LOWER ZONE CORRECTIVE ACTION PLAN

ExxonMobil Baltimore Terminal

SEPTEMBER 10, 2009

Prepared for:

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TABLE OF CONTENTS

1.0 INTRODUCTION

On behalf of ExxonMobil Environmental Services (ExxonMobil), and in accordance with the November 8, 2007 Consent Decree between ExxonMobil and the Maryland Department of the Environment (MDE), GeoTrans, Inc. presents this Corrective Action Plan to remediate Light Non-Aqueous Phase Liquid (LNAPL) in the Lower Zone of the former ExxonMobil Baltimore Terminal. This Corrective Action Plan presents a summary of the Site Conceptual Model including the site stratigraphic and hydrogeologic conditions and nature and extent of LNAPL within the Lower Zone. Based on the results of the Site Conceptual Model and an evaluation of historic and recent LNAPL recovery testing, this plan presents corrective action activities and procedures to optimize LNAPL recovery and meet the remedial objectives as outlined in the Consent Decree.

2.0 BACKGROUND

The former ExxonMobil Baltimore Terminal project area has historically included three main parcels which are presented in **Figure 1**. These include the “Main Terminal”, the “Toone Street Tank Field” and the “14th Street Parcel”. From the late 1800s through 1957, these parcels were used for refining, storing, and distributing petroleum products. The refinery was a key fuels production and distribution facility during World Wars I and II. From 1957 through 1998 the Main Terminal and Toone Street Tank Field parcels were used for the storage and distribution of petroleum products. Adjacent off-site properties include Baltimore City, Canton Railroad, Canton Trade Center, Obrecht, Terminal Corporation, Tulkoff, and Warner Graham.

Historical Lower Zone delineation activities began in 1994, when, as part of environmental assessment activities for the shallow water table aquifer, an investigation determined the presence of LNAPL below the unconfined water table unit and within a deeper water bearing unit. This confined water bearing unit was determined to be in the Patuxent Formation and was designated “Lower Zone”.

Additional Lower Zone investigation activities were conducted from 1994 to 2009 to further define the nature and extent of the LNAPL in the Lower Zone. These activities were conducted in a phased approach and included reports submitted to the MDE in 1994, 1995, 1997, 2001, 2002, 2003, 2004, 2005, 2007, and 2008. A full list of these references is presented in Attachment I of the Lower Zone Site Characterization Report (GeoTrans, March 6, 2009). Based on the results of the Site Characterization Report, LNAPL delineation activities are complete. Investigation methodology historically utilized during site characterization activities included a step by step process to determine the nature and extent of LNAPL in the subsurface and determine LNAPL recoverability. Key steps within the methodology included: identification of stratigraphic data gaps, installation of borings, observation of recoverable LNAPL, well installation, bail-down testing, and LNAPL recoverability testing. Under the guidance of the MDE, LNAPL remediation from the Lower Zone began in 1996 and has been conducted in a phased approach due to the complexity of the hydrogeologic setting. The Site Conceptual Model has been refined during each phase as additional data has been collected. During the recovery operations it has been shown that LNAPL skimming is an effective and proven remediation technology having recovered approximately 3.5 million gallons of LNAPL to date.

3.0 SITE CONCEPTUAL MODEL

The Site Conceptual Model is site-specific and provides the basis for investigation, data gap evaluation, and remediation activities. The model is based on historic LNAPL delineation and site-specific recovery results and presents the framework for remedial efforts and this Corrective Action Plan. The model indicates that there are key relationships between the stratigraphy and the presence/absence and recoverability of LNAPL and this model has been verified by predicting optimal locations of interim corrective action recovery wells as required by the Consent Decree. A graphical representation of the Site Conceptual Model is presented as **Figure 2**. The following sections present a summary of the Site Conceptual Model including site stratigraphy and lithology, environmental deposition, Patuxent Formation characteristics, and the Arundel/Patuxent contact and its importance with LNAPL recovery.

3.1 Stratigraphy and Lithology

The stratigraphic units encountered at the site from shallowest to deepest include Pleistocene deposits, the Arundel Formation, and the upper portions of the Patuxent Formation. Surface topography in the vicinity of the project site dips to the southeast and ranges from approximately 55 to 20 feet above mean sea level (MSL). The Pleistocene deposits include heterogeneous units of sand, silt and clay in which the unconfined groundwater table is present at approximately 15 to 20 feet below grade surface (BGS). The Arundel Formation is a confining unit mainly comprised of silt with some clay and sand lenses which separate the Pleistocene sediments from the underlying Patuxent Formation. The Arundel Formation also dips to the southeast with the top of this formation ranging in depth from approximately 10 to more than 70 feet BGS. The upper most portion of the Patuxent Formation is comprised of heterogeneous units of sand and silty sand deposited as a fining upward sequence. Depth to the Patuxent Formation ranges from 30 feet BGS in the northwestern portion of the project area to greater than 100 feet BGS towards the southeast. The composition and structure of the stratigraphic units is consistent with regional data and trends.

3.2 Depositional Environment

The depositional environment of the sediments beneath the site represents a transgression sequence of sedimentary deposits in the vicinity of a Cretaceous age fresh-water delta. The sediments of the Lower Zone represent a transition zone between the Patuxent and Arundel Formations. The upper portion of the Patuxent Formation represents a fining-upward sequence deposited as meandering streams which, as they lost their energy, graded into deltaic and eventually into swamp-like deposits. Continued deposition in a swamp-like environment represents the deposition of the overlying Arundel Formation. The upper portion of the Patuxent Formation is primarily composed of fine sand with an increasing frequency of silt and clay near its contact with the Arundel Formation. The Arundel formation being deposited in a swamp-like environment is primarily composed of silt and clay with infrequent sand lenses in its lower most sections. Mapping of the Arundel/Patuxent contact in the project area depicts a “bird-foot” delta depositional pattern which dips to the southeast and contains an irregular hummock surface due to the presence of former near shore lagoons/shorelines formed during the deposition of the sediments and the changing channel locations. This contact has been observed to be both distinct and transitional across the site.

3.3 Patuxent Formation

The Patuxent Formation was used in Baltimore City as a source of water mainly for industrial purposes since the early 1900s. Groundwater usage gradually increased through 1945 and then has drastically decreased through the present day. The Patuxent Formation in Baltimore City is not used for domestic or public supply due to acid, chromium, copper sulfate, chloride (brackish water), and organic chemical contamination which has been documented in numerous Maryland Geological Survey investigative reports dating back to 1952 and as recently as 1985. In addition, a portion of the Patuxent Formation in Baltimore City was classified by the MDE as a Type III Aquifer (non-usable for potable water) in 1989.

The potentiometric surface of the groundwater in the Patuxent Formation has changed significantly over the past 60 years. Prior to industrialization of the project area, the potentiometric surface in the vicinity of the site ranged from +5 to –5 feet MSL. The potentiometric surface in the 1940s is estimated to have reached a depth of approximately 70 feet BGS (-40 feet MSL) as a result of heavy industrial pumping in the vicinity of the project area. In 1997, the potentiometric surface was measured at approximately 45 feet BGS (-15 feet MSL), with one down-gradient industrial well (Red Star Yeast) still in operation. As a result of the shutdown of this industrial well in the late 1990s, and additional wells over the past several years, water levels in the Patuxent Formation currently range from 20 to 25 feet BGS (+5 to +10 ft MSL)(**Figure 2**).

3.4 Arundel/Patuxent Contact and Relationship to LNAPL Occurrence and Recoverability

Delineation of the Lower Zone has included the installation of 31 borings and 89 wells since investigation activities began in 1994. During delineation activities, LNAPL saturated soils (LNAPL pooling in the sampling device) are typically encountered within the fine grained soils immediately below the Arundel/Patuxent contact. As a result, the screened interval of a well is placed immediately at the Arundel/Patuxent contact to maximize LNAPL entry into the well. Following well installation, exaggerated LNAPL thicknesses are observed due to the Arundel Formation confining pressure on the LNAPL located within the Patuxent Formation. **Figure 3** presents a diagram of the Site Conceptual Model with a well documenting this exaggerated LNAPL thickness. A site map depicting the location of the borings and wells installed during site characterization activities is presented as **Figure 4** and a contour map depicting the delineated Arundel/Patuxent contact is presented as **Figure 5**. The elevation of the Arundel/Patuxent contact is recognized as one of the keys to understanding optimal LNAPL recovery. A review of the Arundel/Patuxent contact map indicates the presence of hummocks and lower elevation areas between the hummocks. The LNAPL saturated soils found at the Arundel/Patuxent contact are typically located within these hummocks (**Figure 2**). Historic recovery operations tend to show more effective recovery from wells located within these hummocks.

4.0 HISTORIC LNAPL RECOVERY

As previously stated, the Site Conceptual Model has shown the relationship between stratigraphy and the recoverability of LNAPL. The Site Conceptual Model as well as historic LNAPL recovery results including bail-down tests, short and long-term recovery tests, and historic recovery rates are presented in the Lower Zone Site Characterization Report (GeoTrans – March 2009). The report concluded that the presence/absence of LNAPL within the Lower Zone is defined and all necessary data has been collected to generate a corrective action plan for the Lower Zone. The following sections present a summary of the historical LNAPL recovery activities, a technical discussion of LNAPL recoverability from the Lower Zone, and the remedial importance of a definable recovery zone in the project area.

4.1 Historical Remediation Approach

Historic LNAPL remedial efforts have included the installation of multiple recovery wells with pneumatic LNAPL skimming pumps designed to recover LNAPL only. LNAPL within the Lower Zone is a leaded gasoline with an average specific gravity of 0.78 (60^{o} F). The LNAPL recovery system installed in 1996 covers two parcels (Main Terminal Area and Toone Street Tank Field) located west of the railroad tracks that intersect Boston Street, and consists of both above ground and below ground steel piping connected to two above ground recovery tanks and a loading rack located on the Main Terminal parcel. To address the Lower Zone east of the railroad tracks (i.e., Canton Trade property and the 14^{th} Street Parcel) in areas without available power, historical activities have included portable LNAPL skimming systems and satellite systems for LNAPL recovery pilot testing and for long-term recovery efforts.

Recently, as part of the Consent Decree requirements, interim corrective action activities included installing six LNAPL optimization recovery wells (five in the Toone Street Area and one in the Main Terminal Area) to confirm the Site Conceptual Model and maximize LNAPL recovery. These six wells were determined to have recoverable LNAPL, thus verifying the predictions based on the Site Conceptual Model, and therefore were added to the Main Terminal/Toone Street recovery system. In addition, as part of optimizing LNAPL recovery efforts east of the railroad tracks, six wells located on the Canton Trade Center were connected to a second LNAPL recovery system and new tank loading area located on the

14th Street parcel. This system includes below ground piping from wells on the Canton Trade Center under Boston Street and into the 14th Street parcel. This LNAPL recovery system has been operational since November 2008.

In summary, LNAPL skimming has historically been used as an effective remedial technology for the site due to the confining pressures in the Patuxent formation that effectively push LNAPL to the recovery well. As a result, recovery well locations have been historically placed in areas of hummocks at the Arundel/Patuxent contact, where the maximum amount of LNAPL can be recovered.

4.2 LNAPL Recoverability

Historical remedial efforts and the Site Conceptual Model indicate that LNAPL thickness in a monitoring well is a poor predictor of LNAPL volume, mobility and recoverability, and under best efforts, a significant portion of LNAPL will remain trapped. Potentially recoverable LNAPL is present in soil pore spaces directly under the Arundel/Patuxent contact. An analysis conducted during site investigation activities (Data Gap Delineation and LNAPL Recovery Work Plan (GeoTrans 2004)) concluded the LNAPL within the 14th Street parcel is basically under steady state conditions (LNAPL no longer migrates) unless it is acted upon by some outside force such as a change in the pressure of the system. LNAPL recovery is directly related to fluid saturations of both water and LNAPL in pore spaces. Based on the physical properties of the data collected at the site, pore fluids in the subsurface soils have much greater water percentages than LNAPL and the grains are considered “water wet”. If water is the wetting fluid preferentially contacting the soil, then LNAPL will be difficult to remove unless other driving forces are present to move LNAPL through the pore spaces. In the case for the Lower Zone, the buoyancy of the LNAPL under confined conditions in the dome structures creates a driving force to move LNAPL through the pore throats as long as LNAPL is a continuous film and not dispersed as independent ganglia. LNAPL extraction rates that are too high, break the LNAPL-to-LNAPL contact in the soil pores and reduces the efficiency of LNAPL recovery in the well.

Based on the Site Conceptual Model and the remedial activities completed to date, LNAPL recovery is directly related to the presence/absence of a definable “recovery zone” for the project area. The term “recovery zone” (**Figure 6**) is defined as the vertical and horizontal extent of recoverable LNAPL below the Arundel/Patuxent contact. The recovery zone is measured as the difference between the oil/water interface elevation and the elevation of the stratigraphic boundary of the Arundel/Patuxent. Specifically, it is that LNAPL interval which is in direct communication with LNAPL-yielding sediments which results in higher LNAPL recovery rates which are able to be sustained during recovery efforts. In comparison, for those wells without a recovery zone, LNAPL typically “weeps” in from submerged zones which results in very low and inconsistent/unsustainable LNAPL recovery. **Figure 7** presents a contour map of the recovery zone area as documented in the Lower Zone Site Characterization Addendum Report (6/09).

4.3 LNAPL Recovery Rates and Monitoring of Recovery Zone Thickness

Historically, recovery operations have been monitored to maintain greater than 75% of the static LNAPL thickness as gauged in the well. This was performed to maintain the LNAPL to LNAPL contact between the well and the formation. As a result of the refinement of the Site Conceptual Model and the fact that LNAPL thickness in a well is a poor predictor of LNAPL recoverability, it was determined that recovery rates should be monitored in order to maintain a high percentage of the recovery zone thickness since managing the recovery zone thickness is a more effective method to maintain the LNAPL to LNAPL contact.

Since initial operations began in 1996, recovery rate and gauging data (LNAPL thickness) have been collected and utilized to optimize LNAPL recovery over time. **Attachment I** presents examples of graphs that are currently used to track individual well recovery rates, cumulative LNAPL recovered, and the presence and thickness of the recovery zone. Review of the graphs indicates the connection between the recovery zone thickness in an individual well and pumping rates. Specifically, for those wells with deeper Arundel/Patuxent contacts, LNAPL recovery rates and the thickness of its recovery zone are generally less than those wells with shallower Arundel/Patuxent contacts. This is due to the long-term collection and entrapment of the LNAPL at the Arundel/Patuxent contact (**Figure 2**).

An updated summary of bail-down testing results, historic short and long-term recovery testing, and recovery rates is presented in **Table 1**. Historical recovery rates vary significantly across the site and have been categorized as < 1 gallon per hour (GPH), 1 to 3 GPH, 3 to 5 GPH, and greater than 5 GPH. **Figure 8** presents an updated recovery rate contour map.

5.0 PROPOSED CORRECTIVE ACTIONS

5.1 Remedial Goal and Technical Approach

In accordance with the November 8, 2007 Consent Decree between ExxonMobil and the MDE the remedial goal is to remove LNAPL “to the maximum extent practicable” (as determined by the MDE). In addition, “recovery actions shall remove LNAPL at the optimal recovery rate as determined by ExxonMobil” and, “the recovery rate shall be monitored by ExxonMobil, discussed with the MDE and is subject to MDE’s approval”.

The proposed technical approach to meet the remedial goal is to conduct standardized LNAPL recovery testing procedures on all wells to determine the maximum sustainable recovery rate while maintaining the presence and thickness of the LNAPL recovery zone, and based on the results, operate and monitor the well at its optimal recovery rate over time. It is important to fully understand that based on the results of the Site Conceptual Model and published technical literature on LNAPL recoverability, not all LNAPL from the Lower Zone is recoverable. Historic recovery efforts and recent LNAPL recovery testing indicate the presence of a definable recovery zone which will shrink in both area and thickness over time as recovery progresses. Management of the LNAPL recovery zone thickness will determine the maximum extent of LNAPL which can be recovered from the site.

5.2 Standardized LNAPL Recovery Testing

To develop LNAPL recovery optimization procedures and meet the remedial objective, a standardized recovery test was developed to:

- Determine the maximum sustainable recovery rate on a well-specific basis;
- Verify the minimum sustainable pumping rate is ½ GPH using proven site-specific equipment; and,
- Validate the applicability of utilizing the recovery zone as a definable area for LNAPL recovery.

A flow chart presenting the test procedures is presented as **Figure 9**. Recently, these test procedures were utilized on a select number of wells representing the various historic categorized LNAPL recovery rates. Wells included in the testing were 3201, 2813, 2634, 2635, 2623, 2808, 2810, 3084, 3085, and 3088. The locations of the wells and the results are presented in **Attachment II**.

The results indicate that for those historically low-rate categorized wells tested on the fringe of the recovery zone or outside the recovery zone, in 7 of the 8 wells all the LNAPL in the well was removed as expected with very limited LNAPL return after a five week period. Well 2808, which is located at the fringe of the recovery area in the Toone Street Tank Field, but is in a shallow area of the Arundel/Patuxent contact was able to maintain a small thickness of LNAPL at a rate very close to the lowest pumping for a period of time greater than two weeks and thus would either be connected to the existing recovery system or a permanent trailer used for long-term LNAPL recovery. Well 2813 which was categorized at a recovery rate of 1-3 GPH, yielded a sustainable rate of approximately 1.5 GPH. Well 3201 which was historically categorized at a recovery rate of 3-5 GPH yielded a sustainable rate of approximately 8 GPH.

For those wells with initial medium to high LNAPL recovery rates, the recovery rates were increased until the recovery zone was stressed to 75% of static conditions (in order to maintain effective communication between the LNAPL in the well and LNAPL in the formation) and then the test was terminated with a maximum sustainable rate documented. All the recovery tests completed using these procedures correlate with the anticipated results based on the elevation of the Arundel/Patuxent contact, and the presence and thickness of the recovery zone. Based on the results of the recovery testing procedures from these selected wells, an updated recovery zone map documenting the current recovery zone for the project is presented as **Figure 10**. This map represents a defined recovery zone under pumping and non-pumping conditions and will be further refined as additional wells are tested using these standard procedures.

5.3 LNAPL Recovery Optimization Procedures

As previously stated, LNAPL recovery rates vary significantly across the site; however, the use of the above standardized recovery testing procedures allows for an accurate determination of the maximum sustainable yield for a well. Using the standardized recovery testing procedures, LNAPL recovery optimization procedures have been developed and are presented as **Figure 11**.

In summary, the standardized recovery test procedures (**Figure 9**) are utilized to determine a maximum sustainable recovery rate under continuous operations while maintaining a recovery zone thickness greater than 75% of static conditions. For those wells with a recovery zone under continuous pumping conditions, liquid levels are monitored and the pumping rate is optimized to maintain a recovery zone thickness. The well is operated until the maximum sustainable pumping rate has decreased to ½ GPH thus indicating LNAPL has been optimally recovered. The rate of ½ GPH was determined by the minimum recovery rate of the smallest LNAPL skimming pump that has been proven at the site. If a well with a recovery zone cannot sustain ½ GPH, the well is shut down and additional recovery testing is conducted to ensure that rebound conditions are addressed. The well would be tested for a maximum of two consecutive quarters at ½ GPH to determine recovery sustainability. If the well cannot sustain ½ GPH pumping rate and the LNAPL thickness can't be maintained, then the well will be abandoned. If any remaining LNAPL is in the well prior to abandonment, the LNAPL will be removed utilizing a LNAPL skimming pump (i.e., Spill Buddy).

If a well without a recovery zone can sustain a pumping rate of ½ GPH, the well is operated until the LNAPL thickness can't be maintained. If this condition occurs, any remaining LNAPL in the well will be removed utilizing a LNAPL skimming pump (i.e., Spill Buddy) and the well will be abandoned.

This approach correlates with the findings of the Site Conceptual Model and utilizes actual field operational data to justify LNAPL recoverability on a well-specific basis. Benefits of the technical approach include the following:

- Recovery efforts are focused on areas with potentially recoverable LNAPL and not in areas where LNAPL is trapped at residual levels;
- A standard recovery testing approach has been developed to evaluate LNAPL recoverability and determine optimal well-specific recovery rates;
- A more effective method to maximize LNAPL recovery and prevent "watering out" of a well has been developed via definition of and monitoring of the recovery zone; and,
- A technical approach to shrink in both area and thickness the aerial extent of the LNAPL recovery zone over time is provided.

5.4 Planned Recovery Well Additions to Remedial Systems

Attachment III presents the existing 14th Street Lower Zone system layout and pictures of key components of the existing recovery systems. Additional Lower Zone recovery wells are planned to be added to this recovery system to augment Lower Zone recovery east of the railroad tracks. A preliminary layout of the recovery well additions on both the 14th Street area and off-site Canton Railroad area are presented in **Attachment III**. Wells recommended to be connected to the system on the 14th Street parcel include: 3200, 3089, 3201, 3093, 3092, 3202, 3096, 3091 and 3094. Wells recommended to be connected on the Canton Railroad property include: 2928 and 2929.

5.5 Planned Recovery Optimization Wells

Based on the results of the Site Conceptual Model and the recent delineation efforts as documented in the March 6, 2009 Site Characterization Report, two additional recovery optimization wells are proposed (**Figure 12**). One additional recovery well is proposed to be installed on the 14th Street parcel equidistant from 3084, 2828, and 3201 in a shallow area (hummock) of the Arundel/Patuxent contact and one well is proposed in the Toone Street Tank Field northwest of wells 2826 and 2825 also in a shallow area of the Arundel/Patuxent contact. These wells would be installed, baildown tested, recovery tested, and likely connected to the existing LNAPL recovery systems on the parcels. Both of these wells are within the currently defined recovery zone.

5.6 Monitoring Network Optimization

Based on the proposed LNAPL recovery optimization procedures, wells with no LNAPL thickness will be abandoned with MDE approval. Based upon the recent gauging events conducted during the 1st and 2nd quarters of 2009, the following wells are proposed to be abandoned: 2801, 2814, 2815, 2916, 2918, 2919, 2921, 2922, 2923, 2924, 3086, 3087, 3090 and 3098.

In addition, wells that are not able to sustain a ½ GPH recovery operational rate are also proposed to be abandoned with MDE approval. Based on the results of the recovery testing conducted as part of the development of the Corrective Action Plan the wells proposed to be abandoned include 2623, 2634, 2635, 2810, 3084, 3085, and 3088.

As part of the Corrective Action Plan implementation, additional wells will be tested and will likely be petitioned to be abandoned during the monitoring network optimization process. In addition, for those wells which are currently recovery wells within the defined recovery zone, it is expected that recovery rates at individual wells will diminish below ½ GPH and will be also petitioned for well abandonment.

Lastly, there are two historic directly screened wells which are proposed to be abandoned. These wells were installed during the initial stages of the project and are no longer needed for monitoring/recovery. These wells are 2820 and 2821 which are immediately adjacent to wells 2816 and 2818 respectively.

5.7 Historic Delineation Borings with LNAPL

Two historic delineation borings, which during field installation activities exhibited potentially recoverable LNAPL, are proposed not to be converted to LNAPL recovery wells due to site specific conditions. Boring SB-A located in the northern portion of the Main Terminal Area was drilled in 2005. This boring indicated potentially recoverable LNAPL however a well was not installed due to the shallow depth of LNAPL encountered in the boring and because the Arundel Formation could not be readily observed in the boring at the time of drilling. Subsequently, the Site Conceptual Model was verified and it was determined that the Arundel Formation in this location is approximately 50 feet BGS and is approximately five feet in thickness. Currently, the Site Conceptual Model predicts that this location would be outside the recovery zone area and as such a recovery well is not proposed to be installed at this location.

Boring Q4-4 installed in 2009 which is located in close proximity to Boston Street and the Janney Run Box Culvert also indicated the presence of potentially recoverable LNAPL during boring installation. The boring was not converted to a recovery well due to the combination of the air/oil interface elevation and the low topographic surface elevation which may have resulted in the LNAPL in the well being above the top of the well casing due to confining conditions. Based on data collected during the Site Characterization Report, it was determined that this location is outside the recovery zone. As part of the generation of this Corrective Action Plan, an analysis was conducted to evaluate if the LNAPL in a well would be above the ground surface at this location. The analysis indicated that the depth to LNAPL would likely be less than seven feet BGS which would require a minimum 3-foot stickup as a safety measure. Based on this location being in a non-secure area directly adjacent to Boston Street and Janney Run, and that any potential well installed would not be in the recovery zone area, a recovery well is not proposed to be installed at this location.

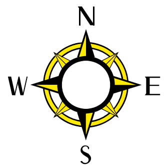
5.8 Evaluation of Engineering and Institutional Controls for Area Redevelopment

Based on the Site Conceptual Model, the Lower Zone is defined as the area below the Arundel/Patuxent contact. As previously stated, depth of the contact varies across the project area and ranges from 30 feet BGS in the Toone Street Tank Field area to greater than 100 feet towards the southeast. Overlying the Patuxent sediments are the silts and clays of the Arundel Formation confining unit. This unit appears to have affectively created a boundary condition that would prevent any human exposure above the contact. Therefore, human exposure pathways such as inhalation, ingestion and dermal contact are not anticipated to be present during any future redevelopment activities. In addition, deed restrictions will be placed on any parcels leased or sold by ExxonMobil to ensure that the Arundel Formation is not breached during any redevelopment activities. Due to the depth of the contact, ecological exposure is not applicable, and there are no known utilities, potential migration pathways, or additional sensitive receptors present below the contact. Engineering and institutional controls (i.e., use of sub-slab ventilation systems, oversight for future excavations, etc.) are currently being used, or will be used by ExxonMobil for any future redevelopment of ExxonMobil owned parcels within the Lower Zone.

5.9 Implementation and Schedule

Implementation of the recovery optimization procedures will begin immediately following approval of this Corrective Action Plan. Monitoring of the recovery zone thickness and recovery rate on a per well basis is currently in progress, is field operationally tracked on a monthly basis, and will be reported on a quarterly basis. In accordance with the Consent Decree, ExxonMobil will review actions and accomplishments related to the Corrective Action Plan with the MDE at regular technical meetings held at least every two years.

FIGURES



0 500

Scale (ft)

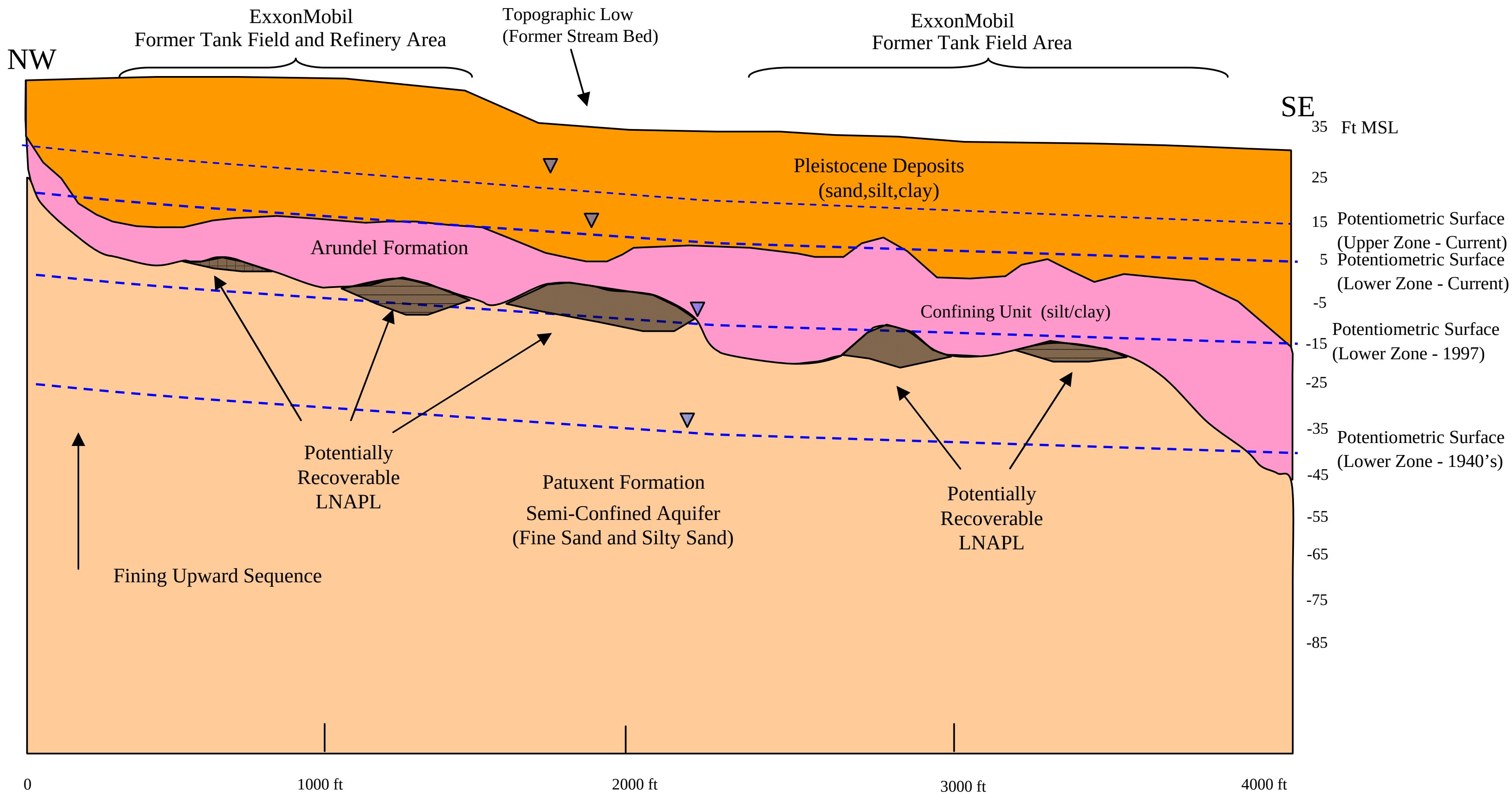
TITLE:

Aerial Map with Project Areas

LOCATION: ExxonMobil Baltimore Terminal
Baltimore, Maryland

GeoTrans, Inc. A TETRA TECH COMPANY

CHECKED		FIGURE:
DRAFTED		1
FILE		
DATE	2/17/09	



Scale Approximate

TITLE:	Site Conceptual Model Diagram
LOCATION:	ExxonMobil Baltimore Terminal Baltimore, Maryland

GeoTrans, Inc. A TETRA TECH COMPANY

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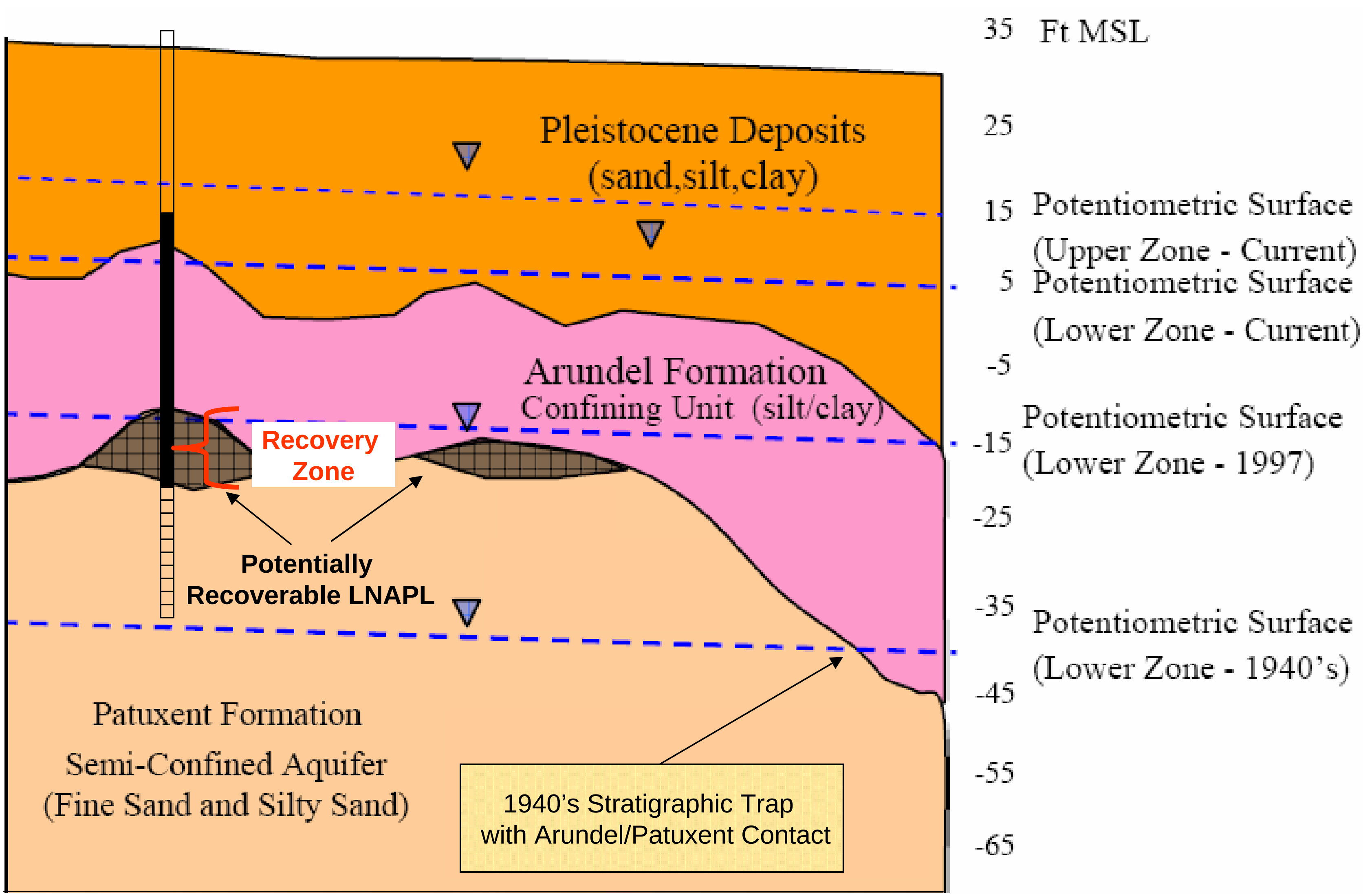
DRAFTED		2
FILE		
DATE	2/17/09	



Scale Approximate

TITLE: LNAPL Thickness Exaggeration Diagram

LOCATION: ExxonMobil Baltimore Terminal
Baltimore, Maryland

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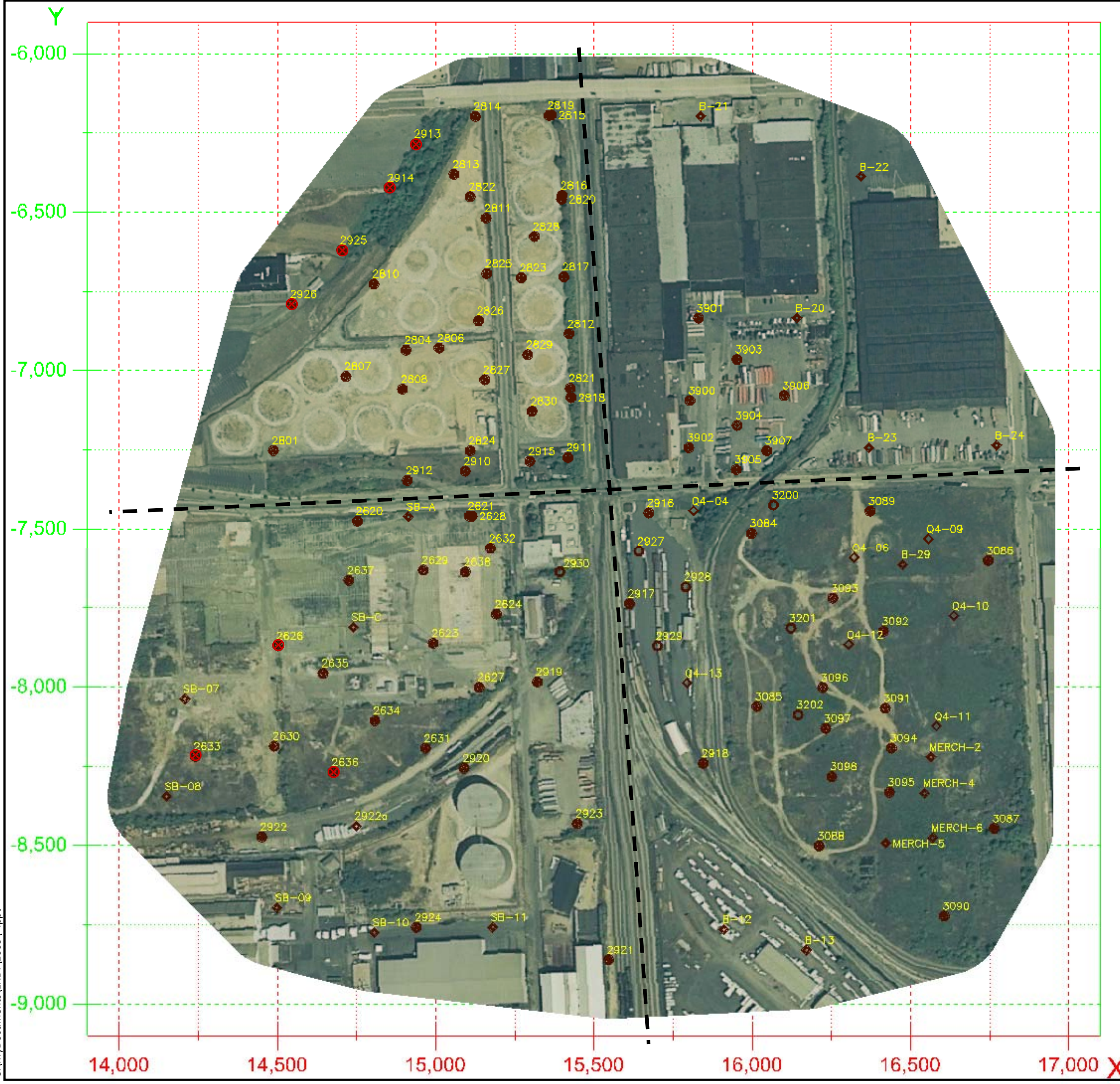
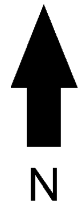
DATE	2/17/09

FIGURE: 3





DATA POSTING LEGEND

- LOWER ZONE WELL
- LOWER ZONE SOIL BORING
- LOWER ZONE DATA GAP ASSESSMENT BORING 2008-2009
- LOWER ZONE DATA GAP ASSESSMENT WELL 2008-2009
- ABANDONED LOWER ZONE WELL

NOTES:

RED COLORED AXIS DENOTES EASTING COORDINATE IN FEET

BLUE COLORED AXIS DENOTES NORTHING COORDINATE IN FEET

AERIAL PHOTOGRAPH COURTESY OF UNITED STATES GEOLOGICAL SURVEY, 2007

Geosyntec consultants

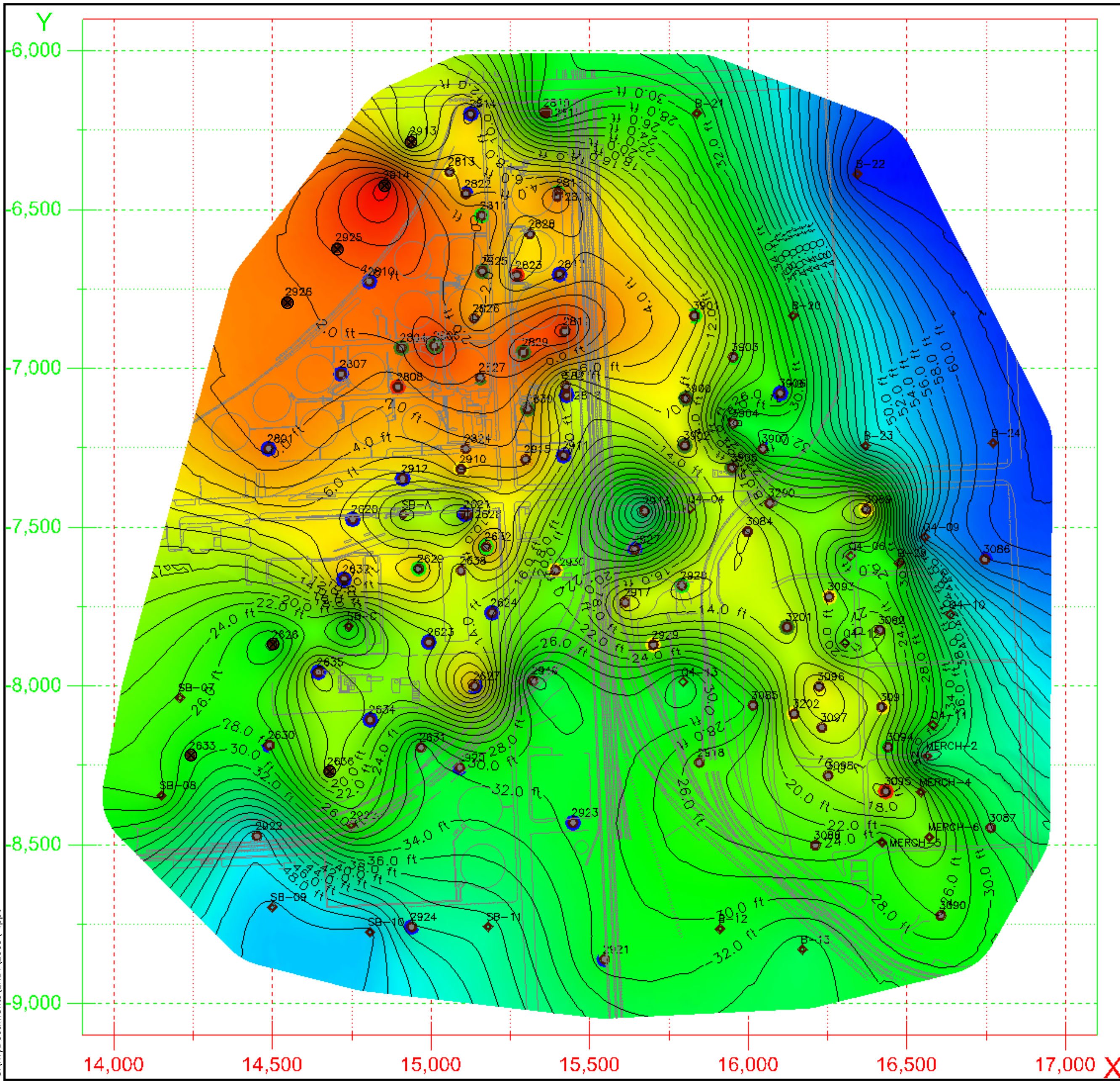
11490 WESTHEIMER ROAD
SUITE 150
HOUSTON, TX 77077

