GW - 14

WORK PLANS

NAVAJO REFINING COMPANY
P.O. DRAWER 159
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ARTESIA, NEW MEXICO 88210
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ENGINEERING DEPARTMENT
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SENDING TO: NAME Roger Anderson / Mark Ashley

ORGANIZATION/FIRM NMOCD

TELECOPY #505-827-8177

SENDING FROM: NAME David Griffin

DATE 9/1/95 NUMBER OF PAGES, INCLUDING THIS COVER PAGE 11

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL TRISH AT EXT. 270,

MESSAGE: Lovington Refinery Groundwater Investigation Plan

August 31, 1995

WORK PLAN

Navajo Refining Co.

Lea Refinery

Groundwater Contamination Investigation

On Friday, August 25, 1995, Navajo discovered free phase hydrocarbon on the groundwater beneath the API Separator at our Lea Refinery near Lovington. Navajo was drilling a test hole adjacent to the API separator sump to investigate the integrity of the API separator sump box. At a depth of approximately 6 ft. Navajo encountered hydrocarbon contaminated soil and continued drilling all the way to groundwater at 93 ft. where 0.02 ft. of oil was found floating on the groundwater.

That same day samples were collected from Navajo's North Water Well and from the two City of Lovington water supply wells (City Well #9 and #5) that are located nearest the refinery. Navajo's Laboratory in Artesia analyzed the samples for Benzene over the weekend. Navajo's lab results showed the possible detection of Benzene at 1 ppb (parts per billion) in all three samples. The possible 1 ppb benzene is well below groundwater and drinking water standards but Navajo decided to collect another round of samples on Monday, August 28, 1995 for a more complete analysis by an independent Laboratory. The results of these samples were received the next day on August 29 (see attachment 1). Navajo's North Well, City #9 and City #5 showed no detectable BTEX (Benzene, Toluene, Ethylbenzene and Xylenes). Samples collected on August 28 included 2 additional wells - Navajo's South Well and City Well #8. Navajo's South Well is located very near the Navajo North Well while City #8 is located over a mile South and east of the refinery. The analysis on these wells showed 1 ppb benzene in the South Well and 2ppb benzene in City #8. Navajo intends to resample these wells to check the validity of these two results.

Verbal notification was made to OCD offices in Santa Fe and Hobbs on August 25. The City of Lovington has also been kept informed of all activities and findings, and they have participated in the sampling of the City wells.

Source of Contamination

Navajo's investigation has disclosed the source of the contamination to be a leaky underground sewer-line junction box located between the API Separator and monitor well MW-1 depicted on Figure 1. Navajo took immediate steps on August 25 to cut off all flow to the junction box and the API Separator. These units have been removed from service and will not be brought back in service until repaired. Thus, further contamination has been cut off at the source. Saturated soil near the source is being removed to bins, and samples have been taken for profiling and determining hazardous/non-hazardous status. At this point, bore holes have shown that the horizontal extent of soil contamination is quite limited.

Monitor Well Installation

The first well drilled has been completed as a monitoring well MW-1 (see attachment 2 for typical well completion). Navajo plans to install at least 4 other monitor wells at the locations shown on Figure 1. These locations were chosen to yield data on depths to groundwater so that Navajo can update the groundwater gradient that was determined back in 1988 when Navajo acquired the refinery. Consideration was also given in locating these wells so that they would yield samples from locations between the known contamination and active water supply wells.

Once the monitor wells have been installed and developed, samples will be collected and analyzed for the following constituents:

A. General Water Chemistry
   1. pH
   2. Conductivity
   3. Major Cations
      Na
      Ca
      Mg
      K
   4. Major Anions
      Cl
      F
      SO_4
      HCO_3
      NO_3

B. Metals
   As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Cu, Fe, Mu, Al, B, Co, Mo, Ni

C. EPA Method 624 Organics which include BTEX and halogenated solvents

D. PAH's by EPA Method 625

9-5-95 PER YOUNGBLOOD:
ALL 4 ARE IN AS OF 9-5-95, NO HYDROCARBONS IN MW2, MW3, MW4 ARE APPARENT AT THIS TIME

CITY OF FARMINGTON:
BOB CARTER ~~396-2044 (WATER YARD)~~ 396-2884 (CITY HALL)
CHARLES KELLEY

9-5-95 BOB CARTER:
CALLED AND REQUESTED WATER DATA & MAP OF WELLS. HE WILL SEND

Plume Delineation Borings

Once the monitoring wells are in place, surveyed and water level measurements taken, a verification of the direction of groundwater flow will be made. This information will be used to determine appropriate locations for exploratory bore holes. These borings will extend to groundwater to verify the presence of contamination. Exploratory boring will continue until the boundaries of the plume of contamination are identified. The bore holes will not be permanently cased and completed as monitoring wells. They will be adequately back filled with a bentonite-cement grout plug at the surface after all necessary information is obtained from them.

