GW - 294

WORK PLANS

2008-2010

PLAINS PIPELINE

RECEIVED
2008 SEP 2 PM 3 25

August 28, 2008

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 Release Site
NMOCD Reference # GW-294
UL-P (SE¼ of the SE¼) of Section 11, T16S, R35E
Lea County, New Mexico

Dear Mr. Griswold:

Plains Pipeline, L.P. (Plains) is pleased to submit the attached Enhanced Product Recovery Work Plan, dated August 2008, for the TNM 97-04 release site located in Section 11 of Township 16 South, and Range 35 East of Lea County, New Mexico. This document details site activities to be conducted to enhance product recovery at the site.

Should you have any questions or comments, please contact me at (505) 441-0965.

Sincerely,

Camille Bryant

Camille Bryant
Remediation Coordinator
Plains Pipeline

Enclosure

ENHANCED PRODUCT RECOVERY
WORK PLAN

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

NOVA
safety and environmental

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

August 2008

Rebecca Haskell for
Ronald K. Rounsaville
Project Manager

Todd K. Choban
Todd K. Choban, P.G.
Vice President - Technical Services

TABLE OF CONTENTS

FIGURES

1.0 INTRODUCTION AND PURPOSE

On behalf of Plains Marketing, L.P. (Plains), NOVA Safety and Environmental (NOVA) has prepared this Enhanced Product Recovery Work Plan for impacted groundwater at the TNM 97-04 site (Townsend). The purpose of this work plan is to summarize the activities involved with this abatement process, review the most current data and to propose a more aggressive product recovery method. This proposed method is designed to maximize phase separated hydrocarbons (PSH) recovery while minimizing groundwater (aquifer) extraction. The system is also designed to introduce air into the saturated zone through air sparging to create an environment conducive to accelerated oxidation, evaporation and in-situ degradation of hydrocarbons. The final system design will be based on results of early pumping data, an air sparging pilot test, and the capacity for on-site discharge of treated water to infiltration gallery.

The TNM 97-04 site (the site), which was formerly the responsibility of Texas New Mexico Pipeline 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 4 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) have been installed to delineate and remediate the hydrocarbon plume. A Site Map with the existing and proposed well locations is included as Figure 2. A multi-phase recovery system was installed at the site and operated from 1999 through 2000. The initial recovery system consisted of a liquid ring pump, extensive liquid/solid/vapor separation equipment, a vapor abatement unit, and a water treatment system. An automated skimmer system operated at the site from 2001 through 2006 but was decommissioned in the 1st quarter of 2007, due to decreasing PSH thicknesses which could not be efficiently removed by the system in use at that time. Manual PSH recovery has been performed on a weekly basis at the site since 2007. The total volume of PSH recovered from the site since 2000 has been approximately 7,200 gallons or 172 bbls. This work plan proposes a new approach to groundwater remediation at the TNM 97-04 site.

2.0 SCOPE OF WORK

This proposal includes the installation of three, four-inch diameter recovery wells to enhance recovery of PSH and dissolved phase hydrocarbons within the existing plume. Total fluid pumps powered by compressed air will be placed in the three new recovery wells and existing recovery well RW-1. Skimmer pumps will be placed in monitor wells MW-2 through MW-6 and MW-9. The four recovery wells and pumps would be designed to produce an average of approximately two gallons per minute. A pump rate of 2 gpm is estimated to produce approximately 11.5 barrels (bbls) per hour or approximately 275 bbls per day from the four recovery wells. Treated groundwater will be discharged within the estimated 20 gpm capacity of the infiltration gallery. Recovered PSH will be temporarily stored in an on-site frac tank and will be periodically re-introduced into the Plains transportation system.

This plan proposes the installation of three additional four-inch recovery wells to supplement the existing recovery well RW-1 located in the area of greatest PSH thickness. Two wells are proposed between monitor wells MW-5 and MW-2 and one recovery well is proposed to the northeast of monitor well MW-3. See Figure 2 for approximate proposed well locations. In addition, this plan also proposes the installation of air sparging wells located along the southern and eastern edge of the PSH plume.