EXXONMOBIL BALTIMORE TERMINAL
BALTIMORE, MARYLAND

LOWER ZONE BORING/WELL LOCATION MAP

PROJECT NO:	GTH3109	DRAWN BY:	EBD	FIGURE
REVISION NO:	00	CHECKED BY:		4
DATE:	18 AUG 2009	APPROVED BY:		

C:\MyDocuments\EXBT\2009*.ppt



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DATA POSTING LEGEND

- LOWER ZONE WELL
- LOWER ZONE SOIL BORING
- LOWER ZONE DATA GAP ASSESSMENT BORING 2008-2009
- LOWER ZONE DATA GAP ASSESSMENT WELL 2008-2009
- ABANDONED LOWER ZONE WELL

Elevation: 11 ft, 7 ft, 2 ft, -2 ft, -6 ft, -11 ft, -15 ft, -20 ft, -24 ft, -28 ft, -33 ft, -37 ft, -42 ft, -46 ft, -50 ft, -55 ft, -59 ft, -64 ft, -68 ft

RecRate: 8 gph, 7 gph, 6 gph, 5 gph, 4 gph, 3 gph, 2 gph, 1 gph, 0 gph

NOTES:

RED COLORED AXIS DENOTES EASTING COORDINATE IN FEET

BLUE COLORED AXIS DENOTES NORTHING COORDINATE IN FEET

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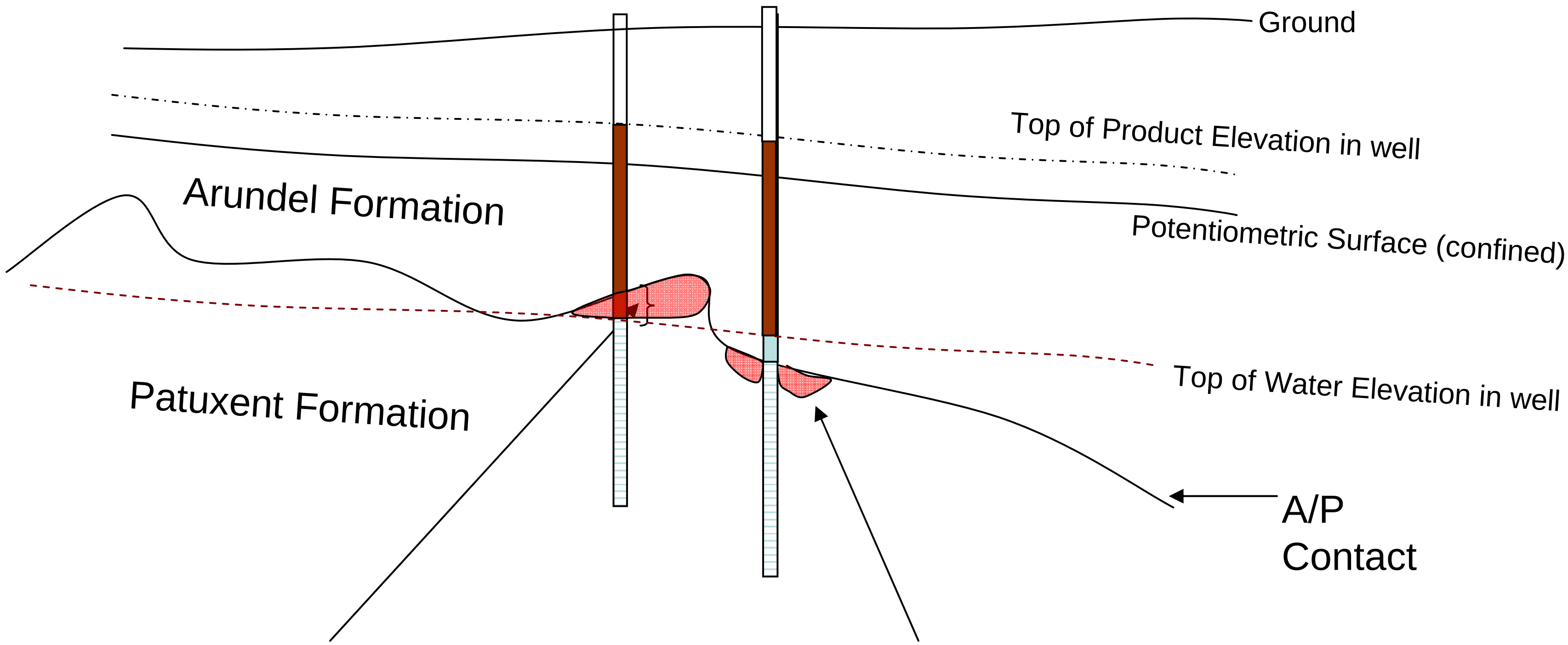
HOUSTON, TX 77077

EXXONMOBIL BALTIMORE TERMINAL
BALTIMORE, MARYLAND

ARUNDEL/PATUXENT ELEVATION CONTACT MAP

PROJECT NO:	GTH3109	DRAWN BY:	EBD	FIGURE
REVISION NO:	00	CHECKED BY:		5
DATE:	18 AUG 2009	APPROVED BY:		

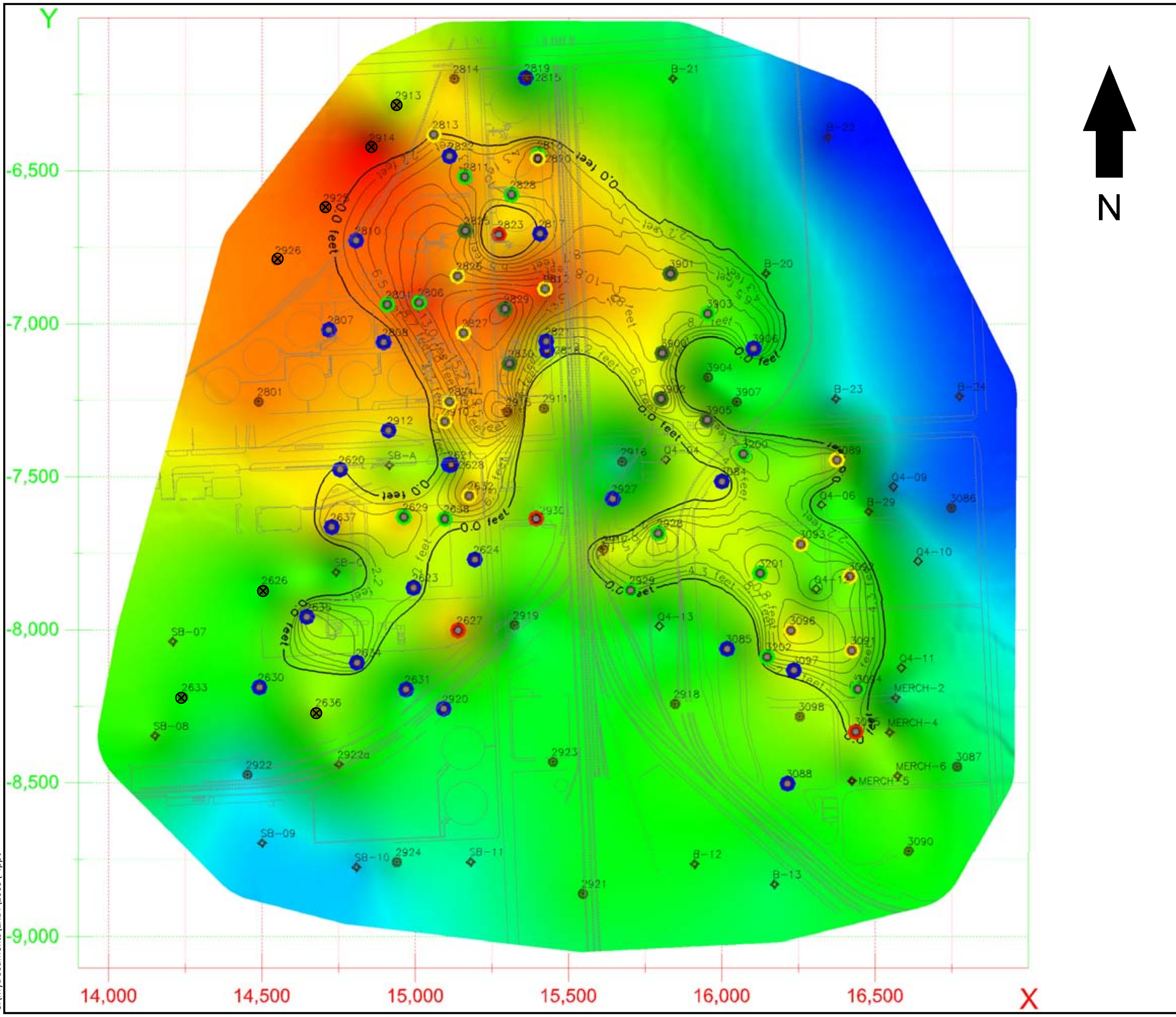
LNAPL “Recovery Zone” = (Water Elevation – A/P Contact)

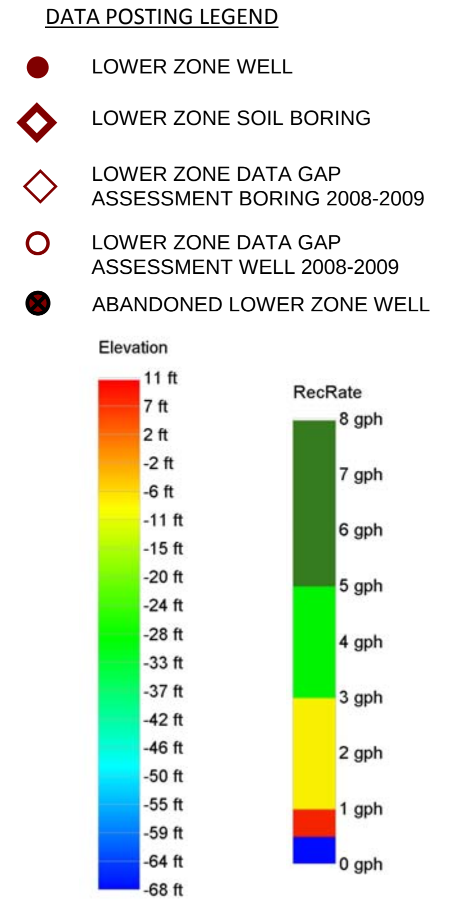


LNAPL interval measured in well where that interval is also located adjacent to Patuxent sediments (below contact). LNAPL in well in direct communication with LNAPL-yielding sediments, higher productivity.

LNAPL measured in well where that interval is not adjacent to Patuxent sediments (LNAPL “weeping” in from submerged zones) low productivity – not in LNAPL Recovery Zone.

TITLE: LNAPL Recovery Zone Diagram			
LOCATION: ExxonMobil Baltimore Terminal Baltimore, Maryland			
GeoTrans, Inc. A TETRA TECH COMPANY	CHECKED DRAFTED FILE DATE	2/17/09	FIGURE: 6





NOTES:

RED COLORED AXIS DENOTES EASTING COORDINATE IN FEET

BLUE COLORED AXIS DENOTES NORTHING COORDINATE IN FEET

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EXXONMOBIL BALTIMORE TERMINAL
BALTIMORE, MARYLAND

LOWER ZONE LNAPL RECOVERY ZONE MAP
(SCR Addendum 6/09)

PROJECT NO:	GTH3109	DRAWN BY:	EBD	FIGURE
REVISION NO:	00	CHECKED BY:		7
DATE:	01 JUNE 2009	APPROVED BY:		

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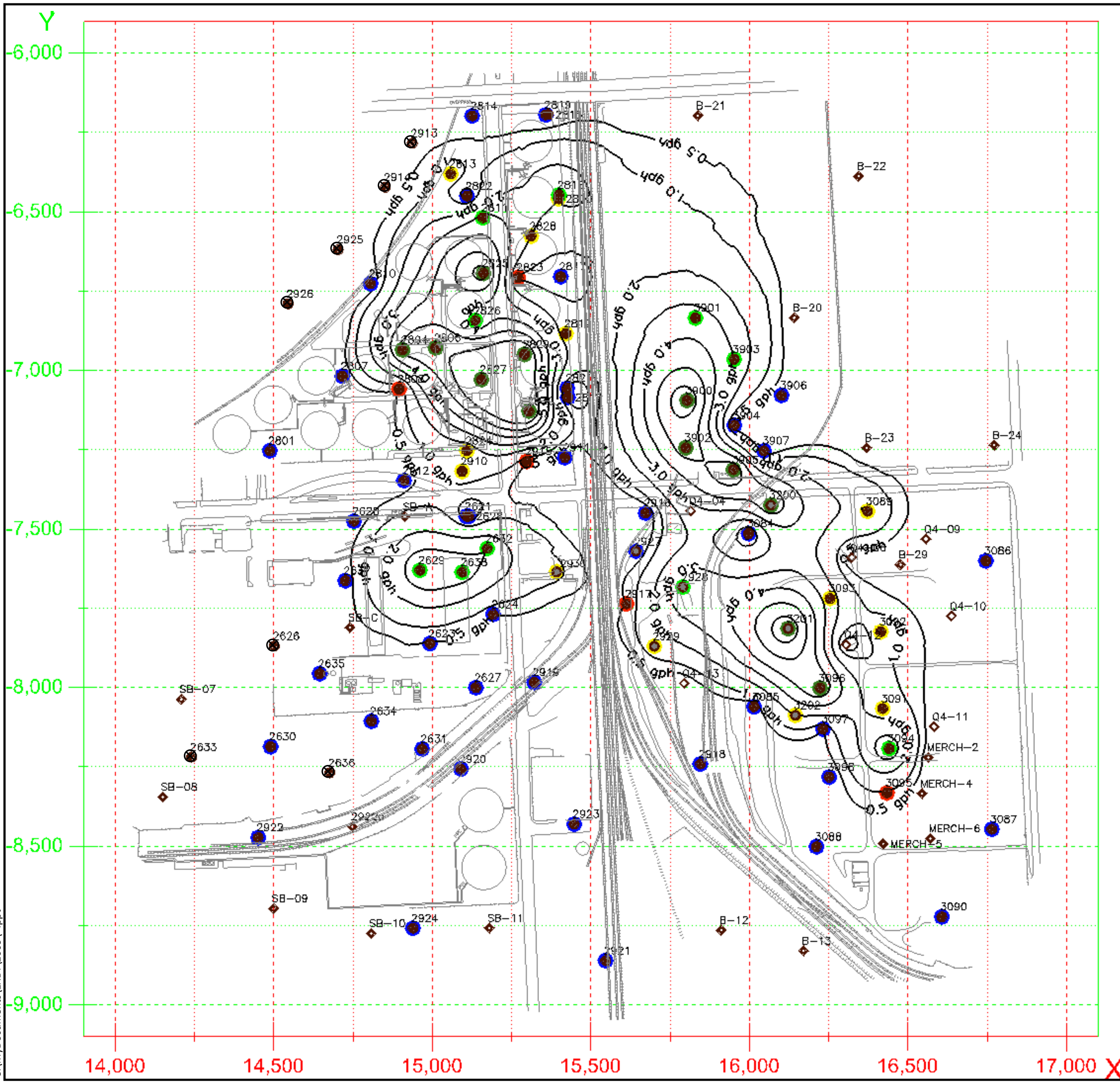

N

DATA POSTING LEGEND

- LOWER ZONE WELL
- LOWER ZONE SOIL BORING
- LOWER ZONE DATA GAP ASSESSMENT BORING 2008-2009
- LOWER ZONE DATA GAP ASSESSMENT WELL 2008-2009
- ABANDONED LOWER ZONE WELL

RecRate

8 gph
7 gph
6 gph
5 gph
4 gph
3 gph
2 gph
1 gph
0 gph

NOTES:

RED COLORED AXIS DENOTES EASTING COORDINATE IN FEET

BLUE COLORED AXIS DENOTES NORTHING COORDINATE IN FEET

RECOVERY RATES ARE MEASURED FOR ALL PERMANENT RECOVERY SYSTEM AND LONG-TERM TRAILER TEST WELLS AND ESTIMATED SUSTAINABLE RATES FOR ALL OTHER POINTS

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EXXONMOBIL BALTIMORE TERMINAL
BALTIMORE, MARYLAND

UPDATED LOWER ZONE LNAPL RECOVERY RATE MAP

PROJECT NO:	GTH3109	DRAWN BY:	EBD	FIGURE
REVISION NO:	00	CHECKED BY:		8
DATE:	18 AUG 2009	APPROVED BY:		

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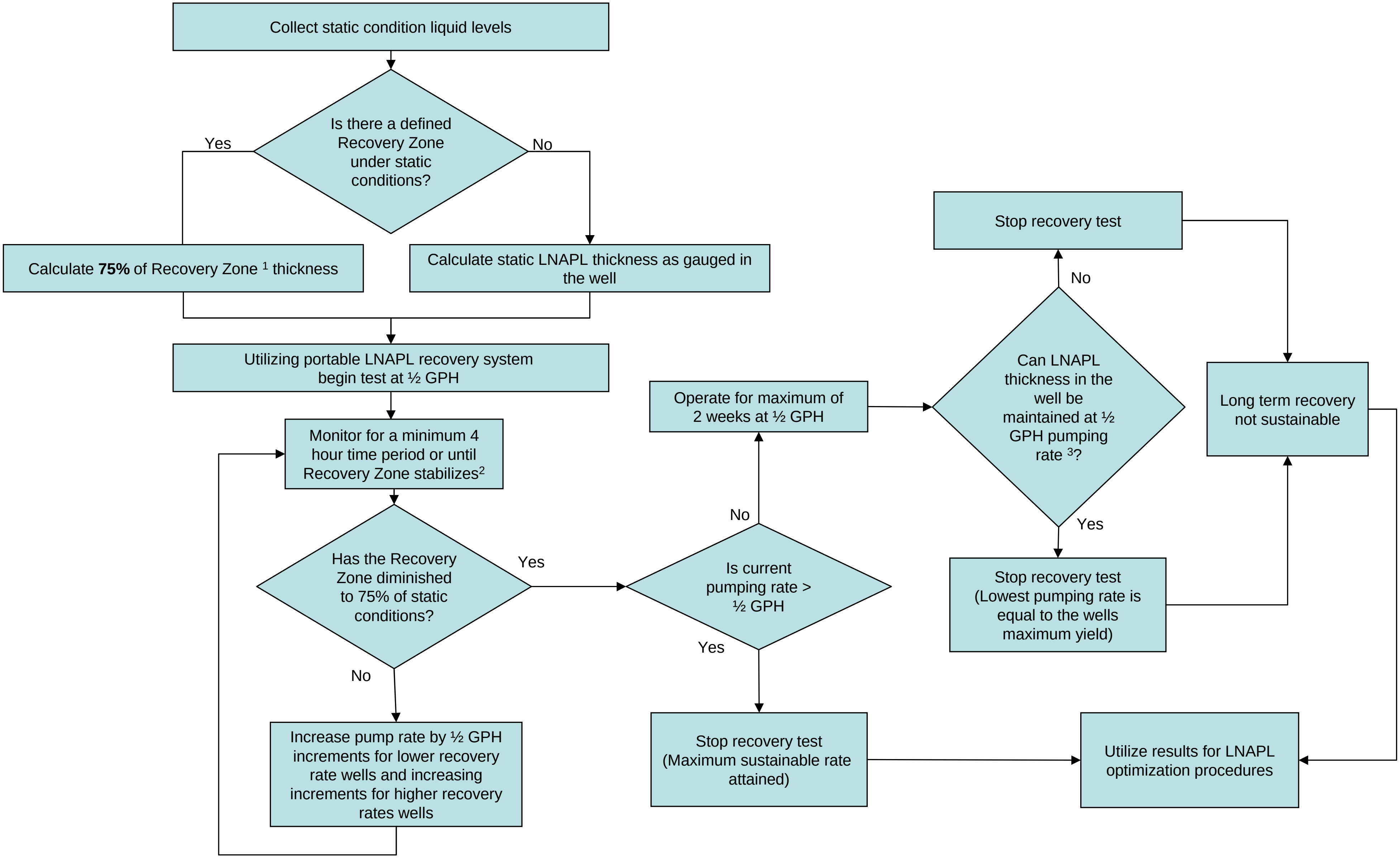
Figure 9
LNAPL Recovery Test Procedures – Baltimore Terminal – Lower Zone



Note [1] : Recovery Zone thickness is calculated as the difference between the Arundel/Patuxent contact elevation and the elevation of the oil/water interface in the recovery well

Note [2] : Stability is determined by a liquid level trend analysis

Note [3] : Lowest rate attainable (1/2 GPH) per manufactures specifications using proven site-specific equipment under continuous pumping conditions

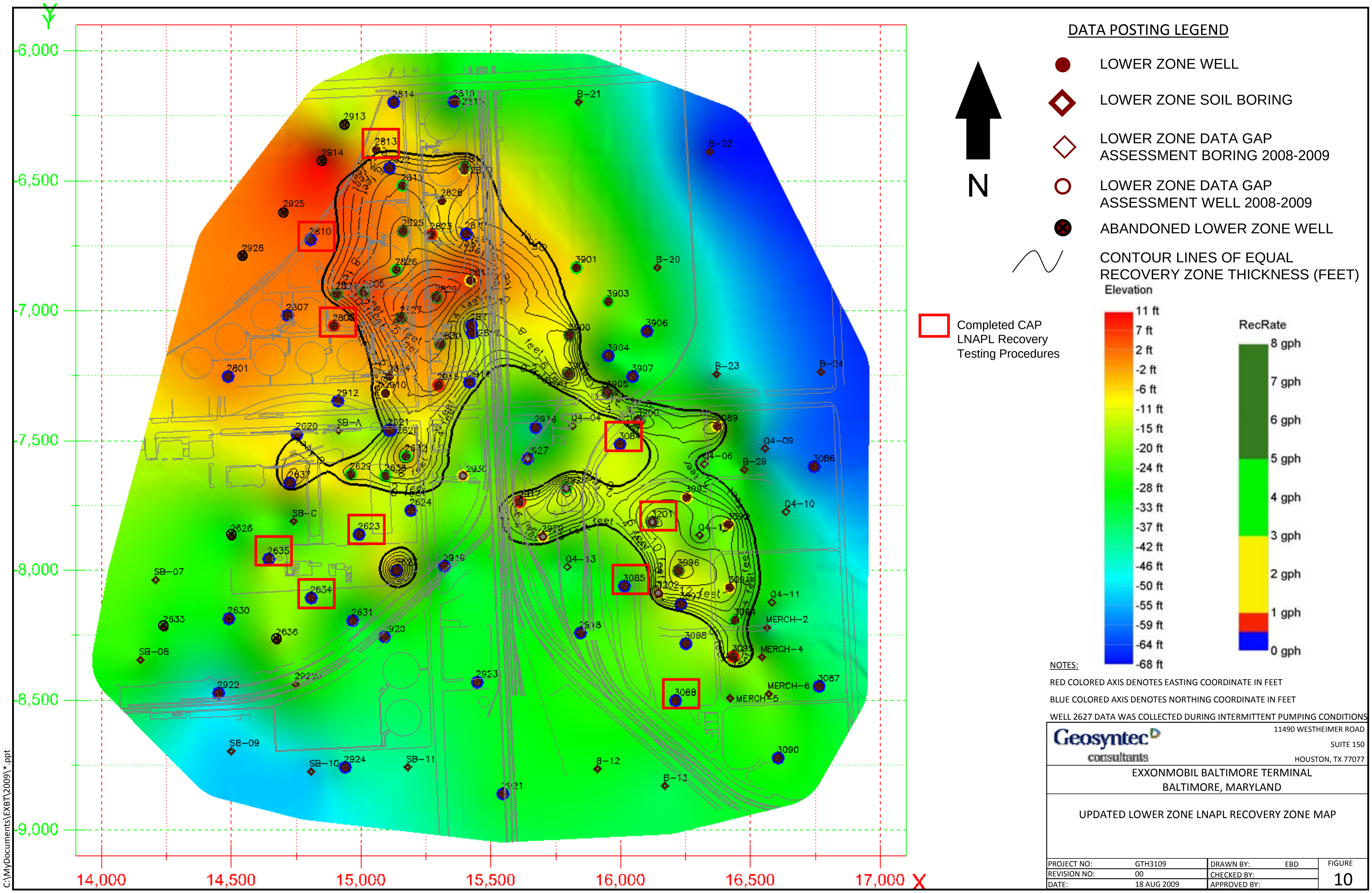

DATA POSTING LEGEND
LOWER ZONE WELL
LOWER ZONE SOIL BORING
LOWER ZONE DATA GAP ASSESSMENT BORING 2008-2009
LOWER ZONE DATA GAP ASSESSMENT WELL 2008-2009
ABANDONED LOWER ZONE WELL
CONTOUR LINES OF EQUAL RECOVERY ZONE THICKNESS (FEET)
N
Completed CAP LNAPL Recovery Testing Procedures
Elevation
11 ft
7 ft
2 ft
-2 ft
-6 ft
-11 ft
-15 ft
-20 ft
-24 ft
-28 ft
-33 ft
-37 ft
-42 ft
-46 ft
-50 ft
-55 ft
-59 ft
-64 ft
-68 ft
RecRate
8 gph
7 gph
6 gph
5 gph
4 gph
3 gph
2 gph
1 gph
0 gph
Y
-6,000
-6,500
-7,000
-7,500
-8,000
-8,500
-9,000
14,000
14,500
15,000
15,500
16,000
16,500
17,000
X
NOTES:
RED COLORED AXIS DENOTES EASTING COORDINATE IN FEET
BLUE COLORED AXIS DENOTES NORTHING COORDINATE IN FEET
WELL 2627 DATA WAS COLLECTED DURING INTERMITTENT PUMPING CONDITIONS
Geosyntec consultants
11490 WESTHEIMER ROAD
SUITE 150
HOUSTON, TX 77077
EXXONMOBIL BALTIMORE TERMINAL
BALTIMORE, MARYLAND
UPDATED LOWER ZONE LNAPL RECOVERY ZONE MAP
PROJECT NO: GTH3109
REVISION NO: 00
DATE: 18 AUG 2009
DRAWN BY: EBD
CHECKED BY:
APPROVED BY:
FIGURE
10
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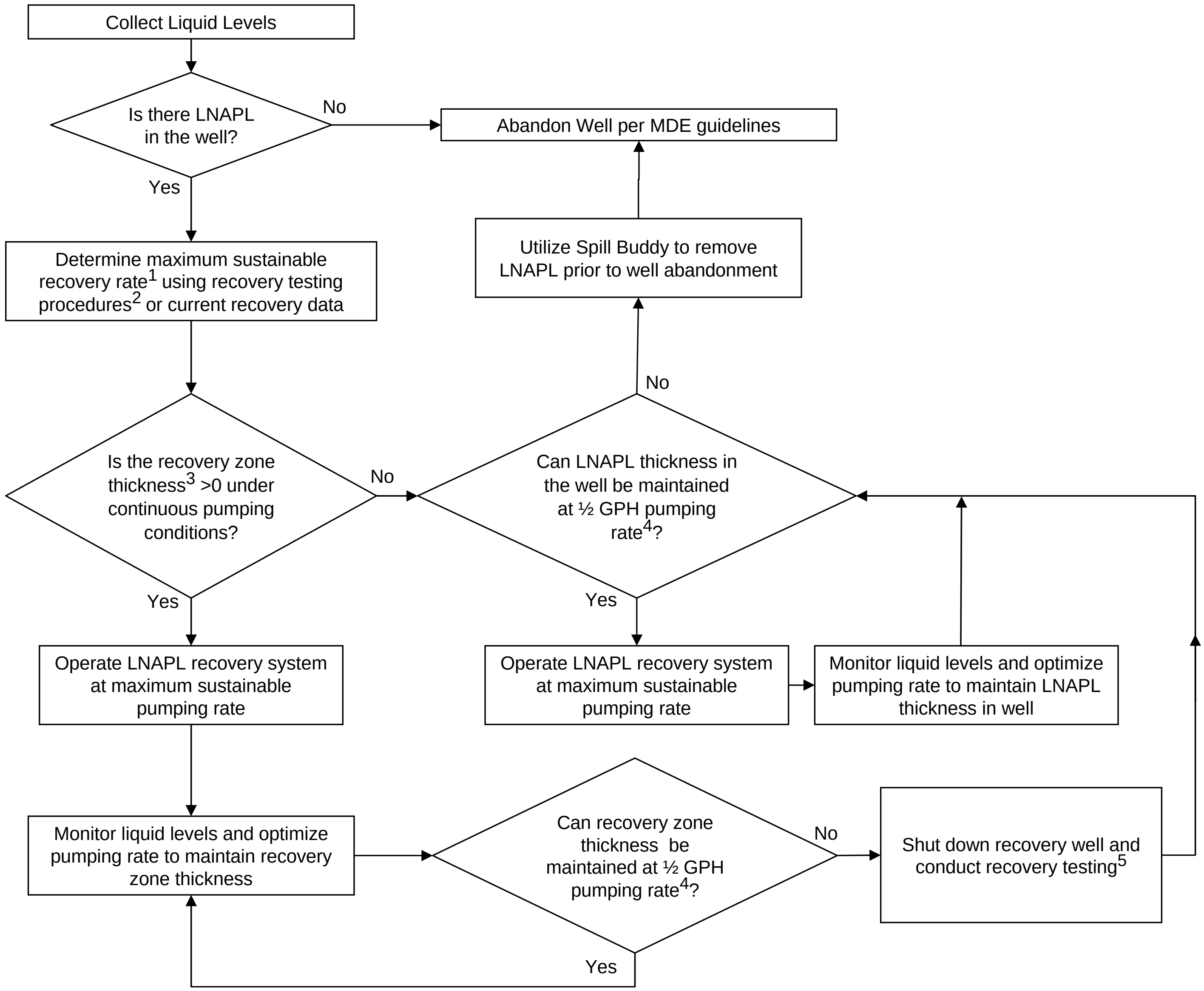
Figure 11 - LNAPL Recovery Optimization Procedures
ExxonMobil Baltimore Terminal – Lower Zone



<u>Footnotes</u>

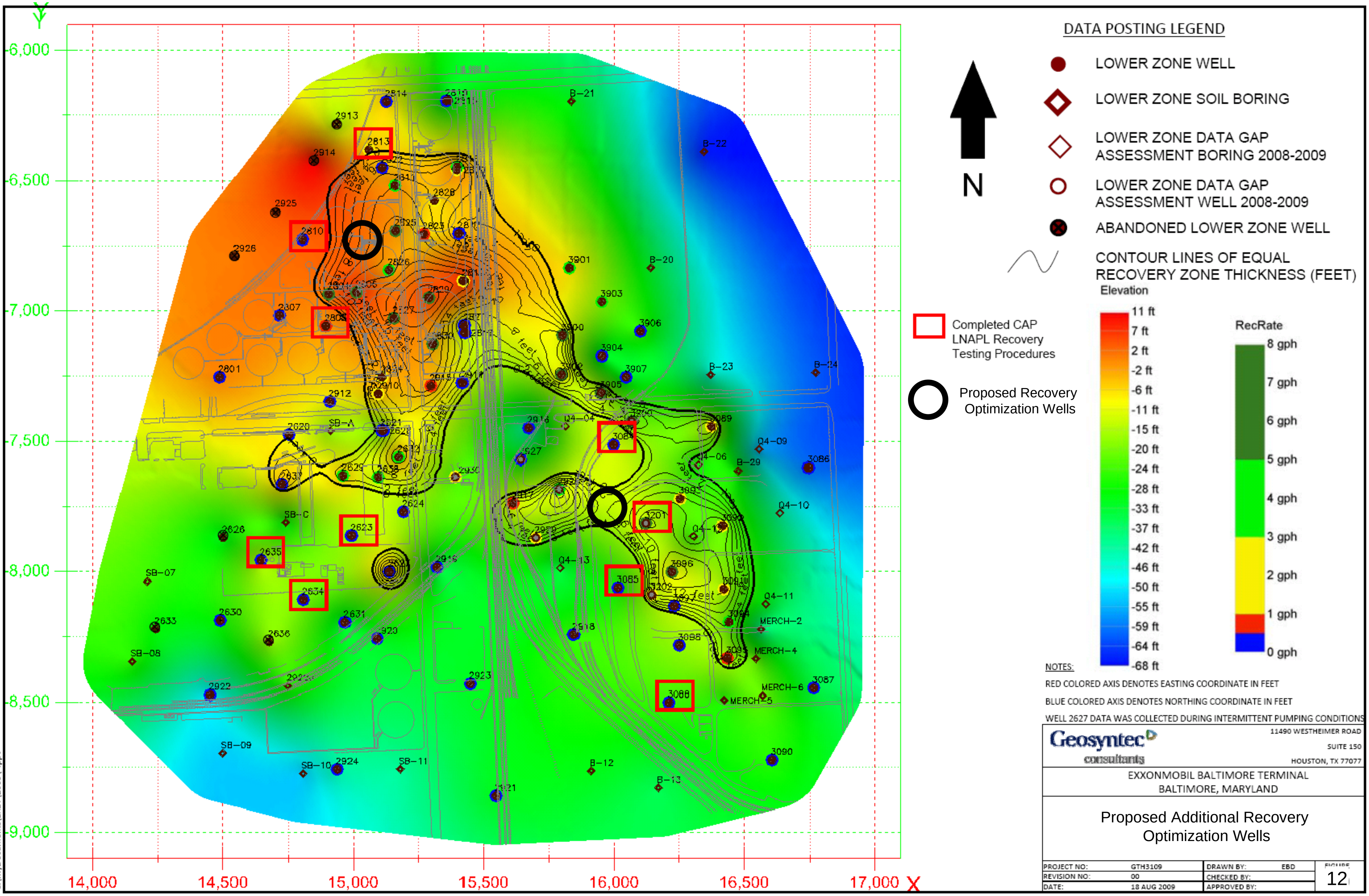
(1) – Maximum sustainable recovery rate is the highest rate (GPH) capable while maintaining a stable recovery zone thickness.

(2) – Recovery testing procedures includes using a stepped approach to determine the maximum sustainable recovery rate in ½ GPH increments for the first 2 GPH then 1 to 2 GPH increments thereafter.

(3) – The LNAPL recovery zone is the horizontal and vertical extent of LNAPL below the A/P contact that is sustainable during continuous pumping conditions and the recovery zone thickness is defined as the difference (ft) between the Arundel/Patuxent contact and the oil/water interface.

(4) – Lowest rate attainable (1/2 GPH) using proven site-specific equipment under continuous pumping conditions.

(5) – The well will be tested for a maximum of 2 consecutive quarters at ½ GPH to determine its recovery sustainability.