Hydrocarbon Recovery and Remediation

It is too early at this stage to provide any details as to the design of a hydrocarbon recovery and remediation system. Current thoughts about remediation include a two pronged approach to the problem. This would possibly consist of a soil vapor extraction process to deal with the contaminated vadose zone soil and a hydrocarbon recovery well network to contain and recover the contaminated groundwater and free oil.

Communications

Navajo proposes to FAX a brief progress report each week until the boundaries of the contamination are identified and the risk of contamination of any water supply well evaluated. This report will be FAXed to Mark Ashley of NMOCD-Santa Fe, Jerry Sexton of NMOCD-Hobbs, and Bob Carter-Lovington City Manager. Once the area of contamination is identified and the threat to any supply wells determined, Navajo proposes to send out progress reports only as each step in the remediation process is complete such as the engineering design step, the recovery well(s) completion step and so on.

Navajo also anticipates required groundwater monitoring at regular intervals as defined by NMOCD. These results will be distributed as above unless otherwise directed.

Summary

Upon discovery of hydrocarbon contamination in the groundwater beneath the refinery, Navajo's initial concern was to determine if any nearby water supply wells had been impacted. Analyses of these wells did not show any contamination of immediate concern therefore, Navajo is proceeding to further investigate the extent of the contamination. Once this is determined, then Navajo will design and install a remediation system. One of the primary remediation goals will be preventing contamination from reaching any water supply wells.

Navajo is well aware of the seriousness of contaminated groundwater. Particularly this groundwater which is the municipal water supply for the City of Lovington as well as the water supply for the refinery.

Attachment 1

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•794•1296
FAX 806•794•1298

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

August 29, 1995
Receiving Date: 08/28/95
Sample Type: Water
Project No: NA
Project Location: Lea Refining

Prep Date: 08/28/95
Analysis Date: 08/28/95
Sampling Date: 08/28/95
Sample Condition: Intact & Cool
Sample Received by: MS
Project Name: NA

BTEX (ug/L)	T40407 City Well #9	Reporting Limit
Methyl tert butyl ether	ND	2
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
m,p-Xylene	ND	1
o-Xylene	ND	1

	% RECOVERY
Dibromofluoromethane	104
Toluene-d8	101
4-Bromofluorobenzene	97

ND = Not Detected

METHODS: EPA SW 846-8240, 5030.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

8/29/95
DATE

TRACE ANALYSIS, INC.
A Laboratory for Advanced Environmental Research and Analysis

Attachment 1 cont'd

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•/94•1296
FAX 806•/HH•1700

ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

August 29, 1995
Receiving Date: 08/28/95
Sample Type: Water
Project No: NA
Project Location: Lea Refining

Prep Date: 08/28/95
Analysis Date: 08/28/95
Sampling Date: 08/28/95
Sample Condition: Intact & Cool
Sample Received by: MS
Project Name: NA

BTEX (ug/L)	T40408 City Well #5	Reporting Limit
Methyl tert butyl ether	ND	2
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
m,p-Xylene	ND	1
o-Xylene	ND	1

	% RECOVERY
Dibromofluoromethane	104
Toluene-d8	101
4-Bromofluorobenzene	100

ND = Not Detected

METHODS: EPA SW 846-8240, 5030.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

8/29/95
DATE

Attachment 1 cont'd

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ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

August 29, 1995
Receiving Date: 08/28/95
Sample Type: Water
Project No: NA
Project Location: Lea Refining

Prep Date: 08/28/95
Analysis Date: 08/28/95
Sampling Date: 08/28/95
Sample Condition: Intact & Cool
Sample Received by: MS
Project Name: NA

BTEX (ug/L)	T40409 City Well #8	Reporting Limit
Methyl tert butyl ether	ND	2
Benzene	2	1
Toluene	ND	1
Ethylbenzene	ND	1
m,p-Xylene	ND	1
o-Xylene	ND	1

	% RECOVERY
Dibromofluoromethane	104
Toluene-d8	102
4-Bromofluorobenzene	96

ND = Not Detected

METHODS: EPA SW 846-8240, 5030.

Director, Dr. Blair Leftwich
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Attachment 1 Cont'd

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ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

August 29, 1995
Receiving Date: 08/28/95
Sample Type: Water
Project No: NA
Project Location: Lea Refining

Prep Date: 08/28/95
Analysis Date: 08/28/95
Sampling Date: 08/28/95
Sample Condition: Intact & Cool
Sample Received by: MS
Project Name: NA

BTEX (ug/L)	T40410 Lea Refining North Well	Reporting Limit
Methyl tert butyl ether	ND	2
Benzene	ND	1
Toluene	ND	1
Ethylbenzene	ND	1
m,p-Xylene	ND	1
o-Xylene	ND	1

	% RECOVERY
Dibromofluoromethane	105
Toluene-d8	101
4-Bromofluorobenzene	98

ND = Not Detected

METHODS: EPA SW 846-8240, 5030.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

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Attachment 1 cont'd

6701 Aberdeen Avenue
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ANALYTICAL RESULTS FOR
NAVAJO REFINING COMPANY
Attention: Darrell Moore
501 E. Main
Artesia, NM 88210

August 29, 1995
Receiving Date: 08/28/95
Sample Type: Water
Project No: NA
Project Location: Lea Refining

Prep Date: 08/28/95
Analysis Date: 08/28/95
Sampling Date: 08/28/95
Sample Condition: Intact & Cool
Sample Received by: MS
Project Name: NA

BTEX (ug/L)	T40411 Lea Refining South Well	Reporting Limit
Methyl tert butyl ether	ND	2
Benzene	1	1
Toluene	ND	1
Ethylbenzene	ND	1
m,p-Xylene	ND	1
o-Xylene	ND	1

	% RECOVERY
Dibromofluoromethane	104
Toluene-d8	101
4-Bromofluorobenzene	99

ND = Not Detected

METHODS: EPA SW 846-8240, 5030.

