUB JR					STRAUB COR	RPORAT	rion	
	DRILLING S	TARTE	5	DRILLING EN	DED !	DEPTH OF COM	BORE HO	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	TERED (FT)			
z	3-25	5-09	ł	3-25-09	)		65			65				
011		<u> </u>	1				-L		STATIC WATER LE	VEL IN COM	PLETED WEI	.L (FT)		
DRILLING INFORMATION	COMPLETE	D WELL	IS:	ARTESIAN	۱	DRY HOLE SHALLOW (UNCONFINED)					1	N/A		
OR	221112121			✓ AIR		MUD	□ ADDITE	VES – SP	ECIEV.					
Z	DRILLING						[]							
NG	DRILLING	METHOD	): 	✓ ROTARY		HAMMER	CABLE	TOOL	ОТНІ	ER - SPECIFY:				
רבו	DEPT	H (FT)		BORE HOL			CASING			NECTION	INSIDE DIA.		G WALL	SLOT
DRI	FROM	ТО		DIA. (IN)		M	ATERIAL		TYPE	(CASING)	CASING (IN)	ļ	IESS (IN)	SIZE (IN)
3.	65	63		6		SCH 40 P	VC .020 SCF	REEN	<u> </u>	BE	2 _	<u> </u>	154	.020
	63	6		. 6			0 PVC RISE			BE	2	0.	154	RISER
	6	+43	3	6		SCH 40 GA	LVANIZED	STEEL		NPT	2	ļ		
									<u> </u>		1	<u> </u>		
	DEPT	H (FT)		THICKNES	ss	F	ORMATION D	ESCRI	PTION OF I	PRINCIPAL W	ATER-BEARING S	TRATA		YIELD
Ι¥	FROM	TO	,	(FT)			(INCLUDE	WATER	R-BEARING	CAVITIES O	R FRACTURE ZON	iES)		(GPM)
RA														
SSI														
Z														
AR		<u> </u>			_	<del> '</del>								
4. WATER BEARING STRATA	ļ					<del></del>		· · · · · · · · · · · · · · · · · · ·						
TEF	METUCE	ICED TO	Ec.	MATE VIELD OF	L	DEADING CT	ATA				TOTAL ESTIMATE	D WELL VIE	LD (GPM)	
₩.	METHOD	JSED IO	COIII	MATE YIELD OF	WAIE	V-DEWINDOLK	MITA.				101.12 2011111/1121		(0.111)	
<b>_</b>														
<u> </u>														10.10.0:
:	FOR OSI	INTE	RNA	L USE			1 200	NUMB	- CD		WELL RECO		i (Version 6	/ <del>9</del> /08)

UMIP	TYPE O	F PUMP:	☐ SUBMER ☐ TURBINI		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED☐ OTHER – SPECIFY:			•
SEAL AND PUMP	ANNI	JLAR	DEPTH FROM	(FT) TO	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH(	OD OF
ZA-L	SEAL	AND	65	60	6	2 BAGS OF 8/16 SAND		TOPL	OAD
5. SI	GRAVE	L PACK	60	10	6	12 BAGS OF 3/8 PLUG		TOPL	OAD
		<u> </u>	10	0	6	1 BAGS OF CEMENT		TOPL	OAD
•	DEPT FROM	H (FT)	THICK			COLOR AND TYPE OF MATERIAL ENCOUN JDE WATER-BEARING CAVITIES OR FRAC		WATER BEARING	
	0	1	1	·		YES			
	1	20	19			DARK BROWN SILTY CLAY CALICHE (DENSE LAYERS)		YES	Ø NO
			<u>-</u>			<del>                                     </del>			
	20	64	44			TAN CALCIFIED SANDSTONI	<b>=</b>	YES	□ NO
:	64	65	1			TAN SAND		YES	Ø NO
J.	TD	65					,	YES	☑ NO
WE								☐ YES	□ N
90.				<u> </u>				☐ YES	_ □ N
2								☐ YES	D N
GEOLOGIC LOG OF WELL								YES	וא 🔲
								☐ YES	D N
			_					☐ YES	□ N
9								☐ YES	□ N
		_			:			☐ YES	□ N
;								☐ YES	□ N
				•				☐ YES	□ N
·								☐ YES	□ N
								☐ YES	□ N
•			ATTACH	ADDITION	IAL PAGES AS NE	EDED TO FULLY DESCRIBE THE GEOLOGI	C LOG OF THE WELL		
<del></del>	<u> </u>		METHOD:	BAILI	R 🔽 PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			
INFO	WELI	. TEST	TEST RESU	LTS - ATT	ACH A COPY OF D	DATA COLLECTED DURING WELL TESTING AND DRAWDOWN OVER THE TESTING PER	, INCLUDING START T	IME, END TI	IME,
7. TEST & ADDITIONAL IN	ADDITIO	NAL STATE	MENTS OR EXPL						
ADDI									
STS									
TE									
8. SIGNATURE	CORRE	CT RECOR	RD OF THE AB	OVE DESC	RIBED HOLE ANI	EST OF HIS OR HER KNOWLEDGE AND BEL D THAT HE OR SHE WILL FILE THIS WELL ON OF WELL DRILLING:	IEF, THE FOREGOING RECORD WITH THE ST	S A TRUE A ATE ENGINI	ND EER AN
ĬĠ.	1	maan	Strace	101		4-20-09			
S. S.	11/2		SIGNATUR	RE OF DRIE	LER	DATE			

FOR OSE INTERNAL USE		WELL RECORD & LOC	3 (Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER	
LOCATION			PAGE 2 OF 2

**\*** 

.

## Recovery Well RW-2

### Soil Description

Columns

(feet)

0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

Date Drilled	3-25-09
Thickness of Bentonite Seal	33 Ft
Lenath of PVC Well Screen	25 Ft
Depth of PVC Well	65 Ft
Depth of Exploratory Well	65 Ft
Depth to Groundwater	53 Ft
Ground Water Elevation	

**Grout Surface Seal** 

Bentonite Pellet Seal

Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

Indicates samples selected for Laboratory Analysis.

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

.....

- The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belied end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- 5. The depths indicated are referenced from below ground surface. (bgs)

TNM 97-04 Lea County, New Mexico **Boring Log And Monitor Well Details** Plains Marketing, L.P. Recovery Well RW-2



## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA



FILE NUMBER

LOCATION

### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

							-								
7	POD NUMB	•		•							OSE FILE NUI	MBER(S)			
Į.	TNM 97											535.27			
CA7	WELL OWN			FINO LD							PHONE (OPT)	ONAL)			
r0	PLAINS					·									
3TF	WELT OW				160	<b>n</b>					CITY	N1	STATE	7	ZIP 7078
<u>×</u>		11 31	KE	ET, SUITE	1001	J					HOUSTO		TX		
S	WELL				DE	GREES	MIN	UTES	SECO	NDS					
AL.	LOCATIO	ON	LATI	ITUDE		32		55	5	7.00 N	* ACCURACY	REQUIRED: ONE TEN	ITH OF A SE	COND	
GENERAL AND WELL LOCATION	(FROM G	PS)	LON	GITUDE		103		25	1:	3.00 W	* DATUM REG	QUIRED: WGS 84			
GE															
-															
	(2.5 ACR	Œ)	(	(10 ACRE)		(40 ACRE)		(160 ACRI	E)	SECTION		TOWNSHIP	NORTH	RANGE	✓ EAST
\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		4		¼		1/4 -				✓ south		west			
OPTIONAL	SUBDIVISIO	ON NAM	E				LOT NUM	BER	BLOCK NUMBER		UNIT/TRA	ст			
o F	1000000	. 5177.0.01							244 5 241 4555		770 + GT > 17	n in the			
2.	HYDROGRA	APHICSU	JKVE	Y								MAPNUMBER		TRACT N	NWREK
		<del></del>												<u> </u>	=
	LICENSE N			NAME OF LICE								NAME OF WELL DR			
	WD1478 RAYMOND STRAUB JR											STRAUB CO	RPORAT	TION	
											E DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	TERED (FT)	
Z	3-25-09 3-26-09 65										65				
ATI	COMPLETE		10.	ARTESIAN		DRY HOLE	1.7	] shallo	11 (1 D.10)	MENED		STATIC WATER LE			LL (FT)
DRILLING INFORMATION	COMPLETE	ED WELL			<u> </u>	DRY HOLE		] SHALLO	W (UNCC	ONFINED)	N/A				
NFC	DRILLING	FLUID:		✓ AIR		MUD		ADDITIV	ES – SPE	CIFY:					
¹G I	DRILLING	METHOD	):	<b>✓</b> ROTARY		HAMMER		CABLET	TOOL	ОТНЕ	R - SPECIFY:				·
TIL	DEPT	H (FT)		BORE HOL	E	(	CASIN	1G		CON	NECTION	INSIDE DIA.	CASING	G WALL	SLOT
RII	FROM	то		DIA. (IN)		M	ATER	IAL		L	(CASING)	CASING (IN)		IESS (IN)	SIZE (IN)
3. E	65	40		7		SCH 40 P\	0. O/	10 SCR	EEN		FJ	4	0.	154	0.10
	40	+43	3	7		SCH 4	) PV	C RISEF	₹		FJ	4	0.1	154	RISER
											<u> </u>				
	DEPT	H (FT)		THICKNES	ss	F	ORM/	ATION DI	ESCRIP	TION OF P	RINCIPAL W	ATER-BEARING S	TRATA		YIELD
ΤĀ	FROM	ТО		(FT)								R FRACTURE ZON			(GPM)
<u>\</u>															
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Ž								-			,				-
EA1															
R B															
ATE	METHOD U	USED TO	ESTI	MATE YIELD OF	WATE	R-BEARING STR	ATA					TOTAL ESTIMATED	WELL YIEL	D (GPM)	
4. WATER BEARING STRATA															
4	<u> </u>														
	FOR OSE	E INTER	NAI	USE							•	WELL RECO	DO 1 & CIS	i (Version 6	/9/08)

POD NUMBER

TRN NUMBER

F				CIDI F		Though we have some							
JMP	TYPE O	F PUMP:	☐ SUBMER☐ TURBIN		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED ☐ OTHER – SPECIFY:			•				
SEAL AND PUMP	ΔΝΝΙ	JLAR	DEPTH FROM	(FT)	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METHO PLACE					
JAL.	SEAL	. AND	65	37	7	11 BAGS 20/40 SAND		TOPL	OAD				
5. SF	GRAVE	L PACK	37	2	7	7 BAGS OF 3/8 PLUG		TOPL	.OAD				
			2	0	7	1 BAGS OF CEMENT		TOPL	.OAD				
	DEPT	H (FT)	THICK (F1		l .	COLOR AND TYPE OF MATERIAL ENCOUNT		WA* BEAR					
	0	1	1	<u> </u>	` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `	☐ YES	☑ NO						
	1	12	1.	 I		DARK BROWN SILTY CLAY  DENSE CALICHE LAYERS							
	12	20	8			SILICATED CALICHE LAYERS							
	20	65	45			TAN CALCIFIED SAND		☐ YES	☑ NO				
		ļ	43			TAN CALCIFIED SAND	·· <del>···</del> ······	☐ YES	□ NO				
ELL	TD	65						<del> </del>					
¥ (								☐ YES	□ NO				
0 5								YES	□ NO				
GEOLOGIC LOG OF WELL		ļ		·				☐ YES	□ио				
GIC								☐ YES	□ NO				
010			·					☐ YES	□ NO.				
GE			·				. <u> </u>	☐ YES	□ №				
6.								☐ YES	□ NO				
							· .	☐ YES	□ NO				
				·				☐ YES	□ NO				
								☐ YES	□ NO				
								□.YES	□ NO				
								☐ YES	□ио				
			ATTACH	ADDITION	AL PAGES AS NE	EEDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL						
			METHOD:	BAILE	R PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:							
L INFO	WELL	TEST				PATA COLLECTED DURING WELL TESTING, AND DRAWDOWN OVER THE TESTING PERIOR		IME, END TI	ME,				
7. TEST & ADDITIONAL	ADDITION	NAL STATE	MENTS OR EXPL	ANATIONS:									
Ĕ	HYDR	OCARB	ON 50'										
ADD	!												
7 &													
TES													
7.							•						
	THE UN	DERSIGN	FD HERERY (	PERTIFIES 1	THAT TO THE BE	EST OF HIS OR HER KNOWLEDGE AND BELIE	F THE FOREGOING I	S A TRUE A	ND				
JRE	CORRE	CT RECOR	ED OF THE AR	OVE DESC	RIBED HOLE AN	D THAT HE OR SHE WILL FILE THIS WELL RI	ECORD WITH THE ST	ATE ENGINE	ER AND				
ATI	THEPE	MII HOL	DER WITHIN	20 DAYS A	FIER COMPLEII	ON OF WELL DRILLING:							
SIGNATURE	Van	بامدمير	Ster	L) (),	١.	4.2000							
s. S	Mays	THURK	SIGNATUR	E OF RIL	LER	DATE							
<u> </u>	<u> </u>												
			•				•						

FOR OSE INTERNAL USE		WELL RECORD & LOG (Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER
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## Recovery Well RW-3

### Soil Description

Columns

(feet)

0 - 5' - Caliche, greyish white, sandy

5 - 10' - Sand, brown, caliche, greyish white

10-23' - Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

53 - 65' - Sand, brown, very fine grained, saturated with depth

## Monitor Well Details

65 Ft 65 Ft 25 Ft 33 Ft Length of PVC Well Screen\_ Thickness of Bentonite Seal\_ Depth of Exploratory Well. Ground Water Elevation Depth to Groundwater Depth of PVC Well,

Grout Surface Seal

Bentonite Pellet Seal

Sand Pack

Indicates the PSH level measured on

Indicates the groundwater level measured on

Head-space reading in ppm obtained with a photo-ionization detector. Indicates samples selected for Laboratory Analysis

3/26/09

¥

### Completion Notes

прининини

- The monitor well was installed on date using air rotary drilling techniques.
- The well was constructed with 2" ID, 0.020 inch factory slotted, belled end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- 5. The depths indicated are referenced from below ground surface. (bgs)

TNM 97-04 Lea County, New Mexico **Boring Log And Monitor Well Details** Plains Marketing, L.P. Recovery Well RW-3



## NOVA Safety and Environmental

Checked By: RKR Drawn By: TA



FILE-NUMBER

LOCATION

### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

	POD NUMB			•					OSE FILE NU	MBER(S)				
IÕ	TNM 97			3										
ΆŢ	WELL OWN								PHONE (OPTI-	ONAL)				
ŏ	PLAINS	MAR	KE1	ING LP										
וחו	WELL OWN								CITY		STATE		ZIP	
WE	333 CLA	AY ST	RE	ET, SUITE	1600				HOUSTO	N	TX	77	7078	
2 Z	WELL				DEGREES	MINUTES	SECONDS							
L. A	LOCATIO		I.AT	ITUDE	32	55	57.00	N	* ACCURACY	REQUIRED: ONE TEN	TH OF A SEC	COND		
RA	(FROM G	PS)		GITUDE	103	25	13.00	w	* DATUM REG	QUIRED: WGS 84				
GENERAL AND WELL LOCATION	DESCRIPTI	ION PEL			ON TO STREET ADDRE	· · · · · · · · · · · · · · · · · · ·			<u> </u>				======	
1. G						SS AND COMMON LA	MINIMAKAS							
	GILLS ROAD, LOVINGTON NM, LEA CO													
	(2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP RANGE													
٩Ľ	7	4		1/4	1/4				South		✓ east			
OPTIONAL	SUBDIVISIO	ON NAM	E	· · · · · · · · · · · · · · · · · · ·		NUM	IBER	BLOCK NUMBER		UNIT/TRA	CT			
PTI														
2.0	HYDROGRAPHIC SURVEY MAP NUMBER TRACT NUMI													
•	LICENSE N	UMBER		NAME OF LICE	NSED DRILLER				·	NAME OF WELL DR	ILLING CON	/PANY		
	WD.	1478		RAYMON	STRAUB JR					STRAUB CO	RPORAT	ΓΙΟΝ		
	DRILLING	STARTE	D	DRILLING EN	DED DEPTH OF COM	PLETED WELL (FT)	BOR	Е НО	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUN	TERED (FT)		
!z	3-2	5-09	·	3-26-09	) [	65			65	<u> </u>				
TIO							<del></del>			STATIC WATER LET	VEL IN COM	PLETED WE	LL (FT)	
MA	COMPLETE	ED WELL	JS:	ARTESIA	DRY HOLE	✓ SHALLOW (	UNCONFINE	D)	N/A					
FOR	DRILLING	FLUID:		✓ AIR	MUD.	ADDITIVES	- SPECIFY:							
DRILLING INFORMATION	DRILLING	METHO	D:	✓ ROTARY	HAMMER	CABLE TOO	ы. Па	THE	THER - SPECIFY:					
Ž														
172	FROM	H (FT)		BORE HOL		CASING ATERIAL			NECTION (CASING)	INSIDE DIA. CASING (IN)	1	G WALL IESS (IN)	SLOT SIZE (IN)	
10	65	40		7		VC .010 SCREE			FJ	4	0	154	0.10	
m	40	+4		7		0 PVC RISER			FJ	4	<del></del>	154	RISER	
:														
	<del>-</del>													
<del>-</del>	DEDT	H (FT)	=	THE COLOR OF CO.		OPMATION DESC	CDIDTION	OF E	DINCIDAL W	ATER-BEARING S	TDATA		VIELD	
	FROM	тс		THICKNES (FT)	22	• • • • • • • • • • • • • • • • • • • •				R FRACTURE ZON			YIELD (GPM)	
STRATA	1 KOW													
	<u> </u>											= .		
BEARING					<del></del>	<del></del>								
AR														
		_						_	<del></del>				<u> </u>	
WATER	METUODI	ICED TO	CCTI	MATE VIELD OF	WATER-BEARING STR	ATA				TOTAL ESTIMATE	WELL YIEL	D (GPM)	L	
	METHOD	USED IC	, 6311	mate Held Of	THE DEALING STA	*****						(•)		
4										<u>L</u>				
<u> </u>	FOR OSI		D	LUCE						WELLBEOO	DD 8 LOC	: (Venier C	(0.00)	
	F( 10 ( 10)	- INI -	KNA	LINE						WELL RECO	ハレ & LU(	LI VEISION O	19/UB1	

PAGE I OF 2

ΜP	TYPE OI	PUMP:	☐ SUBMER		☐ JET ☐ CYLINDER	☐ NO PUMP – WELL NOT EQUIPPED ☐ OTHER – SPECIFY:			
PU					<u> </u>	OTHER-SIZER 1.		T	
SEAL AND PUMP	ANNI	JLAR	DEPTH FROM	TO	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METH( PLACE	
EAL	SEAL	AND	65	37	7	11 BAGS 20/40 SAND		TOPL	.OAD
3. S	GRAVE	LPACK	37	2	7	8 BAGS OF 3/8 PLUG	_	TOPL	.OAD
			2	0	7	1 BAGS OF CEMENT		TOPL	.OAD
	DEPT	H (FT)	THICK			COLOR AND TYPE OF MATERIAL ENCOUNTE		WA	
	FROM	TO	(F7	Γ) 	(INCL	UDE WATER-BEARING CAVITIES OR FRACTU	IRE ZONES)	BEAR	
	0	1	1			DARK BROWN SILTY CLAY  CALICHE		☐ YES	Ø NO
	1	9	8			·	☐ YES	☑ NO	
	9	18	9			SILICATED CALICHE		☐ YES	Ø NO
	18	65	47	7		TAN SAND	·	☐ YES	☑ NO
רר	TD	65						☐ YES	Ø NO
GEOLOGIC LOG OF WELL								☐ YES	☑ NO
; OF								☐ YES	☑ NO
707								☐ YES	Ø NO
GIC								YES	Ø NO
010							·	☐ YES	☑ NO
							·	☐ YES	☑ NO
0.								☐ YES	Ø NO
								☐ YES	Ø NO
								☐ YES	☑ NO
								☐ YES	☑ NO
	L							☐ YES	□ NO
								☐ YES	□ NO
			ATTACH	ADDITION	AL PAGES AS NI	EEDED TO FULLY DESCRIBE THE GEOLOGIC	LOG OF THE WELL		
			METHOD:	BAILE	R PUMP	☐ AIR LIFT ☐ OTHER – SPECIFY:			
LINFO	WELL	. TEST	TEST RESU	ILTS - ATTA	ACH A COPY OF I	DATA COLLECTED DURING WELL TESTING, I AND DRAWDOWN OVER THE TESTING PERIC	NCLUDING START TI	ME, END TI	ME,
1 -	ADDITIO	VAL STATE	MENTS OR EXPL						
TEST & ADDITION		OCARB		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
QQV									
3									
LES									
7.									
	THEUN	DERSIGN	ED HERERY	CERTIFIES	THAT TO THE R	EST OF HIS OR HER KNOWLEDGE AND BELIE	F THE FOREGOING I	S A TRUE A	ND
IRE	CORRE	CT RECOR	RD OF THE A	BOVE DESC	RIBED HOLE AN	D THẠT HE OR SHE WILL FILE THIS WELL RE	CORD WITH THE STA	TE ENGINE	ER AND
ATI	THE PE	KMIT, HOT	DER WITHIN	120 DAYS A	FIER COMPLET	ION OF WELL DRILLING:			
8. SIGNATURE	1 of	/ . l.ma-	Alte		4	4-20-09			
8	A	gum	SIGNATUR	RE OF DR	LER	DATE			}
	<u> </u>								

FOR OSE INTERNAL USE	<u> </u>	WELL RECORD & LOG (Version 6/9/08)
FILE NUMBER	POD NUMBER	TRN NUMBER
LOCATION		PAGE 2 OF 2

## Recovery Well RW-4

## Soil Description

Columns

(feet)

- 0 5' Caliche, greyish white, sandy
- 5 10' Sand, brown, caliche, greyish white
- 10-23' Sand, brown, sandsastone, interbedded

23 - 29' - Sand, tan with some caliche fragments very fine grained

29 - 53' - Sand, brown, very fine grained

Monitor Well Details 33 Ft 25 Ft 65 Ft 65 Ft Length of PVC Well Screen\_ Thickness of Bentonite Seal\_ Bentonite Pellet Seal Grout Surface Seal Depth of Exploratory Well. Ground Water Elevation Depth to Groundwater Depth of PVC Well\_ Sand Pack

Screen

Indicates the PSH level measured on

Indicates the groundwater level measured on

3/26/09

Ž

Indicates samples selected for Laboratory Analysis.

Head-space reading in ppm obtained with a photo-ionization detector.

### Completion Notes

53 - 65' - Sand, brown, very fine grained, saturated with depth

- The monitor well was installed on date using air rotary drilling
- The well was constructed with 2" ID, 0.020 inch factory slotted, belled end joint, schedule 40 PVC pipe.
- 3. The well is protected with a locked stick up steel cover and a compression cap.
- The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
- The depths indicated are referenced from below ground surface. (bgs) 5.

Safety and environmental

TNM 97-04 Lea County, New Mexico

Plains Marketing, L.P.

**Boring Log And Monitor Well Details** 

Recovery Well RW-4

NOVA Safety and Environmental

Checked By: RKR Drawn By: TA



### WELL RECORD & LOG

### OFFICE OF THE STATE ENGINEER

### www.ose.state.nm.us

<del></del>								·							
z	TNM 97-	•		•							OSE FILE NUI	MBER(S)			
T10	WELL OWN			<u> </u>				· · · · · · · · · · · · · · · · · · ·			PHONE (OPTI	ONALY			
LOCATION	PLAINS			INGIP							PHONE (OPTI	ONAL)			
27	WELL OWN							· · · · · · · · · · · · · · · · · · ·			CITY		STATE		ZIP
EU.				ET, SUITE	160	0					HOUSTO	N	TX	77	7078
ΝQ						GREES	MIN	IUTES	SECO	NIDE					
Y X	WELL	1			υ.	32	17131	55		7.00 N	* ACCURACY	ACCURACY REQUIRED: ONE TENTH OF A SECOND			
RAI	(FROM GI	_ ∟		TUDE						3.00 W	*DATUM REQUIRED: WGS 84				
GENERAL AND WELL	000001000	011 0 01		GITUDE	0)170	103	20.431	25		J.00					
1. G	GRILL R			J WELL LOCATI	ON IC	STREET ADDRE	55 AN	D COMMON	LANUM	IARKS					
	(2.5 ACRE) (10 ACRE) (40 ACRE) (160 ACRE) SECTION TOWNSHIP RANGE														
וני	<b>1</b> /2	4		1/4		1/4		1/4					NORTH SOUTH		✓ EAST  west
OPTIONAL	SUBDIVISION NAME LOT NU											BLOCK NUMBER		UNIT/TRA	
PTI															
2. (	HYDROGRA	APHIC SI	URVE	Y				MAP NUMBER TRACT			TRACT NU	JMBER			
	L					<del></del>						]		<u> </u>	
	LICENSE N			NAME OF LICE								NAME OF WELL D			
		1478				RAUB JR			STRAUB CO						
	DRILLING S		D	DRILLING EN		DEPTH OF COM	i	LE DEPTH (FT)	DEPTH WATER FI	RST ENCOUN	ITERED (FT)				
NO.	3-26-09 3-26-09 65 65 STATIC WATER LEVEL IN COMPLETED WELL (												J. (FT)		
DRILLING INFORMATION	COMPLETED WELL IS: ARTESIAN DRY HOLE SHALLOW (UNCONFINED)  STATIC WATER LEVEL IN COMPLETED WELL  N/A														
FO	DRILLING	FLUID:		✓ AIR		MUD		ADDITIVE	S – SPE	CIFY:					
S	DRILLING	метног	D:	<b>✓</b> ROTARY		HAMMER		CABLETO	OOL	ОТНЕ	R - SPECIFY:				
I	DEPT	H (FT)		BORE HOI	Æ					CON	NECTION	INSIDE DIA.	CASING	G WALL	SLOT
RIL	FROM	TO	,	DIA. (IN	)	MATERIAL				TYPE (CASING)		CASING (IN)	THICK	VESS (IN)	SIZE (IN)
3.1	65	40	)	7		SCH 40 P\				FJ		4		154	0.10
i	40	+4	3	7		SCH 4	0 PV	C RISER			FJ	4	0.	154	RISER
:										ļ			-		
	<u> </u>	<u> </u>		<u> </u>						<u> </u>			1		
_		H (FT)		THICKNE (FT)	SS	F						ATER-BEARING : R FRACTURE 201			YIELD (GPM)
AT/	FROM	TC		(F1)			(11)	ICLUDE W	AIEK	-BEAKING		R FRACTURE ZU	YES)		(GFW)
STR															
NG.															
AR											•				
WATER BEARING STRATA	<u> </u>	<b>-</b>									<del> </del>	<del> </del>			
TE	METHOD	ISED TO	) ESTI	MATE YIELD O	WAT	ER-BEARING STR	ATA	<del></del>				TOTAL ESTIMATE	D WELL YIEI	LD (GPM)	
W.															
. 4	<u>L</u>								····			<u> </u>			
	FOR OS	E INTE	RNA	L USE								WELL RECO	ORD & LOC	G (Version 6	/9/08)
	FILE NU			<del></del>				PODN	IUMBI	ER		TRN NUMB			. = 1 =

Ь	TYPE OF PUMP:		SUBMER		☐ JET ☐ NO PUMP – WELL NOT EQUIPPED							
S. SEAL AND PUMP			TURBINE		☐ CYLINDER ☐ OTHER – SPECIFY:							
	ANNULAR SEAL AND GRAVEL PACK		DEPTH FROM	(FT) TO	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METHO PLACE				
			65	37	7	11 BAGS 20/40 SAND		TOPLOAD				
			37	2	7	9 BAGS OF 3/8 PLUG		TOPLOAD				
			2	0	7	1 BAGS OF CEMENT		TOPL	.OAD			
	DEPTH (FT) FROM TO		THICKNESS (FT)		COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)			WATER BEARING?				
	0 1		1		DARK BROWN SILTY CLAY WITH COBBLES			☐ YES ☑ NO				
	1	18	17		DENSE CALICHE			☐ YES	☑ NO			
	18	40 22		TAN SAND			☐ YES	☑ NO				
	40				TAN SAND (SOFT SANDSTONE)			☐ YES	☑ NO			
ر	TD	65					· · · · · · · · · · · · · · · · · · ·	☐ YES	□ NO			
VEL								YES	□NO			
0F.							☐ YES	□NO				
90								☐ YES	□ NO			
GEOLOGIC LOG OF WELL								YES	□ NO			
070								☐ YES	□ №			
GEO								☐ YES	□ NO			
ف								☐ YES	□ NO			
								☐ YES	□ NO			
							·	☐ YES	□ NO			
								☐ YES	□ NO			
						· · · · · · · · · · · · · · · · · · ·		☐ YES	□ NO			
								☐ YES	□NO			
	ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL											
0			METHOD:	BAILE	☐ AIR LIFT ☐ OTHER – SPECIFY:							
IL INFO	WELL TEST		TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.									
N N	ADDITIO	NAL STATE	MENTS OR EXPL	ANATIONS:	· · · · · · · · · · · · · · · · · · ·							
ADDITIONA	HYDR	OCARB	ON 18-40 (	ODOR								
TEST &	}											
7.	<u></u>											
ы	THE UN	IDERSIGN	IED HEREBY	CERTIFIES	THAT, TO THE B	EST OF HIS OR HER KNOWLEDGE AND BELLI	EF, THE FOREGOING I	S A TRUE A	ND EER AND			
T T	CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:											
A N.	of off 10											
8. SIGNATURE	SIGNATURE OF BRIL			uli)	<u>ی</u> د	4-20-09						
			SIGNATU	KE OF ØRIL	LEK	DATE						
								•				

FOR OSE INTERNAL USE	WELL RECORD & LC	WELL RECORD & LOG (Version 6/9/08)		
FILE NUMBER	POD NUMBER	TRN NUMBER		
LOCATION			PAGE 2 OF 2	

APPENDIX C: NMOCD C-141 Form

P.O. BOX 1980, HOBBS, NM 88241-1980

State of New Mexico Energy, Minerals and Natural Resources 1 riment

SUBMIT 2 COPIES TO

<u>DISTRICT II</u> P.O. DRAWER DD, ARTESIA, NM 88211-

1000 Rie Brezos Rd, Aztec, NM 87410

OIL CONSERVATION DIVISION

APPROPRIATE DISTRICT OFFICE IN ACCORDANCE WITH RULE 116 PRINTED ON BACK SIDE OF FORM

TNM-97-04 DISTRICTUI

P.O. Box 2088 Santa Fe, New Mexico 87504-2058

Initial Resort

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS TELEPHONE ADDRESS OPERATOR (915) 947-9000 P. O. Box 60028, San Angelo, TX 76906 Texas-New Mexico Pipe Line Company OTHER. BLOWOUT LEAK SPILL FIRE BREAK REPORT OF OTHER. OIL PIPE GASO PROD TANK TYPE OF DRLG PLANT RFY LINEX BTRY WELL WELL FACILITY FACILITY NAME: 4" gathering line COUNTY. TWP. SEC. LOCATION OF FACILITY 35E Lca Qtr/Qtr Sec. or Footage. SW/4 SW/4 DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK 2 miles west of Lovington DATE AND HOUR DATE AND HOUR OF DISCOVERY April 16, 1997 4:00 p.m. OF OCCURRENCE Unknown IF YES, NO NOT RE-WAS IMMEDIATE QUIRED X TO WHOM Wayne Price NOTICE GIVEN? DATE AND HOUR April 25, 1997 9:00 a.m. WROM B. D. Chapman (reported that quantity may be more than 10 barrels VOLUME **OUANTITY** TYPE OF RECOVERED Unknown ("see note below) OF LOSS FLUID LOST Sweet Crude **QUANTITY** NO YE5 DID ANY FLUIDS REACH A WATERCOURSE? IF YES, DESCRIBE FULLY DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN External Corrosion. Leak successfully clamped off. DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN\*\* Approximately 1500 sq.ft. pasture land. Will remediate on site. \*Originally estimated at 10 barrels. Under investigation. An amended report will be issued when quantity is determined OTHER\* GRAZING URBAN FARMING DESCRIPTION SNOW OF AREA WET DRY ROCKY CLAY SANDY LOAM SANDY SURFACE CONDITION CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)\*\* I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF PRINTED NAME AND TITLE DATE April 25, 1997 Edwin H. Oripp, District Manager SIGNES

SPECIFY

State Corp. Commission Pipe Line Division

\*\*ATTACH ADDITIONAL SHEETS IF NECESSARY

Hezardous Waste Section NM Environmental Improvement Div.

TNM-97-04

BDC



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E 5002 Basin Street, Suite-A1

Lubbock, Texas 79424 El Paso, Texas 79922

800 • 378 • 1296 888 • 588 • 3446

806 • 794 • 1296 915 • 585 • 3443

FAX 806 • 794 • 1298 FAX 915 - 585 - 4944 . FAX 432 • 689 • 6313

Midland, Texas 79703 6015 Harris Parkway, Suite 110 Ft. Worth, Texas 76132

432 • 689 • 6301 817 \* 201 \* 5260

E-Mail: lab@traceanalysis.com

### Certifications

WBENC:

237019

HUB:

1752439743100-86536

**DBE:** VN 20657

**NCTRCA** WFWB38444Y0909

### **NELAP Certifications**

Lubbock:

T104704219-08-TX

LELAP-02003

El Paso:

T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

Kansas E-10317

### Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: September 16, 2010

Work Order: 

10090707

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
243703	Post-Carbon	water	2010-09-02	13:30	2010-09-03

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 28 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abel

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

# Standard Flags

 ${\bf B}$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-09-03 and assigned to work order 10090707. Samples for work order 10090707 were received intact without headspace and at a temperature of 3.7 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	$\operatorname{Prep}$	QC	Analysis
Test	Method	Batch	Date	Batch	Date
Ag, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Al, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
As, Total	$S_{010C}$	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Ba, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
BTEX	S 8021B	62854	2010-09-07 at 07:58	73276	2010-09-07 at 07:58
B, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at $13:59$
Cd, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Co, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Cr, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at $13:59$
Cu, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at $13:59$
Fe, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at $13:59$
Hg, Total	S 7470A	62883	2010-09-08 at 09:41	73330	2010-09-08 at $14:11$
Mn, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at $13:59$
Mo, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
Ni, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at 13:59
PAH	S 8270D	63094	2010-09-09 at 15:00	73544	2010-09-15 at 23:44
Pb, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at $13:59$
Se, Total	S 6010C	62910	2010-09-09 at 08:12	73359	2010-09-09 at $13:59$
Zn, Total	S 6010C	62910	2010-09-09  at  08:12	73359	2010-09-09 at 13:59

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10090707 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend Page Number: 4 of 28 Lovington, NM

# **Analytical Report**

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: Al, Total QC Batch: 73359 Prep Batch: 62910

Analytical Method: Date Analyzed:

S 6010C 2010-09-09

S 3010A Prep Method: Analyzed By: RR

Sample Preparation: 2010-09-09

Prepared By: KV

RL

Parameter	Flag	Result	Units	Dilution	$\mathrm{RL}$
Total Aluminum		0.533	mg/L	1	0.0500

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: B, Total QC Batch: 73359 Prep Batch: 62910

Analytical Method: Date Analyzed:

Sample Preparation:

S 6010C 2010-09-09 2010-09-09 Prep Method: S 3010A

RRAnalyzed By: Prepared By:

RL

Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\mathrm{RL}$
Total Boron		0.105	${ m mg/L}$	1	0.0100

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: BTEX QC Batch: 73276 Prep Batch: 62854

Analytical Method: Date Analyzed:

S 8021B 2010-09-07 Sample Preparation: 2010-09-07 Prep Method: S 5030B

Analyzed By: ERPrepared By: ER

RL

Parameter Dilution RLFlag Result Units Benzene < 0.00100 mg/L 0.00100 mg/L 0.00100Toluene < 0.00100 1 Ethylbenzene mg/L 1 0.00100< 0.00100 Xylene mg/L 0.00100< 0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	$egin{array}{c} { m Recovery} \\ { m Limits} \end{array}$
Trifluorotoluene (TFT)		0.0931	mg/L	1	0.100	93	78.4 - 113
4-Bromofluorobenzene (4-BFB)		0.0977	mg/L	1	0.100	98	81.5 - 121

TNM 97-04

Work Order: 10090707

TNM 97-04 Townsend

Page Number: 5 of 28

Lovington, NM

Sample: 243703 - Post-Carbon

Laboratory:

Lubbock

Analysis: QC Batch:

Prep Batch: 62910

Co, Total 73359

Analytical Method: Date Analyzed:

S 6010C

2010-09-09 2010-09-09 Prep Method: S 3010A Analyzed By: RR

Prepared By:

Sample Preparation:

RL

Parameter	Flag
Total Cobalt	

Result < 0.00500

Units mg/L Dilution

RL0.00500

KV

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch:

Cu, Total 73359

Analytical Method:

S 6010C 2010-09-09 Prep Method: S 3010A Analyzed By: RR

Prep Batch: 62910

Date Analyzed: Sample Preparation:

2010-09-09

Prepared By:

KV

RL

Parar	neter	
Total	Copper	

Flag Result < 0.00500

Units mg/L Dilution

RL

0.00500

Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: Fe, Total QC Batch: 73359

Analytical Method: Date Analyzed:

S 6010C 2010-09-09 Prep Method: Analyzed By:

S 3010A RR

Prep Batch:

62910

Sample Preparation: 2010-09-09

Prepared By:

KV

Parameter Total Iron

Flag Result 0.119

Units

mg/L

Dilution

RL

0.0100

Sample: 243703 - Post-Carbon

Laboratory: Analysis:

Lubbock

Mn, Total QC Batch: 73359

Analytical Method:

RL

S 6010C 2010-09-09 Prep Method: Analyzed By:

S 3010A

Prep Batch:

62910

Date Analyzed:

Sample Preparation: 2010-09-09

Prepared By:

RRKV

RL

Parameter Flag Total Manganese

Result 0.197

Units mg/L Dilution

RL0.00250

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Lovington, NM

# Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch:

Mo, Total 73359 Prep Batch: 62910

Analytical Method: Date Analyzed:

S 6010C

2010-09-09 Sample Preparation: 2010-09-09 Prep Method: S 3010A Analyzed By: RRPrepared By: KV

RL

Parameter

Flag Result

Units

Dilution

RLTotal Molybdenum < 0.0100 0.0100 mg/L

# Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch: Prep Batch:

Ni, Total 73359 62910

Analytical Method: Date Analyzed:

S 6010C 2010-09-09

Analyzed By: Sample Preparation: 2010-09-09 Prepared By:

RL

Parameter Total Nickel Flag

Result < 0.00500

Units mg/L Dilution 1 RL

0.00500

RR

KV

#### Sample: 243703 - Post-Carbon

Laboratory: Lubbock

Analysis: PAH QC Batch: 73544

Prep Batch: 63094

Analytical Method: Date Analyzed:

Sample Preparation:

S 8270D 2010-09-15 2010-09-09

Prep Method: S 3510C Analyzed By: MNPrepared By: MN

Prep Method: S 3010A

RL

Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Naphthalene		< 0.000184	m mg/L	0.922	0.000200
2-Methylnaphthalene		< 0.000184	$_{ m mg/L}$	0.922	0.000200
1-Methylnaphthalene		< 0.000184	m mg/L	0.922	0.000200
Acenaphthylene		< 0.000184	m mg/L	0.922	0.000200
Acenaphthene		< 0.000184	m mg/L	0.922	0.000200
Dibenzofuran		< 0.000184	m mg/L	0.922	0.000200
Fluorene		< 0.000184	m mg/L	0.922	0.000200
Anthracene		< 0.000184	m mg/L	0.922	0.000200
Phenanthrene		< 0.000184	m mg/L	0.922	0.000200
Fluoranthene		< 0.000184	m mg/L	0.922	0.000200
Pyrene		< 0.000184	m mg/L	0.922	0.000200
Benzo(a)anthracene		< 0.000184	m mg/L	0.922	0.000200
Chrysene		< 0.000184	m mg/L	0.922	0.000200
Benzo(b)fluoranthene		< 0.000184	mg/L	0.922	0.000200

continued ...

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sample 243703 continued ...