DATA POSTING LEGEND
LOWER ZONE WELL
LOWER ZONE SOIL BORING
LOWER ZONE DATA GAP ASSESSMENT BORING 2008-2009
LOWER ZONE DATA GAP ASSESSMENT WELL 2008-2009
ABANDONED LOWER ZONE WELL
CONTOUR LINES OF EQUAL RECOVERY ZONE THICKNESS (FEET)
N
Completed CAP LNAPL Recovery Testing Procedures
Proposed Recovery Optimization Wells
Elevation
11 ft
7 ft
2 ft
-2 ft
-6 ft
-11 ft
-15 ft
-20 ft
-24 ft
-28 ft
-33 ft
-37 ft
-42 ft
-46 ft
-50 ft
-55 ft
-59 ft
-64 ft
-68 ft
RecRate
8 gph
7 gph
6 gph
5 gph
4 gph
3 gph
2 gph
1 gph
0 gph
NOTES:
RED COLORED AXIS DENOTES EASTING COORDINATE IN FEET
BLUE COLORED AXIS DENOTES NORTHING COORDINATE IN FEET
WELL 2627 DATA WAS COLLECTED DURING INTERMITTENT PUMPING CONDITIONS
Y
-6,000
-6,500
-7,000
-7,500
-8,000
-8,500
-9,000
14,000
14,500
15,000
15,500
16,000
16,500
17,000
X
Geosyntec consultants
11490 WESTHEIMER ROAD
SUITE 150
HOUSTON, TX 77077
EXXONMOBIL BALTIMORE TERMINAL
BALTIMORE, MARYLAND
Proposed Additional Recovery Optimization Wells
PROJECT NO: GTH3109
REVISION NO: 00
DATE: 18 AUG 2009
DRAWN BY: EBD
CHECKED BY:
APPROVED BY:
FIGURE
12

TABLES

Table 1 - LNAPL Recoverability Results (Updated 8/09)
Lower Zone Corrective Action Plan
ExxonMobil Baltimore Terminal

Well/Boring ID	Baildown Test Date (s)	Baildown Test Results (1) (Low/Medium/High)	Yield Test Duration (2) and Dates	LNAPL Yield Trailer Testing Results (GPH)	Current (8/09) and Estimated* LNAPL Recovery (GPH)
2620	Not completed	N/A	Short Term (Feb 2008)	Reduced LNAPL to minimal thickness in less than 2 hours (< 1/2 GPH)	< 1/2 GPH *
2621	8/13/1995, 10/2/2002	Low	Short Term (Oct 2003), Short Term (April 2004, July 04)	Reduced LNAPL to minimal thickness in less than 2 hours (< 1/2 GPH)	< 1/2 GPH *
2623	10/3/2002	Low	Long Term (Oct 03), Long Term (March 04, Sept 04)	< 1/2 GPH	LNAPL thickness could not be maintained during CAP recovery testing procedures at 1/2 GPH (recovery not sustainable)
2624	7/19/1995	Medium	Not Tested - designated as recovery well in original recovery system	Not Tested - designated as recovery well in original recovery system	1/2 GPH
2626	No LNAPL	No LNAPL	No LNAPL	No LNAPL	Well abandoned
2627	7/19/1995	High	Not Tested - designated as recovery well in original recovery system	Not Tested - designated as recovery well in original recovery system	< 1/2 GPH (intermittent)
2628	Not completed	N/A	Short Term (June 04)	<1 GPH	< 1/2 GPH (intermittent)
2629	3/7/1996	Medium	Long Term (Nov 99 to June 05)	3-5 GPH	4 GPH
2630	10/3/2002	Medium	Long Term (Nov 99), Long Term (April 04), Long Term (Feb 08)	< 1 GPH	< 1/2 GPH *
2631	1/15/2003	Low	Not Tested - due to Low baildown test results	Not Tested - due to Low baildown test results	0 GPH *
2632	3/7/1996	Poor baildown test data	Long Term (May 00 to Jan 01)	3-5 GPH	3 GPH
2633	No LNAPL	No LNAPL	No LNAPL	No LNAPL	Well abandoned
2634	2/9/2006	Low	Long Term (Aug 08 to Jan 09)	< 1/2 GPH	LNAPL thickness could not be maintained during CAP recovery testing procedures at 1/2 GPH (recovery not sustainable)
2635	2/9/2006	Low	Short Term (Oct 06)	< 1/2 GPH	LNAPL thickness could not be maintained during CAP recovery testing procedures at 1/2 GPH (recovery not sustainable)
2636	No LNAPL	No LNAPL	No LNAPL	No LNAPL	Well abandoned
2637	2/8/2006	Low	Short Term test indicated water during recovery	N/A	< 1/2 GPH *
2638	1/4/2008	High	Long Term (Jan 08)	3-5 GPH	3 GPH
2801	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL

Table 1 - LNAPL Recoverability Results (Updated 8/09)
Lower Zone Corrective Action Plan
ExxonMobil Baltimore Terminal

Well/Boring ID	Baildown Test Date (s)	Baildown Test Results (1) (Low/Medium/High)	Yield Test Duration (2) and Dates	LNAPL Yield Trailer Testing Results (GPH)	Current (8/09) and Estimated* LNAPL Recovery (GPH)
2804	7/20/1995	High	Not Tested - designated as recovery well in original recovery system	Not Tested - designated as recovery well in original recovery system	5 GPH
2806	7/20/1995	High	Not Tested - designated as recovery well in original recovery system	Not Tested - designated as recovery well in original recovery system	6 GPH
2807	1/9/2003	Low	Not Tested - due to Low baildown test results	Not Tested - due to Low baildown test results	< 1/2 GPH *
2808	Not completed	N/A	Not Tested - designated as recovery well in original recovery system	Not Tested - designated as recovery well in original recovery system	1/2 GPH
2810	1/9/2003	Low	Short Term (Mar 02)	<1/2 GPH	LNAPL thickness could not be maintained during CAP recovery testing procedures at 1/2 GPH (recovery not sustainable)
2811	7/19/1995	High	Not Tested - designated as recovery well in original recovery system	Not Tested - designated as recovery well in original recovery system	3 GPH
2812	7/25/1995	Medium	Not Tested - designated as recovery well in original recovery system	Not Tested - designated as recovery well in original recovery system	1 1/2 GPH
2813	7/2/1995, 2/6/03	Medium	Long Term (Mar 02 to Jan 03), Long Term (July/Aug 03), Long Term (Nov 03 to March 04), Long Term (Nov 04 to Feb 05)	3-5 GPH, 1-3 GPH (Rates decreased over time)	1 1/2 GPH
2814	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
2816	8/3/1995	Medium	Not Tested - designated as recovery well in original recovery system	Not Tested - designated as recovery well in original recovery system	3 GPH
2817	7/20/1995, 10/24/02	Low	Not Tested - due to Low baildown test results	Not Tested - due to Low baildown test results	<1/2 GPH *
2818	7/19/95, 10/24/02	Medium	Long Term (Mar 03)	< 1 GPH	0 GPH **
2819/2815	Not sufficient LNAPL	N/A	N/A	N/A	<1/2 GPH*
2820	10/24/2002	Medium	Long Term (Mar to May 03)	1-3 GPH	Discretely Screened (2 GPH*)
2821	10/24/2002	Low	Short Term (Oct 03)	Reduced LNAPL to minimal thickness in less than 2 hours (<1/2 GPH)	Discretely Screened (<1/2 GPH*)
2822	8/3/1995	Medium	Not Tested - added to original system in 1998	N/A	<1/2 GPH*
2823	3/7/1996	High	Long Term (Dec 99 to May 00)	3-5 GPH	1 GPH
2824	Not completed	N/A	Not Tested - designated as recovery well in original recovery system	Not Tested - designated as recovery well in original recovery system	1 GPH
2825	1/9/2003	High	Long Term (Jan to Mar 03)	> 5 GPH	7 GPH

Table 1 - LNAPL Recoverability Results (Updated 8/09)
Lower Zone Corrective Action Plan
ExxonMobil Baltimore Terminal

Well/Boring ID	Baildown Test Date (s)	Baildown Test Results (1) (Low/Medium/High)	Yield Test Duration (2) and Dates	LNAPL Yield Trailer Testing Results (GPH)	Current (8/09) and Estimated* LNAPL Recovery (GPH)
2826	1/4/2008	High	Long Term (Feb to July 08)	3-5 GPH	3 GPH
2827	1/23/2008	Medium	Long Term (Mar to April 08)	3-5 GPH	8 GPH
2828	1/16/2008	High	Long Term (Mar 08)	3-5 GPH	2 GPH
2829	1/23/2008	High	Long Term (Jan to Feb 08)	> 5 GPH	7 1/2 GPH
2830	1/29/2008	High	Long Term (Feb 08)	3-5 GPH	8 GPH
2910	7/25/95, 1/15/03	Medium	Not Tested due to Access	Not Tested due to Access	1 1/2 GPH*
2911	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
2912	7/25/1995	Medium	Not Tested due to Access	Not Tested due to Access	<1/2 GPH*
2913	No LNAPL	No LNAPL	No LNAPL	No LNAPL	Well abandoned
2914	No LNAPL	No LNAPL	No LNAPL	No LNAPL	Well abandoned
2915	Not Completed due to access	N/A	Not Tested due to Access	Not Tested due to Access	>1/2 GPH*
2916	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
2917	Not Completed due to access	N/A	Not Tested due to Access	Not Tested due to Access	>1/2 GPH *
2918	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
2919	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
2920	8/3/1995	Low	Initial Short Term Tests (June and Sept 00). Multiple Short Term events in 03, 04, and 05)	Reduced LNAPL to minimal thickness in less than 2 hours (<1/2 GPH)	0 GPH *
2921	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
2922	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
2923	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL

Table 1 - LNAPL Recoverability Results (Updated 8/09)
Lower Zone Corrective Action Plan
ExxonMobil Baltimore Terminal

Well/Boring ID	Baildown Test Date (s)	Baildown Test Results (1) (Low/Medium/High)	Yield Test Duration (2) and Dates	LNAPL Yield Trailer Testing Results (GPH)	Current (8/09) and Estimated* LNAPL Recovery (GPH)
2924	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
2925	Insufficient LNAPL	Insufficient LNAPL	Insufficient LNAPL	Insufficient LNAPL	Well abandoned
2926	Insufficient LNAPL	Insufficient LNAPL	Insufficient LNAPL	Insufficient LNAPL	Well abandoned
3084	7/25/95, 3/27/03	Low	Converted to Satellite Recovery System in July 1996	Satellite System initial recovery (1-3 GPH)	LNAPL thickness could not be maintained during CAP recovery testing procedures at 1/2 GPH (recovery not sustainable)
3085	7/25/1995, 3/27/03	Low	Converted to Satellite Recovery System in July 1996	Satellite System initial recovery (<1/2 GPH)	LNAPL thickness could not be maintained during CAP recovery testing procedures at 1/2 GPH (recovery not sustainable)
3086	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
3087	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
3088	8/3/95, 4/6/03	Medium, Low	Converted to Satellite Recovery System in July 1996	Satellite System initial recovery (1-3 GPH)	LNAPL thickness could not be maintained during CAP recovery testing procedures at 1/2 GPH (recovery not sustainable)
3089	3/7/1996	Medium	Converted to Satellite Recovery System in Aug 1996	Satellite System initial recovery (1-3 GPH)	2 GPH
3090	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL
3091	3/27/98, 3/27/03	High	Initial Long Term (June to July 99). Multiple Long Term events in 00, 01, 02, 03, 04, 05, 06, 07, 08)	Initial Long Term Test (3-5 GPH)	1 1/2 GPH*
3092	9/4/2002	Medium	Long Term Test (Sept to Oct 02)	1-3 GPH	1 1/2 GPH*
3093	9/3/2002	Medium	Long Term (Sept 02)	1-3 GPH	2 1/2 GPH*
3094	12/16/2002	High	Initial Long Term (Dec 02 to March 03), Multiple Long Term events in 03, 04, 05, 06, 07, 08)	Initial Long Term Test (> 5 GPH)	4 GPH
3095	12/16/2002	Medium	Short Term Test Sept 08	< 1 GPH	< 1 GPH *
3096	12/16/2002	High	Initial Long Term (Mar 03 to Mar 05), Multiple long term events in 06, 07, 08	3-5 GPH	5 GPH
3097	12/16/2002	Low	Not Tested - due to Low baildown test results	Not Tested - due to Low baildown test results	<1/2 GPH*
3098	No LNAPL	No LNAPL	No LNAPL	No LNAPL	No LNAPL

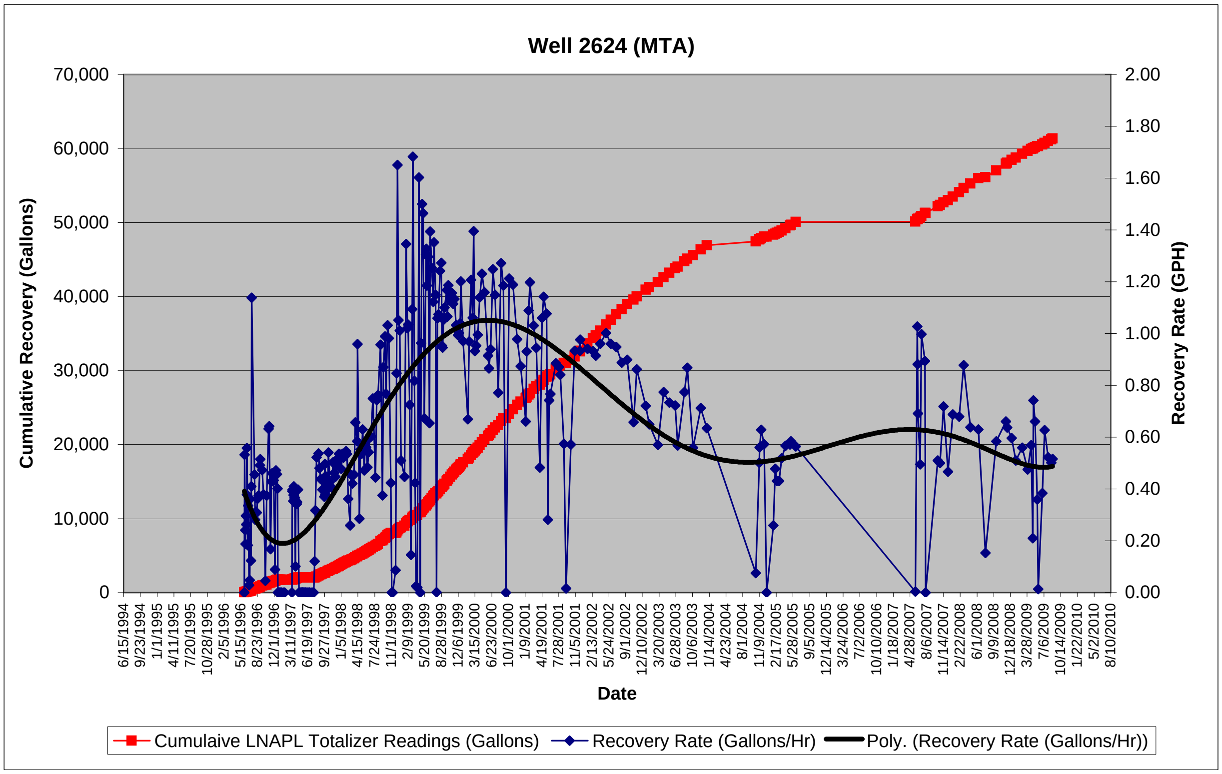
Table 1 - LNAPL Recoverability Results (Updated 8/09)
Lower Zone Corrective Action Plan
ExxonMobil Baltimore Terminal

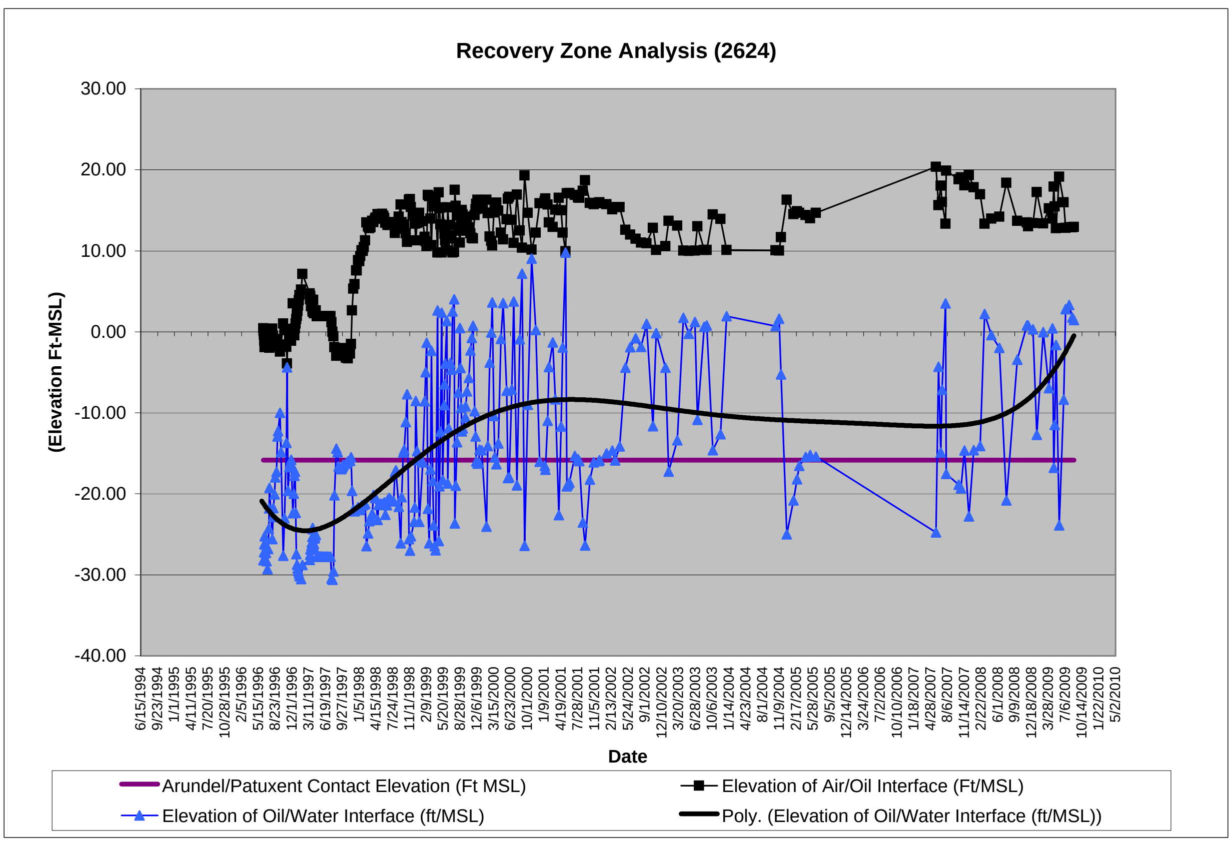
Well/Boring ID	Baildown Test Date (s)	Baildown Test Results (1) (Low/Medium/High)	Yield Test Duration (2) and Dates	LNAPL Yield Trailer Testing Results (GPH)	Current (8/09) and Estimated* LNAPL Recovery (GPH)
3900	10/3/2002	High	Initial Short Term (Oct 03), Multiple Long Term Events (03, 04, 05, 06, 07, 08)	> 5 GPH	7 GPH
3901	2/10/2004	High	Initial Short Term (May 04)	> 5 GPH	3 1/2 GPH
3902	2/11/2004	High	Initial Short Term (April 04)	> 5 GPH	5 1/2 GPH
3903	2/10/2004	High	Initial Short Term (April 04)	> 5 GPH	3 GPH
3904	Insufficient LNAPL	N/A	N/A	N/A	<1/2 GPH*
3905	2/11/2004	High	Initial Short Term (April 04), Multiple Long Term (Nov 04 to Mar 05), Oct 06 to June 08	> 5 GPH	6 GPH
3906	Not Completed	N/A	Installed as Recovery Well in CT/14th System	Installed as Recovery Well in CT System	<1/2 GPH (Intermittent)
3907	Insufficient LNAPL	N/A	N/A	N/A	<1/2 GPH*
Q4-1:**2927**	Minimal LNAPL As of 2/09	Minimal LNAPL As of 2/09	Minimal LNAPL As of 2/09	Minimal LNAPL As of 2/09	<1/2 GPH*
Q4-2:**2928**	1/22/2008	High	Long Term (Jan 09)	> 5 GPH	4 GPH*
Q4-3:**2929**	2/6/2009	High	Long Term (Jan 09)	3-5 GPH	1 1/2 GPH*
Q4-4 **2930**	4/23/2009	Medium	Short Term (May 09)	1-3 GPH	1-3 GPH*
Q4-5:**3200**	1/21/2009	High	Long Term (Jan 09)	> 5 GPH	5 GPH *
Q4-7:**3201**	1/21/2009	High	Long Term (Jan/Feb 09)	> 5 GPH	7 GPH*
Q4-8:**3202**	1/21/2009	High	Long Term (Feb 09)	> 5 GPH	2 GPH*

Active LNAPL Recovery Remedial System	CAP Recovery Test Procedure Well
Active LNAPL Recovery Satellite System or Trailer	Planned CAP System Addition Well

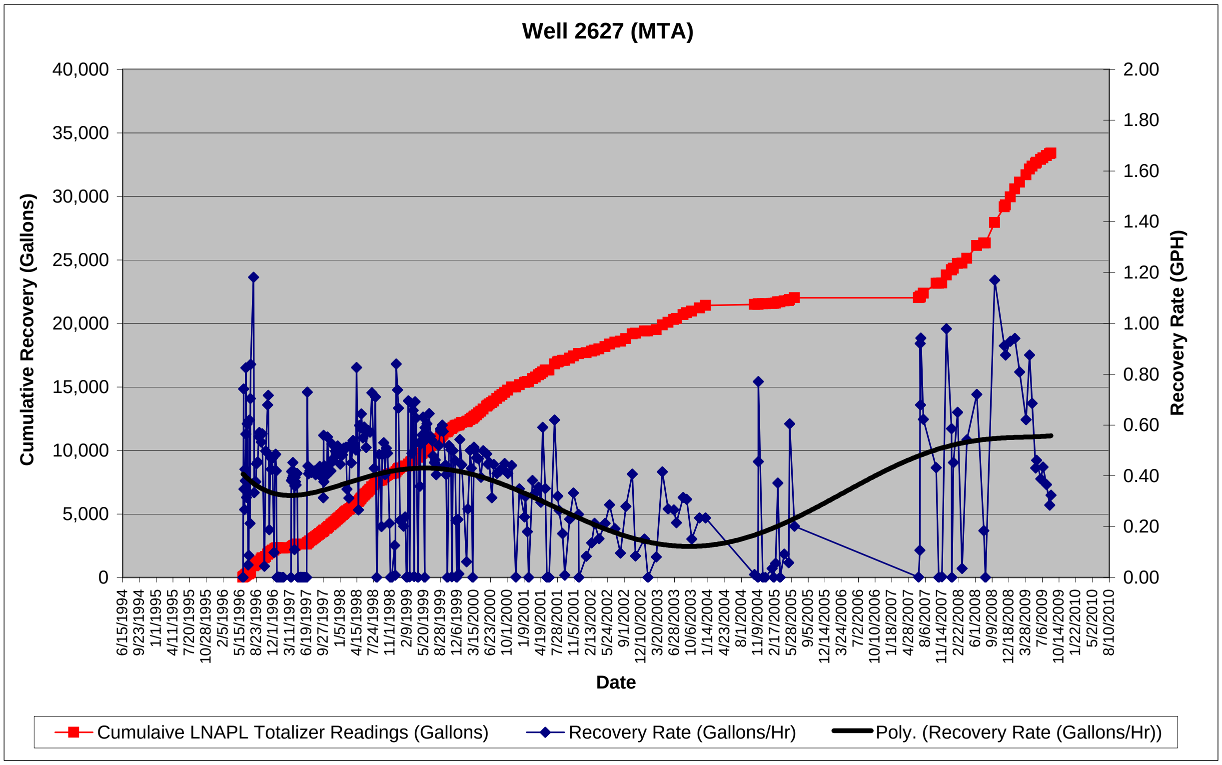
Notes
(1) Baildown test results = Low/Medium/High are unit less rankings calculated by comparing LNAPL recharge rates documented during the test.
(2) Short term is less than 48 hours, Long Term is greater than 48 hours
(*) = Estimated sustainable recovery rate from baildown testing, trailer testing, and stratigraphic location
(**) = Inactive system well shut down due to lack of LNAPL

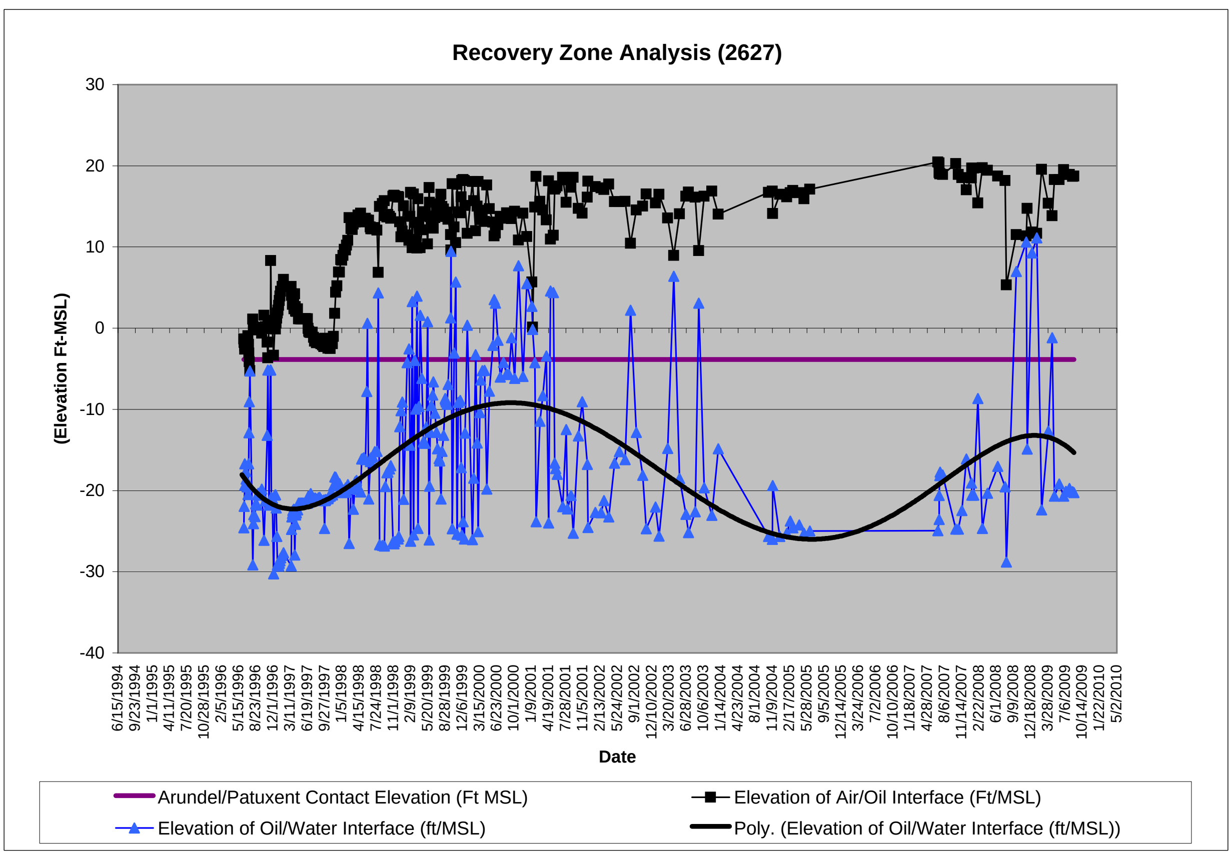
ATTACHMENT I



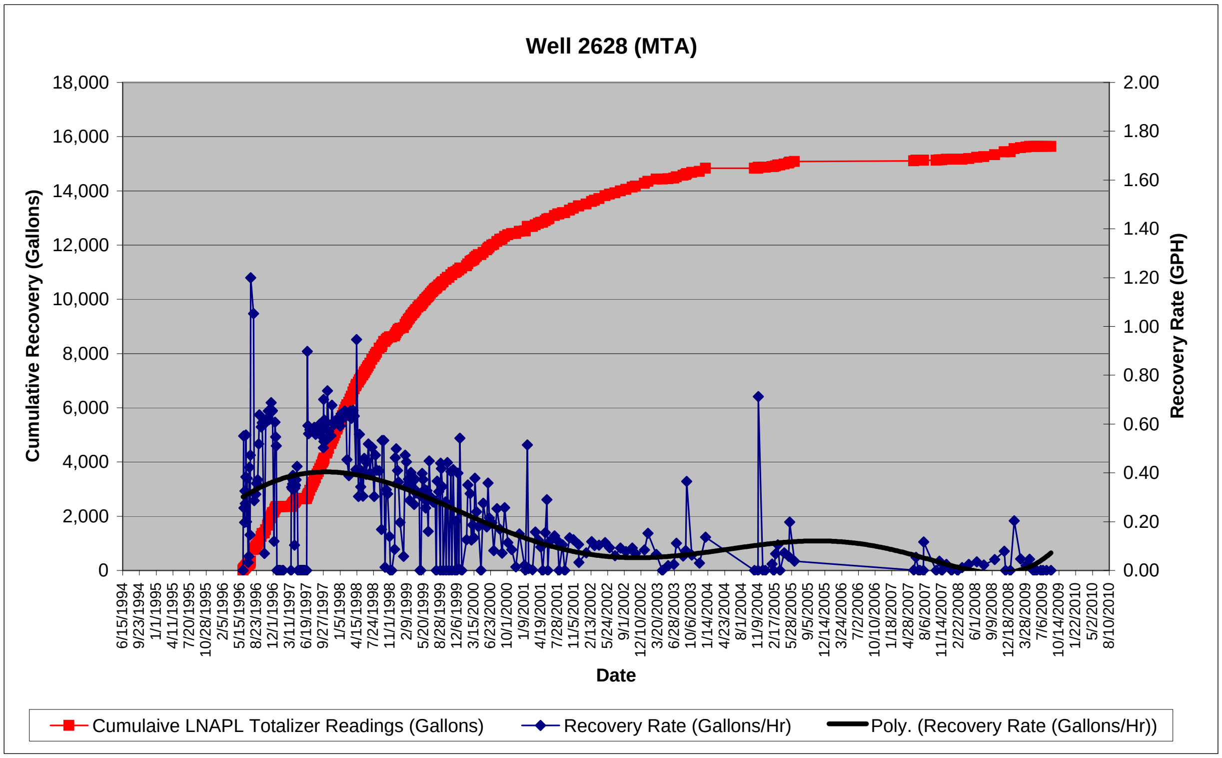


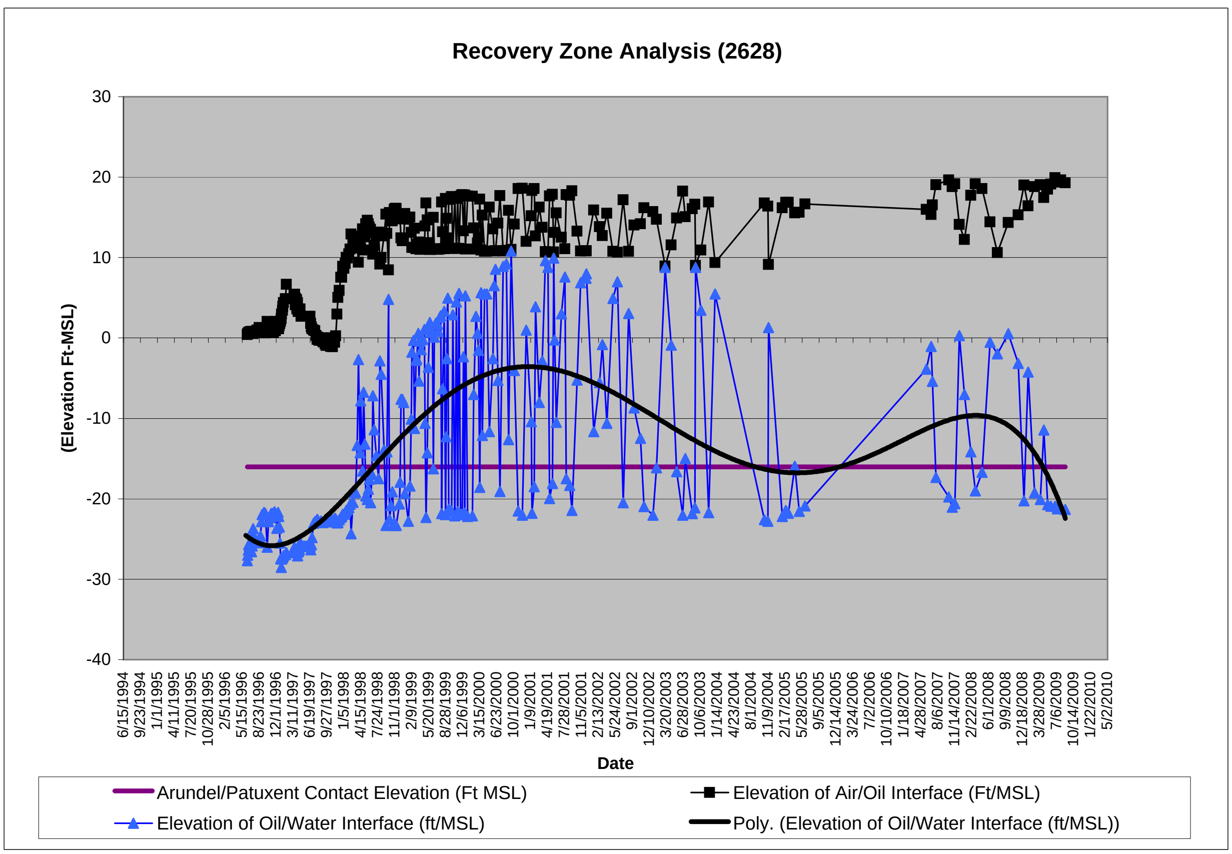
Note: The recovery pump in this well is not operated on a 24/7 continuous basis and therefore recovery rates below 1/2 GPH are not indicative of sustainable recovery.



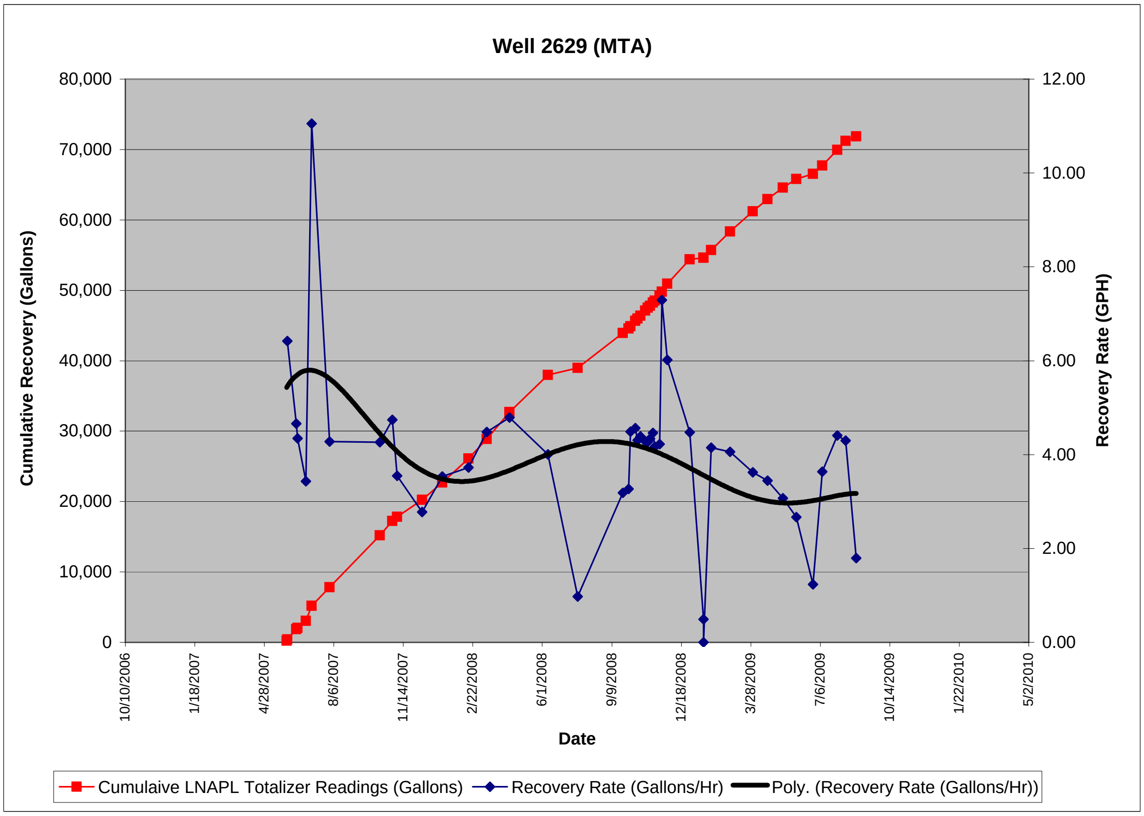


Note: The recovery pump in this well is not operated on a 24/7 continuous basis and therefore recovery rates below 1/2 GPH are not indicative of sustainable recovery.

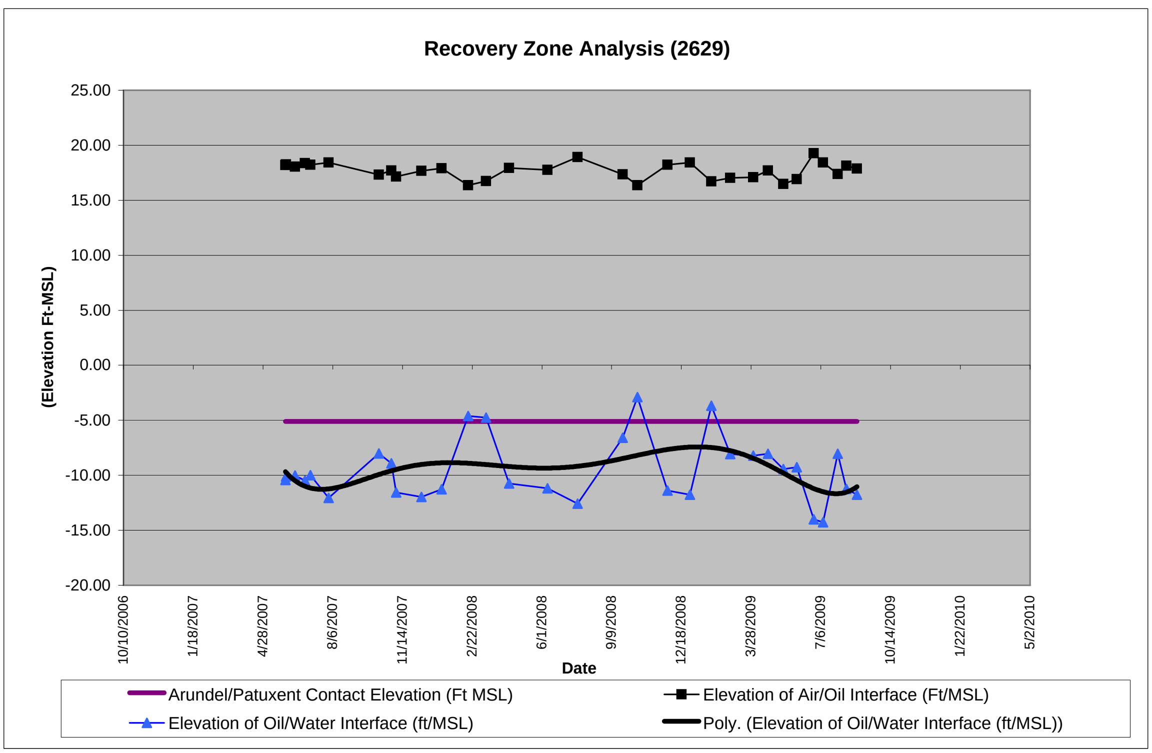




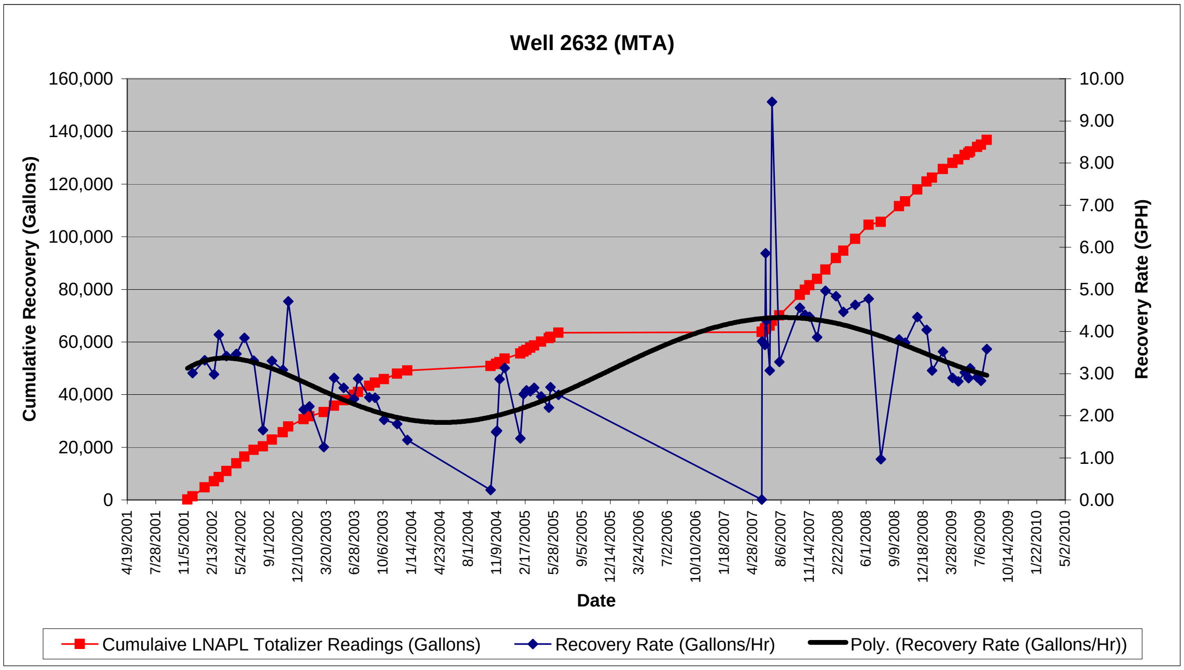
Note: The recovery pump in this well is not operated on a 24/7 continuous basis and therefore recovery rates below 1/2 GPH are not indicative of sustainable recovery.