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

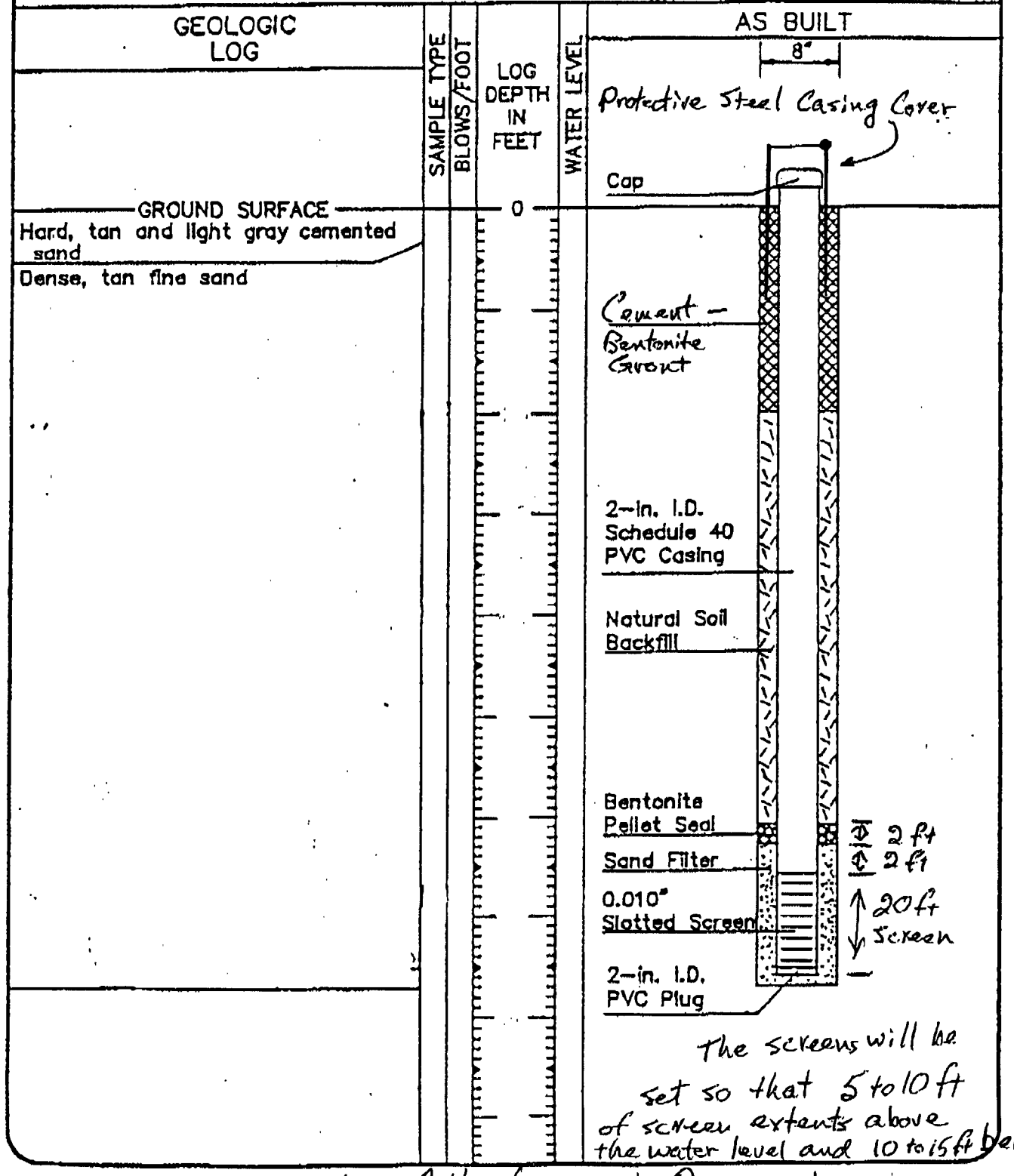
8/29/95
DATE

7599-10

Typical Monitoring Well Installation

GEOLOGIST: Darrell Moore
DRILLER: Pool Environmental Drilling
DRILLING METHOD: Hollowstem Auger

COMPLETION DATE:
TOP OF CASING ELEV.:
GROUND SURFACE ELEV.:



The screens will be set so that 5 to 10 ft of screen extents above the water level and 10 to 15 ft below

Attachment 2