		$\mathrm{RL}$			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\mathrm{RL}$
Benzo(k)fluoranthene		< 0.000184	mg/L	0.922	0.000200
Benzo(a)pyrene		< 0.000184	${ m mg/L}$	0.922 -	0.000200
Indeno $(1,2,3\text{-cd})$ pyrene		< 0.000184	$_{ m mg/L}$	0.922	0.000200
Dibenzo(a,h)anthracene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
Benzo(g,h,i)perylene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200

•					Spike	Percent	Recovery
Surrogate	Flag	Result	$\operatorname{Units}$	Dilution	${f Amount}$	Recovery	Limits
Nitrobenzene-d5		0.0515	mg/L	0.922	0.0800	64	10 - 111
2-Fluorobiphenyl		0.0569	m mg/L	0.922	0.0800	71	10 - 92.7
Terphenyl-d14		0.0576	${ m mg/L}$	0.922	$0.0800^{\circ}$	72	35.9 - 107

# Sample: 243703 - Post-Carbon

Dabotatory. Dubbock	Laborato	ry:	Lubbock
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Analysis:	Total 8 Metals	Analytical Method:	S 7470A	Prep Method:	N/A
QC Batch:	73330	Date Analyzed:	2010-09-08	Analyzed By:	$\operatorname{TP}$
Prep Batch:	62883	Sample Preparation:	2010-09-08	Prepared By:	$\operatorname{TP}$
Laboratory:	Lubbock			•	

Analysis: Total 8 Metals Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73359 Date Analyzed: 2010-09-09 Analyzed By: RR Prep Batch: 62910 Sample Preparation: 2010-09-09 Prepared By: KV

		$\mathrm{RL}$			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\operatorname{RL}$
Total Silver		< 0.00500	${ m mg/L}$	1	0.00500
Total Arsenic		< 0.0100	m mg/L	1	0.0100
Total Barium		0.171	m mg/L	1	0.0100
Total Cadmium		< 0.00500	$\mathrm{mg/L}$	1	0.00500
Total Chromium		< 0.00500	m mg/L	1	0.00500
Total Mercury		< 0.000200	m mg/L	1	0.000200
Total Lead		0.00500	$_{ m mg/L}$	1	0.00500
Total Selenium		< 0.0200	mg/L	1	0.0200

#### Sample: 243703 - Post-Carbon

Laboratory	,. 1	[]	obock	r
Laboratory		ւսս	ノいひしょ	٤

Analysis:	Zn, Total	Analytical Method:	S 6010C	Prep Method:	S 3010A
QC Batch:	73359	Date Analyzed:	2010-09-09	Analyzed By:	RR
Prep Batch:	62910	Sample Preparation:	2010-09-09	Prepared By:	KV

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QC Batch:

Parameter

Total Aluminum

Prep Batch: 62910

73359

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Analyzed By: RR

Prepared By: KV

RL

0.05

Units

mg/L

Lovington, NM

11111 91-04			11VIVI 91*05	i Townsend			ovington, iviv
		$_{ m RL}$					
Parameter	Flag	$\operatorname{Result}$		Units	$\operatorname{Dilu}$	tion	RL
Total Zinc		0.0100		mg/L		1	0.00500
Method Blank (1)	QC Batch: 73276		•				
QC Batch: 73276		Date Anal	lvzed: 20	)10-09-07		Analyz	ed By: ER
Prep Batch: 62854		QC Prepa		010-09-07		Prepar	
		<b>√</b> o = - o∤o					
n.	T)		MI		TT 11		pr
Parameter	Flag		Res		Unit		$\frac{\text{RL}}{0.001}$
Benzene Toluene			< 0.0003		mg/		0.001
			< 0.0004		mg/		0.001
Ethylbenzene			< 0.0004		$_{ m mg/L}$		0.001
Xylene			< 0.0003	379	mg/	L,	0.001
					Spike	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits_
Trifluorotoluene (TFT)		0.0983	m mg/L	1	0.100	98	78.4 - 113
4-Bromofluorobenzene (	4-BFB)	0.104	mg/L	1	0.100	104	81.5 - 121
3.5 (1 1 D1 1 /1)	OC D . 1 70000						
Method Blank (1)	QC Batch: 73330						
QC Batch: 73330		Date Ana	lyzed: 20	010-09-08		Analyz	ed By: TP
Prep Batch: 62883		QC Prepa	•	010-09-08		Prepar	•
- 10p =		<b>4</b>		,10 00 00		F	J ·
			$\mathbf{M}$	DL			
Parameter	Flag		Res		Unit		RL_
Total Mercury			< 0.0000	388	mg/l	L	0.0002

Date Analyzed:

Flag

QC Preparation: 2010-09-09

2010-09-09

MDL

 ${\bf Result}$ 

< 0.00404

Report Date: Septemb	er 16, 2010	Work Order: 10 TNM 97-04 Tov	Page Number: 9 of 28 Lovington, NM		
Method Blank (1)	QC Batch: 73359				
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: Prepared By:	RR KV
Parameter	Flag	$\begin{array}{c} \text{MDL} \\ \text{Result} \end{array}$	Units		RL
Total Boron		< 0.00146	mg/L		0.01
Method Blank (1)	QC Batch: 73359				
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: Prepared By:	RR KV
Parameter Total Cobalt	Flag	MDL Result	Units		RL 0.005
Total Cobalt		< 0.00247	mg/L		0.000
Method Blank (1)	QC Batch: 73359				
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: Prepared By:	RR KV
Parameter	Flag	MDL Result	Units		RL
Total Copper		< 0.00205	mg/L		0.005
Method Blank (1)	QC Batch: 73359				
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: Prepared By:	RR KV
Parameter	Flag	MDL Result	Units		RL
Total Iron		< 0.00300	mg/L		0.01
Method Blank (1)	QC Batch: 73359				
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: Prepared By:	RR KV

Report Date: September 16, 2010 TNM 97-04

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continued ...

		MDL		,
Parameter	Flag	Result	Units	RI
Total Manganese		<0.00170	$_{ m mg/L}$	0.00
Method Blank (1)	QC Batch: 73359			
QC Batch: 73359 Prep Batch: 62910	·	Date Analyzed: 2010-09-09 QC Preparation: 2010-09-09		Analyzed By: RI Prepared By: K
Parameter	Flag	$rac{ ext{MDL}}{ ext{Result}}$	Units	R
Total Molybdenum		< 0.00356	mg/L	0.
Method Blank (1)	QC Batch: 73359			
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-09-09 QC Preparation: 2010-09-09		Analyzed By: RI Prepared By: K
Parameter	$\operatorname{Flag}$	MDL Result	Units	R
Total Nickel		< 0.00274	mg/L	0.0
Method Blank (1)	QC Batch: 73359			,
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-09-09 QC Preparation: 2010-09-09		Analyzed By: RI Prepared By: K
Parameter	$\operatorname{Flag}$	$egin{array}{c}  ext{MDL} \  ext{Result} \end{array}$	Units	$\mathbf{R}$
Total Zinc		< 0.00204	mg/L	0.0
Method Blank (1)	QC Batch: 73359			
QC Batch: 73359 Prep Batch: 62910		Date Analyzed: 2010-09-09 QC Preparation: 2010-09-09		Analyzed By: Ri Prepared By: K
11ср Бакси. 02310		MDL		repared by. It
Parameter	Flag	Result	Units	R
Total Silver		< 0.00131	mg/L	0.0
Total Arsenic		< 0.00540	mg/L	0.0
Total Barium		<0.00730 <0.00209	mg/L	0.0 0.0
Total Cadmium		<0.00209	$_{ m mg/L}$	0.0

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method	blank	continued		
memoa	ouum	Communacu		

		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	Result	Units	RL
Total Chromium		< 0.000873	mg/L	0.005
Total Lead		< 0.00494	$\mathrm{mg/L}$	0.005
Total Selenium		< 0.0140	m mg/L	0.02

Method Blank (1)

QC Batch: 73544

QC Batch: 73544 Prep Batch: 63094 Date Analyzed: 2010-09-15 QC Preparation: 2010-09-09 Analyzed By: MN

Prepared By: MN

op 2	do - reberesen	-010 00 00
		MIDI

		MDL		
Parameter	Flag	$\operatorname{Result}$	Units	$\operatorname{RL}$
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	$\mathrm{mg/L}$	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	m mg/L	0.0002
Acenaphthene		< 0.0000617	m mg/L	0.0002
Dibenzofuran		< 0.0000952	m mg/L	0.0002
Fluorene		< 0.000134	$\mathrm{mg/L}$	0.0002
Anthracene		< 0.000441	mg/L	0.0002
Phenanthrene		< 0.000435	m mg/L	0.0002
Fluoranthene		< 0.000476	m mg/L	0.0002
Pyrene		< 0.000590	m mg/L	0.0002
Benzo(a)anthracene	•	< 0.000118	m mg/L	0.0002
Chrysene		< 0.0000766	mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	m mg/L	0.0002
Benzo(a)pyrene		< 0.000132	$\mathrm{mg/L}$	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	mg/L	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

					$_{ m Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	$\mathbf{A}\mathbf{mount}$	Recovery	Limits
Nitrobenzene-d5		0.0243	mg/L	1	0.0800	30	10 - 111
2-Fluorobiphenyl		0.0270	mg/L	1	0.0800	34	10 - 92.7
Terphenyl-d14		0.0385	mg/L	1	0.0800	48	35.9 - 107

# Laboratory Control Spike (LCS-1)

QC Batch: 73276 Prep Batch: 62854 Date Analyzed: 2010-09-07 QC Preparation: 2010-09-07 Analyzed By: ER Prepared By: ER

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Lovington, NM

Param	$rac{ ext{LCS}}{ ext{Result}}$	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.0985	mg/L	1	0.100	< 0.000371	98	79.8 - 112
Toluene	0.0984	mg/L	1	0.100	< 0.000400	98	76.9 - 116
Ethylbenzene	0.0980	mg/L	1	0.100	< 0.000430	98	78.1 - 116
Xylene	0.292	mg/L	1	0.300	< 0.000379	97	80.1 - 113

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	$\mathrm{Rec}.$	Limit	RPD	$\operatorname{Limit}$
Benzene	0.0984	mg/L	1	0.100	< 0.000371	98	79.8 - 112	0	20
Toluene	0.0985	mg/L	1	0.100	< 0.000400	98	76.9 - 116	0	20
Ethylbenzene	0.0986	mg/L	1	0.100	< 0.000430	99	78.1 - 116	1	20
Xylene	0.294	mg/L	1	0.300	< 0.000379	98	80.1 - 113	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$_{ m Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0933	0.0967	mg/L	1	0.100	93	97	75.8 - 111
4-Bromofluorobenzene (4-BFB)	0.0923	0.0968	mg/L	1	0.100	92	. 97	71.9 - 111

# Laboratory Control Spike (LCS-1)

QC Batch:

73330

Date Analyzed:

2010-09-08

TP Analyzed By:

Prep Batch: 62883

QC Preparation:

2010-09-08

Prepared By:

LCS Spike Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit 0.00413 < 0.0000388 91.4 - 111 Total Mercury 0.00400 103 mg/L

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	$\dot{\mathrm{U}}\mathrm{nits}$	Dil.	Amount	$\operatorname{Result}$	Rec.	$\operatorname{Limit}$	RPD	$_{ m Limit}$
Total Mercury	0.00404	mg/L	1	0.00400	< 0.0000388	101	91.4 - 111	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation:

2010-09-09

Prepared By: KV

LCS Spike Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit 85 - 115 Total Aluminum 1.05 < 0.00404 105 mg/L 1 1.00

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Total Aluminum	1.04	mg/L	1	1.00	< 0.00404	104	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: ΚV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$
Total Boron	0.0490	mg/L	1	0.0500	< 0.00146	98	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Boron	0.0500	mg/L	1	0.0500	< 0.00146	100	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Date Analyzed:

2010-09-09

Prepared By: KV

Analyzed By: RR

Prep Batch: 62910

QC Preparation:

2010-09-09

LCS Spike Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit 85 - 115 Total Cobalt 0.252mg/L 0.250 < 0.00247 101

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param .	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
Total Cobalt	0.251	mg/L	1	0.250	< 0.00247	100	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

Prep Batch: 62910

73359

Date Analyzed:

2010-09-09

QC Preparation: 2010-09-09 Analyzed By: RR

Prepared By: KV

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Copper	0.131	mg/L	1	0.125	< 0.00205	105	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	${f A}{f m}{f o}{f u}{f n}{f t}$	Result	Rec.	Limit	RPD	Limit
Total Copper	0.131	$\mathrm{mg/L}$	1	0.125	< 0.00205	105	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-09

Analyzed By: RR

Prepared By: KV

Prep Batch: 62910

QC Preparation: 2010-09-09

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\mathbf{Limit}$
Total Iron	0.508	mg/L	1	0.500	< 0.00300	102	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		${ m Rec.}$		$\operatorname{RPD}$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Iron	0.510	mg/L	1	0.500	< 0.00300	102	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	LCS			$_{ m Spike}$	Matrix		Rec.
Param .	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Manganese	0.253	mg/L	1	0.250	< 0.00170	101	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	$\operatorname{Units}$	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Manganese	0.252	mg/L	1	0.250	< 0.00170	101	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Molybdenum	0.540	$\mathrm{mg/L}$	1	0.500	< 0.00356	108	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Molybdenum	0.540	mg/L	1	0.500	< 0.00356	108	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Laboratory Control Spike (LCS-1)

QC Batch:

73359 Prep Batch: 62910 Date Analyzed:

2010-09-09

Analyzed By: RR

QC Preparation: 2010-09-09

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit
Total Nickel	0.242	mg/L	1	0.250	< 0.00274	97	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	$\operatorname{Dil}$ .	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Nickel	0.242	mg/L	1	0.250	< 0.00274	97	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation:

2010-09-09

Prepared By: KV

LCS Spike Matrix Rec. Param Result Units Dil. Amount Result Rec. Limit Total Zinc 0.244 0.250 < 0.00204 98 85 - 115 mg/L

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\mathbf{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Zinc	0.232	mg/L	1	0.250	< 0.00204	93	85 - 115	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

Report Date: September 16, 2010 Work Order: 10090707 Page Number: 16 of 28 TNM 97-04 TNM 97-04 Townsend Lovington, NM

Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Total Silver	0.126	mg/L	1	0.125	< 0.00131	101	85 - 115
Total Arsenic	0.494	mg/L	1	0.500	< 0.00540	99	85 - 115
Total Barium	1.03	mg/L	1	1.00	< 0.00730	103	85 - 115
Total Cadmium	0.250	mg/L	1	0.250	< 0.00209	100	85 - 115
Total Chromium	0.0980	$\mathrm{mg/L}$	1	0.100	< 0.000873	98	85 - 115
Total Lead	0.490	mg/L	1	0.500	< 0.00494	98	85 - 115
Total Selenium	0.441	mg/L	1	0.500	< 0.0140	88	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Silver	0.127	mg/L	1	0.125	< 0.00131	102	85 - 115	1	20
Total Arsenic	0.489	${ m mg/L}$	1	0.500	< 0.00540	98	85 - 115	1	20
Total Barium	1.03	$\mathrm{mg/L}$	1	1.00	< 0.00730	103	85 - 115	0	20
Total Cadmium	0.251	$\mathrm{mg/L}$	1	0.250	< 0.00209	100	85 - 115	0	20
Total Chromium	0.0960	$\mathrm{mg/L}$	1	0.100	< 0.000873	96	85 - 115	2	20
Total Lead	0.490	mg/L	1	0.500	< 0.00494	98	85 - 115	0	20
Total Selenium	0.445	mg/L	1	0.500	< 0.0140	89	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Laboratory Control Spike (LCS-1)

QC Batch: 73544 Date Analyzed: 2010-09-15 Analyzed By: MN Prep Batch: 63094 QC Preparation: 2010-09-09 Prepared By: MN

Param		LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	$egin{array}{c} \operatorname{Rec.} \ \operatorname{Limit} \end{array}$
Naphthalene		0.0600	mg/L	1	0.0800	< 0.0000784	75	32.2 - 80.3
2-Methylnaphthalene		0.0666	mg/L	1	0.0800	< 0.0000747	83	34.8 - 87
1-Methylnaphthalene		0.0706	mg/L	1	0.0800	< 0.0000575	88	36.9 - 89.6
Acenaphthylene		0.0684	mg/L	1	0.0800	< 0.0000963	86	35 - 93.2
Acenaphthene		0.0673	mg/L	1	0.0800	< 0.0000617	84	35.8 - 92.9
Dibenzofuran		0.0532	mg/L	1	0.0800	< 0.0000952	66	35.3 - 85.1
Fluorene		0.0726	mg/L	1	0.0800	< 0.000134	91	43.4 - 101
Anthracene		0.0573	mg/L	1	0.0800	< 0.000441	72	44.8 - 92.4
Phenanthrene		0.0661	mg/L	1	0.0800	< 0.000435	83	44 - 93.7
Fluoranthene		0.0734	$\mathrm{mg/L}$	1	0.0800	< 0.000476	92	52.7 - 104
Pyrene		0.0631	mg/L	1	0.0800	< 0.000590	. 79	42.2 - 93.8
Benzo(a)anthracene		0.0584	mg/L	1	0.0800	< 0.000118	73	40.4 - 91.9
Chrysene	1	0.0877	mg/L	1	0.0800	< 0.0000766	110	44.4 - 107
Benzo(b)fluoranthene		0.0376	mg/L	1	0.0800	< 0.000146	47	34.8 - 105
Benzo(k)fluoranthene		0.0507	$\mathrm{mg/L}$	1	0.0800	< 0.000141	63	50.2 - 158

 $continued \dots$ 

<sup>&</sup>lt;sup>1</sup>Spike analyte out of control limits. Results biased high. •

 $\rm TNM~97\text{-}04$ 

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control spikes continued ...

	LCS			$\operatorname{Spike}$	$\operatorname{Matrix}$		${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Benzo(a)pyrene	0.0504	mg/L	1	0.0800	< 0.000132	63	51.3 - 151
Indeno(1,2,3-cd)pyrene	0.0488	${ m mg/L}$	1	0.0800	< 0.0000702	61	43.2 - 115
Dibenzo(a,h)anthracene	0.0702	${ m mg/L}$	1	0.0800	< 0.0000534	88	43.9 - 115
Benzo(g,h,i)perylene	0.0451	$\mathrm{mg/L}$	1	0.0800	< 0.0000473	56	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\operatorname{Limit}$	RPD	Limit
Naphthalene	2	0.0662	mg/L	1	0.0800	< 0.0000784	83	32.2 - 80.3	10	20
2-Methylnaphthalene	3	0.0746	mg/L	1	0.0800	< 0.0000747	93	34.8 - 87	11	20
1-Methylnaphthalene	4	0.0775	mg/L	1	0.0800	< 0.0000575	97	36.9 - 89.6	9	20
Acenaphthylene	5	0.0762	mg/L	1	0.0800	< 0.0000963	95	35 - 93.2	11	20
Acenaphthene		0.0740	mg/L	1	0.0800	< 0.0000617	92	35.8 - 92.9	10	20
Dibenzofuran		0.0586	$\mathrm{mg/L}$	1	0.0800	< 0.0000952	73	35.3 - 85.1	10	20
Fluorene		0.0794	mg/L	1	0.0800	< 0.000134	99	43.4 - 101	9	20
Anthracene	6	0.0705	$\mathrm{mg/L}$	1	0.0800	< 0.000441	88	44.8 - 92.4	21	20
Phenanthrene		0.0744	$\mathrm{mg/L}$	1	0.0800	< 0.000435	93	44 - 93.7	12	20
Fluoranthene	7	0.0920	$\mathrm{mg/L}$	1	0.0800	< 0.000476	115	52.7 - 104	22	20
Pyrene		0.0612	mg/L	1	0.0800	< 0.000590	76	42.2 - 93.8	3	20
Benzo(a)anthracene		0.0638	$\mathrm{mg/L}$	1	0.0800	< 0.000118	80	40.4 - 91.9	9	20
Chrysene	8	0.0876	$\mathrm{mg/L}$	1	0.0800	< 0.0000766	110	44.4 - 107	0	20
Benzo(b)fluoranthene	9	0.0510	mg/L	1	0.0800	< 0.000146	64	34.8 - 105	30	20
Benzo(k)fluoranthene	10	0.0710	mg/L	1	0.0800	< 0.000141	89	50.2 - 158	33	20
Benzo(a)pyrene		0.0589	mg/L	1	0.0800	< 0.000132	74	51.3 - 151	16	20
Indeno(1,2,3-cd)pyrene	11	0.0600	mg/L	1	0.0800	< 0.0000702	75	43.2 - 115	21	20
Dibenzo(a,h)anthracene	12	0.0864	mg/L	1	0.0800	< 0.0000534	108	43.9 - 115	21	20
Benzo(g,h,i)perylene	13	0.0574	mg/L	1	0.0800	< 0.0000473	72	45.1 - 115	24	20

	LCS	LCSD			$\operatorname{Spike}$	LCS	LCSD	$\mathrm{Rec}.$
Surrogate	$\operatorname{Result}$	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Nitrobenzene-d5	0.0607	0.0650	mg/L	1	0.0800	76	81	10 - 111
2-Fluorobiphenyl	0.0602	0.0665	mg/L	1	0.0800	75	83	10 - 92.7
Terphenyl-d14	0.0617	0.0578	mg/L	. 1	0.0800	77	72	35.9 - 107

<sup>&</sup>lt;sup>2</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occurred properly.

<sup>&</sup>lt;sup>3</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

<sup>&</sup>lt;sup>4</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occurred properly.

<sup>&</sup>lt;sup>5</sup>LCSD analyte out of range: LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occurred properly.

<sup>&</sup>lt;sup>6</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>7</sup>Spike analyte recovery and RPD out of control limits. Results biased high.

<sup>&</sup>lt;sup>8</sup>Spike analyte recovery out of control limits. Results biased high. •

<sup>&</sup>lt;sup>9</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>10</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>11</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>12</sup>RPD outside RPD control limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>13</sup>RPD outside RPD control limits. Analyte not detected in samples.

TNM 97-04

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Matrix Spike (MS-1) Spiked Sample: 243638

QC Batch: 73276 Prep Batch: 62854 Date Analyzed: 2010-09-07 QC Preparation: 2010-09-07

Analyzed By: ER Prepared By: ER

		MS			$_{ m Spike}$	Matrix		Rec.
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene		0.0352	mg/L	1	0.100	0.0009	34	29.6 - 139
Toluene	14	0.0342	mg/L	1	0.100	0.0011	33	44.3 - 131
Ethylbenzene	15	0.0338	mg/L	1	0.100	< 0.000430	34	43.8 - 131
Xylene	16	0.105	mg/L	1	0.300	0.0043	34	48.8 - 126

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		MSD			$_{ m Spike}$	Matrix		$\operatorname{Rec}$ .		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Benzene	17	0.0541	mg/L	1	0.100	0.0009	53	29.6 - 139	42	20
Toluene	18	0.0531	mg/L	1	0.100	0.0011	52	44.3 - 131	43	20
Ethylbenzene	19	0.0526	mg/L	1.	0.100	< 0.000430	53	43.8 - 131	44	20
Xylene	20	0.161	mg/L	1	0.300	0.0043	52	48.8 - 126	42	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	${f Amount}$	${ m Rec.}$	Rec.	Limit
Trifluorotoluene (TFT)	0.0988	0.0923	mg/L	1	0.1	99	92	73.9 - 118
4-Bromofluorobenzene (4-BFB)	0.101	0.0953	mg/L	1	0.1	101	95	73.8 - 116

Matrix Spike (MS-1) Spiked Sample: 243703

QC Batch: 73330 Prep Batch: 62883 Date Analyzed: 2010-09-08 QC Preparation: 2010-09-08

Analyzed By: TP Prepared By: TP

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Mercury	0.00384	${ m mg/L}$	1	0.00400	< 0.0000388	96	75 - 122

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Mercury	0.00389	mg/L	1	0.00400	< 0.0000388	97	75 - 122	1	20

<sup>&</sup>lt;sup>14</sup>Matrix spike recovery out of control limits. Use LCS/LCSD to demonstrate analysis is under control.

<sup>&</sup>lt;sup>15</sup>Matrix spike recovery out of control limits. Use LCS/LCSD to demonstrate analysis is under control.

 $<sup>^{16}\</sup>mathrm{Matrix}$  spike recovery out of control limits. Use LCS/LCSD to demonstrate analysis is under control.

<sup>&</sup>lt;sup>17</sup>MS/MSD RPD out of RPD Limits. Use LCS/LCSD to demonstrate analysis is under control.

<sup>&</sup>lt;sup>18</sup>MS/MSD RPD out of RPD Limits. Use LCS/LCSD to demonstrate analysis is under control.

 $<sup>^{19}\</sup>rm MS/MSD$  RPD out of RPD Limits. Use LCS/LCSD to demonstrate analysis is under control.  $^{20}\rm MS/MSD$  RPD out of RPD Limits. Use LCS/LCSD to demonstrate analysis is under control.

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR KV

Prep Batch:

62910

QC Preparation:

2010-09-09

Prepared By:

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\mathbf{Limit}$
Total Aluminum	0.875	${ m mg/L}$	1	1.00	< 0.00404	88	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Aluminum	0.963	mg/L	1	1.00	< 0.00404	96	75 - 125	10	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch:

62910

QC Preparation:

2010-09-09

Prepared By: KV

MSSpike Matrix Rec. Param Result Dil. Amount Result Limit Units Rec. < 0.00146 Total Boron 75 - 125 0.0490 mg/L 0.0500 98 1

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0480	mg/L	1	0.0500	< 0.00146	96	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Prep Batch: 62910

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

QC Preparation: 2010-09-09 Prepared By:

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}_{-}$
Total Cobalt	0.236	${ m mg/L}$	1	0.250	< 0.00247	94	75 - 125

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	MSD	•		Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\operatorname{Limit}$ .	RPD	Limit
Total Cobalt	0.238	mg/L	1	0.250	< 0.00247	95	75 - 125	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch: Prep Batch: 73359

62910

Date Analyzed:

2010-09-09

Analyzed By: RR

QC Preparation: 2010-09-09

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Total Copper	0.126	mg/L	1	0.125	< 0.00205	101	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result.	Rec.	Limit	RPD	Limit
Total Copper	0.129	mg/L	1	0.125	< 0.00205	103	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359 Prep Batch: 62910

Date Analyzed:

2010-09-09

QC Preparation: 2010-09-09

Analyzed By: RR

Prepared By: KV

	MS ·			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Iron	0.507	mg/L	1	0.500	< 0.00300	101	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit	RPD	Limit
Total Iron	0.507	mg/L	1	0.500	< 0.00300	101	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch: Prep Batch: 73359

Date Analyzed:

2010-09-09

Analyzed By: RR

62910

QC Preparation:

2010-09-09

Prepared By: KV

 $\overline{continued}$  . . .

TNM 97-04

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	ma	itrix	spikes	continued				
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T	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
	MS			$\operatorname{Spike}$	Matrix		$\mathrm{Rec}.$
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Manganese	0.242	mg/L	1	0.250	< 0.00170	97	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
Total Manganese	0.246	mg/L	1	0.250	< 0.00170	98	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	MS			$\operatorname{Spike}$	Matrix		${ m Rec.}$
Param	Result	. Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Molybdenum	0.498	mg/L	1	0.500	< 0.00356	100	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	$\mathbf{A}$ mount	Result	Rec.	Limit	RPD	Limit
Total Molybdenum	0.505	mg/L	1	0.500	< 0.00356	101	75 - 125	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	MS			$\operatorname{Spike}$	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Nickel	0.239	mg/L	1	0.250	< 0.00274	96	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit.
Total Nickel	0.242	mg/L	1	0.250	< 0.00274	97	75 - 125	1	20

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Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359 Prep Batch: 62910 Date Analyzed:

2010-09-09

QC Preparation: 2010-09-09

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix	٠	${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Zinc	0.234	mg/L	1	0.250	< 0.00204	94	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Zinc	0.234	mg/L	1	0.250	< 0.00204	94	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243830

QC Batch:

73359

Date Analyzed:

2010-09-09

Analyzed By: RR

Prep Batch: 62910

QC Preparation: 2010-09-09

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Silver	0.126	mg/L	1	0.125	< 0.00131	101	75 - 125
Total Arsenic	0.499	mg/L	1	0.500	< 0.00540	100	75 - 125
Total Barium	0.982	$_{ m mg/L}$	1	1.00	< 0.00730	98	75 - 125
Total Cadmium	0.232	mg/L	1	0.250	< 0.00209	93	75 - 125
Total Chromium	0.0910	mg/L	1	0.100	< 0.000873	91	75 - 125
Total Lead	0.454	mg/L	1	0.500	0.01	89	75 - 125
Total Selenium	0.448	$\mathrm{mg/L}$	11	0.500	< 0.0140	90	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		$\mathrm{Rec}.$		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$_{ m Limit}$	RPD	Limit
Total Silver	0.125	mg/L	1	0.125	< 0.00131	100	75 - 125	1	20
Total Arsenic	0.507	m mg/L	1	0.500	< 0.00540	101	75 - 125	2	20
Total Barium	0.984	mg/L	1	1.00	< 0.00730	98	75 - 125	0	20
Total Cadmium	0.238	mg/L	1	0.250	< 0.00209	95	75 - 125	3	20
Total Chromium	0.0900	mg/L	1	0.100	< 0.000873	90	75 - 125	1	20
Total Lead	0.454	mg/L	1	0.500	0.01	89	75 - 125	0	20
Total Selenium	0.441	mg/L	1	0.500	< 0.0140	88	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (CCV-2)

QC Batch: 73276

Date Analyzed: 2010-09-07

Analyzed By: ER

Report Date: September 16, 2010 TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend

Page Number: 23 of 28 Lovington, NM

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0945	94	80 - 120	2010-09-07
Toluene		mg/L	0.100	0.0938	94	80 - 120	2010-09-07
Ethylbenzene		mg/L	0.100	0.0931	93	80 - 120	2010-09-07
Xylene		mg/L	0.300	0.280	93	80 - 120	2010-09-07

# Standard (CCV-3)

QC Batch: 73276

Date Analyzed: 2010-09-07

Analyzed By: ER

			CCVs	$\mathrm{CCVs}$	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0959	96	80 - 120	2010-09-07
Toluene		mg/L	0.100	0.0946	95	80 - 120	2010-09-07
Ethylbenzene		mg/L	0.100	0.0939	94	80 - 120	2010-09-07
Xylene		mg/L	0.300	0.281	94	80 - 120	2010-09-07

# Standard (CCV-1)

QC Batch: 73330

Date Analyzed: 2010-09-08

Analyzed By: TP

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00511	102	90 - 110	2010-09-08

# Standard (CCV-2)

QC Batch: 73330

Date Analyzed: 2010-09-08

Analyzed By: TP

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Mercury	* *****	$\frac{\rm mg/L}{}$	0.00500	0.00512	102	90 - 110	2010-09-08

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend

Page Number: 24 of 28

Lovington, NM

			ICVs True	ICVs Found	$\begin{array}{c} {\rm ICVs} \\ {\rm Percent} \end{array}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		${ m mg/L}$	1.00	1.03	103	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		$\mathrm{mg/L}$	1.00	1.02	102	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		mg/L	1.00	1.05	105	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		mg/L	1.00	1.01	101	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	1.02	102	90 - 110	2010-09-09

#### Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend

Page Number: 25 of 28

Lovington, NM

			ICVs True	ICVs Found	ICVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		${ m mg/L}$	1.00	1.05	105	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	$\operatorname{Found}$	$\operatorname{Percent}$	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		$\mathrm{mg/L}$	1.00	1.03	103	90 - 110	2010-09-09

#### Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	Doto
Param	Flag	Units	True Conc.	Found Conc.	Percent Recovery	$egin{array}{c}  ext{Recovery} \  ext{Limits} \end{array}$	Date Analyzed
Total Nickel		$\mathrm{mg/L}$	1.00	1.06	106	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	1.03	103	90 - 110	2010-09-09

# Standard (ICV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			ICVs	ICVs	ICVs	$\operatorname{Percent}$	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Silver		mg/L	0.250	0.249	100	90 - 110	2010-09-09
Total Arsenic		${ m mg/L}$	2.00	2.02	101	95 - 105	2010-09-09
Total Barium		$\mathrm{mg/L}$	1.00	1.04	104	90 - 110	2010-09-09
Total Cadmium		mg/L	1.00	1.04	104	90 - 110	2010-09-09
Total Chromium		mg/L	1.00	1.05	105	90 - 110	2010-09-09
Total Lead		${ m mg/L}$	1.00	0.989	99	90 - 110	2010-09-09

continued ...

Report Date:	September	16, 2010
TNM 97-04		

Work Order: 10090707 TNM 97-04 Townsend

Page Number: 26 of 28 Lovington, NM

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$_{ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Total Selenium	<u> </u>	mg/L	1.00	0.986	99	90 - 110	2010-09-09

# Standard (CCV-1)

OC.	Batch:	73359
$\omega$	Daten.	10000

Date Analyzed: 2010-09-09

Analyzed By: RR

			$\mathrm{CCVs}$	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		mg/L	1.00	1.02	102	90 - 110	2010-09-09

# Standard (CCV-1)

~ ~	** . 1	
$\omega$ C	Batch:	-73359

Date Analyzed: 2010-09-09

Analyzed By: RR

	•		$\begin{array}{c} { m CCVs} \\ { m True} \end{array}$	${ m CCVs} \ { m Found}$	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		mg/L	1.00	0.993	99	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		mg/L	1.00	1.00	100	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

		•	${ m CCVs} \ { m True}$	${ m CCVs} \ { m Found}$	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		mg/L	1.00	1.01	101	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

· Analyzed By: RR

TNM 97-04

Work Order: 10090707

TNM 97-04 Townsend

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Lovington, NM

	,		${ m CCVs} \ { m True}$	${ m CCVs} \ { m Found}$	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		$\mathrm{mg/L}$	1.00	1.04	104	90 - 110	2010-09-09

#### Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	$\operatorname{Percent}$	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		$\mathrm{mg/L}$	1.00	1.01	101	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			CCVs True	CCVs Found	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	Flag	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		$_{ m mg/L}$	1.00	0.983	98	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	ъ.
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Units}$	$\operatorname{Conc.}$	$\operatorname{Conc}$ .	$\operatorname{Recovery}$	$\operatorname{Limits}$	Analyzed
Total Nickel		${ m mg/L}$	1.00	0.979	98	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		$\mathrm{mg/L}$	1.00	0.978	98	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73359

Date Analyzed: 2010-09-09

Analyzed By: RR

TNM 97-04

Work Order: 10090707 TNM 97-04 Townsend Page Number: 28 of 28 Lovington, NM

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Silver		mg/L	0.125	0.126	101	90 - 110	2010-09-09
Total Arsenic		$\mathrm{mg/L}$	1.00	0.953	95	90 - 110	2010-09-09
Total Barium		mg/L	1.00	1.00	100	90 - 110	2010-09-09
Total Cadmium		mg/L	1.00	0.968	97	90 - 110	2010-09-09
Total Chromium		mg/L	1.00	0.997	· 100	90 - 110	2010-09-09
Total Lead		$_{ m mg/L}$	1.00	1.00	100	90 - 110	2010-09-09
Total Selenium		mg/L	1.00	0.956	96	90 - 110	2010-09-09

# Standard (CCV-1)

QC Batch: 73544

Date Analyzed: 2010-09-15

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		${ m mg/L}$	60.0	58.4	97	80 - 120	2010-09-15
2-Methylnaphthalene		${ m mg/L}$	60.0	61.9	103	80 - 120	2010-09-15
1-Methylnaphthalene		m mg/L	60.0	61.7	103	80 - 120	2010-09-15
Acenaphthylene		m mg/L	60.0	56.5	94	80 - 120	2010-09-15
Acenaphthene		m mg/L	60.0	57.0	95	80 - 120	2010-09-15
Dibenzofuran		m mg/L	60.0	60.8	101	80 - 120	2010-09-15
Fluorene		mg/L	60.0	61.6	103	80 - 120	2010-09-15
Anthracene		m mg/L	60.0	52.7	88	80 - 120	2010-09-15
Phenanthrene		m mg/L	60.0	56.9	95	80 - 120	2010-09-15
Fluoranthene		${ m mg/L}$	60.0	54.5	91	80 - 120	2010-09-15
Pyrene -		${ m mg/L}$	60.0	62.3	104	80 - 120	2010-09-15
Benzo(a)anthracene		mg/L	60.0	53.3	89	80 - 120	2010-09-15
Chrysene		$_{ m mg/L}$	60.0	68.0	113	80 - 120	2010-09-15
Benzo(b)fluoranthene		mg/L	60.0	51.8	86	80 - 120	2010-09-15
Benzo(k)fluoranthene		${ m mg/L}$	60.0	67.2	112	80 - 120	2010-09-15
Benzo(a)pyrene		$_{ m mg/L}$	60.0	60.8	101	80 - 120	2010-09-15
Indeno(1,2,3-cd)pyrene		${ m mg/L}$	60.0	56.3	94	80 - 120	2010-09-15
Dibenzo(a,h)anthracene		${ m mg/L}$	60.0	57.3	96	80 - 120	2010-09-15
Benzo(g,h,i)perylene		m mg/L	60.0	59.5	99	80 - 120	2010-09-15

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5	2 1000	61.9	mg/L	1	60.0	103	80 - 120
2-Fluorobiphenyl		60.8	mg/L	1	60.0	101	80 - 120
Terphenyl-d14		63.3	$\mathrm{mg/L}$	1 ·	60.0	106	80 - 120

LAB Order ID # /0090707

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2011 tests-tulked Turn Around Time if different from standard BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750 or specify Wethod Ni Cs, Mg, K, TDS, EC Νa, CI' EI' 204' NO3' NOS' YIKalinity **ANALYSIS REQUEST** Moisture Content Dry Weight Basis Required Check If Special Reporting Limits Are Needed Hq ,22T ,008 TRRP Report Required Pesticides 8081 / 608 PCB's 8082 / 608 200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (1915) 585-3443 Fax (1915) 585-3443 1 (888) 588-3443 GC/MS Semi. Vol. 8270 / 625 REMARKS CC/W2 A91, 8260 / 624 TCLP Pesticides TCLP Semi Volatiles 9010 Headspace Y N NA TCLP Volatiles AB USE ONLY TCLP Metals Ag As Ba Cd Cr Pb Se Hg Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313 PAH 8270 625 TPH 8015 GRO / DRO / TVHC TPH 418.1 / TX1005 / TX1005 Ext(C35) 10 81EX 8051) 605 | 8560 | 624 F. & S80 COR 3.7 \$021 \ 602 \ 8260 \ 624 MT8E INST OBS INST OBS COR COR 1330 INST SAMPLING **BMIT** 05:11 Time: 40 Time: 6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1296 **BTA**0 01/2 Date: Date: PRESERVATIVE NONE ICE METHOD Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. Fig. 7.720 Fig. 7.720 Fig. 7.701 Fig. 7.701 HOPN Company: Company: pler Signatu Company Sylves ACCE CO <sup>†</sup>OS²H Project Name:  $^{\epsilon}$ ONH HCI Received by: Received by: Received by: SCUDGE MATRIX Trace Analysis, Inc. AIA TIOS **MATER** email: lab@traceanalysis.com 3,5 Volume / Amount Time: Time: Time: # CONTAINERS 91310 9/12/A C 9 3 19-19-(If different from above) HALLS FIELD CODE TARG Company: Сотрапу: Company: Project Location (including state): 420 32 Relinquished by Relinquished by: Relinquished by Company Name: Contact Personx LAB USE 243703 Invoice to: Project #: Address: LAB#

Carrier #

CHICAL BARACHOL



6701 Aberdeen Avenue, Suite 9 200 Éast Sunset Boad, Suite E. 5002 Basin Street, Suite A1

Lubbook, Texas 79424 El Paso, Texas 79922 Midland Texas 79703

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# Certifications

**WBENC:** 237019

HUB:

1752439743100-86536

DBE:

VN 20657

NCTRCA WFWB38444Y0909

# NELAP Certifications

Lubbock: T104704219-08-TX

LELAP-02003

El Paso:

T104704221-08-TX

LELAP-02002

Midland:

T104704392-08-TX

Kansas E-10317

# Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: September 28, 2010

Work Order: 

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			$\operatorname{Date}$	${f Time}$	$\operatorname{Date}$
Sample	Description	Matrix	Taken	Taken	Received
243988	Post-Carbon	water	2010-09-10	11:15	2010-09-10

#### NOTE

Work Order 10091008: HNO3 bottle received with a pH above 2. Added HNO3 in Lubbock lab.

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 28 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

# Standard Flags

 ${\bf B}$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-09-10 and assigned to work order 10091008. Samples for work order 10091008 were received intact without headspace and at a temperature of 3.8 C.

Samples were analyzed for the following tests using their respective methods.