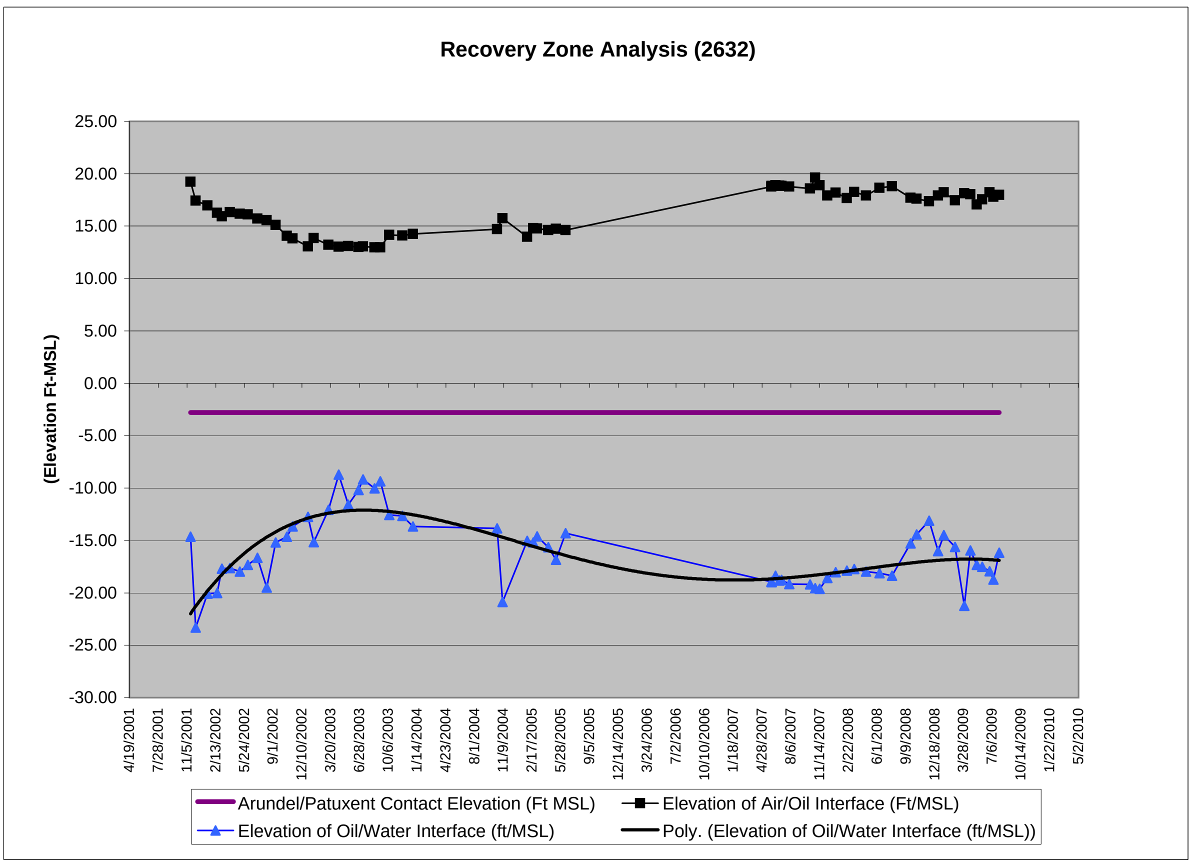
Well 2629 (MTA)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
12.00
10.00
8.00
6.00
4.00
2.00
0.00
10/10/2006
1/18/2007
4/28/2007
8/6/2007
11/14/2007
2/22/2008
6/1/2008
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))



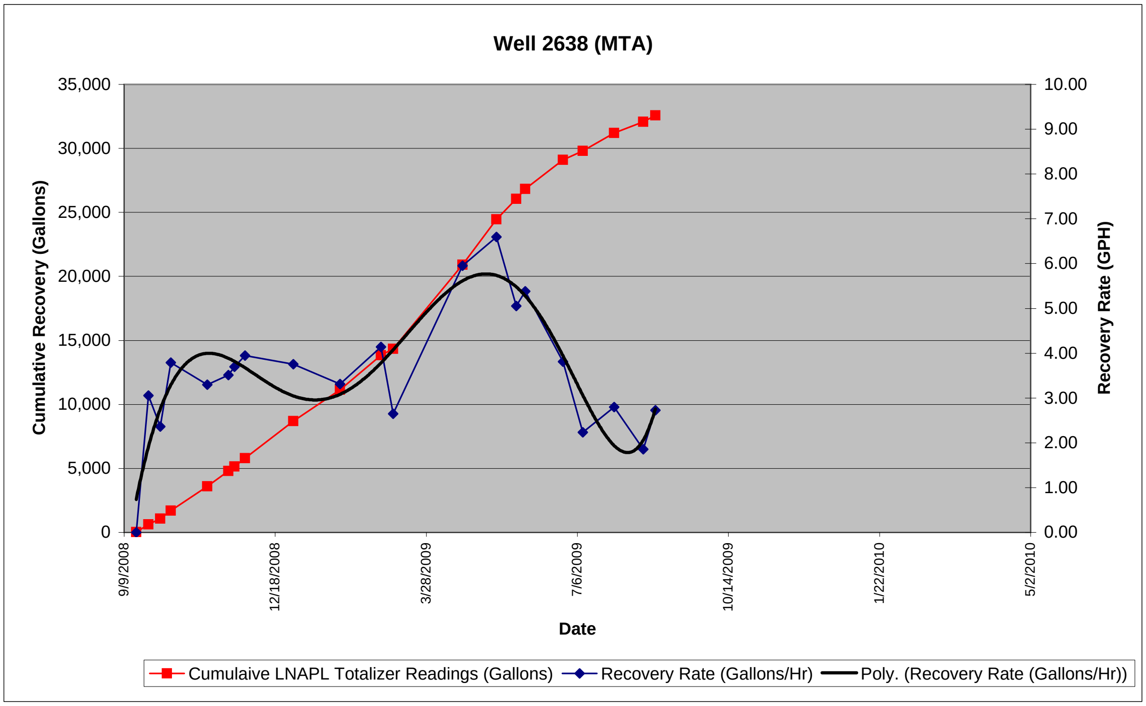
Recovery Zone Analysis (2629)
(Elevation Ft-MSL)
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
10/10/2006
1/18/2007
4/28/2007
8/6/2007
11/14/2007
2/22/2008
6/1/2008
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))

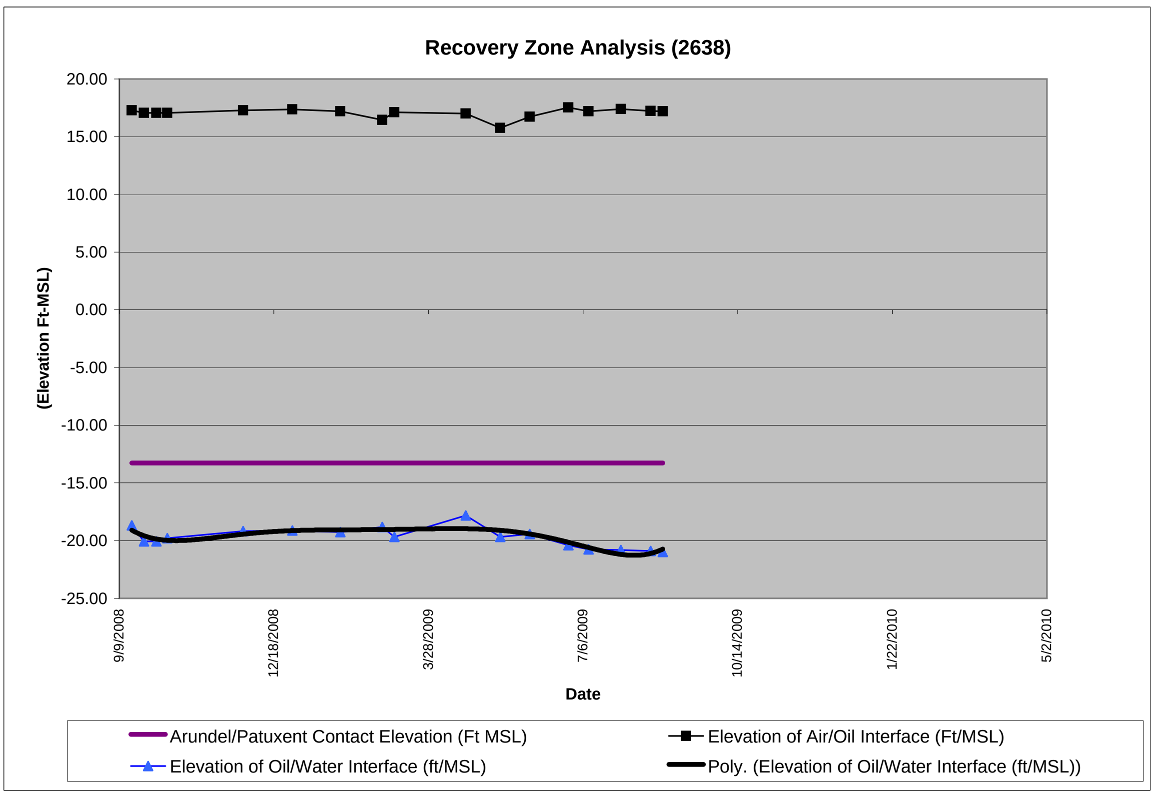


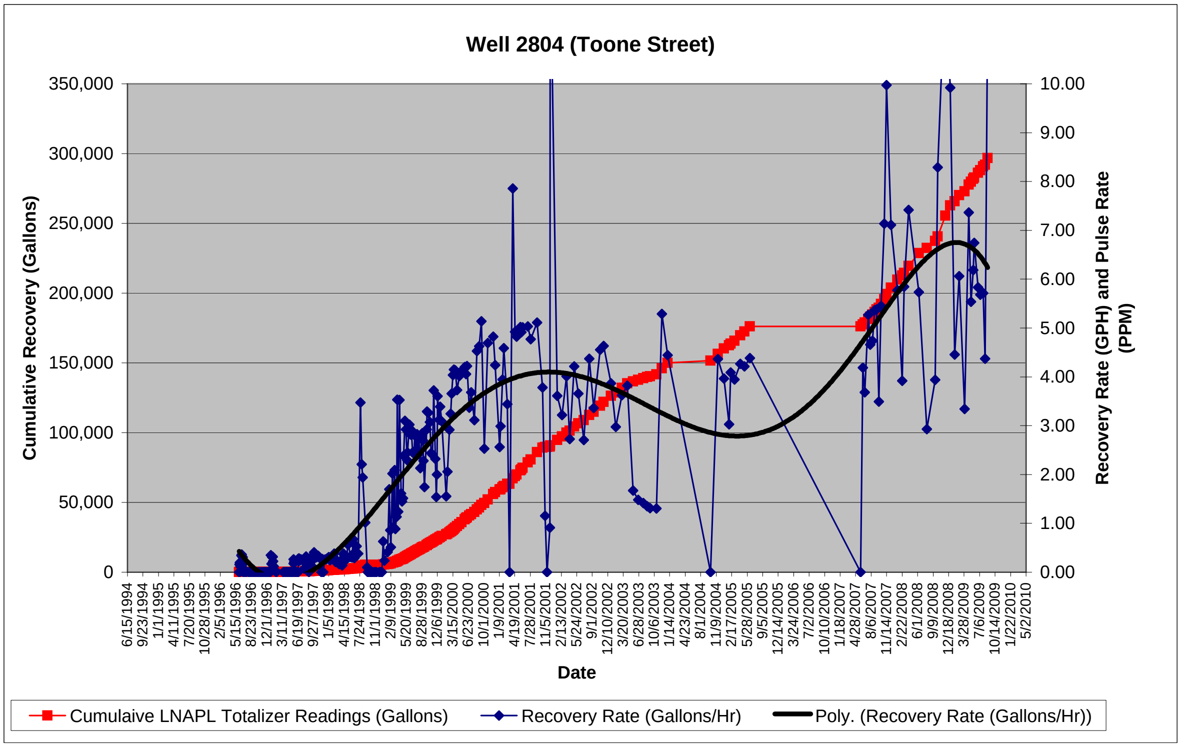
Well 2632 (MTA)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

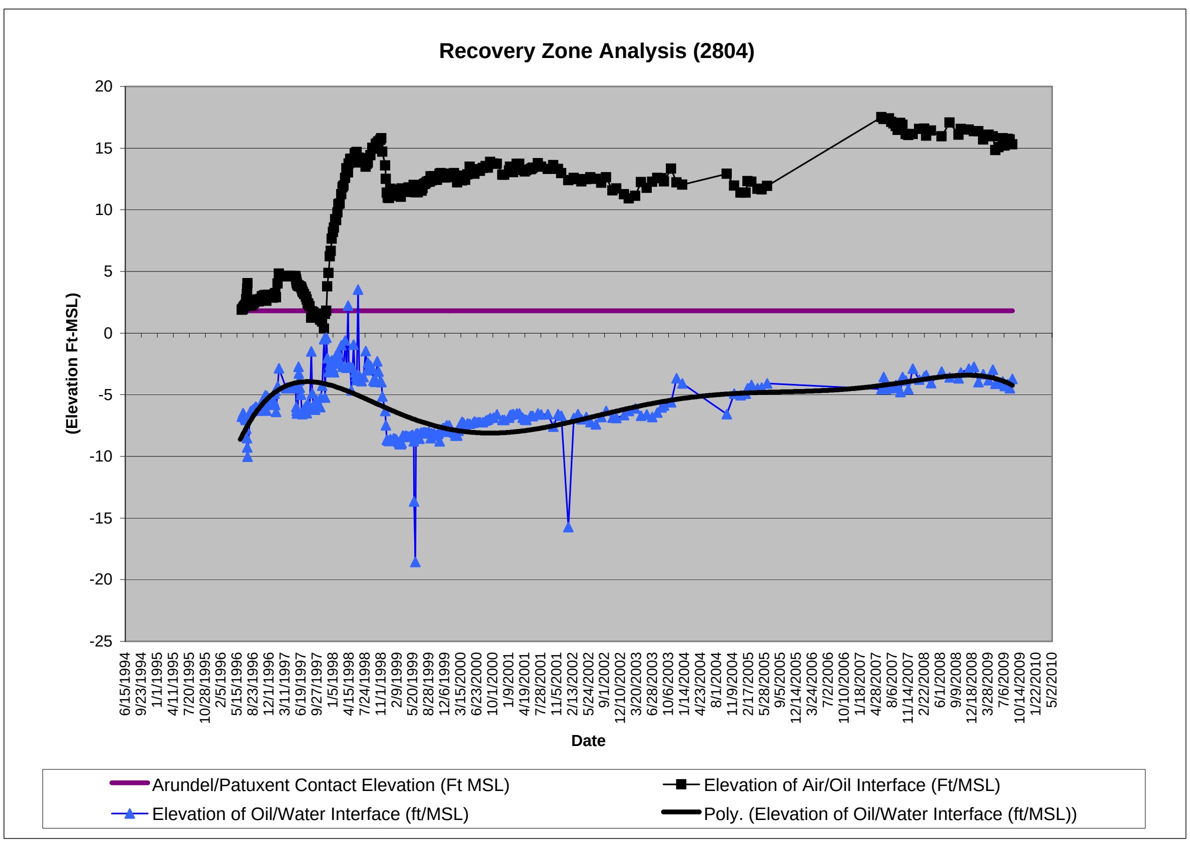


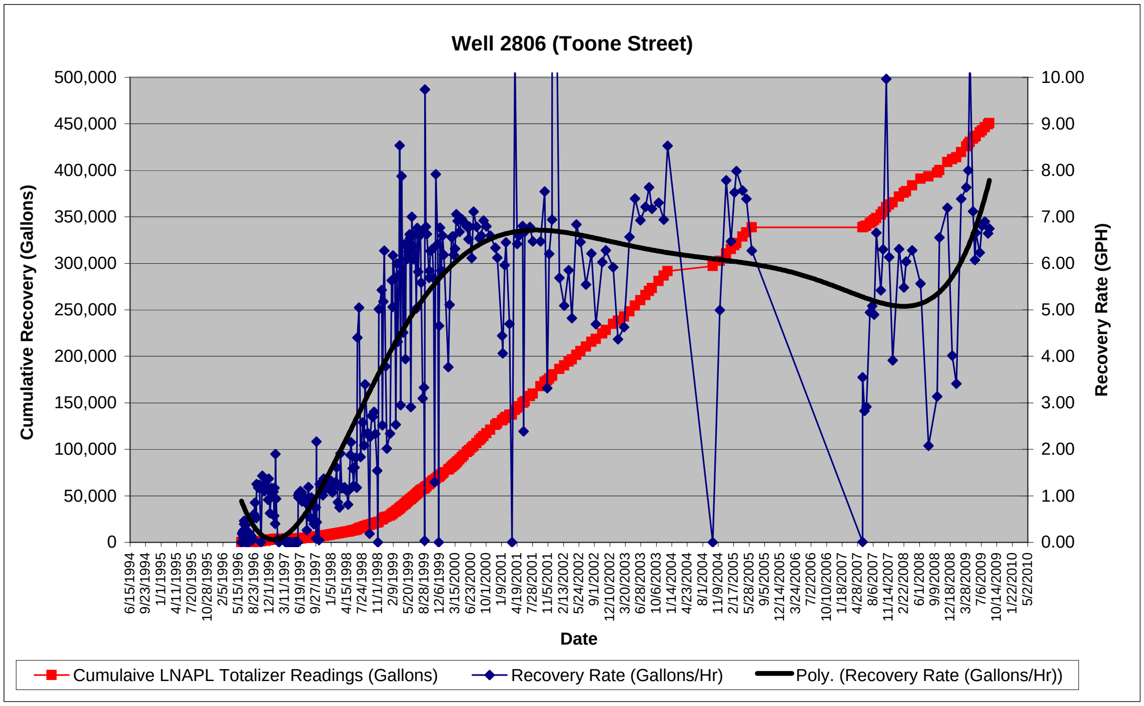
Recovery Zone Analysis (2632)
(Elevation Ft-MSL)
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))


Well 2638 (MTA)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Cumulative Recovery (Gallons)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Recovery Rate (GPH)
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

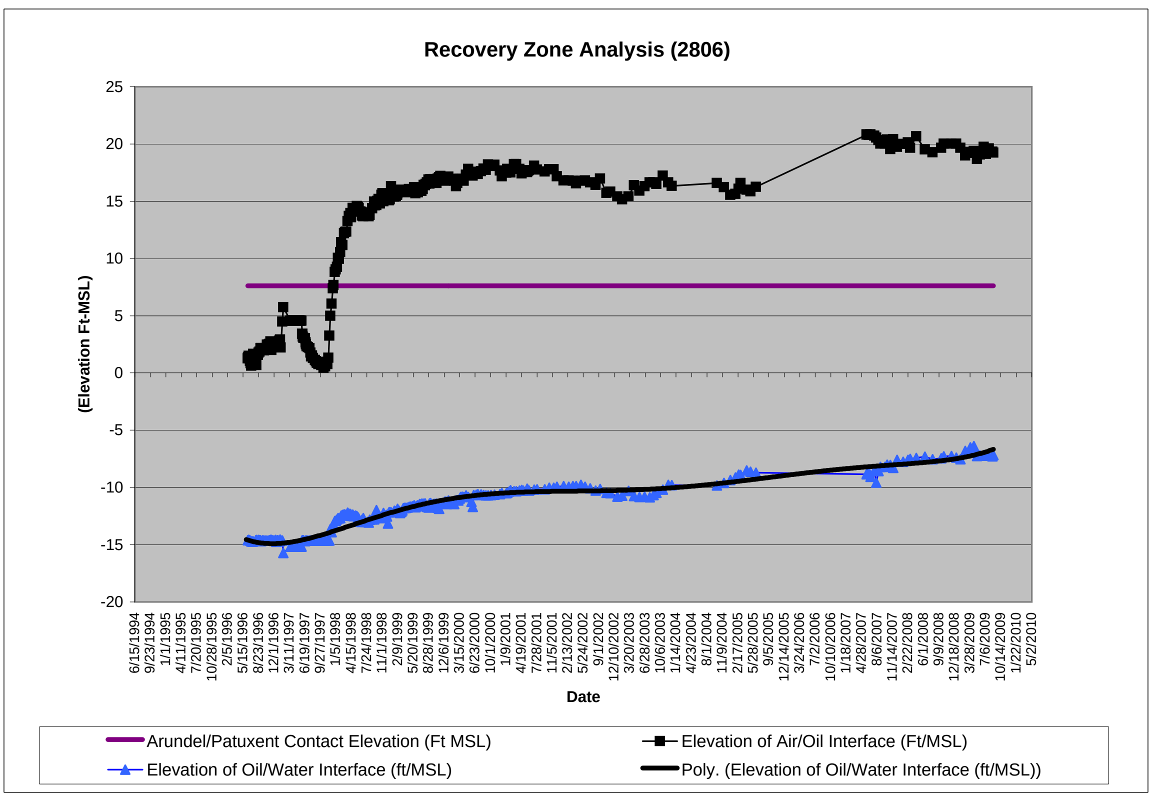

Recovery Zone Analysis (2638)
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
(Elevation Ft-MSL)
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))


Well 2804 (Toone Street)
Cumulative Recovery (Gallons)
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Recovery Rate (GPH) and Pulse Rate (PPM)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

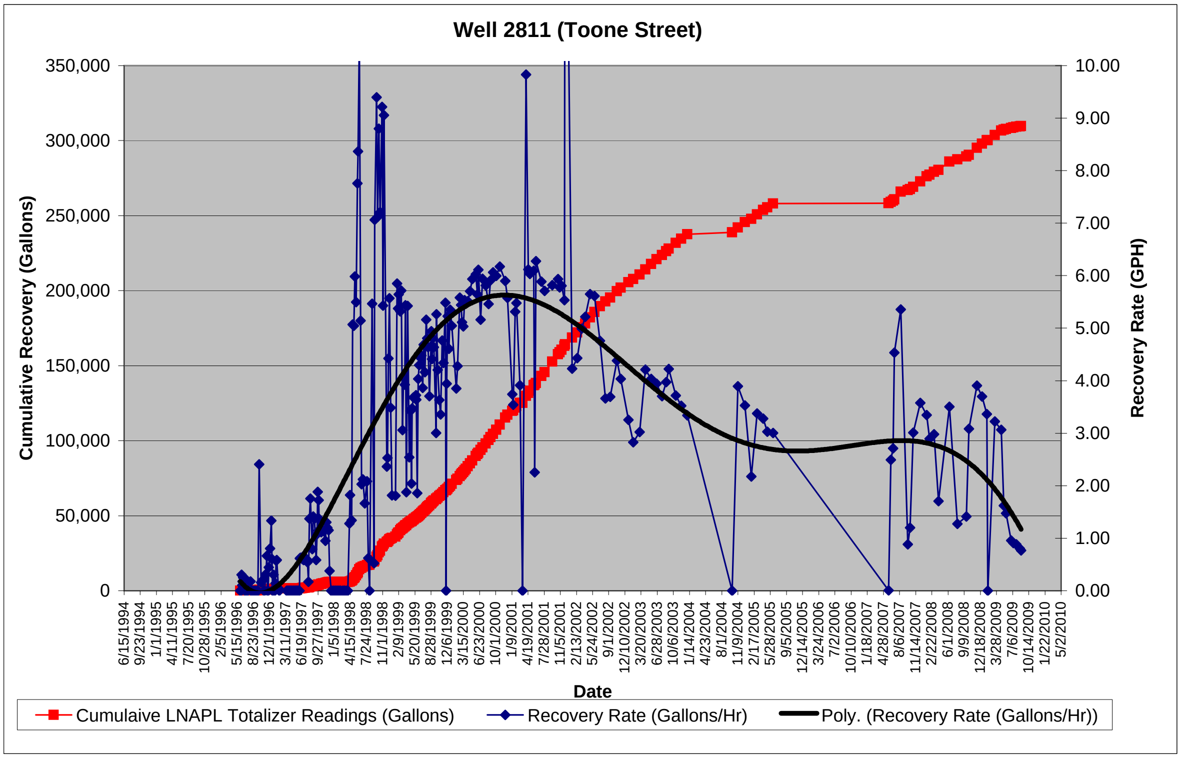

Recovery Zone Analysis (2804)
(Elevation Ft-MSL)
20
15
10
5
0
-5
-10
-15
-20
-25
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))



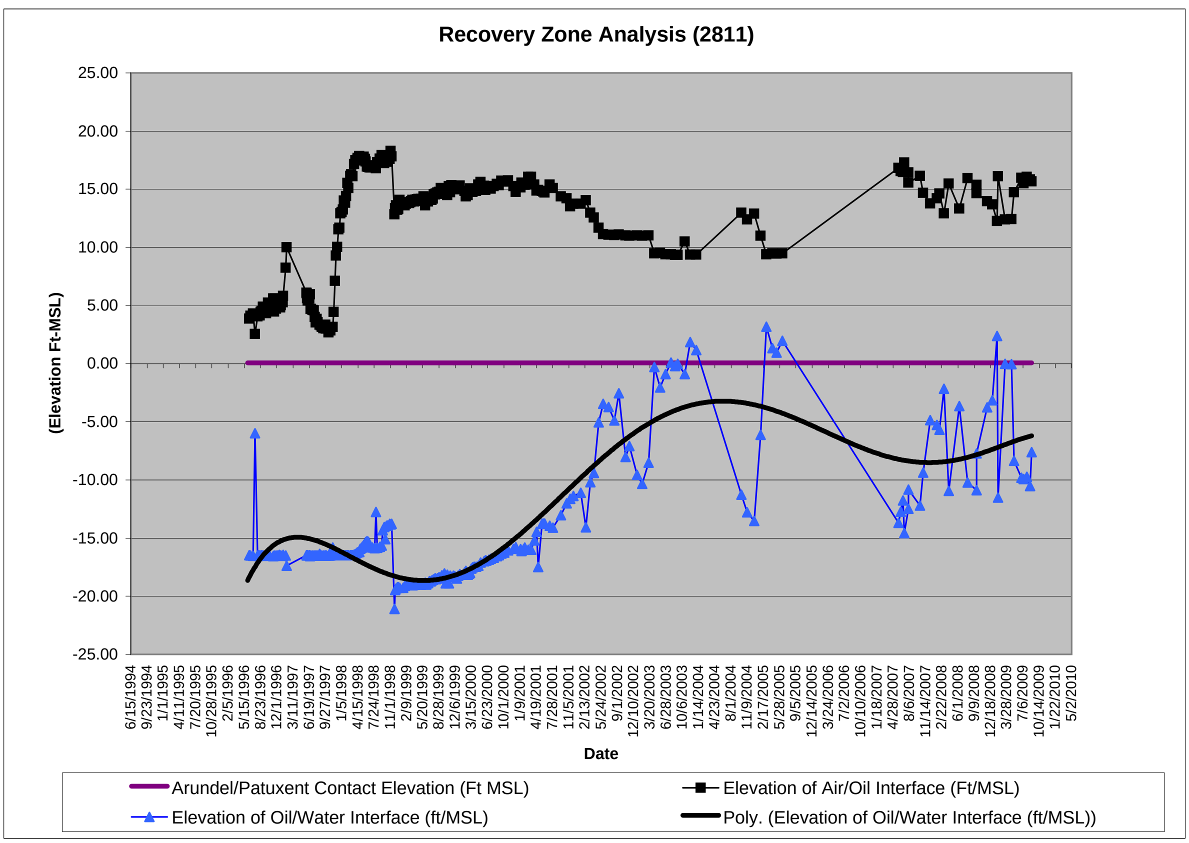
Well 2806 (Toone Street)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))



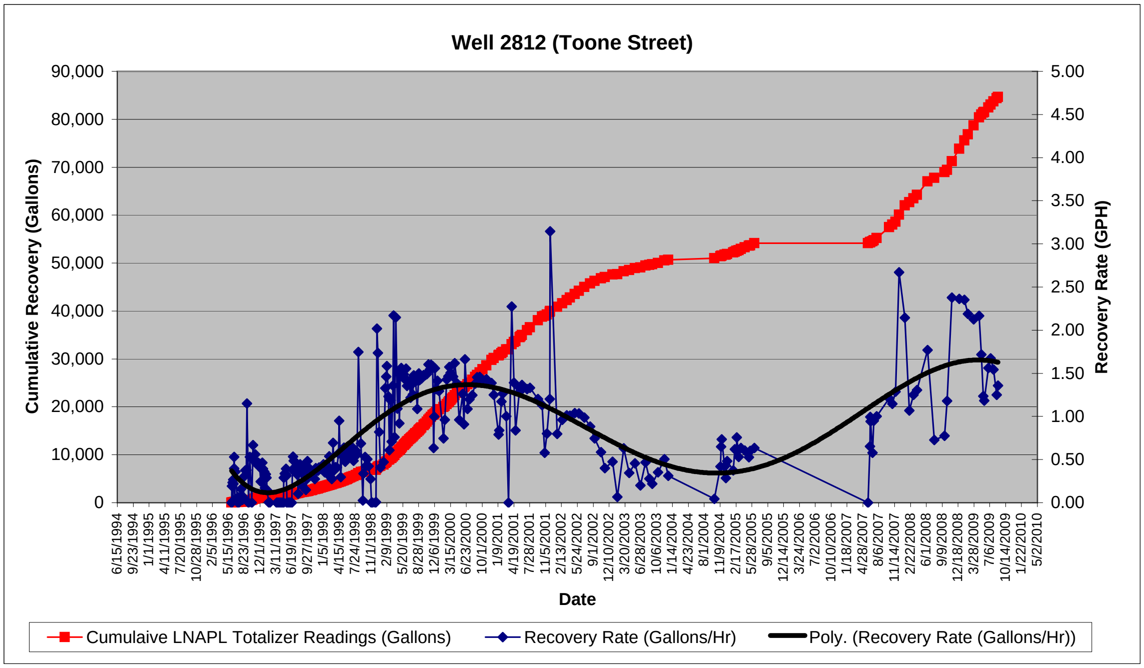
Recovery Zone Analysis (2806)
(Elevation Ft-MSL)
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))

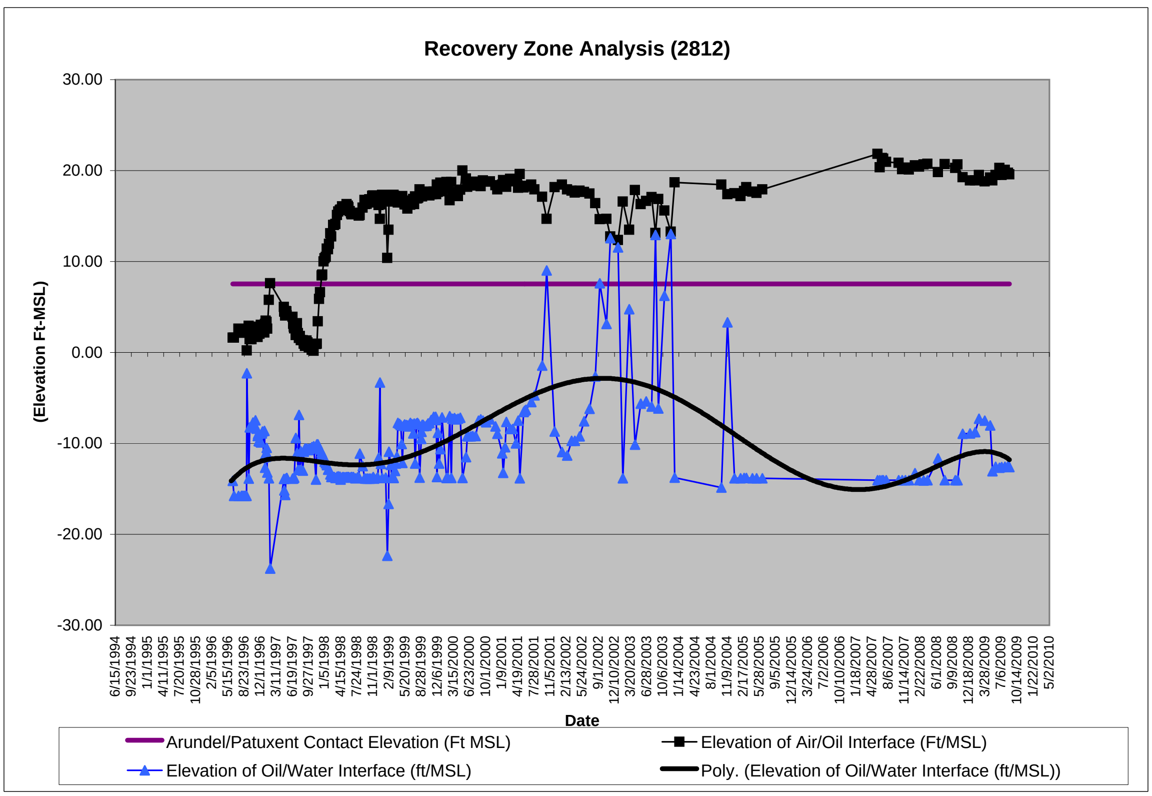


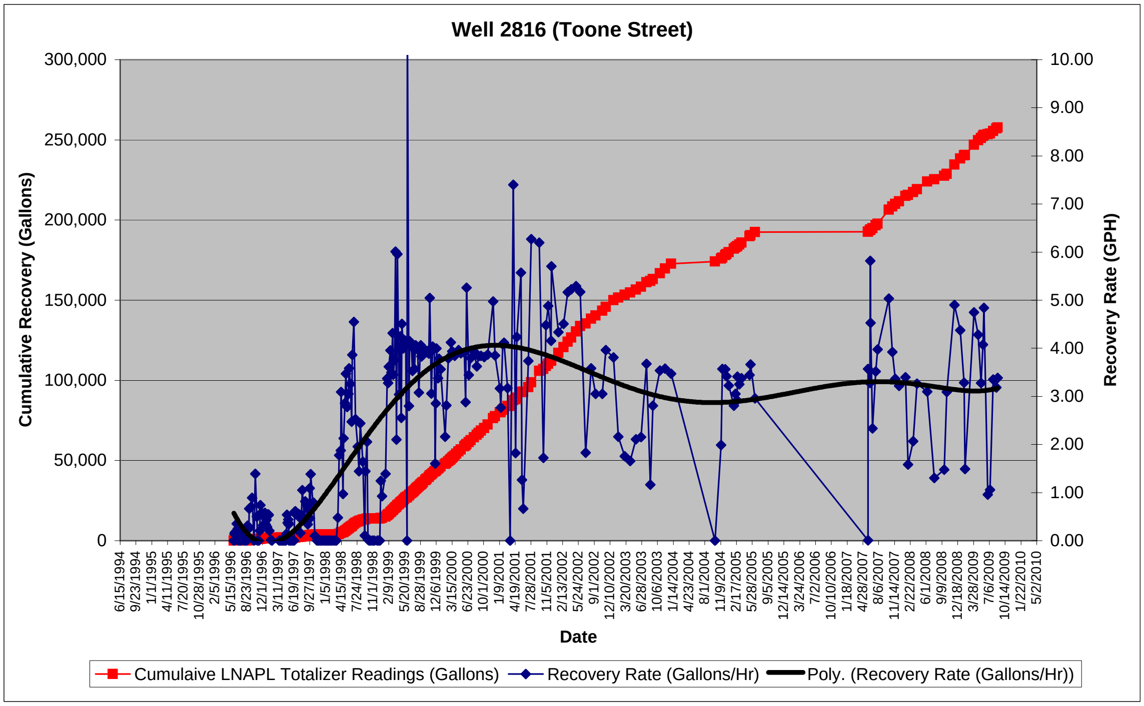
Well 2811 (Toone Street)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

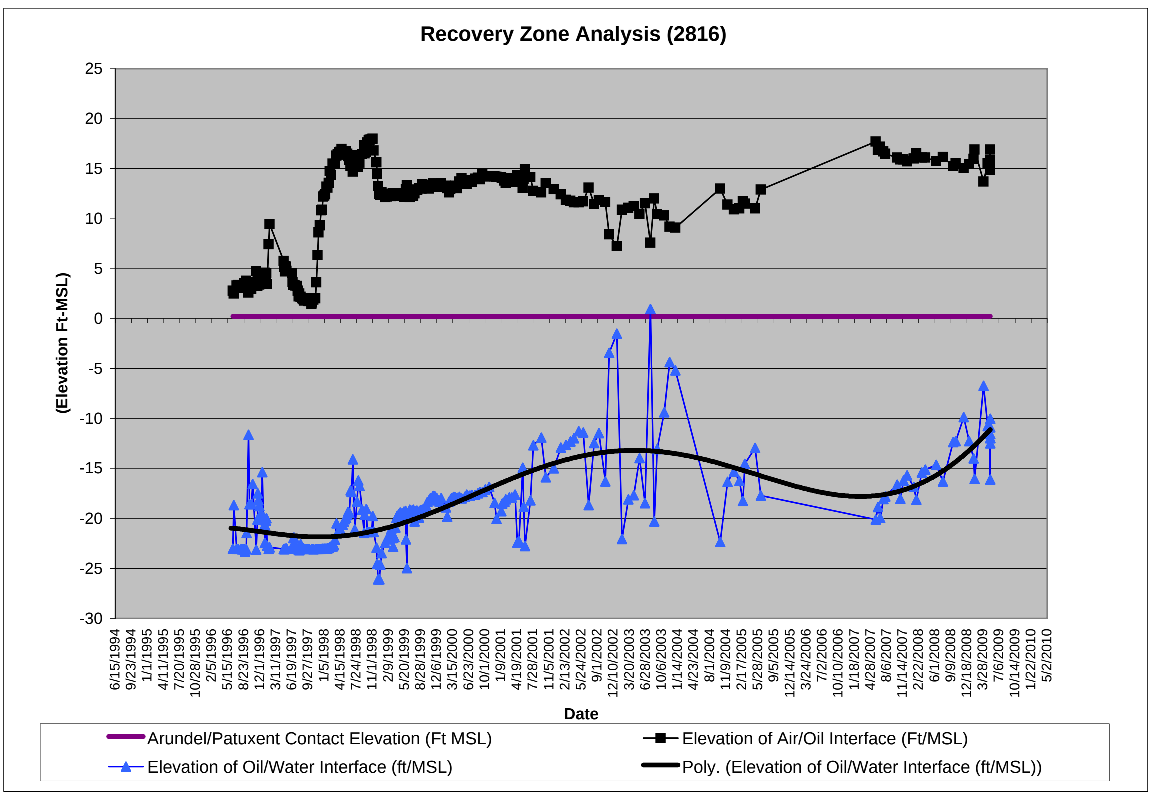


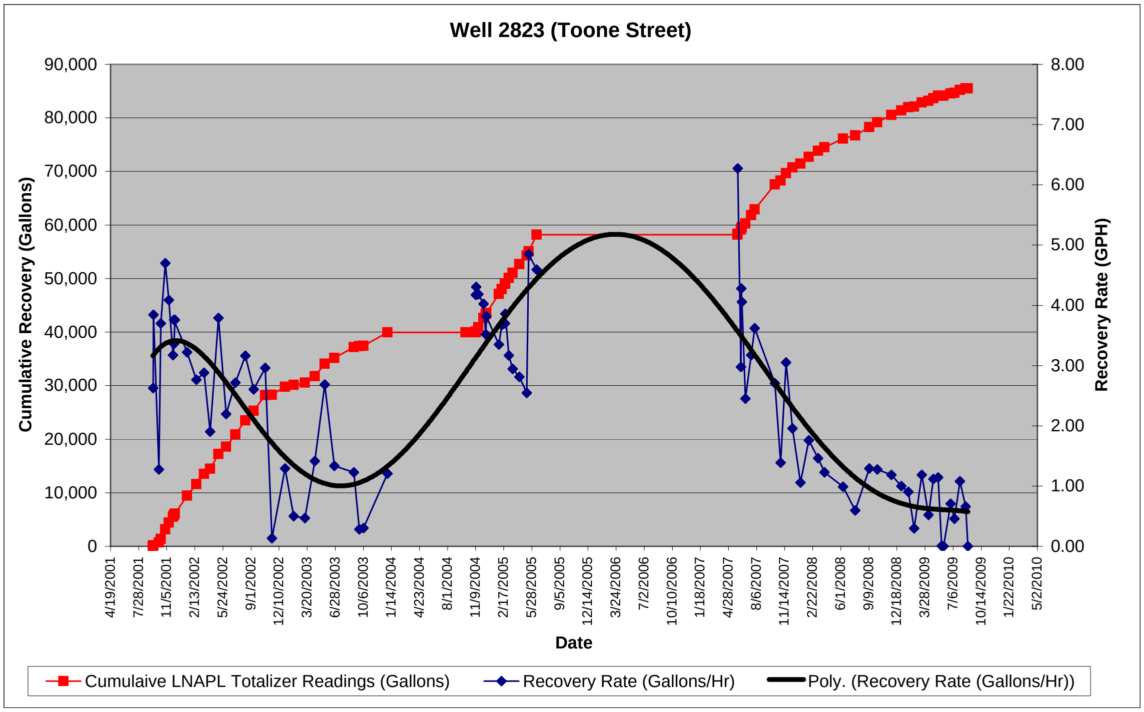
Recovery Zone Analysis (2811)
(Elevation Ft-MSL)
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))

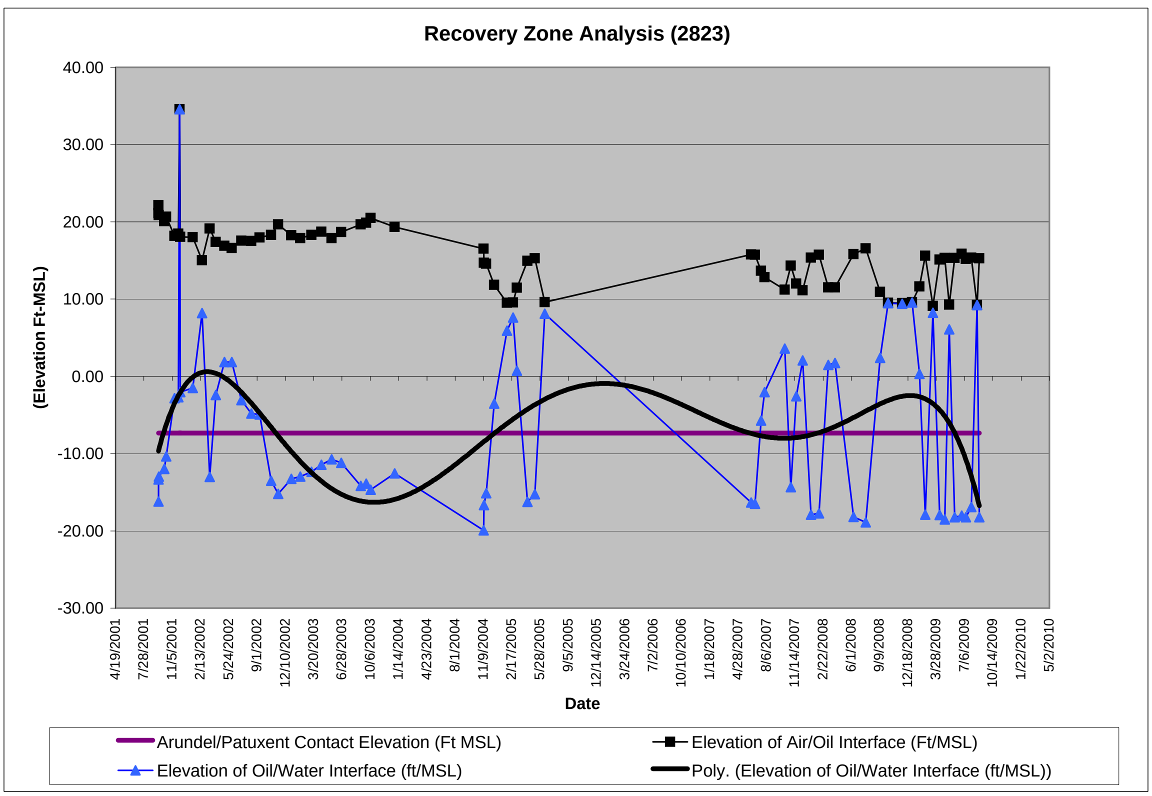

Well 2812 (Toone Street)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))


