TETRA TECH, INC.

1910 N. Big Spring St.
Midland, Texas 79705
432-686-8081

October 6, 2009

Mr. Larry Johnson
New Mexico Oil Conservation Division
1625 N. French Dr.
Hobbs, NM 88240

Ms. Trisha Bad Bear
US Bureau of Land Management
414 West Taylor
Hobbs, NM 88240

RE: MCA 2A Header Fiberglass Trunk Line
Lea County, New Mexico
Unit G, Sec. 29, T17S, R32E
1RP 2223

Dear Mr. Gates and Ms. Bad Bear:

Tetra Tech is pleased to submit this findings report for the subsurface investigation performed July 23, 2009 at ConocoPhillips' MCA 2A Header 3-inch Trunk Line oil/produced water release site (Site). This work is in support of ConocoPhillips' efforts to remediate soil affected by a recent 1 barrel crude oil and 21 barrel produced water release reported to the New Mexico Oil Conservation Division (NMOCD; C141 attached). The Site is located below the Mescalero Ridge, approximately 1.4 miles southwest of the ConocoPhillips MCA Unit office in Lea County, New Mexico (32.807717°N, 103.784688°W). The U.S. Bureau of Land Management (USBLM) is the land administrator.

The Site is located in the Querecho Plains of eastern New Mexico. This area generally consists of a thin cover of Quaternary sand dunes overlying the undivided Triassic Upper Chinle Group[1]. The Pyote series soil at the Site is well drained, non-calcareous fine sands.[2]

The Site is heavily populated with oil field pipelines. Observations made by Tetra Tech during an initial site overview revealed that there are at least 4 pipelines running through the site, two steel 4-inch, and one 2-inch diameter steel pipelines, and one 3-inch diameter fiberglass produced water trunk line.

Exposure Pathway Analysis

Depth to water in the vicinity of the Site is estimated to be approximately 76 feet below ground surface (fbgs). This interpretation is based information gathered at monitoring well MW-20 that is described in ConocoPhillips' remediation project entitled "*Maljamar Gas Plant GW-020*" (log attached). The monitoring well is located approximately 2,160 feet northeast of the Site. The nearest playa is approximately 0.4 miles southeast of the Site.

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[1] U.S. Department of Agriculture, Natural Resources Conservation Services. Web Soil Survey Database.
[2] Turner, M.T., D.N. Cox, B.C Mickelson, A.J. Roath, and C.D Wilson, 1973. Soil Survey Lea County, New Mexico. U.S. Depart of Agr Soil Conser Ser, 89p.

Following the ranking criteria presented in "*Guidelines for Remediation of Leaks, Spills, and Releases*" promulgated on August 13, 1993 by the NMOCD, this Site has the following score:

Criteria		Ranking Score
Depth to groundwater	50 - 99 feet	10
Distance from water source	>1,000 feet	0
Distance from domestic water source	>200 feet	0
Distance from surface water body	>1,000 feet	0
Total Ranking Score		10

The remediation action level for a ranking score of 10-19 is 10 parts per million (ppm) for benzene, 50 ppm for total benzene, toluene, ethylbenzene, and total xylenes (BTEX), and 1,000 ppm for total petroleum hydrocarbons (TPH).

Scope of Work

The lateral extent of the release area is defined by soil discoloration (Figure 2 and 2B). To delineate the vertical extent of the crude oil / produced water affected area, Tetra Tech used a hand auger in the affected area to describe vertical environmental conditions. Soil samples were collected every two feet in each boring.

Fourteen soil samples were collected from five borings and submitted to a laboratory for analyses. The samples were placed into glass sample jars, sealed with Teflon-lined lids, and placed on ice for transportation to an analytical laboratory where they were analyzed for diesel and gasoline range TPH (TPH_{DRO} and TPH_{GRO}, Method 8015), BTEX (Method 8021), and chloride (Method 300). These analyses were used to confirm clean vertical boundaries have been identified.

Excavated soil was returned to the affected area for handling during site remediation.

Findings

Soil encountered at the Site was moist reddish yellow medium to very fine grained loose silty sands from the surface to varying depths. The dune sands overly red sandy clay interbedded with caliche.

The affected areas in a sand dune area west of ConocoPhillips' MCA Well #308 were approximately:

- Area A – 50 x 26 feet,
- Area B – 10 x 6 feet,
- Area C – 35 x 15 feet, and
- Overspray Area – 66 x 33 feet.

TPH and BTEX laboratory analyses for this investigative event are presented in Table 1 and Appendix. TPH and BTEX concentrations in all borings were below NMOCD remedial guideline levels at all depths. BTEX was not detected in any of the soil samples.

Table 1
ConocoPhillips
MCA 2A Header
Lea County, NM
23-Jul-09

Sample		Laboratory Analyses (mg/Kg)							
		TPH		Benzene	Ethyl-benzene	Toluene	Xylenes Total	Total BTEX	Chloride
Location	Depth (ft)	GRO	DRO						
AH-1	0-1.5	ND	64	ND	ND	ND	ND	ND	1930
	2-3.5	ND	ND	ND	ND	ND	ND	ND	3500
	4-5.5	ND	ND	ND	ND	ND	ND	ND	2020
AH-2	0-1.5	0.13	160	ND	ND	ND	ND	ND	1020
	2-3.5	ND	ND	ND	ND	ND	ND	ND	2370
	4-5.5	ND	ND	ND	ND	ND	ND	ND	3470
AH-3	0-1.5	ND	17	ND	ND	ND	ND	ND	1060
	2-3.5	ND	ND	ND	ND	ND	ND	ND	929
	4-5.5	ND	ND	ND	ND	ND	ND	ND	14.6
AH-4	0-1.5	0.45	140	ND	ND	ND	ND	ND	91.7
	2-3.5	ND	11	ND	ND	ND	ND	ND	5350
	4-5.5	ND	6.6	ND	ND	ND	ND	ND	ND
AH-5	0-1								436
AH-6	0-1								271

TPH = Total petroleum hydrocarbons
GRO = Gasoline range hydrocarbons
DRO = Diesel range hydrocarbons
ND = Not detected at or above laboratory level of detection
ft = feet below ground surface
mg/Kg = Milligrams per kilogram
blank = No data
AH = Hand auger

Chloride concentrations were present in all hand auger boring locations and ranged from non-detect to 5,350 milligrams per kilogram (Table 1). With exception of AH-2, chloride attenuated with depth.