An air sparging pilot test will be conducted to collect aquifer characteristics and data to determine the best location/spacing for maximizing sparging well efficiency. Data from the completed test will be utilized to design and implement alternative remediation systems for the site.

Abatement of the impacted groundwater will utilize the following technologies:

- Air Sparging
- Groundwater Pump and Treat/ Total Fluids Removal
- Utilize existing discharge permit for injection of treated water in infiltration gallery
- Manuel and Automated PSH Recovery
- Monitored Natural Attenuation / Long Term Groundwater Monitoring

A NMOCD permitted injection/infiltration system was installed prior to Plains assuming operational responsibilities in 2004. The initial system has not been operated since at least 2004. At the direction of the NMOCD, injection/infiltration technology will be utilized through this existing system if operational (or a new infiltration system may be installed). Since the system has been dormant for at least five years, mechanical and operational assessment will be required to determine the viability of this system and any repairs/upgrades needed to put the system back in use. The water from the treatment system will be discharged to the existing injection/infiltration gallery as well as removal by tanker/vac truck if conditions for recharge are not adequate. Any water removed from the site will be disposed of at a NMOCD approved facility.

The air sparging system will consist of a series of 2-inch diameter sparging wells along the southern and eastern edges of the PSH plume at a spacing of approximately 20 feet apart so that the individual zone of influence (ZOI) from each well will overlap developing a barrier between wells. Air sparging will attenuate downgradient migration of dissolved phase hydrocarbons and limit downgradient migration of phase separated hydrocarbons (PSH). The actual sparging well spacing dimensions will be determined based upon data obtained from the pilot test. Air sparging mechanisms include partitioning of volatile contaminants from the aqueous phase to the vapor phase (stripping) and the transfer of oxygen from the injected air to the aqueous phase to enhance aerobic microbial degradation of contaminants in the saturated zone.

The air sparging system wells will each be drilled to a depth of approximately 75 feet below ground surface (bgs), approximately 25 feet below the existing water table, and constructed with 70 feet of 2-inch diameter pvc casing and 2 feet of 0.020 inch slotted screen. The screen filter pack will consist of 3 feet of ¼-inch gravel placed from the bottom of the bore hole to approximately 1 foot above the top of the screen. The remaining well annulus will be filled with

45 feet of hydrated bentonite hole plug followed by a bentonite slurry seal to the surface. Pressurized air will be provided through a stinger with an attached air diffuser head. An oilfield grade well packer surrounding the stinger will be placed within the well casing above the top of the screened interval to seal off the interior of the well.

The air sparging system will utilize a Roots® type blower unit to provide sufficient air pressure to the eight proposed air sparging wells to maintain 10 to 50 psi and seeking approximately 30 to 35 degrees of dispersion of air in each well depending on effect in the silty sand of the formation. The desired effects of the sparging system are a slight mounding of the water table in addition to oxidation, evaporation and biological stimulation.

Recovered impacted groundwater and PSH will be pumped from the recovery wells into two frac tanks. The tanks will be plumbed to allow phase separation and residence time prior to being sent through a bag filter system and two carbon vessels, whereby the treated water will then be discharged to the on site infiltration gallery. High level cutoff switches will be installed to prevent overfilling of tanks. When water levels in the tanks reach a predetermined level, pumps will activate and pump the water through a bag filter system to limit sediment. After bag filtration, fluid will proceed through a series of two carbon vessels and then to a header for distribution to the infiltration gallery.