Recovery Zone Analysis (2812)
(Elevation Ft-MSL)
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))

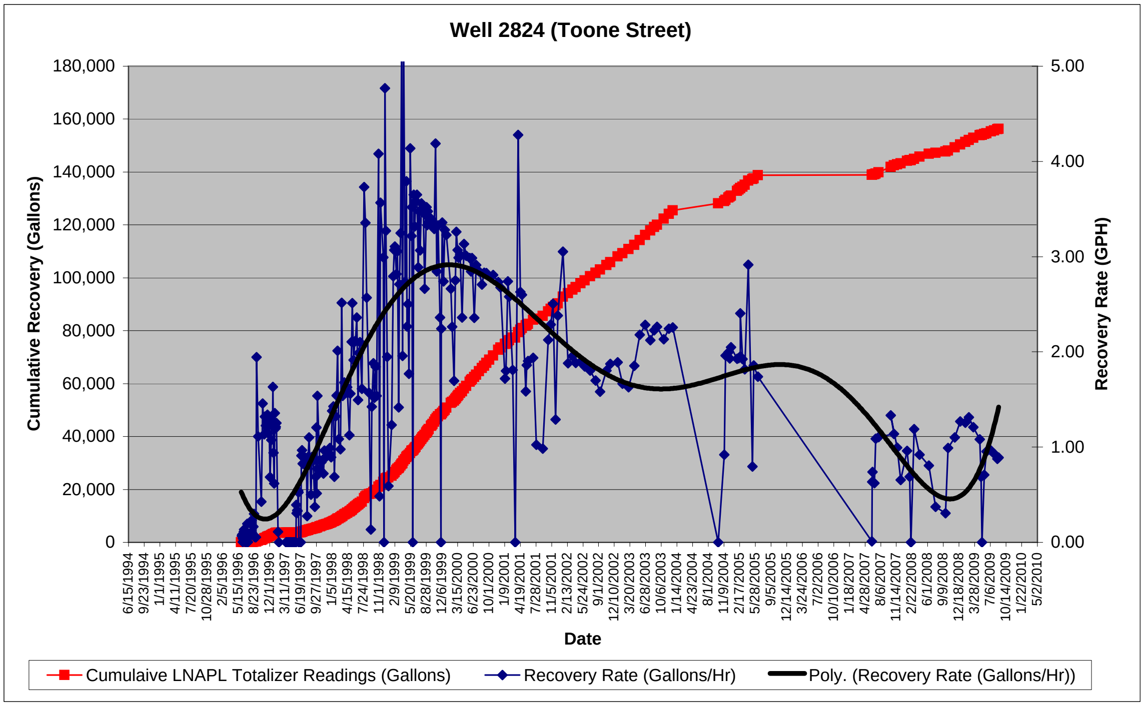

Well 2816 (Toone Street)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

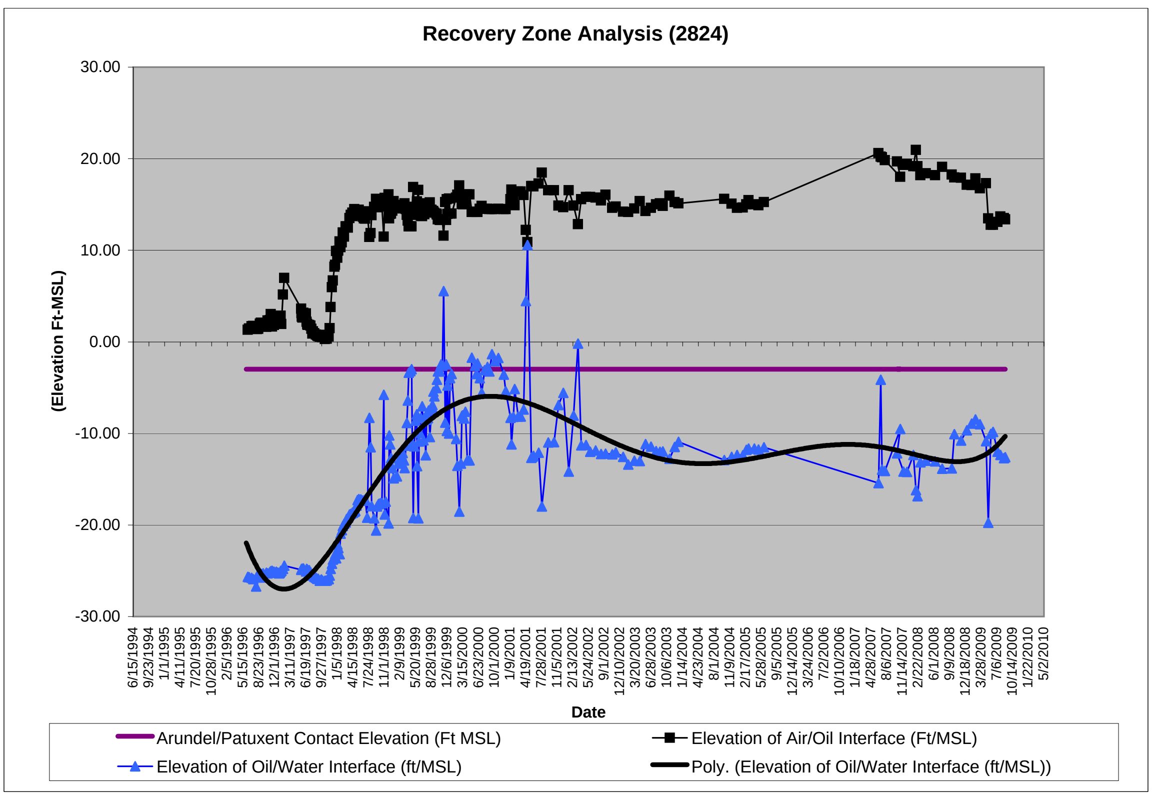

Recovery Zone Analysis (2816)
(Elevation Ft-MSL)
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))



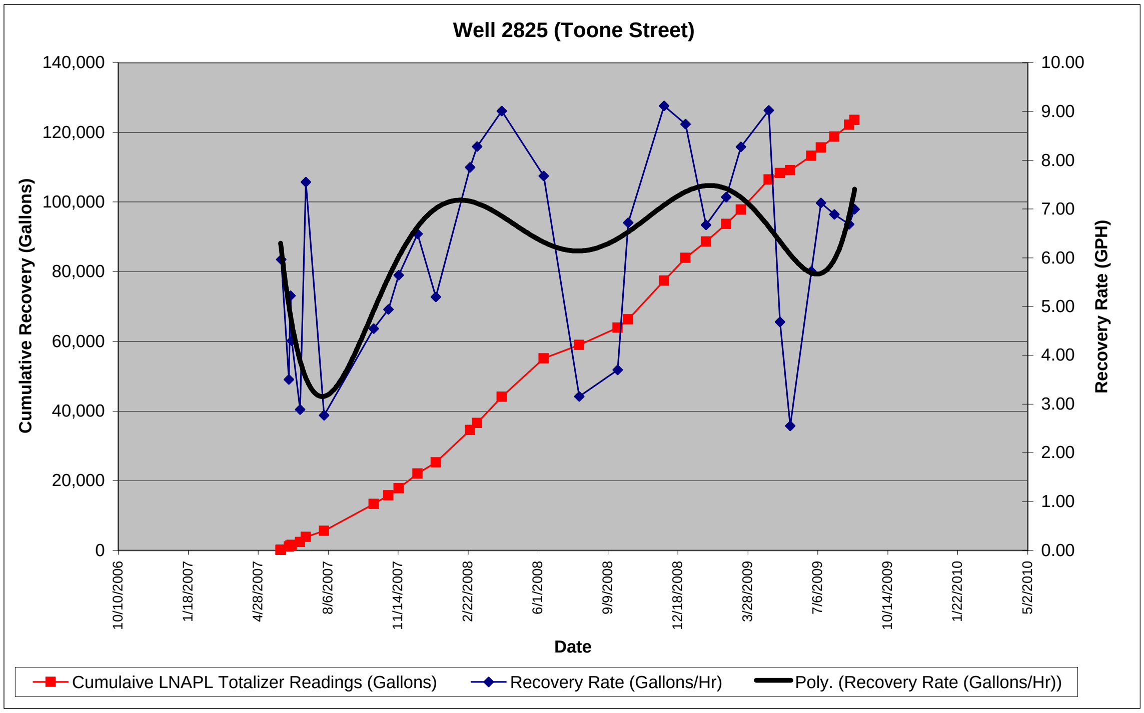


Note: The recovery pump in this well is not operated on a 24/7 continuous basis and therefore recovery rates below 1/2 GPH are not indicative of sustainable recovery.

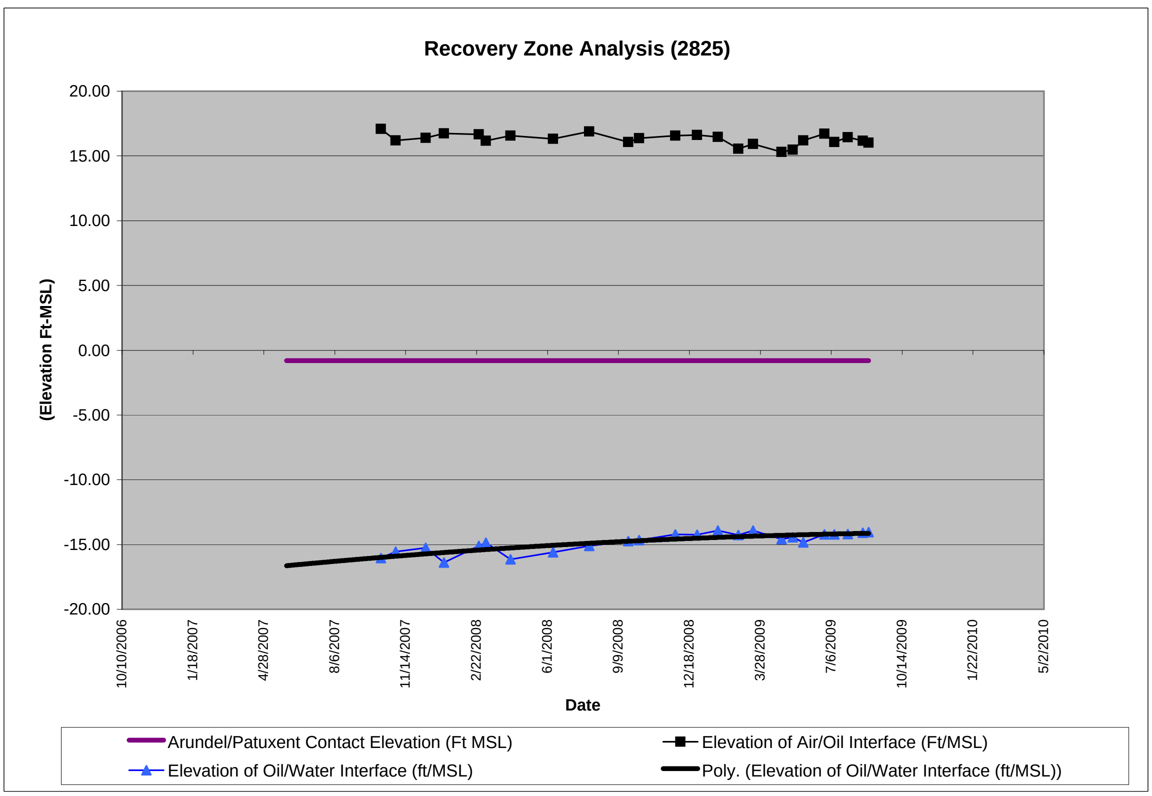




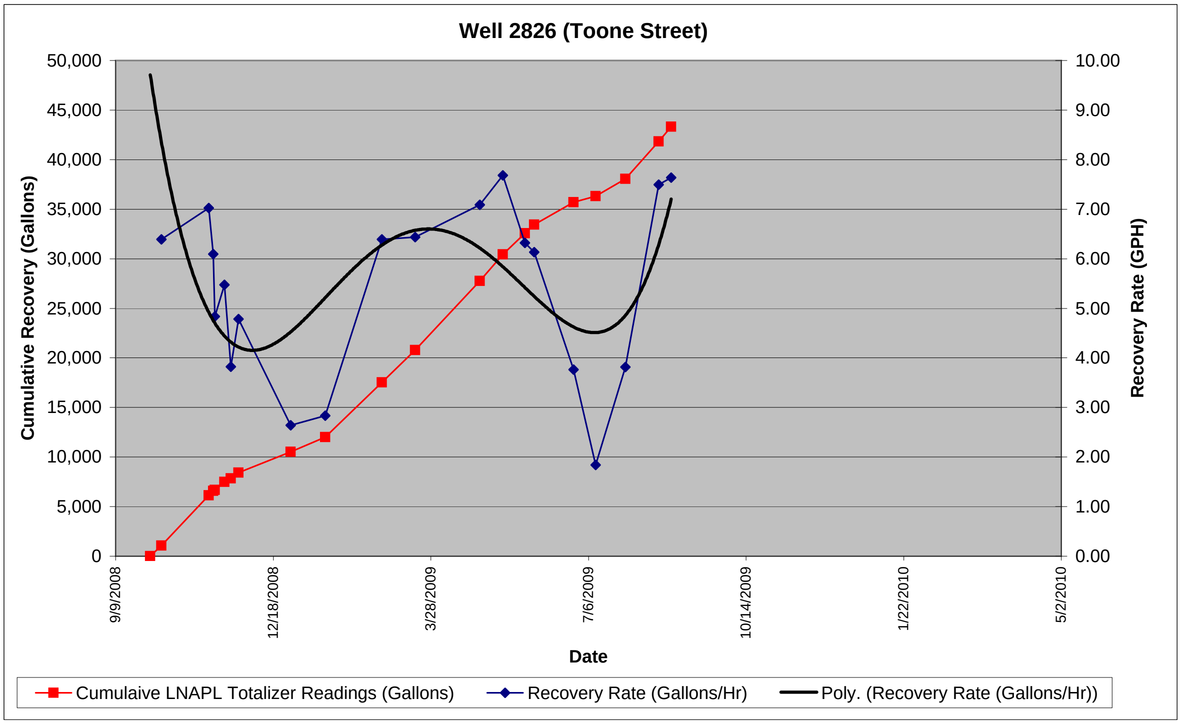
Note: The recovery pump in this well is not operated on a 24/7 continuous basis and therefore recovery rates below 1/2 GPH are not indicative of sustainable recovery.

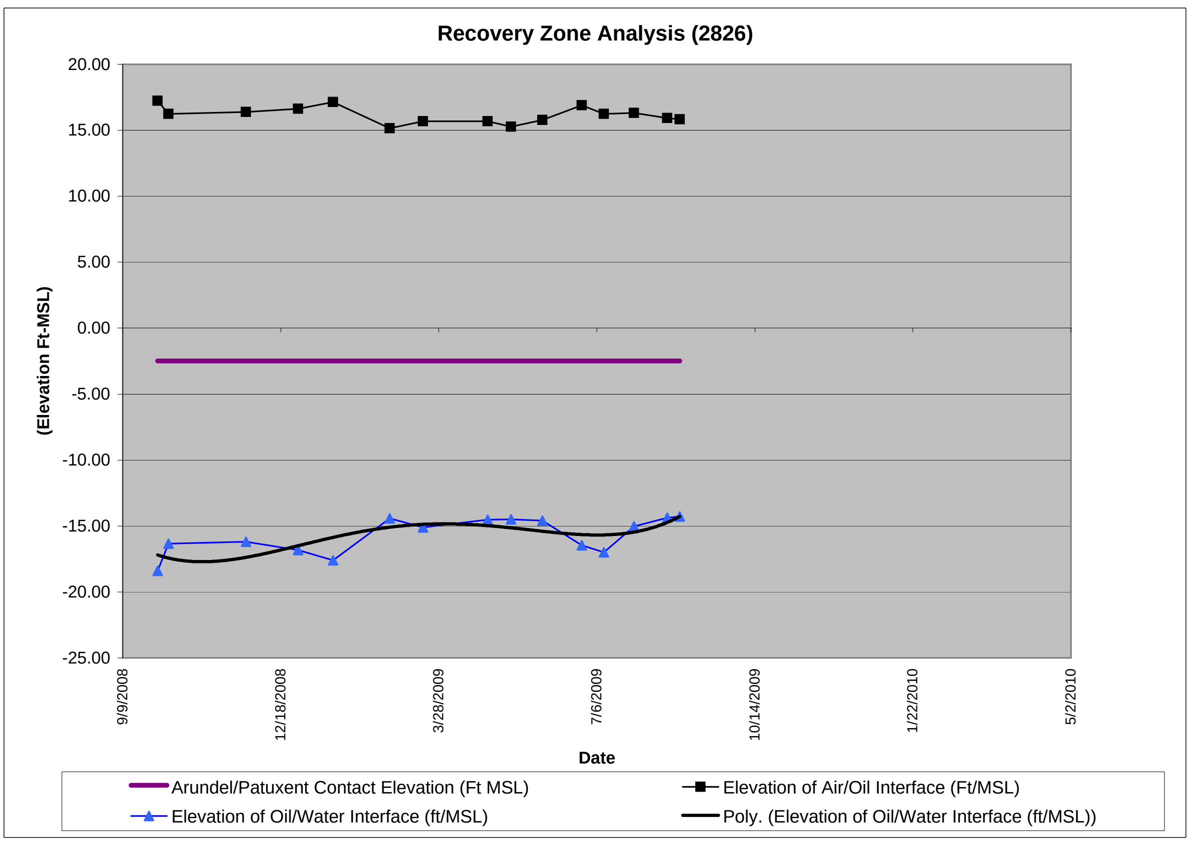


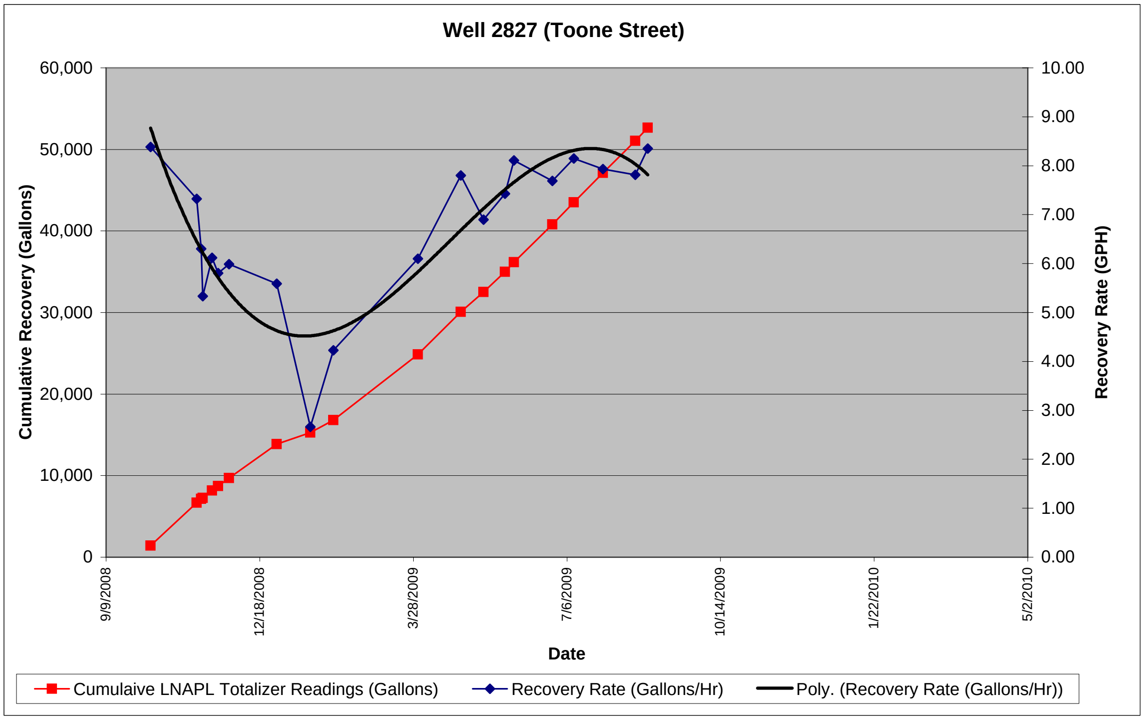
Well 2825 (Toone Street)
Cumulative Recovery (Gallons)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Recovery Rate (GPH)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
10/10/2006
1/18/2007
4/28/2007
8/6/2007
11/14/2007
2/22/2008
6/1/2008
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

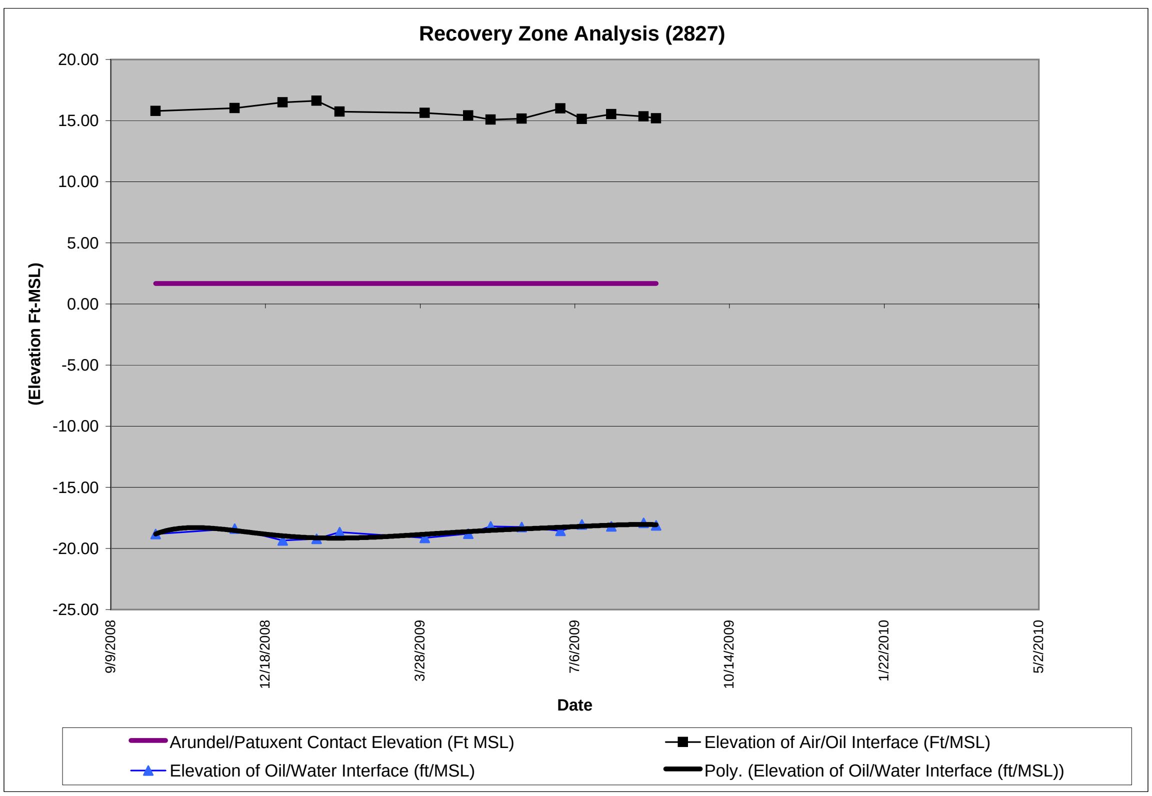


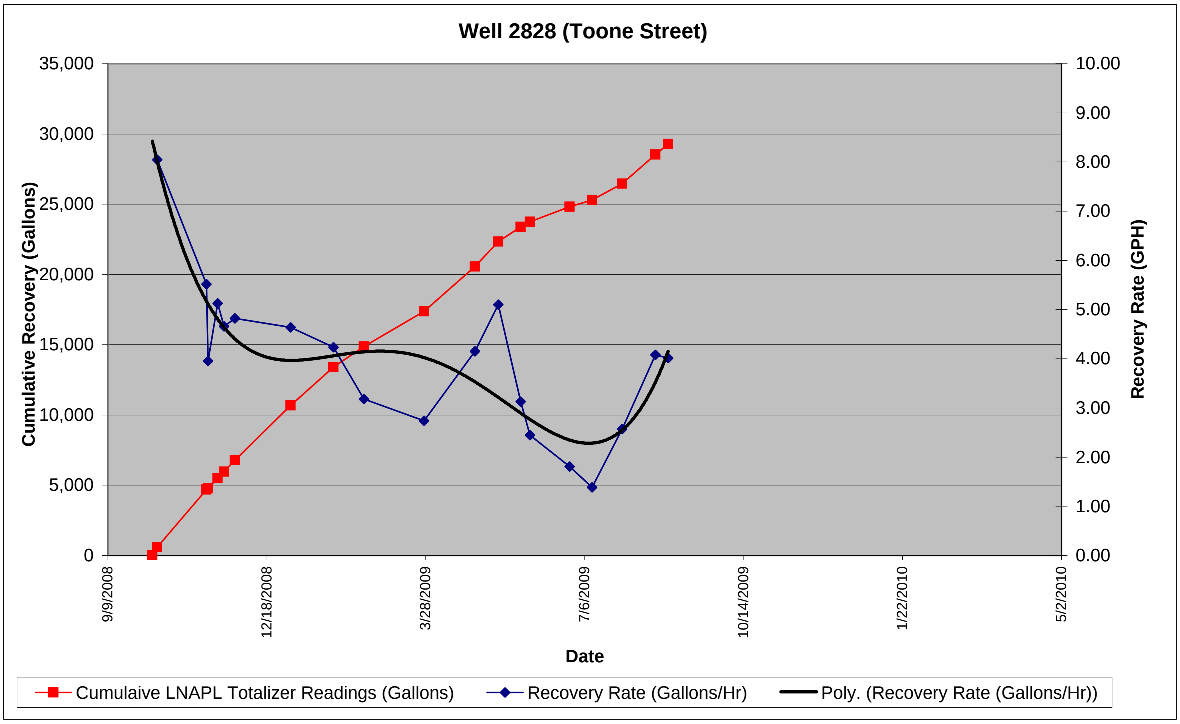
Recovery Zone Analysis (2825)
(Elevation Ft-MSL)
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
10/10/2006
1/18/2007
4/28/2007
8/6/2007
11/14/2007
2/22/2008
6/1/2008
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))


Well 2826 (Toone Street)
Cumulative Recovery (Gallons)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Recovery Rate (GPH)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

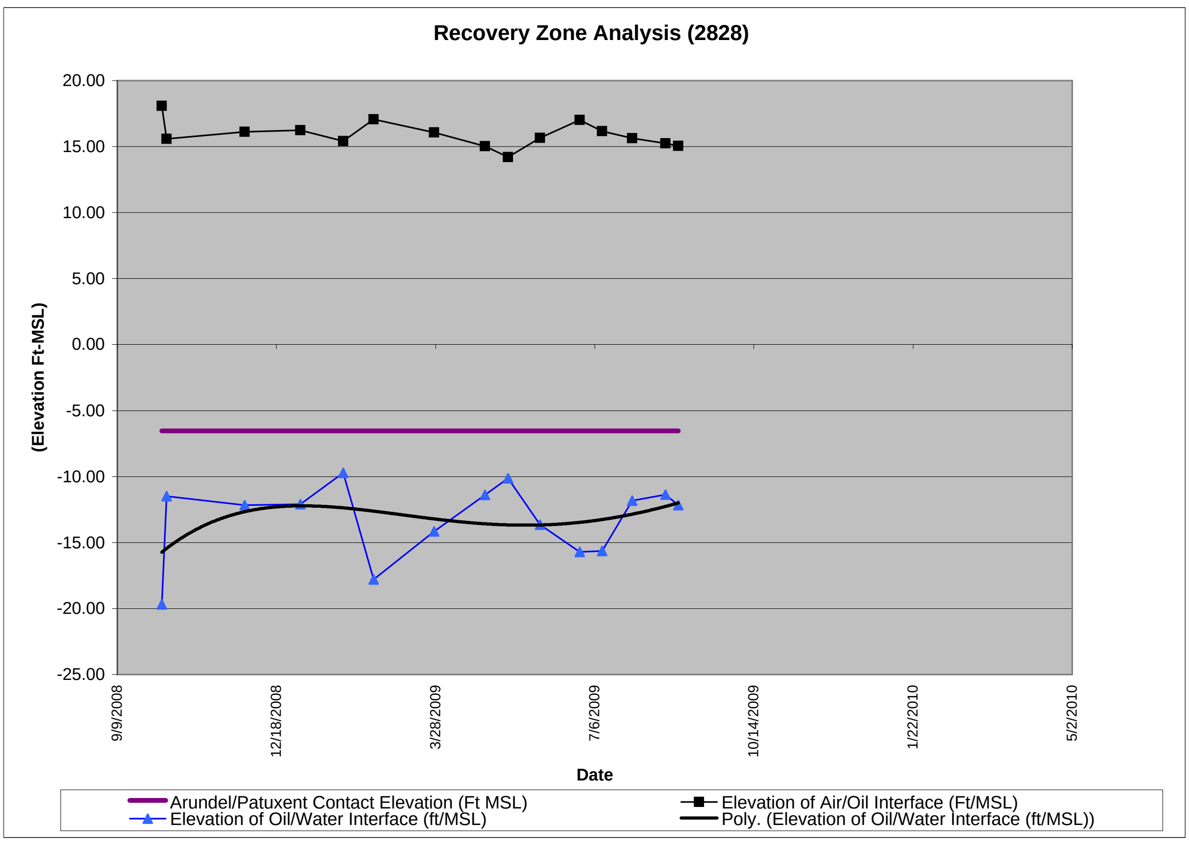

Recovery Zone Analysis (2826)
(Elevation Ft-MSL)
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))


Well 2827 (Toone Street)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
60,000
50,000
40,000
30,000
20,000
10,000
0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

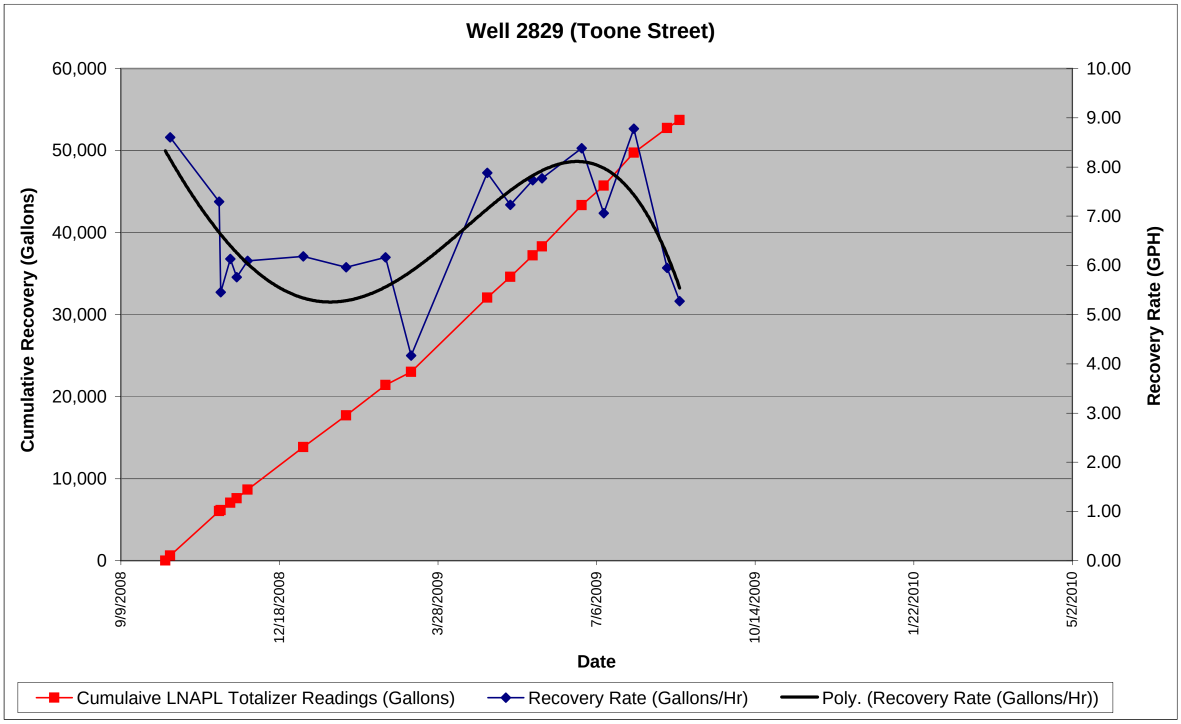

Recovery Zone Analysis (2827)
(Elevation Ft-MSL)
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))



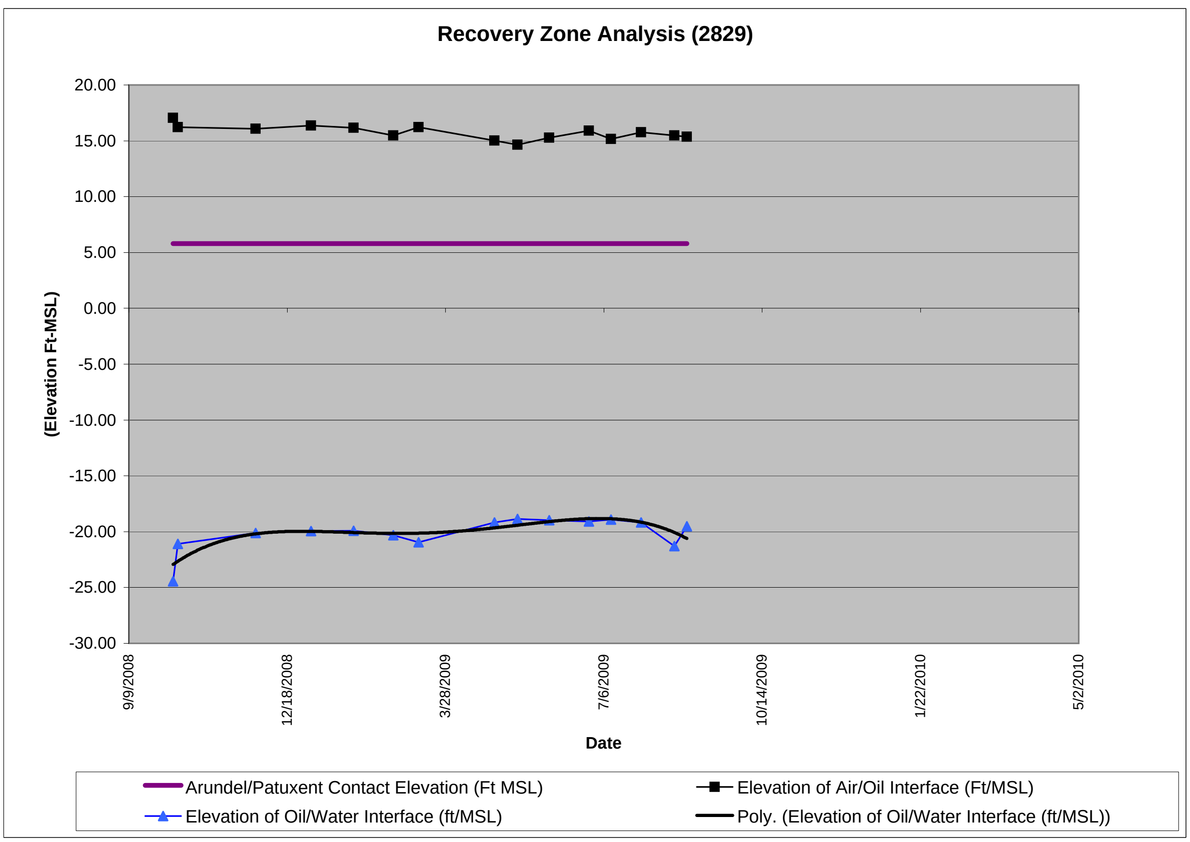
Well 2828 (Toone Street)
Cumulative Recovery (Gallons)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Recovery Rate (GPH)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))



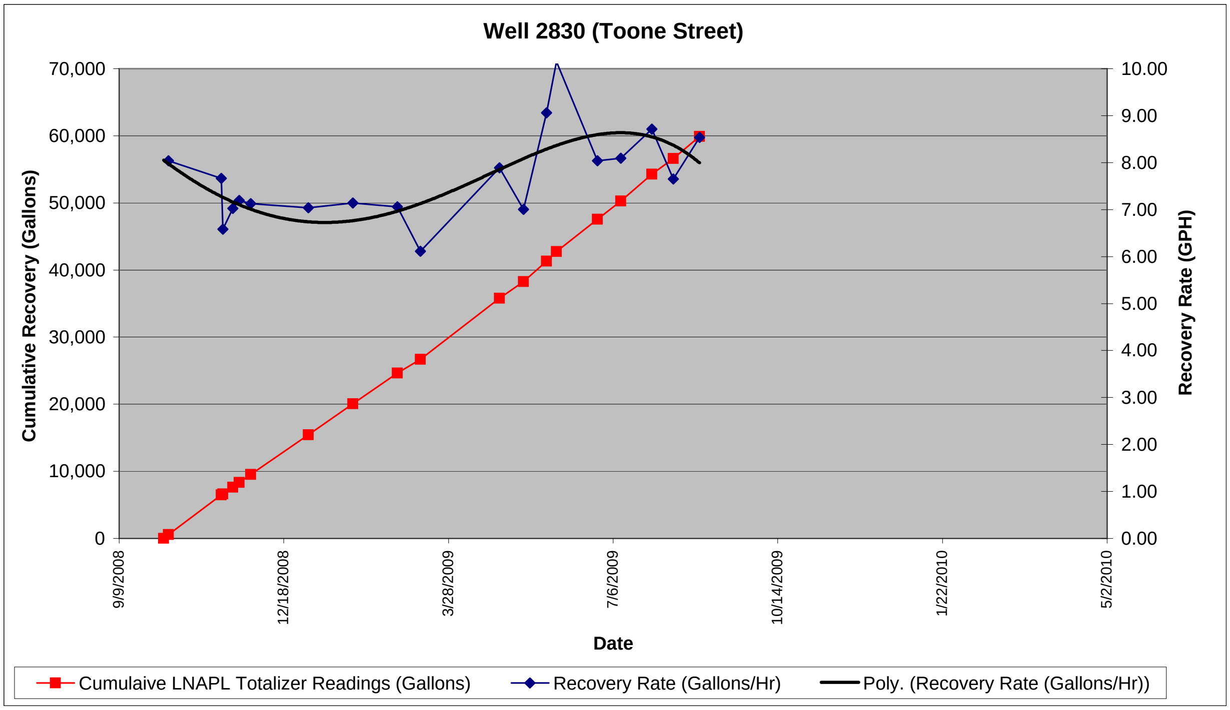
Recovery Zone Analysis (2828)
(Elevation Ft-MSL)
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Oil/Water Interface (ft/MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))



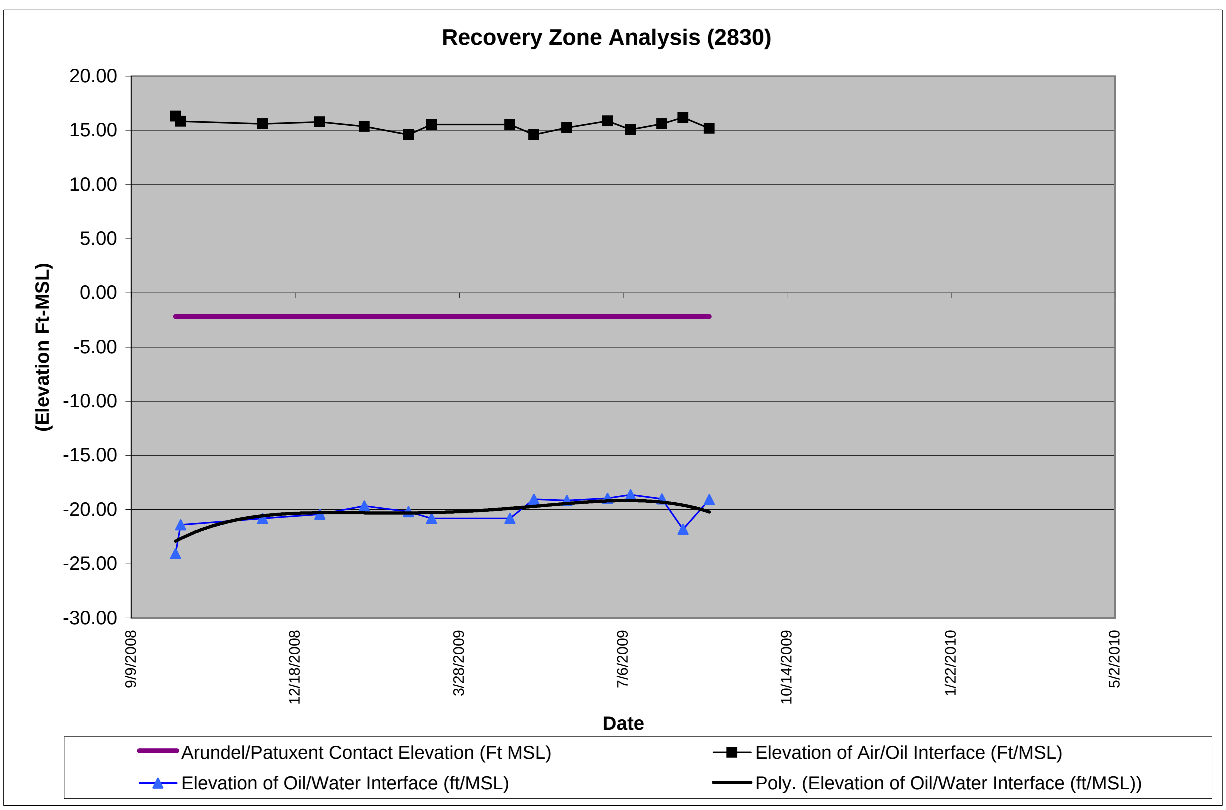
Well 2829 (Toone Street)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
60,000
50,000
40,000
30,000
20,000
10,000
0
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))



