AP - 015

STAGE 1 & 2 WORKPLANS

DATE:

Aug 25, 1999

PHILLIPS PIPE LINE COMPANY

September 15, 1999

SEP 2 0 1999

Ground Water Abatement Plan
East Hobbs Junction Leak Site
Phillips Pipe Line Company

Mr. Bill Olson
New Mexico Oil Conservation Division
2040 S. Pacheco St.
Santa Fe, NM 87505

Dear Mr. Olson:

Phillips Pipe Line Company has enclosed a Stage 1 Abatement Plan for the crude oil release that occurred near Hobbs, New Mexico in Lea County on March 23, 1999. PPL wishes to implement this plan as soon as possible in order to determine the limits of impacts of this release.

If you need more information regarding this plan, please contact me at 918-661-3557.

Sincerely,

Anthony "Tony" C. Walker
Phillips Pipe Line Company
Staff Environmental Representative
3 B11 Adams Building

ACW: St1AbPlanCvrLtr.doc

cc: Mr. Chris Williams
State of New Mexico
Energy Minerals and Natural Resources Dept.
Oil Conservation Division
District 1
1625 N. French Drive
Hobbs, New Mexico 88240

Mr. Chris Higgins (cover letter only)
Higgins and Associates, L.L.C.
9940 East Costilla Avenue
Suite B
Englewood, CO 80112

August 25, 1999

Mr. Tony Walker
Phillips Pipe Line Company
3B11 Adams Building
Bartlesville, Oklahoma 74004

Higgins and Associates, LLC

RE: Stage I Abatement Plan for the East Hobbs Junction,
New Mexico Gathering Line Release

Dear Mr. Walker:

Higgins and Associates, L.L.C. (Higgins and Associates) has prepared the following Stage I Abatement Plan as per the New Mexico Oil Conservation Division (OCD) Rule 19.E.3 for conducting assessment activities at the referenced site. The abatement plan presents a summary of the project background, a description of assessment activities conducted to date, a general description of the geology/hydrogeology, a discussion of the distribution of the hydrocarbon impacts, the scope of work for Stage I assessment activities, and a schedule for implementation of the activities.

Project Background

The subject site is located in Unit N, NE 1/4, NE 1/4, Section 8, Township 19 South, Range 68 East, N.M.P.M., Lea County, New Mexico. The property on which the release occurred is largely undeveloped arid land. The primary land use is grazing land for cattle. There are no surface bodies of water within 0.5 miles of the site. Several pipelines and crude oil production wells are located near the pipeline release.

On March 23, 1999, Phillips personnel discovered a release of unrefined petroleum products (crude oil) associated with a local well field gathering pipe line located near the town of Hobbs, New Mexico. The area of release discovery is known as the East Hobbs Junction. This particular area consists of several gathering lines which meet in one locality. The failed line was a six inch line diameter and was taken out of service. The line leak was noted by the detection of oil impacts on the ground surface in the area of the release. The quantity of crude oil released is not known.

Phillips excavated approximately 200 cubic yards of petroleum impacted soil from around and below the release location. The limits of the excavation were approximately 10 feet wide by 60 feet long and averaged approximately 6-8 feet deep with the deepest extent around 12 feet. Excavation activities were halted because of other active petroleum pipe lines present in the area.

On April 27, 1999, Higgins and Associates personnel supervised the installation of three soil borings to 40 feet to investigate for the presence of liquid phase hydrocarbons (LPH). The borings were located to the north and south of the excavation. Groundwater was encountered at approximately 27 feet. Based upon the soil analytical results of the soil borings, monitoring wells were installed and completed on July 12, 1999. Approximately 3 feet of crude oil was detected on the water table in each monitoring well. The geology and hydrogeology will be discussed below.

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Phillips initiated a LPH recovery program from the three monitoring wells on July 19, 1999. The program consisted of bailing the LPH everyday for one week utilizing a bailer. Approximately 54 gallons of LPH were recovered.