Conclusions

According to laboratory analysis of soils collected during this investigation, TPH and BTEX were either not detected or were reported at low concentrations in all samples. Exposure pathway analysis indicated a ranking score of "10." Therefore, the site-specific remediation levels are 1,000 mg/kg for TPH, 50 mg/kg for BTEX and 10 mg/kg for benzene. Based on laboratory analyses presented in Table 1, the impacts to soil are below the NMOCD action level for both TPH and BTEX in all affected areas.

Laboratory analyses indicate the produced water penetrated and migrated downward in the sandy soil and stayed generally within a swell located between the sand dunes (Figure 2).

Recommendations

Tetra Tech recommends the following actions be taken at the Site:

Tetra Tech proposes to excavate three areas (A, B, and C) affected by the produced water release. The overspray area will not be worked. At a minimum, the three areas will be excavated to a depth of 6 fbgs.

A trackhoe will be used to excavate the affected soil. A front-end loader will haul the material to nearby well pad #308 to load dump trucks. Individual soil samples will be collected in a "W" pattern, and composited for each sidewall and floor in the excavations, and field analyzed using chloride field titration to determine that remediation levels established by NMOCD have been achieved.

Soil samples will be collected and submitted to an analytical laboratory (Methods 300.0A) to confirm a clean excavation. The NMOCD will be notified 48 hours in advance of collection of confirmation samples to witness sample collection. Adjacent sand dune material will be used to partially backfilled the excavation. Natural wind erosion will re-sculpture the affected area and restore the sand dune lizard's, *Sceloporus arenicolus,* habitat. The USBLM approved seed mix will be applied to the rough graded surface.

Tetra Tech will supervise and direct all subcontractor activities, and prepare a report describing and documenting what was done at the Site, including a site map. This report on activities, laboratory results and recommendations will be submitted for USBLM and NMOCD review and ultimate approval for closure.

Project Approach

Mr. Charles Durrett will serve as the Project Manager and will have the authority to commit whatever resources are necessary to support the project team. It will be Mr. Durrett's responsibility to ensure that the Client's needs are met in terms of scope of work and schedule. Mr. Durrett is located in Tetra Tech's Midland, Texas office.

Project Schedule

Tetra Tech will commence work on this project immediately following BLM and NMOCD's approval of this work plan. Please contact me or Mr. John Gates (ConocoPhillips, 575-390-4821), if you have any questions or require additional information.

Sincerely,

Tetra Tech

Charles Durrett

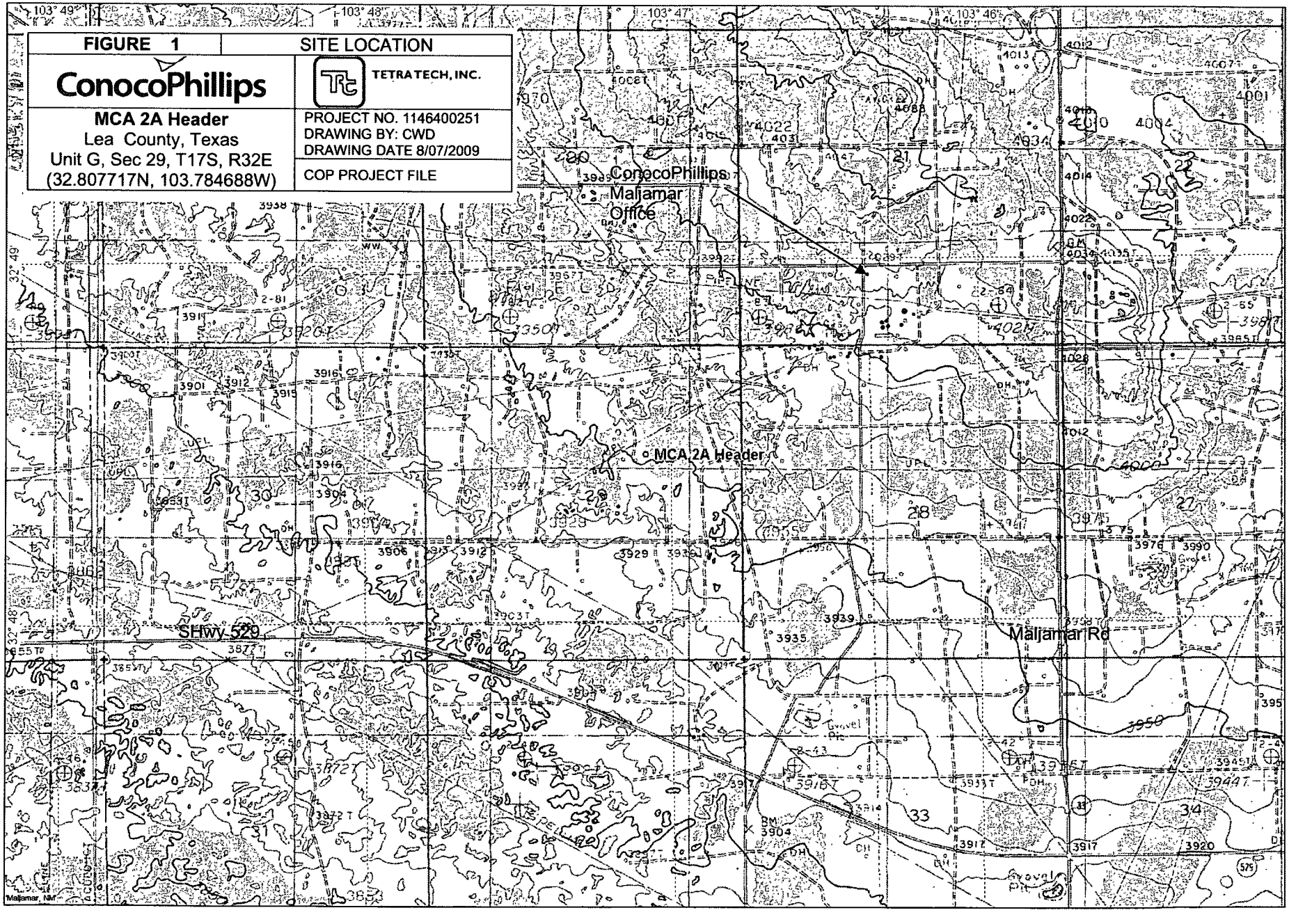
Digitally signed by Charles Durrett
DN cn=Charles Durrett, o=TETRA TECH, ou=Midland, TX, email=Charles.Durrett@TetraTech.com, c=US
Date: 2009.10.06 08:25:04 -05'00'