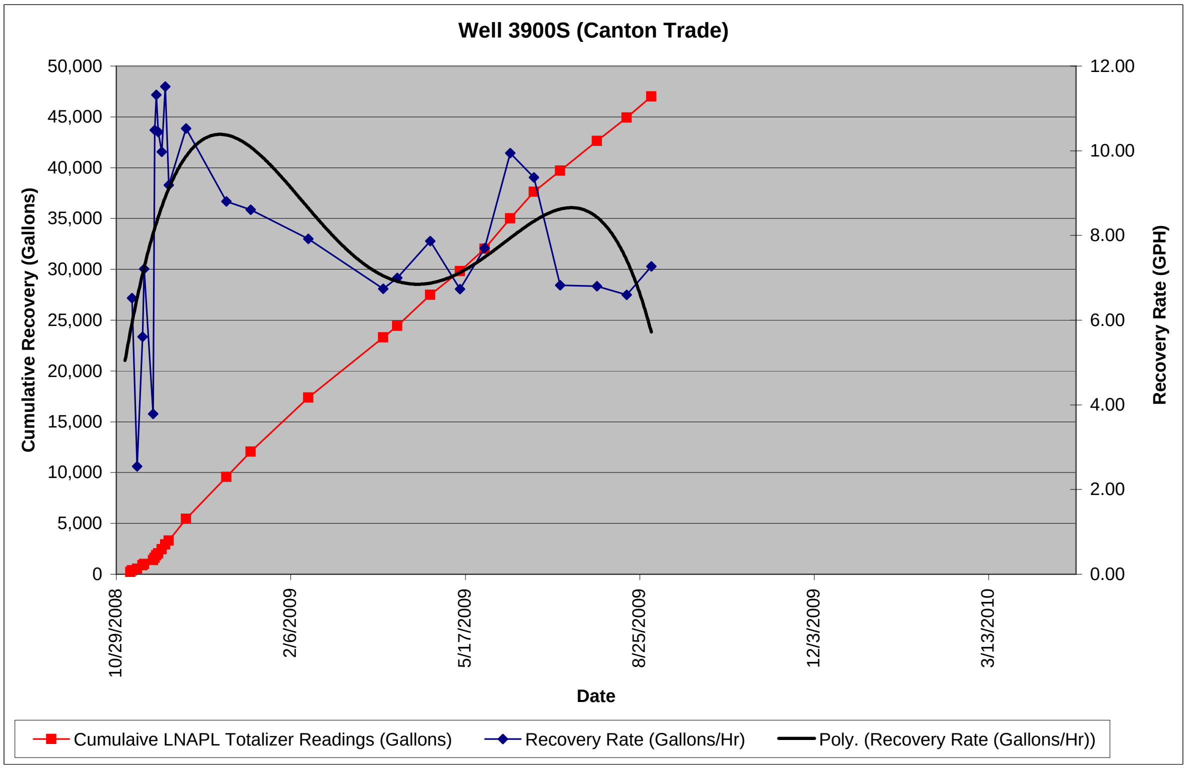
Recovery Zone Analysis (2829)
(Elevation Ft-MSL)
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
-30.00
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))

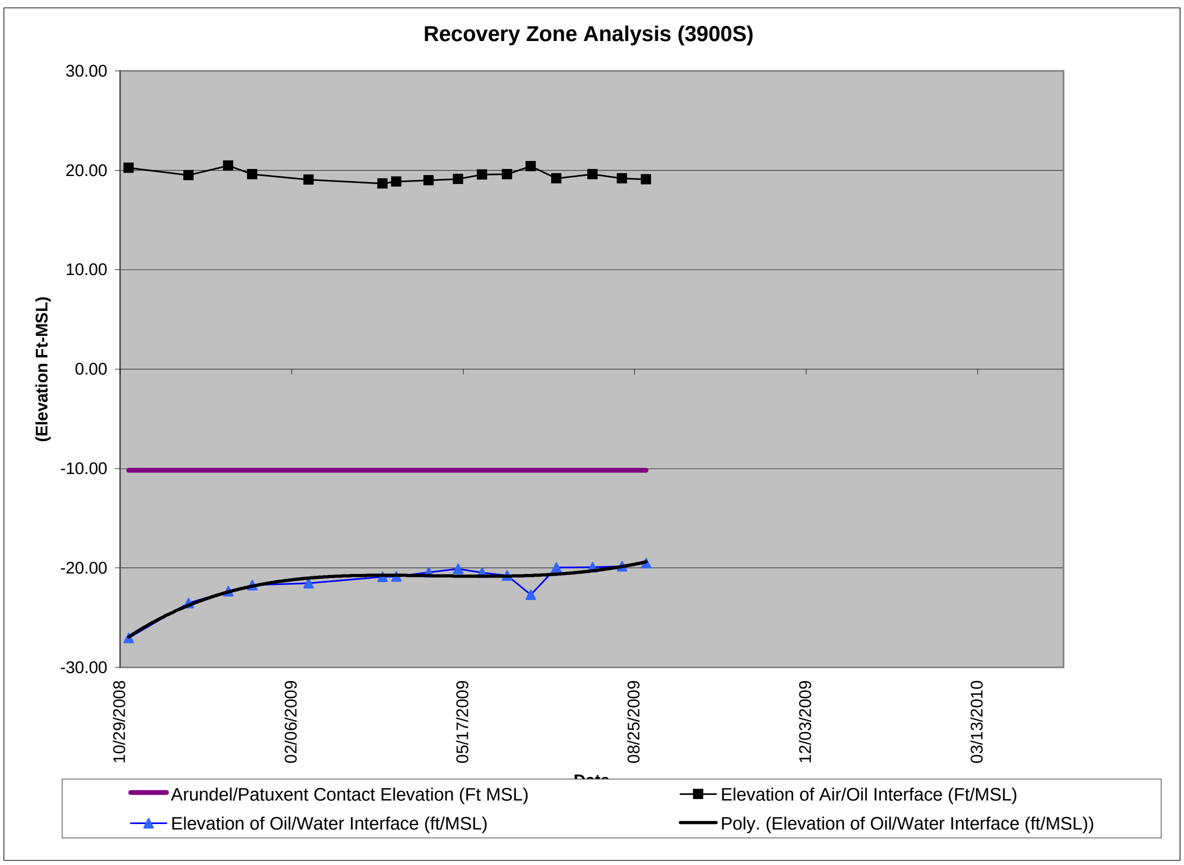


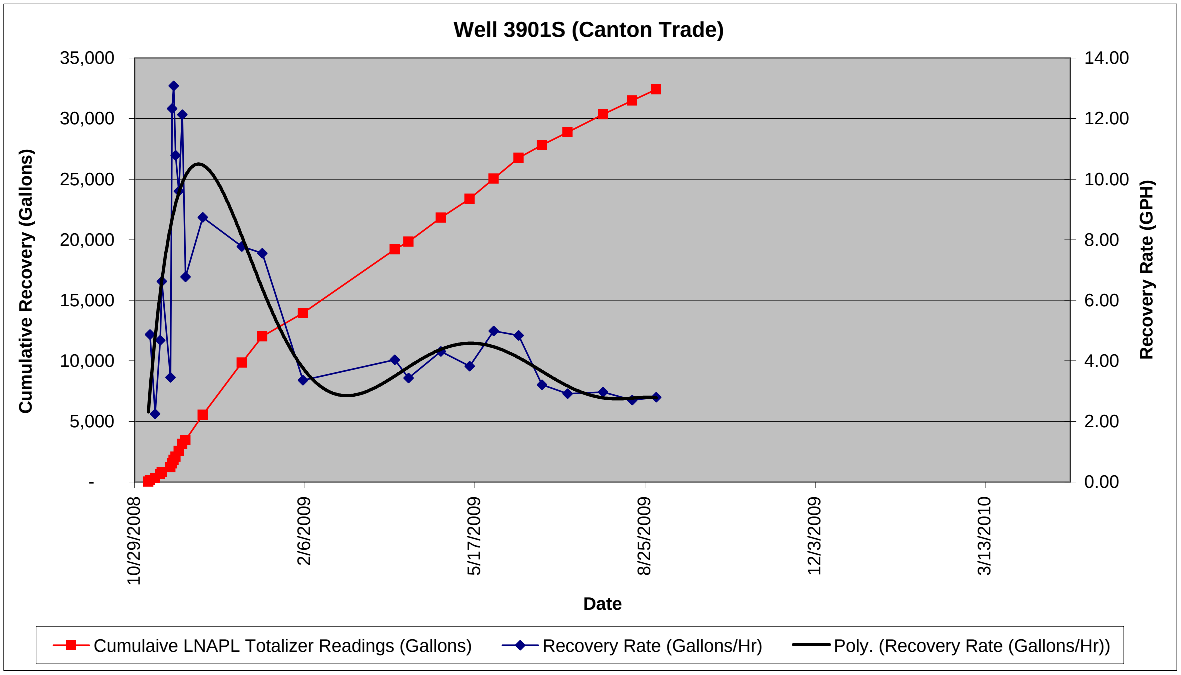
Well 2830 (Toone Street)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Cumulative Recovery (Gallons)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Recovery Rate (GPH)
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))



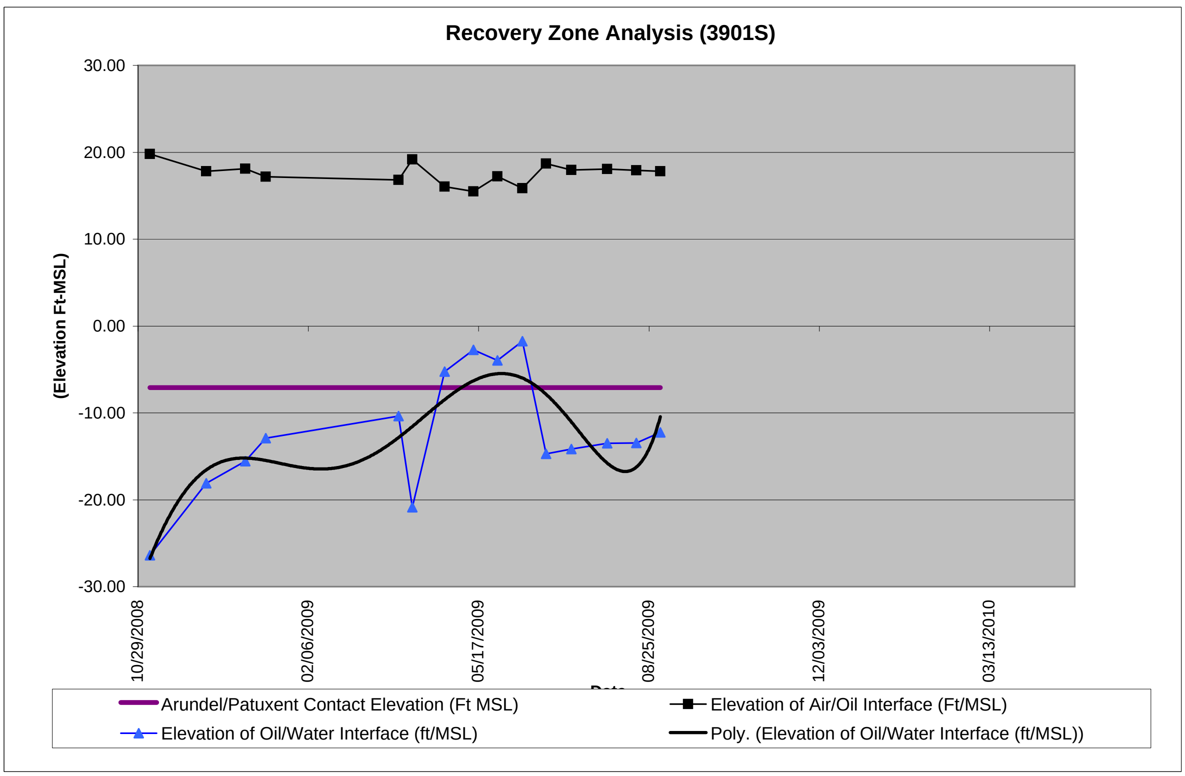
Recovery Zone Analysis (2830)
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
-30.00
(Elevation Ft-MSL)
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))


Well 3900S (Canton Trade)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
12.00
10.00
8.00
6.00
4.00
2.00
0.00
10/29/2008
2/6/2009
5/17/2009
8/25/2009
12/3/2009
3/13/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

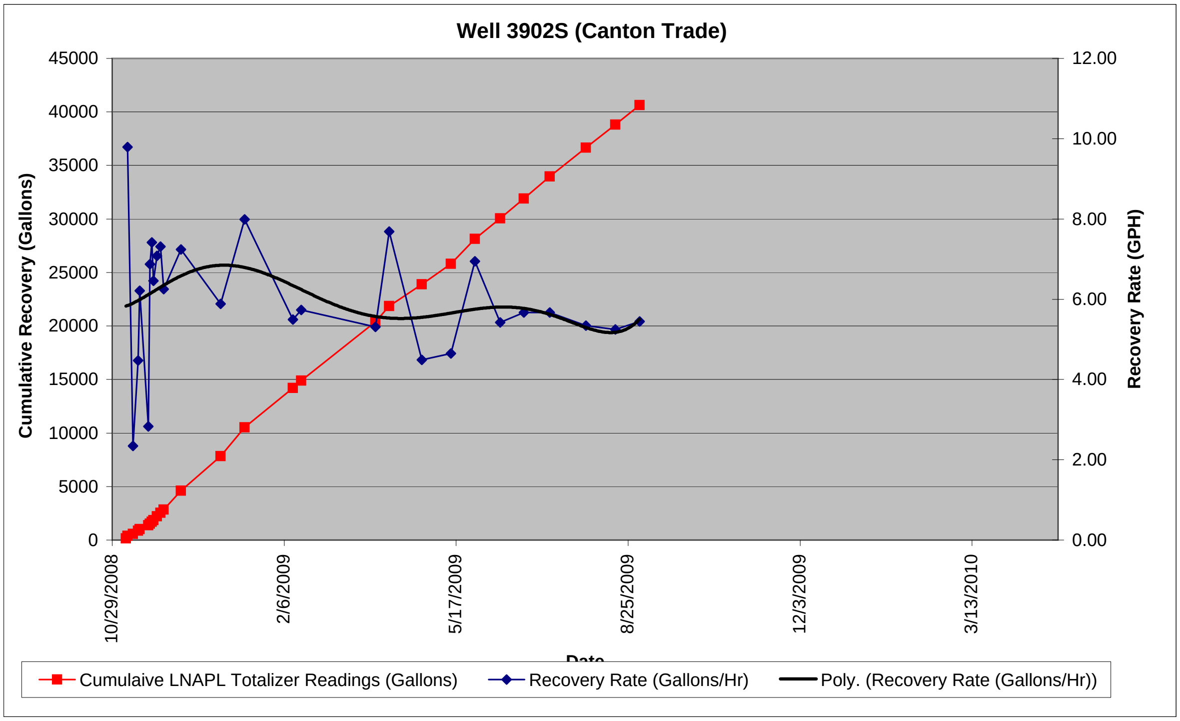

Recovery Zone Analysis (3900S)
(Elevation Ft-MSL)
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
10/29/2008
02/06/2009
05/17/2009
08/25/2009
12/03/2009
03/13/2010
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))

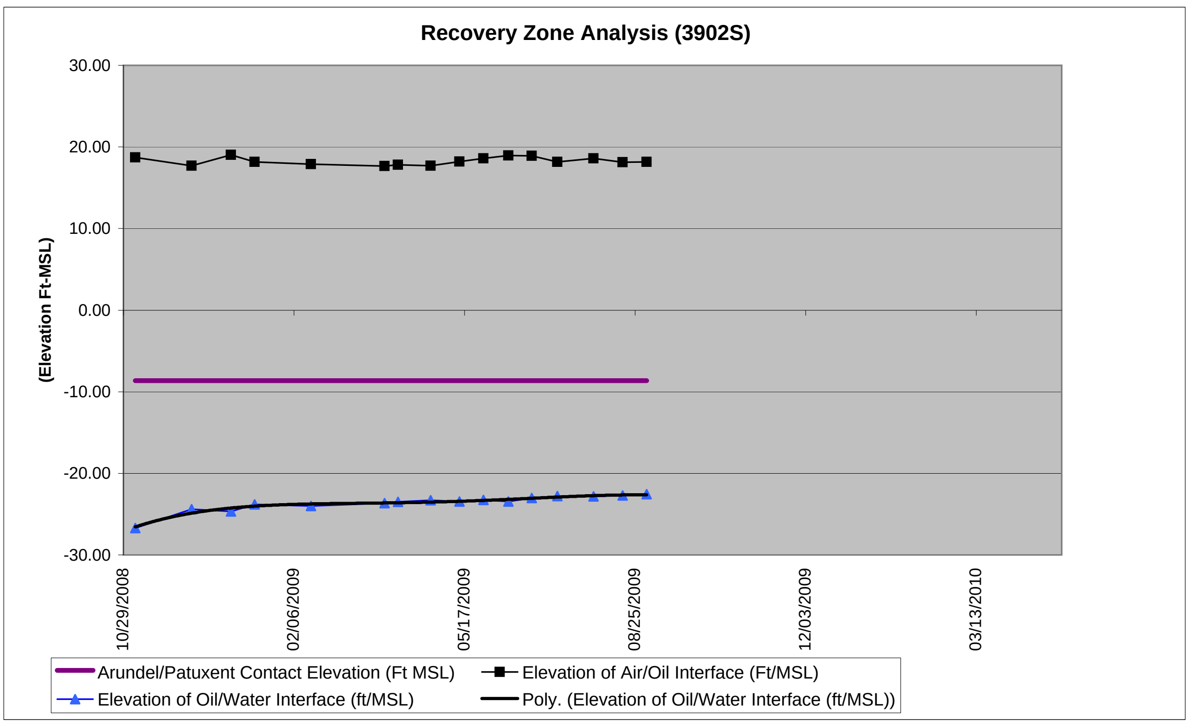


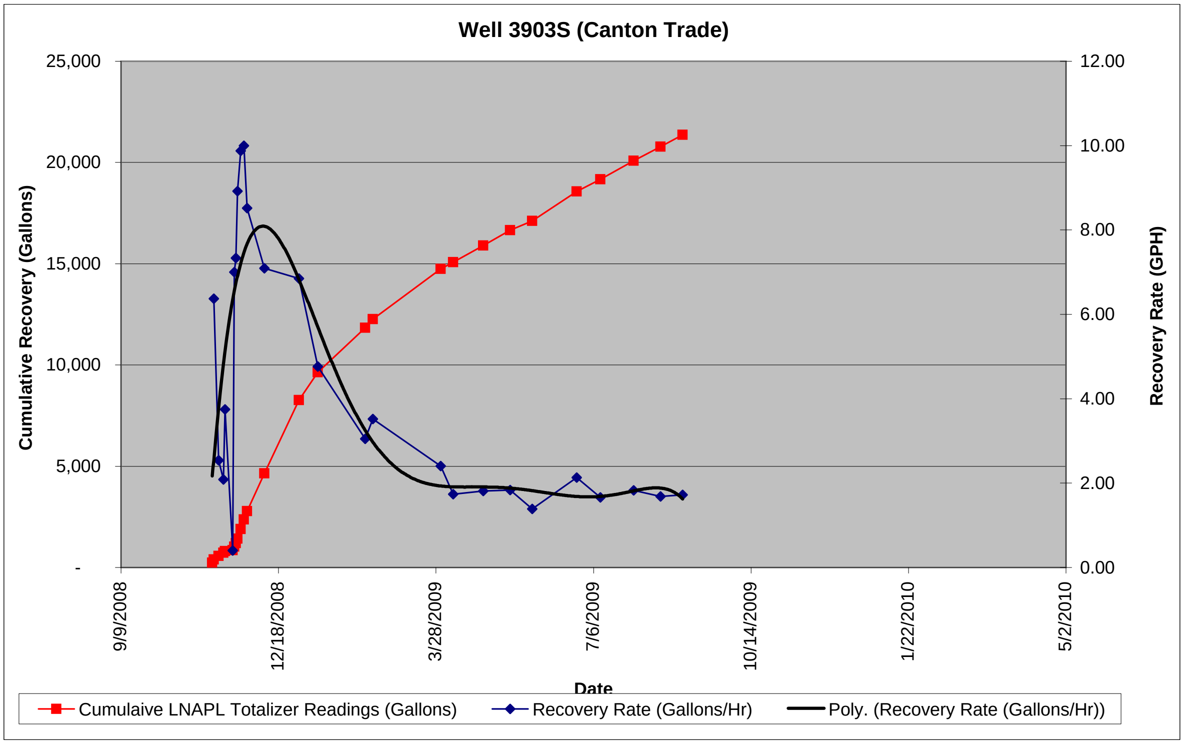
Well 3901S (Canton Trade)
Cumulative Recovery (Gallons)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Recovery Rate (GPH)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
10/29/2008
2/6/2009
5/17/2009
8/25/2009
12/3/2009
3/13/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

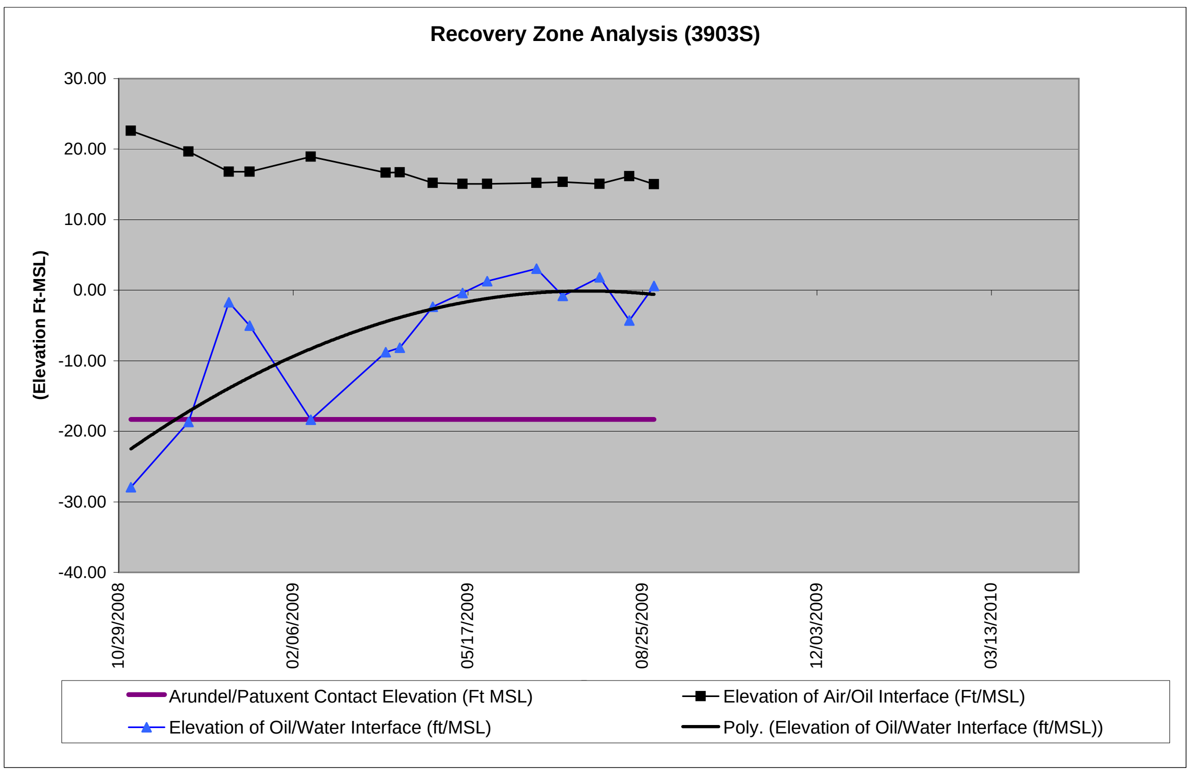


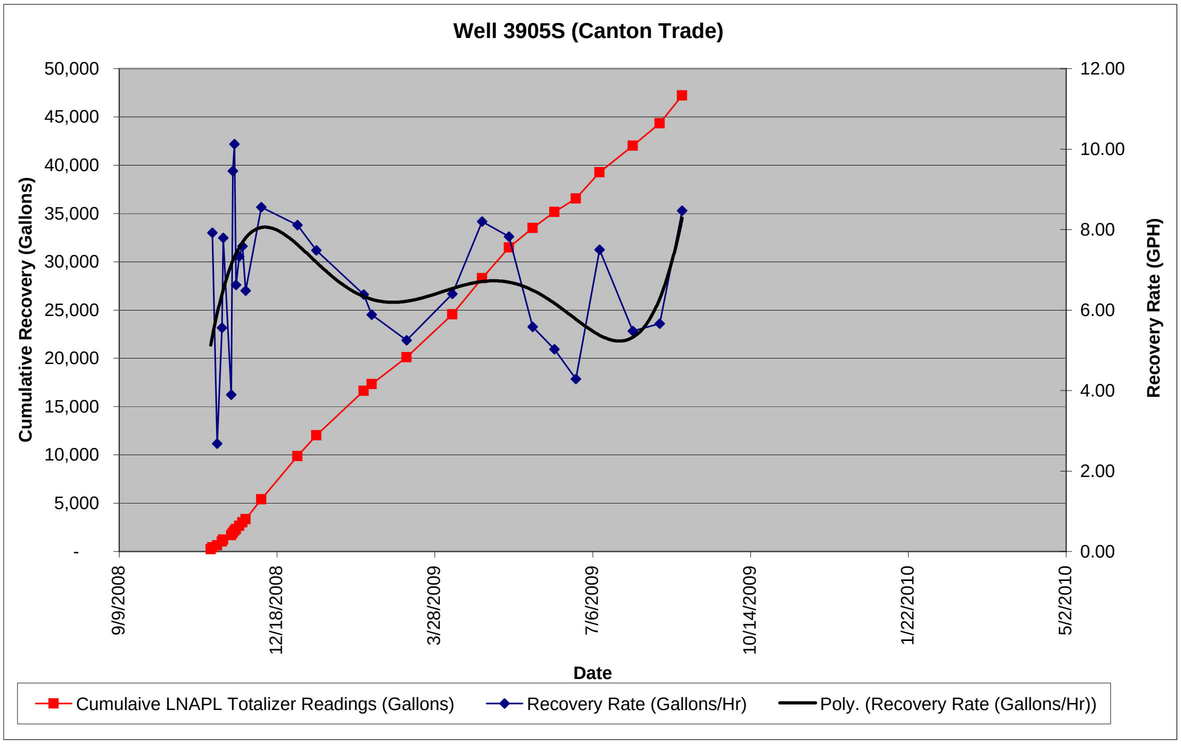
Recovery Zone Analysis (3901S)
(Elevation Ft-MSL)
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
10/29/2008
02/06/2009
05/17/2009
08/25/2009
12/03/2009
03/13/2010
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))


Well 3902S (Canton Trade)
Cumulative Recovery (Gallons)
Recovery Rate (GPH)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
12.00
10.00
8.00
6.00
4.00
2.00
0.00
10/29/2008
2/6/2009
5/17/2009
8/25/2009
12/3/2009
3/13/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

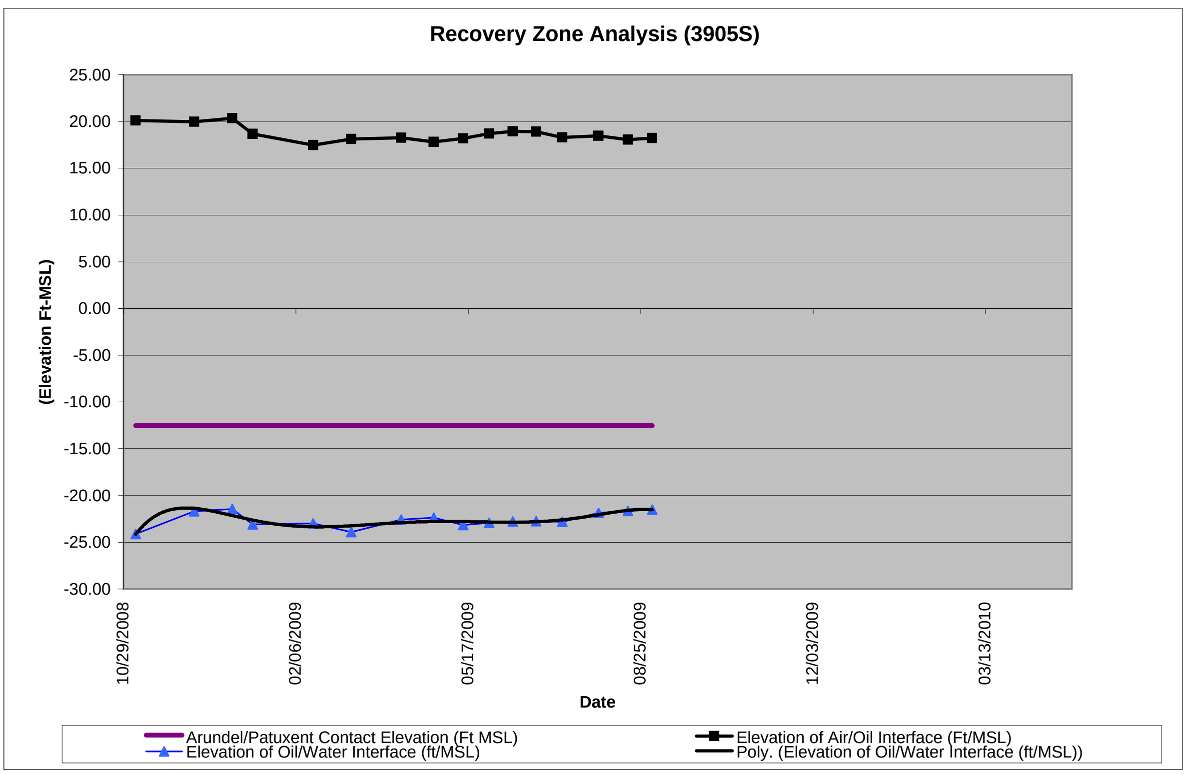

Recovery Zone Analysis (3902S)
(Elevation Ft-MSL)
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
10/29/2008
02/06/2009
05/17/2009
08/25/2009
12/03/2009
03/13/2010
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))


Well 3903S (Canton Trade)
Cumulative Recovery (Gallons)
25,000
20,000
15,000
10,000
5,000
-
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Recovery Rate (GPH)
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))

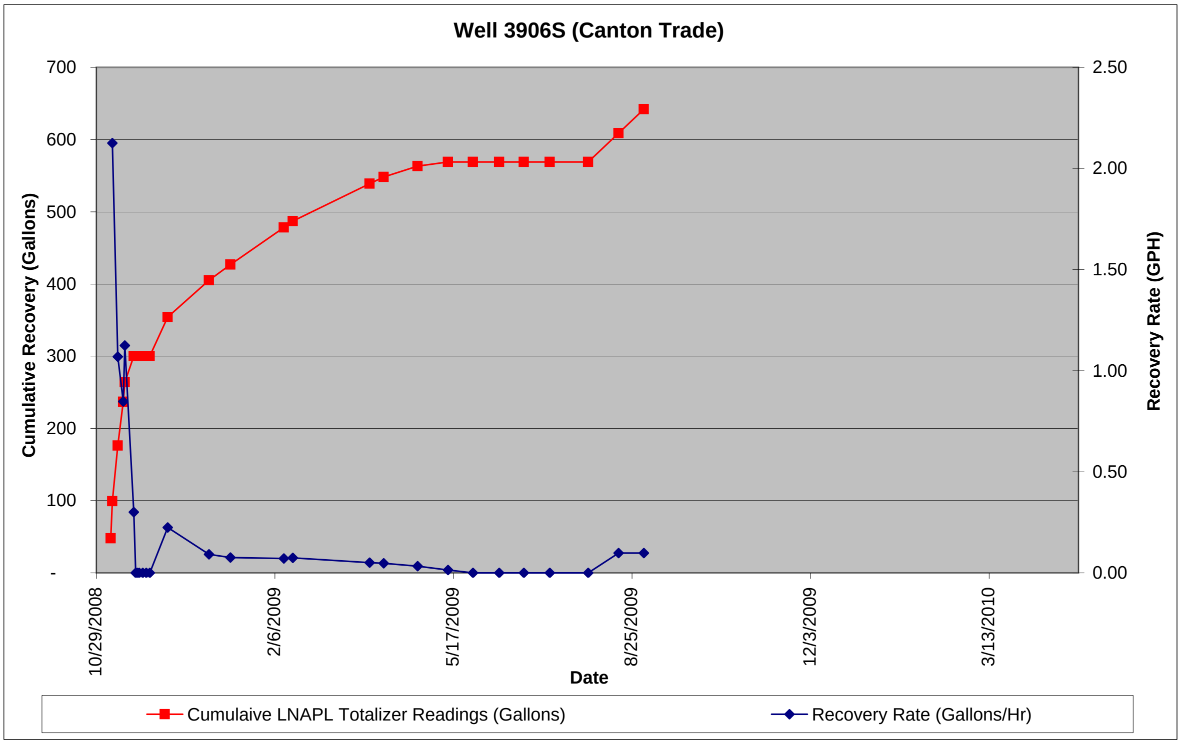

Recovery Zone Analysis (3903S)
(Elevation Ft-MSL)
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
10/29/2008
02/06/2009
05/17/2009
08/25/2009
12/03/2009
03/13/2010
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Elevation of Oil/Water Interface (ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))

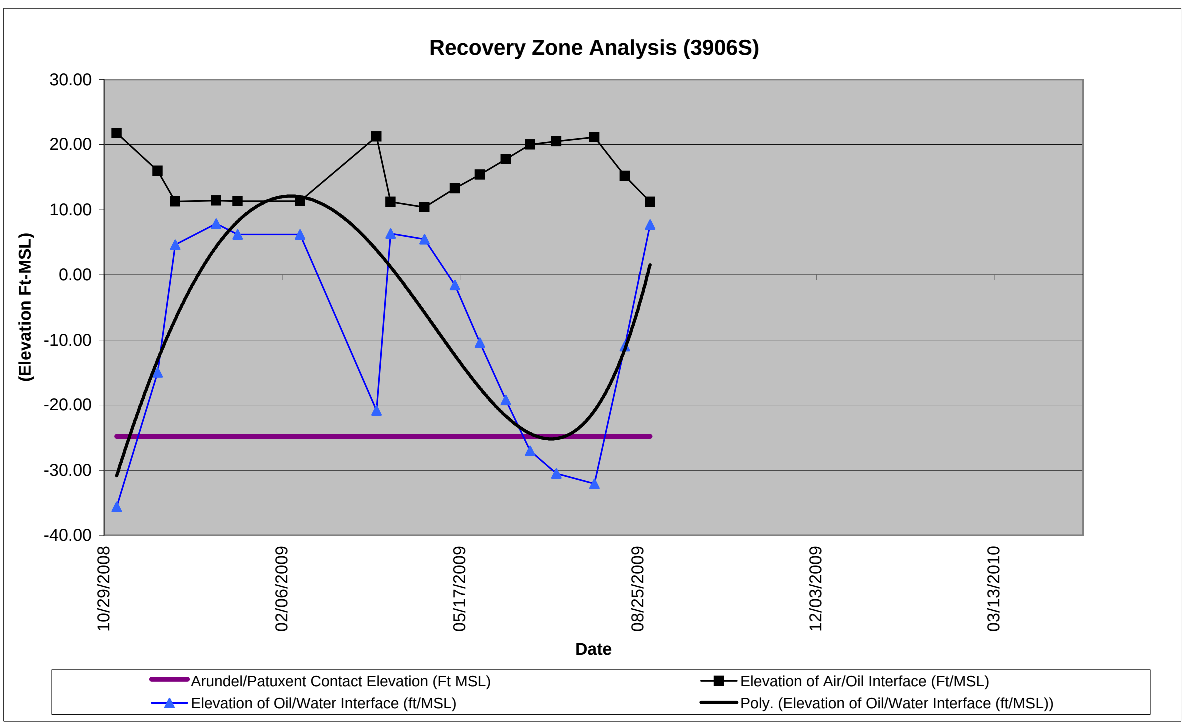


Well 3905S (Canton Trade)
Cumulative Recovery (Gallons)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Recovery Rate (GPH)
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
Date
Cumulaive LNAPL Totalizer Readings (Gallons)
Recovery Rate (Gallons/Hr)
Poly. (Recovery Rate (Gallons/Hr))



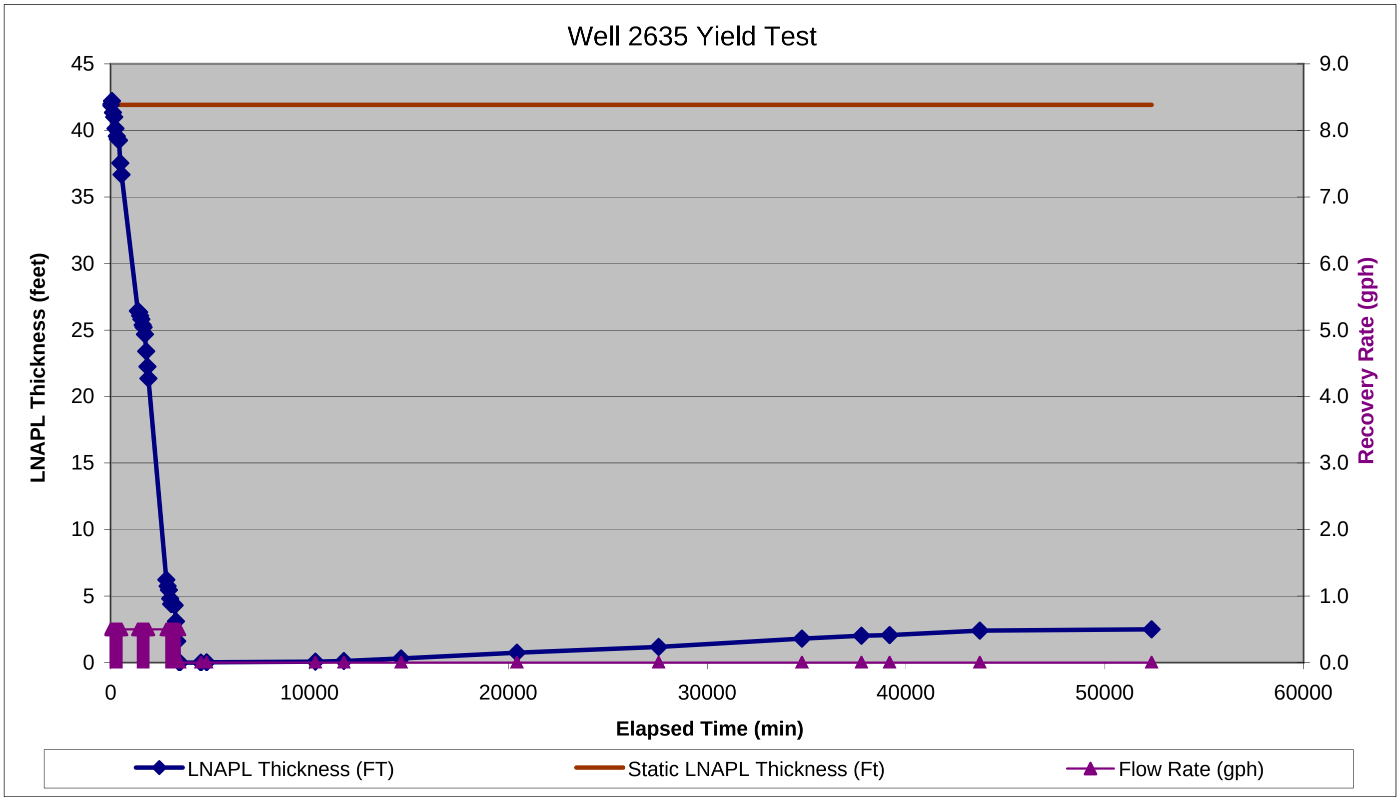
Recovery Zone Analysis (3905S)
(Elevation Ft-MSL)
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
-30.00
10/29/2008
02/06/2009
05/17/2009
08/25/2009
12/03/2009
03/13/2010
Date
Arundel/Patuxent Contact Elevation (Ft MSL)
Elevation of Oil/Water Interface (ft/MSL)
Elevation of Air/Oil Interface (Ft/MSL)
Poly. (Elevation of Oil/Water Interface (ft/MSL))



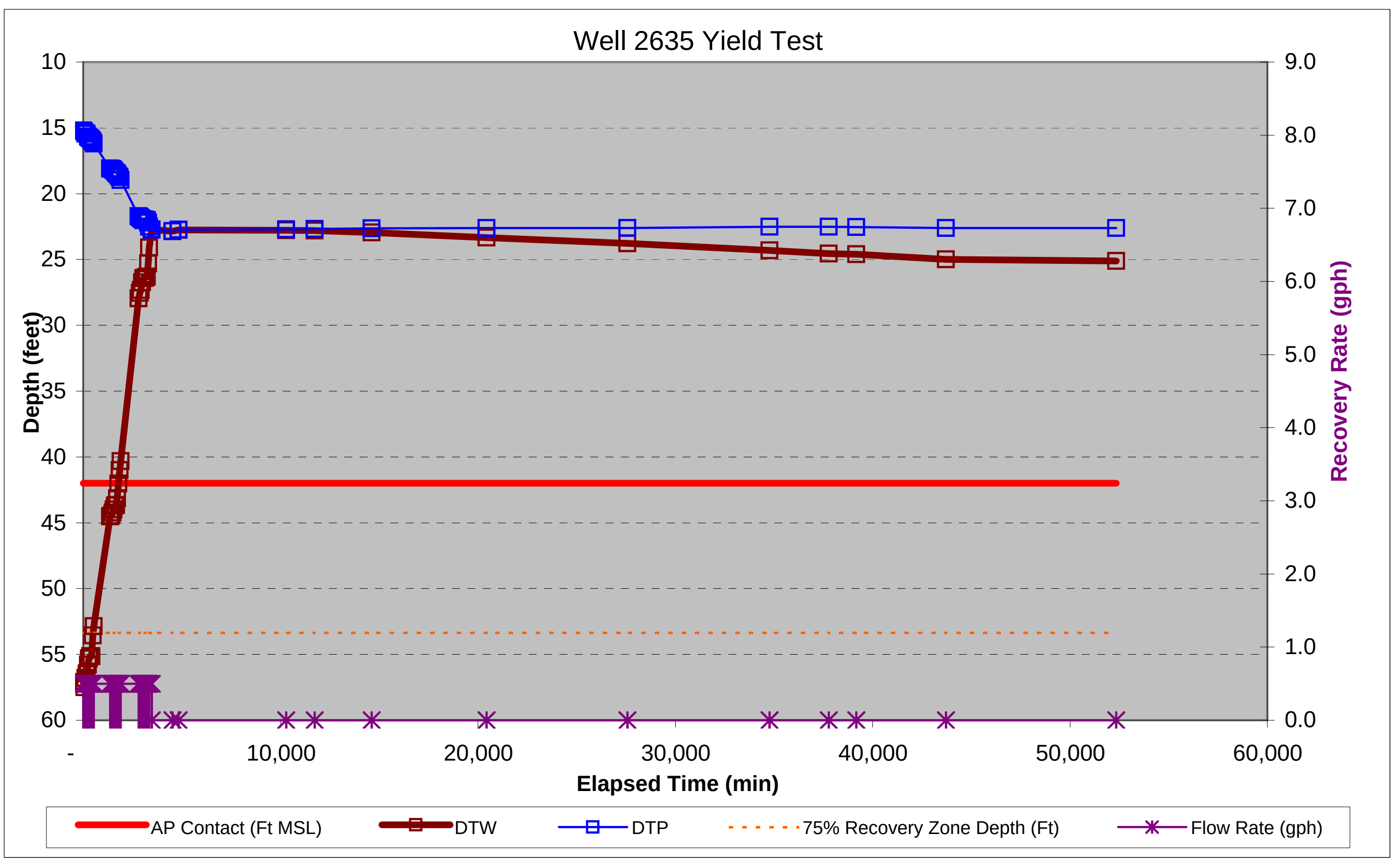


Note: The recovery pump in this well is not operated on a 24/7 continuous basis and therefore recovery rates below 1/2 GPH are not indicative of sustainable recovery.