The samples will be 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 will be 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

Annually - BTEX and PAH concentrations, Method 8270, WQCC Metals

Groundwater samples from all monitor wells which do not contain PSH will be sampled according to the following schedule:

Initial - BTEX and PAH concentrations, Method 8270, WQCC Metals

Quarterly – BTEX, Method 8021B

Annually - BTEX and PAH concentrations, Method 8270, WQCC Metals

The goal of this recovery system will be to increase product recovery in the center mass of the product plume and advance the site toward regulatory clean-up targets. This dual-phase system is anticipated to inhibit the movement of PSH and proximal dissolved phase contaminants to the southeast, while controlling the dissolved phase plume of the downgradient edge. A Groundwater concentration and Inferred PSH Distribution Map is presented as Figure 3.

The amounts of PSH removed will be totaled from the vac truck tickets. The volumes of each will be recorded at the time the vac truck withdraws the fluids. The crude oil will be re-injected into the Plains pipeline system at a nearby Plains facility.

3.0 REPORTING

NOVA will submit a System Installation Report, summarizing installation and operational parameters of the total fluids recovery system 30 days after the end of startup activities. This report will include as-built drawings, operational data and pumping rates, a gradient map prior to and after startup activities and product distribution and thickness maps prior to and after startup.

Quarterly Status Reports will be prepared and submitted to Plains summarizing the effectiveness and progress of the PSH recovery from the groundwater. Data including product thickness, recovery volumes, disposal quantities and system adjustments will be summarized and transmitted, along with updated gradient maps, product thickness and distribution maps and any pertinent system as-built changes.

4.0 DISTRIBUTION

Copy 1:
Jim Griswold
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Copy 2:
Larry Johnson
New Mexico Oil Conservation Division (District 1)
1625 French Drive
Hobbs, NM 88240

Copy 3:
Camille Reynolds
Plains Pipeline, L.P.
3112 Highway 82
Lovington, New Mexico
cjreynolds@paalp.com

Copy 4:
Jeff Dann
Plains Pipeline, L.P.
333 Clay Street, Suite 1600
Houston, Texas 77002
jpdann@paalp.com

Copy 5:
NOVA Safety and Environmental.
2057 Commerce Drive
Midland, Texas 79703
rrounsaville@novatraining.cc