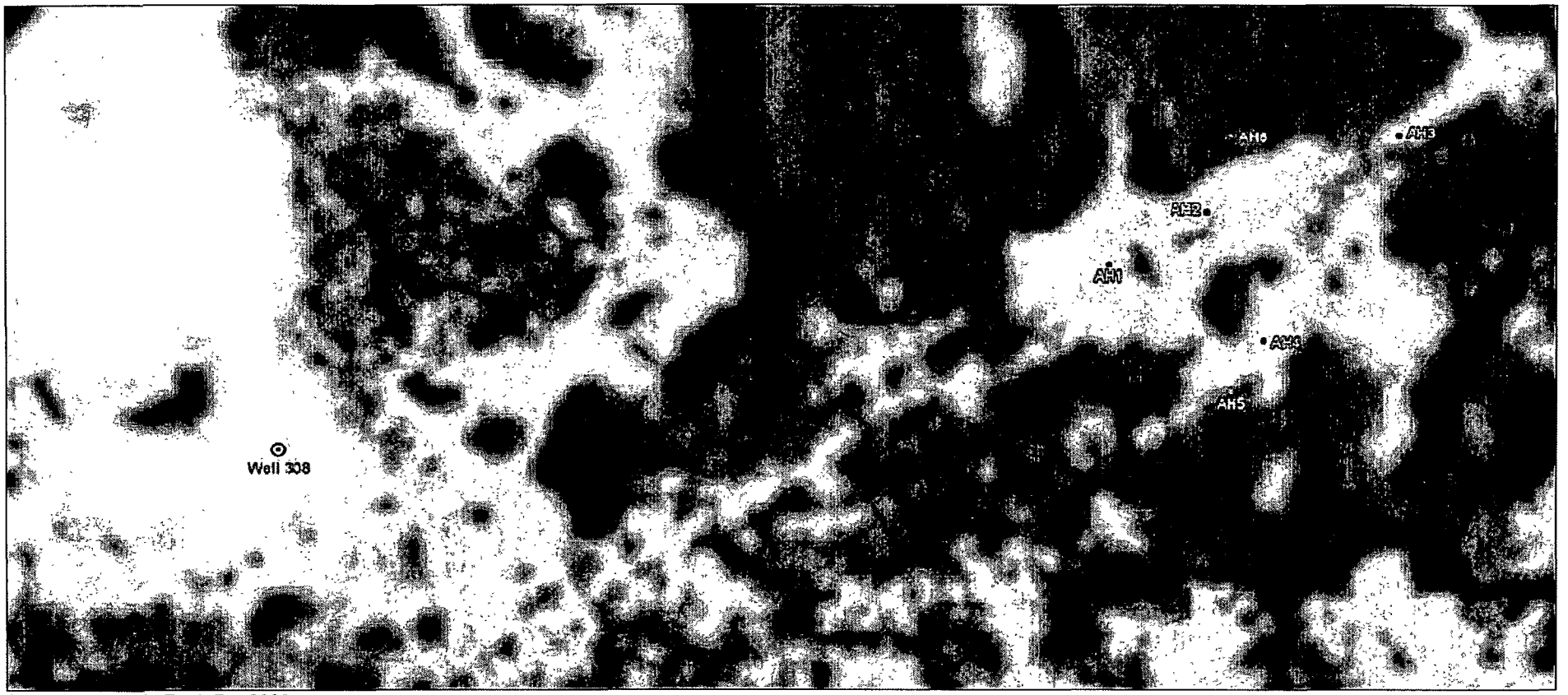
Charles Durrett
Sr. Project Manager

Attachment

Cc: John Gates, ConocoPhillips Company

FIGURE 1	SITE LOCATION
ConocoPhillips	TETRA TECH, INC.
MCA 2A Header Lea County, Texas Unit G, Sec 29, T17S, R32E (32.807717N, 103.784688W)	PROJECT NO. 1146400251 DRAWING BY: CWD DRAWING DATE 8/07/2009 COP PROJECT FILE





SOURCE: Google Earth Pro 2009

FIGURE 2	SAMPLING LOCATIONS
ConocoPhillips	TETRA TECH, INC.
MCA 2A Header Lea County, Texas Unit G, Sec 29, T17S, R32E	PROJECT NO. 1146400251 DRAWING BY: CWD DRAWING DATE 8/07/2009 COP PROJECT FILE