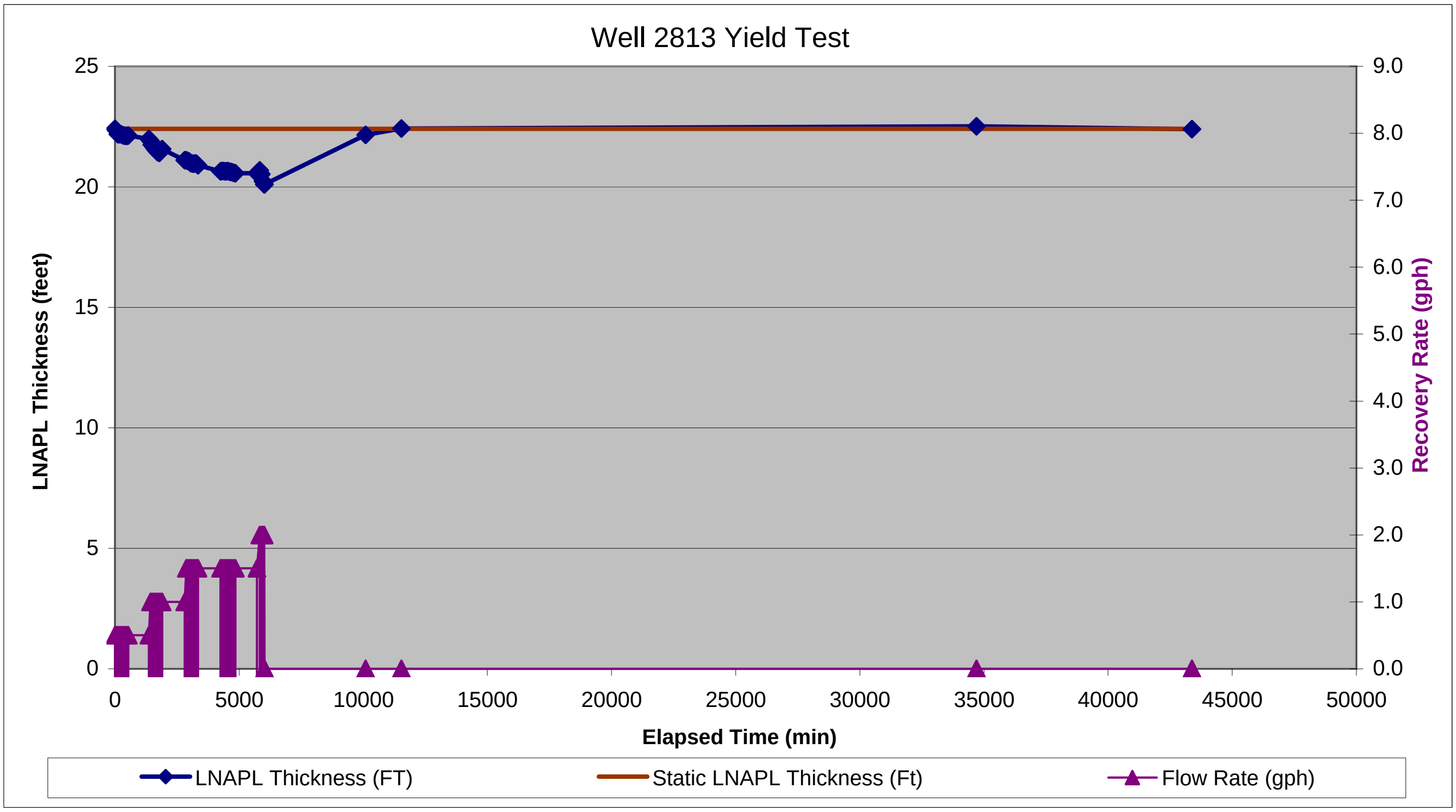
ATTACHMENT II

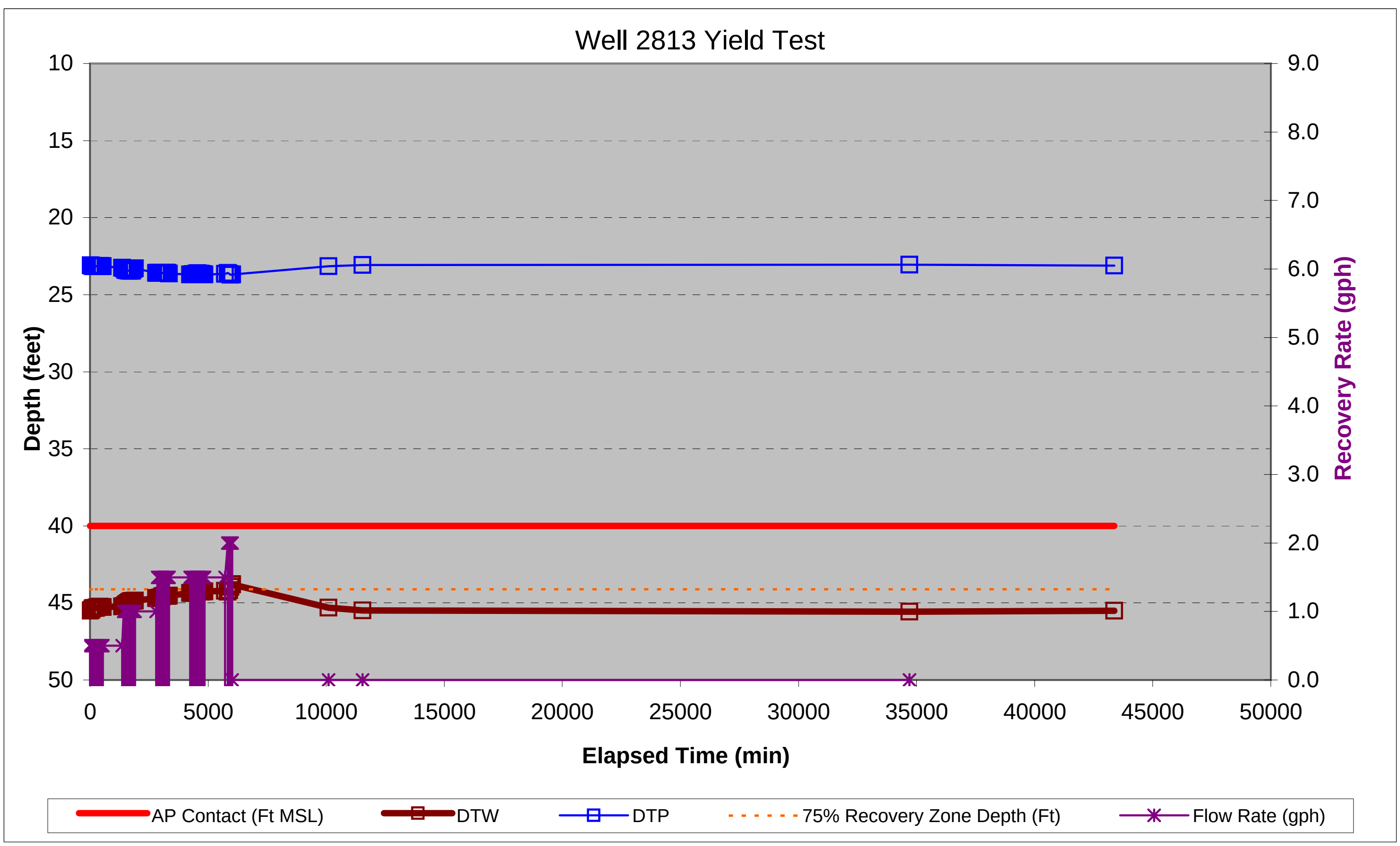


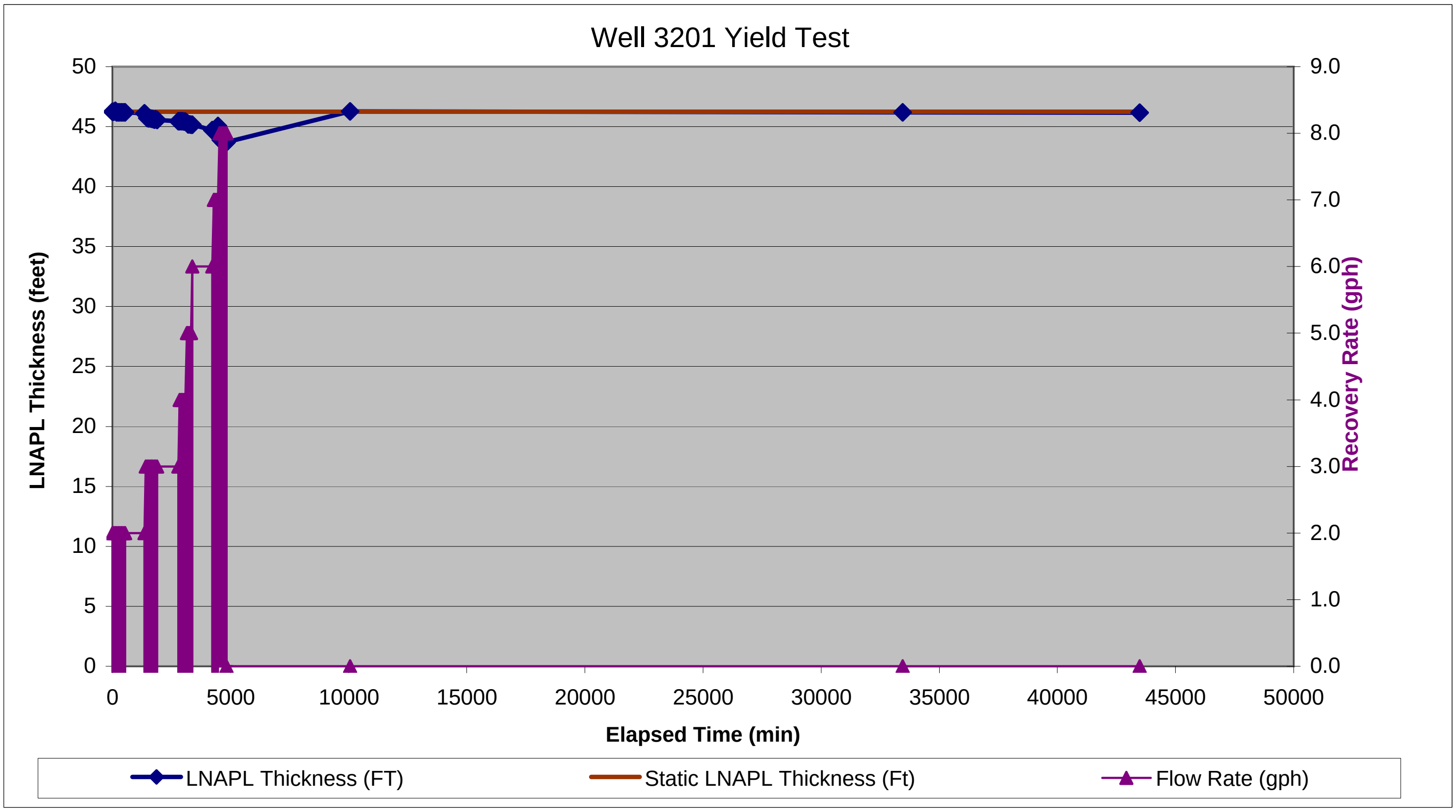
Well 2635 Yield Test
LNAPL Thickness (feet)
Recovery Rate (gph)
Elapsed Time (min)
0
10000
20000
30000
40000
50000
60000
0
5
10
15
20
25
30
35
40
45
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
LNAPL Thickness (FT)
Static LNAPL Thickness (Ft)
Flow Rate (gph)

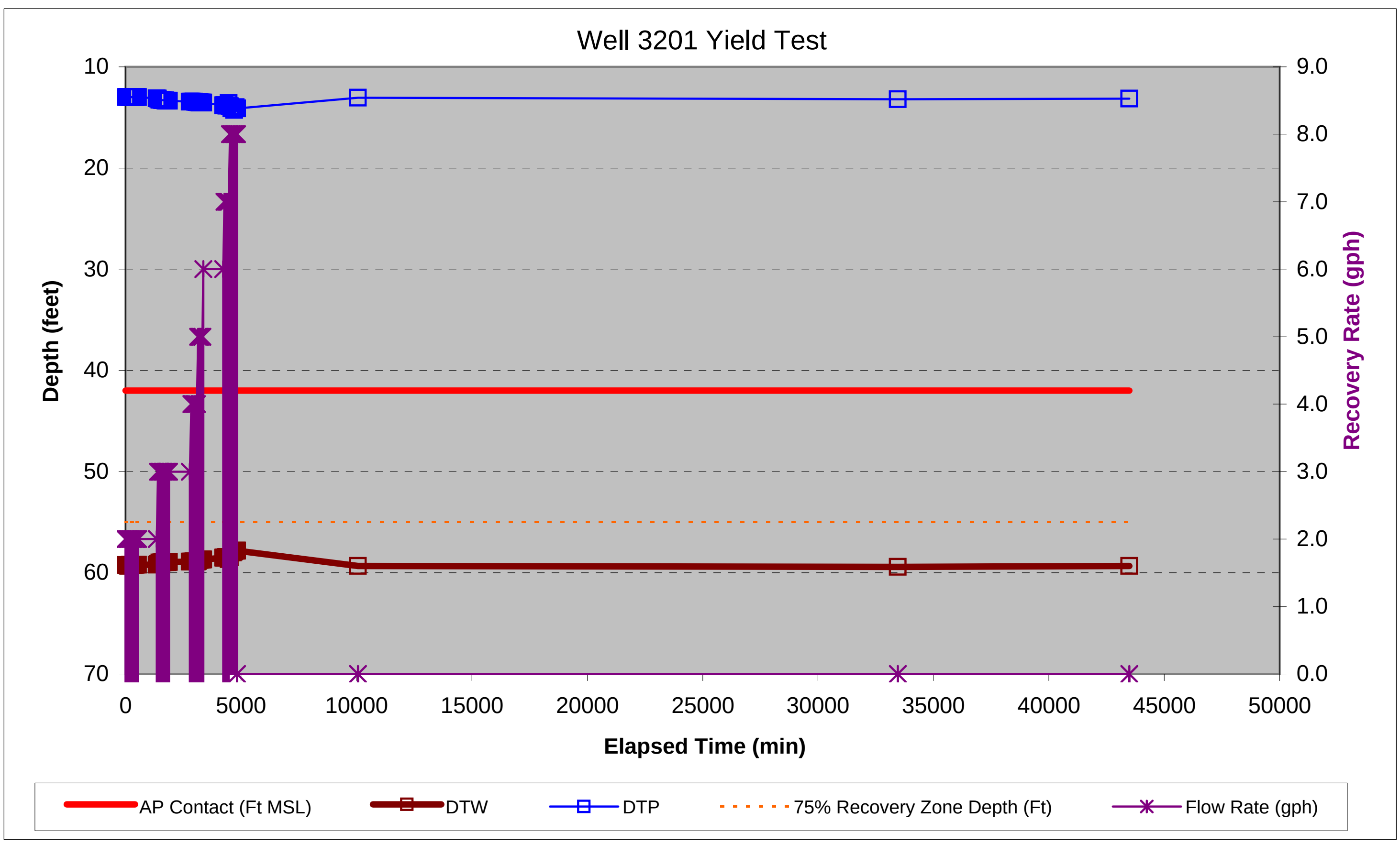


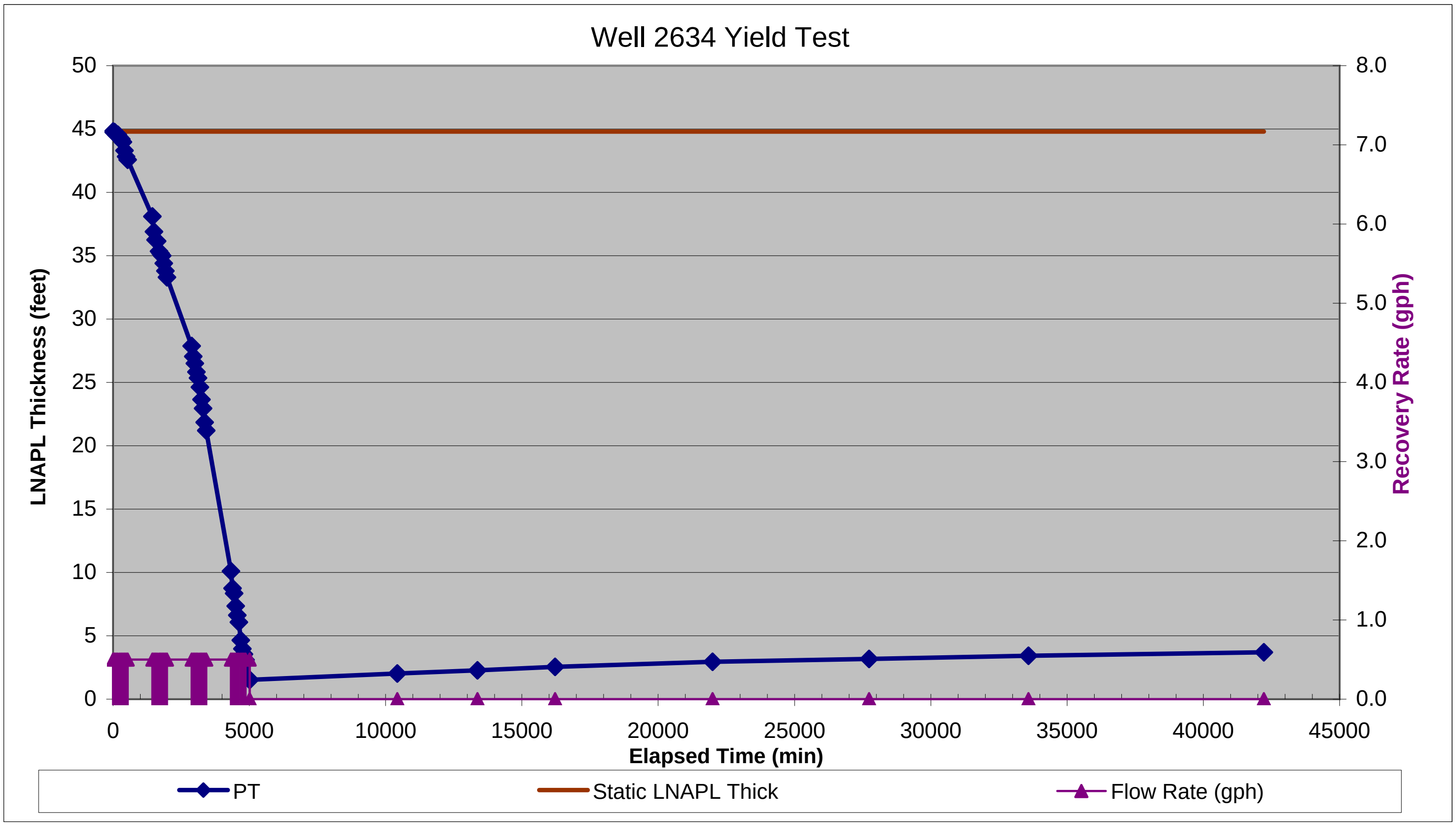
Well 2635 Yield Test
Depth (feet)
Recovery Rate (gph)
Elapsed Time (min)
-
10,000
20,000
30,000
40,000
50,000
60,000
10
15
20
25
30
35
40
45
50
55
60
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
AP Contact (Ft MSL)
DTW
DTP
75% Recovery Zone Depth (Ft)
Flow Rate (gph)


Well 2813 Yield Test
LNAPL Thickness (feet)
Recovery Rate (gph)
Elapsed Time (min)
0
5
10
15
20
25
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
50000
LNAPL Thickness (FT)
Static LNAPL Thickness (Ft)
Flow Rate (gph)

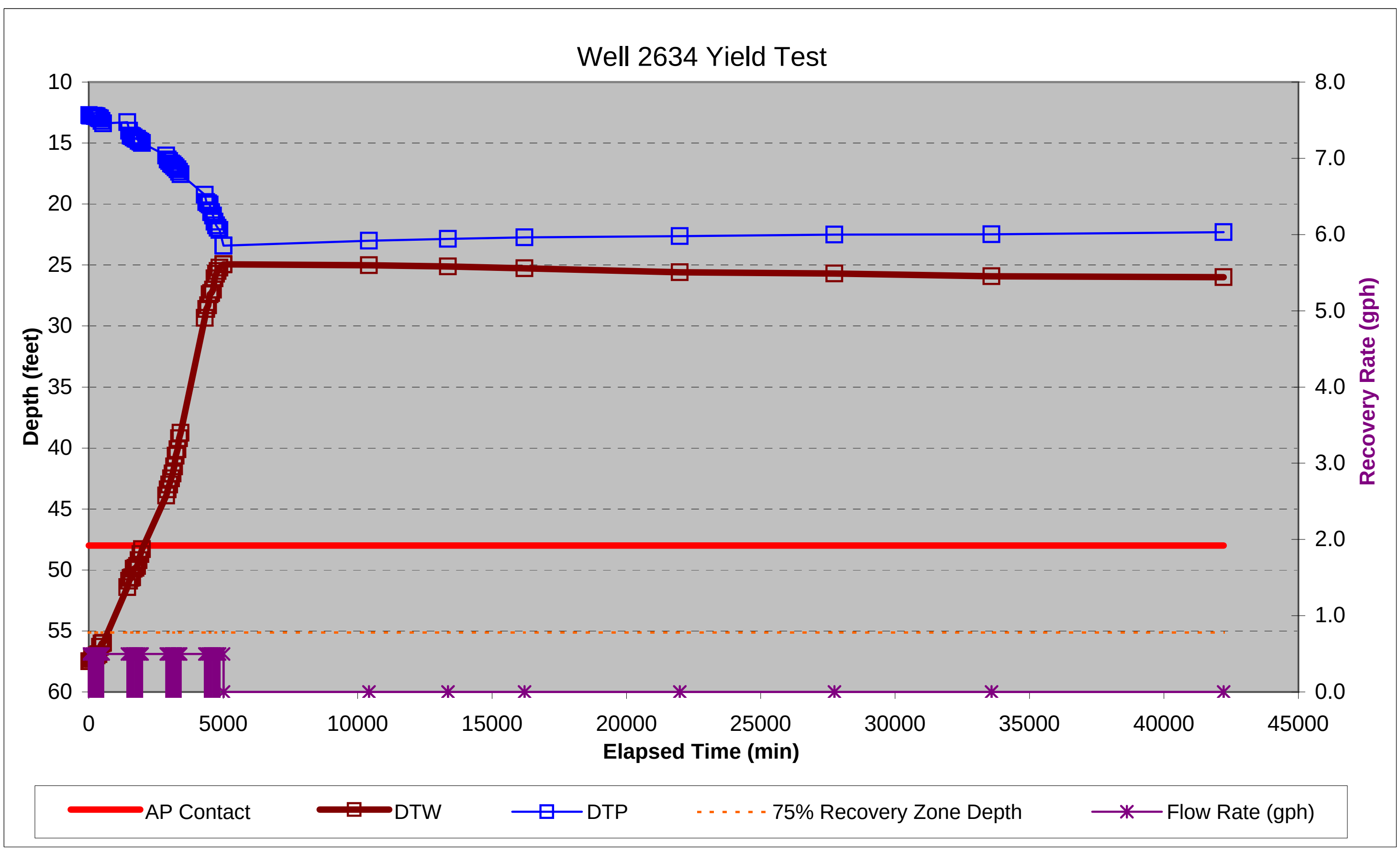

Well 2813 Yield Test
Depth (feet)
Recovery Rate (gph)
Elapsed Time (min)
10
15
20
25
30
35
40
45
50
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
50000
AP Contact (Ft MSL)
DTW
DTP
75% Recovery Zone Depth (Ft)
Flow Rate (gph)


Well 3201 Yield Test
LNAPL Thickness (feet)
Recovery Rate (gph)
Elapsed Time (min)
0
5
10
15
20
25
30
35
40
45
50
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
50000
LNAPL Thickness (FT)
Static LNAPL Thickness (Ft)
Flow Rate (gph)

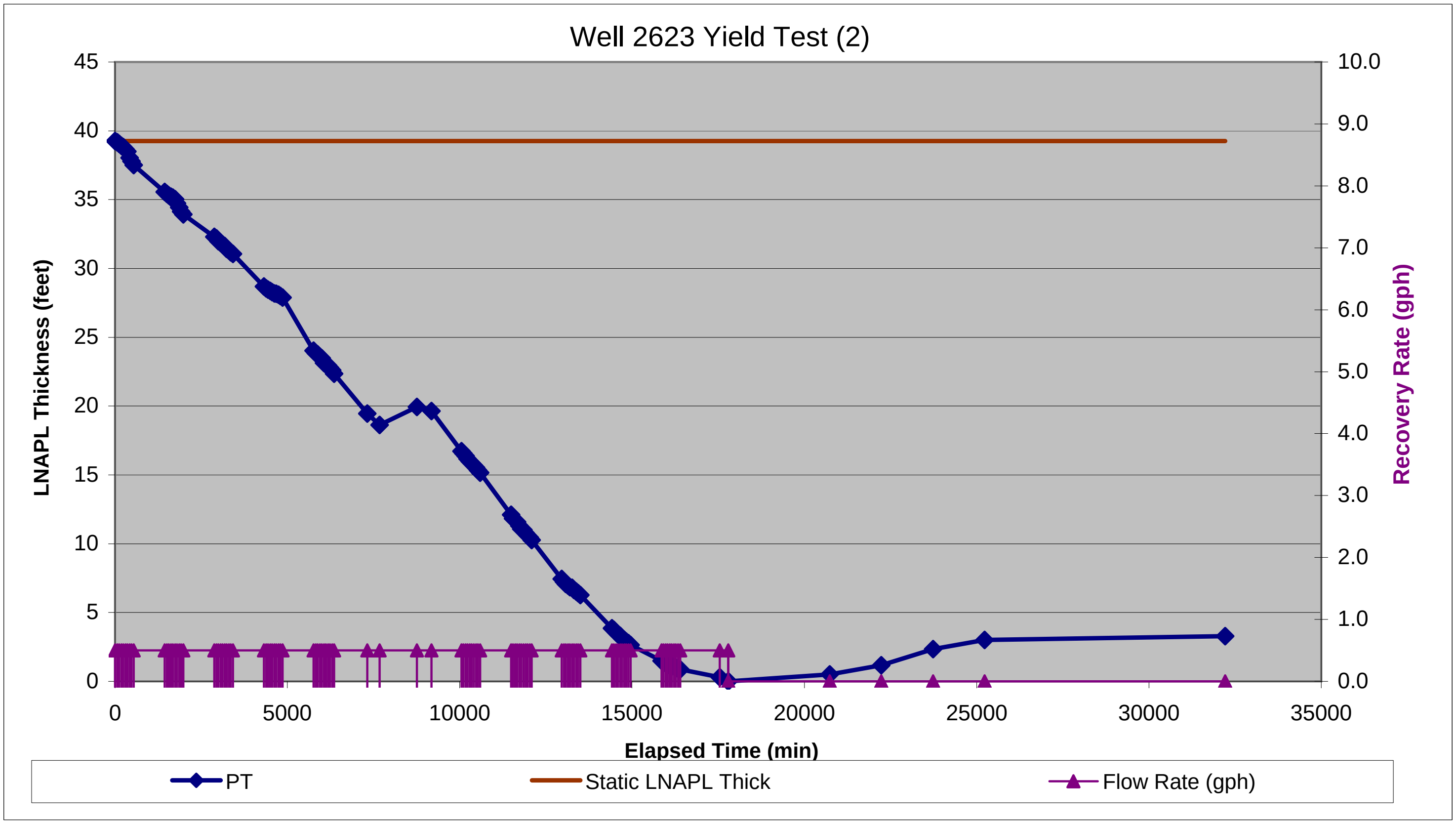

Well 3201 Yield Test
Depth (feet)
Recovery Rate (gph)
Elapsed Time (min)
10
20
30
40
50
60
70
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
50000
AP Contact (Ft MSL)
DTW
DTP
75% Recovery Zone Depth (Ft)
Flow Rate (gph)

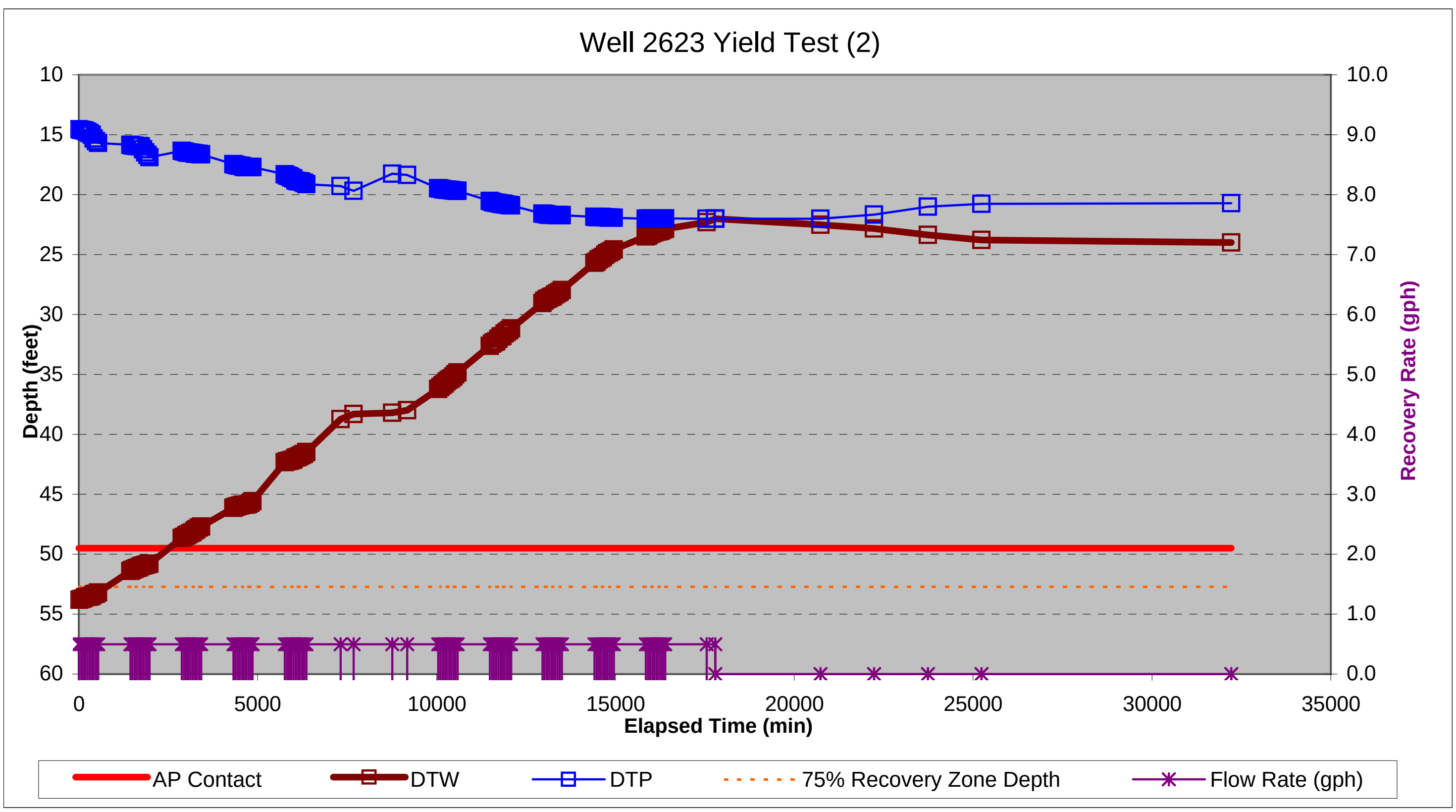


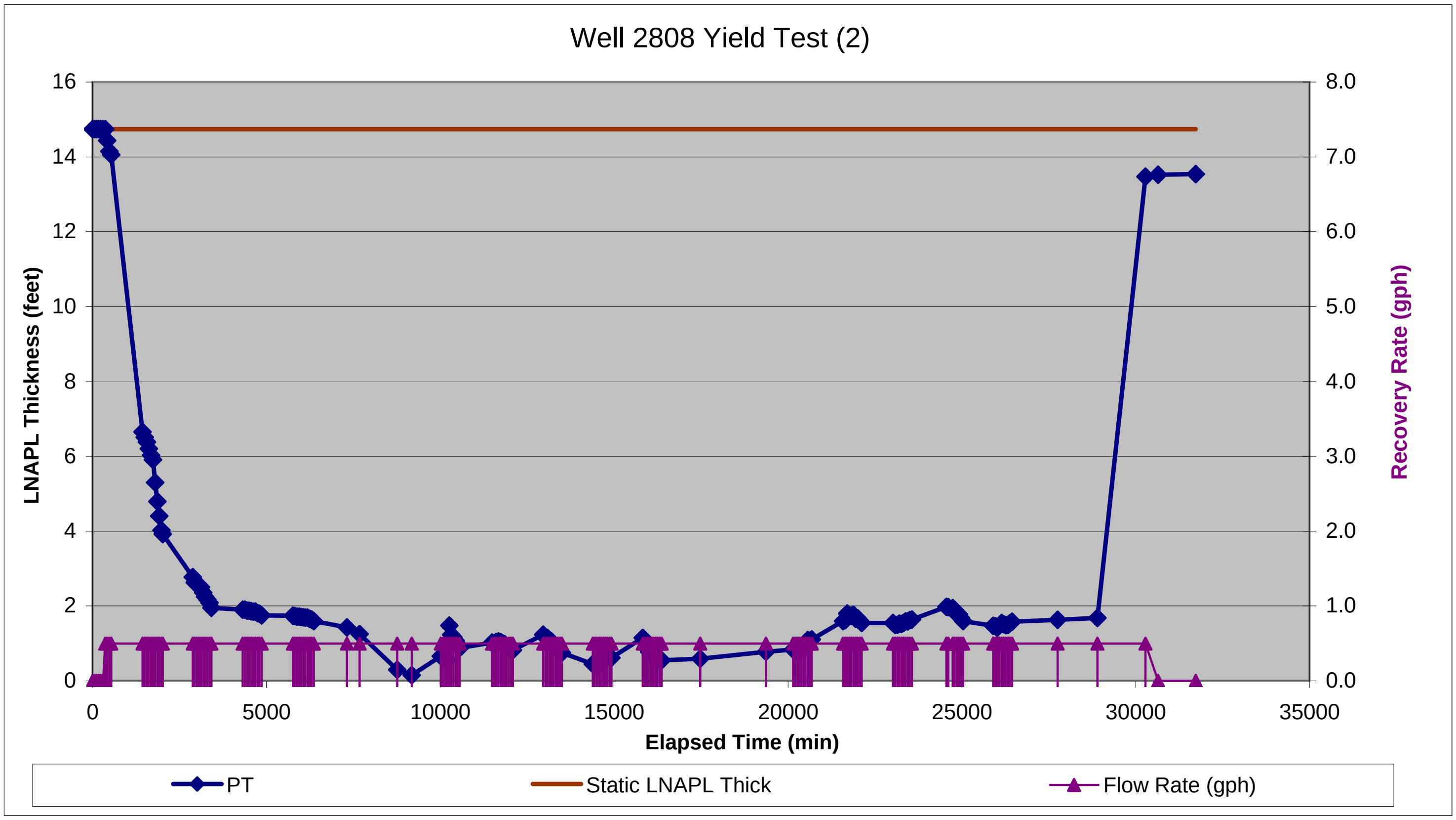
Well 2634 Yield Test
LNAPL Thickness (feet)
Recovery Rate (gph)
Elapsed Time (min)
0
5
10
15
20
25
30
35
40
45
50
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
PT
Static LNAPL Thick
Flow Rate (gph)