		$\operatorname{Prep}$	Prep	QC	Analysis
Test	Method	Batch	Date	Batch	Date
Ag, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Al, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
As, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Ba, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
BTEX	S 8021B	62959	2010-09-10 at $11:45$	73407	2010-09-10 at 12:49
B, Total	S 6010C	63010	2010-09-14 at $08:53$	73465	2010-09-14 at $10:47$
Cd, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Co, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Cr, Total	$S_{010C}$	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Cu, Total	S 6010C	63010	2010-09-14 at $08:53$	73465	2010-09-14 at 10:47
Fe, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Hg, Total	S 7470A	63181	2010-09-20 at 14:02	73659	2010-09-20 at 16:20
Mn, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Mo, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Ni, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
PAH	S 8270D	63356	2010-09-17 at 15:00	73832	2010-09-26 at 13:25
Pb, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Se, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47
Zn, Total	S 6010C	63010	2010-09-14 at 08:53	73465	2010-09-14 at 10:47

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10091008 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10091008 TNM 97-04 Townsend

Page Number: 4 of 28 Lovington, NM

# **Analytical Report**

Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch: Prep Batch:

Al, Total 73465 63010

Analytical Method: Date Analyzed:

Sample Preparation:

S 6010C

2010-09-14 2010-09-14 Prep Method: S 3010A Analyzed By: RR

KV

Prepared By:

RL

Parameter Flag Result Units Dilution RLTotal Aluminum < 0.0500 0.0500 mg/L

Sample: 243988 - Post-Carbon

Laboratory: Analysis:

Lubbock B, Total QC Batch: 73465 Prep Batch: 63010

Analytical Method: Date Analyzed:

Sample Preparation:

S 6010C 2010-09-14 2010-09-14 Prep Method: S 3010A

Analyzed By: RRKVPrepared By:

RLParameter Flag Result Total Boron 0.168

Dilution RLUnits 0.0100mg/L

Sample: 243988 - Post-Carbon

Laboratory: Midland

Analysis: BTEX QC Batch: 73407 Prep Batch: 62959

Analytical Method: Date Analyzed:

S 8021B 2010-09-10 Sample Preparation: 2010-09-10 Prep Method: S 5030B Analyzed By: AG Prepared By: AG

RLParameter Flag Result Units Dilution RLBenzene 0.00100 < 0.00100 mg/L1 Toluene < 0.00100 mg/L1 0.00100 1 0.00100Ethylbenzene < 0.00100 mg/L Xylene 1 0.00100 < 0.00100 mg/L

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
	1 108	recourt	Omto	Dilution	Amount	Ttccovery	
Trifluorotoluene (TFT)		0.0975	$_{ m mg/L}$	1	0.100	98	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0522	$_{ m mg/L}$	1	0.100	52	51.1 - 128

TNM 97-04

Work Order: 10091008

TNM 97-04 Townsend

Page Number: 5 of 28 Lovington, NM

KV

RL

0.00500

Sample: 243988 - Post-Carbon

Laboratory:

Lubbock

Analysis: QC Batch: Prep Batch: Co, Total 73465

Analytical Method: Date Analyzed:

S 6010C

2010-09-14 2010-09-14 Prep Method: S 3010A Analyzed By: RR

RL

Sample Preparation:

Flag Parameter Total Cobalt

63010

Result < 0.00500

Units mg/L Dilution

 $\overline{1}$ 

Prepared By:

Sample: 243988 - Post-Carbon

Laboratory:

Lubbock

Analysis: Cu, Total QC Batch: 73465 Prep Batch: 63010

Analytical Method: Date Analyzed:

S 6010C 2010-09-14 Sample Preparation: 2010-09-14

Prep Method: S 3010A Analyzed By: RRPrepared By: KV

RL

Parameter Total Copper Flag Result < 0.00500

Units mg/L Dilution 1

RL0.00500

Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Fe, Total Analysis: QC Batch: 73465 Prep Batch: 63010

Analytical Method: Date Analyzed:

S 6010C 2010-09-14

S 3010A Prep Method: Analyzed By: RR

Flag

RL

Sample Preparation:

2010-09-14

Prepared By:

KV

Parameter Result Units Dilution RLTotal Iron 0.1770.0100 mg/L

Sample: 243988 - Post-Carbon

Laboratory: Analysis:

Lubbock

Mn, Total QC Batch: 73465 Prep Batch: 63010

Analytical Method: Date Analyzed:

S 6010C 2010-09-14 Prep Method: S 3010A

Sample Preparation: 2010-09-14

Analyzed By: RRKV Prepared By:

RL

Result RLParameter Flag Units Dilution 0.00500 Total Manganese 0.0910 mg/L

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# Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Mo, Total Analysis: QC Batch: 73465

Prep Batch: 63010

Analytical Method: Date Analyzed:

Sample Preparation:

S 6010C 2010-09-14

Prep Method: S 3010A Analyzed By: RRPrepared By: KV2010-09-14

RL

Parameter	$\operatorname{Flag}$	Result	${ m Units}$	Dilution	RL
Total Molybdenum		< 0.0500	mg/L	1.	0.0500

# Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Analysis: Ni, Total QC Batch: 73465 Prep Batch: 63010

Analytical Method: S 6010C Date Analyzed:

2010-09-14 Sample Preparation: 2010-09-14 Prep Method: S 3010A Analyzed By: RRPrepared By: KV

Parameter	Flag	Result	Units	Dilution	RL
Total Nickel		< 0.0100	mg/L	1	0.0100

#### Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Analysis: PAHQC Batch: 73832 Prep Batch: 63356

Benzo(b)fluoranthene

Analytical Method: Date Analyzed:

Sample Preparation:

RL

S 8270D 2010-09-26 2010-09-17

mg/L

Prep Method: S 3510C

Analyzed By: MNPrepared By: MN

0.000200

Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\mathrm{RL}$
Naphthalene		< 0.000186	mg/L	0.93	0.000200
2-Methylnaphthalene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
1-Methylnaphthalene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
Acenaphthylene		< 0.000186	${ m mg/L}$	0.93	0.000200
Acenaphthene		< 0.000186	mg/L	0.93	0.000200
Dibenzofuran		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
Fluorene		< 0.000186	${ m mg/L}$	0.93	0.000200
Anthracene		< 0.000186	mg/L	0.93	0.000200
Phenanthrene		< 0.000186	mg/L	0.93	0.000200
Fluoranthene		< 0.000186	mg/L	0.93	0.000200
Pyrene		< 0.000186	mg/L	-0.93	0.000200
Benzo(a)anthracene,		< 0.000186	mg/L	0.93	0.000200
Chrysene		< 0.000186	mg/L	0.93	0.000200

< 0.000186

RL

 $continued \dots$ 

0.93

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sample 243988 continued ...

m RL							
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\mathrm{RL}$		
Benzo(k)fluoranthene		< 0.000186	mg/L	0.93	0.000200		
Benzo(a)pyrene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200		
Indeno(1,2,3-cd)pyrene		< 0.000186	mg/L	0.93	0.000200		
Dibenzo(a,h)anthracene		< 0.000186	mg/L	0.93	0.000200		
Benzo(g,h,i)perylene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200		

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		0.0203	mg/L	0.93	0.0800	25	10 - 111
2-Fluorobiphenyl		0.0239	$_{ m mg/L}$	0.93	0.0800	30	10 - 92.7
Terphenyl-d14		0.0451	${ m mg/L}$	0.93	0.0800	56	35.9 - 107

#### Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Analysis: Total 8 Metals Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RRPrep Batch: 63010 Prepared By: KVSample Preparation: 2010-09-14 Laboratory: Lubbock N/A Analysis: Total 8 Metals Analytical Method: S 7470A Prep Method:

Analysis: Total 8 Metals Analytical Method: S 7470A Prep Method: N/A QC Batch: 73659 Date Analyzed: 2010-09-20 Analyzed By: TP Prep Batch: 63181 Sample Preparation: 2010-09-20 Prepared By: TP

		RL			
Parameter	Flag	Result	Units	Dilution	RL
Total Silver		< 0.00500	mg/L	1	0.00500
Total Arsenic		< 0.0100	m mg/L	1	0.0100
Total Barium		0.243	mg/L	1	0.0100
Total Cadmium		< 0.00500	m mg/L	1	0.00500
Total Chromium		< 0.0100	mg/L	1	0.0100
Total Mercury		< 0.000200	$\mathrm{mg/L}$	1	0.000200
Total Lead	•	< 0.00500	$\mathrm{mg/L}$	1	0.00500
Total Selenium		< 0.0200	${ m mg/L}$	1	0.0200

#### Sample: 243988 - Post-Carbon

Laboratory: Lubbock

Analysis: Zn, Total Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR Prep Batch: 63010 Sample Preparation: 2010-09-14 Prepared By: KV

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		RL				•	
Parameter	Flag	Result		Units	Dilu	ıtion	RL
Total Zinc		<0.00500		mg/L		1	0.00500
Method Blank (1)	QC Batch: 73407	7					
QC Batch: 73407		Date Anal	lvzed: 2	2010-09-10		Analyz	ed Bv: AG
Prep Batch: 62959		QC Prepa		2010-09-10		Prepare	
		•	λ	łDL			
Parameter	$\operatorname{Flag}$		$R\epsilon$	esult	Unit	ts	$\mathrm{RL}$
Benzene			< 0.000	0600	mg/	L	0.001
Toluene			< 0.000	0600	mg/	$\mathbf{L}$	0.001
Ethylbenzene			< 0.000	0800	mg/	L	0.001
Xylene			< 0.000	0767	mg/	L	0.001
					Spike	Percent	Recovery
Surrogate	Flag	$\operatorname{Result}$	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0971	mg/L	1	0.100	97	70.2 - 118
4-Bromofluorobenzene (4	4-BFB)	0.0541	mg/L	. 1	0.100	54	47.3 - 116

Method Blank (1) QC Batch: 73465

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

Prepared By: KV

QC Preparation: 2010-09-14

		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	Result	Units	RL
Total Aluminum		< 0.00982	${ m mg/L}$	0.05

Method Blank (1)

QC Batch: 7.3465

QC Batch:

73465 Prep Batch: 63010 Date Analyzed:

2010-09-14

Analyzed By: RR

Prepared By:

MDL

Units RLResult Parameter Flag 0.01 Total Boron < 0.00215 mg/L

QC Preparation: 2010-09-14

Report Date: Septemb TNM 97-04	er 28, 2010	Work Order: 10 TNM 97-04 Tov	Page Number: 9 of 28 Lovington, NM	
Method Blank (1)	QC Batch: 73465			
QC Batch: 73465 Prep Batch: 63010		Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: RR Prepared By: KV
Parameter	Flag	$egin{array}{l}  ext{MDL} \  ext{Result} \end{array}$	Units	RL
Total Cobalt	Ü	< 0.00258	mg/L	0.005
Method Blank (1)	QC Batch: 73465			
QC Batch: 73465 Prep Batch: 63010		Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: RR Prepared By: KV
Parameter	Flag	MDL Result	Units	RL
Total Copper		< 0.00313	mg/L	0.005
Method Blank (1)  QC Batch: 73465  Prep Batch: 63010	QC Batch: 73465	Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: RR Prepared By: KV
Parameter	Flag	MDL Result	Units	RL
Total Iron		< 0.00273	m mg/L	0.01
Method Blank (1)	QC Batch: 73465			
QC Batch: 73465 Prep Batch: 63010		Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: RR Prepared By: KV
Parameter	Flag	MDL Result	Units	RL
Total Manganese		< 0.00423	mg/L	0.005
Method Blank (1)	QC Batch: 73465	•		
QC Batch: 73465 Prep Batch: 63010		Date Analyzed: 2010-0 QC Preparation: 2010-0		Analyzed By: RR Prepared By: KV

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Parameter	$\operatorname{Flag}$	$rac{ ext{MDL}}{ ext{Result}}$	Units		$_{ m RL}$
Total Molybdenum		< 0.00164	mg/L		0.05
Method Blank (1)	QC Batch: 73465				
QC Batch: 73465		Date Analyzed: 2010-09-14		Analyzed By:	RR
Prep Batch: 63010		QC Preparation: 2010-09-14		Prepared By:	KV
		$\mathrm{MDL}$			
Parameter	Flag	Result	Units		RL
Total Nickel		< 0.00593	mg/L		0.01
Method Blank (1)	QC Batch: 73465				
QC Batch: 73465		Date Analyzed: 2010-09-14		Analyzed By:	RR
Prep Batch: 63010		QC Preparation: 2010-09-14		Prepared By:	KV
		$\operatorname{MDL}$	,		
Parameter	Flag	Result	Units		RL
Total Zinc		< 0.00178	mg/L		0.005
Method Blank (1)	QC Batch: 73465				
QC Batch: 73465		Date Analyzed: 2010-09-14		Analyzed By:	RR
Prep Batch: 63010		QC Preparation: 2010-09-14		Prepared By:	KV
		$\mathrm{MDL}$			
Parameter	Flag	Result	Units		RL
Total Silver		< 0.000469	mg/L		0.005
Total Arsenic		< 0.00465	mg/L		0.01
Total Barium Total Cadmium		< 0.00418 $< 0.00232$	$_{ m mg/L}$		0.01 $0.005$
Total Chromium		<0.00232	mg/L		0.003
Total Lead		<0.00291 <0.00303	mg/L		0.005
Total Selenium		< 0.00570	mg/L		0.00

Method Blank (1)

QC Batch: 73659

QC Batch: Date Analyzed: Analyzed By: TP 73659 2010-09-20 Prep Batch: 63181 QC Preparation: 2010-09-20 Prepared By: TP

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		$\operatorname{MDL}$		
Parameter	$\operatorname{Flag}$	Result	Units	RL
Total Mercury		< 0.0000388	${ m mg/L}$	0.0002

Method Blank (1)

QC Batch: 73832

QC Batch:

73832

Date Analyzed:

2010-09-26

Analyzed By: MN

Prep Batch: 63356

QC Preparation: 2010-09-17

Prepared By: MN

		$\operatorname{MDL}$		
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	$ m_{RL}$
Naphthalene		< 0.0000784	m mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	m mg/L	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	mg/L	0.0002
Acenaphthene		< 0.0000617	$\mathrm{mg/L}$	0.0002
Dibenzofuran		< 0.0000952	m mg/L	0.0002
Fluorene		< 0.000134	$\mathrm{mg/L}$	0.0002
Anthracene		< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	$\mathrm{mg/L}$	0.0002
Fluoranthene		< 0.000476	m mg/L	0.0002
Pyrene		< 0.000590	$\mathrm{mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	mg/L	0.0002
Chrysene		< 0.0000766	mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	mg/L	0.0002
Benzo(k)fluoranthene		< 0.000141	$\mathrm{mg/L}$	0.0002
Benzo(a)pyrene		< 0.000132	mg/L	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	mg/L	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	$_{ m Units}$	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0285	mg/L	1	0.0800	36	10 - 111
2-Fluorobiphenyl		0.0281	mg/L	1	0.0800	35	10 - 92.7
Terphenyl-d14		0.0394	mg/L	1	0.0800	49	35.9 - 107

# Laboratory Control Spike (LCS-1)

QC Batch: 73407Prep Batch: 62959 Date Analyzed:

2010-09-10

QC Preparation: 2010-09-10

Analyzed By: AG

Prepared By: AG

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Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.0996	mg/L	1	0.100	< 0.000600	100	82.9 - 118
Toluene	0.0982	$\mathrm{mg/L}$	1	0.100	< 0.000600	98	82.7 - 117
Ethylbenzene	0.0969	m mg/L	1	0.100	< 0.000800	97	78.8 - 116
Xylene	0.284	m mg/L	1	0.300	< 0.000767	95	79.3 - 116

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
Benzene	0.105	mg/L	1	0.100	< 0.000600	105	82.9 - 118	5	20
Toluene	0.102	mg/L	1	0.100	< 0.000600	102	82.7 - 117	4	20
Ethylbenzene	0.101	mg/L	1	0.100	< 0.000800	101	78.8 - 116	4	20
Xylene	0.295	mg/L	1	0.300	< 0.000767	98	79.3 - 116	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$_{ m Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	${f Amount}$	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0996	0.104	mg/L	1	0.100	100	104	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.0865	0.0898	mg/L	1	0.100	86	90	68.2 - 134

# Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Aluminum	1.03	mg/L	1	1.00	< 0.00982	103	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Aluminum	1.02	mg/L	1	1.00	< 0.00982	102	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	${f Amount}$	Result	$\operatorname{Rec}$ .	$\operatorname{Limit}$
Total Boron	0.0490	mg/L	1	0.0500	< 0.00215	98	85 - 115

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		$\operatorname{Rec}$ .		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0510	mg/L	1	0.0500	< 0.00215	102	85 - 115	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-14

Analyzed By: RR

Prepared By: KV

Prep Batch: 63010

QC Preparation: 2010-09-14

	LCS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit
Total Cobalt	0.268	mg/L	1	0.250	< 0.00258	107	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Cobalt	0.263	mg/L	1	0.250	< 0.00258	105	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\mathbf{Result}$	Rec.	$\operatorname{Limit}$
Total Copper	0.127	mg/L	1	0.125	< 0.00313	102	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Copper	0.128	mg/L	1	0.125	< 0.00313	102	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

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_	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	$\operatorname{Result}$	$\operatorname{Rec}$ .	Limit
Total Iron	0.502	$\mathrm{mg/L}$	1	0.500	< 0.00273	100	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	${ m Rec.}$	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Iron	0.501	mg/L	1	0.500	< 0.00273	100	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

## Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	LCS			$\mathbf{Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Manganese	0.257	mg/L	1	0.250	< 0.00423	103	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		$\mathrm{Rec}.$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Manganese	0.256	mg/L	1	0.250	< 0.00423	102	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	LCS			Spike	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit
Total Molybdenum	0.520	mg/L	1	0.500	< 0.00164	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Total Molybdenum	0.519	mg/L	1	0.500	< 0.00164	104	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit
Total Nickel	0.268	mg/L	1	0.250	< 0.00593	107	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Nickel	0.264	$\overline{\mathrm{mg}}/\mathrm{L}$	1	0.250	< 0.00593	106	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

## Laboratory Control Spike (LCS-1)

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	LCS			Spike	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Zinc	0.259	mg/L	1	0.250	< 0.00178	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Zinc	· · · · · · · · · · · · · · · · · · ·	0.253	mg/L	1	0.250	< 0.00178	101	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: 73465 Prep Batch: 63010

Total Selenium

Date Analyzed:

2010-09-14 QC Preparation: 2010-09-14

Analyzed By: RR Prepared By: KV

101

LCS Spike Rec. Matrix Param Result Units Dil. Amount Result Rec. Limit 85 - 115 Total Silver 0.135 mg/L 1 0.125< 0.000469 108 Total Arsenic 85 - 115 0.534mg/L 0.500< 0.00465 107 1 Total Barium 1.05mg/L 1 1.00 < 0.00418 105 85 - 115 Total Cadmium 85 - 115 0.271mg/L 1 0.250< 0.00232 108 Total Chromium 85 - 115 0.0910 mg/L 1 0.100< 0.00291 91 Total Lead 0.543mg/L 1 0.500< 0.00303 109 85 - 115 85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

mg/L

0.506

	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Silver	0.135	mg/L	1	0.125	< 0.000469	108	85 - 115	0	20

1

0.500

< 0.00570

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control spikes continued ...

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Arsenic	0.524	mg/L	1	0.500	< 0.00465	105	85 - 115	2	20
Total Barium	1.01	$\mathrm{mg/L}$	1	1.00	< 0.00418	101	85 - 115	4	20
Total Cadmium	0.270	${ m mg/L}$	1	0.250	< 0.00232	108	85 - 115	0	20
Total Chromium	0.0880	$\mathrm{mg/L}$	1	0.100	< 0.00291	88	85 - 115	3	20
Total Lead	0.536	m mg/L	1	0.500	< 0.00303	107	85 - 115	1	20
Total Selenium	0.497	$\mathrm{mg/L}$	1	0.500	< 0.00570	99	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

## Laboratory Control Spike (LCS-1)

QC Batch:

73659

Date Analyzed:

2010-09-20

Analyzed By: TP

Prep Batch: 63181

QC Preparation: 2010-09-20

Prepared By: TP

	LCS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Mercury	0.00404	mg/L	1	0.00400	< 0.0000388	101	91.4 - 111

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		$\operatorname{Rec}$ .		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Mercury	0.00405	mg/L	1	0.00400	< 0.0000388	101	91.4 - 111	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 63356

73832

Date Analyzed: QC Preparation: 2010-09-17

2010-09-26

Analyzed By: MN

Prepared By: MN

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Naphthalene	0.0624	mg/L	1	0.0800	< 0.0000784	78	32.2 - 80.3
2-Methylnaphthalene	0.0647	mg/L	1	0.0800	< 0.0000747	81	34.8 - 87
1-Methylnaphthalene	0.0686	mg/L	1	0.0800	< 0.0000575	86	36.9 - 89.6
Acenaphthylene	0.0721	mg/L	1	0.0800	< 0.0000963	90	35 - 93.2
Acenaphthene	0.0725	mg/L	1	0.0800	< 0.0000617	91	35.8 - 92.9
Dibenzofuran	0.0525	mg/L	1	0.0800	< 0.0000952	66	35.3 - 85.1
Fluorene	0.0722	mg/L	1	0.0800	< 0.000134	90	43.4 - 101
Anthracene	0.0615	mg/L	1	0.0800	< 0.000441	77	44.8 - 92.4
Phenanthrene	0.0657	mg/L	1	0.0800	< 0.000435	82	44 - 93.7
Fluoranthene	0.0739	mg/L	1	0.0800	< 0.000476	92	52.7 - 104
Pyrene	0.0698	$\mathrm{mg/L}$	1	0.0800	< 0.000590	87	42.2 - 93.8

continued ...

TNM 97-04

Work Order: 10091008 TNM 97-04 Townsend

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control spikes continued . . .

		LCS			$\operatorname{Spike}$	Matrix		${ m Rec.}$
Param		Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit
Benzo(a)anthracene		0.0565	mg/L	1	0.0800	< 0.000118	71	40.4 - 91.9
Chrysene	1	0.0954	mg/L	1	0.0800	< 0.0000766	119	44.4 - 107
Benzo(b)fluoranthene		0.0423	mg/L	1	0.0800	< 0.000146	53	34.8 - 105
Benzo(k)fluoranthene		0.0654	mg/L	1	0.0800	< 0.000141	82	50.2 - 158
Benzo(a)pyrene		0.0621	${ m mg/L}$	1	0.0800	< 0.000132	78	51.3 - 151
Indeno(1,2,3-cd)pyrene		0.0494	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	62	43.2 - 115
Dibenzo(a,h)anthracene		0.0696	mg/L	1	0.0800	< 0.0000534	87	43.9 - 115
Benzo(g,h,i)perylene		0.0504	m mg/L	1	0.0800	< 0.0000473	63	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit	RPD	Limit
Naphthalene	2	0.0689	mg/L	1	0.0800	< 0.0000784	86	32.2 - 80.3	10	20
2-Methylnaphthalene		0.0693	mg/L	1	0.0800	< 0.0000747	87	34.8 - 87	7	20
1-Methylnaphthalene	3	0.0743	mg/L	1	0.0800	< 0.0000575	93	36.9 - 89.6	8	20
Acenaphthylene	4	0.0792	mg/L	1	0.0800	< 0.0000963	99	35 - 93.2	9	20
Acenaphthene	5	0.0805	mg/L	1	0.0800	< 0.0000617	101	35.8 - 92.9	10	20
Dibenzofuran		0.0573	${ m mg/L}$	1	0.0800	< 0.0000952	72	35.3 - 85.1	9	20
Fluorene		0.0770	$\mathrm{mg/L}$	1	0.0800	< 0.000134	96	43.4 - 101	6	20
Anthracene		0.0681	$\mathrm{mg/L}$	1	0.0800	< 0.000441	85	44.8 - 92.4	10	20
Phenanthrene		0.0735	$\mathrm{mg/L}$	1	0.0800	< 0.000435	92	44 - 93.7	11	20
Fluoranthene		0.0732	mg/L	1	0.0800	< 0.000476	92	52.7 - 104	1	20
Pyrene		0.0673	${ m mg/L}$	1	0.0800	< 0.000590	84	42.2 - 93.8	4	20
Benzo(a)anthracene		0.0579	${ m mg/L}$	1	0.0800	< 0.000118	72	40.4 - 91.9	$^2$	20
Chrysene	6	0.0964	${ m mg/L}$	1	0.0800	< 0.0000766	120	44.4 - 107	1	20
Benzo(b)fluoranthene		0.0462	$\mathrm{mg/L}$	1	0.0800	< 0.000146	58	34.8 - 105	9	20
Benzo(k)fluoranthene		0.0674	${ m mg/L}$	1	0.0800	< 0.000141	84	50.2 - 158	3	20
Benzo(a)pyrene		0.0565	${ m mg/L}$	1	0.0800	< 0.000132	71	51.3 - 151	9	20
Indeno(1,2,3-cd)pyrene		0.0497	${ m mg/L}$	1	0.0800	< 0.0000702	62	43.2 - 115	1	20
Dibenzo(a,h)anthracene		0.0690	mg/L	1	0.0800	< 0.0000534	86	43.9 - 115	1	20
Benzo(g,h,i)perylene		0.0536	$\mathrm{mg/L}$	1	0.0800	< 0.0000473	67	45.1 - 115	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$\operatorname{Spike}$	LCS	LCSD	$\mathrm{Rec}.$
Surrogate	Result	Result	Units	Dil.	Amount	$\mathrm{Rec}.$	Rec.	$\operatorname{Limit}$
Nitrobenzene-d5	0.0511	0.0525	mg/L	1	0.0800	64	66	10 - 111
2-Fluorobiphenyl	0.0607	0.0673	$_{ m mg/L}$	1	0.0800	76	84	10 - 92.7
Terphenyl-d14	0.0626	0.0605	mg/L	1	0.0800	78	76	35.9 - 107

Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>2</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>3</sup>Spike analyte out of control limits. Results biased high. •
<sup>4</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>5</sup>Spike analyte out of control limits. Results biased high. • <sup>6</sup>Spike analyte out of control limits. Results biased high. •

TNM 97-04

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Matrix Spike (MS-1) Spiked Sample: 243988

QC Batch: Prep Batch: 62959

73407

Date Analyzed:

2010-09-10

Analyzed By: AG

Prepared By: AG

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene	0.0949	mg/L	1	0.100	< 0.000 600	95	77.9 - 114
Toluene	0.0913	mg/L	1	0.100	< 0.000600	91	78.3 - 111
Ethylbenzene	0.0894	$\mathrm{mg/L}$	1	0.100	< 0.000800	89	75.3 - 110
Xylene	0.266	${ m mg/L}$	1	0.300	< 0.000767	89	75.7 - 109

QC Preparation: 2010-09-10

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene	0.0966	mg/L	1	0.100	< 0.000600	97	77.9 - 114	2	20
Toluene	0.0927	${ m mg/L}$	1	0.100	< 0.000600	93	78.3 - 111	$^2$	20
Ethylbenzene	0.0901	$\mathrm{mg/L}$	1	0.100	< 0.000800	90	75.3 - 110	1	20
Xylene	0.267	$\mathrm{mg/L}$	1	0.300	< 0.000767	89	75.7 - 109	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0984	0.101	mg/L	1	0.1	98	101	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.0854	0.0813	mg/L	1	0.1	85	81	60.1 - 135

Matrix Spike (MS-1) Spiked Sample: 243997

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR Prepared By: KV

Prep Batch: 63010

QC Preparation: 2010-09-14

	MS			$\mathbf{S}_{\mathbf{P}}$ ike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Aluminum	1.02	m mg/L	1	1.00	< 0.00982	102	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Aluminum	1.05	m mg/L	1	1.00	< 0.00982	105	75 - 125	. 3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 243997

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation:

2010-09-14

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Lovington, NM

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Total Boron	0.0470	${ m mg/L}$	1	0.0500	< 0.00215	94	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	$\operatorname{Limit}$
Total Boron	0.0480	mg/L	1	0.0500	< 0.00215	96	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 243997

OC Batch: 73465 Prep Batch: 63010 Date Analyzed: 2010-09-14

QC Preparation: 2010-09-14

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	$\operatorname{Rec}$ .	Limit
Total Cobalt	0.250	mg/L	1	0.250	< 0.00258	100	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Cobalt	0.255	mg/L	1	0.250	< 0.00258	102	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 243997

QC Batch: 73465 Prep Batch: 63010 Date Analyzed: QC Preparation: 2010-09-14

2010-09-14

Analyzed By: RR Prepared By: KV

MS Spike Matrix Rec. Param Units Dil. Result Limit Result Amount Rec. Total Copper 0.1250.125 < 0.00313 100 75 - 125 mg/L 1

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Copper	0.124	mg/L	1	0.125	< 0.00313	99	75 - 125	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 243997

QC Batch: 73465 Prep Batch: 63010 Date Analyzed: 2010-09-14 QC Preparation: 2010-09-14

Analyzed By: RR Prepared By:

TNM 97-04

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Lovington, NM

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Iron	1.47	$\mathrm{mg/L}$	1	0.500	1.03	88	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	$RPD_{\underline{}}$	Limit
Total Iron	1.47	mg/L	1	0.500	1.03	88	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch: 73465 Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	MS			$\mathbf{S}_{\mathbf{P}i\mathbf{k}e}$	Matrix		Rec.
Param	Result	· Units	Dil.	Amount	Result	Rec.	Limit
Total Manganese	0.254	mg/L	1	0.250	< 0.00423	102	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	$\operatorname{Matrix}$		${ m Rec.}$		$\operatorname{RPD}$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Manganese	0.262	mg/L	1	0.250	< 0.00423	105	75 - 125	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit
Total Molybdenum	0.518	mg/L	1	0.500	< 0.00164	104	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	${ m Rec.}$	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Molybdenum	0.526	mg/L	1	0.500	< 0.00164	105	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prepared By: KV

Prep Batch: 63010

QC Preparation: 2010-09-14

TNM 97-04

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Lovington, NM

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Nickel	0.251	mg/L	1	0.250	< 0.00593	100	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Nickel	 0.246	mg/L	1	0.250	< 0.00593	98	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch:

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Zinc	0.252	mg/L	1	0.250	< 0.00178	101	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Zinc	0.257	mg/L	1	0.250	< 0.00178	103	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243997

QC Batch:

73465

Date Analyzed:

2010-09-14

Analyzed By: RR

Prep Batch: 63010

QC Preparation: 2010-09-14

Prepared By: KV

	MS		•	Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Silver	0.134	${ m mg/L}$	1	0.125	< 0.000469	107	75 - 125
Total Arsenic	0.542	$\mathrm{mg/L}$	1	0.500	< 0.00465	108	75 - 125
Total Barium	1.02	${ m mg/L}$	1	1.00	< 0.00418	102	75 - 125
Total Cadmium	0.256	${ m mg/L}$	1	0.250	< 0.00232	102	75 - 125
Total Chromium	0.100	$\mathrm{mg/L}$	1	0.100	< 0.00291	100	75 - 125
Total Lead	0.524	$\mathrm{mg/L}$	1	0.500	< 0.00303	105	75 - 125
Total Selenium	0.503	mg/L	1	0.500	< 0.00570	101	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Silver	0.138	mg/L	1	0.125	< 0.000469	110	75 - 125	3	20

continued ...

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Work Order: 10091008 TNM 97-04 Townsend

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Lovington, NM

	.,			
matrix	spikes	continued		,

-	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Arsenic	0.534	mg/L	1	0.500	< 0.00465	107	75 - 125	2	20
Total Barium	1.06	mg/L	1	1.00	< 0.00418	106	75 - 125	4	20
Total Cadmium	0.264	mg/L	1	0.250	< 0.00232	106	75 - 125	3	20
Total Chromium	0.101	mg/L	1	0.100	< 0.00291	101	75 - 125	1	20
Total Lead	0.532	mg/L	1	0.500	< 0.00303	106	75 - 125	<b>2</b>	20
Total Selenium	0.506	mg/L	1	0.500	< 0.00570	101	75 - 125	_1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 243988

QC Batch:

73659

Date Analyzed:

2010-09-20

Analyzed By: TP

Prep Batch: 63181

QC Preparation: 2010-09-20

Prepared By:

	MS			$_{ m Spike}$	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Mercury	0.00381	mg/L	1	0.00400	< 0.0000388	95	75 - 122

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		$\operatorname{Rec}$ .		$\operatorname{RPD}$
Param	Result	Units	Dil.	Amount	$\mathbf{Result}$	Rec.	Limit	RPD	Limit
Total Mercury	0.00378	mg/L	1	0.00400	< 0.0000388	94	75 - 122	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Standard (CCV-1)

QC Batch: 73407

Date Analyzed: 2010-09-10

Analyzed By: AG

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0951	95	80 - 120	2010-09-10
Toluene		m mg/L	0.100	0.0931	93	80 - 120	2010-09-10
Ethylbenzene		$\mathrm{mg/L}$	0.100	0.0892	89	80 - 120	2010-09-10
Xylene		${ m mg/L}$	0.300	0.263	88	80 - 120	2010-09-10

#### Standard (CCV-2)

QC Batch: 73407

Date Analyzed: 2010-09-10

Analyzed By: AG

 $\rm TNM~97\text{-}04$ 

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Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene	·	mg/L	0.100	0.102	102	80 - 120	2010-09-10
Toluene		mg/L	0.100	0.0986	99	80 - 120	2010-09-10
Ethylbenzene		${ m mg/L}$	0.100	0.0963	96	80 - 120	2010-09-10
Xylene		$_{ m mg/L}$	0.300	0.281	94	80 - 120	2010-09-10

# Standard (ICV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		mg/L	1.00	1.02	102	90 - 110	2010-09-14

# Standard (ICV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	•
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		$\mathrm{mg/L}$	1.00	1.03	103	90 - 110	2010-09-14

# Standard (ICV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		$_{ m mg/L}$	1.00	1.00	100	90 - 110	2010-09-14

# Standard (ICV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		mg/L	1.00	1.02	102	90 - 110	2010-09-14

Report Date: September 28, 2010 Work Order: 10091008 Page Number: 24 of 28 TNM 97-04 Townsend Lovington, NM

Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

			$\dot{ ext{ICVs}}$	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	$\operatorname{Percent}$	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	1.01	101	90 - 110	2010-09-14

Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		mg/L	1.00	1.01	101	90 - 110	2010-09-14

Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14

**ICVs ICVs ICVs** Percent True Found Percent Recovery Date Units Conc. Conc. Recovery Limits Analyzed Param Flag Total Molybdenum 90 - 110 2010-09-14 mg/L 1.00 1.01 101

Analyzed By: RR

Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

**ICVs ICVs ICVs** Percent Date True Found Percent Recovery Analyzed Param Flag Units Limits Conc. Conc. Recovery 2010-09-14 Total Nickel mg/L 1.00 1.02 102 90 - 110

Standard (ICV-1)

QC Batch: 73465 Date Analyzed: 2010-09-14 Analyzed By: RR

**ICVs** ICVs**ICVs** Percent True Found Percent Recovery Date Param Flag Units Conc. Recovery Limits Analyzed Conc. Total Zinc 90 - 110 2010-09-14 mg/L 1.00 1.02 102

TNM 97-04

Work Order: 10091008 TNM 97-04 Townsend

Page Number: 25 of 28 Lovington, NM

Standard (ICV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

Param	Flag	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Silver		mg/L	0.125	0.127	102	90 - 110	2010-09-14
Total Arsenic		mg/L	1.00	0.998	100	90 - 110	2010-09-14
Total Barium		mg/L	1.00	0.984	98	90 - 110	2010-09-14
Total Cadmium		mg/L	1.00	1.02	102	90 - 110	2010-09-14
Total Chromium		mg/L	1.00	1.00	100	90 - 110	2010-09-14
Total Lead		$\mathrm{mg/L}$	1.00	1.02	102	90 - 110	2010-09-14
Total Selenium		$\mathrm{mg/L}$	1.00	1.00	100	90 - 110	2010-09-14

Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			${ m CCVs} \ { m True}$	CCVs Found	$rac{ ext{CCVs}}{ ext{Percent}}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		mg/L	1.00	1.01	101	90 - 110	2010-09-14

Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs True	$\operatorname{CCVs}$ Found	${f CCVs} \ {f Percent}$	Percent Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		m mg/L	1.00	0.983	98	90 - 110	2010-09-14

Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	$\mathrm{CCVs}$	Percent	
			True	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		m mg/L	1.00	1.00	100	90 - 110	2010-09-14

Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

TNM 97-04

Work Order: 10091008

TNM 97-04 Townsend

Page Number: 26 of 28

Lovington, NM

			CCVs True	$\begin{array}{c} { m CCVs} \\ { m Found} \end{array}$	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		mg/L	1.00	1.01	101	90 - 110	2010-09-14

## Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	1.01	101	90 - 110	2010-09-14

## Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		mg/L	1.00	1.01	101	90 - 110	2010-09-14

### Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	$\mathrm{CCVs}$	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	1.01	101	90 - 110	2010-09-14

# Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	1.01	101	90 - 110	2010-09-14

# Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

TNM 97-04

Work Order: 10091008 TNM 97-04 Townsend

Page Number: 27 of 28

Lovington, NM

			$rac{ ext{CCVs}}{ ext{True}}$	$\begin{array}{c} { m CCVs} \\ { m Found} \end{array}$	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	1.01	101	90 - 110	2010-09-14

# Standard (CCV-1)

QC Batch: 73465

Date Analyzed: 2010-09-14

Analyzed By: RR

	-	<b></b> .	CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Units}$	$\operatorname{Conc.}$	$\operatorname{Conc}$ .	Recovery	Limits	Analyzed
Total Silver	-	mg/L	0.125	0.126	101	90 - 110	2010-09-14
Total Arsenic		$\mathrm{mg/L}$	1.00	0.992	99	90 - 110	2010-09-14
Total Barium		${ m mg/L}$	1.00	0.994	99	90 - 110	2010-09-14
Total Cadmium		$\mathrm{mg/L}$	1.00	1.01	101	90 - 110	2010-09-14
Total Chromium	•	mg/L	1.00	0.992	99	. 90 - 110	2010-09-14
Total Lead		m mg/L	1.00	1.02	102	90 - 110	2010-09-14
Total Selenium		mg/L	1.00	0.998	100	90 - 110	2010-09-14

# Standard (CCV-1)

QC Batch: 73659

Date Analyzed: 2010-09-20

Analyzed By: TP

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00511	102	90 - 110	2010-09-20

# Standard (CCV-2)

QC Batch: 73659

Date Analyzed: 2010-09-20

Analyzed By: TP

•	•		CCVs True	${ m CCVs} \ { m Found}$	$rac{ ext{CCVs}}{ ext{Percent}}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00504	101	90 - 110	2010-09-20

# Standard (CCV-1)

QC Batch: 73832

Date Analyzed: 2010-09-26

Analyzed By: MN

TNM 97-04

Work Order: 10091008 TNM 97-04 Townsend Page Number: 28 of 28 Lovington, NM

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	$_{ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	60.2	100	80 - 120	2010-09-26
2-Methylnaphthalene		m mg/L	60.0	60.9	102	80 - 120	2010-09-26
1-Methylnaphthalene		${ m mg/L}$	60.0	60.5	101	80 - 120	2010-09-26
A cenaphthylene		${ m mg/L}$	60.0	59.9	100	80 - 120	2010-09-26
Acenaphthene		${ m mg/L}$	60.0	62.3	104	80 - 120	2010-09-26
Dibenzofuran		${ m mg/L}$	60.0	59.3	99	80 - 120	2010-09-26
Fluorene		${ m mg/L}$	60.0	61.3	102	80 - 120	2010-09-26
Anthracene		m mg/L	60.0	55.2	92	80 - 120	2010-09-26
Phenanthrene		m mg/L	60.0	56.6	94	80 - 120	2010-09-26
Fluoranthene		${ m mg/L}$	60.0	53.8	90	80 - 120	2010-09-26
Pyrene		$_{ m mg/L}$	60.0	60.9	102	80 - 120	2010-09-26
Benzo(a)anthracene		${ m mg/L}$	60.0	48.2	80	80 - 120	2010-09-26
Chrysene		m mg/L	60.0	65.1	108	80 - 120	2010-09-26
Benzo(b)fluoranthene		$_{ m mg/L}$	60.0	50.2	84	80 - 120	2010-09-26
Benzo(k)fluoranthene		mg/L	60.0	68.5	114	80 - 120	2010-09-26
Benzo(a)pyrene		${ m mg/L}$	60.0	67.1	112	80 - 120	2010-09-26
Indeno(1,2,3-cd)pyrene		m mg/L	60.0	55.2	92	80 - 120	2010-09-26
Dibenzo(a,h)anthracene	•	$_{ m mg/L}$	60.0	54.2	90	80 - 120	2010-09-26
$\underline{\mathrm{Benzo}(\mathrm{g,h,i})}$ perylene		mg/L	60.0	58.0	97	80 - 120	2010-09-26

Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		68.4	mg/L	1	60.0	114	80 - 120
2-Fluorobiphenyl		60.4	$_{ m mg/L}$	1	60.0	101	80 - 120
Terphenyl-d14		54.5	m mg/L	1	60.0	91	80 - 120