Geology and Hydrogeology

The regional geology surrounding the site is alluvium (unconsolidated) overlaying the Ogalalla Formation. The Ogalalla is also known as the High Plains aquifer which extends north to south from South Dakota to New Mexico and Texas. The Ogalalla was formed during the formation of the Rocky Mountains (Larimide orogeny - late Cretaceous to end of Paleocene). The Ogalalla Formation primarily consists of outwash alluvium deposited by the streams draining the newly formed Rocky Mountains. Caliche deposits are encountered in those areas considered under semiarid to arid conditions. The caliche was (and continues to be) formed as a result of the vertical movement of water through the unconsolidated alluvium from rainfall recharge (downward) and evaporation (upward). The calcium carbonate and/or calcium sulfate forms out of solution and creates a cementation effect. The origin of the calcarious material is either eolian (wind blown dust) or eroded limestone within the alluvium of the Ogalalla.

The hydrogeology of the Ogalalla aquifer can vary tremendously on a relatively small scale due to the wide grain-size distribution of the alluvial sediments. The regional water table slopes from west to east. The saturated thickness of the Ogalalla ranges from 0 feet to the west to upwards of 1,000 feet to the east. In the area of Hobbs, New Mexico, the saturated thickness may be 10 to 150 feet. Depth to groundwater is shallower to the west and gradually gets deeper to the east. Aquifer recharge is primarily rainfall; aquifer discharge is a combination of streams or springs and evapotranspiration.

Based on information obtained from the soil borings and the drilling of monitoring wells, the site specific geology consists primarily of caliche mixed with sands and some gravel. The caliche was encountered from ground surface to approximately 20 feet below ground surface. The sands and gravels were encountered below the caliche to total depth. The drilling method used to complete the monitoring wells was air rotary.

Groundwater was encountered in the monitoring wells at approximately 27 feet. Crude oil was detected in each of the monitoring wells. The groundwater elevation and LPH thickness data for July 14, 1999 is attached. The current groundwater flow direction and gradient is to the south. Based on recent "slug out" test data from a nearby site, the hydraulic conductivity ranges from 5.9×10^{-3} cm/sec to 3.5×10^{-4} cm/sec.

Hydrocarbon Distribution

The known phases of petroleum impacts associated with this site are adsorbed phase hydrocarbons and liquid phase hydrocarbons. The presence/absence of dissolved phase hydrocarbons has not been determined. The lateral extent of petroleum impacts to the soil and groundwater are not known.

Petroleum impacts were apparent throughout the limits of the excavation from near surface to the total depth. Fingers of petroleum were apparent in the side walls of the excavation indicating that shallow migration of crude oil occurred along zones of increased permeability.

As stated above, the lateral extent of petroleum impacts have not been defined. A better understanding of the subsurface geology and hydrocarbon distribution will be obtained through the installation of additional monitoring wells.

Project Approach

The assessment activities outlined in this abatement plan have been developed to obtain additional information concerning the lateral and vertical extent of petroleum hydrocarbons in the subsurface. This information will be used to prepare a Stage II Abatement Plan for evaluating and selection of the appropriate remedial method. The general project approach is as follows:

- Installation of a series of monitoring wells to define the lateral and vertical extent of petroleum impacts.
- Collection of soil samples for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) and total extractable petroleum hydrocarbons (TEPH).
- Collection of soil samples for phospholipid (PLFA) and most probable number (MPN) analysis to determine the types and populations of microbial organisms in the subsurface.
- Collection of groundwater samples from all wells absent of LPH to determine the lateral extent, if any, of dissolved phase hydrocarbons associated with the pipeline release.
- Conducting a series of rising head permeability tests to determine and confirm site-specific aquifer characteristics.
- Prepare either a final site investigation report or a work plan for additional assessment activities.
- Prepare a Stage II Abatement Plan to evaluate remedial technologies for addressing the petroleum impacts, and to further define the lateral extent of petroleum hydrocarbons, if needed.