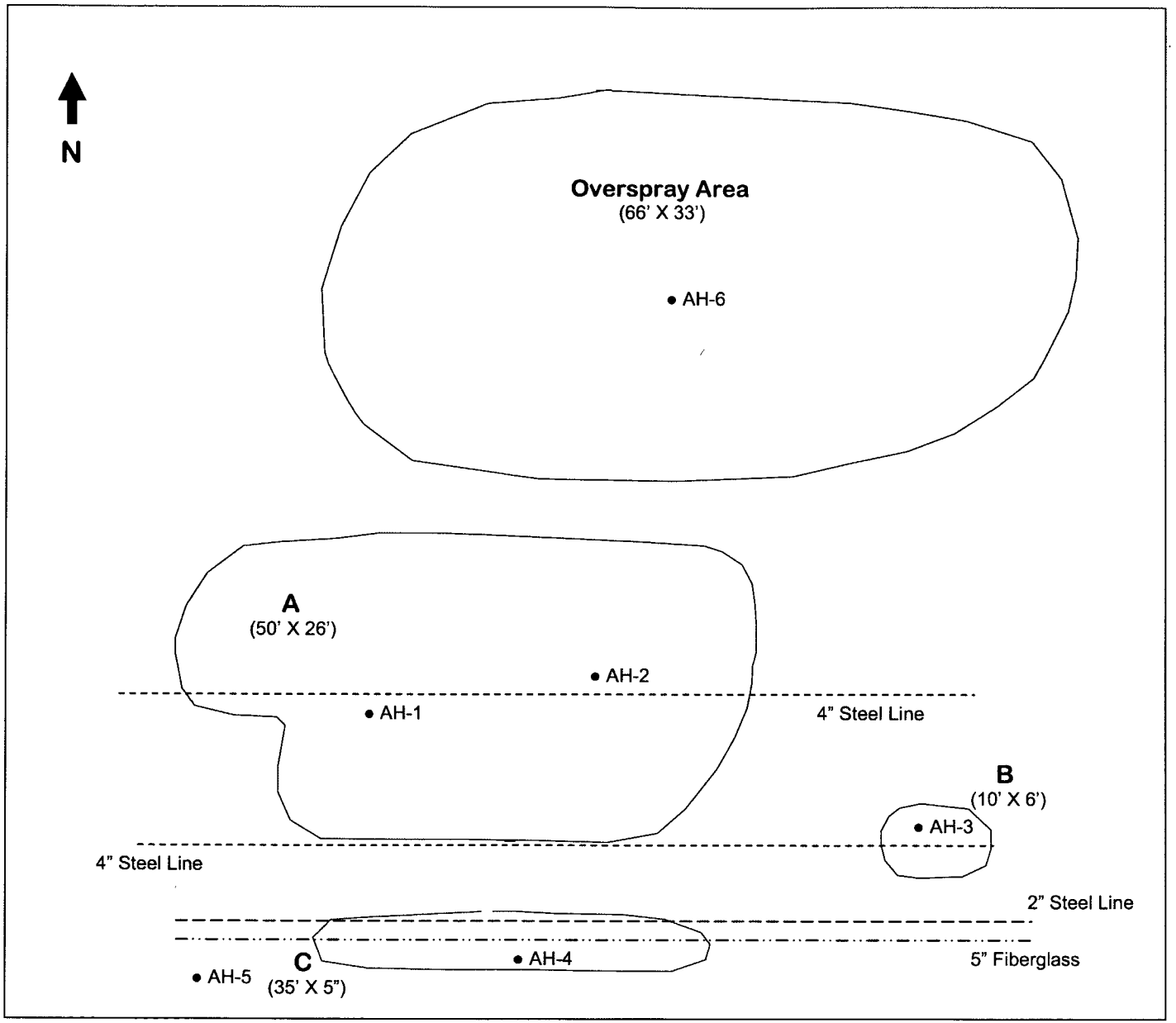


FIGURE 2B
SAMPLING LOCATIONS

ConocoPhillips

MCA 2A Header
Lea County, Texas
Unit G, Sec 29, T17S, R32E

TETRA TECH, INC.

PROJECT NO. 1146400251
DRAWING BY: CWD
DRAWING DATE 9/04/2009

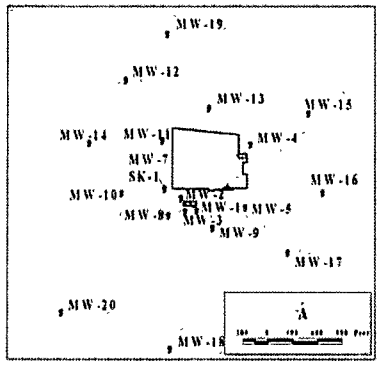
COP PROJECT FILE

PROJECT NAME: Maxim #2690032
LOCATION: Maljamar Gas Plant, Lea County

MONITORING WELL NO. MW-20
FIELD LOGGED BY: F. Lichnovsky
ELEVATION: GROUND SURFACE (msl): 3975.42 (ft)
GROUNDWATER ELEVATION (msl): 3899.92 (ft)
DRILL TYPE: Truck Mounted Air Rotary

BORE HOLE DIAMETER: 5 (in)
DRILLED BY: Scarborough Drilling
DATE/TIME: HOLE STARTED: 9/18/02
DATE/TIME: COMPLETED: 9/19/02
REMARKS: bgs=Below Ground Surface
ND=Not Detected, NS=No Sample
msl=mean sea level
FOG-First occurrence of groundwater
SWL-Static Water Level

LOCATION MAP



WELL COMPLETION INFORMATION

Measuring Point Description (msl): Top of Casing
Measuring Point Elevation (msl): 3976.92
Static Water Level (feet below Top of Casing): 77
Well Development: Water Extraction Until Visibly Free of Sediment
Well Cap: Locking Cap

Type of Casing: PVC
Casing Diameter: 2 in.
Slot Size: 0.010 in

ELEVATION (msl) - ft	SAMPLE INTERVAL/ID #	COMPLETION DIAGRAM	CLASSIFICATION AND DESCRIPTION	USCS SYMBOL	BLOW COUNT	ANALYTICAL	TIME	% RECOVERY	PID RESULT (ppm)	DEPTH (bgs) - ft
3975.0	1	GROUTED ANNULUS	SAND, red	SP					0.6	0
3970.0	2		Shale, red						2.2	5
3965.0	3		Caliche, white						4.2	10
3960.0	4		SAND, light red	SP					2.5	15
3955.0	5								2.1	20
3950.0	6								1.9	25
3945.0	7		Shale, red						2.2	30
3940.0	8								2.4	35
3935.0										40