LAB Order ID # \0009\0008

BioAquatic Testing 2501 Mayes Rd. Se 100 Carroliton, Texas 75006 Tel (972) 242-7750	× 4	<u>ૄ</u> 	Y, V	l <sub>i</sub> a)	,1, <b>B</b> ,	<b>4</b> ,~2	راسها	كة, Mg, K, <b>كورا</b> Around Ti	PART.	χ.							7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 -	(i) 01. 8 8 101.1		LE BOOKS HOUSE	Check If Special Reporting
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5002 Basin Sneet, Suite A1 6015 Harris Parkway, Suite 110

Midland, Texas 79703 Ft. Worth, Texas 76132

432 • 689 • 6301 817 • 201 • 5260 FAX 432 • 689 • 6313

E-Mail: lab@traceanalysis.com

# Certifications

**WBENC:** 237019

HUB:

1752439743100-86536

DBE: VN 20657

**NCTRCA** WFWB38444Y0909

# **NELAP Certifications**

Lubbock: T104704219-08-TX

LELAP-02003

El Paso:

T104704221-08-TX

LELAP-02002

Midland:

T104704392-08-TX

Kansas E-10317

# **Analytical and Quality Control Report**

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: September 28, 2010

Work Order:

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

	-		Date	Time	$\operatorname{Date}$
Sample	Description	Matrix	Taken	Taken	Received
244990	Post-Carbon	water	2010-09-16	12:30	2010-09-17

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 28 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abel

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

# Standard Flags

 ${\bf B}$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-09-17 and assigned to work order 10091705. Samples for work order 10091705 were received intact without headspace and at a temperature of 3.7 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	Prep	QC	Analysis
Test	Method	Batch	Date	Batch	Date
Ag, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Al, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
As, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Ba, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
BTEX	S 8021B	63178	2010-09-17 at 16:00	73660	2010-09-18 at 09:57
B, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Cd, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Co, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Cr, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Cu, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Fe, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
Hg, Total	S 7470A	63300	2010-09-24 at 08:43	73807	2010-09-24 at 13:22
Mn, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Mo, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Ni, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18
PAH	S 8270 $D$	63356	2010-09-17 at 15:00	73832	2010-09-26 at $13:25$
Pb, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Se, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at $10:18$
Zn, Total	S 6010C	63277	2010-09-23 at 08:18	73754	2010-09-23 at 10:18

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10091705 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10091705

TNM 97-04 Townsend

Page Number: 4 of 28 Lovington, NM

# **Analytical Report**

Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Analysis:

Al, Total

73754

Analytical Method:

S 6010C

2010-09-23

Analyzed By:

Prep Method: S 3010A

QC Batch: Prep Batch:

63277

Date Analyzed: Sample Preparation:

2010-09-23

RRPrepared By: KV

RL

Parameter Total Aluminum Flag Result 0.0570 Units mg/L Dilution

RL0.0500

Sample: 244990 - Post-Carbon

Laboratory:

Prep Batch: 63277

Lubbock

Analysis: QC Batch:

B, Total 73754

Analytical Method:

Date Analyzed:

S 6010C

2010-09-23 2010-09-23 Prep Method: S 3010A RR

Analyzed By: Prepared By:

RL

Sample Preparation:

Parameter	Flag	Result	Units	Dilution	RL
Total Boron		0.216	m mg/L	1	0.0100

Sample: 244990 - Post-Carbon

Laboratory:

Midland

Analysis: BTEX QC Batch: 73660 Prep Batch: 63178

Analytical Method: Date Analyzed:

S 8021B 2010-09-18 Sample Preparation: 2010-09-17 Prep Method: S 5030B Analyzed By: AGPrepared By: AG

RL

Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Benzene		< 0.00100	mg/L	1	0.00100
Toluene		< 0.00100	mg/L	1	0.00100
Ethylbenzene		< 0.00100	mg/L	1	0.00100
Xylene		< 0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	$\begin{array}{c} {\rm Spike} \\ {\rm Amount} \end{array}$	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0914	mg/L	1	0.100	91	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.0593	mg/L	1	0.100	59	51.1 - 128

Report Date: September 28, 2010 TNM 97-04

Work Order: 10091705 TNM 97-04 Townsend

Page Number: 5 of 28 Lovington, NM

Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Analysis: Co, Total QC Batch: 73754 63277 Prep Batch:

Analytical Method: Date Analyzed: Sample Preparation:

S 6010C 2010-09-23 2010-09-23 Prep Method: S 3010A Analyzed By: RRKV Prepared By:

RL

RLParameter Result Units Dilution Flag < 0.00500 0.00500 Total Cobalt mg/L

Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Analysis: Cu, Total QC Batch: 73754 Prep Batch: 63277

Analytical Method: Date Analyzed:

S 6010C 2010-09-23 Sample Preparation: 2010-09-23 Prep Method: S 3010A Analyzed By: RRPrepared By: KV

RL

Parameter Flag Result Units Dilution RL0.00500 Total Copper 0.00500mg/L

Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Total Iron

Analysis: Fe, Total 73754 QC Batch: Prep Batch: 63277

Analytical Method: Date Analyzed:

RL

0.0440

Sample Preparation:

S 6010C 2010-09-23 2010-09-23

mg/L

S 3010A Prep Method: Analyzed By: RR

Prepared By:

Parameter Flag Result Units

RLDilution

KV

KV

0.0100

Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Analysis: Mn, Total QC Batch: 73754 Prep Batch: 63277

Analytical Method: Date Analyzed:

S 6010C 2010-09-23 Sample Preparation: 2010-09-23

Prep Method: S 3010A Analyzed By: RR

Prepared By:

RL

Parameter Flag Result Units Dilution RL0.00500 Total Manganese 0.101mg/L

TNM 97-04

Work Order: 10091705

Page Number: 6 of 28 TNM 97-04 Townsend Lovington, NM

Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Prep Batch: 63277

Analysis: QC Batch: Mo, Total 73754

Analytical Method: Date Analyzed:

S 6010C 2010-09-23 Prep Method: Analyzed By:

Parameter

Sample Preparation: 2010-09-23 RL

RRPrepared By: KV

S 3010A

Flag Result Units Dilution RL0.0500 Total Molybdenum < 0.0500 mg/L

Sample: 244990 - Post-Carbon

Laboratory:

Lubbock

Analysis: QC Batch:

Ni, Total 73754 Prep Batch: 63277

Analytical Method: Date Analyzed:

S 6010C 2010-09-23 2010-09-23

Prep Method: S 3010A Analyzed By: RRPrepared By: KV

RL

Sample Preparation:

Dilution RLParameter Flag Result Units 0.0100 Total Nickel < 0.0100 mg/L 1

Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Analysis: PAH QC Batch: 73832 Prep Batch: 63356

Analytical Method: Date Analyzed:

Sample Preparation:

S 8270D 2010-09-26 2010-09-17

Prep Method: S 3510C

Analyzed By: MN Prepared By: MN

RL

Parameter	Flag	Result	Units	Dilution	$\mathrm{RL}$
Naphthalene		< 0.000200	mg/L	1	0.000200
2-Methylnaphthalene		< 0.000200	mg/L	1 .	0.000200
1-Methylnaphthalene		< 0.000200	m mg/L	1	0.000200
Acenaphthylene		< 0.000200	m mg/L	1	0.000200
Acenaphthene		< 0.000200	mg/L	1	0.000200
Dibenzofuran		< 0.000200	mg/L	1	0.000200
Fluorene		< 0.000200	$_{ m mg/L}$	1	0.000200
Anthracene		< 0.000200	mg/L	1	0.000200
Phenanthrene		< 0.000200	mg/L	1	0.000200
Fluoranthene		< 0.000200	$\mathrm{mg/L}$	1	0.000200
Pyrene		< 0.000200	m mg/L	1	0.000200
Benzo(a)anthracene		< 0.000200	m mg/L	1	0.000200
Chrysene		< 0.000200	m mg/L	1	0.000200
Benzo(b)fluoranthene		< 0.000200	mg/L	1	0.000200

 $\overline{continued}$  . . .

 $\rm TNM~97\text{-}04$ 

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sample 244990 continued ...

		$\mathrm{RL}$			
Parameter	Flag	Result	$\operatorname{Units}$	Dilution	$\mathrm{RL}$
Benzo(k)fluoranthene	•	< 0.000200	mg/L	1	0.000200
Benzo(a)pyrene		< 0.000200	mg/L	1	0.000200
Indeno(1,2,3-cd)pyrene		< 0.000200	mg/L	1	0.000200
Dibenzo(a,h)anthracene		< 0.000200	m mg/L	1	0.000200
$\mathrm{Benzo}(\mathrm{g}, \mathrm{h}, \mathrm{i})$ perylene		< 0.000200	mg/L	1	0.000200

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Nitrobenzene-d5		0.0288	mg/L	1	0.0800	36	10 - 111
2-Fluorobiphenyl		0.0340	mg/L	1	0.0800	42	10 - 92.7
Terphenyl-d14		0.0413	mg/L	1	0.0800	52	35.9 - 107

#### Sample: 244990 - Post-Carbon

Laboratory: Lubbock

Analysis: Total 8 Metals Analytical Method: S 6010C Prep Method: S 3010A 73754 QC Batch: Date Analyzed: 2010-09-23 Analyzed By: RRPrep Batch: 63277 Sample Preparation: 2010-09-23 Prepared By: KV Laboratory: Lubbock Total 8 Metals Analysis: Analytical Method: S 7470A Prep Method: N/A

Analysis: Total 8 Metals Analytical Method: S 7470A Prep Method: N/A QC Batch: 73807 Date Analyzed: 2010-09-24 Analyzed By: TP Prep Batch: 63300 Sample Preparation: 2010-09-24 Prepared By: TP

RLParameter Flag Result Units Dilution RLTotal Silver 0.00500 < 0.00500 mg/L 1 1 Total Arsenic < 0.0100 mg/L 0.01001 Total Barium 0.280mg/L 0.0100 Total Cadmium 1 0.00500< 0.00500 mg/LTotal Chromium < 0.0100 mg/L 1 0.0100Total Mercury < 0.000200 mg/L 1 0.000200Total Lead 1 0.00500< 0.00500 mg/L Total Selenium < 0.0200 0.0200mg/L

#### Sample: 244990 - Post-Carbon

Laboratory: Lubbock

S 3010A Analysis: Zn, Total Analytical Method: S 6010C Prep Method: QC Batch: 73754 Date Analyzed: 2010-09-23 Analyzed By: RRPrep Batch: 63277 Sample Preparation: Prepared By: 2010-09-23

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Total Boron

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	7 - 7	RL						
Parameter	Flag	Result		Units	Dilu	tion		RL
Total Zinc		0.0100		mg/L		1	0.0	00500
Method Blank (1)	QC Batch: 73660							
QC Batch: 73660		Date Analy	vzed: 20	010-09-18		Analyz	ed Bv:	AG
Prep Batch: 63178		QC Prepar		010-09-17		Prepar		$\overline{AG}$
-							•	
Parameter	Flag		Ml Res		Unit			RL
Benzene	r lag		<0.0006		mg/			$\frac{10.001}{0.001}$
Toluene			< 0.0006		mg/			0.001
Ethylbenzene			<0.0008		$\frac{mg}{mg}$			0.001
Xylene			< 0.0007		mg/			0.001
			· · · · · · · · · · · · · · · · · · ·					
_					Spike	Percent		overy
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery		nits
Trifluorotoluene (TFT)	( DDD)	0.0887	mg/L	1	0.100	89		- 118
4-Bromofluorobenzene (	4-BFB)	0.0516	mg/L	1	0.100	52	47.3	- 116
Method Blank (1)	QC Batch: 73754							
QC Batch: 73754		Date Analy	yzed: 20	010-09-23		Analyz	ed By:	RR
Prep Batch: 63277		QC Prepar		010-09-23		Prepar		KV
				MDL				
Parameter	Flag			esult		nits		RL
Total Aluminum			<0.0	0982	mg	g/L		0.05
Method Blank (1)	QC Batch: 73754							
QC Batch: 73754		Date Analy		010-09-23		Analyz		RR
Prep Batch: 63277		QC Prepar	ration: 20	010-09-23		Prepar	ed By:	KV
_			MI		<b>.</b> .			D.T.
Parameter	Flag		Rest		Uni	ts		RL

< 0.00215

mg/L

0.01

Work Order: 10091705 Page Number: 9 of 28 Report Date: September 28, 2010 TNM 97-04 TNM 97-04 Townsend Lovington, NM Method Blank (1) QC Batch: 73754 Analyzed By: RR QC Batch: 73754 Date Analyzed: 2010-09-23 Prep Batch: 63277 QC Preparation: 2010-09-23 Prepared By: KV MDL RLParameter Flag Result Units Total Cobalt < 0.00258 mg/L 0.005 Method Blank (1) QC Batch: 73754 QC Batch: 73754 Date Analyzed: 2010-09-23 Analyzed By: RR Prep Batch: 63277 QC Preparation: 2010-09-23 Prepared By: KVMDL RLParameter Flag Result Units 0.005Total Copper < 0.00313 mg/L Method Blank (1) QC Batch: 73754 QC Batch: Date Analyzed: 2010-09-23 Analyzed By: RR 73754 Prep Batch: Prepared By: KV63277 QC Preparation: 2010-09-23 MDL Flag RLParameter Result Units 0.01Total Iron < 0.00273 mg/L Method Blank (1) QC Batch: 73754 QC Batch: Analyzed By: RR 73754 Date Analyzed: 2010-09-23 Prep Batch: 63277 2010-09-23 Prepared By: KVQC Preparation: MDL Units RLParameter Flag Result 0.005 Total Manganese < 0.00423 mg/L Method Blank (1) QC Batch: 73754

Date Analyzed:

QC Preparation: 2010-09-23

2010-09-23

Analyzed By: RR

KV

Prepared By:

QC Batch:

Prep Batch: 63277

73754

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Lovington, NM

		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Total Molybdenum		< 0.00164	mg/L	0.05

Method Blank (1)

QC Batch: 73754

QC Batch:

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

73754

QC Preparation: 2010-09-23

Prepared By: KV

MDL

Parameter	Flag	$\operatorname{Result}$	Units	$\mathrm{RL}$
Total Nickel		< 0.00593	mg/L	0.01

Method Blank (1)

QC Batch: 73754

QC Batch: 73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	Result	Units	RL
Total Zinc		< 0.00178	mg/L	0.005

Method Blank (1)

QC Batch: 73754

QC Batch: Prep Batch: 63277

73754

Date Analyzed: QC Preparation: 2010-09-23

2010-09-23

Analyzed By: RR

Prepared By: KV

	·	$\mathrm{MDL}$		
Parameter	Flag	$\operatorname{Result}$	Units	$\mathrm{RL}$
Total Silver		< 0.000469	mg/L	0.005
Total Arsenic		< 0.00465	${ m mg/L}$	0.01
Total Barium		< 0.00418	${ m mg/L}$	0.01
Total Cadmium		< 0.00232	${ m mg/L}$	0.005
Total Chromium		< 0.00291	${ m mg/L}$	0.01
Total Lead		< 0.00303	${ m mg/L}$	0.005
Total Selenium		< 0.00570	$_{ m mg/L}$	0.02

Method Blank (1)

QC Batch: 73807

QC Batch: 73807 Prep Batch: 63300 Date Analyzed:

2010-09-24

Analyzed By: TP Prepared By: TP

QC Preparation: 2010-09-24

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	•	$\mathrm{MDL}$		
Parameter	Flag	$\operatorname{Result}$	Units	$\mathrm{RL}$
Total Mercury		< 0.0000388	m mg/L	0.0002

Method Blank (1)

QC Batch: 73832

QC Batch: Prep Batch: 63356

73832

Date Analyzed: 2010-09-26 QC Preparation: 2010-09-17 Analyzed By: MN

Prepared By: MN

		$\mathrm{MDL}$		
Parameter	Flag	$\operatorname{Result}$	Units	RL
Naphthalene		< 0.0000784	m mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	$\mathrm{mg/L}$	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	$\mathrm{mg/L}$	0.0002
Acenaphthene		< 0.0000617	m mg/L	0.0002
Dibenzofuran		< 0.0000952	$\mathrm{mg/L}$	0.0002
Fluorene		< 0.000134	$\mathrm{mg/L}$	0.0002
Anthracene		< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	m mg/L	0.0002
Fluoranthene		< 0.000476	$\mathrm{mg/L}$	0.0002
Pyrene		< 0.000590	m mg/L	0.0002
Benzo(a)anthracene		< 0.000118	m mg/L	0.0002
Chrysene	•	< 0.0000766	$\mathrm{mg/L}$	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	$\mathrm{mg/L}$	0.0002
Benzo(a)pyrene		< 0.000132	$\mathrm{mg/L}$	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	$\mathrm{mg/L}$	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	$\mathrm{mg/L}$	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

					Spike	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0285	mg/L	1	0.0800	36	10 - 111
2-Fluorobiphenyl		0.0281	mg/L	1	0.0800	35	10 - 92.7
Terphenyl-d14		0.0394	${ m mg/L}$	1	0.0800	49	35.9 - 107

# Laboratory Control Spike (LCS-1)

QC Batch: 73660 Prep Batch: 63178 Date Analyzed: 2010-09-18 QC Preparation: 2010-09-17

Analyzed By: AG Prepared By: AG

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Param	LCS Result	Units	Dil.	$\begin{array}{c} {\rm Spike} \\ {\rm Amount} \end{array}$	Matrix Result	Rec.	Rec. Limit
Benzene	0.0992	mg/L	1	0.100	< 0.000600	99	82.9 - 118
Toluene	0.0934	mg/L	1	0.100	< 0.000600	93	82.7 - 117
Ethylbenzene	0.0847	mg/L	1	0.100	< 0.000800	85	78.8 - 116
Xylene	0.239	m mg/L	1	0.300	< 0.000767	80	79.3 - 116

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Benzene	0.0997	mg/L	1	0.100	< 0.000600	100	82.9 - 118	0	20
Toluene	0.0942	mg/L	1	0.100	< 0.000600	94	82.7 - 117	1	20
Ethylbenzene	0.0866	mg/L	1	0.100	< 0.000800	87	78.8 - 116	2	20
Xylene	0.245	mg/L	1	0.300	< 0.000767	82	79.3 - 116	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$_{ m Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0982	0.0988	mg/L	1	0.100	98	99	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.108	0.113	mg/L	1	0.100	108	113	68.2 - 134

#### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 63277

73754

Date Analyzed:

2010-09-23 QC Preparation: 2010-09-23

Analyzed By: RR Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Aluminum	1.02	mg/L	1	1.00	< 0.00982	102	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Aluminum	1.02	mg/L	1	1.00	< 0.00982	102	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch:

63277

QC Preparation:

2010-09-23

Prepared By: KV

LCS Spike Matrix Rec. Rec. Param Result Units Dil. Amount Result Limit Total Boron < 0.00215 100 85 - 115 0.0500 0.0500 mg/L

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0490	mg/L	1	0.0500	< 0.00215	98	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

## Laboratory Control Spike (LCS-1)

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	$_{ m Units}$	Dil.	Amount	Result	Rec.	Limit
Total Cobalt	0.270	${ m mg/L}$	1	0.250	< 0.00258	108	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Cobalt	0.267	mg/L	1	0.250	< 0.00258	107	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	${ m Rec.}$	Limit
Total Copper	0.130	${ m mg/L}$	1	0.125	< 0.00313	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Copper	0.134	mg/L	1	0.125	< 0.00313	107	85 - 115	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Iron	0.537	mg/L	1	0.500	< 0.00273	107	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Iron	0.535	mg/L	1	0.500	< 0.00273	107	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Manganese	0.262	${ m mg/L}$	1	0.250	< 0.00423	105	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		$\operatorname{Rec}$ .		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Manganese	0.259	mg/L	1	0.250	< 0.00423	104	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	LCS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	$\operatorname{Rec}$ .	Limit
Total Molybdenum	0.530	${ m mg/L}$	1	0.500	< 0.00164	106	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Molybdenum	0.530	mg/L	1	0.500	< 0.00164	106	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

Prep Batch: 63277

Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Nickel	0.269	mg/L	1	0.250	< 0.00593	108	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	$\operatorname{Result}$	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Nickel	0.267	mg/L	1	0.250	< 0.00593	107	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

## Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

4	LCS			$_{ m Spike}$	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	$\operatorname{Rec}$ .	Limit
Total Zinc	0.257	mg/L	1	0.250	< 0.00178	103	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		$\mathrm{Rec}.$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Zinc	0.258	mg/L	1	0.250	< 0.00178	103	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	LCS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit
Total Silver	0.135	mg/L	1	0.125	< 0.000469	108	85 - 115
Total Arsenic	0.540	${ m mg/L}$	1	0.500	< 0.00465	108	85 - 115
Total Barium	1.04	${ m mg/L}$	1	1.00	< 0.00418	104	85 - 115
Total Cadmium	0.272	mg/L	1	0.250	< 0.00232	109	85 - 115
Total Chromium	0.102	mg/L	1	0.100	< 0.00291	102	85 - 115
Total Lead	0.542	mg/L	1	0.500	< 0.00303	108	85 - 115
Total Selenium	0.492	mg/L	1	0.500	< 0.00570	98	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Silver	0.133	mg/L	1	0.125	< 0.000469	106	85 - 115	2	20

continued ...

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control spikes continued ...

	LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Arsenic	0.536	mg/L	1	0.500	< 0.00465	107	85 - 115	1	20
Total Barium	1.05	mg/L	1	1.00	< 0.00418	105	85 - 115	1	20
Total Cadmium	0.269	mg/L	1	0.250	< 0.00232	108	85 - 115	1	20
Total Chromium	0.102	mg/L	1	0.100	< 0.00291	102	85 - 115	0	20
Total Lead	0.539	mg/L	1	0.500	< 0.00303	108	85 - 115	1	20
Total Selenium	0.491	mg/L	1	0.500	< 0.00570	98	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73807

Date Analyzed: 2010-09-24

Analyzed By: TP

Prep Batch: 63300

QC Preparation: 2010-09-24

Prepared By: TP

	LCS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Mercury	0.00415	mg/L	1	0.00400	< 0.0000388	104	91.4 - 111

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

•	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$	RPD	Limit
Total Mercury	0.00413	mg/L	1 .	0.00400	< 0.0000388	103	91.4 - 111	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 63356

73832

Date Analyzed: QC Preparation: 2010-09-17

2010-09-26

Analyzed By: MN

Prepared By: MN

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Naphthalene	0.0624	mg/L	1	0.0800	< 0.0000784	78	32.2 - 80.3
2-Methylnaphthalene	0.0647	${ m mg/L}$	1	0.0800	< 0.0000747	81	34.8 - 87
1-Methylnaphthalene	0.0686	mg/L	1	0.0800	< 0.0000575	86	36.9 - 89.6
Acenaphthylene	0.0721	mg/L	1	0.0800	< 0.0000963	90	35 - 93.2
Acenaphthene	0.0725	mg/L	1	0.0800	< 0.0000617	91	35.8 - 92.9
Dibenzofuran	0.0525	mg/L	1	0.0800	< 0.0000952	66	35.3 - 85.1
Fluorene	0.0722	mg/L	1	0.0800	< 0.000134	90	43.4 - 101
Anthracene	0.0615	mg/L	1	0.0800	< 0.000441	77	44.8 - 92.4
Phenanthrene	0.0657	mg/L	1	0.0800	< 0.000435	82	44 - 93.7
Fluoranthene	0.0739	mg/L	1	0.0800	< 0.000476	92	52.7 - 104
Pyrene	0.0698	mg/L	1	0.0800	< 0.000590	87	42.2 - 93.8

continued ...

TNM 97-04

Work Order: 10091705 TNM 97-04 Townsend

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control spikes continued . . .

		LCS			$_{ m Spike}$	Matrix		$\mathrm{Rec}.$
Param		Result	Units	Dil.	Amount	$\operatorname{Result}$	$\mathrm{Rec}.$	$\operatorname{Limit}$
Benzo(a)anthracene		0.0565	mg/L	1	0.0800	< 0.000118	71	40.4 - 91.9
Chrysene	1	0.0954	${ m mg/L}$	1	0.0800	< 0.0000766	119	44.4 - 107
Benzo(b)fluoranthene		0.0423	$_{ m mg/L}$	1	0.0800	< 0.000146	53	34.8 - 105
Benzo(k)fluoranthene		0.0654	${ m mg/L}$	1	0.0800	< 0.000141	82	50.2 - 158
Benzo(a)pyrene		0.0621	mg/L	1	0.0800	< 0.000132	78	51.3 - 151
Indeno(1,2,3-cd)pyrene		0.0494	mg/L	1	0.0800	< 0.0000702	62	43.2 - 115
Dibenzo(a,h)anthracene		0.0696	mg/L	1	0.0800	< 0.0000534	87	43.9 - 115
Benzo(g,h,i)perylene		0.0504	$\mathrm{mg/L}$	1	0.0800	< 0.0000473	63	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Naphthalene	2	0.0689	mg/L	`1	0.0800	< 0.0000784	86	32.2 - 80.3	10	20
2-Methylnaphthalene		0.0693	mg/L	1	0.0800	< 0.0000747	87	34.8 - 87	7	20
1-Methylnaphthalene	3	0.0743	mg/L	1	0.0800	< 0.0000575	93	36.9 - 89.6	8	20
Acenaphthylene	4	0.0792	$\mathrm{mg/L}$	1	0.0800	< 0.0000963	99	35 - 93.2	9	20
Acenaphthene	5	0.0805	mg/L	1	0.0800	< 0.0000617	101	35.8 - 92.9	10	20
Dibenzofuran		0.0573	mg/L	1	0.0800	< 0.0000952	72	35.3 - 85.1	9	20
Fluorene		0.0770	mg/L	1	0.0800	< 0.000134	96	43.4 - 101	6	20
Anthracene		0.0681	mg/L	1	0.0800	< 0.000441	85	44.8 - 92.4	10	20
Phenanthrene		0.0735	mg/L	1	0.0800	< 0.000435	92	44 - 93.7	11	20
Fluoranthene		0.0732	mg/L	1	0.0800	< 0.000476	92	52.7 - 104	1	20
Pyrene		0.0673	mg/L	1	0.0800	< 0.000590	84	42.2 - 93.8	4	20
Benzo(a)anthracene		0.0579	m mg/L	1	0.0800	< 0.000118	72	40.4 - 91.9	2	20
Chrysene	6	0.0964	mg/L	1	0.0800	< 0.0000766	120	44.4 - 107	1	20
Benzo(b)fluoranthene		0.0462	mg/L	1	0.0800	< 0.000146	58	34.8 - 105	9	20
Benzo(k)fluoranthene		0.0674	m mg/L	1	0.0800	< 0.000141	84	50.2 - 158	3	20
Benzo(a)pyrene		0.0565	mg/L	1	0.0800	< 0.000132	71	51.3 - 151	9	20
Indeno(1,2,3-cd)pyrene		0.0497	mg/L	1	0.0800	< 0.0000702	62	43.2 - 115	1	20
Dibenzo(a,h)anthracene		0.0690	mg/L	1	0.0800	< 0.0000534	86	43.9 - 115	1	20
Benzo(g,h,i)perylene		0.0536	mg/L	1	0.0800	< 0.0000473	67	45.1 - 115	6	20

	LCS	LCSD			$_{ m Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	$\mathrm{Rec}.$	$\mathrm{Rec}.$	Limit
Nitrobenzene-d5	0.0511	$0.05\overline{25}$	mg/L	1	0.0800	64	66	10 - 111
2-Fluorobiphenyl	0.0607	0.0673	mg/L	1	0.0800	76	84	10 - 92.7
Terphenyl-d14	0.0626	0.0605	mg/L	1	0.0800	78	76	35.9 - 107

<sup>&</sup>lt;sup>1</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>2</sup>Spike analyte out of control limits. Results biased high. • <sup>3</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>4</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>5</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>6</sup>Spike analyte out of control limits. Results biased high. •

TNM 97-04

Work Order: 10091705 TNM 97-04 Townsend

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Matrix Spike (MS-1)

Prep Batch: 63178

Spiked Sample: 244806

QC Batch:

73660

Date Analyzed:

2010-09-18

QC Preparation: 2010-09-17

Analyzed By: AG

Prepared By: AG

Param		MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	-	0.517	mg/L	5	0.500	0.045	94	77.9 - 114
Toluene		0.440	mg/L	5	0.500	< 0.00300	88	78.3 - 111
Ethylbenzene		0.398	mg/L	5	0.500	< 0.00400	80	75.3 - 110
Xylene	7	1.11	mg/L	5	1.50	0.0306	72	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene	0.542	mg/L	5	0.500	0.045	99	77.9 - 114	5	20
Toluene	0.466	mg/L	5	0.500	< 0.00300	93	78.3 - 111	6	20
Ethylbenzene	0.428	mg/L	5	0.500	< 0.00400	86	75.3 - 110	7	20
Xylene	1.20	mg/L	5	1.50	0.0306	78	75.7 - 109	8	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			$\operatorname{Spike}$	MS	MSD	${ m Rec.}$
Surrogate	Result	Result	Units	Dil.	${f A}{f m}{f o}{f u}{f n}{f t}$	${ m Rec.}$	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	0.469	0.488	mg/L	5	0.5	94	98	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.503	0.540	mg/L	5	0.5	101	108	60.1 - 135

Matrix Spike (MS-1)

Prep Batch: 63277

Spiked Sample: 245384

QC Batch:

73754

Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR Prepared By: KV

MS Spike Matrix Rec. Limit Param Result Units Dil. Amount Result Rec. Total Aluminum 1.03 mg/L 1 1.00 < 0.00982 103 75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Aluminum	1.03	m mg/L	1	1.00	< 0.00982	103	75 - 125	0	20

<sup>&</sup>lt;sup>7</sup>Matrix spike recovery out of control limits due to peak interference. Use LCS/LCSD to demonstrate analysis is under control.

TNM 97-04

Work Order: 10091705

TNM 97-04 Townsend

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Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754Prep Batch: 63277 Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR

Prepared By: KV

Lovington, NM

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	${f A}{f m}{f o}{f u}{f n}{f t}$	Result	Rec.	Limit
Total Boron	0.0520	$\mathrm{mg/L}$	1	0.0500	< 0.00215	104	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param.	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0480	mg/L	1	0.0500	< 0.00215	96	75 - 125	8	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754 Prep Batch: 63277 Date Analyzed:

2010-09-23 QC Preparation: 2010-09-23 Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Cobalt	0.255	mg/L	1	0.250	< 0.00258	102	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Cobalt	0.254	mg/L	1	0.250	< 0.00258	102	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754

Date Analyzed:

2010-09-23

Analyzed By: RR

Prep Batch: 63277

QC Preparation: 2010-09-23

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Copper	0.130	${ m mg/L}$	1	0.125	< 0.00313	104	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Copper	0.130	mg/L	1	0.125	< 0.00313	104	75 - 125	0	20

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Lovington, NM

Matrix Spike (MS-1) Spiked Sample: 245384

OC Batch:

73754 Prep Batch: 63277 Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	${ m Rec.}$	$\operatorname{Limit}$
Total Iron	0.468	mg/L	1	0.500	< 0.00273	94	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Iron	0.485	mg/L	1	0.500	< 0.00273	97	75 - 125	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

OC Batch:

73754 Prep Batch: 63277 Date Analyzed:

2010-09-23

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit
Total Manganese	0.246	mg/L	1	0.250	< 0.00423	98	75 - 125

QC Preparation: 2010-09-23

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Manganese	0.246	mg/L	1	0.250	< 0.00423	98	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754 Prep Batch: 63277

Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23 Analyzed By: RR

Prepared By: KV

Spike MS Matrix Rec. Param Result Limit Result Units Dil. Amount Rec. Total Molybdenum 0.502mg/L 1 0.500 < 0.00164 100 75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Molybdenum	0.507	mg/L	1	0.500	< 0.00164	101	75 - 125	1	20

TNM 97-04

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Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch:

73754 Prep Batch: 63277 Date Analyzed:

2010-09-23

QC Preparation: 2010-09-23

Analyzed By: RR

Prepared By: KV

·	MS			$_{ m Spike}$	Matrix		$\operatorname{Rec}$ .
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Nickel	0.249	mg/L	1	0.250	< 0.00593	100	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		$\mathrm{Rec}.$		RPD
Param	Result	Units	Dil.	$\mathbf{A}$ mount	Result	Rec.	Limit	RPD	Limit
Total Nickel	0.268	mg/L	1	0.250	< 0.00593	107	75 - 125	7	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch: Prep Batch: 63277

73754

Date Analyzed:

2010-09-23 QC Preparation: 2010-09-23 Analyzed By: RR

Prepared By: KV

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Total Zinc	0.260	mg/L	1	0.250	< 0.00178	104	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit	RPD	Limit
Total Zinc	0.256	mg/L	1	0.250	< 0.00178	102	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245384

QC Batch: Prep Batch: 63277

73754

Date Analyzed:

2010-09-23 QC Preparation: 2010-09-23 Analyzed By: RR

Prepared By: KV

Param	$rac{ ext{MS}}{ ext{Result}}$	Units	Dil.	Spike Amount	$egin{array}{l}  ext{Matrix} \  ext{Result} \end{array}$	Rec.	${ m Rec.} \ { m Limit}$
Total Silver	0.128	mg/L	1	0.125	< 0.000469	102	75 - 125
Total Arsenic	0.501	m mg/L	1	0.500	< 0.00465	100	75 - 125
Total Barium	1.01	mg/L	1	1.00	< 0.00418	101	75 - 125
Total Cadmium	0.253	mg/L	1	0.250	< 0.00232	101	75 - 125
Total Chromium	0.0970	mg/L	1	0.100	< 0.00291	97	75 - 125
Total Lead	0.504	m mg/L	1	0.500	< 0.00303	101	75 - 125

 $continued \dots$ 

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matrix spikes continued . . .

	MS			Spike	Matrix		${ m Rec.}$
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Selenium	0.466	$\mathrm{mg/L}$	1	0.500	< 0.00570	93	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Silver	0.133	mg/L	1	0.125	< 0.000469	106	75 - 125	4	20
Total Arsenic	0.526	$\mathrm{mg/L}$	1	0.500	< 0.00465	105	75 - 125	5	20
Total Barium	1.03	mg/L	1	1.00	< 0.00418	103	75 - 125	$^2$	20
Total Cadmium	0.265	mg/L	1	0.250	< 0.00232	106	75 - 125	5	20
Total Chromium	0.100	mg/L	1	0.100	< 0.00291	100	75 - 125	3	20
Total Lead	0.517	mg/L	1	0.500	< 0.00303	103	75 - 125	2	20
Total Selenium	0.484	mg/L	1	0.500	< 0.00570	97	75 - 125	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 244990

QC Batch:

73807

Date Analyzed:

2010-09-24

Analyzed By:

Prepared By:

Prep Batch: 63300

QC Preparation: 2010-09-24

MS Spike Matrix Rec. Limit Param Result Units Dil. Result Rec. Amount Total Mercury 0.00387 0.00400 < 0.0000388 97 75 - 122 mg/L

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	${ m Rec.}$	Limit	RPD	Limit
Total Mercury	0.00393	mg/L	1	0.00400	< 0.0000388	98	75 - 122	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Standard (CCV-2)

QC Batch: 73660

Date Analyzed: 2010-09-18

Analyzed By: AG

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0969	97	80 - 120	2010-09-18
Toluene		${ m mg/L}$	0.100	0.0905	90	80 - 120	2010-09-18
Ethylbenzene		$\mathrm{mg/L}$	0.100	0.0817	82	80 - 120	2010-09-18
Xylene		mg/L	0.300.	0.240	80	80 - 120	2010-09-18

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Standard (CCV-3)

QC Batch: 73660

Date Analyzed: 2010-09-18

Analyzed By: AG

Param	$\operatorname{Flag}$	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene	1108	mg/L	0.100	0.0967	97	80 - 120	2010-09-18
Toluene		mg/L	0.100	0.0898	90	80 - 120	2010-09-18
Ethylbenzene		$_{ m mg/L}$	0.100	0.0809	81	80 - 120	2010-09-18
Xylene		${ m mg/L}$	0.300	0.241	80	80 - 120	2010-09-18

Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	,
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		$\mathrm{mg/L}$	1.00	0.963	96	90 - 110	2010-09-23

Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		mg/L	1.00	1.02	102	90 - 110	2010-09-23

Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		mg/L	1.00	0.989	99	90 - 110	2010-09-23

Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

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			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	$\operatorname{Date}$
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		m mg/L	1.00	0.970	97	90 - 110	2010-09-23

### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	0.971	97	90 - 110	2010-09-23

### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs True	$\begin{array}{c} \rm ICVs \\ \rm Found \end{array}$	ICVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		$_{ m mg/L}$	1.00	0.978	98	90 - 110	2010-09-23

### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	$\operatorname{Found}$	$\operatorname{Percent}$	$\operatorname{Recovery}$	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	0.990	99	90 - 110	2010-09-23

### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	·
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	0.981	98	90 - 110	2010-09-23

### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

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Work Order: 10091705

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			ICVs True	ICVs Found	${ m ICVs} \ { m Percent}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	0.980	98	90 - 110	2010-09-23

### Standard (ICV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

Param	Flag	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Silver		mg/L	0.125	0.121	97	90 - 110	2010-09-23
Total Arsenic		mg/L	1.00	0.988	99	90 - 110	2010-09-23
Total Barium		$\mathrm{mg/L}$	1.00	0.976	98	90 - 110	2010-09-23
Total Cadmium		mg/L	1.00	0.983	98	90 - 110	2010-09-23
Total Chromium		mg/L	1.00	0.975	98	90 - 110	2010-09-23
Total Lead		m mg/L	1.00	0.990	99	90 - 110	2010-09-23
Total Selenium		mg/L	1.00	0.996	100	90 - 110	2010-09-23

### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			${ m CCVs} \ { m True}$	CCVs Found	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		mg/L	1.00	0.999	100	90 - 110	2010-09-23

### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		mg/L	1.00	0.963	96	90 - 110	2010-09-23

### Standard (CCV-1)

QC Batch: 73754

 $Date\ Analyzed:\ \ 2010\text{-}09\text{-}23$ 

TNM 97-04

Work Order: 10091705

TNM 97-04 Townsend

Page Number: 26 of 28

Lovington, NM

			CCVs True	CCVs Found	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	$\operatorname{Flag}$	$\mathbf{U}\mathbf{nits}$	Conc.	Conc.	$\operatorname{Recovery}$	Limits	$\mathbf{A}$ nalyzed
Total Cobalt		${ m mg/L}$	1.00	0.988	99	90 - 110	2010-09-23

Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		mg/L	1.00	0.978	98	90 - 110	2010-09-23

Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	CCVs	$\mathrm{CCVs}$	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	0.959	96	90 - 110	2010-09-23

Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	•
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		mg/L	1.00	0.988	99	90 - 110	2010-09-23

Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs	$\mathrm{CCVs}$	CCVs	Percent	•
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	0.988	99	90 - 110	2010-09-23

Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

TNM 97-04

Work Order: 10091705

TNM 97-04 Townsend

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Lovington, NM

			CCVs True	$\begin{array}{c} { m CCVs} \\ { m Found} \end{array}$	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	0.990	99	90 - 110	2010-09-23

### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

			CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		m mg/L	1.00	0.989	99	90 - 110	2010-09-23

### Standard (CCV-1)

QC Batch: 73754

Date Analyzed: 2010-09-23

Analyzed By: RR

Param	$\operatorname{Flag}$	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Silver	1 lag		0.125	0.123	98	90 - 110	2010-09-23
		m mg/L	-				
Total Arsenic		${ m mg/L}$	1.00	0.979	98	90 - 110	2010-09-23
Total Barium		${ m mg/L}$	1.00	0.997	100	90 - 110	2010-09-23
Total Cadmium		mg/L	1.00	0.988	99	90 - 110	2010-09-23
Total Chromium		mg/L	1.00	0.986	99	90 - 110	2010-09-23
Total Lead		mg/L	1.00	0.991	99	90 - 110	2010-09-23
Total Selenium		mg/L	1.00	0.991	99	90 - 110	2010-09-23

### Standard (CCV-1)

QC Batch: 73807

Date Analyzed: 2010-09-24

Analyzed By: TP

			CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00500	100	90 - 110	2010-09-24

### Standard (CCV-2)

QC Batch: 73807

Date Analyzed: 2010-09-24

Analyzed By: TP

TNM 97-04

Work Order: 10091705 TNM 97-04 Townsend Page Number: 28 of 28 Lovington, NM

			CCVs True	${ m CCVs} \ { m Found}$	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00509	102	90 - 110	2010-09-24

## Standard (CCV-1)

QC Batch: 73832

Date Analyzed: 2010-09-26

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		m mg/L	60.0	60.2	100	80 - 120	2010-09-26
2-Methylnaphthalene		$\mathrm{mg/L}$	60.0	60.9	102	80 - 120	2010-09-26
1-Methylnaphthalene		${ m mg/L}$	60.0	60.5	101	80 - 120	2010-09-26
${f Acenaphthylene}$		$_{ m mg/L}$	60.0	59.9	100	80 - 120	2010-09-26
Acenaphthene		mg/L	60.0	62.3	104	80 - 120	2010-09-26
Dibenzofuran		mg/L	60.0	59.3	99	80 - 120	2010-09-26
Fluorene		mg/L	60.0 .	61.3	102	80 - 120	2010-09-26
Anthracene		${ m mg/L}$	60.0	55.2	92	80 - 120	2010-09-26
Phenanthrene		mg/L	60.0	56.6	94	80 - 120	2010-09-26
Fluoranthene		${ m mg/L}$	60.0	53.8	90	80 - 120	2010-09-26
Pyrene		m mg/L	60.0	60.9	102	80 - 120	2010-09-26
Benzo(a)anthracene		${ m mg/L}$	60.0	48.2	80	80 - 120	2010-09-26
Chrysene .		${ m mg/L}$	60.0	65.1	108	80 - 120	2010-09-26
Benzo(b)fluoranthene		mg/L	60.0	50.2	84	80 - 120	2010-09-26
Benzo(k)fluoranthene		mg/L	60.0	68.5	114	80 - 120	2010-09-26
Benzo(a)pyrene		m mg/L	60.0	67.1	112	80 - 120	2010-09-26
Indeno(1,2,3-cd)pyrene		${ m mg/L}$	60.0	55.2	92	80 - 120	2010-09-26
Dibenzo(a,h)anthracene		mg/L	60.0	54.2	90	80 - 120	2010-09-26
Benzo(g,h,i)perylene		${ m mg/L}$	60.0	58.0	97	80 - 120	2010-09-26

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limit
Nitrobenzene-d5		68.4	mg/L	1	60.0	114	80 - 120
2-Fluorobiphenyl		60.4	$\mathrm{mg/L}$	1	60.0	101	80 - 120
Terphenyl-d14		54.5	m mg/L	1	60.0	91	80 - 120

LAB Order ID #

Check If Special Reporting しろ Zんしばばれるし Limits Are Needed Turn Around Time if different from standard BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750 ŏ Hay Lo, Fe, Ma, Zu, Al \*IVIIONOUCOI-BHX Na, Ca, Mg, K, TDS, EC Circle or Specify Wethod CI' EI' 204' NO3' NOS' AIKalinity **ANALYSIS REQUEST** Moisture Content \* Kulbhoch-Dry Weight Basis Required **BOD, TSS, pH** TRRP Report Required Pesticides 8081 / 608 bCB.2 8082 \ 608 200 East Sunset Rd., Suite E El Paso, Texas 79922
Tel (915) 585-3443
Fax (915) 585-3944
1 (888) 588-3443 CC/MS Semi. Vol. 8270 / 625 REMARKS CC/W2 A91 8560 / 624 くくさいとる BCI TCLP Pesticides TCLP Semi Volatiles C Headspace Y(N/NA 1 TCLP Volatiles LAB USE ONLY TCLP Metals Ag As Ba Cd Cr Pb Se Hg Log-in-Review. Intact N N Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 5002 Basin Street, Suite A1 **Midland, Texas 79703** Tel (432) 689-6301 Fax (432) 689-6313 6259 (6258 HA9) TPH 8015 GRO / DRO / TVHC ٥٠ TPH 418.1 / TX1005 / TX1005 Ext(C35) Carrier # 81EX 80513 602 / 8260 / 624 OBS 3. 8021 / 602 / 8260 / 624 **BETM** CORY INST 3. COR INST INST OBS COR 1230 TIME SAMPLING 8.05 Time: Time: Olat 6701 Aberdeen Avenue, Suite 9 **Lubbock, Texas 79424**Tel (806) 794-1296
Fax (806) 794-1298
(1800) 378-1296 **DATE** ۍ 7 PRESERVATIVE NONE ن  $\sim$ METHOD ICE Ö Fax#: -7720 520-770| E-mail: Sampler Signature HOBN Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. THACK Company Company OS2H Project Name: FONH マ HCI SUDDE Received by: Received by MATRIX Frace Analysis, Inc. ЯІА NOS **A**3TAW email: lab@traceanalysis.com 分二 InuomA \ emuloV Time: Time: Time: # CONTAINERS 1 9117119 9/1-1- Porto 01/11 Date: Surverse JAHA 7 O FIELD CODE 97-6 MESM Company Company Project Location (including state): City, Zip) TRACE (If different from above) £ Relinquished by: Relinquished by Relinquished b Company Name Contact Person 24490 LAB USE Invoice to: Project #: Address: LAB#

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PloH



6701 Aberdeen Avenue, Suita 9 200 East Sunset Road, Suite E 5002 Basin Street, Suite A1

Lubbock, Texas 79424 El Paso, Texas 79922 Midland, Texas 79703 800 • 378 • 1296 888 • 588 • 3440

806 • 794 • 1296 915 • 585 • 3443 432 • 689 • 6301

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6015 Harris Parkway, Suine 110 Ft. Worth, Texas 76132 817 • 201 • 5260

FAX 432 • 689 • 6313

E-Mail: lab@traceanalysis.com

# Certifications

WBENC: 237019 HUB:

1752439743100-86536 WFWB38444Y0909

DBE: VN 20657

NCTRCA

**NELAP** Certifications

Lubbock: T104704219-08-TX

LELAP-02003 Kansas E-10317 El Paso:

T104704221-08-TX

Midland:

T104704392-08-TX

LELAP-02002

# Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St.

