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TOW WAY FUEL FARM

QUARTERLY SUMMARY PROGRESS REPORT NO. 12

(NOVEMBER 1, 1999 THROUGH JANUARY 31, 2000)

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Appendix A McLaren/Hart Operation and Maintenance Reports

ACRONYMS AND ABBREVIATIONS

CMS	Corrective Measures Study
EPA	Environmental Protection Agency
EQB	Environmental Quality Board
ICM	Interim Corrective Measure
O&M	Operation and Maintenance
OU	Operable Unit
RCRA	Resource Conservation and Recovery Act
TWFF	Tow Way Fuel Farm
UST	Underground Storage Tank

1.0 INTRODUCTION

Construction of the Interim Corrective Measure (ICM) at the Tow Way Fuel Farm (TWFF) Naval Station Roosevelt Roads, Puerto Rico (including the commissioning phase) was completed April 30, 1997. This is the twelfth Quarterly Progress Report which provides a summary of free-product removal progress during the commissioning stage and first eleven quarters of operation of the program. This document being Quarterly Summary Progress Report No. 12 covers the period of operation of the ICM system from November 1999 through January 2000.

Two types of progress reports are being provided for the ICM. The first type (Type I) is a basic summary report of ICM activities during the preceding three months. At a minimum, the basic summary report contains the following:

- Well Location Map fully annotated with well designations
- Tabulation of water levels at the site
- Tabulation of free-product thickness measured at the site
- Tabulation of free product recovered during the reporting period
- Tabulated cumulative total of free product recovered to report date
- Discussion of the system operation for the reporting period

[Note: The preceding list was developed based on the requirements contained within the Environmental Protection Agency (EPA) Region II comment letter of March 7, 1997]. The first Type I summary report (Quarterly Summary Progress Report No. 1) covered the months of January, February, and March 1997 and was submitted on June 3, 1997.

The second type of report (Type II) is produced semi-annually and contains a more rigorous analysis of the system=s progress to date and its ability to effectively remediate the free-product plume at the Tow Way Fuel Farm. To accomplish this, the semi-annual report contains all the elements included in the Type I quarterly report as well as the following:

- More extensive discussion of the systems operation and effectiveness
- Results of groundwater modeling of various scenarios including the present case (i.e., continued operation of the existing recovery system) and one or more cases involving enhancements to the existing system.
- Analyses of possible system enhancements.

The first Type II semi-annual report (Quarterly Summary Progress Report No. 2) covered the months of April, May, and June, 1997 and was submitted on September 22, 1997.

Quarterly Summary Progress Report No. 3 was a Type I basic summary report and covered four months instead of three: July, August, September, and October 1997. It was submitted on December 10, 1997. [Note: the data from October 1997 was included in Quarterly Summary Progress Report No. 3; however, because of the change in reporting schedule, the October Terra Vac Report was not available for inclusion in the appendix of this document. The October Terra Vac Report was included in the Quarterly Summary Progress report No. 4 to provide a complete record.]

Quarterly Progress Report No. 4 was a Type II report and covered the months of November and December, 1997 and January 1998. It was submitted on March 6, 1998.

Quarterly Progress Reports No.-s 5, 6, and 7 were Type I reports and covered the months of February, March and April, 1998; May, June, and July 1998; and August, September, and October 1998, respectively.

Quarterly Progress Report No. 8 was the third Type II Report and covered the months of November and December 1998 and January 1999. It was submitted on February 26, 1999.

Quarterly Progress Report No. 9, 10, and 11 were Type I Reports covering the months of February, March, and April 1999; May, June, and July 1999; August, September, and October 1999 respectively.

This Quarterly Progress Report No. 12 is a Type I Report covering the months of November and December 1999 and January 2000.