Boring Terminated at 120' bgs

Bulk Sampling

2690032	MAXIM TECHNOLOGIES INC	EXPLORATORY BORING LOG	MW-20

PROJECT NAME: Maxim #2690032
LOCATION: Maljamar Gas Plant, Lea County

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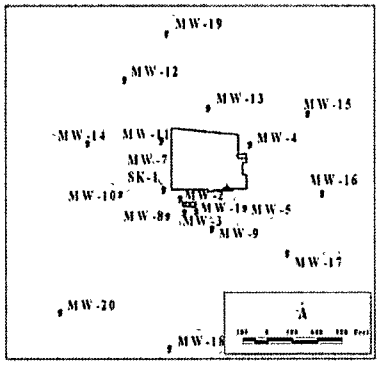

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3930.0	9		Shale, gray						2.0	45
3925.0	10								2.8	50
3920.0	11								2.4	55
3915.0	12		Shale, gray, with light yellow sand						2.1	60
3910.0	13		Shale, light yellow						3.1	65
3905.0	14		Shale, light yellowish-green, sand, yellow						2.6	70
3900.0	15	BENTONITE SEAL	Shale, gray to grayish-green						3.2	75
3895.0	16	9/17/02 SWL	Shale, grayish-green						1.5	80

Boring Terminated at 120' bgs

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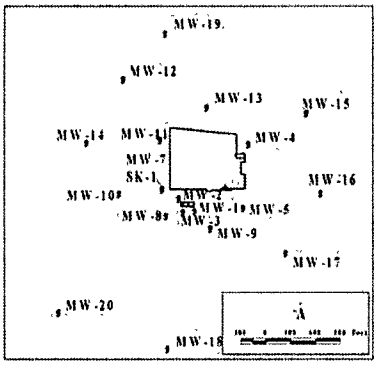

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3890.0	17	SAND PACK	Shale, gray, some thin layers of red shale						1.5	85
3885.0	18		Shale, red						1.4	90
3880.0	19								2.7	95
3875.0	20								1.7	100
3870.0	21		Shale, purplish-red						1.9	105
3865.0	22								1.7	110
3860.0	23								1.3	115
	24								0.9	120

Boring Terminated at 120' bgs

Bulk Sampling

2690032	MAXIM TECHNOLOGIES INC	EXPLORATORY BORING LOG	MW-20

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

RECEIVED
JUL 07 2009
HOBBSOCD

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

Form C-141
Revised October 10, 2003

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company: ConocoPhillips Company	Contact John W. Gates
Address 3300 North A St. Bldg 6, Midland, TX 79705-5406	Telephone No. 505.391.3158
Facility Name MCA 2A Header 3" Fiberglass Trunk Line	Facility Type Oil and Gas

Surface Owner Federal	Mineral Owner Federal	Lease No. LC-060199A

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
G	29	17S	32E					Lea

Latitude 32 48.461 **Longitude** 103 47.082

NATURE OF RELEASE

Type of Release **Crude Oil & Produced Water**	Volume of Release 22bbl (1oil, 21water)	Volume Recovered (0oil, 0water)
Source of Release **Hole in 3" Fiberglass Trunk Line**	Date and Hour of Occurrence	Date and Hour of Discovery
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? **Mark Whitaker**	
By Whom? Jesse Sosa	Date and Hour 7/4/09 0930	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

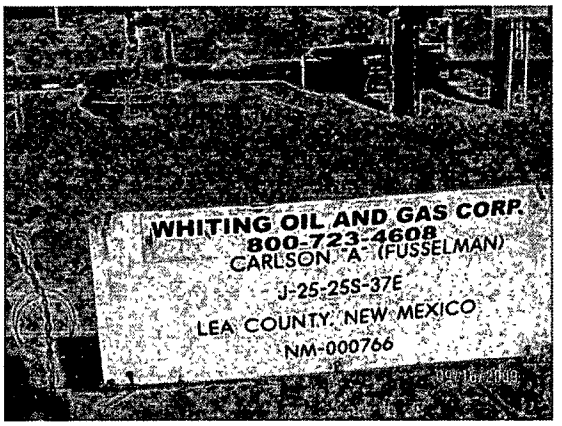
Describe Cause of Problem and Remedial Action Taken.*
3" Fiberglass Trunkline failed due to internal/external corrosion. Temporary repairs were made with a line clamp until failed section of line can be replaced

Describe Area Affected and Cleanup Action Taken.*
100' X 240' X 1" area of sandy pasture land with no livestock present. Spill site will be remediated in accordance with an agreement with NMOCD and BLM

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

Signature: [signature]	OIL CONSERVATION DIVISION
Printed Name: John W. Gates	Approved by ~~District Supervisor~~: ENV. ENGINEER [signature]
Title: HSER Lead	Approval Date: 07/08/09 Expiration Date: 09/08/09
E-mail Address: John.W.Gates@conocophillips.com	Conditions of Approval: DELINEATE TO CLEAN +1. SUBMIT FINAL C-141 BY Attached ☐
Date: 7/8/09 Phone: 505.391.3158	1RP-09-7-2223

- Attach Additional Sheets If Necessary



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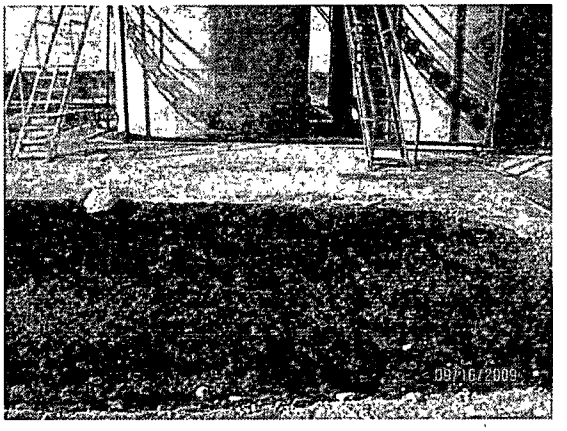