Report Date: September 29, 2010

Midland, TX, 79703

Work Order:

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	rime	Date
Sample	Description	Matrix	Taken	Taken	Received
245804	Post-Carbon	water	2010-09-23	09:45	2010-09-23

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 28 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

### Standard Flags

 ${\bf B}$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-09-23 and assigned to work order 10092419. Samples for work order 10092419 were received intact without headspace and at a temperature of 3.8 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	$\operatorname{Prep}$	QC	Analysis
Test	Method	Batch	Date	Batch	Date
Ag, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Al, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
As, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Ba, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
BTEX	S 8021B	63437	2010-09-28 at 14:27	73924	2010-09-28 at 14:27
B, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
Cd, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Co, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Cr, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
Cu, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Fe, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
Hg, Total	S 7470A	63447	2010-09-29 at 08:45	73961	2010-09-29 at $14:18$
Mn, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Mo, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Ni, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
PAH	S 8270D	63353	2010-09-24 at 15:00	73828	2010-09-26 at 13:19
Pb, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at 08:57
Se, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$
Zn, Total	S 6010C	63446	2010-09-29 at 05:46	73942	2010-09-29 at $08:57$

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10092419 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10092419

TNM 97-04 Townsend

Page Number: 4 of 28 Lovington, NM

# **Analytical Report**

Sample: 245804 - Post-Carbon

Laboratory: Lubbock

Prep Batch: 63446

Analysis: QC Batch: Al, Total

73942

Analytical Method: Date Analyzed:

S 6010C

2010-09-29

Sample Preparation: 2010-09-29 Prep Method:

S 3010A RR

Analyzed By: Prepared By:

KV

RL0.0500

RL.

		1617			
Parameter	Flag	Result	Units	Dilution	
Total Aluminum		0.0530	mg/L	1	

Sample: 245804 - Post-Carbon

Laboratory: Lubbock

B, Total Analysis: QC Batch: 73942

Analytical Method:

S 6010C 2010-09-29 Prep Method: Analyzed By:

S 3010A RR

Prep Batch: 63446

Date Analyzed: Sample Preparation:

2010-09-29

Prepared By:

KV

RL

Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Total Boron		0.112	mg/L	1	0.0100

Sample: 245804 - Post-Carbon

Laboratory: Lubbock

BTEX Analysis: QC Batch: 73924

Analytical Method: Date Analyzed:

S 8021B 2010-09-28 Prep Method: S 5030B Analyzed By:  $\mathbf{E}\mathbf{R}$ 

Prep Batch: 63437

Sample Preparation:

Prepared By: ER

RL

Parameter	Flag	Result	Units	Dilution	$\operatorname{RL}$
Benzene		< 0.00100	mg/L	1	0.00100
Toluene		< 0.00100	mg/L	1	0.00100
Ethylbenzene		< 0.00100	$\mathrm{mg/L}$	1	0.00100
Xylene		< 0.00100	mg/L	1	0.00100

C	Tale	Dl+	IIi.	D:1+:	Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Result}$	$\operatorname{Units}$	Dilution	$\mathbf{A}\mathbf{mount}$	$\operatorname{Recovery}$	Limits
Trifluorotoluene (TFT)		0.0893	mg/L	1	0.100	89	78.4 - 113
4-Bromofluorobenzene (4-BFB)		0.0964	mg/L	1	0.100	96	81.5 - 121

TNM 97-04

Work Order: 10092419

TNM 97-04 Townsend

Page Number: 5 of 28

Lovington, NM

Sample: 245804 - Post-Carbon

Laboratory:

Lubbock

Analysis: Co, Total QC Batch: 73942

Analytical Method: Date Analyzed:

S 6010C

2010-09-29

Prep Method: Analyzed By:

S 3010A RR

Prep Batch: 63446

Sample Preparation:

2010-09-29

Prepared By:

KV

RL

Parameter Total Cobalt

Result < 0.00500 Units mg/L Dilution

RL0.00500

Sample: 245804 - Post-Carbon

Laboratory:

Lubbock

Flag

Flag

Analysis:

Cu, Total 73942

Analytical Method:

S 6010C 2010-09-29

S 3010A Prep Method: Analyzed By:

QC Batch: Prep Batch: 63446

Date Analyzed: Sample Preparation:

2010-09-29

KV Prepared By:

RR

RL

Parameter Total Copper

Result < 0.00500

Units mg/L Dilution

RL0.00500

Sample: 245804 - Post-Carbon

Laboratory: Lubbock

Analysis: QC Batch: Prep Batch: Fe, Total 73942

Analytical Method:

S 6010C

Prep Method:

S 3010A

63446

Date Analyzed: Sample Preparation:

2010-09-29 2010-09-29 Analyzed By: Prepared By:

RRKV

Parameter Flag

RLResult 0.311 Units

mg/L

1

Dilution

RL

0.0100

Sample: 245804 - Post-Carbon

Laboratory:

Prep Batch:

Total Iron

Lubbock

Analysis: Mn, Total QC Batch: 73942

Analytical Method: Date Analyzed:

S 6010C 2010-09-29 Prep Method: S 3010A Analyzed By:

RR

63446

Sample Preparation: 2010-09-29

Prepared By:

KV

RL

Parameter Result Dilution RLFlag Units 0.00500 Total Manganese 0.0340mg/L

TNM 97-04

Work Order: 10092419

TNM 97-04 Townsend

Page Number: 6 of 28

Lovington, NM

Sample: 245804 - Post-Carbon

Laboratory: Analysis:

Lubbock

Mo, Total 73942

Analytical Method:

S 6010C 2010-09-29 Prep Method: S 3010A Analyzed By: RR

QC Batch: Prep Batch: 63446

Date Analyzed: Sample Preparation:

2010-09-29

Prepared By:

RL

Parameter Total Molybdenum Flag Result < 0.0500 Units mg/L Dilution

RL

0.0500

Sample: 245804 - Post-Carbon

Laboratory:

Lubbock

Analysis: QC Batch: Ni, Total 73942

Analytical Method:

S 6010C 2010-09-29 Prep Method: S 3010A Analyzed By:

Prep Batch: 63446

Date Analyzed: Sample Preparation: 2010-09-29

Prepared By:

RRKV

RL

Sample Preparation:

Parameter Total Nickel Flag

Result < 0.0100

Units mg/L Dilution

RL0.0100

Sample: 245804 - Post-Carbon

63353

Laboratory: Lubbock

Analysis: PAH QC Batch: 73828

Prep Batch:

Analytical Method: Date Analyzed:

S 8270D 2010-09-26 2010-09-24 Prep Method: S 3510C Analyzed By:

Prepared By:

MN MN

RL

Flag	Result	Units	Dilution	$\mathrm{RL}$
	0.00856	mg/L	0.952	0.000200
	0.00272	$\mathrm{mg/L}$	0.952	0.000200
	0.00106	mg/L	0.952	0.000200
	< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
	< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
	< 0.000190	mg/L	0.952	0.000200
	< 0.000190	mg/L	0.952	0.000200
•	< 0.000190	mg/L	0.952	0.000200
	< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
,	< 0.000190	mg/L	0.952	0.000200
	< 0.000190	mg/L	0.952	0.000200
	< 0.000190	mg/L	0.952	0.000200
	< 0.000190	mg/L	0.952	0.000200
	< 0.000190	m mg/L	0.952	0.000200
	Flag	$\begin{array}{c} \textbf{0.00856} \\ \textbf{0.00272} \\ \textbf{0.00106} \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ < 0.000190 \\ \end{aligned}$	$\begin{array}{cccc} \textbf{0.00856} & \text{mg/L} \\ \textbf{0.00272} & \text{mg/L} \\ \textbf{0.00106} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ < \textbf{0.000190} & \text{mg/L} \\ \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

 $continued \dots$ 

 $\rm TNM~97\text{-}04$ 

Work Order: 10092419 TNM 97-04 Townsend Page Number: 7 of 28 Lovington, NM

sample 245804 continued ...

		$\mathrm{RL}$			
Parameter	Flag	Result	Units	Dilution	RL
Benzo(k)fluoranthene		< 0.000190	mg/L	0.952	0.000200
Benzo(a)pyrene		< 0.000190	mg/L	0.952	0.000200
Indeno(1,2,3-cd)pyrene		< 0.000190	mg/L	0.952	0.000200
Dibenzo(a,h)anthracene		< 0.000190	mg/L	0.952	0.000200
Benzo(g,h,i)perylene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200

		•			$\operatorname{Spike}$	$\operatorname{Percent}$	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	$\mathbf{A}\mathbf{mount}$	Recovery	Limits
Nitrobenzene-d5		0.0453	mg/L	0.952	0.0800	57	10 - 111
2-Fluorobiphenyl		0.0595	mg/L	0.952	0.0800	74	10 - 92.7
Terphenyl-d14		0.0592	$\mathrm{mg/L}$	0.952	0.0800	74	35.9 - 107

### Sample: 245804 - Post-Carbon

Laboratory: Lubbock

Analysis: Total 8 Metals Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73942 2010-09-29 Analyzed By: RRDate Analyzed: Prep Batch: 63446 Sample Preparation: 2010-09-29 Prepared By: KV Laboratory: Lubbock Analysis: Total 8 Metals Analytical Method: S 7470A Prep Method: N/AOC Batch: Analyzed By: TP 73961 Date Analyzed: 2010-09-29 Prep Batch: 63447 Sample Preparation: 2010-09-29 Prepared By: TP

RLParameter Flag Result Units Dilution RLTotal Silver 0.00500 < 0.00500 mg/L 1 Total Arsenic 1 0.0100 < 0.0100 mg/L Total Barium 1 0.0100 0.194mg/L Total Cadmium < 0.00500 mg/L 1 0.00500Total Chromium 0.0100< 0.0100 mg/L 1 0.000200 Total Mercury < 0.000200 mg/L1 Total Lead 0.00500 < 0.00500 mg/L 1 Total Selenium 0.0200 < 0.0200 mg/L 1

#### Sample: 245804 - Post-Carbon

Laboratory: Lubbock

Analysis: Zn, Total Analytical Method: S 6010C Prep Method: S 3010A QC Batch: 73942 Date Analyzed: 2010-09-29 Analyzed By: RR Prep Batch: 63446 Sample Preparation: 2010-09-29 Prepared By: KV

TNM 97-04

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		$\operatorname{RL}$			
Parameter	Flag	Result	Units	Dilution	$\mathrm{RL}$
Total Zinc		$0.\overline{0150}$	mg/L	1	0.00500

Method Blank (1)

QC Batch: 73828

QC Batch: Prep Batch: 63353

73828

Date Analyzed: QC Preparation: 2010-09-24

2010-09-26

Analyzed By: MN

Prepared By: MN

		$\operatorname{MDL}$		
Parameter	$\operatorname{Flag}$	Result	Units	$\operatorname{RL}$
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	$\mathrm{mg/L}$	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	m mg/L	0.0002
Acenaphthene		< 0.0000617	m mg/L	0.0002
Dibenzofuran		< 0.0000952	m mg/L	0.0002
Fluorene		< 0.000134	m mg/L	0.0002
Anthracene		< 0.000441	m mg/L	0.0002
Phenanthrene		< 0.000435	m mg/L	0.0002
Fluoranthene		< 0.000476	mg/L	0.0002
Pyrene		< 0.000590	${ m mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	m mg/L	0.0002
Chrysene		< 0.0000766	$\mathrm{mg/L}$	0.0002
Benzo(b)fluoranthene		< 0.000146	mg/L	0.0002
Benzo(k)fluoranthene		< 0.000141	$\mathrm{mg/L}$	0.0002
Benzo(a)pyrene	,	< 0.000132	m mg/L	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	m mg/L	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	m mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	m mg/L	0.0002

					$_{ m Spike}$	$\operatorname{Percent}$	$\operatorname{Recovery}$
Surrogate	Flag	Result	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0333	mg/L	1	0.0800	42	10 - 111
2-Fluorobiphenyl		0.0280	$\mathrm{mg/L}$	1 .	0.0800	35	10 - 92.7
Terphenyl-d14		0.0397	$_{ m mg/L}$	1	0.0800	50	35.9 - 107

Method Blank (1)

QC Batch: 73924

QC Batch: 73924 Prep Batch: 63437 Date Analyzed: 2010-09-28 QC Preparation: 2010-09-28 Analyzed By: ER Prepared By: ER

TNM 97-04

Total Cobalt

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			MDL				
Parameter	Flag	]	Result	Units			RL
Benzene			00371	mg/L	1		0.001
Toluene		< 0.0	00400	mg/L	,		0.001
Ethylbenzene		< 0.0	00430	mg/L			0.001
Xylene		<0.0	00379	mg/L			0.001
				Spike	Percent	Rec	overy
Surrogate	$\operatorname{Flag}$	Result Units	s Dilution	Amount	Recovery		nits
Trifluorotoluene (TFT)		0.102 mg/I	1	0.100	102	78.4	- 113
4-Bromofluorobenzene (	4-BFB)	0.107 mg/I	1	0.100	107	81.5	- 121
Method Blank (1)	QC Batch: 73942						
QC Batch: 73942		Date Analyzed:	2010-09-29		Analyze	d Bv:	RR
Prep Batch: 63446		QC Preparation:	2010-09-29		Prepare		KV
•		•			-	v	
<b>D</b>	771		MDL	<b>T</b> T .			DI
Parameter	Flag		Result	Uni			RL
Total Aluminum			0.00982	mg/	<u></u>		0.05
Method Blank (1)	QC Batch: 73942						
QC Batch: 73942		Date Analyzed:	2010-09-29		Analyze	d Bv	RR
Prep Batch: 63446		QC Preparation:	2010-09-29		Prepare		KV
2 Top - State		•			2 2 4 1 4 4	J	
Davamatan	Ela m		MDL Result	Units			RL
Parameter Total Boron	Flag		00215	mg/I			$\frac{100}{0.01}$
Total Bolon			50215				0.01
Method Blank (1)	QC Batch: 73942						
QC Batch: 73942		Date Analyzed:	2010-09-29		Analyze	ed Bv	RR
Prep Batch: 63446		QC Preparation:	2010-09-29		Prepare	•	KV
			MDL				
Parameter	Flag		lesult	Units			RL
Tatal Cahalt	<del></del>		20050	/T			0.005

< 0.00258

mg/L

0.005

Report Date: Septemb TNM 97-04	er 29, 2010	Work Order: 10092419 TNM 97-04 Townsend	I	Page Number: 10 Lovingto	
Method Blank (1)	QC Batch: 73942				
QC Batch: 73942 Prep Batch: 63446		Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29		Analyzed By: Prepared By:	RR KV
Parameter	$\operatorname{Flag}$	$egin{array}{c}  ext{MDL} \  ext{Result} \end{array}$	Units		RL
Total Copper		< 0.00313	mg/L		0.005
Method Blank (1)	QC Batch: 73942				
QC Batch: 73942 Prep Batch: 63446		Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29		Analyzed By: Prepared By:	RR KV
Parameter	Flag	MDL Result	Units		RL
Total Iron		< 0.00273	mg/L		0.01
Method Blank (1)	QC Batch: 73942				
QC Batch: 73942 Prep Batch: 63446		Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29		Analyzed By: Prepared By:	RR KV
Parameter Tetal Managana	Flag	MDL Result	Units		RL 0.005
Total Manganese		< 0.00423	mg/L		0.003
Method Blank (1)	QC Batch: 73942	·			
QC Batch: 73942 Prep Batch: 63446		Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29		Analyzed By: Prepared By:	RR KV
Parameter	Flag	MDL Result	Units		RL
Total Molybdenum		< 0.00164	mg/L		0.05
Method Blank (1)	QC Batch: 73942				
QC Batch: 73942 Prep Batch: 63446		Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29		Analyzed By: Prepared By:	RR KV

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RL0.01

		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	$\operatorname{Units}$	
Total Nickel		< 0.00593	mg/L	_

Method Blank (1)

QC Batch: 73942

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch:

63446

QC Preparation: 2010-09-29

Prepared By: KV

MDL

Flag RLParameter Result Units Total Zinc < 0.00178 0.005 mg/L

Method Blank (1)

QC Batch: 73942

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation:

2010-09-29

Prepared By: KV

		$\mathrm{MDL}$	_	
Parameter	$\operatorname{Flag}$	Result	Units	$\mathrm{RL}$
Total Silver		< 0.000469	mg/L	0.005
Total Arsenic		< 0.00465	${ m mg/L}$	0.01
Total Barium		< 0.00418	m mg/L	0.01
Total Cadmium		< 0.00232	${ m mg/L}$	0.005
Total Chromium		< 0.00291	${ m mg/L}$	0.01
Total Lead		< 0.00303	${ m mg/L}$	0.005
Total Selenium		< 0.00570	$\mathrm{mg/L}$	0.02

Method Blank (1)

QC Batch: 73961

QC Batch:

73961

Date Analyzed:

2010-09-29

Analyzed By: TP

Prep Batch: 63447

QC Preparation: 2010-09-29

Prepared By:

TP

Parameter Flag

MDL Result

< 0.0000388

RLUnits 0.0002

mg/L

Laboratory Control Spike (LCS-1)

QC Batch:

73828

Date Analyzed:

2010-09-26

Analyzed By: MN

Prep Batch:

Total Mercury

63353

QC Preparation:

2010-09-24

Prepared By: MN

TNM 97-04

Benzo(a)pyrene

Indeno(1,2,3-cd)pyrene

Dibenzo(a,h)anthracene

Benzo(g,h,i)perylene

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61

53

71

55

< 0.000132

< 0.0000702

< 0.0000534

< 0.0000473

51.3 - 151

43.2 - 115

43.9 - 115

45.1 - 115

LCS Matrix Rec. Spike Result Units Dil. Result Limit Param Amount Rec. Naphthalene 0.0615 < 0.0000784 32.2 - 80.3 mg/L 1 0.080077 34.8 - 87 2-Methylnaphthalene 0.0618 77 mg/L 1 0.0800 < 0.0000747 36.9 - 89.6 1-Methylnaphthalene 0.0661 mg/L1 0.0800< 0.0000575 83 35 - 93.2Acenaphthylene 0.0678 mg/L 1 0.0800< 0.0000963 85 87 35.8 - 92.9 Acenaphthene 0.0696 mg/L1 0.0800< 0.0000617 35.3 - 85.1 Dibenzofuran 0.0490mg/L 1 0.0800< 0.0000952 61 Fluorene 0.0689 mg/L 1 0.0800< 0.000134 86 43.4 - 101 Anthracene 0.0629mg/L1 < 0.00044179 44.8 - 92.4 0.0800Phenanthrene 1 81 44 - 93.7 0.0648mg/L 0.0800< 0.000435 Fluoranthene < 0.000476 86 52.7 - 1040.0691mg/L 1 0.0800 42.2 - 93.8 Pyrene 0.06951 < 0.000590 87 mg/L 0.0800Benzo(a)anthracene 0.0586 mg/L 1 0.0800 < 0.000118 73 40.4 - 91.9 Chrysene 0.0929 0.0800< 0.0000766116 44.4 - 107 mg/L 1 34.8 - 105Benzo(b)fluoranthene 0.0387mg/L 48 1 0.0800< 0.000146 Benzo(k)fluoranthene 0.0592mg/L0.0800< 0.000141 74 50.2 - 1581

1

1

1

1

0.0800

0.0800

0.0800

0.0800

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

mg/L

mg/L

mg/L

mg/L

0.0488

0.0423

0.0567

0.0438

		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	$\operatorname{Result}$	$\mathrm{Rec}.$	$\operatorname{Limit}$	RPD	Limit
Naphthalene	2	0.0687	mg/L	1	0.0800	< 0.0000784	86	32.2 - 80.3	11	20
2-Methylnaphthalene		0.0689	$\mathrm{mg/L}$	1	0.0800	< 0.0000747	86	34.8 - 87	11	20
1-Methylnaphthalene	3	0.0753	mg/L	1	0.0800	< 0.0000575	94	36.9 - 89.6	13	20
Acenaphthylene	4	0.0769	mg/L	1	0.0800	< 0.0000963	96	35 - 93.2	13	20
Acenaphthene	5	0.0753	mg/L	1	0.0800	< 0.0000617	94	35.8 - 92.9	8	20
Dibenzofuran		0.0556	mg/L	1	0.0800	< 0.0000952	70	35.3 - 85.1	13	20
Fluorene		0.0743	mg/L	1	0.0800	< 0.000134	93	43.4 - 101	8	20
Anthracene		0.0640	mg/L	1	0.0800	< 0.000441	80	44.8 - 92.4	$^2$	20
Phenanthrene		0.0679	$\mathrm{mg/L}$	1	0.0800	< 0.000435	85	44 - 93.7	5	20
Fluoranthene		0.0754	$\mathrm{mg/L}$	1	0.0800	< 0.000476	94	52.7 - 104	9	20
Pyrene		0.0667	$\mathrm{mg/L}$	1	0.0800	< 0.000590	83	42.2 - 93.8	4	20
Benzo(a)anthracene		0.0572	mg/L	1	0.0800	< 0.000118	72	40.4 - 91.9	2	20
Chrysene	6	0.0966	mg/L	1	0.0800	< 0.0000766	121	44.4 - 107	4	20
Benzo(b)fluoranthene		0.0377	mg/L	1	0.0800	< 0.000146	47	34.8 - 105	3	20
Benzo(k)fluoranthene		0.0664	mg/L	1	0.0800	< 0.000141	83	50.2 - 158	12	20
Benzo(a)pyrene		0.0562	mg/L	1	0.0800	< 0.000132	70	51.3 - 151	14	20

continued ...

<sup>&</sup>lt;sup>1</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>2</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occurred properly.

<sup>&</sup>lt;sup>3</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

<sup>&</sup>lt;sup>4</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occurred properly.

<sup>&</sup>lt;sup>5</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occurred properly.

<sup>&</sup>lt;sup>6</sup>Spike analyte out of control limits. Results biased high.

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control spikes continued . . .

	LCSD			$_{ m Spike}$	Matrix		$\mathrm{Rec}.$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Indeno(1,2,3-cd)pyrene	0.0426	mg/L	1	0.0800	< 0.0000702	53	43.2 - 115	1	20
Dibenzo(a,h)anthracene	0.0592	mg/L	1	0.0800	< 0.0000534	74	43.9 - 115	4	20
Benzo(g,h,i)perylene	0.0461	mg/L	1	0.0800	< 0.0000473	58	45.1 - 115	_ 5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$\mathbf{Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	${ m Rec.}$	Rec.	Limit
Nitrobenzene-d5	0.0675	0.0783	mg/L	1	0.0800	84	98	10 - 111
2-Fluorobiphenyl	0.0580	0.0643	$_{ m mg/L}$	1	0.0800	72	80	10 - 92.7
Terphenyl-d14	0.0615	0.0595	${ m mg/L}$	1	0.0800	77	74	35.9 - 107

### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 63437

73924

Date Analyzed:

2010 - 09 - 28QC Preparation: 2010-09-28 Analyzed By: ER

Prepared By: ER

Param	LCS Result	Units	Dil.	$rac{ ext{Spike}}{ ext{Amount}}$	Matrix Result	Rec.	Rec. Limit
Benzene	0.101	mg/L	1	0.100	< 0.000371	101	79.8 - 112
Toluene	0.101	$_{ m mg/L}$	1	0.100	< 0.000400	101	76.9 - 116
Ethylbenzene	0.103	mg/L	1	0.100	< 0.000430	103	78.1 - 116
Xvlene	0.308	mg/L	1	0.300	< 0.000379	102	80.1 - 113

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Benzene	0.102	mg/L	1	0.100	< 0.000371	102	79.8 - 112	0	20
Toluene	0.102	mg/L	1	0.100	< 0.000400	102	76.9 - 116	1	20
Ethylbenzene	0.104	mg/L	. 1	0.100	< 0.000430	104	78.1 - 116	1	20
Xylene	0.310	mg/L	1	0.300	< 0.000379	103	80.1 - 113	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0992	0.0900	mg/L	1	0.100	99	90	75.8 - 111
4-Bromofluorobenzene (4-BFB)	0.0988	0.0901	mg/L	1	0.100	99	90	71.9 - 111

### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 63446

73942

Date Analyzed: QC Preparation: 2010-09-29

2010-09-29

Analyzed By: RR

Prepared By: KV

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		LCS			Spike	Matrix		Rec.	
Param	1	Result	Units	Dil.	Amount	Result	Rec.	Limit	
Total Aluminum		0.936	mg/L	1	1.00	< 0.00982	94	85 - 115	
Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.									

	LCSD			$\operatorname{Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	${f A}{f m}{f o}{f u}{f n}{f t}$	Result	Rec.	Limit	RPD	Limit
Total Aluminum	0.913	mg/L	1	1.00	< 0.00982	91	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Boron	0.0520	mg/L	1	0.0500	< 0.00215	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.0520	mg/L	1	0.0500	< 0.00215	104	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	, LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	$\operatorname{Rec}$ .	Limit
Total Cobalt	0.259	$\mathrm{mg/L}$	1	0.250	< 0.00258	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Total Cobalt	0.262	mg/L	1	0.250	< 0.00258	105	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Copper	0.127	mg/L	1	0.125	< 0.00313	102	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Copper	0.126	mg/L	1	0.125	< 0.00313	101	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	$\operatorname{Limit}$
Total Iron	0.464	mg/L	1	0.500	< 0.00273	93	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Iron	0.469	mg/L	1	0.500	< 0.00273	94	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	LCS			Spike	Matrix		$\operatorname{Rec}$ .
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Manganese	0.259	${ m mg/L}$	1	0.250	< 0.00423	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Manganese	0.253	mg/L	1	0.250	< 0.00423	101	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-29

QC Preparation: 2010-09-29

Analyzed By: RR

Prepared By: KV

Prep Batch: 63446

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	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	$\mathrm{Rec.}$	$\operatorname{Limit}$
Total Molybdenum	0.457	mg/L	1	0.500	< 0.00164	91	85 - 115

Percent recovery is based on the spike result: RPD is based on the spike and spike duplicate result.

	LCSD			$\operatorname{Spike}$	Matrix		$\mathrm{Rec}.$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Molybdenum	0.539	mg/L	1	0.500	< 0.00164	108	85 - 115	16	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Total Nickel	0.266	$\mathrm{mg/L}$	1	0.250	< 0.00593	106	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Nickel	0.260	mg/L	1	0.250	< 0.00593	104	85 - 115	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	$\mathrm{Rec}.$	Limit
Total Zinc	0.262	mg/L	1	0.250	< 0.00178	105	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Total Zinc	0.253	mg/L	1	0.250	< 0.00178	101	85 - 115	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

TNM 97-04

Work Order: 10092419

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Param	$rac{ ext{LCS}}{ ext{Result}}$	Units	· Dil.	$\begin{array}{c} {\rm Spike} \\ {\rm Amount} \end{array}$	Matrix Result	Rec.	${ m Rec.} \ { m Limit}$
Total Silver	0.125	mg/L	1	0.125	< 0.000469	100	85 - 115
Total Arsenic	0.498	mg/L	1	0.500	< 0.00465	100	85 - 115
Total Barium	1.05	mg/L	1	1.00	< 0.00418	105	85 - 115
Total Cadmium	0.265	m mg/L	1	0.250	< 0.00232	106	85 - 115
Total Chromium	0.104	mg/L	1	0.100	< 0.00291	104	85 - 115
Total Lead	0.517	mg/L	1	0.500	< 0.00303	103	85 - 115
Total Selenium	0.449	$\mathrm{mg/L}$	1	0.500	< 0.00570	90	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	$\begin{array}{c} \text{RPD} \\ \text{Limit} \end{array}$
Total Silver	0.123	mg/L	1	0.125	< 0.000469	98	85 - 115	2	20
Total Arsenic	0.491	mg/L	1	0.500	< 0.00465	98	85 - 115	1	20
Total Barium	1.04	mg/L	1	1.00	< 0.00418	104	85 - 115	1	20
Total Cadmium	0.260	mg/L	1	0.250	< 0.00232	104	85 - 115	2	20
Total Chromium	0.0990	mg/L	1	0.100	< 0.00291	99	85 - 115	5	20
Total Lead	0.517	mg/L	1	0.500	< 0.00303	103	85 - 115	0	20
Total Selenium	0.450	mg/L	1	0.500	< 0.00570	90	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:

73961 Prep Batch: 63447 Date Analyzed:

2010-09-29 QC Preparation: 2010-09-29

2010-09-28

Analyzed By: TP Prepared By: TP

LCS Matrix Rec. Spike Param Result Limit Units Dil. Amount Result Rec. 91.4 - 111 0.00390 Total Mercury mg/L 0.00400 < 0.0000388 98

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

•	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Mercury	0.00389	mg/L	1	0.00400	< 0.0000388	97	91.4 - 111	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 246001

QC Batch: 73924 Prep Batch: 63437

Date Analyzed:

QC Preparation: 2010-09-28

Analyzed By: ER Prepared By: ER

 $continued \dots$ 

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matrix spikes continued . . .

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene	0.118	mg/L	1	0.100	0.0186	99	29.6 - 139
Toluene	0.134	mg/L	1	0.100	0.0313	103	44.3 - 131
Ethylbenzene	0.109	mg/L	1	0.100	0.0054	104	43.8 - 131
Xylene	0.342	$\mathrm{mg/L}$	1	0.300	$0.0\overline{362}$	102	48.8 - 126

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene	0.114	mg/L	1	0.100	0.0186	95	29.6 - 139	3	20
Toluene	0.131	mg/L	1	0.100	0.0313	100	44.3 - 131	2	20
Ethylbenzene	0.106	mg/L	1	0.100	0.0054	101	43.8 - 131	3	20
Xylene	0.333	mg/L	1	0.300	0.0362	99	48.8 - 126	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	${f Amount}$	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	0.0886	0.0870	mg/L	1	0.1	89	87	73.9 - 118
4-Bromofluorobenzene (4-BFB)	0.0902	0.0885	${ m mg/L}$	1	0.1	90	88	73.8 - 116

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch:

73942 Prep Batch: 63446 Date Analyzed:

2010-09-29

QC Preparation: 2010-09-29

Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Total Aluminum	0.914	mg/L	1	1.00	0.053	86	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Aluminum	0.967	mg/L	1	1.00	0.053	91	75 - 125	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch: 73942 Prep Batch: 63446 Date Analyzed: 2010-09-29 QC Preparation: 2010-09-29

Analyzed By: RR Prepared By: KV

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Lovington, NM

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	$\operatorname{Dil}$ .	Amount	Result	Rec.	Limit
Total Boron	0.163	mg/L	1	0.0500	0.112	102	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Boron	0.159	mg/L	1	0.0500	0.112	94	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

73942

Spiked Sample: 245804

Date Analyzed:

2010-09-29

Analyzed By: RR

QC Batch: Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	MS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Cobalt	0.239	mg/L	1	0.250	< 0.00258	96	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Cobalt	0.239	mg/L	1	0.250	< 0.00258	96	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245804

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Copper	0.124	mg/L	1	0.125	< 0.00313	99	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Total Copper	0.118	mg/L	1	0.125	< 0.00313	94	75 - 125	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245804

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

TNM 97-04

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	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Iron	0.765	${ m mg/L}$	1	0.500	0.311	91	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Iron	0.746	mg/L	1	0.500	0.311	87	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch: 73942 Prep Batch: 63446 Date Analyzed:

2010-09-29 QC Preparation: 2010-09-29 Analyzed By: RR

Prepared By: KV

	MS			Spike	Matrix		$\mathrm{Rec}.$
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Manganese	0.276	m mg/L	1	0.250	0.034	97	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		$\mathrm{Rec}.$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Total Manganese	0.265	mg/L	1	0.250	0.034	92	75 - 125	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	MS			Spike	Matrix		$\mathrm{Rec}.$
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit
Total Molybdenum	0.494	mg/L	1	0.500	0.003	98	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Molybdenum	0.483	mg/L	1	0.500	0.003	96	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 245804

QC Batch:

Date Analyzed: 2010-09-29

Analyzed By: RR Prepared By: KV

Prep Batch: 63446

QC Preparation: 2010-09-29

TNM 97-04

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	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Nickel	0.237	mg/L	1	0.250	< 0.00593	95	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Total Nickel	0.239	· mg/L	1	0.250	< 0.00593	96	75 - 125	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245804

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Zinc	0.244	${ m mg/L}$	. 1	0.250	0.015	92	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Zinc	0.248	$\mathrm{mg/L}$	1	0.250	0.015	93	75 - 125	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245804

QC Batch:

73942

Date Analyzed:

2010-09-29

Analyzed By: RR

Prep Batch: 63446

QC Preparation: 2010-09-29

Prepared By: KV

	MS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Total Silver	0.114	mg/L	1	0.125	< 0.000469	91	75 - 125
Total Arsenic	0.451	mg/L	1	0.500	< 0.00465	90	75 - 125
Total Barium	1.07	mg/L	1	1.00	0.194	88	75 - 125
Total Cadmium	0.240	$_{ m mg/L}$	1	0.250	< 0.00232	96	75 - 125
Total Chromium	0.0920	mg/L	1	0.100	< 0.00291	92	75 - 125
Total Lead	0.480	mg/L	1	0.500	< 0.00303	96	75 - 125
Total Selenium	0.436	mg/L	1	0.500	< 0.00570	87	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit	RPD	Limit
Total Silver	0.116	mg/L	1	0.125	< 0.000469	93	75 - 125	2	20

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matrix spikes continued . . .

	MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Arsenic	0.456	mg/L	1	0.500	< 0.00465	91	75 - 125	1	20
Total Barium	1.06	mg/L	1	1.00	0.194	87	75 - 125	1	20
Total Cadmium	0.244	mg/L	1	0.250	< 0.00232	98	75 - 125	2	20
Total Chromium	0.0900	mg/L	1	0.100	< 0.00291	90	75 - 125	2	20
Total Lead	0.467	mg/L	1	0.500	< 0.00303	93	75 - 125	3	20
Total Selenium	0.448	mg/L	1	0.500	< 0.00570	90	75 - 125	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 245634

QC Batch:

73961

Date Analyzed:

2010-09-29

Analyzed By: TP

Prep Batch: 63447

QC Preparation: 2010-09-29

Prepared By: TP

	MS			$\operatorname{Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit
Total Mercury	0.00349	mg/L	1	0.00400	< 0.0000388	87	75 - 122

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Total Mercury	0.00356	mg/L	1	0.00400	< 0.0000388	89	75 - 122	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Standard (CCV-1)

QC Batch: 73828

Date Analyzed: 2010-09-26

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	60.2	100	80 - 120	2010-09-26
2-Methylnaphthalene		${ m mg/L}$	60.0	60.9	102	80 - 120	2010-09-26
1-Methylnaphthalene		$\mathrm{mg/L}$	60.0	61.4	102	80 - 120	2010-09-26
Acenaphthylene		mg/L	60.0	59.4	99	80 - 120	2010-09-26
Acenaphthene		${ m mg/L}$	60.0	61.8	103	80 - 120	2010-09-26
Dibenzofuran		mg/L	60.0	58.7	. 98	80 - 120	2010-09-26
Fluorene		mg/L	60.0	61.6	103	80 - 120	2010-09-26
Anthracene		mg/L	60.0	56.6	94	80 - 120	2010-09-26
Phenanthrene		mg/L	60.0	56.3	94	80 - 120	2010-09-26
Fluoranthene		mg/L	60.0	60.6	101	80 - 120	2010-09-26
Pyrene		mg/L	60.0	61.5	102	80 - 120	2010-09-26
Benzo(a)anthracene		mg/L	60.0	48.0	80	80 - 120	2010-09-26

continued ...