It should be noted that reports 5, 6, and 7 have been Type I rather than alternating between types which would apparently be indicated by the schedule. During an August 4, 1998 conference call among the Navy, EPA Region II, and Puerto Rico Environmental Quality Board (EQB), it was decided that if conditions had not changed enough at the site to warrant a modeling effort, the modeling would be performed for the next quarterly report (5/98 - 7/98), the results of which will be used in the Corrective Measure Study (CMS) Task I report.

During the next quarter, hurricane Georges hit the island with strong winds and heavy rains. The water table was raised as a result of the rains causing anomalous measurements. During the November 4, 1998 JIG Conference Call, it was agreed that modeling anomalous conditions would serve no useful purpose in the August 1998 through October 1998 quarterly report. Therefore, modeling was postponed until the previous quarter (November 1998 through January 1999) when it was assumed that conditions would have returned to Anormal.@

Modeling was performed in Quarterly Summary Progress Report No. 8 using ARMOS. The results of the modeling effort will be used to assist in screening corrective measures to be performed as part of Task 2 of the Operable Unit (OU) 2 CMS process. Conditions have not significantly changed at the site since the last modeling effort, therefore, no new modeling has been performed.

2.0 CONSTRUCTION ACTIVITIES

This section describes the construction activities that took place during the reporting period of this report.

The recovery system has been in full operation since April 30, 1997.

There are currently pumps in wells PW-6, RW-1, and RW-4. However, the system was shut down last quarter on October 31, 1999 to let the site conditions stabilize for the upcoming pneumatic fracturing pilot study. The recovery system has been off-line since, due to the current pneumatic fracturing pilot study. This pilot study will be used to evaluate the enhancement of product recovery using pneumatic fracturing methods as well as different pumping methods. The pilot studies will be completed around June 2000 Future construction activities will be documented in subsequent Quarterly Progress Reports as appropriate.

3.0 SITE CONDITIONS

This section describes the existing site conditions including groundwater flow, current estimated product thickness, and the extent of product contamination in the soil and groundwater.

3.1 Product Release History

Seven underground fuel storage tanks (USTs) are located north of Forrestal Drive on a hill overlooking Ensenada Honda. These tanks constitute the upper Tow Way Fuel Farm. As referenced in the NEESA report 12-051 (September, 1984), spills, leaks, and sludge disposal have occurred here since 1957.

In 1957 or 1958, a fuel line to Tank 82 leaked, resulting in a spill of Bunker C fuel. It is estimated that approximately 420,000 gallons of Bunker C fuel leaked from the storage tank. The oil spill followed a path downhill toward the harbor in a southwesterly direction towards Ensenada Honda, extending to the shoreline and the Ensenada Honda mangrove swamp across the harbor.

It is also estimated that approximately 420,000 gallons of fuel spilled from Tanks 56A and 56B, onto the surrounding soil over a 15 to 20-year period. Tanks 56A and 56B were removed in February 1984. A dark fuel-stained soil was present around the old tanks. Isolated pools of oil from the spills and leaks were evident on the groundwater that seeped into the holes where the tanks had been removed.

Between 1971 and 1972, Tanks 83 and 1080 were cleaned and the Bunker C fuel sludge was emptied into two pits dug within a 100-foot radius of the tanks. One pit was dug approximately 100 feet in circumference and 10 to 20 feet deep near Tank 83; the second pit was 50 feet in circumference and 10 to 20 feet deep near Tank 1080. It is estimated that 3,900 to 7,500 cubic yards of Bunker C fuel sludge were cleaned from the tanks and disposed of at the site in these pits.

In 1978 a leak occurred at Tank 1080, resulting in the release of approximately 65,000 gallons of diesel fuel from the tank. It is estimated that about 10,000 gallons were recovered during cleanup operations.

In November 1986, Tank 85 leaked approximately 91,000 gallons of JP-5 fuel. Approximately 12,000 gallons were recovered on land and 10,000 gallons were recovered from water. Another 10,000 gallons were trapped in sand under the tank. As a result, approximately 59,000 gallons were unaccounted for during the spill (NAVSTA, Roosevelt Roads, 1992).