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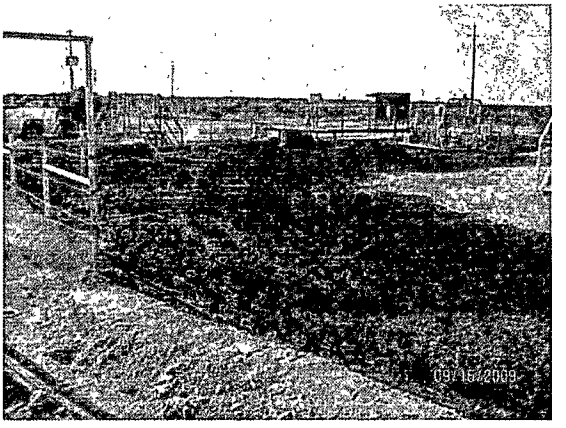

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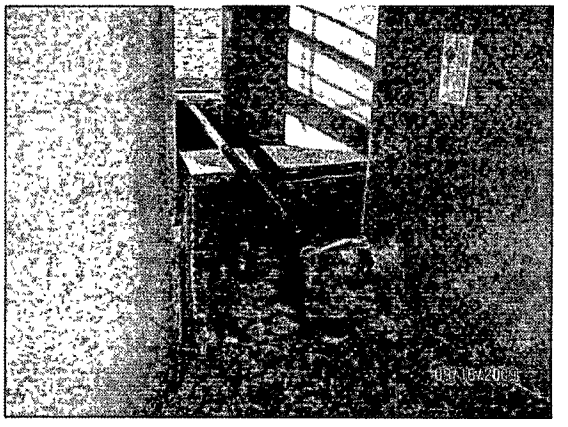

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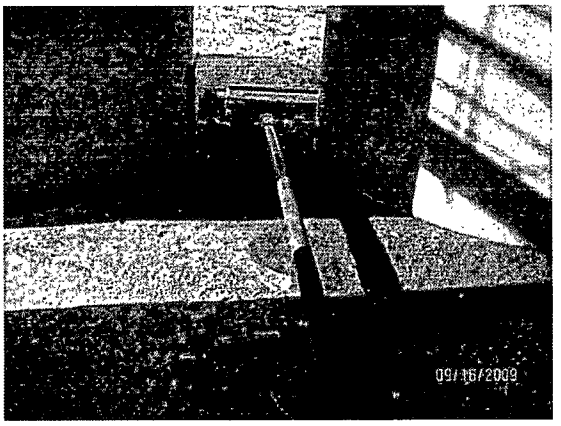

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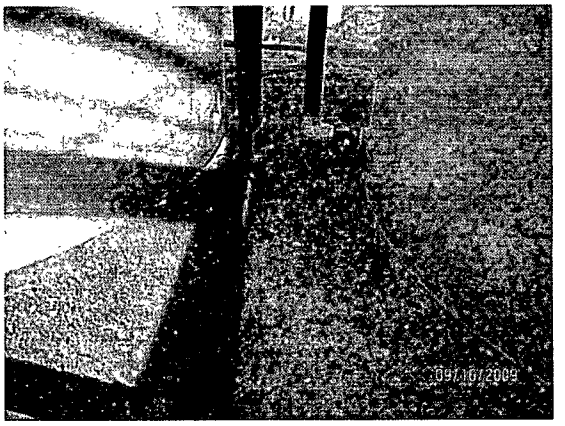

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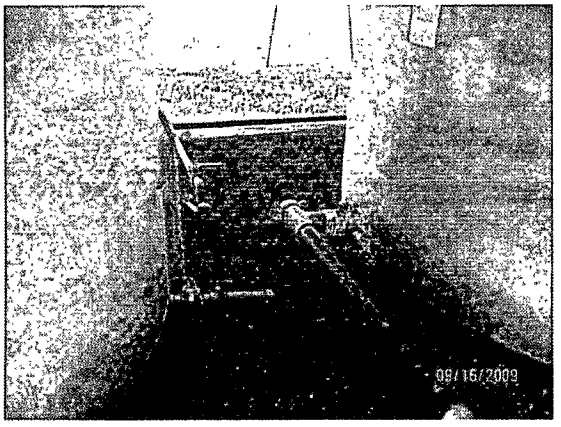

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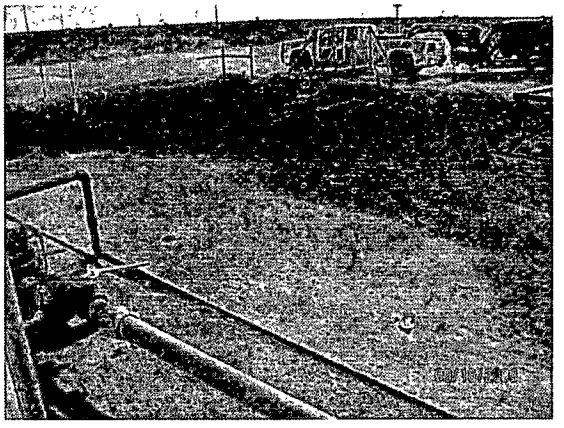

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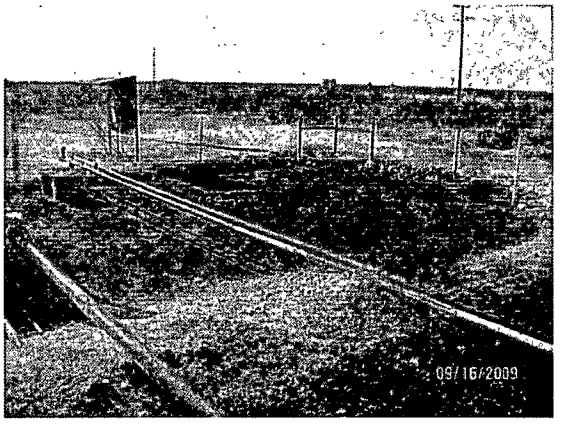