Report Date: September 29, 2010

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stand	ard	continued	

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chrysene		mg/L	60.0	68.8	115	80 - 120	2010-09-26
Benzo(b)fluoranthene		$\mathrm{mg/L}$	60.0	54.9	92	80 - 120	2010-09-26
Benzo(k)fluoranthene		$\mathrm{mg/L}$	60.0	71.3	119	80 - 120	2010-09-26
Benzo(a)pyrene		mg/L	60.0	62.2	104	80 - 120	2010-09-26
Indeno(1,2,3-cd)pyrene		${ m mg/L}$	60.0	53.7	90	80 - 120	2010-09-26
Dibenzo(a,h)anthracene		mg/L	60.0	49.0	82	80 - 120	2010-09-26
Benzo(g,h,i)perylene		${ m mg/L}$	60.0	52.7	88	80 - 120	2010-09-26

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5	1105_	69.1	mg/L	1	60.0	115	80 - 120
2-Fluorobiphenyl		59.3	$_{ m mg/L}$	1	60.0	99	80 - 120
Terphenyl-d14		53.5	$\mathrm{mg/L}$	1	60.0	89	80 - 120

### Standard (CCV-1)

QC Batch: 73924

Date Analyzed: 2010-09-28

Analyzed By: ER

Param	$\operatorname{Flag}$	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.100	.100	80 - 120	2010-09-28
Toluene		mg/L	0.100	0.100	100	80 - 120	2010-09-28
Ethylbenzene		m mg/L	0.100	0.101	101	80 - 120	2010-09-28
Xylene		m mg/L	0.300	0.302	101	80 - 120	2010-09-28

## Standard (CCV-2)

QC Batch: 73924

Date Analyzed: 2010-09-28

Analyzed By: ER

			CCVs True	${ m CCVs} \ { m Found}$	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.100	100	80 - 120	2010-09-28
Toluene		mg/L	0.100	0.100	100	80 - 120	2010-09-28
Ethylbenzene		m mg/L	0.100	0.102	102	80 - 120	2010-09-28
Xylene		$_{ m mg/L}$	0.300	0.303	_101	80 - 120	2010-09-28

Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

Report Date: September 29, 2010

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			ICVs True	ICVs Found	$rac{ ext{ICVs}}{ ext{Percent}}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Aluminum		mg/L	1.00	0.985	98	90 - 110	2010-09-29

Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Boron		$\mathrm{mg/L}$	1.00	1.03	103	90 - 110	2010-09-29

Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Cobalt		mg/L	1.00	1.01	101	90 - 110	2010-09-29

Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
•			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Copper		mg/L	1.00	1.00	100	90 - 110	2010-09-29

Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	$\mathbf{Found}$	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Iron		mg/L	1.00	1.01	101	90 - 110	2010-09-29

Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

Report Date: September 29, 2010 TNM 97-04

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			ICVs	ICVs	ICVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		mg/L	1.00	1.01	101	90 - 110	2010-09-29

#### Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	1.02	102	90 - 110	2010-09-29

#### Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\mathbf{U}$ nits	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		mg/L	1.00	1.01	101	90 - 110	2010-09-29

#### Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	1.01	101	90 - 110	2010-09-29

#### Standard (ICV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

Param	$\operatorname{Flag}$	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Silver		mg/L	0.125	0.125	100	90 - 110	2010-09-29
Total Arsenic ·		mg/L	1.00	1.02	102	90 - 110	2010-09-29
Total Barium		$_{ m mg/L}$	1.00	1.00	100	90 - 110	2010-09-29
Total Cadmium		mg/L	1.00	1.02	102	90 - 110	2010-09-29
Total Chromium		$_{ m mg/L}$	1.00	1.02	102	90 - 110	2010-09-29
Total Lead		$_{ m mg/L}$	1.00	1.01	101	90 - 110	2010-09-29

continued ...

TNM 97-04	eptember 29, 2	010		k Order: 1009 M 97-04 Town	Page Number: 26 of 28 Lovington, NM		
standard continu	$ued \dots$						
			ICVs	ICVs	ICVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Selenium		mg/L	1.00	1.02	102	90 - 110	2010-09-29
Standard (CC	V-1)		•				
QC Batch: 739	942		Date Analyze	ed: 2010-09-2	29	Anal	yzed By: RR
			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
i aium			1.00	1.01	101	90 - 110	2010-09-29
Total Aluminum		mg/L	1.00	1.01	101	90 - 110	2010-03-2
Total Aluminum  Standard (CC  QC Batch: 739	V-1)	mg/L	Date Analyz	ed: 2010-09-:	29		yzed By: RR
Total Aluminum Standard (CC	V-1)	mg/L	Date Analyz	ed: 2010-09-2	29 CCVs	Anal Percent	yzed By: RR
Total Aluminum  Standard (CC  QC Batch: 739	V-1) 942		Date Analyz CCVs True	ed: 2010-09-: CCVs Found	29 CCVs Percent	Anal Percent Recovery	yzed By: RR Date
Total Aluminum  Standard (CC  QC Batch: 739  Param	V-1)	Units	Date Analyz CCVs True Conc.	ed: 2010-09-: CCVs Found Conc.	29 CCVs Percent Recovery	Anal Percent Recovery Limits	yzed By: RR Date Analyzed
Total Aluminum Standard (CC	V-1) 942		Date Analyz CCVs True	ed: 2010-09-: CCVs Found	29 CCVs Percent	Anal Percent Recovery	yzed By: RR Date
Total Aluminum  Standard (CC  QC Batch: 739  Param  Total Boron	Flag	Units	Date Analyz CCVs True Conc.	ed: 2010-09-: CCVs Found Conc.	29 CCVs Percent Recovery	Anal Percent Recovery Limits	yzed By: RR Date Analyzed
Total Aluminum  Standard (CC  QC Batch: 739  Param  Total Boron  Standard (CC)	Flag FV-1)	Units	Date Analyz CCVs True Conc.	ed: 2010-09-: CCVs Found Conc.	CCVs Percent Recovery	Anal Percent Recovery Limits 90 - 110	yzed By: RR Date Analyzed
Total Aluminum  Standard (CC  QC Batch: 739  Param	Flag FV-1)	Units	Date Analyz CCVs True Conc.	ed: 2010-09-: CCVs Found Conc. 1.01	CCVs Percent Recovery	Anal Percent Recovery Limits 90 - 110	yzed By: RR Date Analyzed 2010-09-29
Total Aluminum  Standard (CC  QC Batch: 739  Param  Total Boron  Standard (CC)	Flag FV-1)	Units mg/L	Date Analyzo	ed: 2010-09-:  CCVs Found Conc. 1.01	CCVs Percent Recovery 101	Anal Percent Recovery Limits 90 - 110	yzed By: RR  Date Analyzed 2010-09-29  yzed By: RR  Date
Total Aluminum  Standard (CC  QC Batch: 739  Param  Total Boron  Standard (CC)	Flag FV-1)	Units	Date Analyze CCVs True Conc. 1.00  Date Analyze CCVs	ed: 2010-09-:  CCVs Found Conc. 1.01  ed: 2010-09-:	CCVs Percent Recovery 101	Anal Percent Recovery Limits 90 - 110 Anal	yzed By: RR  Date Analyzed 2010-09-20

Standard	$(CCV_{-1})$	۱

QC Batch: 73942

Param

Total Copper

QC Batch: 73942 Date Analyzed: 2010-09-29 Analyzed By: RR

 $Date\ Analyzed:\ \ 2010\text{-}09\text{-}29$ 

CCVs

Found

 $\operatorname{Conc.}$ 

1.02

CCVs

Percent

Recovery

102

 $\mathrm{CCVs}$ 

True

Conc.

1.00

Units

mg/L

Flag

Analyzed By: RR

Date

Analyzed

2010-09-29

Percent

Recovery

Limits

90 - 110

Report Date: September 29, 2010

TNM 97-04

Work Order: 10092419 TNM 97-04 Townsend

Page Number: 27 of 28

Lovington, NM

			CCVs True	$\begin{array}{c} \text{CCVs} \\ \text{Found} \end{array}$	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	${f Analyzed}$
Total Iron		mg/L	1.00	1.03	103	90 - 110	2010-09-29

#### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			CCVs	CCVs	$\mathrm{CCVs}$	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Manganese		$\mathrm{mg/L}$	1.00	1.04	104	90 - 110	2010-09-29

#### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	Б.,
			True	Found	$\operatorname{Percent}$	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Molybdenum		mg/L	1.00	1.04	104	90 - 110	2010-09-29

#### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			$^{\circ}\mathrm{CCVs}$	$\mathrm{CCVs}$	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Nickel		m mg/L	1.00	1.03	103	90 - 110	2010-09-29

#### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Zinc		mg/L	1.00	1.03	103	90 - 110	2010-09-29

#### Standard (CCV-1)

QC Batch: 73942

Date Analyzed: 2010-09-29

Analyzed By: RR

Report Date: September 29, 2010 TNM 97-04

Work Order: 10092419 TNM 97-04 Townsend Page Number: 28 of 28 Lovington, NM

			CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Total Silver		mg/L	0.125	0.127	102	90 - 110	2010-09-29
Total Arsenic		mg/L	. 1.00	1.04	104	90 - 110	2010-09-29
Total Barium		m mg/L	1.00	1.02	102	90 - 110	2010-09-29
Total Cadmium		$\mathrm{mg/L}$	1.00	1.05	105	90 - 110	2010-09-29
Total Chromium		mg/L	1.00	1.05	105	90 - 110	2010-09-29
Total Lead		$\mathrm{mg/L}$	1.00	1.03	103	90 - 110	2010-09-29
Total Selenium		mg/L	1.00	1.04	104	90 - 110	2010-09-29

#### Standard (CCV-1)

QC Batch: 73961

Date Analyzed: 2010-09-29

Analyzed By: TP

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	$\operatorname{Percent}$	$\operatorname{Recovery}$	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00519	104	90 - 110	2010-09-29

## Standard (CCV-2)

QC Batch: 73961

Date Analyzed: 2010-09-29

Analyzed By: TP

			$\mathrm{CCVs}$	$\mathrm{CCVs}$	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Total Mercury		mg/L	0.00500	0.00525	105	90 - 110	2010-09-29

LAB Order ID #

TraceAnalysis, Inc.

email: lab@traceanalysis.com

Street, City, Zip)

Company Name

CIM IN CINC. E. Bon

Contact Person:

6701 Aberdeen Avenue. Suite 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (600) 376-1298

432-530-7730

5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313

200 East Sunset Rd., Suite E El Paso, Texas 79922
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 586-3443

BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750

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**ANALYSIS REQUEST** 

Turn Around Time if different from standard NGCC METALS () () Na, Ca, Mg, K, TDS, EC Circle or Specify Westrod CI' EI' 204' NO3' NOS' Alkalinity Moisture Content BOD, TSS, pH Pesticides 8081 / 608 PCB's 8082 / 608 GC/MS Semi. Vol. 8270 / 625 CC/W2 AOL 8260 / 624 BCI TCLP Pesticides TCLP Semi Volatiles TCLP Volatiles TCLP Metals Ag As Ba Cd Cr Pb Se Hg Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 TPH 8015 GRO / DRO / TVHC TPH 418.1 / TX1005 / TX1005 Ext(C35) BIEX 8021 / 602 / 8260 / 624 8021 / 602 / 8260 / 624 **BETM** 54.6 SAMPLING 3MIT **3TA**0 1015 616W NONE PRESERVATIVE METHOD ICE Sampler Signature: HOBN FOS<sup>2</sup>H Project Name: EONH HCI SCUDGE MATRIX AIA ZIOS **A3TAW** InuomA \ emuloV 10 # CONTAINERS

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FIELD CODE

AB USE)

LAB#

Project Location (including state):

(If different from above)

Project #:

Invoice to:

PIOH

 $\vec{c}$ Ö Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.

Carrier #

822CB C Log-in-Review

24482149 Check If Special Reporting Limits Are Needed 5

] Dry Weight Basis Required

· C Headspace Y/N/NA

Intact N

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1:20 OBS 1

9-24-10 Date:

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Company:

Received by:

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Company

Company

INST OBS COR

REMARKS JEX X

LAB USE

OBS 38

Time:

Company:

Received by:

Time:

Date:

Company:

Relinquished by:

5,40 COR

93%

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calved by

3:40

ONLY

TRRP Report Required

## NMOCD - Analytical Parameters for Initial Groundwater Sampling (3-12-08)

#### Field Parameters

specific conductance

pН

temperature

depth to water

PAH- Liter Amber

### General Chemistry

Calcium

Magnesium

Potassium

Sodium

Chloride

Sulfate

Bicarbonate Alkalinity

Carbonate Alkalinity

Nitrate

Phosphate

Fluoride

Cital plantic Cotions | Arrions | Arkalinity

#### RCRA Metals

Arsenic

Barium

Cadmium

Chromium

Lead

Mercury

Selenium

Silver

500 ml plastic - Nitric

### Additional WQCC Metals

Copper

Iron

Manganese

Zinc

Aluminum

Boron

Cobalt

Molybdenum

Nickel



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E. 5002 Gasin Street, Suite A1 6015 Harris Parkway, Suite 110

Lubbock, Texas 79424 El Paso, Texas 79922 Midland, Texas 79703 Ft. Worth, Texas 76132

800 • 378 • 1296 688 • 588 • 3443

806 • 794 • 1296 915 • 585 • 3443 432 • 689 • 6301

FAX 806 • 794 • 1298 FAX 915 • 585 • 4944 FAX 432 • 689 • 6313

817 \* 201 \* 5260

E-Mail: lab@traceanalysis.com

## Certifications

**WBENC**: 237019

HUB:

1752439743100-86536

**DBE:** VN 20657

NCTRCA WFWB38444Y0909

# **NELAP Certifications**

Lubbock: T104704219-08-TX

> LELAP-02003 Kansas E-10317

El Paso:

T104704221-08-TX LELAP-02002

Midland: T104704392-08-TX

# Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: November 16, 2010

Work Order: 

10102928

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
249154	Post-Carbon	water	2010-10-25	13:00	2010-10-29

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abel

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

#### Standard Flags

 ${\bf B}$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-10-29 and assigned to work order 10102928. Samples for work order 10102928 were received intact without headspace and at a temperature of 2.8 C.

Samples were analyzed for the following tests using their respective methods.

		$\operatorname{Prep}$	$\operatorname{Prep}$	QC	Analysis
Test	Method	$\operatorname{Batch}$	Date	Batch	Date
BTEX	S 8021B	64291	2010-11-01 at 09:00	74939	2010-11-01 at 09:48
PAH	S 8270 $D$	64659	2010-11-01 at 15:00	75374	2010-11-16 at 10:59

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10102928 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10102928 TNM 97-04 Townsend

Page Number: 4 of 10 Lovington, NM

# **Analytical Report**

Sample: 249154 - Post-Carbon

Laboratory: Midland

Analysis: QC Batch:

Prep Batch: 64291

BTEX

74939

Analytical Method:

Date Analyzed:

S 8021B

2010-11-01 Sample Preparation: 2010-11-01 Prep Method: S 5030B

Analyzed By: AG Prepared By: AG

RL

Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\operatorname{RL}$
Benzene		< 0.00100	mg/L	1	0.00100
Toluene		< 0.00100	m mg/L	1	0.00100
Ethylbenzene		< 0.00100	m mg/L	1	0.00100
Xylene		< 0.00100	m mg/L	1	0.00100

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)		0.115	mg/L	1	0.100	115	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.112	mg/L	1	0.100	112	51.1 - 128

Sample: 249154 - Post-Carbon

Laboratory: Lubbock

Analysis: PAH

QC Batch: 75374 Prep Batch: 64659 Analytical Method:

Date Analyzed:

S 8270D 2010-11-16

Sample Preparation: 2010-11-01 Prep Method: S 3510C

Analyzed By: MN Prepared By: MN

RL

		1(11			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	RL
Naphthalene		< 0.000186	mg/L	0.93	0.000200
2-Methylnaphthalene		< 0.000186	${ m mg/L}$	0.93	0.000200
1-Methylnaphthalene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
Acenaphthylene		< 0.000186	mg/L	0.93	0.000200
Acenaphthene		< 0.000186	m mg/L	0.93	0.000200
Dibenzofuran		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
Fluorene		< 0.000186	$\mathrm{mg/L}$	0.93	0.000200
Anthracene		< 0.000186	m mg/L	0.93	0.000200
Phenanthrene		< 0.000186	m mg/L	0.93	0.000200
Fluoranthene		< 0.000186	m mg/L	0.93	0.000200
Pyrene		< 0.000186	m mg/L	0.93	0.000200
Benzo(a)anthracene		< 0.000186	m mg/L	0.93	0.000200
Chrysene		< 0.000186	m mg/L	0.93	0.000200
Benzo(b)fluoranthene		< 0.000186	m mg/L	0.93	0.000200
Benzo(k)fluoranthene		< 0.000186	m mg/L	0.93	0.000200
Benzo(a)pyrene		< 0.000186	${ m mg/L}$	0.93	0.000200

continued ...

Report Date: November 16, 2010 TNM 97-04

Work Order: 10102928 TNM 97-04 Townsend Page Number: 5 of 10 Lovington, NM

> AG AG

sample	249154	continued			
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			•	RL			
Parameter		Flag	Res	sult	Units	Dilution	RL
$\overline{\text{Indeno}(1,2,3\text{-cd})}$	pyrene		< 0.000	186	mg/L	0.93	0.000200
Dibenzo(a,h)anth	nracene		< 0.000	186	mg/L	0.93	0.000200
$\underline{\mathrm{Ben}}_{\mathrm{zo}(\mathrm{g,h,i})\mathrm{pery}}$	lene		< 0.000	186	m mg/L	0.93	0.000200
Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits

Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0562	mg/L	0.93	0.0800	70	10 - 111
2-Fluorobiphenyl		0.0412	mg/L	0.93	0.0800	52	10 - 92.7
Terphenyl-d14		0.0579	mg/L	0.93	0.0800	72	35.9 - 107
Terphenyl-d14		0.0579	mg/L	0.93	0.0800	$\frac{72}{}$	

Method Blank	(1)	QC Batch:	74939
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QC Batch:	74939	Date Analyzed:	2010-11-01	Analyzed By:
Prep Batch:	64291	QC Preparation:	2010-11-01	Prepared By:

		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	Result	Units	RL
Benzene		< 0.000600	mg/L	0.001
Toluene		< 0.000600	${ m mg/L}$	0.001
Ethylbenzene		< 0.000800	${ m mg/L}$	0.001
Xylene		< 0.000767	m mg/L	0.001

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)		0.112	$\mathrm{mg/L}$	1	0.100	112	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.108	${ m mg/L}$	1	0.100	108	47.3 - 116

#### Method Blank (1) QC Batch: 75374

QC Batch: Prep Batch:	75374 64659	Date Analyzed: QC Preparation:	2010-11-16 2010-11-01		Analyzed By: Prepared By:	
			•			
			$\mathrm{MDL}$			
Parameter		$\operatorname{Flag}$	Result	Units	_	RL

Parameter	$\operatorname{Flag}$	Result	Units	RL
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	$\mathrm{mg/L}$	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	$\mathrm{mg/L}$	0.0002
Acenaphthene		< 0.0000617	$\mathrm{mg/L}$	0.0002
Dibenzofuran .		< 0.0000952	mg/L	0.0002

 $continued \dots$ 

Report Date: November 16, 2010

TNM 97-04

Work Order: 10102928 TNM 97-04 Townsend Page Number: 6 of 10 Lovington, NM

#### method blank continued . . .

		MDL		
Parameter	$\operatorname{Flag}$	Result	Units	$\mathrm{RL}$
Fluorene		< 0.000134	mg/L	0.0002
Anthracene		< 0.000441	mg/L	0.0002
Phenanthrene		< 0.000435	$\mathrm{mg/L}$	0.0002
Fluoranthene	•	< 0.000476	mg/L	0.0002
Pyrene		< 0.000590	m mg/L	0.0002
Benzo(a)anthracene		< 0.000118	mg/L	0.0002
Chrysene		< 0.0000766	m mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	m mg/L	0.0002
Benzo(k)fluoranthene		< 0.000141	mg/L	0.0002
Benzo(a)pyrene		< 0.000132	mg/L	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	mg/L	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	$\mathrm{mg/L}$	0.0002
Benzo(g,h,i)perylene		< 0.0000473	${ m mg/L}$	0.0002

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Result}$	$\operatorname{Units}$	Dilution	$\mathbf{A}\mathbf{mount}$	$\operatorname{Recovery}$	$_{ m Limits}$
Nitrobenzene-d5		0.0500	mg/L	1	0.0800	62	10 - 111
2-Fluorobiphenyl		0.0303	$\mathrm{mg/L}$	1	0.0800	38	10 - 92.7
Terphenyl-d14	•	0.0483	mg/L	1	0.0800	60	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 64291

74939

Date Analyzed: QC Preparation: 2010-11-01

2010-11-01

Analyzed By: AG Prepared By: AG

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit
Benzene	0.0987	mg/L	1	0:100	< 0.000600	99	82.9 - 118
Toluene	0.0993	mg/L	1	0.100	< 0.000600	99	82.7 - 117
Ethylbenzene	0.0997	mg/L	1	0.100	< 0.000800	100	78.8 - 116
Xylene	0.300	mg/L	11	0.300	< 0.000767	100	79.3 - 116

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene	 0.101	mg/L	1	0.100	< 0.000600	101	82.9 - 118	2	20
Toluene	0.0998	mg/L	1	0.100	< 0.000600	100	82.7 - 117	0	20
Ethylbenzene	0.101	mg/L	1	0.100	< 0.000800	101	78.8 - 116	1	20
Xylene	0.303	mg/L	1	0.300	< 0.000767	101	79.3 - 116	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Report Date: November 16, 2010

TNM 97-04

Work Order: 10102928 TNM 97-04 Townsend

Page Number: 7 of 10

Lovington, NM

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	${ m Rec.} \ { m Limit}$
Trifluorotoluene (TFT)	0.0966	0.105	mg/L	1	0.100	97	105	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.0976	0.106	$\mathrm{mg/L}$	1	0.100	98	106	68.2 - 134

#### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 64659

75374

Date Analyzed:

2010-11-16 QC Preparation: 2010-11-01

Analyzed By: MN Prepared By: MN

Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	$egin{array}{c}  ext{Rec.} \  ext{Limit} \end{array}$
Naphthalene	0.0452	mg/L	1	0.0800	< 0.0000784	56	32.2 - 80.3
2-Methylnaphthalene	0.0433	$_{ m mg/L}$	1	0.0800	< 0.0000747	54	34.8 - 87
1-Methylnaphthalene	0.0482	mg/L	1	0.0800	< 0.0000575	60	36.9 - 89.6
Acenaphthylene	0.0532	mg/L	1	0.0800	< 0.0000963	66	35 - 93.2
Acenaphthene	0.0530	mg/L	1	0.0800	< 0.0000617	66	35.8 - 92.9
Dibenzofuran	0.0395	mg/L	1	0.0800	< 0.0000952	49	35.3 - 85.1
Fluorene	0.0519	mg/L	1	0.0800	< 0.000134	65	43.4 - 101
Anthracene	0.0660	mg/L	1 '	0.0800	< 0.000441	82	44.8 - 92.4
Phenanthrene	0.0513	mg/L	1	0.0800	< 0.000435	64	44 - 93.7
Fluoranthene	0.0572	mg/L	1	0.0800	< 0.000476	72	52.7 - 104
Pyrene	0.0602	${ m mg/L}$	1.	0.0800	< 0.000590	75	42.2 - 93.8
Benzo(a)anthracene	0.0438	$\mathrm{mg/L}$	1	0.0800	< 0.000118	55	40.4 - 91.9
Chrysene	0.0825	mg/L	1	0.0800	< 0.0000766	103	44.4 - 107
Benzo(b)fluoranthene	0.0318	mg/L	1	0.0800	< 0.000146	40	34.8 - 105
Benzo(k)fluoranthene	0.0582	mg/L	1	0.0800	< 0.000141	73	50.2 - 158
Benzo(a)pyrene	0.0441	mg/L	1	0.0800	< 0.000132	55	51.3 - 151
Indeno(1,2,3-cd)pyrene	0.0431	mg/L	1	0.0800	< 0.0000702	54	43.2 - 115
Dibenzo(a,h)anthracene	0.0532	mg/L	1	0.0800	< 0.0000534	66	43.9 - 115
Benzo(g,h,i) perylene	0.0513	$_{ m mg/L}$	1	0.0800	< 0.0000473	64	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Naphthalene	0.0448	mg/L	1	0.0800	< 0.0000784	56	32.2 - 80.3	1	20
2-Methylnaphthalene	0.0433	mg/L	1	0.0800	< 0.0000747	54	34.8 - 87	0	20
1-Methylnaphthalene	0.0490	mg/L	1	0.0800	< 0.0000575	61	36.9 - 89.6	$^2$	20
Acenaphthylene	0.0528	mg/L	1	0.0800	< 0.0000963	66	35 - 93.2	1	20
Acenaphthene	0.0534	mg/L	1	0.0800	< 0.0000617	67	35.8 - 92.9	1	20
Dibenzofuran	0.0396	mg/L	1	0.0800	< 0.0000952	50	35:3 - 85.1	0	20
Fluorene	0.0524	mg/L	1	0.0800	< 0.000134	66	43.4 - 101	1	20
Anthracene	0.0624	mg/L	1	0.0800	< 0.000441	78	44.8 - 92.4	6	20
Phenanthrene	0.0506	mg/L	1	0.0800	< 0.000435	63	44 - 93.7	1	20
Fluoranthene	0.0567	mg/L	1	0.0800	< 0.000476	71	52.7 - 104	1	20
Pyrene	0.0531	mg/L	1	0.0800	< 0.000590	66	42.2 - 93.8	12	20

continued ...

TNM 97-04

Work Order: 10102928 TNM 97-04 Townsend

Page Number: 8 of 10 Lovington, NM

control spikes continued . . .

•		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzo(a)anthracene		0.0503	mg/L	1	0.0800	< 0.000118	63	40.4 - 91.9	14	20
Chrysene		0.0837	${ m mg/L}$	1	0.0800	< 0.0000766	105	44.4 - 107	1	20
Benzo(b)fluoranthene		0.0341	$\mathrm{mg/L}$	1	0.0800	< 0.000146	43	34.8 - 105	7	20
Benzo(k)fluoranthene		0.0502	mg/L	1	0.0800	< 0.000141	63	50.2 - 158	15	20
Benzo(a)pyrene	1	0.0550	$\mathrm{mg/L}$	1	0.0800	< 0.000132	69	51.3 - 151	22	20
Indeno(1,2,3-cd)pyrene		0.0440	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	55	43.2 - 115	$^2$	20
${ m Dibenzo(a,h)}$ anthracene		0.0507	$\mathrm{mg/L}$	1	0.0800	< 0.0000534	63	43.9 - 115	5	20
Benzo(g,h,i)perylene		0.0500	mg/L	1	0.0800	< 0.0000473	62	45.1 - 115	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS ·	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Nitrobenzene-d5	0.0475	0.0463	mg/L	1	0.0800	59	58	10 - 111
2-Fluorobiphenyl	0.0461	0.0450	mg/L	1	0.0800	58	56	10 - 92.7
Terphenyl-d14	0.0538	0.0534	$\mathrm{mg/L}$	1	0.0800	67	67	35.9 - 107

Matrix Spike (MS-1) Spiked Sample: 249154

QC Batch: Prep Batch: 64291

74939

Date Analyzed:

2010-11-01 QC Preparation: 2010-11-01 Analyzed By: AG

Prepared By: AG

Param	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	0.0993	mg/L	• 1	0.100	< 0.000600	99	77.9 - 114
Toluene	0.0989	mg/L	1	0.100	< 0.000600	99	78.3 - 111
Ethylbenzene	0.0994	mg/L	1	0.100	< 0.000800	99	75.3 - 110
Xylene	0.299	mg/L	1	0.300	< 0.000767	100	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	$rac{ ext{MSD}}{ ext{Result}}$	Units	Dil.	. Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	$egin{array}{c}  ext{RPD} \  ext{Limit} \end{array}$
Benzene	0.104	· mg/L	1	0.100	< 0.000600	104	77.9 - 114	5	20
Toluene	0.104	mg/L	1	0.100	< 0.000600	104	78.3 - 111	5	20
Ethylbenzene	0.104	mg/L	1	0.100	< 0.000800	104	75.3 - 110	4	20
Xylene	0.314	mg/L	1	0.300	< 0.000767	105	75.7 - 109	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

 $continued \dots$ 

<sup>&</sup>lt;sup>1</sup>RPD out of RPD Limits. Analye not detected in sample. •

$matrix\ spikes\ continued\ \dots$								
•	MS	MSD			$_{ m Spike}$	MS	MSD	$\operatorname{Rec}$ .
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT) 2	0.127	0.109	mg/L	1	0.1	127	109	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.128	0.112	mg/L	1	0.1	128	112	60.1 - 135

#### Standard (CCV-1)

QC Batch:	74939	Date Analyzed:	2010-11-01	Analyzed By:	AG
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Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0993	99	80 - 120	2010-11-01
Toluene		${ m mg/L}$	0.100	0.0999	100	80 - 120	2010-11-01
Ethylbenzene		$\mathrm{mg/L}$	0.100	0.105	105	80 - 120	2010-11-01
Xylene		$\mathrm{mg/L}$	0.300	0.316	105	80 - 120	2010-11-01

## Standard (CCV-2)

QC Batch: 74939	Date Analyzed: 2010-11-01	Analyzed By:	AG
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			${ m CCVs} \ { m True}$	CCVs Found	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery .	Limits	Analyzed
Benzene		$\mathrm{mg/L}$	0.100	0.103	103	80 - 120	2010-11-01
Toluene		mg/L	0.100	0.103	103	80 - 120	2010-11-01
Ethylbenzene		${ m mg/L}$	0.100	0.103	103	80 - 120	2010-11-01
Xylene_		${ m mg/L}$	0.300	0.311	104	80 - 120	2010-11-01

## Standard (CCV-1)

			$rac{ ext{CCVs}}{ ext{True}}$	$\operatorname{CCVs}$ Found	${ m CCVs} \ { m Percent}$	Percent Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	60.4	101	80 - 120	2010-11-16
2-Methylnaphthalene		m mg/L	60.0	63.1	105	80 - 120	2010-11-16
1-Methylnaphthalene		mg/L	60.0	62.5	104	80 - 120	2010-11-16

 $continued \dots$ 

<sup>&</sup>lt;sup>2</sup>High surrogate recovery due to peak interference.

<sup>&</sup>lt;sup>3</sup>High surrogate recovery due to peak interference.

Report Date: November 16, 2010

TNM 97-04

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			$\mathrm{CCVs}$	CCVs	$\mathrm{CCVs}$	Percent	
			True	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Acenaphthylene		mg/L	60.0	59.5	99	80 - 120	2010-11-16
Acenaphthene		mg/L	60.0	60.9	102	80 - 120	2010-11-16
Dibenzofuran		$_{ m mg/L}$	60.0	62.4	104	80 - 120	2010-11-16
Fluorene		$\mathrm{mg/L}$	60.0	64.6	108	80 - 120	2010-11-16
Anthracene		$\mathrm{mg/L}$	60.0	61.8	103	80 - 120	2010-11-16
Phenanthrene		${ m mg/L}$	60.0	53.4	89	80 - 120	2010-11-16
Fluoranthene		$_{ m mg/L}$	60.0	49.5	82	80 - 120	2010-11-16
Pyrene		m mg/L	60.0	61.0	102	80 - 120	2010-11-16
Benzo(a)anthracene		m mg/L	60.0	49.6	83	80 - 120	2010-11-16
Chrysene		${ m mg/L}$	60.0	66.9	112	80 - 120	2010-11-16
$\operatorname{Benzo}(\operatorname{b})$ fluoranthene		m mg/L	60.0	50.0	83	80 - 120	2010-11-16
Benzo(k)fluoranthene		m mg/L	60.0	64.8	108	80 - 120	2010-11-16
Benzo(a)pyrene		${ m mg/L}$	60.0	67.5	112	80 - 120	2010-11-16
Indeno(1,2,3-cd)pyrene		$\mathrm{mg/L}$	60.0	53.7	90	80 - 120	2010-11-16
Dibenzo(a,h)anthracene		$\mathrm{mg/L}$	60.0	55.2	92	80 - 120	2010-11-16
Benzo(g,h,i) perylene		mg/L	60.0	61.2	102	80 - 120	2010-11-16

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result ·	Units	Dilution	Amount	Recovery	Limit
Nitrobenzene-d5		70.3	$_{ m mg/L}$	1	60.0	117	80 - 120
2-Fluorobiphenyl		61.0	mg/L	1 .	60.0	102	80 - 120
Terphenyl-d14		58.9	${ m mg/L}$	1	60.0	98	80 - 120

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LAB Order ID #	

Turn Around Time if different from standard BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750 ō Š A Mudland - OTEX 出去 アウンディガス Na, Ca, Mg, K, TDS, EC 26797820 or Specify Method S04, NO3, NO2, Alkalinity CI, FI, **ANALYSIS REQUEST** Moisture Content Dry Weight Basis Required TRRP Report Required
Check If Special Reporting
Limits Are Needed Hq ,22T ,008 Pesticides 8081 / 608 D0 East Sunset Rd., Suite E El Paso, Texas 79922
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443 LCB, 2 8085 \ 608 GC/MS Semi. Vol. 8270 / 625 REMARKS CC/W2 AOI: 8560 / 624 **BCI** TCLP Pesticides TCLP Semi Volatiles Circle Headspace Y (N) NA TCLP Volatiles LAB USE Time: INST 5-17 OBS 3-4° c Log-in-Review 43-TCLP Metals Ag As Ba Cd Cr Pb Se Hg ONLY Intacf N N Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 5002 Basin Street, Suite A1 **Midland, Texas 79703** Tel (432) 689-6301 Fax (432) 689-6313 PAH 8270 / 625 THE SO IS OF DRO / TVHC OBS 28°C TPH 418.1 / TX1005 / TX1005 Ext(C35) BIEX 805 \$\ 605 \ 8560 \ 654 8021 / 602 / 8260 / 624 **MTBE** 13 Deor OBS 2830 COR Time: INST SAMPLING **BMIT** Time: 6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1298 **3TAG** 1926/1 01/20/10 The BACKER 01/62/ 027-0CH Date: Date: Date: PRESERVATIVE NONE Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C. METHOD ICE 1 race Sampler Signature: 5.7A-HOBN Company: Company: Company: FOS<sup>2</sup>H Project Name: CONH Phone # HCI Fax #: Received by: SCUDGE Received by MATRIX Received by TraceAnalysis, Inc. ЯIA SOIL **MATER** 190 email: lab@traceanalysis.com (0/25/10/0) 10-62-10 1322 8:20 InnomA \ emuloV Time: Time: # CONTAINERS 01-58-0 Date: Date: 150 EE (If different from above) FIELD CODE Ss: (Street, City, Zip) CONNECT Company Company Company Project Location (including state) 11/10 Ant Caubin Dan P Ö Relinquished by: Relinquished by: Contact Person: inglished by Company Name LAB USE) 249164 Project #: Invoice to Address: LAB#

Carrier #

CHRIST COR

DIOH



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E. 5002 Basin Street, Suite A1

El.Paso, Texas 79922 Midland, Texas 79703 6015 Harris Parkway, Suite 110 Ft. Worth, Texas 76132

Lubbock, Texas 79424 800 • 378 • 1296 889 • 588 • 3443 806 • 794 • 1296 915 • 585 • 3443 432 • 689 • 6301

FAX 806 • 794 • 1298 FAX 915 • 585 • 4944 FAX 432 • 689 • 6313

817 • 201 • 5260

E-Mail: lab@treceanalysis.com

## Certifications

**WBENC:** 237019

HUB:

1752439743100-86536

DBE: VN 20657

NCTRCA WFWB38444Y0909

# **NELAP Certifications**

T104704219-08-TX Lubbock:

LELAP-02003

Kansas E-10317

El Paso:

T104704221-08-TX

Midland: T104704392-08-TX

LELAP-02002

# Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: December 8, 2010

Work Order:

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	rime	Date
Sample	Description	Matrix	Taken	Taken	Received
251405	Townsend Post-Carbon	water	2010-11-23	13:00	2010-11-24

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

#### Standard Flags

 $\, B \,$  -  $\,$  The sample contains less than ten times the concentration found in the method blank.

## Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2010-11-24 and assigned to work order 10112414. Samples for work order 10112414 were received intact without headspace and at a temperature of 3.5 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	Prep	QC	Analysis
$\operatorname{Test}$	Method	$\operatorname{Batch}$	Date	Batch	Date
$\overline{\mathrm{BTEX}}$	S 8021B	64941	2010-11-29 at 09:00	75706	2010-11-29 at 15:41
PAH	S 8270D	65157	2010-11-24 at 14:00	75971	2010-12-07 at 16:00

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10112414 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 10112414 TNM 97-04 Townsend Page Number: 4 of 10 Lovington, NM

# **Analytical Report**

#### Sample: 251405 - Townsend Post-Carbon

Laboratory: Midland

Analysis: BTEX QC Batch: 75706 Prep Batch: 64941 Analytical Method: Date Analyzed:

S 8021B 2010-11-29 2010-11-29 Prep Method: S 5030B Analyzed By: AG Prepared By: AG

ep Batch: 64941 Sample Preparation:

RL

		$\mathrm{RL}$			
Parameter	Flag	Result	Units	Dilution	RL
Benzene		0.00470	mg/L	1	0.00100
Toluene		< 0.00100	mg/L	1	0.00100
Ethylbenzene		< 0.00100	$\mathrm{mg/L}$	1	0.00100
Xylene		< 0.00100	$\mathrm{mg/L}$	1	0.00100

					Spike	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)		0.101	$_{ m mg/L}$	1	0.100	101	67.8 - 126
4-Bromofluorobenzene (4-BFB)		0.102	${ m mg/L}$	1	0.100	102	51.1 - 128

#### Sample: 251405 - Townsend Post-Carbon

Laboratory: Lubbock

Analysis: PAH QC Batch: 75971 Prep Batch: 65157 Analytical Method: Date Analyzed:

Sample Preparation:

S 8270D 2010-12-07 2010-11-24 Prep Method: S 3510C Analyzed By: MN Prepared By: MN

RLFlag Parameter Result Units Dilution RL0.000200 Naphthalene < 0.000184 0.922 mg/L2-Methylnaphthalene 0.9220.000200< 0.000184 mg/L 1-Methylnaphthalene 0.922 0.000200 < 0.000184 mg/LAcenaphthylene 0.9220.000200 < 0.000184 mg/L Acenaphthene 0.9220.000200 < 0.000184 mg/L Dibenzofuran < 0.000184 mg/L 0.9220.0002000.000200 Fluorene < 0.000184 0.922mg/L 0.000200Anthracene 0.922< 0.000184 mg/L 0.000200Phenanthrene < 0.000184 mg/L 0.9220.922 0.000200 Fluoranthene < 0.000184 mg/L 0.9220.000200Pyrene < 0.000184 mg/L Benzo(a)anthracene < 0.000184 mg/L 0.9220.000200Chrysene < 0.000184 mg/L 0.9220.0002000.9220.000200 Benzo(b)fluoranthene < 0.000184 mg/L 0.000200Benzo(k)fluoranthene < 0.000184 0.922mg/L

 $continued \dots$ 

<sup>&</sup>lt;sup>1</sup>Concentration biased low.