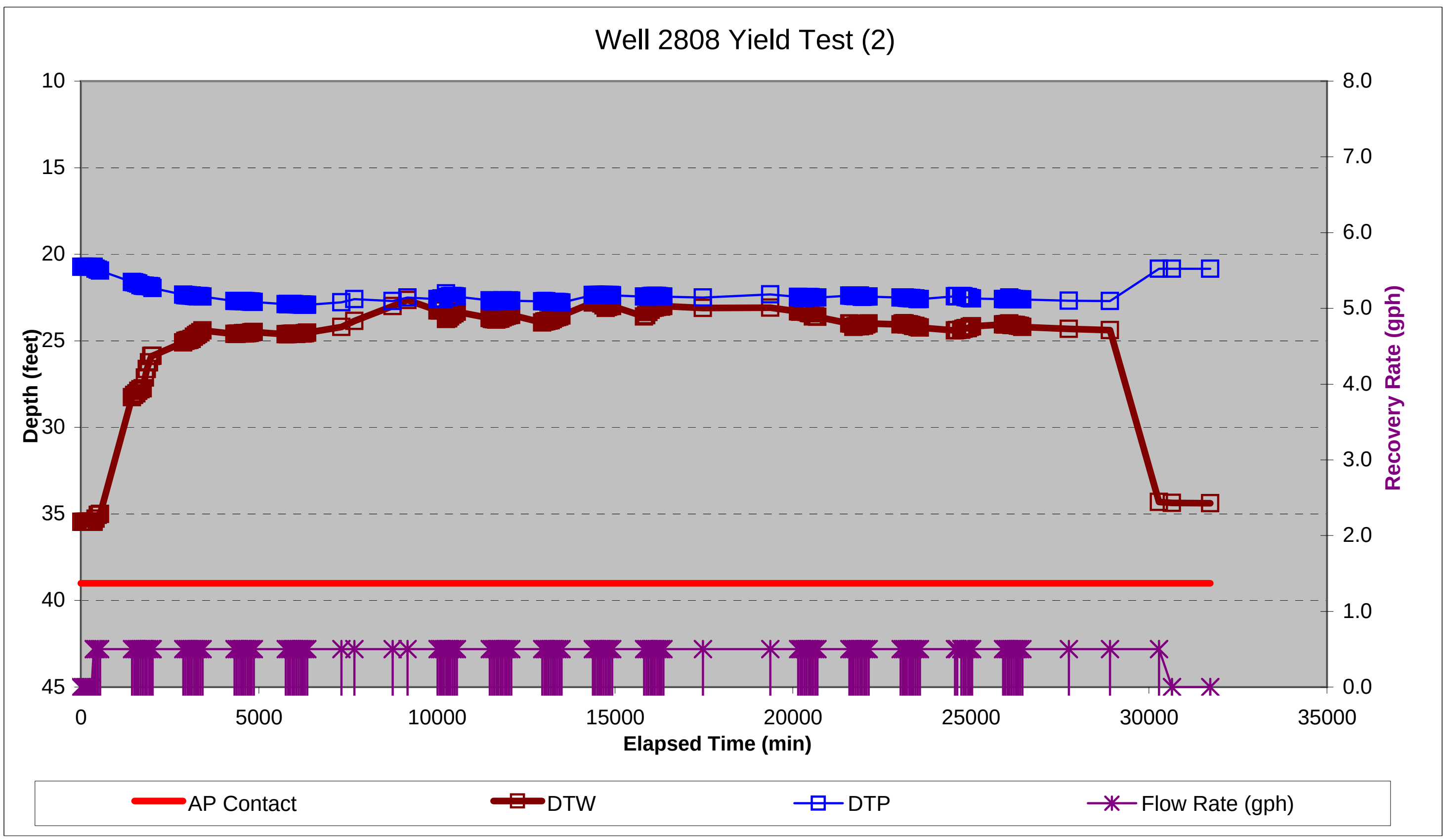
Well 2634 Yield Test
Depth (feet)
Recovery Rate (gph)
Elapsed Time (min)
10
15
20
25
30
35
40
45
50
55
60
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
AP Contact
DTW
DTP
75% Recovery Zone Depth
Flow Rate (gph)


Well 2623 Yield Test (2)
LNAPL Thickness (feet)
Recovery Rate (gph)
Elapsed Time (min)
45
40
35
30
25
20
15
10
5
0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
5000
10000
15000
20000
25000
30000
35000
PT
Static LNAPL Thick
Flow Rate (gph)

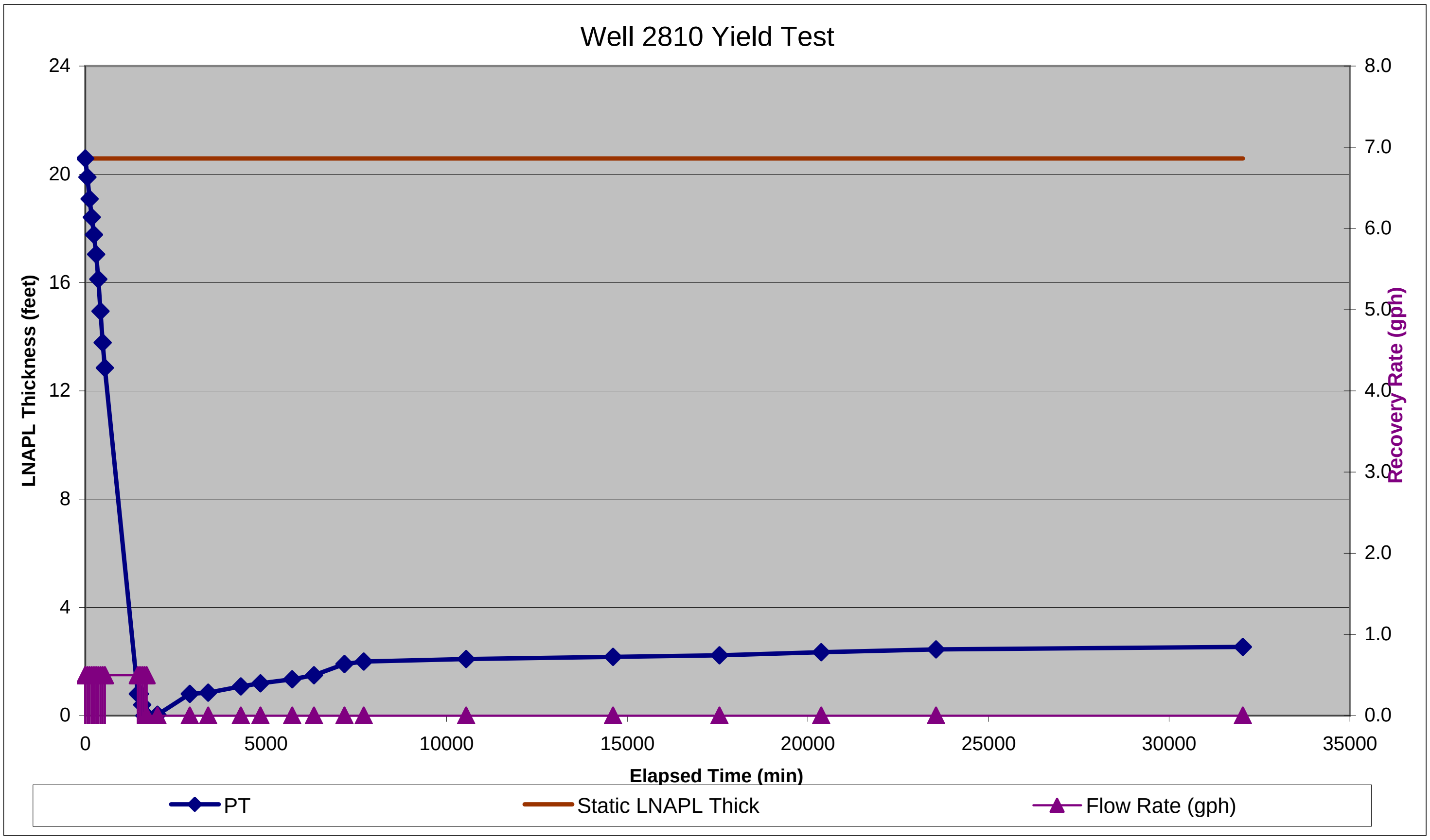

Well 2623 Yield Test (2)
Depth (feet)
Recovery Rate (gph)
Elapsed Time (min)
10
15
20
25
30
35
40
45
50
55
60
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
5000
10000
15000
20000
25000
30000
35000
AP Contact
DTW
DTP
75% Recovery Zone Depth
Flow Rate (gph)

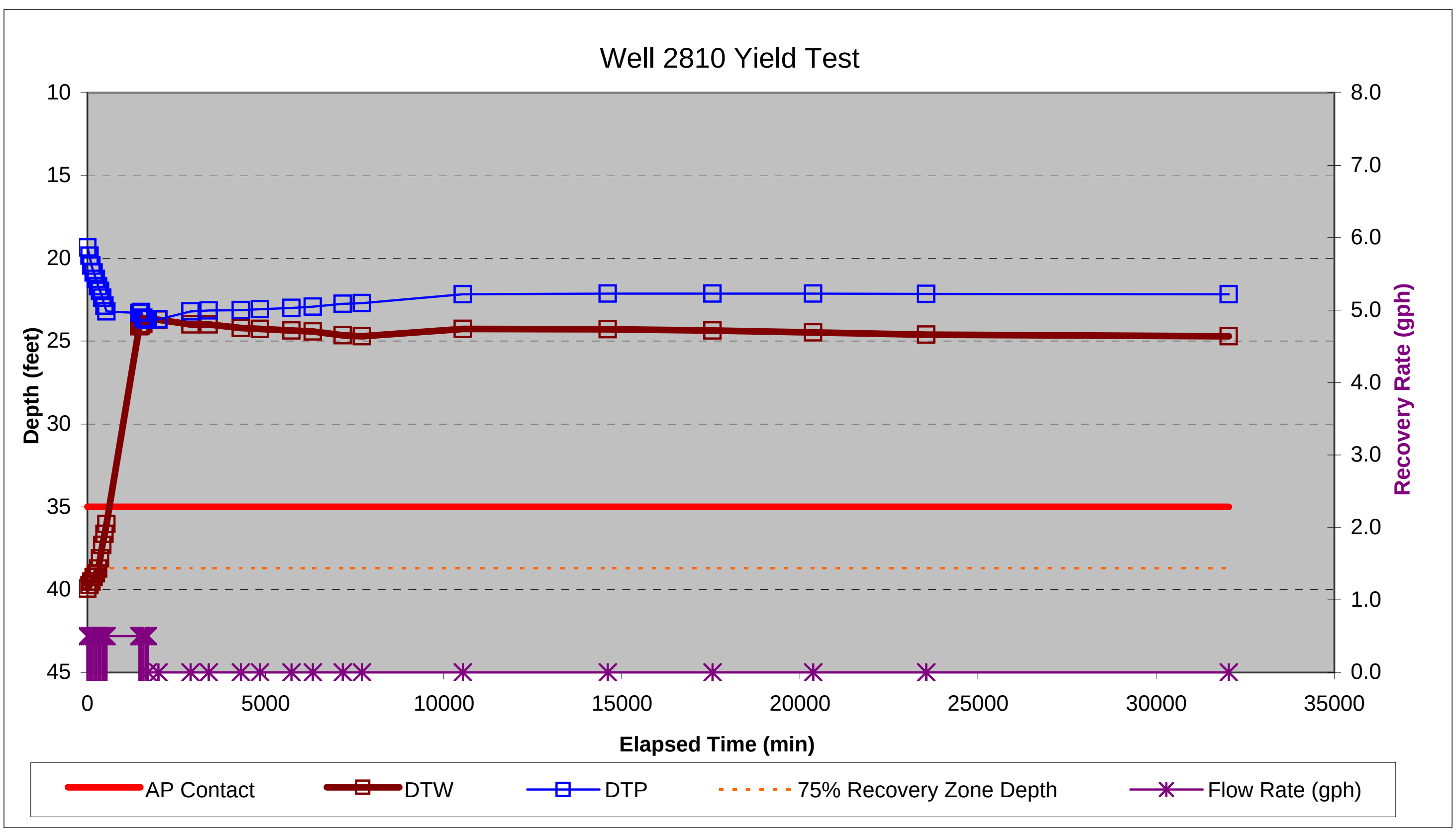


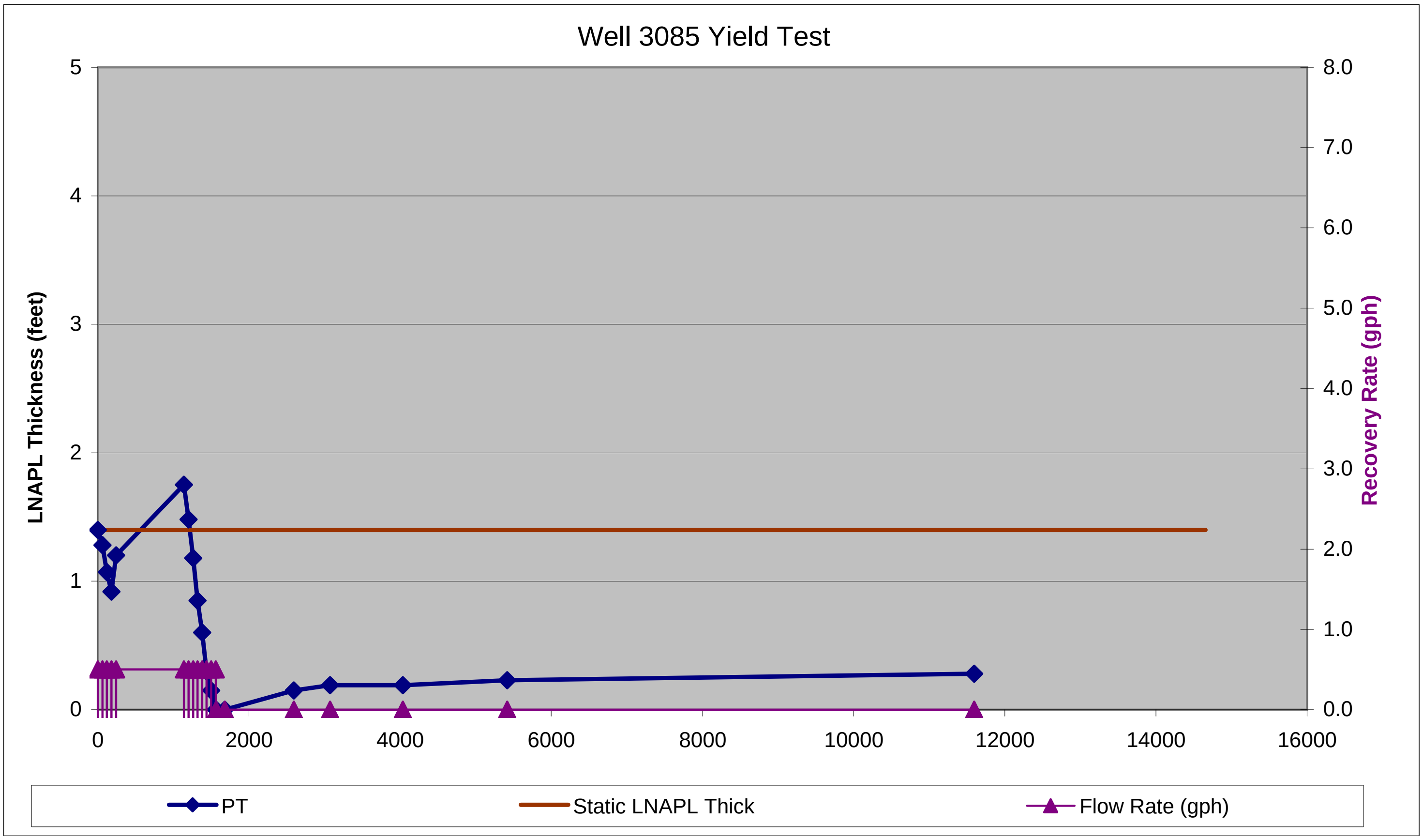
Well 2808 Yield Test (2)
LNAPL Thickness (feet)
Recovery Rate (gph)
16
14
12
10
8
6
4
2
0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
5000
10000
15000
20000
25000
30000
35000
Elapsed Time (min)
PT
Static LNAPL Thick
Flow Rate (gph)



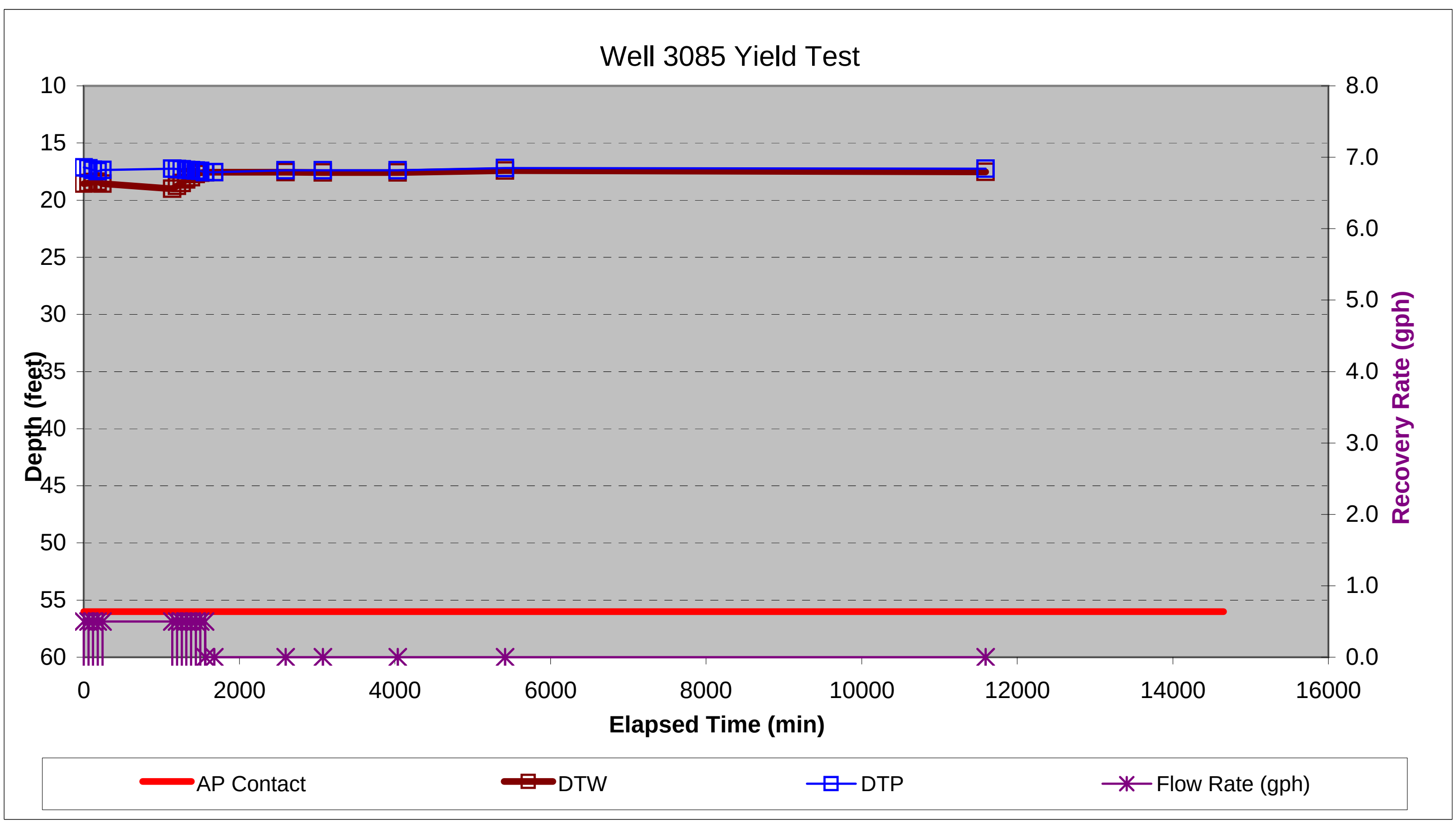
Well 2808 Yield Test (2)
Depth (feet)
Recovery Rate (gph)
10
15
20
25
30
35
40
45
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
5000
10000
15000
20000
25000
30000
35000
Elapsed Time (min)
AP Contact
DTW
DTP
Flow Rate (gph)


Well 2810 Yield Test
LNAPL Thickness (feet)
Recovery Rate (gph)
24
20
16
12
8
4
0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
5000
10000
15000
20000
25000
30000
35000
Elapsed Time (min)
PT
Static LNAPL Thick
Flow Rate (gph)

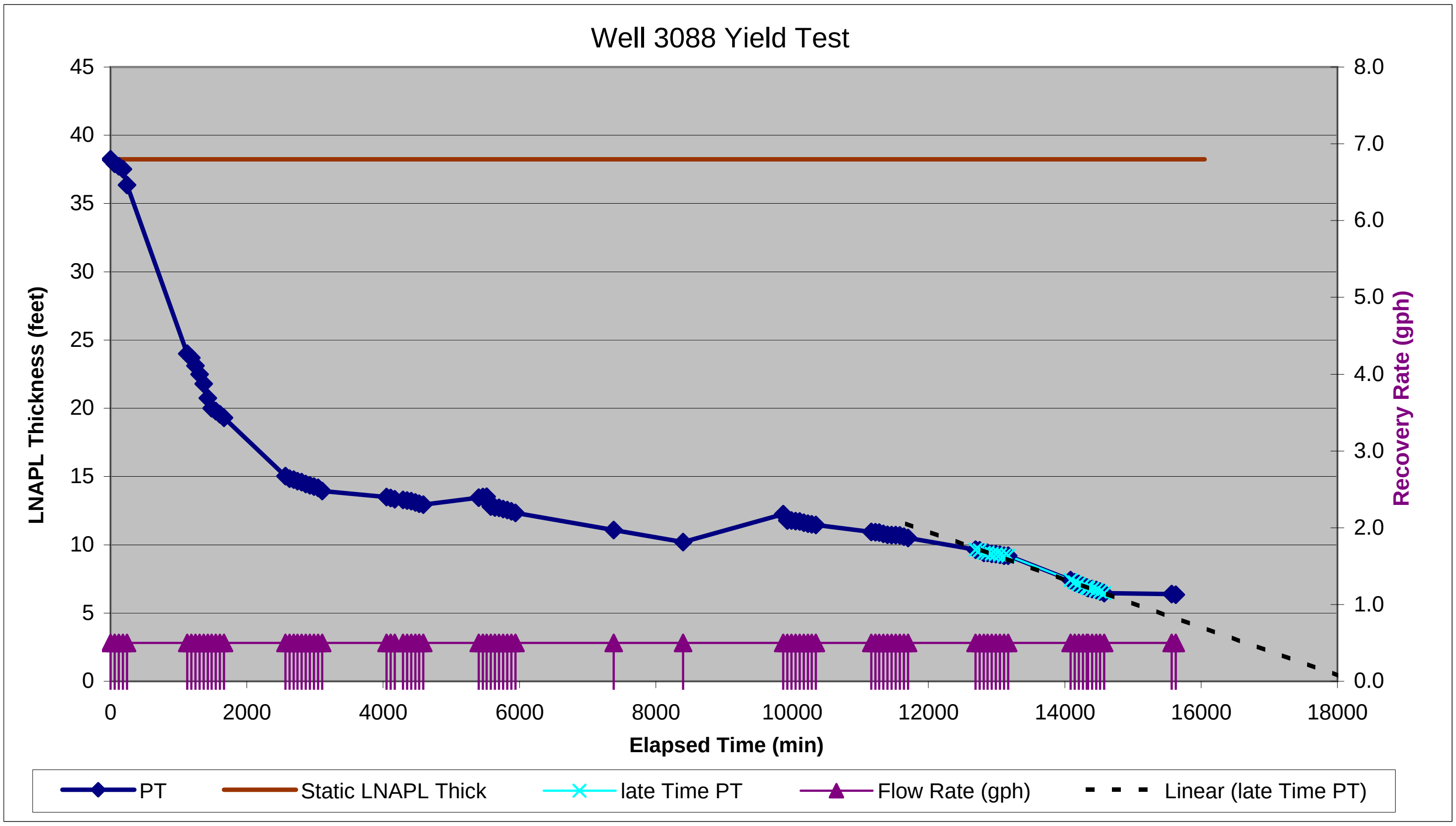

Well 2810 Yield Test
Depth (feet)
Recovery Rate (gph)
10
15
20
25
30
35
40
45
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
5000
10000
15000
20000
25000
30000
35000
Elapsed Time (min)
AP Contact
DTW
DTP
75% Recovery Zone Depth
Flow Rate (gph)

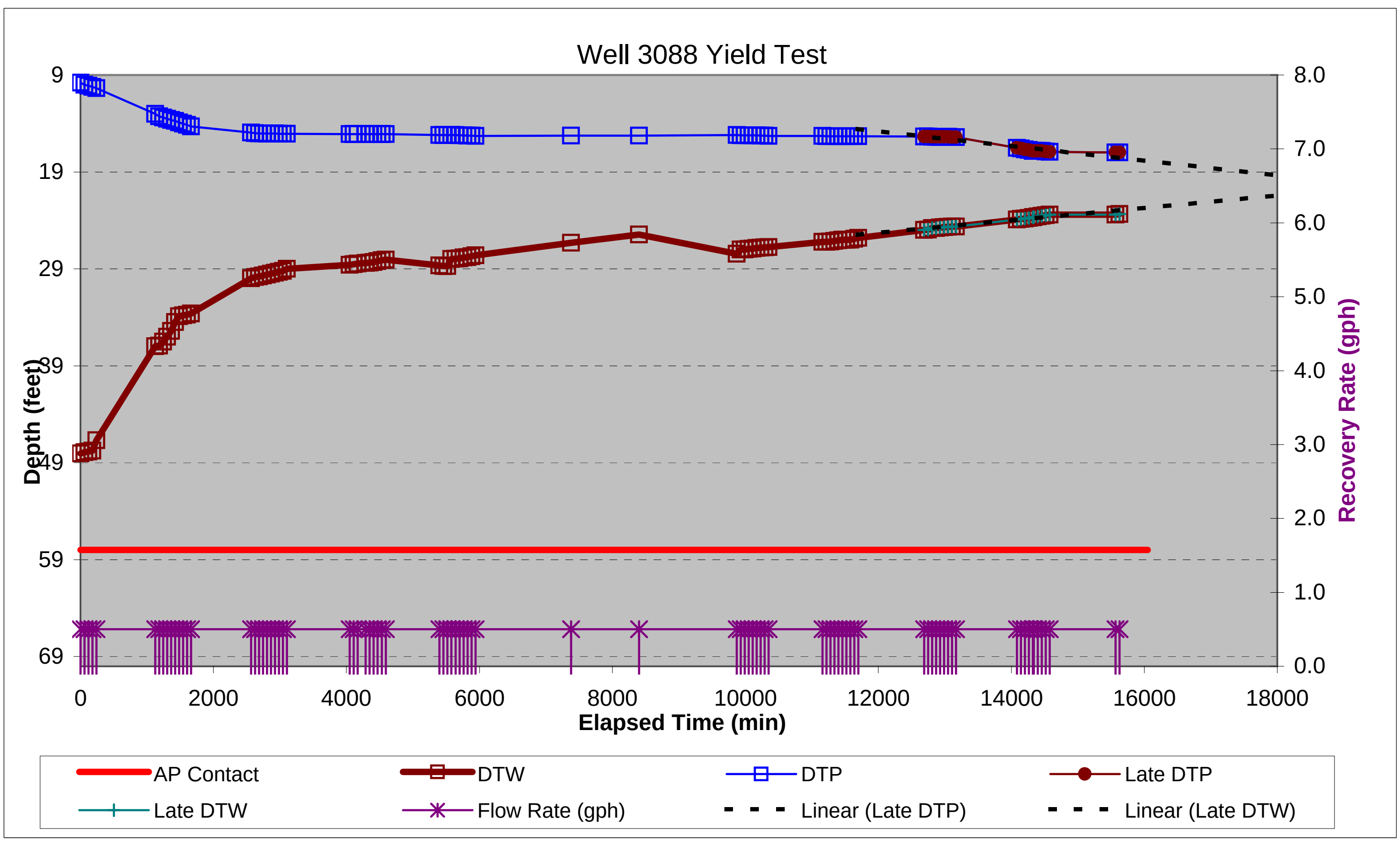


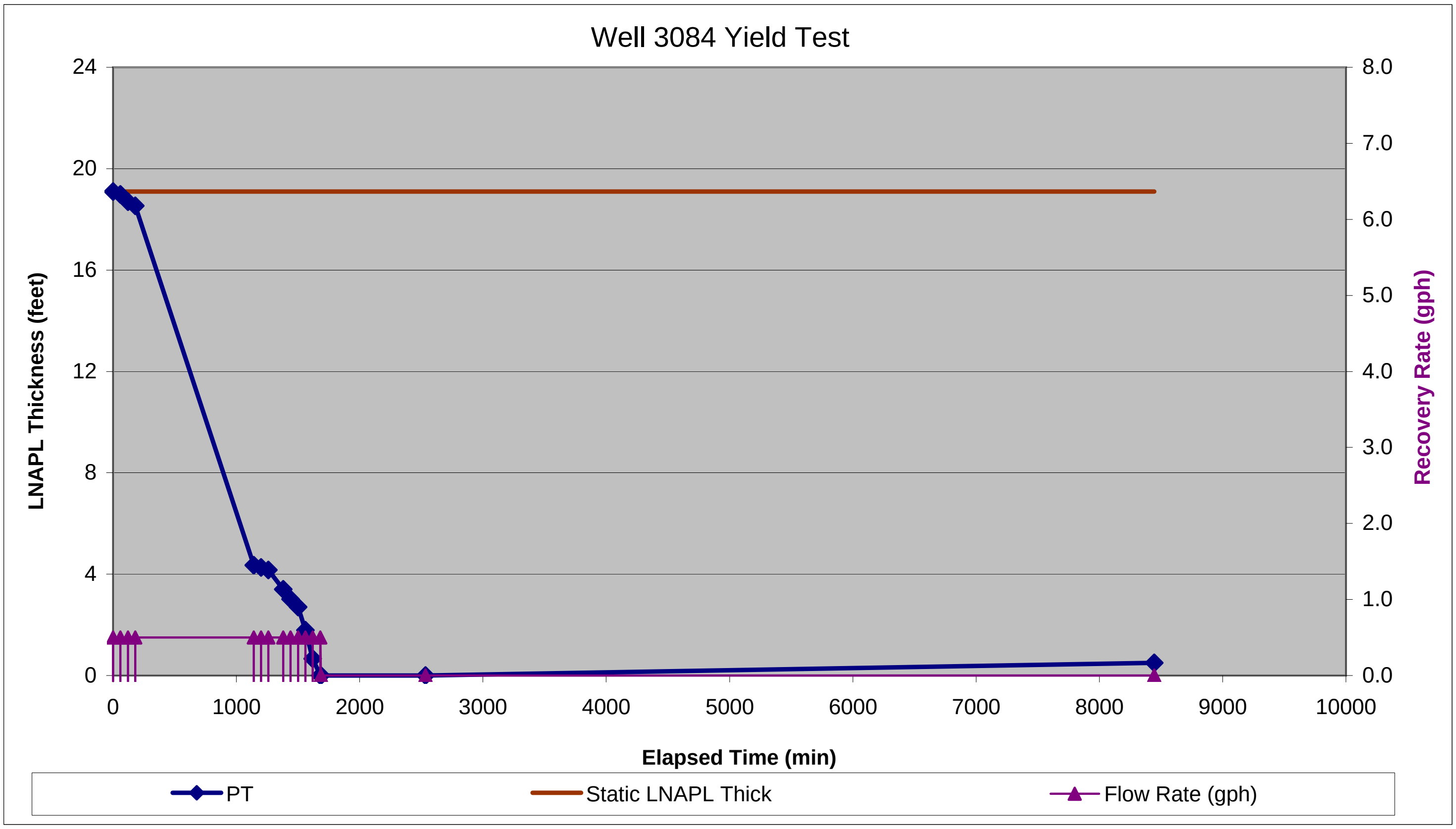
Well 3085 Yield Test
LNAPL Thickness (feet)
Recovery Rate (gph)
0
1
2
3
4
5
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0
2000
4000
6000
8000
10000
12000
14000
16000
PT
Static LNAPL Thick
Flow Rate (gph)

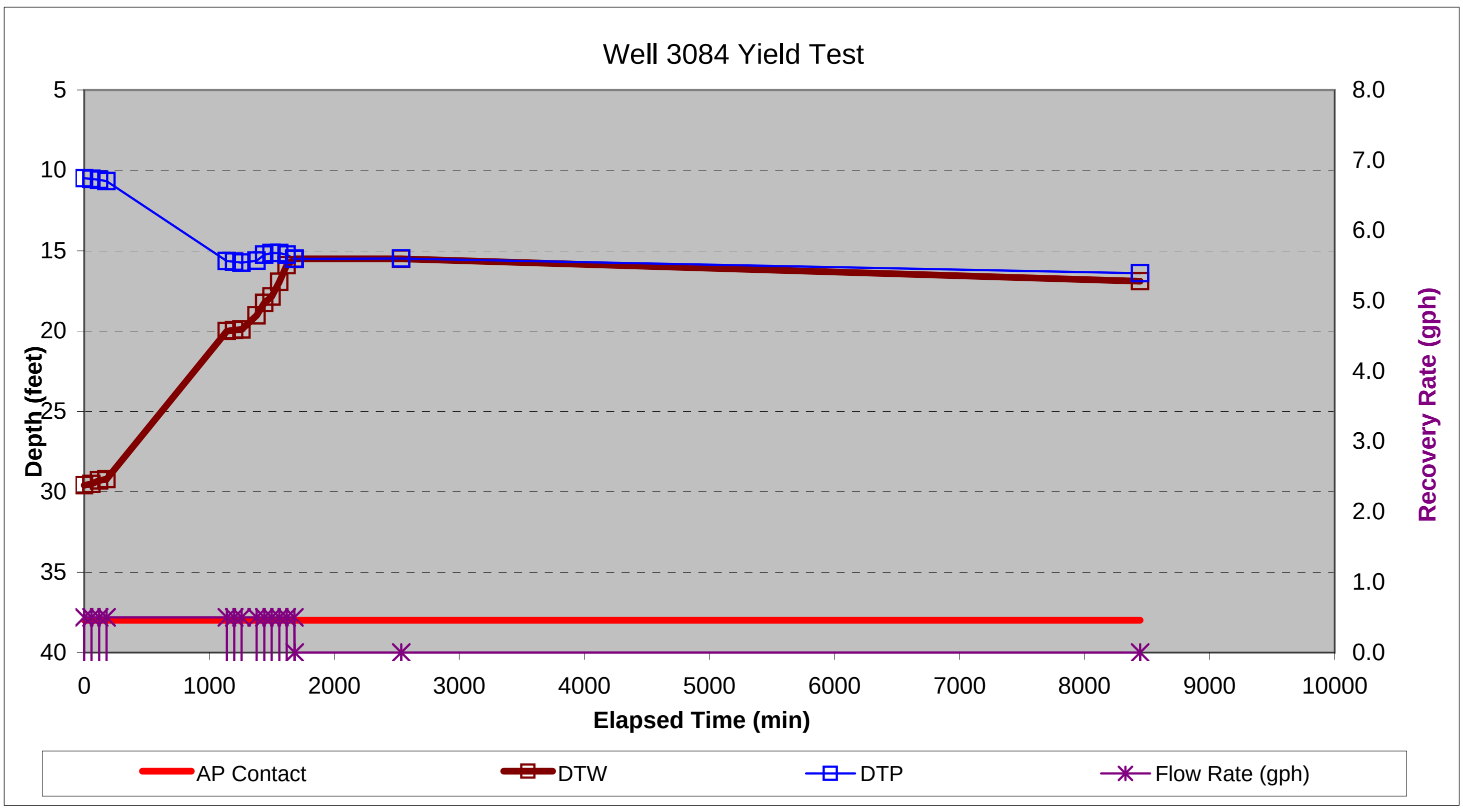


Well 3085 Yield Test
Depth (feet)
Recovery Rate (gph)
10
15
20
25
30
35
40
45
50
55
60
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
2000
4000
6000
8000
10000
12000
14000
16000
Elapsed Time (min)
AP Contact
DTW
DTP
Flow Rate (gph)

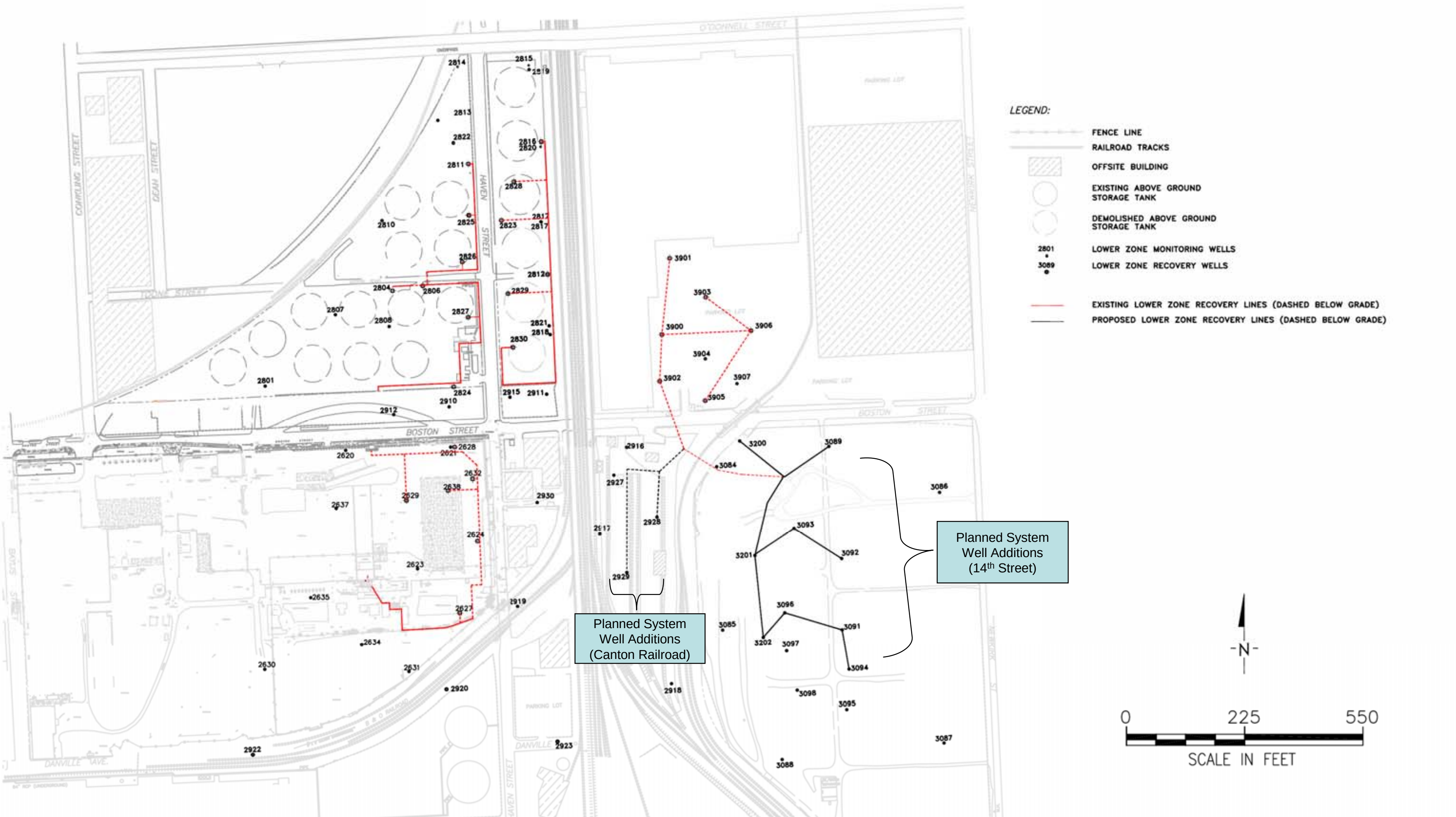

Well 3088 Yield Test
LNAPL Thickness (feet)
Recovery Rate (gph)
Elapsed Time (min)
0
5
10
15
20
25
30
35
40
45
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
PT
Static LNAPL Thick
late Time PT
Flow Rate (gph)
Linear (late Time PT)


Well 3088 Yield Test
Depth (feet)
Recovery Rate (gph)
Elapsed Time (min)
9
19
29
39
49
59
69
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
AP Contact
DTW
DTP
Late DTP
Late DTW
Flow Rate (gph)
Linear (Late DTP)
Linear (Late DTW)


Well 3084 Yield Test
LNAPL Thickness (feet)
Recovery Rate (gph)
Elapsed Time (min)
24
20
16
12
8
4
0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
PT
Static LNAPL Thick
Flow Rate (gph)


Well 3084 Yield Test
Depth (feet)
Recovery Rate (gph)
Elapsed Time (min)
5
10
15
20
25
30
35
40
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
AP Contact
DTW
DTP
Flow Rate (gph)

ATTACHMENT III



TITLE: Lower Zone LNAPL Recovery System and Planned System Well Additions (14th Street and Canton Railroad)

LOCATION: ExxonMobil Baltimore Terminal

GeoTrans, Inc. A TETRA TECH COMPANY

CHECKED	DM	FIGURE:
DRAFTED	SC	
FILE	BostonSpurOv	
DATE	06-12-09	

LOWER ZONE LNAPL RECOVERY SYSTEM

View of above grade sump in Toone Street Tankfield.

View of below grade sump in Main Terminal Area.

Main Terminal Area recovery tanks 800 and 801

14th Street Area recovery tank 802