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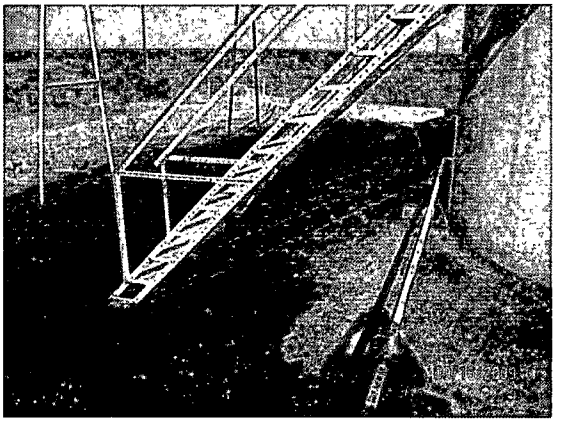

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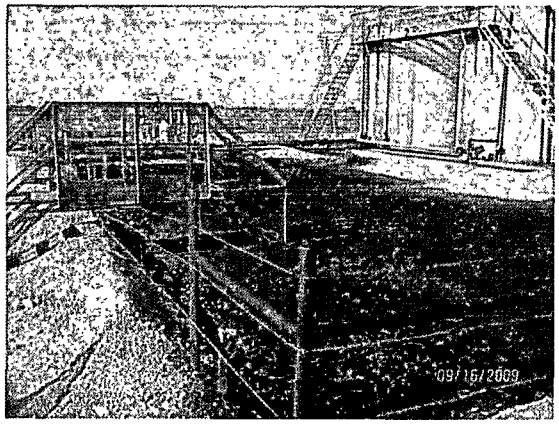

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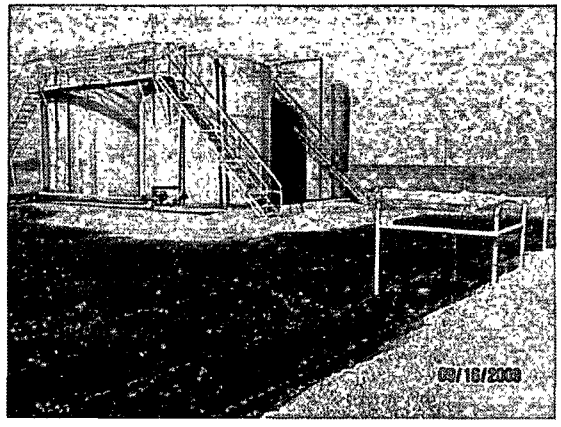

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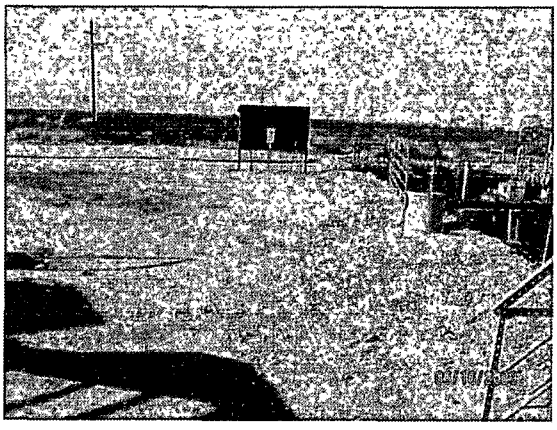
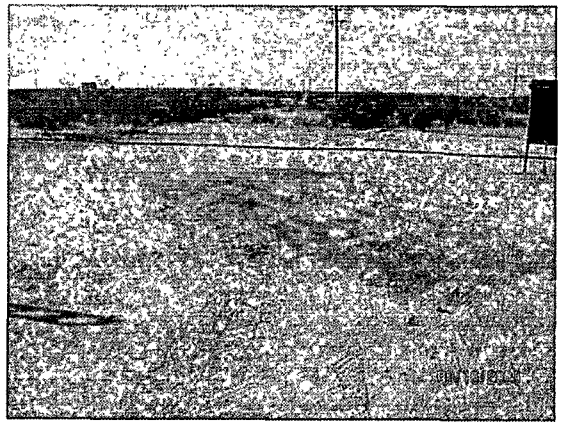
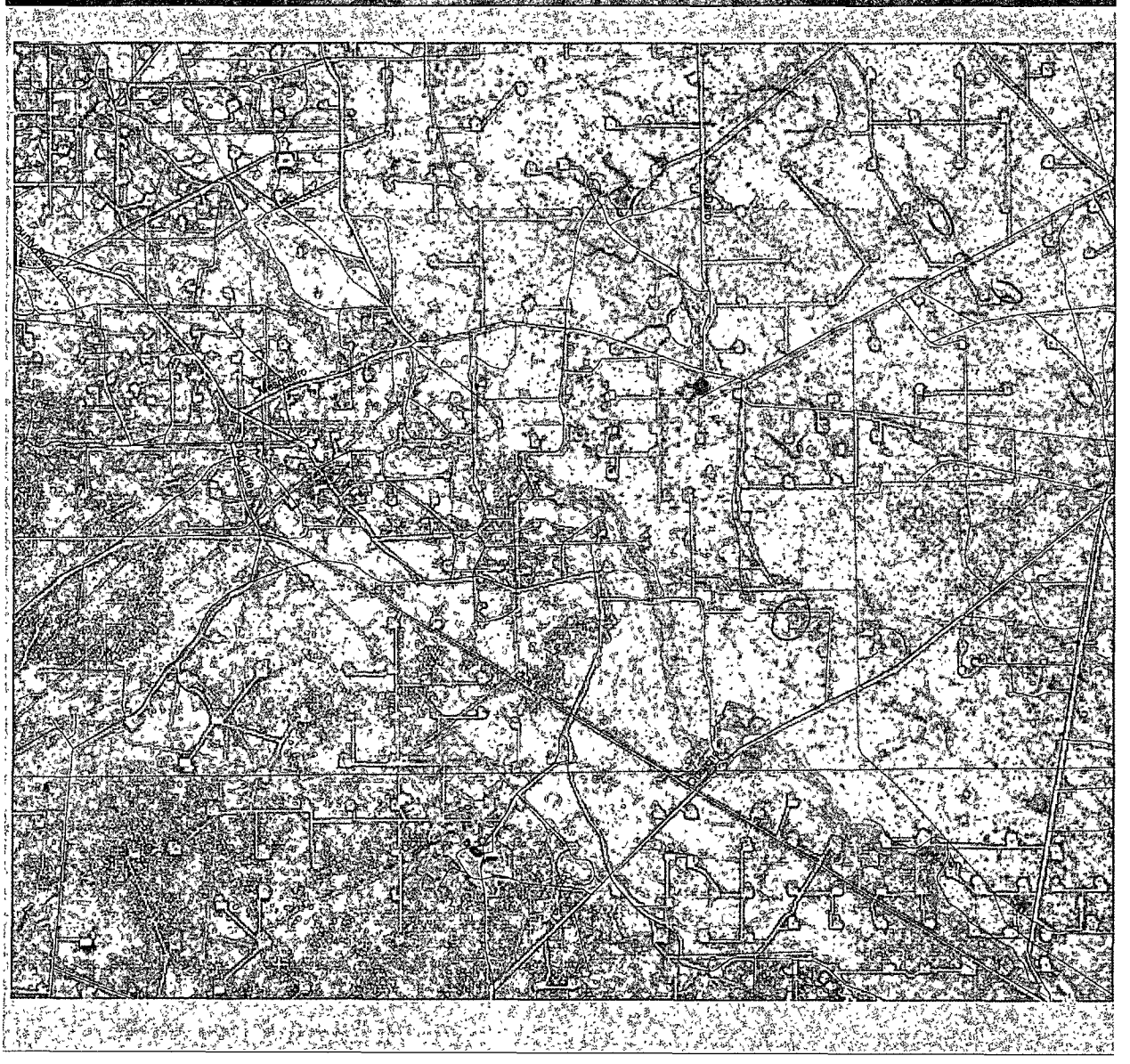