Report Date:	December	8,	2010
TNM 97-04			

Work Order: 10112414 TNM 97-04 Townsend

Page Number: 5 of 10 Lovington, NM

$sample \ 251405 \ co$	ntinued
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		$\mathrm{RL}$	,		
Parameter	Flag	Result	Units	Dilution	$\mathrm{RL}$
Benzo(a)pyrene	2	< 0.000184	mg/L	0.922	0.000200
Indeno(1,2,3-cd)pyrene		< 0.000184	$\mathrm{mg/L}$	0.922	0.000200
Dibenzo(a,h)anthracene		< 0.000184	m mg/L	0.922	0.000200
Benzo(g,h,i)perylene		< 0.000184	mg/L	0.922	0.000200

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Nitrobenzene-d5		0.0168	$\mathrm{mg/L}$	0.922	0.0800	21	10 - 111
2-Fluorobiphenyl		0.0247	$\mathrm{mg/L}$	0.922	0.0800	31	10 - 92.7
Terphenyl-d14		0.0445	mg/L	0.922	0.0800	56	35.9 - 107

Method Blank (1)

QC Batch: 75706

QC Batch: 75706 Date Analyzed:

2010-11-29

Analyzed By: AG

Prep Batch: 64941

QC Preparation: 2010-11-29

Prepared By:

MDLParameter Flag Units RLResult Benzene mg/L 0.001 < 0.000600 Toluene 0.001 < 0.000600 mg/LEthylbenzene < 0.000800 mg/L 0.001Xylene < 0.000767  $\mathrm{mg/L}$ 0.001

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0953	mg/L	1	0.100	95	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.0981	${ m mg/L}$	1	0.100	98	47.3 - 116

Method Blank (1)

QC Batch: 75971

QC Batch: 75971 Date Analyzed:

2010-12-07

Analyzed By: MN

Prep Batch: 65157

QC Preparation: 2010-11-24

Prepared By: MN

MDL

Parameter	Flag	Result	Units	$\mathrm{RL}$
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	$_{ m mg/L}$	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	$\mathrm{mg/L}$	0.0002

continued ...

<sup>&</sup>lt;sup>2</sup>Concentration biased low.

Report Date: December 8, 2010

TNM 97-04

Work Order: 10112414 TNM 97-04 Townsend Page Number: 6 of 10 Lovington, NM

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		$\operatorname{MDL}$		
Parameter	$\operatorname{Flag}$	$\mathbf{Result}$	Units	$\mathrm{RL}$
Acenaphthene		< 0.0000617	mg/L	0.0002
Dibenzofuran		< 0.0000952	$\mathrm{mg/L}$	0.0002
Fluorene		< 0.000134	$\mathrm{mg/L}$	0.0002
Anthracene		< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	$\mathrm{mg/L}$	0.0002
Fluoranthene		< 0.000476	${ m mg/L}$	0.0002
Pyrene		< 0.000590	m mg/L	0.0002
Benzo(a)anthracene		< 0.000118	$\mathrm{mg/L}$	0.0002
Chrysene		< 0.0000766	mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	mg/L	0.0002
$\operatorname{Benzo}(k)$ fluoranthene	•	< 0.000141	$\mathrm{mg/L}$	0.0002
Benzo(a)pyrene		< 0.000132	m mg/L	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	$\mathrm{mg/L}$	0.0002
${f Dibenzo(a,h)}$ anthracene		< 0.0000534	$\mathrm{mg/L}$	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

Surrogate	Flag	Result	Units	Dilution	$\begin{array}{c} {\rm Spike} \\ {\rm Amount} \end{array}$	Percent Recovery	$egin{array}{c}  ext{Recovery} \  ext{Limits} \end{array}$
Nitrobenzene-d5		0.0446	mg/L	1	0.0800	56	10 - 111
2-Fluorobiphenyl		0.0451	mg/L	1	0.0800	56	10 - 92.7
Terphenyl-d14		0.0400	mg/L	1	0.0800	50	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch: 75706 Prep Batch: 64941 Date Analyzed: 2010-11-29 QC Preparation: 2010-11-29 Analyzed By: AG Prepared By: AG

Param	LCS Result	Units	Dil.	${ m Spike} \ { m Amount}$	Matrix Result	Rec.	Rec. Limit
Benzene	0.0938	mg/L	1	0.100	< 0.000600	94	82.9 - 118
Toluene	0.0936	mg/L	1	0.100	< 0.000600	94	82.7 - 117
Ethylbenzene	0.0960	mg/L	1	0.100	< 0.000800	96	78.8 - 116
Xylene	0.291	mg/L	1	0.300	< 0.000767	97	79.3 - 116

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit	RPD	Limit
Benzene	0.103	mg/L	1	0.100	< 0.000600	103	82.9 - 118	9	20
Toluene	0.102	mg/L	1	0.100	< 0.000600	102	82.7 - 117	9	20
Ethylbenzene	0.101	mg/L	1	0.100	< 0.000800	101	78.8 - 116	5	20
Xylene	0.306	mg/L	1	0.300	< 0.000767	102	79.3 - 116	.5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Report Date: December 8, 2010

TNM 97-04

Work Order: 10112414 TNM 97-04 Townsend

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Surrogate	$rac{ ext{LCS}}{ ext{Result}}$	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.102	0.0950	mg/L	1	0.100	102	95	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.102	0.0998	mg/L	1	0.100	102	100	68.2 - 134

#### Laboratory Control Spike (LCS-1)

QC Batch:

75971

Date Analyzed:

2010-12-07

Analyzed By: MN

Prep Batch: 65157

QC Preparation: 2010-11-24

Prepared By: MN

		LCS			Spike	Matrix		Rec.
Param		Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Naphthalene		0.0342	mg/L	1	0.0800	< 0.0000784	43	32.2 - 80.3
2-Methylnaphthalene		0.0335	mg/L	1	0.0800	< 0.0000747	42	34.8 - 87
1-Methylnaphthalene		0.0344	${ m mg/L}$	1	0.0800	< 0.0000575	43	36.9 - 89.6
Acenaphthylene		0.0460	${ m mg/L}$	1	0.0800	< 0.0000963	58	35 - 93.2
Acenaphthene		0.0454	$_{ m mg/L}$	1	0.0800	< 0.0000617	57	35.8 - 92.9
Dibenzofuran		0.0429	${ m mg/L}$	1	0.0800	< 0.0000952	54	35.3 - 85.1
Fluorene		0.0559	${ m mg/L}$	1	0.0800	< 0.000134	70	43.4 - 101
Anthracene		0.0492	m mg/L .	1	0.0800	< 0.000441	62	44.8 - 92.4
Phenanthrene		0.0547	${ m mg/L}$	1	0.0800	< 0.000435	68	44 - 93.7
Fluoranthene		0.0575	mg/L	1	0.0800	< 0.000476	72	52.7 - 104
Pyrene		0.0411	${ m mg/L}$	1	0.0800	< 0.000590	51	42.2 - 93.8
Benzo(a)anthracene		0.0512	mg/L	1	0.0800	< 0.000118	64	40.4 - 91.9
Chrysene		0.0782	mg/L	1	0.0800	< 0.0000766	98	44.4 - 107
Benzo(b)fluoranthene		0.0351	mg/L	1	0.0800	< 0.000146	44	34.8 - 105
Benzo(k)fluoranthene	3	0.0327	mg/L	1 ·	0.0800	< 0.000141	41	50.2 - 158
Benzo(a)pyrene	4	0.0386	mg/L	1	0.0800	< 0.000132	48	51.3 - 151
Indeno(1,2,3-cd)pyrene		0.0412	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	52	43.2 - 115
Dibenzo(a,h)anthracene		0.0560	mg/L	1	0.0800	< 0.0000534	70	43.9 - 115
Benzo(g,h,i)perylene		0.0391	${ m mg/L}$	1	0.0800	< 0.0000473	49	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	$_{ m Units}$	Dil.	$\mathbf{A}$ mount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Naphthalene	0.0350	mg/L	1	0.0800	< 0.0000784	44	32.2 - 80.3	2	20
2-Methylnaphthalene	0.0332	mg/L	1	0.0800	< 0.0000747	42	34.8 - 87	1	20
1-Methylnaphthalene	0.0339	mg/L	1	0.0800	< 0.0000575	42	36.9 - 89.6	<b>2</b> .	20
Acenaphthylene	0.0480	mg/L	1	0.0800	< 0.0000963	60	35 - 93.2	4	20
Acenaphthene	0.0468	mg/L	1	0.0800	< 0.0000617	58	35.8 - 92.9	3	20
Dibenzofuran	0.0444	mg/L	1	0.0800	< 0.0000952	56	35.3 - 85.1	3	20
Fluorene	0.0580	mg/L	1	0.0800	< 0.000134	72	43.4 - 101	4	20
Anthracene	0.0511	mg/L	1	0.0800	< 0.000441	64	44.8 - 92.4	4	20

 $continued \dots$ 

<sup>&</sup>lt;sup>3</sup>Spike recovery outside control limits. Concentration biased low. •

<sup>&</sup>lt;sup>4</sup>Spike recovery outside control limits. Concentration biased low. •

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Work Order: 10112414 TNM 97-04 Townsend

control spikes continued										
		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Phenanthrene		0.0570	mg/L	1	0.0800	< 0.000435	71	44 - 93.7	4	20
Fluoranthene		0.0573	${ m mg/L}$	1	0.0800	< 0.000476	72	52.7 - 104	0	20
Pyrene		0.0426	mg/L	1	0.0800	< 0.000590	53	42.2 - 93.8	4	20
Benzo(a)anthracene		0.0529	mg/L	1	0.0800	< 0.000118	66	40.4 - 91.9	3	20
Chrysene		0.0842	mg/L	1	0.0800	< 0.0000766	105	44.4 - 107	7.	20
Benzo(b)fluoranthene		0.0364	mg/L	1	0.0800	< 0.000146	46	34.8 - 105	<b>4</b>	20
Benzo(k)fluoranthene	5	0.0326	mg/L	1	0.0800	< 0.000141	41	50.2 - 158	0	20
Benzo(a)pyrene	6	0.0402	$\mathrm{mg/L}$	1	0.0800	< 0.000132	50	51.3 - 151	4	20
Indeno(1,2,3-cd)pyrene		0.0420	mg/L	1	0:0800	< 0.0000702	52	43.2 - 115	$^2$	20
Dibenzo(a,h)anthracene		0.0577	mg/L	1	0.0800	< 0.0000534	72	43.9 - 115	3	20
Benzo(g,h,i)perylene		0.0404	mg/L	1	0.0800	< 0.0000473	50	45.1 - 115	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	$\mathrm{Rec}.$	$\mathrm{Rec}.$	Limit
Nitrobenzene-d5	0.0412	0.0450	mg/L	1	0.0800	52	56	10 - 111
2-Fluorobiphenyl	0.0440	0.0465	${ m mg/L}$	1	0.0800	55	58	10 - 92.7
Terphenyl-d14	0.0519	0.0544	${ m mg/L}$	1	0.0800	65	68	35.9 - 107

Matrix Spike (MS-1)

Spiked Sample: 251472

QC Batch: 75706 Prep Batch: 64941 Date Analyzed: 2010-11-29 QC Preparation: 2010-11-29 Analyzed By: AG Prepared By: AG

	MS			$\operatorname{Spike}$	Matrix		Rec.
Param	Result	$_{ m Units}$	Dil.	$\mathbf{A}\mathbf{mount}$	Result	${ m Rec.}$	$\operatorname{Limit}$
Benzene	20.7	mg/L	200	20.0	2.0561	93	77.9 - 114
Toluene	20.8	${ m mg/L}$	200	20.0	2.6625	91	78.3 - 111
Ethylbenzene	20.5	mg/L	200	20.0	3.0643	87	75.3 - 110
Xylene	62.0	${ m mg/L}$	200	60.0	9.495	88	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$	RPD	Limit
Benzene	19.4	mg/L	200	20.0	2.0561	87	77.9 - 114	6	20
Toluene	19.4	mg/L	200	20.0	2.6625	84	78.3 - 111	7	20
Ethylbenzene	19.1	mg/L	200	20.0	3.0643	80	75.3 - 110	7	20
Xylene	57.7	mg/L	200	60.0	9.495	80	75.7 - 109	7	· 20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

<sup>&</sup>lt;sup>5</sup>Spike recovery outside control limits. Concentration biased low. •

<sup>&</sup>lt;sup>6</sup>Spike recovery outside control limits. Concentration biased low. •

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Surrogate	$rac{MS}{Result}$	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD  Rec.	Rec. Limit
Trifluorotoluene (TFT)	19.9	19.7	mg/L	200	20	100	98	68.3 - 107
4-Bromofluorobenzene (4-BFB)	21.0	21.4	mg/L	200	20	105	107	60.1 - 135

### Standard (CCV-1)

QC Batch: 75706

Date Analyzed: 2010-11-29

Analyzed By: AG

			CCVs	CCVs	CCVs	Percent		
			$\operatorname{True}$	Found	$\operatorname{Percent}$	Recovery	Date	
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed	
Benzene		mg/L	0.100	0.0899	90	80 - 120	2010-11-29	
Toluene		${ m mg/L}$	0.100	0.0893	89	80 - 120	2010-11-29	
Ethylbenzene		mg/L	0.100	0.0888	89	80 - 120	2010-11-29	
Xylene		mg/L	0.300	0.270	90	80 - 120	2010-11-29	

#### Standard (CCV-2)

QC Batch: 75706

Date Analyzed: 2010-11-29

Analyzed By: AG

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$_{ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		$\mathrm{mg/L}$	0.100	0.0880	88	80 - 120	2010-11-29
Toluene		mg/L	0.100	0.0874	87	80 - 120	2010-11-29
Ethylbenzene		mg/L	0.100	0.0871	87	80 - 120	2010-11-29
Xylene		mg/L	0.300	0.264	88	80 - 120	2010-11-29

#### Standard (CCV-1)

QC Batch: 75971

Date Analyzed: 2010-12-07

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	50.9	85	80 - 120	2010-12-07
2-Methylnaphthalene		mg/L	60.0	51.6	86	80 - 120	2010-12-07
1-Methylnaphthalene		mg/L	60.0	49.0	82	80 - 120	2010-12-07
Acenaphthylene		mg/L	60.0	51.7	86	80 - 120	2010-12-07
Acenaphthene		mg/L	60.0	50.9	85	80 - 120	2010-12-07
Dibenzofuran		mg/L	60.0	54.8	91	80 - 120	2010-12-07
Fluorene		mg/L	60.0	55.6	93	80 - 120	2010-12-07
Anthracene		mg/L	60.0	47.9	80	80 - 120	2010-12-07
Phenanthrene		mg/L	60.0	51.8	86	80 - 120	2010-12-07

 $\overline{continued}$  . . .

Report Date: December 8, 2010

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Work Order: 10112414 TNM 97-04 Townsend Page Number: 10 of 10 Lovington, NM

standard	continued	

			$\mathrm{CCVs}$	$\mathrm{CCVs}$	$\mathrm{CCVs}$	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Fluoranthene		mg/L	60.0	52.5	88	80 - 120	2010-12-07
Pyrene		${ m mg/L}$	60.0	59.1	98	80 - 120	2010-12-07
Benzo(a)anthracene		${ m mg/L}$	60.0	53.0	88	80 - 120	2010-12-07
Chrysene		mg/L	60.0	48.2	80	80 - 120	2010-12-07
Benzo(b)fluoranthene		mg/L	60.0	52.1	87	80 - 120	2010-12-07
Benzo(k)fluoranthene	7	mg/L	60.0	42.1	70	80 - 120	2010-12-07
Benzo(a)pyrene		$\mathrm{mg/L}$	60.0	48.6	81	80 - 120	2010-12-07
Indeno(1,2,3-cd)pyrene		mg/L	60.0	51.7	86	80 - 120	2010-12-07
Dibenzo(a,h)anthracene		mg/L	60.0	52.0	87	80 - 120	2010-12-07
Benzo(g,h,i)perylene		mg/L	60.0	52.9	88	80 - 120	2010-12-07

Campagata	Ela -	Donale	Units	Dibation	Spike	Percent	Recovery Limit
Surrogate	$\operatorname{Flag}$	Result	Omes	Dilution	Amount	Recovery	THIII C
Nitrobenzene-d5		64.4	mg/L	1	60.0	107	80 - 120
2-Fluorobiphenyl		53.8	m mg/L	1	60.0	90	80 - 120
Terphenyl-d14		61.6	${ m mg/L}$	1	60.0	103	80 - 120

<sup>&</sup>lt;sup>7</sup>Analyte recovery outside CCV control limits. Concentration biased low. •

Turn Around Time if different from standard BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750 ŏ or Specify Method No. AMidlemd-BTEX 736200 Na, Ca, Mg, K, TDS, EC XXIIIINOCK - PAH CI, FI, S04, NO3, NO2, Alkalinity **ANALYSIS REQUEST** Moisture Content TRRP Report Required
Check If Special Reporting
Limits Are Needed Dry Weight Basis Required н<sub>д</sub> ,22T ,008 21/2 Pesticides 8081 / 608 PCB's 8082 / 608 00 East Sunset Rd., Suite El Paso, Texas 79922 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443 Suite GC/MS Semi. Vol. 8270 / 625 GC/W2 A91: 8560 / 624 RCI TCLP Pesticides ? TCLP Semi Volatiles Circle K TCLP Volatiles LAB USE Carrier # [Amage ONLY C Log-in-Review TCLP Metals Ag As Ba Cd Cr Pb Se Hg Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 6AB 8270 / 625 5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313 TPH 8015 GRO / DRO / TVHC OBS 3.5 °C COR 3.5 °C TPH 418.1 / TX1005 / TX1005 Ext(C35) AMCORZ.3 BTEX (8021) 602 / 8260 / 624 11.30.10 9.20 0852.4 8021 / 602 / 8260 / 624 MTBE OBS COR INST SAMPLING TIME 11 2 10:00 10:00 Time: 432-520 -770 11-27-10 Time: QUUNSCING 6701 Aberdeen Avenue. Suite 9 **Lubbock, Texas 79424**Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296 **DATE** 452-530-1 Date: PRESERVATIVE NONE A Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C. METHOD ICE Sampler Signature: HOBN 2000 Company: Company: Company: <sup>r</sup>OS<sup>z</sup>H Project Name: F HNO<sup>3</sup> Phone #: HCI Fax #: JONAT FOR Received by: SCUDGE Received by: ğ MATRIX Received Trace Analysis, Inc. ЯIA TIOS **ABTAW** 8:71 email: lab@traceanalysis.com InuomA \ amuloV Time: Time: Time: 1-24-10 930 OFFICE # CONTAINERS 01-12-11 Rounsin 6St Calbon Date: Date: ann LAB Order 1D# 101/04/14 0 FIELD CODE せるへ Company: Company: (Street, City, Zip) Project Location (including state)  $\mathcal{C}$ E Ran MON# 100 ton Jourson (If different from above) 5 Relinquished by: Company Name: Relinquished **b**y Contact Person: ₹ 2 Ralinguished LAB USE 82405 Invoice to: Project #: LAB# Address

YROU LEAR OFF



6701 Aberdeen Avenue, Suita 9 200 East Sunset Road: Suite E 5002 Basin Street, Suite A1

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817 • 201 • 5260

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E-Mail: lab@traceanalysis.com

# Certifications

WBENC: 237019

1752439743100-86536

DBE: VN 20657

NCTRCA WFWB38444Y0909

# **NELAP Certifications**

Lubbock: T104704219-08-TX

LELAP-02003

El Paso:

T104704221-08-TX LELAP-02002

Midland:

T104704392-08-TX

Kansas E-10317

# Analytical and Quality Control Report

Ron Rounsaville Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: February 10, 2011

Work Order: 11012828

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
256496	Post-Carbon	water	2011-01-28	11:30	2011-01-28

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 9 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

#### Standard Flags

B - The sample contains less than ten times the concentration found in the method blank.

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2011-01-28 and assigned to work order 11012828. Samples for work order 11012828 were received intact without headspace and at a temperature of 3.3 C.

Samples were analyzed for the following tests using their respective methods.

		$\operatorname{Prep}$	Prep	$_{ m QC}$	Analysis
Test	Method	Batch	Date	Batch	Date
BTEX	S 8021B	66260	2011-01-28 at 16:30	77248	2011-01-29 at 06:01
PAH	S 8270D	66487	2011-02-02 at 15:00	77510	2011-02-10 at 08:25

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11012828 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 11012828 TNM 97-04 Townsend

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S 5030B

AG

AG

# **Analytical Report**

Sample: 256496 - Post-Carbon

Laboratory: Midland

Analysis: BTEX QC Batch: 77248 Prep Batch: 66260

Analytical Method: Date Analyzed:

S 8021B 2011-01-29 Prep Method: Analyzed By: Prepared By:

Sample Preparation:

2011-01-28

RLParameter Flag Result Dilution RLUnits Benzene < 0.00100 0.00100 mg/L 1 0.00100 Toluene < 0.00100 mg/L 1 Ethylbenzene 1 0.00100< 0.00100 mg/L Xylene < 0.00100 mg/L 1 0.00100

Surrogate	Flag	Result	Units	Dilution	$egin{array}{c}  ext{Spike} \  ext{Amount} \end{array}$	Percent Recovery	$egin{array}{c} { m Recovery} \\ { m Limits} \end{array}$
Trifluorotoluene (TFT)		0.109	mg/L	1	0.100	109	75.4 - 119.4
4-Bromofluorobenzene (4-BFB)	·	0.0998	$\mathrm{mg/L}$	1	0.100	100	78.6 - 122.8

Sample: 256496 - Post-Carbon

Laboratory: Lubbock

Analysis: PAH QC Batch: 77510 Prep Batch: 66487

Analytical Method: Date Analyzed:

Sample Preparation:

S 8270D 2011-02-10 2011-02-02 Prep Method: S 3510C Analyzed By: MN Prepared By: MN

RLDilution RLParameter Flag Result Units Naphthalene < 0.000188 mg/L 0.9390.000200 2-Methylnaphthalene 0.939 0.000200 < 0.000188 mg/L1-Methylnaphthalene 0.939 0.000200 < 0.000188 mg/L Acenaphthylene 0.939 0.000200 < 0.000188 mg/L 0.939 0.000200Acenaphthene mg/L< 0.000188 1 Dibenzofuran 0.000200< 0.000188 mg/L0.939Fluorene < 0.000188 0.939 0.000200mg/L 0.000200 Anthracene 0.939< 0.000188 mg/L0.000200 Phenanthrene mg/L 0.939 < 0.000188 Fluoranthene < 0.000188 0.939 0.000200 mg/L 0.000200Pyrene mg/L0.939 < 0.000188 mg/L 0.9390.000200Benzo(a)anthracene < 0.000188 Chrysene < 0.000188 mg/L0.9390.000200Benzo(b)fluoranthene < 0.000188 mg/L0.939 0.000200 0.9390.000200Benzo(k)fluoranthene < 0.000188 mg/L

 $continued \dots$ 

<sup>&</sup>lt;sup>1</sup>Concentration biased low.

Report Date: February 10, 2011 TNM 97-04 Work Order: 11012828 TNM 97-04 Townsend Page Number: 5 of 9 Lovington, NM

sample	256496	continued		
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Surrogate	Flag	Result	Units Diluti	Spike on Amount	Percent Recovery	Recovery Limits
Benzo(g,h,i)perylene			<0.000188	mg/L	0.939	0.000200
Dibenzo(a,h)anthrac	ene		< 0.000188	${ m mg/L}$	0.939	0.000200
Indeno(1,2,3-cd)pyre	ene		< 0.000188	$_{ m mg/L}$	0.939	0.000200
Benzo(a)pyrene			< 0.000188	mg/L	0.939	0.000200
Parameter		Flag	Result	Units	Dilution	RL
			m RL			

					opino	1 01 00110	10000,01
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0350	mg/L	0.939	0.0800	44	10 - 111
2-Fluorobiphenyl		0.0390	$\mathrm{mg/L}$	0.939	0.0800	49	10 - 92.7
Terphenyl-d14		0.0523	${ m mg/L}$	0.939	0.0800	65	35.9 - 107

Method Blank (1) QC Batch: 77248

QC Batch: 77248 Prep Batch: 66260 Date Analyzed: 2011-01-29 QC Preparation: 2011-01-28 Analyzed By: AG Prepared By: AG

		$_{\cdot}$ MDL		
Parameter	$\operatorname{Flag}$	Result	$\operatorname{Units}$	RL
Benzene		< 0.000400	mg/L	0.001
Toluene		< 0.000300	${ m mg/L}$	0.001
Ethylbenzene		< 0.000300	${ m mg/L}$	0.001
Xylene		< 0.000333	m mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	$egin{array}{c} \mathbf{Spike} \ \mathbf{Amount} \end{array}$	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.103	mg/L	1	0.100	103	70.8 - 117.4
4-Bromofluorobenzene (4-BFB)		0.0963	mg/L	1	0.100	96	79 - 113.4

Method Blank (1) QC Batch: 77510

QC Batch: 77510 Date Analyzed: 20 Prep Batch: 66487 QC Preparation: 20

Date Analyzed: 2011-02-10 Analyzed By: MN QC Preparation: 2011-02-02 Prepared By: MN

		$\mathrm{MDL}$		
Parameter	Flag	$\operatorname{Result}$	Units	$\mathrm{RL}$
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	m mg/L	0.0002
1-Methylnaphthalene		< 0.0000575	$\mathrm{mg/L}$	0.0002
Acenaphthylene		< 0.0000963	m mg/L	0.0002
Acenaphthene		< 0.0000617	mg/L	0.0002

continued ...

Report Date: February 10, 2011 TNM 97-04 Work Order: 11012828 TNM 97-04 Townsend Page Number: 6 of 9 Lovington, NM

method blank continued.	SURDU DEWIEN CONCERNACI	
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		$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	$\mathrm{RL}$
Dibenzofuran		0.00427	mg/L	0.0002
Fluorene		< 0.000134	m mg/L	0.0002
Anthracene		< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	$\mathrm{mg/L}$	0.0002
Fluoranthene		< 0.000476	$\mathrm{mg/L}$	0.0002
Pyrene		< 0.000590	$\mathrm{mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	$\mathrm{mg/L}$	0.0002
Chrysene		< 0.0000766	mg/L	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	mg/L	0.0002
Benzo(a)pyrene		< 0.000132	m mg/L	0.0002
Indeno(1,2,3-cd)pyrene		< 0.0000702	$\mathrm{mg/L}$	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	m mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

			•		Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Result}$	Units	Dilution	$\mathbf{A}\mathbf{mount}$	Recovery	Limits
Nitrobenzene-d5		0.0402	mg/L	1	0.0800	50	10 - 111
2-Fluorobiphenyl		0.0426	mg/L	1	0.0800	53	10 - 92.7
Terphenyl-d14		0.0406	${ m mg/L}$	1	0.0800	51	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch: 77248 Prep Batch: 66260 Date Analyzed: 2011-01-29 QC Preparation: 2011-01-28 Analyzed By: AG Prepared By: AG

	LCS			$_{ m Spike}$	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit
Benzene	0.0918	mg/L	1	0.100	< 0.000400	92	76.8 - 110.3
Toluene	0.0919	mg/L	1	0.100	< 0.000300	92	81 - 108.2
Ethylbenzene	0.101	mg/L	1	0.100	< 0.000300	101	78.8 - 111
Xylene	0.303	$\mathrm{mg/L}$	1	0.300	< 0.000333	101	80.3 - 111.4

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	$egin{array}{c}  ext{LCSD} \  ext{Result} \end{array}$	Units	Dil.	$\begin{array}{c} {\rm Spike} \\ {\rm Amount} \end{array}$	$rac{ m Matrix}{ m Result}$	Rec.	$egin{array}{c} { m Rec.} \\ { m Limit} \end{array}$	RPD	RPD Limit
Benzene	0.0925	mg/L	1	0.100	< 0.000400	92	76.8 - 110.3	1	20
Toluene	0.0933	mg/L	1	0.100	< 0.000300	93	81 - 108.2	2	20
Ethylbenzene	0.104	mg/L	1	0.100	< 0.000300	104	78.8 - 111	3	20
Xylene	0.314	mg/L	1	0.300	< 0.000333	105	80.3 - 111.4	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Work Order: 11012828 TNM 97-04 Townsend Page Number: 7 of 9 Lovington, NM

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	${ m Rec.} \ { m Limit}$
Trifluorotoluene (TFT)	0.102	0.102	mg/L	1	0.100	102	102	66.6 - 114.5
4-Bromofluorobenzene (4-BFB)	0.0980	0.0993	mg/L	1	0.100	98	99	77.1 - 114.4

#### Laboratory Control Spike (LCS-1)

QC Batch: 77510 Prep Batch: 66487 Date Analyzed: 2011-02-10 QC Preparation: 2011-02-02

Analyzed By: MN Prepared By: MN

		LCS			Spike	Matrix		$\mathrm{Rec}.$
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit
Naphthalene		0.0527	mg/L	1	0.0800	< 0.0000784	66	32.2 - 80.3
2-Methylnaphthalene		0.0539	$\mathrm{mg/L}$	1	0.0800	< 0.0000747	67	34.8 - 87
1-Methylnaphthalene		0.0508	$\mathrm{mg/L}$	1	0.0800	< 0.0000575	64	36.9 - 89.6
Acenaphthylene		0.0601	$\mathrm{mg/L}$	1	0.0800	< 0.0000963	75	35 - 93.2
Acenaphthene		0.0551	$_{ m mg/L}$	1	0.0800	< 0.0000617	69	35.8 - 92.9
Dibenzofuran	2	0.0258	mg/L	1	0.0800	0.00427	27	35.3 - 85.1
Fluorene		0.0660	$\mathrm{mg/L}$	1	0.0800	< 0.000134	82	43.4 - 101
Anthracene		0.0486	${ m mg/L}$	1	0.0800	< 0.000441	61	44.8 - 92.4
Phenanthrene		0.0598	${ m mg/L}$	1	0.0800	< 0.000435	75	44 - 93.7
Fluoranthene		0.0683	${ m mg/L}$	1	0.0800	< 0.000476	85	52.7 - 104
Pyrene		0.0581	${ m mg/L}$	1	0.0800	< 0.000590	73	42.2 - 93.8
Benzo(a)anthracene		0.0668	mg/L	1	0.0800	< 0.000118	84	40.4 - 91.9
Chrysene		0.0809	${ m mg/L}$	1	0.0800	< 0.0000766	101	44.4 - 107
Benzo(b)fluoranthene		0.0433	${ m mg/L}$	1	0.0800	< 0.000146	54	34.8 - 105
Benzo(k)fluoranthene		0.0493	${ m mg/L}$	1	0.0800	< 0.000141	62	50.2 - 158
Benzo(a)pyrene		0.0460	$\mathrm{mg/L}$	1	0.0800	< 0.000132	58	51.3 - 151
Indeno(1,2,3-cd)pyrene		0.0526	mg/L	1	0.0800	< 0.0000702	66	43.2 - 115
Dibenzo(a,h)anthracene		0.0621	mg/L	1	0.0800	< 0.0000534	78	43.9 - 115
Benzo(g,h,i)perylene		0.0455	mg/L	1	0.0800	< 0.0000473	57	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param		LCSD Result	Units	Dil.	Spike Amount	$egin{array}{l}  ext{Matrix} \  ext{Result} \end{array}$	Rec.	Rec. Limit	RPD	RPD Limit
Naphthalene		0.0605	mg/L	1	0.0800	<0.0000784	76	32.2 - 80.3	14	20
2-Methylnaphthalene		0.0611	mg/L	1	0.0800	< 0.0000747	76	34.8 - 87	12	20
1-Methylnaphthalene		0.0565	mg/L	1	0.0800	< 0.0000575	71	36.9 - 89.6	11	. 20
Acenaphthylene		0.0692	mg/L	1	0.0800	< 0.0000963	86	35 - 93.2	14	20
Acenaphthene		0.0636	mg/L	1	0.0800	< 0.0000617	80	35.8 - 92.9	14	20
Dibenzofuran	3	0.0295	mg/L	1	0.0800	0.00427	32	35.3 - 85.1	13	20
Fluorene		0.0766	mg/L	1	0.0800	< 0.000134	96	43.4 - 101	15	20
Anthracene		0.0553	mg/L	1	0.0800	< 0.000441	69	44.8 - 92.4	13	20

 $<sup>^2{\</sup>rm Spike}$  analyte out of control limits. Results biased low.  $\bullet$ 

<sup>&</sup>lt;sup>3</sup>Spike analyte out of control limits. Results biased low. •

Report Date: February 10, 2011

 $\rm TNM~97\text{-}04$ 

Work Order: 11012828 TNM 97-04 Townsend Page Number: 8 of 9 Lovington, NM

control spikes continued . . .

		LCSD			$_{ m Spike}$	Matrix		${ m Rec.}$		$\operatorname{RPD}$
Param		Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\mathbf{Limit}$
Phenanthrene		0.0675	mg/L	1	0.0800	< 0.000435	84	44 - 93.7	12	20
Fluoranthene		0.0776	${ m mg/L}$	1	0.0800	< 0.000476	97	52.7 - 104	13	20
Pyrene		0.0673	m mg/L	1	0.0800	< 0.000590	84	42.2 - 93.8	15	20
Benzo(a)anthracene	4	0.0766	${ m mg/L}$	1	0.0800	< 0.000118	96	40.4 - 91.9	14	20
Chrysene	5	0.0932	${ m mg/L}$	1	0.0800	< 0.0000766	116	44.4 - 107	14	20
Benzo(b)fluoranthene	6	0.0533	$\mathrm{mg/L}$	1	0.0800	< 0.000146	67	34.8 - 105	21	20
Benzo(k)fluoranthene		0.0543	$\mathrm{mg/L}$	1	0.0800	< 0.000141	68	50.2 - 158	10	20
Benzo(a)pyrene		0.0529	$\mathrm{mg/L}$	1	0.0800	< 0.000132	66	51.3 - 151	14	20
Indeno(1,2,3-cd)pyrene		0.0612	mg/L	1	0.0800	< 0.0000702	76	43.2 - 115	15	20
Dibenzo(a,h)anthracene		0.0716	mg/L	1	0.0800	< 0.0000534	90	43.9 - 115	14	20
Benzo(g,h,i) perylene		0.0548	$\mathrm{mg/L}$	1	0.0800	< 0.0000473	68	45.1 - 115	18	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	${ m Rec.}$
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	${ m Rec.}$	Limit
Nitrobenzene-d5	0.0405	0.0473	mg/L	1	0.0800	51	59	10 - 111
2-Fluorobiphenyl	0.0430	0.0500	$_{ m mg/L}$	1	0.0800	54	62	10 - 92.7
Terphenyl-d14	0.0424	0.0491	mg/L	1	0.0800	53	61	35.9 - 107

#### Standard (CCV-1)

QC Batch: 77248

Date Analyzed: 2011-01-29

Analyzed By: AG

			CCVs	$\mathrm{CCVs}$	CCVs	$\operatorname{Percent}$	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene	<u> </u>	$\mathrm{mg/L}$	0.100	0.0978	98	80 - 120	2011-01-29
Toluene		mg/L	0.100	0.0971	97	80 - 120	2011-01-29
Ethylbenzene		mg/L	0.100	0.104	104	80 - 120	2011-01-29
Xylene		$\mathrm{mg/L}$	0.300	0.316	105	80 - 120	2011-01-29

#### Standard (CCV-2)

QC Batch: 77248

Date Analyzed: 2011-01-29

Analyzed By: AG

			CCVs	CCVs	CCVs	$\operatorname{Percent}$	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0927	93	80 - 120	2011-01-29
Toluene		$\mathrm{mg/L}$	0.100	0.0938	94	80 - 120	2011-01-29

 $continued \dots$ 

 $^6\mathrm{RPD}$  out of RPD Limits. Analyte not detected in samples.

<sup>&</sup>lt;sup>4</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

<sup>&</sup>lt;sup>5</sup>LCSD analyte out of range. LCS/LCSD has a RPD within limits. Therfore, LCS shows extraction occured properly.

Report Date: February 10, 2011

TNM 97-04

Work Order: 11012828 TNM 97-04 Townsend Page Number: 9 of 9 Lovington, NM

standard continu	ed						
			$\mathrm{CCVs}$	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Ethylbenzene		mg/L	0.100	0.103	103	80 - 120	2011-01-29
Xvlene		mg/L	0.300	0.313	104	80 - 120	2011-01-29

#### Standard (CCV-1)

QC Batch: 77510

Date Analyzed: 2011-02-10

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	•
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	53.8	90	80 - 120	2011-02-10
2-Methylnaphthalene		$_{ m mg/L}$	60.0	62.3	104	80 - 120	2011-02-10
1-Methylnaphthalene		mg/L	60.0	56.8	95	80 - 120	2011-02-10
Acenaphthylene		${ m mg/L}$	60.0	57.5	96	80 - 120	2011-02-10
Acenaphthene		mg/L	60.0	55.4	92	80 - 120	2011-02-10
Dibenzofuran		mg/L	60.0	64.5	108	80 - 120	2011-02-10
Fluorene		mg/L	60.0	64.9	108	80 - 120	2011-02-10
Anthracene		mg/L	60.0	54.9	92	80 - 120	2011-02-10
Phenanthrene		mg/L	60.0	60.5	101	80 - 120	2011-02-10
Fluoranthene		$\mathrm{mg/L}$	60.0	66.7	111	80 - 120	2011-02-10
Pyrene		${ m mg/L}$	60.0	69.6	116	80 - 120	2011-02-10
Benzo(a)anthracene		${ m mg/L}$	60.0	60.5	101	80 - 120	2011-02-10
Chrysene		${ m mg/L}$	60.0	57.0	95	80 - 120	2011-02-10
Benzo(b)fluoranthene		$\mathrm{mg/L}$	60.0	58.2	97	80 - 120	2011-02-10
Benzo(k)fluoranthene		$\mathrm{mg/L}$	60.0	59.0	98	80 - 120	2011-02-10
Benzo(a)pyrene		mg/L	60.0	54.5	91	80 - 120	2011-02-10
Indeno(1,2,3-cd)pyrene		${ m mg/L}$	60.0	64.7	108	80 - 120	2011-02-10
Dibenzo(a,h)anthracene		${ m mg/L}$	60.0	64.1	107	80 - 120	2011-02-10
Benzo(g,h,i)perylene		$\mathrm{mg/L}$	60.0	62.0	103	80 - 120	2011-02-10

					Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	$_{ m Units}$	Dilution	$\mathbf{A}\mathbf{mount}$	Recovery	Limit
Nitrobenzene-d5		54.5	mg/L	1	60.0	91	80 - 120
2-Fluorobiphenyl		53.5	mg/L	1	60.0	89	80 - 120
Terphenyl-d14		67.6	$\mathrm{mg/L}$	1	60.0	113	80 - 120

11012828 LAB Order ID #

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Turn Around Time if different from standard BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750 Circle or Specify Method No.) Na, Ca, Mg, K, TDS, EC CI' EI' 204' NO3' NO5' YIKalinity ZK9802 **ANALYSIS REQUEST** Moisture Content BTEK-Midland Dry Weight Basis Required Check If Special Reporting Limits Are Needed BOD, TSS, pH PAH - Lubback TRRP Report Required Pesticides 8081 / 608 **LCB**,2 8082 \ 608 200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443 GC/MS Semi. Vol. 8270 / 625 REMARKS: CC/W2 Aol: 8560 / 624 TCLP Pesticides TCLP Semi Volatiles  $\overrightarrow{\Delta}$ TCLP Volatiles LAB USE TCLP Metals Ag As Ba Cd Cr Pb Se Hg ONLY Intact O / N 3 Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313 **GAH 8270/ 625** TPH 8015 GRO / DRO / TVHC TPH 418.1 / TX1005 / TX1005 Ext(C35) INST TR OBS 2.1 °C COR 2,0 °c Carrier # @1EX\_80ZD\ 605 \ 8560 \ 654 0BS3.3 (4.20 COR 3.3 8021 / 602 / 8260 / 624 **38TM** OBS COR INST SAMPLING TIME 138 432-520-7720 lime: Time: Time: 6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 78424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1296 **DATE** 453-520-770 1-28-11 2045 en 1710/20 Date: NONE PRESERVATIVE METHOD ICE Sampler Signature: NaOH Company: Company: Company OS2H Project Name: 4 A <sup>2</sup>ОИН Phone #: HCI E-mail: Fax #: mclon Received by: SCUDGE Received by: Received by: MATRIX ЯΙΑ TraceAnalysis, Inc. TIOS **MATER** email: lab@traceanalysis.com 8 JnuomA \ emuloV Time: 17:00 # CONTAINERS 11-16-1-28 Date: Date: FIELD CODE Company: Company: Project Location (including state): (Street, City, Zip) Ast Carbon COMMENCE (If different from above) Z Relinquished by: Relinquished by: Relinquished by Contact Person: Company Name LAB USE) 25,496 Invoice to: Project #: Address: LAB#

PIOH

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C.