COPY # _____

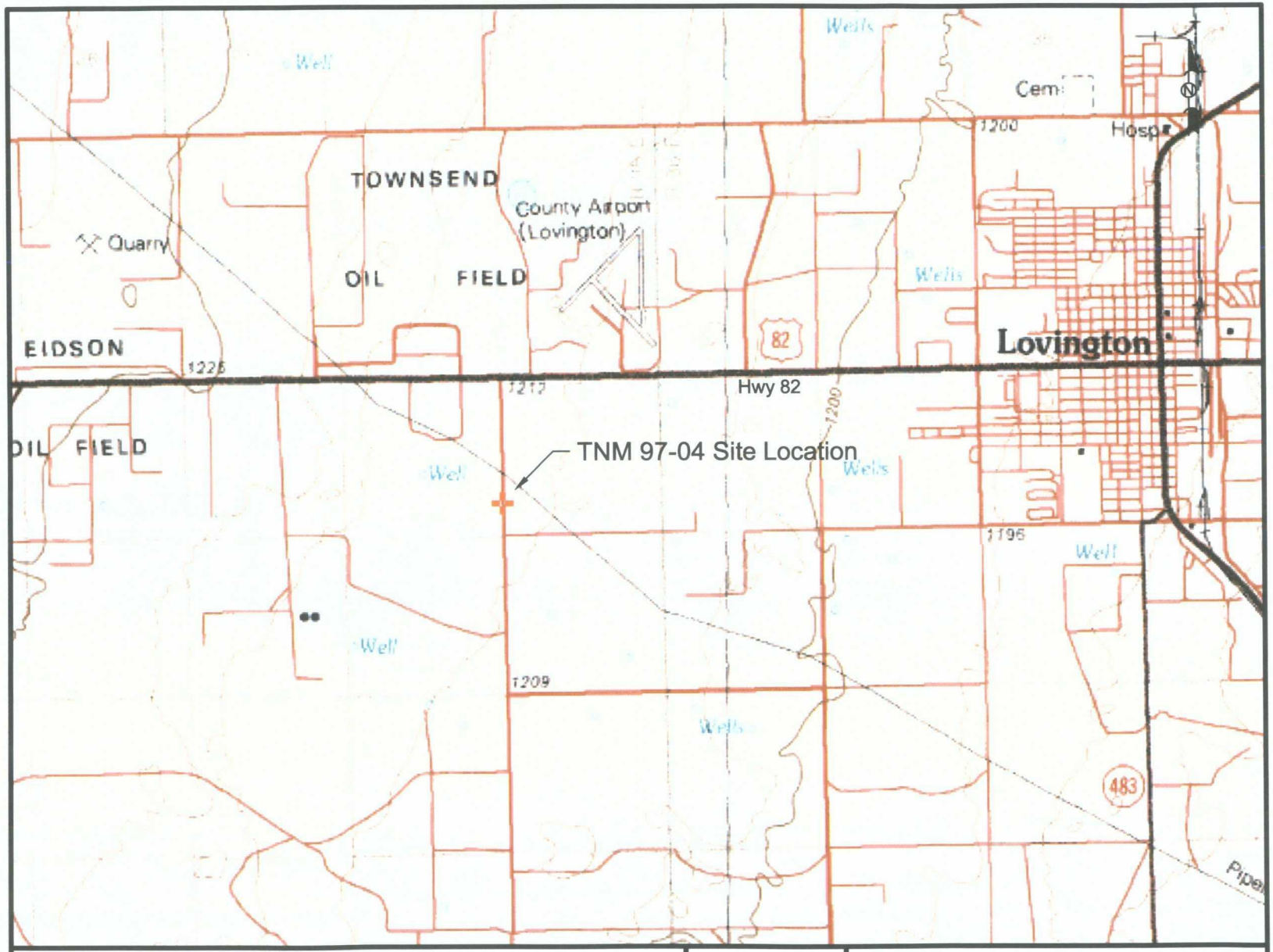