The detailed scope of work to accomplish the above is presented below.

Site Investigation Work Plan

Well Record Search

Available well records will be reviewed to determine the location of domestic or production wells within a one mile radius of the subject site. The location of these wells will be plotted on a topographic map.

Drilling Activities

In order to obtain information on the lateral and vertical extent of petroleum impacts, a series of soil borings and monitoring wells are proposed for the area surrounding the release point. Based on the results of the soil borings and monitoring wells, combined with the presence of LPH in MW-1, MW-2, and MW-3, six additional monitoring wells are proposed as illustrated on Figure 1. The objective of the drilling activities are to further define the groundwater gradient beneath the release site and to define the vertical and lateral extent of petroleum impacts to soil and groundwater. Additional drilling activities may be required for complete definition of the petroleum impacts. The locations of the monitoring wells are discussed in the following.

- Monitoring well MW-4 will be located approximately 100 feet northwest of MW-2. The objective of this well is to provide an upgradient well for definition of the northern and western extent of petroleum impacts.

- Monitoring well MW-5 will be located approximately 140 feet northeast of monitoring well MW-3. The objective of this well is to define the lateral extent of impacts to the northeast and to provide gradient control.

- Monitoring well MW-6 will be located approximately 130 feet southwest of monitoring well MW-1. The objective of this well is to define the west/southwest extent of petroleum hydrocarbons and to provide gradient control.

- Monitoring well MW-7 will be located approximately 200 feet south of monitoring well MW-1. The objective of this well is to define the southern extent of petroleum hydrocarbons.

- Monitoring well MW-8 will be located approximately 175 feet southeast of MW-1. The objective of this well is to define the southerly extent of petroleum impacts and to provide gradient control.

- Monitoring well MW-9 will be located approximately 30 feet south/southeast of MW-1. The objective of this well is to install a four-inch recovery well within the LPH plume to help in LPH recovery efforts.

The drilling activities will be accomplished utilizing a truck mounted air rotary drill rig. Grab soil samples will be collected at five foot intervals from wells MW-4 through MW-9.

Monitoring wells MW-4 through MW-8 will be constructed to a depth of 30 to 40 feet utilizing 2 inch diameter schedule 40 PVC screen and casing. The wells are anticipated to be screened from 10 feet to

the total depth utilizing 0.020 inch slot screen. If adsorbed phase petroleum impacts are noted shallower than 10 feet, the well screen may be extended to a minimum depth of 5 feet to facilitate possible remedial measures in the future. The well annulus will be backfilled will 10/20 sand to depth of one foot above the screen. A two foot thick bentonite seal will be placed above the sand pack and the remaining well annulus will be backfilled with clean soil or cement grout to a depth of three feet. The remaining well annulus will be filled with cement grout. A locking steel protective riser will be installed over each monitoring well to a height of three feet. A J-plug well cap will be placed on the monitoring well and the well will be secured with a brass lock.

Monitoring well MW-9 will be constructed as above except that 4 inch diameter well materials will be utilized. The larger diameter well materials are to facilitate installation of a product recovery system, if warranted.

Well Development

Following completion, each well absent of LPH will be developed by bailing and surging with a bailer and/or a submersible pump. Development water will be collected in 55 gallon drums.

Well Surveying

Following completion of the drilling activities the wells will be surveyed to a common benchmark in order to facilitate collection of groundwater elevation and gradient data.

Aquifer Testing

Rising head permeability tests will be conducted in wells MW-4 and MW-8. The tests will be conducted by instantaneous removal of a volume of water from the wells and measuring the rate of groundwater recharge into the well. The aquifer tests will provide general information on the hydraulic conductivity, transmissivity, and storativity of the aquifer. An aquifer pump test may be conducted as part of the Stage II Abatement Plan to provide the above information with a higher degree of accuracy.