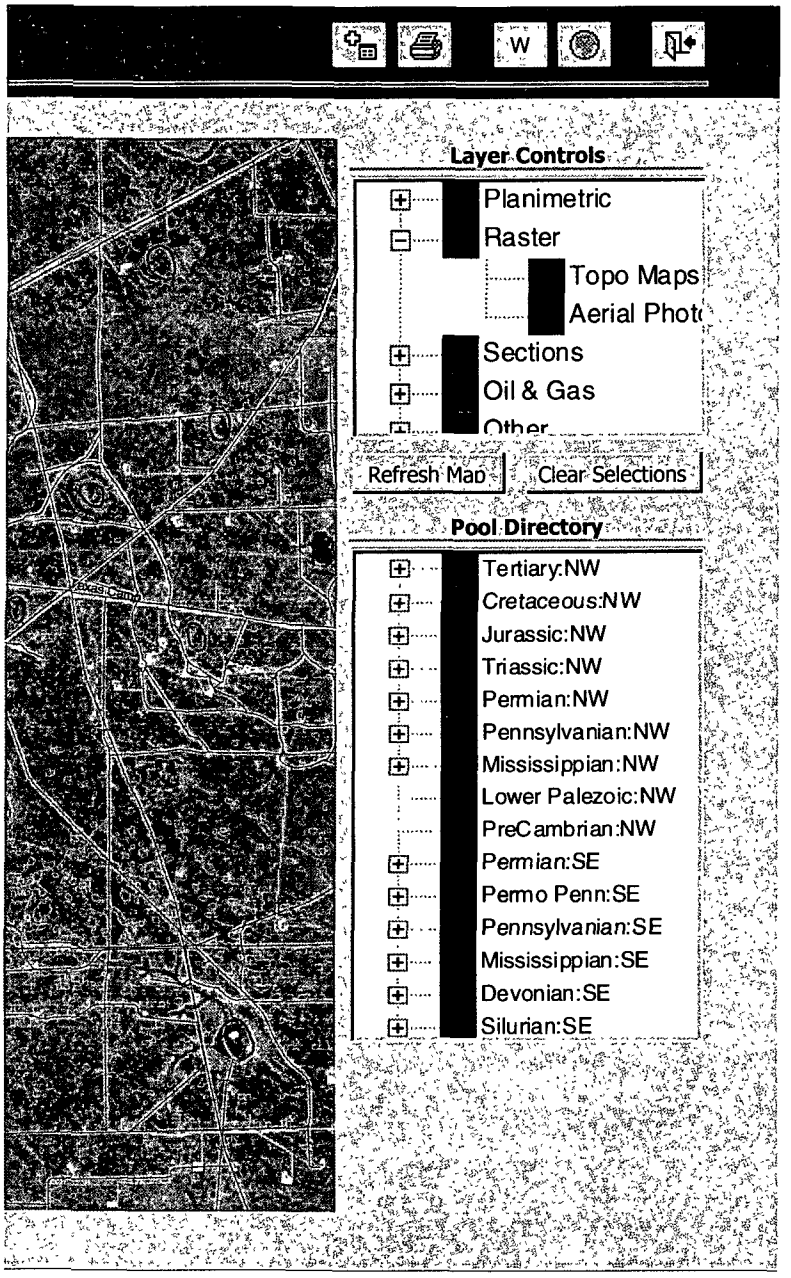
IMG_0831



IMG_0832

RBDMS GIS/GPS Utility




W
Layer Controls
Planimetric
Raster
Topo Maps
Aerial Phot
Sections
Oil & Gas
Other
Refresh Map
Clear Selections
Pool Directory
Tertiary:NW
Cretaceous:NW
Jurassic:NW
Triassic:NW
Permian:NW
Pennsylvanian:NW
Mississippian:NW
Lower Palezoic:NW
PreCambrian:NW
Permian:SE
Permo Penn:SE
Pennsylvanian:SE
Mississippian:SE
Devonian:SE
Silurian:SE