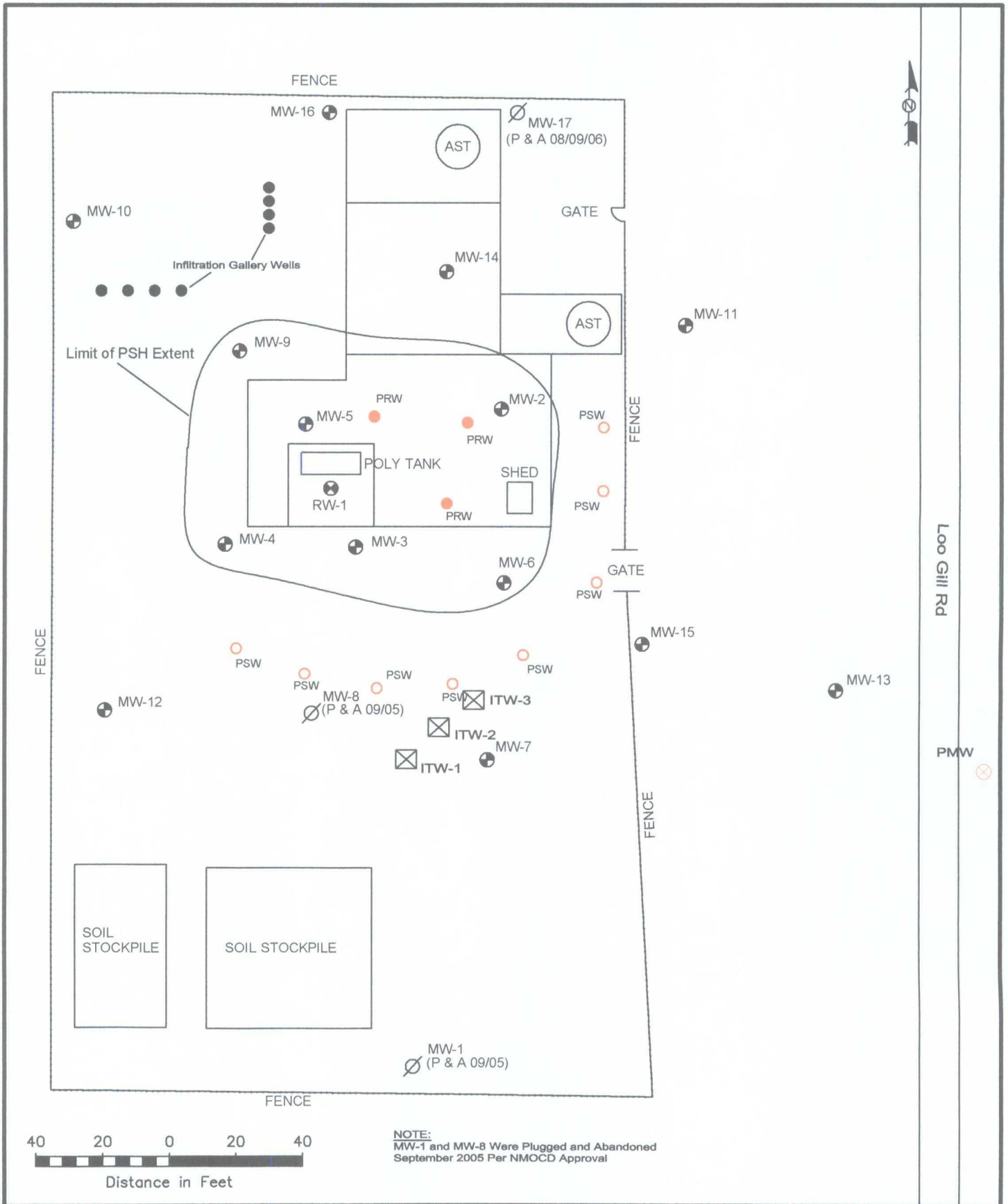