Sampling and Monitoring Plan

During the drilling activities, a geologist will collect and describe soil samples as described above. Representative soil samples will be collected at five foot intervals or from zones of obvious petroleum impact. The samples will be split into representative portions. One sample will be placed in the appropriate laboratory container and placed on ice for possible analysis. The remaining portion of the sample will be screened with a photoionization detector (PID) as outlined in the OCD guidance document. A minimum of one soil sample will be submitted from each boring for laboratory analysis of BTEX by EPA Method 8021 and TEPH by EPA Method 8015 modified. If only one soil sample is submitted, the sample from just above the water table interface will be selected. If two samples are submitted, one sample will

be submitted from the zone above the water table with the highest levels of observable hydrocarbon impact and the second sample will be submitted from the water table interface.

In addition to the above sampling, soil samples will be collected from MW-4, MW-7, and MW-9 for PLFA and MPN analysis. The PLFA analysis will provide information on the general types, populations, and stress level of the microbial community upgradient, within, and downgradient of the areas of impact. The MPN analysis will provide information on the populations of specific hydrocarbon degrading organisms.

Following completion of drilling and well development activities, groundwater samples will be collected from all monitoring wells absent of LPH. A minimum of three well volumes of groundwater will be purged from each well with a bailer or a submersible pump. Measurements of temperature, pH, and conductivity will be collected during purging to insure that the water sampled is representative of the surrounding aquifer. A groundwater sample will be collected from each well for analysis of BTEX by EPA Method 8021, major cations and anions, OCD list of metals by EPA Method 6010, PAH's by EPA Method 8100, and total dissolved solids. The groundwater samples will be submitted to a New Mexico certified laboratory for analysis.

Quality Assurance Plan

Industry accepted standard operating practices will be followed for all field activities to insure the quality of the data obtained. These procedures are summarized as follows:

- Soil sampling equipment will be decontaminated between sample intervals. Down hole equipment will be decontaminated utilizing a pressure washer between borehole locations.

- Well development and purging activities for the monitoring wells will be conducted from the cleanest well (based on field observations) to the most contaminated well to minimize potential cross contamination between wells.

- All reusable groundwater sampling equipment will be decontaminated utilizing an detergent (alconox) wash and distilled water rinse prior to sampling activities and between each well.

- Groundwater samples will be collected utilizing new disposable bailers. One duplicate sample will be collected during the sampling activities. In addition to the duplicate sample, one trip blank sample will be analyzed for the cooler containing the samples for BTEX analysis.

- The soil and groundwater samples will be collected in the appropriate sample containers, labeled, sealed with custody seals, and placed on ice. The samples will be logged on a chain of custody form and submitted to the laboratory for analysis.

- New disposable gloves will be utilized or all sampling activities and will be discarded between

samples.

Public Notification Plan

The public notification process will be followed as outlined in Rule 19.G. Public Notification and Participation.

Reporting

Following completion of the above assessment activities an assessment report will be prepared which details the results of the assessment activities. This report will either be considered a final assessment report if delineation of the plume is complete or will contain a scope of work for additional assessment activities. Following definition of the petroleum impacts a Stage II Abatement Plan will be prepared to evaluate and select the appropriate remedial approach for addressing the petroleum hydrocarbons detected in the subsurface.

Schedule

Due to the uncertainty of the time period for acceptance of the plan and the public notification process for final plan approval, the actual schedule for implementation of the above activities can not be determined at this time. However, Higgins and Associates will proceed forward with implementation of the plan upon receipt of final approval from OCD. If available, the drilling contractor will be scheduled to perform the drilling within two weeks following plan acceptance. Completion of the scope of work and preparation of a detailed assessment report is anticipated to take 60 to 90 days from the date of plan approval.

Higgins and Associates appreciates the opportunity to provide Phillips Pipe Line Company with environmental consulting services. Should you have any questions concerning this work plan please contact me at 303/708-9846.

Sincerely,
Higgins and Associates, L.L.C.