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432 • 689 • 6301 817 \* 201 \* 5260

E-Mail: lab@traceanalysic.com

### Certifications

**WBENC:** 237019

HUB:

1752439743100-86536

**DBE:** VN 20657

NCTRCA WFWB38444Y0909

### NELAP Certifications

Lubbock: T104704219-08-TX

LELAP-02003

Kansas E-10317

El Paso: T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

# Analytical and Quality Control Report

E-mail Reports Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: March 15, 2011

Work Order:

11030109

Project Location: Lovington, NM

Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
259117	Post-Carbon	water	2011-02-28	15:00	2011-03-01

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

### Standard Flags

B - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2011-03-01 and assigned to work order 11030109. Samples for work order 11030109 were received intact without headspace and at a temperature of 3.8 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	Prep	$_{ m QC}$	Analysis
Test	Method	Batch	Date	$\operatorname{Batch}$	Date
BTEX	S 8021B	67068	2011-03-04 at 08:44	79032	2011-03-04 at 08:44
PAH	S 8270D	67198	2011-03-09 at 15:00	79210	2011-03-12 at 10:52

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11030109 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

TNM 97-04

Work Order: 11030109 TNM 97-04 Townsend

**Analytical Report** 

#### Sample: 259117 - Post-Carbon

Laboratory: Midland

Analysis: BTEX QC Batch: 79032 Prep Batch: 67068

Analytical Method: S 8021B Date Analyzed: Sample Preparation:

2011-03-04 2011-03-04 Prep Method: S 5030B Analyzed By: MEPrepared By: ME

Page Number: 4 of 10

Lovington, NM

RLParameter Flag Result Units Dilution RLBenzene 0.0319 0.00100 mg/L 5 Toluene 0.0370mg/L 5 0.001005 Ethylbenzene 0.001000.0338mg/LXylene 0.09925 0.00100 mg/L

Spike Percent Recovery Surrogate Flag Result Units Dilution Amount Recovery Limits Trifluorotoluene (TFT) 0.498 mg/L 5 0.500 100 67.8 - 126 4-Bromofluorobenzene (4-BFB) 0.47896 51.1 - 128 mg/L 5 0.500

#### Sample: 259117 - Post-Carbon

Laboratory:

Lubbock

Analysis: PAH QC Batch: 79210 Prep Batch: 67198

Analytical Method: Date Analyzed:

Sample Preparation:

S 8270D 2011-03-12 2011-03-09 Prep Method: S 3510C Analyzed By: MN Prepared By: MN

RL

Parameter	Flag	Result	Units	Dilution	RL
Naphthalene		< 0.000190	m mg/L	0.952	0.000200
2-Methylnaphthalene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
1-Methylnaphthalene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Acenaphthylene		< 0.000190	${ m mg/L}$	0.952	0.000200
Acenaphthene		< 0.000190	${ m mg/L}$	0.952	0.000200
Dibenzofuran		< 0.000190	$_{ m mg/L}$	0.952	0.000200
Fluorene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Anthracene		< 0.000190	${ m mg/L}$	0.952	0.000200
Phenanthrene		< 0.000190	mg/L	0.952	0.000200
Fluoranthene		< 0.000190	mg/L	0.952	0.000200
Pyrene		< 0.000190	${ m mg/L}$	0.952	0.000200
Benzo(a)anthracene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Chrysene		< 0.000190	$\mathrm{mg/L}$	0.952	0.000200
Benzo(b)fluoranthene		< 0.000190	m mg/L	0.952	0.000200
Benzo(k)fluoranthene		< 0.000190	${ m mg/L}$	0.952	0.000200
Benzo(a)pyrene		< 0.000190	${ m mg/L}$	0.952	0.000200

Report Date: March 15, 2011 TNM 97-04 Work Order: 11030109 TNM 97-04 Townsend Page Number: 5 of 10 Lovington, NM

35.9 - 107

sample 259117 continued ...

Terphenyl-d14

				RL			
Parameter		$\mathbf{Flag}$	Result		Units	Dilution	RL
Indeno(1,2,3-cd)pyre	ene		< 0.000190		mg/L	0.952	0.000200
Dibenzo(a,h)anthrac	ene		< 0.000	190	mg/L	0.952	0.000200
Benzo(g,h,i)perylene			190	${ m mg/L}$	0.952	0.000200	
Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		0.0369	mg/L	0.952	0.0800	46	10 - 111
2-Fluorobiphenyl		0.0403	${ m mg/L}$	0.952	0.0800	50	10 - 92.7

0.952

0.0800

64

Method Blank (1) QC Batch: 79032

0.0510

QC Batch: 79032 Date Analyzed: 2011-03-04 Analyzed By: ME Prep Batch: 67068 QC Preparation: 2011-03-04 Prepared By: ME

mg/L

		$\mathrm{MDL}$		
Parameter .	Flag	Result	Units	RL
Benzene		< 0.000400	mg/L	0.001
Toluene		< 0.000300	m mg/L	0.001
Ethylbenzene		< 0.000300	m mg/L	0.001
Xylene		< 0.000333	$_{ m mg/L}$	0.001

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)		0.0880	mg/L	1	0.100	88	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.0857	${ m mg/L}$	1	0.100	86	47.3 - 116

Method Blank (1) QC Batch: 79210

QC Batch: 79210 Date Analyzed: 2011-03-12 Analyzed By: MN Prep Batch: 67198 QC Preparation: 2011-03-09 Prepared By: MN

MDL Parameter Flag Result Units RLNaphthalene mg/L 0.0002 < 0.0000784 2-Methylnaphthalene mg/L 0.0002< 0.0000747 mg/L0.00021-Methylnaphthalene < 0.0000575 0.0002Acenaphthylene < 0.0000963 mg/L Acenaphthene < 0.0000617 mg/L 0.0002Dibenzofuran < 0.0000952  $\mathrm{mg}/\mathrm{L}$ 0.0002

Work Order: 11030109

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#### method blank continued . . .

		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Fluorene		< 0.000134	mg/L	0.0002
Anthracene		< 0.000441	m mg/L	0.0002
Phenanthrene		< 0.000435	m mg/L	0.0002
Fluoranthene		< 0.000476	m mg/L	0.0002
Pyrene		< 0.000590	${ m mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	$\mathrm{mg/L}$	0.0002
Chrysene		< 0.0000766	$\mathrm{mg/L}$	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	m mg/L	0.0002
Benzo(a)pyrene		< 0.000132	m mg/L	0.0002
Indeno $(1,2,3$ -cd)pyrene		< 0.0000702	m mg/L	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	m mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	mg/L	0.0002

0 4-	1721	D 14	TT **	D.1	Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0425	mg/L	1	0.0800	53	10 - 111
2-Fluorobiphenyl		0.0451	$\mathrm{mg/L}$	1	0.0800	56	10 - 92.7
Terphenyl-d14		0.0573	mg/L	1	0.0800	72	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch:

79032

Date Analyzed:

2011-03-04

Analyzed By: ME

Prep Batch: 67068

QC Preparation: 2011-03-04

Prepared By: ME

	LCS			Spike	Matrix		Rec.
Param	Result	$_{ m Units}$	Dil.	Amount	Result	Rec.	Limit
Benzene	0.0946	mg/L	1	0.100	< 0.000400	95	82.9 - 108
Toluene	0.0938	mg/L	1	0.100	< 0.000300	94	82.7 - 107
Ethylbenzene	0.0916	mg/L	1	0.100	< 0.000300	92	78.8 - 106
Xylene	0.277	mg/L	1	0.300	< 0.000333	92	79.3 - 106

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Benzene	0.0935	mg/L	1	0.100	< 0.000400	94	82.9 - 108	1	20
Toluene	0.0922	mg/L	1	0.100	< 0.000300	92	82.7 - 107	2	20
Ethylbenzene	0.0904	mg/L	1	0.100	< 0.000300	90	78.8 - 106	1	20
Xylene	0.276	$\mathrm{mg/L}$	1	0.300	< 0.000333	92	79.3 - 106	. 0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

TNM 97-04

Work Order: 11030109 TNM 97-04 Townsend

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Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0931	0.0912	mg/L	1	0.100	93	91	67.3 - 113
4-Bromofluorobenzene (4-BFB)	0.0938	0.0956	mg/L	1	0.100	94	96	68.2 - 124

#### Laboratory Control Spike (LCS-1)

QC Batch:

79210 Prep Batch: 67198 Date Analyzed: QC Preparation: 2011-03-09

2011-03-12

Analyzed By: MN

Prepared By: MN

Param	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Naphthalene	0.0341	mg/L	1	0.0800	< 0.0000784	43	32.2 - 80.3
2-Methylnaphthalene	0.0398	mg/L	1	0.0800	< 0.0000747	50	34.8 - 87
1-Methylnaphthalene	0.0374	mg/L	1	0.0800	< 0.0000575	47	36.9 - 89.6
Acenaphthylene	0.0449	mg/L	1	0.0800	< 0.0000963	56	35 - 93.2
Acenaphthene	0.0417	mg/L	1	0.0800	< 0.0000617	52	35.8 - 92.9
Dibenzofuran	0.0405	${ m mg/L}$	1	0.0800	< 0.0000952	51	35.3 - 85.1
Fluorene	0.0542	$\mathrm{mg/L}$	1	0.0800	< 0.000134	68	43.4 - 101
Anthracene	0.0523	mg/L	1	0.0800	< 0.000441	65	44.8 - 92.4
Phenanthrene	0.0569	mg/L	1	0.0800	< 0.000435	71	44 - 93.7
Fluoranthene	0.0705	$\mathrm{mg/L}$	1 .	0.0800	< 0.000476	88	52.7 - 104
Pyrene	0.0633	mg/L	1	0.0800	< 0.000590	79	42.2 - 93.8
Benzo(a)anthracene	0.0681	$\mathrm{mg/L}$	1	0.0800	< 0.000118	85	40.4 - 91.9
Chrysene	0.0827	$\mathrm{mg/L}$	1	0.0800	< 0.0000766	103	44.4 - 107
Benzo(b)fluoranthene	0.0464	mg/L	1	0.0800	< 0.000146	58	34.8 - 105
Benzo(k)fluoranthene	0.0532	mg/L	1	0.0800	< 0.000141	66	50.2 - 158
Benzo(a)pyrene	0.0482	$\mathrm{mg/L}$	1	0.0800	< 0.000132	60	51.3 - 151
Indeno $(1,2,3\text{-cd})$ pyrene	0.0525	mg/L	1	0.0800	< 0.0000702	66	43.2 - 115
Dibenzo(a,h)anthracene	0.0609	mg/L	1	0.0800	< 0.0000534	76	43.9 - 115
Benzo(g,h,i)perylene	0.0482	mg/L	1	0.0800	< 0.0000473	60	45.1 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	R.esult	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Naphthalene	0.0352	mg/L	1	0.0800	< 0.0000784	44	32.2 - 80.3	3	20
2-Methylnaphthalene	0.0424	mg/L	1	0.0800	< 0.0000747	53	34.8 - 87	6	20
1-Methylnaphthalene	0.0390	mg/L	1	0.0800	< 0.0000575	49	36.9 - 89.6	4	20
Acenaphthylene	0.0460	mg/L	1	0.0800	< 0.0000963	58	35 - 93.2	$^2$	20
Acenaphthene	0.0427	$\mathrm{mg/L}$	1	0.0800	< 0.0000617	53	35.8 - 92.9	<b>2</b>	20
Dibenzofuran	0.0422	$\mathrm{mg/L}$	1	0.0800	< 0.0000952	53	35.3 - 85.1	4	20
Fluorene	$0.0556^{\circ}$	mg/L	1	0.0800	< 0.000134	70	43.4 - 101	3	20
Anthracene	0.0532	mg/L	1	0.0800	< 0.000441	66	44.8 - 92.4	2	20
Phenanthrene	0.0581	mg/L	1	0.0800	< 0.000435	73	44 - 93.7	2	20
Fluoranthene	0.0725	mg/L	1	0.0800	< 0.000476	91	52.7 - 104	3	20
Pyrene	0.0651	mg/L	1	0.0800	< 0.000590	81	42.2 - 93.8	3	20

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Work Order: 11030109 TNM 97-04 Townsend

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•	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Benzo(a)anthracene	0.0695	mg/L	1	0.0800	< 0.000118	87	40.4 - 91.9	2	20
Chrysene	0.0843	${ m mg/L}$	1	0.0800	< 0.0000766	105	44.4 - 107	2	20
Benzo(b)fluoranthene	0.0515	${ m mg/L}$	1	0.0800	< 0.000146	64	34.8 - 105	10	20
Benzo(k)fluoranthene	0.0563	${ m mg/L}$	1	0.0800	< 0.000141	70	50.2 - 158	6	20
Benzo(a)pyrene	0.0541	$\mathrm{mg/L}$	1	0.0800	< 0.000132	68	51.3 - 151	12	20
Indeno $(1,2,3-cd)$ pyrene	0.0536	$\mathrm{mg/L}$	1	0.0800	< 0.0000702	67	43.2 - 115	2	20
Dibenzo(a,h)anthracene	0.0626	mg/L	1	0.0800	< 0.0000534	78	43.9 - 115	3	20
Benzo(g,h,i)perylene	0.0498	mg/L	1	0.0800	< 0.0000473	62	45.1 - 115	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Nitrobenzene-d5	0.0311	0.0306	mg/L	1	0.0800	39	38	10 - 111
2-Fluorobiphenyl	0.0362	0.0376	$\mathrm{mg/L}$	1	0.0800	45	47	10 - 92.7
Terphenyl-d14	0.0574	0.0584	${ m mg/L}$	1	0.0800	72	73	35.9 - 107

Matrix Spike (MS-1) Spiked Sample: 259115

QC Batch: Prep Batch: 67068

79032

Date Analyzed: QC Preparation: 2011-03-04

2011-03-04

Analyzed By: ME

Prepared By: ME

Param	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	2.61	mg/L	5	0.500	2.1558	91	77.9 - 114
Toluene	0.447	mg/L	5	0.500	< 0.00150	89	78.3 - 111
Ethylbenzene	0.444	mg/L	5	0.500	0.0426	80	75.3 - 110
Xylene	1.30	mg/L	5	1.50	< 0.00166	87	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Benzene	2.67	mg/L	5	0.500	2.1558	103	77.9 - 114	2	20
Toluene	0.462	mg/L	. 5	0.500	< 0.00150	92	78.3 - 111	3	20
Ethylbenzene	0.462	${ m mg/L}$	5	0.500	0.0426	84	75.3 - 110	4	20
Xylene	1.36	$\mathrm{mg/L}$	5	1.50	< 0.00166	91	75.7 - 109	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	${ m MSD}$ Result	Units	Dil.	Spike Amount	MS Rec.	$\begin{array}{c} \mathrm{MSD} \\ \mathrm{Rec.} \end{array}$	CRec.
Trifluorotoluene (TFT)	0.466	0.487	mg/L	5	0.5	93	97	68.3 - 107
4-Bromofluorobenzene (4-BFB)	0.500	0.520	mg/L	5	0.5	100	104	60.1 - 135

TNM 97-04

Work Order: 11030109 TNM 97-04 Townsend Page Number: 9 of 10 Lovington, NM

#### Standard (CCV-2)

QC Batch: 79032

Date Analyzed: 2011-03-04

Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0928	93	80 - 120	2011-03-04
Toluene ·		mg/L .	0.100	0.0909	91	80 - 120	2011-03-04
Ethylbenzene		m mg/L	0.100	0.0875	88	80 - 120	2011-03-04
Xylene		mg/L	0.300	0.266	89	80 - 120	2011-03-04

#### Standard (CCV-3)

QC Batch: 79032

Date Analyzed: 2011-03-04

Analyzed By: ME

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\mathbf{Flag}$	Units	Conc.	Conc.	R.ecovery	Limits	Analyzed $\_$
Benzene		mg/L	0.100	0.0948	95	80 - 120	2011-03-04
Toluene		${ m mg/L}$	0.100	0.0933	93	80 - 120	2011-03-04
Ethylbenzene		$_{ m mg/L}$	0.100	0.0902	90	80 - 120	2011-03-04
Xylene		$\mathrm{mg/L}$	0.300	0.272	91	80 - 120	2011-03-04

#### Standard (CCV-1)

QC Batch: 79210

 $Date\ Analyzed:\ \ 2011-03-12$ 

Analyzed By: MN

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		${ m mg/L}$	60.0	53.2	89	80 - 120	2011-03-12
2-Methylnaphthalene		${ m mg/L}$	60.0	64.7	108	80 - 120	2011-03-12
1-Methylnaphthalene		${ m mg/L}$	60.0	57.7	96	80 - 120	2011-03-12
Acenaphthylene		$_{ m mg/L}$	60.0	56.3	94	80 - 120	2011-03-12
Acenaphthene		$_{ m mg/L}$	60.0	53.8	90	80 - 120	2011-03-12
Dibenzofuran		${ m mg/L}^{-1}$	60.0	62.1	104	80 - 120	2011-03-12
Fluorene		$\mathrm{mg/L}$	60.0	60.8	101	80 - 120	2011-03-12
Anthracene		$_{ m mg/L}$	60.0	54.6	91	80 - 120	2011-03-12
Phenanthrene		${ m mg/L}$	60.0	60.2	100	80 - 120	2011-03-12
Fluoranthene		mg/L	60.0	69.3	116	80 - 120	2011-03-12
Pyrene		${ m mg/L}$	60.0	63.8	106	80 - 120	2011-03-12
Benzo(a)anthracene		${ m mg/L}$	60.0	60.4	101	80 - 120	2011-03-12
Chrysene		${ m mg/L}$	60.0	56.7	94	80 - 120	2011-03-12
Benzo(b)fluoranthene		$_{ m mg/L}$	60.0	57.9	96	80 - 120	2011-03-12
Benzo(k)fluoranthene		mg/L	60.0	61.6	103	80 - 120	2011-03-12

TNM 97-04

Work Order: 11030109 TNM 97-04 Townsend Page Number: 10 of 10 Lovington, NM

 $standard\ continued\ \dots$ 

			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	R.ecovery	Limits	Analyzed
Benzo(a)pyrene		mg/L	60.0	57.3	96	80 - 120	2011-03-12
Indeno $(1,2,3$ -cd)pyrene		${ m mg/L}$	60.0	56.9	95	80 - 120	2011-03-12
Dibenzo(a,h)anthracene		${ m mg/L}$	60.0	56.6	94	80 - 120	2011-03-12
Benzo(g,h,i)perylene		${ m mg/L}$	60.0	54.8	91	80 - 120	2011-03-12

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	${ m Amount}$	Recovery	Limit
Nitrobenzene-d5		56.0	mg/L	1	60.0	93	80 - 120
2-Fluorobiphenyl	•	56.0	$\mathrm{mg/L}$	1	60.0	93	80 - 120
Terphenyl-d14		62.0	mg/L	1	60.0	103	80 - 120

BioAquatic Testing 2501 Mayes Rd., Ste 100 Carrollton, Texas 75006 Tel (972) 242-7750 & Midlend-BTEX Circle or Specify Method CI' EI' 204' NO3' NO5' Alkalinity Moisture Content **ANALYSIS REQUEST** Dry Weight Basis Required Check If Special Reporting Limits Are Needed на ,гзт ,пов TRRP Report Required Pesticides 8081 / 608 200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (915) 585-3443 Fax (915) 585-9944 1 (888) 588-3443 PCB's 8082 / 608 8270 / 625 GC/MS Semi. Vol. REMARKS CC/W2 AOI: 8560 / 624 RCI TCLP Pesticides TCLP Semi Volatiles TCLP Volatiles LAB USE TCLP Metals Ag As Ba Cd Cr Pb Se Hg ONLY Total Metals Ag As Ba Cd Cr Pb Se Hg 6010/200.7 5002 Basin Street. Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313 PAH 8270/ 625 TPH 8015 GRO / DRO / TVHC OBS 38 % TPH 418.1 / TX1005 / TX1005 Ext(C35) GIFX 8020 \ 602 \ 8260 \ 624 8021 / 602 / 8260 / 624 **BETM** SOR, OBS COR OBS COR INST INST INST SAMPÉTING **TIME** 132-520-8920 Time: Time: Time: Ofou 6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 121 (805) 794-1296 Fax (806) 794-1298 1 (800) 378-1298 **BATE** 22/11/50 3-1-11 NONE PRESERVATIVE Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C. METHOD ICE Sampler Signature: HOBN Company Company Company DS2H Project Name: Phone #: HCI Fax #: Received by: SENDEE Received by MATRIX ЯIA TraceAnalysis, Inc. SOIL **MATER** email: lab@traceanalysis.com K 21,00 080 JunomA \ emuloV Time: Time: Time: # CONTAINERS 1-1-8 (Street, City, Zip) (Street, City, Zip) 3-1-11 Date: 110301PA FIELD CODE 1010 Company Company Company Project Location (including state) 205 7 COMMISCECE 50-45 M (If different from above) LAB Order ID # 26G117F097 Relinquished by Contact Person: Company Name (LAB USE) Invoice to: Project #: LAB# Address:

Carrier#

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PIOH

Turn Around Time if different from standard

Na, Ca, Mg, K, TDS, EC

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#### Certifications

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**DBE:** VN 20657

NCTRCA

WFWB38444Y0909

## **NELAP Certifications**

Lubbock: T104704219-08-TX

LELAP-02003

Kansas E-10317

El Paso: T104704221-08-TX

LELAP-02002

Midland: T104704392-08-TX

# Analytical and Quality Control Report

E-mail Reports Nova Safety & Environmental 2057 Commerce St. Midland, TX, 79703

Report Date: March 24, 2011

Work Order:

11032107

Lovington, NM Project Location: Project Name:

TNM 97-04 Townsend

Project Number:

TNM 97-04

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
261152	TPC	water	2011-03-18	12:00	2011-03-21

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

### ${\bf Standard\ Flags}$

 $\, B \,$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

Samples for project TNM 97-04 Townsend were received by TraceAnalysis, Inc. on 2011-03-21 and assigned to work order 11032107. Samples for work order 11032107 were received intact without headspace and at a temperature of 21.3 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	Prep	QC	Analysis
Test	Method	Batch	Date	Batch	Date
BTEX	S 8021B	67576	2011-03-21 at 14:22	79654	2011-03-21 at 14:22
PAH	S 8270D	67618	2011-03-22 at 15:00	79704	2011-03-23 at 10:05

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 11032107 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Work Order: 11032107 TNM 97-04 TNM 97-04 Townsend

# **Analytical Report**

#### Sample: 261152 - TPC

Laboratory:

Midland BTEX

Analysis: QC Batch: 79654 Prep Batch: 67576 Analytical Method: Date Analyzed:

S 8021B 2011-03-21 Sample Preparation: 2011-03-21 Prep Method: S 5030B ME

Page Number: 4 of 10

Lovington, NM

Analyzed By: Prepared By: ME

•		RL			
Parameter	Flag	Result	Units	Dilution	$\operatorname{RL}$
Benzene		< 0.00100	mg/L	1	0.00100
Toluene		< 0.00100	${ m mg/L}$	1	0.00100
Ethylbenzene		< 0.00100	$\mathrm{mg/L}$	1	0.00100
Xylene		< 0.00100	${ m mg/L}$	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	- 100	0.113		1	0.100		67.8 - 129
` ,	1		mg/L	1		113	
4-Bromofluorobenzene (4-BFB)	1 .	0.129	m mg/L	1	0.100	129	51.1 - 128

#### Sample: 261152 - TPC

Laboratory: Lubbock

PAH Analysis: QC Batch: 79704 Prep Batch: 67618 Analytical Method: Date Analyzed: Sample Preparation:

S 8270D 2011-03-23 2011-03-22 Prep Method: S 3510C Analyzed By: MNPrepared By: MN

		$\operatorname{RL}$		•	
Parameter	Flag	Result	Units	Dilution	RL
Naphthalene		< 0.000183	mg/L	0.913	0.000200
2-Methylnaphthalene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
1-Methylnaphthalene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Acenaphthylene		< 0.000183	${ m mg/L}$	0.913	0.000200
Acenaphthene		< 0.000183	${ m mg/L}$	0.913	0.000200
Dibenzofuran		< 0.000183	${ m mg/L}$	0.913	0.000200
Fluorene		< 0.000183	m mg/L	0.913	0.000200
Anthracene		< 0.000183	${ m mg/L}$	0.913	0.000200
Phenanthrene		< 0.000183	${ m mg/L}$	0.913	0.000200
Fluoranthene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Pyrene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Benzo(a)anthracene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Chrysene		< 0.000183	m mg/L	0.913	0.000200
Benzo(b)fluoranthene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Benzo(k)fluoranthene ·		< 0.000183	m mg/L	0.913	0.000200
Benzo(a)pyrene		< 0.000183	${ m mg/L}$	0.913	0.000200

<sup>&</sup>lt;sup>1</sup>High surrogate recovery. Sample non-detect, result bias high. ·

 $continued \dots$ 

Report Date: March 24, 2011 TNM 97-04 Work Order: 11032107 TNM 97-04 Townsend

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sample 261152 continued . . .

		RL			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\mathrm{RL}$
Indeno(1,2,3-cd)pyrene		< 0.000183	$\mathrm{mg/L}$	0.913	0.000200
Dibenzo(a,h)anthracene		< 0.000183	${ m mg/L}$	0.913	0.000200
Benzo(g,h,i)perylene		< 0.000183	${ m mg/L}$	0.913	0.000200

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		0.0319	mg/L	0.913	0.0800	40	10 - 111
2-Fluorobiphenyl		0.0354	${ m mg/L}$	0.913	0.0800	44	10 - 92.7
Terphenyl-d14		0.0464	${ m mg/L}$	0.913	0.0800	58	35.9 - 107

Method Blank (1) QC Batch: 79654

QC Batch: 79654 Date Analyzed: 2011-03-21 Analyzed By: ME Prep Batch: 67576 QC Preparation: 2011-03-21 Prepared By: ME

		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Benzene		< 0.000400	mg/L	0.001
Toluene		< 0.000300	${ m mg/L}$	0.001
Ethylbenzene		< 0.000300	${ m mg/L}$	0.001
Xylene		< 0.000333	${ m mg/L}$	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0916	mg/L	1	0.100	92	70.2 - 118
4-Bromofluorobenzene (4-BFB)		0.109	mg/L	1	0.100	109	47.3 - 116

Method Blank (1) QC Batch: 79704

QC Batch: 79704 Date Analyzed: 2011-03-23 Analyzed By: MN Prep Batch: 67618 QC Preparation: 2011-03-22 Prepared By: MN

		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	$\operatorname{RL}$
Naphthalene		< 0.0000784	mg/L	0.0002
2-Methylnaphthalene		< 0.0000747	m mg/L	0.0002
1-Methylnaphthalene		< 0.0000575	m mg/L	0.0002
Acenaphthylene		< 0.0000963	m mg/L	0.0002
Acenaphthene		< 0.0000617	${ m mg/L}$	0.0002
Dibenzofuran		< 0.0000952	${ m mg/L}$	0.0002

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Work Order: 11032107 TNM 97-04 Townsend

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method blank	: continued		
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		$\mathrm{MDL}$		
Parameter	Flag	Result	Units	RL
Fluorene		< 0.000134	m mg/L	0.0002
Anthracene		< 0.000441	$\mathrm{mg/L}$	0.0002
Phenanthrene		< 0.000435	$\mathrm{mg/L}$	0.0002
Fluoranthene		< 0.000476	$\mathrm{mg/L}$	0.0002
Pyrene		< 0.000590	$\mathrm{mg/L}$	0.0002
Benzo(a)anthracene		< 0.000118	${ m mg/L}$	0.0002
Chrysene		< 0.0000766	$\mathrm{mg/L}$	0.0002
Benzo(b)fluoranthene		< 0.000146	$\mathrm{mg/L}$	0.0002
Benzo(k)fluoranthene		< 0.000141	$\mathrm{mg/L}$	0.0002
Benzo(a)pyrene		< 0.000132	$\mathrm{mg/L}$	0.0002
Indeno $(1,2,3\text{-cd})$ pyrene		< 0.0000702	${ m mg/L}$	0.0002
Dibenzo(a,h)anthracene		< 0.0000534	mg/L	0.0002
Benzo(g,h,i)perylene		< 0.0000473	${ m mg/L}$	0.0002

				•	Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	Result	Units	Dilution	Amount	Recovery	Limits
Nitrobenzene-d5		0.0199	$_{ m mg/L}$	1	0.0800	25	10 - 111
2-Fluorobiphenyl		0.0207	mg/L	1	0.0800	26	10 - 92.7
Terphenyl-d14		0.0378	${ m mg/L}$	1	0.0800	47	35.9 - 107

#### Laboratory Control Spike (LCS-1)

QC Batch:

79654 Prep Batch: 67576 Date Analyzed: QC Preparation: 2011-03-21

2011-03-21

Analyzed By: ME Prepared By: ME

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Benzene	0.0925	mg/L	1	0.100	< 0.000400	92	76.8 - 110
Toluene	0.0997	mg/L	1	0.100	< 0.000300	100	81 - 108
Ethylbenzene	. 0.112	$\mathrm{mg}/\mathrm{L}$	1	0.100	< 0.000300	112	78.8 - 118
Xylene	0.340	$\mathrm{mg/L}$	1	0.300	< 0.000333	113	80.3 - 119

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Benzene	0.0979	mg/L	1	0.100	< 0.000400	98	76.8 - 110	6	20.
Toluene	0.106	mg/L	1	0.100	< 0.000300	106	81 - 108	6	20
Ethylbenzene	0.116	mg/L	1	0.100	< 0.000300	116	78.8 - 118	4	20
Xylene	0.358	$\mathrm{mg/L}$	1	0.300	< 0.000333	119	80.3 - 119	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

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Work Order: 11032107 TNM 97-04 Townsend

Page Number: 7 of 10 Lovington, NM

Common de	LCS	LCSD	T1:4	Dil	Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	${f Limit}$
Trifluorotoluene (TFT)	0.0974	0.0863	m mg/L	1	0.100	97	86	66.6 - 114
4-Bromofluorobenzene (4-BFB)	0.122	0.109	mg/L	1	0.100	122	109	68.2 - 124

#### Laboratory Control Spike (LCS-1)

QC Batch:

79704

Date Analyzed:

2011-03-23

0.0800

Analyzed By: MN

Prepared By: MN

45.1 - 115

46

< 0.0000473

Prep Batch: 67618

Benzo(g,h,i)perylene

QC Preparation: 2011-03-22

LCS Spike Matrix Rec. Param Result Units Dil. Result Limit Amount Rec. Naphthalene 0.0317 mg/L 0.0800 < 0.0000784 40 32.2 - 80.3 2-Methylnaphthalene 0.0353 mg/L 1 0.0800 < 0.0000747 44 34.8 - 871-Methylnaphthalene 0.0333 mg/L 1 0.0800 < 0.0000575 42 36.9 - 89.6 Acenaphthylene 0.0411 mg/L 1 0.0800 < 0.0000963 51 35 - 93.2Acenaphthene 0.0395mg/L 49 35.8 - 92.91 0.0800< 0.0000617 Dibenzofuran 0.0361mg/L 1 0.0800< 0.0000952 45 35.3 - 85.1Fluorene 0.0521mg/L 1 0.0800 < 0.000134 65 43.4 - 101 Anthracene 0.0436 54 44.8 - 92.4 mg/L 1 0.0800 < 0.000441 0.0512 64 Phenanthrene mg/L 1 0.0800 < 0.000435 44 - 93.7Fluoranthene 0.0633 mg/L 1 0.0800 < 0.000476 79 52.7 - 104  $\rm mg/L$ Pyrene 0.0696 87 42.2 - 93.81 0.0800 < 0.000590 78 Benzo(a)anthracene 0.062640.4 - 91.9 mg/L 1 0.0800 < 0.000118 0.0905 44.4 - 107 Chrysene mg/L 1 0.0800< 0.0000766 113 Benzo(b)fluoranthene 0.0350 mg/L 0.0800 < 0.000146 44 34.8 - 105Benzo(k)fluoranthene 0.0533 mg/L 0.0800 < 0.000141 67 50.2 - 1581 Benzo(a)pyrene 0.0453 57 51.3 - 151 mg/L 1 0.0800 < 0.000132 Indeno(1,2,3-cd)pyrene 0.0430 mg/L 1 0.0800 < 0.0000702 54 43.2 - 115Dibenzo(a,h)anthracene 0.0476 43.9 - 115 mg/L 0.080060 1 < 0.0000534

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

mg/L

0.0369

	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Naphthalene	0.0361	mg/L	1	0.0800	< 0.0000784	45	32.2 - 80.3	13	20
2-Methylnaphthalene	0.0398	mg/L	1	0.0800	< 0.0000747	50	34.8 - 87	12	20
1-Methylnaphthalene	0.0380	mg/L	1	0.0800	< 0.0000575	48	36.9 - 89.6	13	20
Acenaphthylene	0.0459	mg/L	1	0.0800	< 0.0000963	57	35 - 93.2	11	20
Acenaphthene	0.0447	mg/L	1	0.0800	< 0.0000617	56	35.8 - 92.9	12	20
Dibenzofuran	0.0405	mg/L	1	0.0800	< 0.0000952	51	35.3 - 85.1	12	20
Fluorene	0.0582	mg/L	1	0.0800	< 0.000134	73	43.4 - 101	11	20
Anthracene	0.0505	mg/L	1	0.0800	< 0.000441	63	44.8 - 92.4	15	20
Phenanthrene	0.0599	mg/L	1	0.0800	< 0.000435	75	44 - 93.7	16	20

1

 $continued \dots$ 

<sup>&</sup>lt;sup>2</sup>Spike analyte out of control limits. Results biased high. •

Report Date: March 24, 2011 TNM 97-04 Work Order: 11032107 TNM 97-04 Townsend Page Number: 8 of 10 Lovington, NM

control spikes continued										
·		LCSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Fluoranthene		0.0744	mg/L	1	0.0800	< 0.000476	93	52.7 - 104	16	20
Pyrene	3	0.0774	${ m mg/L}$	1	0.0800	< 0.000590	97	42.2 - 93.8	11	20
Benzo(a)anthracene		0.0710	mg/L	1	0.0800	< 0.000118	89	40.4 - 91.9	13	20
Chrysene	4	0.0916	mg/L	1	0.0800	< 0.0000766	114	44.4 - 107	1	20
Benzo(b)fluoranthene		0.0363	mg/L	1	0.0800	< 0.000146	45	34.8 - 105	4	20
Benzo(k)fluoranthene		0.0585	mg/L	1	0.0800	< 0.000141	73	50.2 - 158	9	20
Benzo(a)pyrene		0.0447	mg/L	1	0.0800	< 0.000132	56	51.3 - 151	1	20
Indeno(1,2,3-cd)pyrene		0.0488	mg/L	1	0.0800	< 0.0000702	61	43.2 - 115	13	20
Dibenzo(a,h)anthracene		0.0555	mg/L	1	0.0800	< 0.0000534	69	43.9 - 115	15	20
Benzo(g,h,i)perylene		0.0430	$\mathrm{mg/L}$	1	0.0800	< 0.0000473	54	45.1 - 115	15 ·	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Nitrobenzene-d5	0.0300	0.0330	mg/L	1	0.0800	38	41	10 - 111
2-Fluorobiphenyl	0.0369	0.0413	${ m mg/L}$	1	0.0800	46	52	10 - 92.7
Terphenyl-d14	0.0720	0.0806	${ m mg/L}$	1	0.0800	90	101	35.9 - 107

Matrix Spike (MS-1) Spiked Sample: 260125

QC Batch: 79654 Prep Batch: 67576 Date Analyzed: 2011-03-21 QC Preparation: 2011-03-21 Analyzed By: ME Prepared By: ME

Param	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	11.0	mg/L	50	5.00	5.7675	105	77.9 - 114
Toluene	5.15	$_{ m mg/L}$	50	5.00	< 0.0150	103	78.3 - 111
Ethylbenzene	6.20	m mg/L	50	5.00	0.7803	108	75.3 - 110
Xylene	17.1	mg/L	50	15.0	0.9691	108	75.7 - 109

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		MSD			Spike	Matrix		Rec.		RPD
Param		Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$	RPD	Limit
Benzene		11.2	mg/L	50	5.00	5.7675	109	77.9 - 114	2	20
Toluene		5.27	mg/L	50	5.00	< 0.0150	105	78.3 - 111	2	20
Ethylbenzene		6.28	mg/L	50	5.00	0.7803	110	75.3 - 110	1	20
Xylene	5	17.4	mg/L	50	15.0	0.9691	110	75.7 - 109	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

<sup>&</sup>lt;sup>3</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>4</sup>Spike analyte out of control limits. Results biased high. •

<sup>&</sup>lt;sup>5</sup>MSD analyte out of range. MS/MSD has a RPD within limits. Therfore, MS shows extraction occured properly.

TNM 97-04

Work Order: 11032107 TNM 97-04 Townsend Page Number: 9 of 10 Lovington, NM

Surrogate	MS . Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT) 4-Bromofluorobenzene (4-BFB)	4.96	5.00	mg/L	50	5	99	100	68.3 - 107
	5.91	5.91	mg/L	50	5	118	118	60.1 - 135

#### Standard (CCV-1)

QC Batch: 79654

Date Analyzed: 2011-03-21

Analyzed By: ME

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0989	99	80 - 120	2011-03-21
Toluene		${ m mg/L}$	0.100	0.105	105	80 - 120	2011-03-21
Ethylbenzene		$_{ m mg/L}$	0.100	0.118	118	80 - 120	2011-03-21
Xylene		$\mathrm{mg/L}$	0.300	0.359	120	80 - 120	2011-03-21

#### Standard (CCV-2)

QC Batch: 79654

Date Analyzed: 2011-03-21

Analyzed By: ME

		•	CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		mg/L	0.100	0.0898	90	80 - 120	2011-03-21
Toluene		$\mathrm{mg/L}$	0.100	0.0960	96	80 - 120	2011-03-21
Ethylbenzene		${ m mg/L}$	0.100	0.106	106	80 - 120	2011-03-21
Xylene		${ m mg/L}$	0.300	0.322	107	80 - 120	2011-03-21

#### Standard (CCV-1)

QC Batch: 79704

Date Analyzed: 2011-03-23

Analyzed By: MN

			CCVs	$\mathrm{CCVs}$	CCVs	Percent	
			True .	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Units .	Conc.	Conc.	Recovery	Limits	Analyzed
Naphthalene		mg/L	60.0	52.4	87	80 - 120	2011-03-23
2-Methylnaphthalene		${ m mg/L}$	60.0	61.4	102	80 - 120	2011-03-23
1-Methylnaphthalene		$_{ m mg/L}$	60.0	55.2	92	80 - 120	2011-03-23
Acenaphthylene		$_{ m mg/L}$	60.0	55.3	92	80 - 120	2011-03-23
Acenaphthene		${ m mg/L}$	60.0	53.8	90	80 - 120	2011-03-23
Dibenzofuran		mg/L	60.0	65.0	108	80 - 120	2011-03-23
Fluorene		$\mathrm{mg/L}$	60.0	63.2	105	80 - 120	2011-03-23
Anthracene		mg/L	60.0	54.0	90	80 - 120	2011-03-23
Phenanthrene		mg/L	60.0	59.1	98	80 - 120	2011-03-23

Report Date: March 24, 2011 TNM 97-04

Work Order: 11032107 TNM 97-04 Townsend

Page Number: 10 of 10 Lovington, NM

			$\mathrm{CCVs}$	$\mathrm{CCVs}$	$\mathrm{CCVs}$	Percent	
			True	Found	Percent	Recovery	$_{ m Date}$
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Fluoranthene		mg/L	60.0	69.4	116	80 - 120	2011-03-23
Pyrene		${ m mg/L}$	60.0	69.0	115	80 - 120	2011-03-23
Benzo(a)anthracene		${ m mg/L}$	60.0	58.2	97	80 - 120	2011-03-23
Chrysene		${ m mg/L}$	60.0	56.4	94	80 - 120	2011-03-23
Benzo(b)fluoranthene		${ m mg/L}$	60.0	52.4	87	80 - 120	2011-03-23
Benzo(k)fluoranthene		mg/L	60.0	68.2	114	80 - 120	2011-03-23
Benzo(a)pyrene		$_{ m mg/L}$	60.0	61.3	102	80 - 120	2011-03-23
Indeno(1,2,3-cd)pyrene		${ m mg/L}$	60.0	53.1	88	80 - 120	2011-03-23
Dibenzo(a,h)anthracene		mg/L	60.0	53.9	90	80 - 120	2011-03-23
Benzo(g,h,i)perylene		mg/L	60.0	49.4	82	80 - 120	2011-03-23

					$\operatorname{Spike}$	Percent	Recovery
Surrogate	Flag	Result	Units	Dilution	Amount	Recovery	$_{ m Limit}$
Nitrobenzene-d5		53.1	mg/L	1	60.0	88	80 - 120
2-Fluorobiphenyl		54.3	${ m mg/L}$	1	60.0	90	80 - 120
Terphenyl-d14		68.8	$\mathrm{mg/L}$	1	60.0	115	80 - 120

11032107 LAB Order ID #\_ TraceAnalysis, Inc.

email: lab@traceanalysis.com

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 794.24 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1296

5002 Basin Street, Suite A1 Midland, Texas 79703 Tel (432) 689-6301 Fax (432) 689-6313

200 East Sunset Rd., Suite E El Paso, Texas 79922 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443

BioAquatic Testing 2501 Mayes Rd., Ste 100 **Carrollton, Texas 75006** Tel (972) 242-7750

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