Figure 1
Site Location Map
Plains Marketing, L.P.
TNM 97-04
Lea County, NM

NMOCD Reference # GW-0294

NOVA Safety and Environmental

Scale:1" = 5000'	CAD By: DGC	Checked By: RKR
August 26, 2008	SE 1/4, SE 1/4, Sec 11 T16S R35E	
Lat. N32° 557' 57.1" Long. W103° 25' 12.3"		



LEGEND:

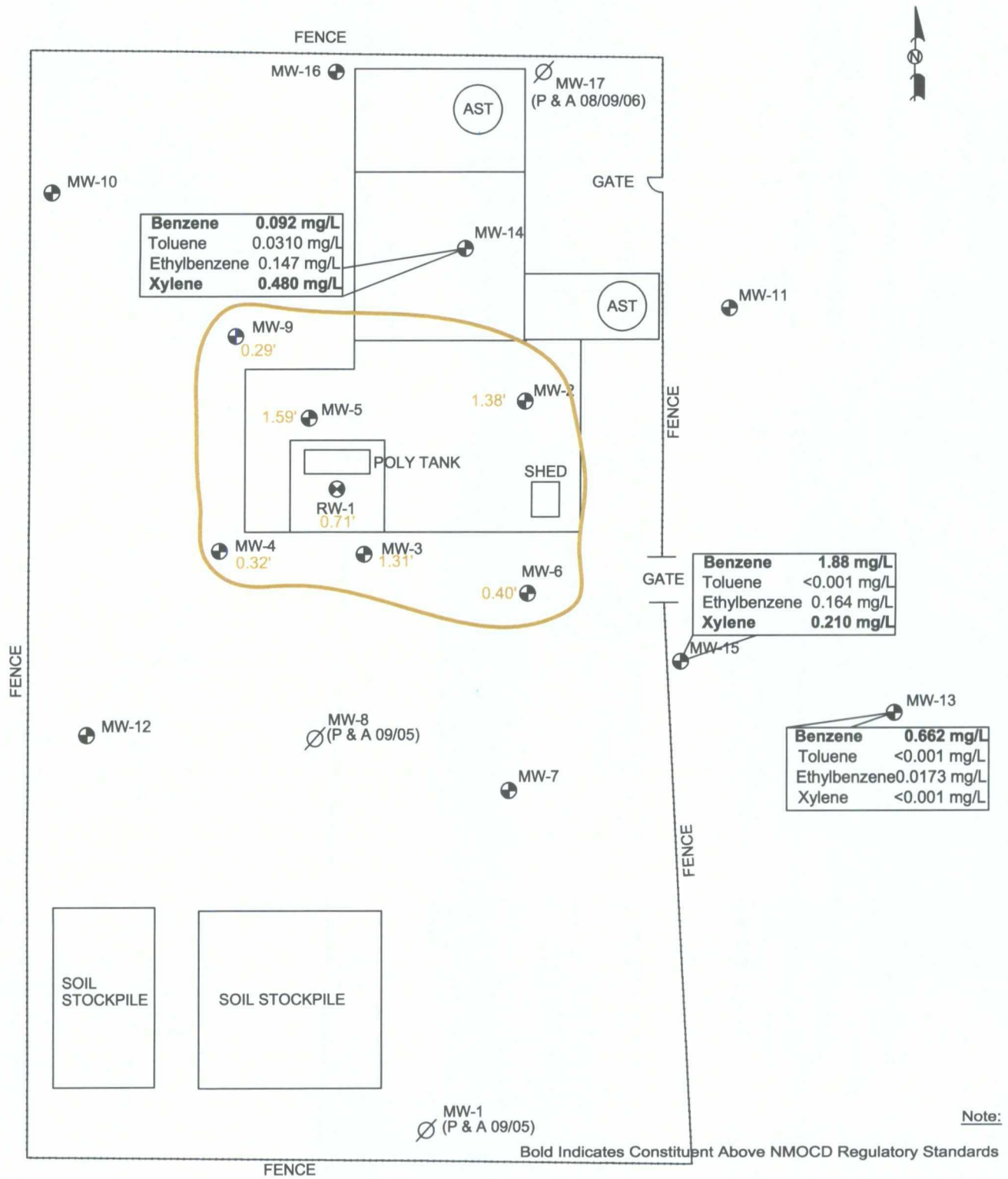
- Monitoring Well Location
- PSW Proposed Recovery Well Location
- PMW Proposed Monitor Well Location
- PRW Proposed Sparging Well Location
- ITW-1 Infiltration Test Well Location
- Infiltration Gallery Well Location

Figure 2
Site Map and Proposed Well Locations Map
Plains Marketing, L.P.
TNM 97-04
Lea County, NM

NOVA Safety and Environmental

NOVA safety and environmental

Scale: 1" = 40'	Drawn By: DPM	Prepared By: CDS
September 22, 2005	NW1/4 SE1/4 Sec 18 T18S R36E	
	Lat. N32° 44' 50.3" Long. W103° 23' 38.5"	



LEGEND:

- Monitor Well Location
- Inferred PSH Extent
- 2.42' Thickness of PSH (feet)
- (NS) Not Sampled
- <0.001 Constituent Concentration (mg/L)

Figure 3
Groundwater Concentration and Inferred PSH Extent Map (06/02/08)
Plains Marketing, L.P.
TNM 97-04
Lea County, NM

NOVA Safety and Environmental

Scale: 1" = 40'	CAD By: DGC	Checked By: RKR
August 26, 2008	NW1/4 SE1/4 Sec 18 T18S R36E	
	Lat. N32° 44' 50.3" Long. W103° 23' 38.5"	