Chris Higgins
NMUSTB Certified Scientist #234
President

Attachments

GROUNDWATER ELEVATION DATA

CLIENT: Phillips Pipe Line
FACILITY: East Hobbs Junction, NM
LOCATION: Section 8, Township 19 S, Range 38 E
Hobbs, New Mexico
DATE: July 14, 1999

WELL ID	ETC	DTW	DTP	PT	PT X.8	ADJ DTW	WTE	COMMENTS
MW-1	3606.28	27.01	24.30	2.71	2.17	24.84	3581.44	
MW-2	3606.45	26.95	23.52	3.43	2.74	24.21	3582.24	
MW-3	3606.33	27.10	23.34	3.76	3.01	24.09	3582.24	

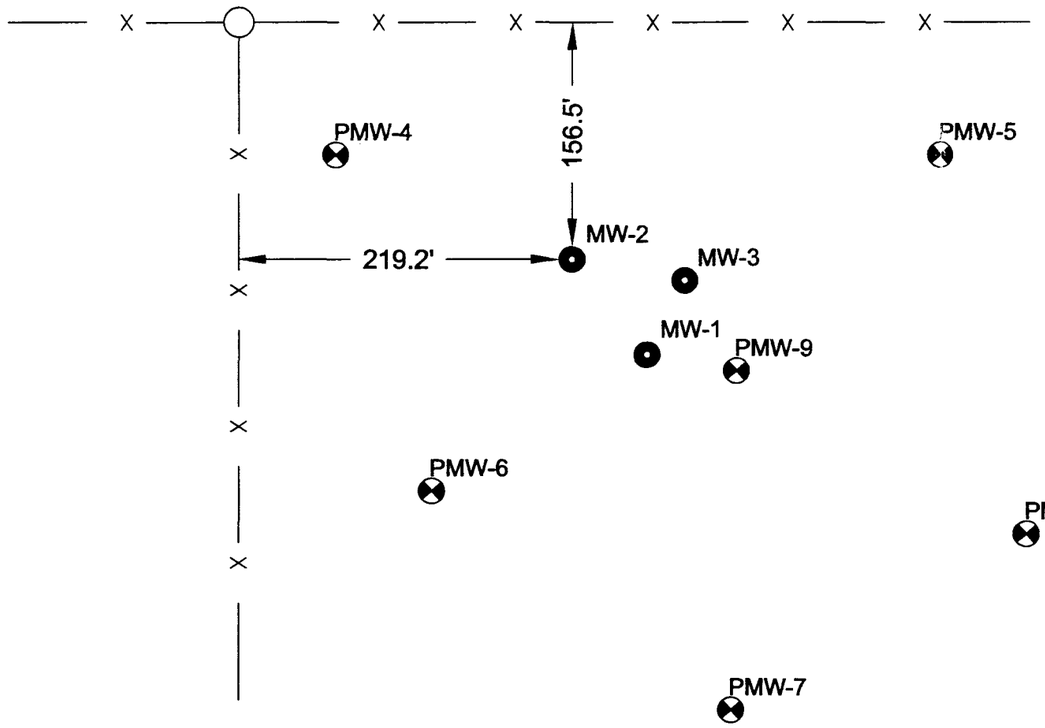
ETC = Elevation Top of Casing
DTW = Depth to water
DTP = Depth to Petroleum Hydrocarbons
PT = Measured Petroleum Thickness

ADJ. DTW = Adjusted Depth to Water
WTE = Water Table Elevation
PTE = Elevation Top of Petroleum
N.A. = Not Applicable
All measurements in linear feet

LEGEND

MW-1 Monitor Well

PMW-7 Proposed Monitor Well



N

0 100 200

Scale (ft)

HIGGINS AND ASSOCIATES, L.L.C.

Project No.:	Date Map Generated: 8/24/99	Date Data Collected: -	Figure No. 1

Authored: CH

Checked: CJ

Detailed: DG

Title: PROPOSED WELL LOCATIONS FOR EAST HOBBS JUNCTION

Client: Phillips Pipeline

Location: Hobbs New Mexico

ACAD File: SITEMAP2.DWG