3.2 Monitoring Wells, Product Recovery Wells, and Soil Borings

Investigations have been conducted at the Tow Way Fuel Farm by various consultants under various programs since 1982. One result of these studies has been the installation of 60 monitoring/recovery wells and 28 additional soil borings. The wells and soil borings are summarized on Table 3-1. Figure 3-1, the site map, shows the location of the monitoring wells, product recovery wells. The newest well , UGW-20R, must be added to the monitoring program. The resulting data will be added to the database and the figures once the well has been surveyed for location and elevation.

In past months it has been noted that the field crew responsible for taking measurements has not made measurements consistently in every well. Improvements have been made in the last quarter, however, several wells were not measured consistently during the site-wide event this quarter (see Table 3-2). For the sake of accuracy and completeness, the field crew should make every effort to take measurements in every well as located on the current map.

3.3 Groundwater and Product Information

Groundwater monitoring activities have occurred during the various studies and have most recently been conducted by McLaren/Hart as part of their Interim Corrective Measure. Water levels and product thicknesses are normally measured monthly. The monthly groundwater and product level measurements from the Operation and Maintenance (O&M) Reports are presented on Table 3-2.

Table 3-3 summarizes the historical product thickness measurements in all site monitoring and recovery wells. A complete round of water level and product thickness measurements were made during November and December 1999 and January 2000.

Groundwater flow directions remain generally southwestward toward Ensenada Honda. There still appears to be a component of flow toward the southeast along Forrestal Drive. This is important to note because the roadway shoulder (and most likely the underlying utility fill) appears to be a possible conduit for groundwater and floating product.

Figures 3-2, 3-3, and 3-4 reflect groundwater measurements taken in November and December 1999 and January 2000, respectively. They show that the general groundwater flow direction is still toward Ensenada Honda. Local deflections of the contours indicate a preferential flow direction along Forrestal Drive toward the southeast.

Figure 3-2 shows that there was a large groundwater mound during November to the north of Forrestal Drive within well 7MW02A. There is also mounding in well 470-MW1 to the north west of Forrestal Drive and in UGW-20 near the bay.

Figure 3-3 shows that the mounding is occurring in well UGW-2 to the north side of the site and in RW-1 to the north west of Forrestal Drive in December. Well 7MW02A was not measured this month to determine if the large groundwater mound is still present.

Figure 3-4 shows that the mounding is still present in UGW-2 to the north of the site, but is not as significant in RW-1 in January. There is also a small groundwater mound in UGW-20 near the bay.

Figure 3-5 shows that the thickest measured product in November (up to 10.95 feet thick) is floating atop the water table between wells UGW-12 and RW-4 along Forrestal Drive. Also, floating product (up to 9.00 feet thick) lies along Forrestal Drive between wells UGW-17 and RW-6. Smaller amounts of product are present near UGW-19 and UGW-21 along Forrestal Drive. Also present is a relatively

smaller amount of product (1.6 feet) in well UGW-25 to the west side of the site. There is still a small amount of product in the cluster of wells that include PW-5 and MW-1.

Figure 3-6 shows that the thickness of the floating product has decreased in the wells along Forrestal Drive in December. The thickest measured product exists near wells UGW-12 and UGW-13 where the floating product is as much as 8.70 feet thick. There is also a significant amount of product near wells UGW-17 and UGW-21. The second area of floating product (1.1 feet thick) lies to the northwest of Forrestal Drive in well UGW-25. There were only very small changes in product in the cluster of wells that include PW-5 and MW-1.

Figure 3-7 shows that the floating product between wells UGW-12 and UGW-13 is nearly the same in January as in December. This narrow band of product appears to be migrating to the southeast along Forrestal Drive. This is indicated by the consistent product thickness in UGW-21. Product thicknesses in UGW-21 and UGW-17 also remain high this month. The product level in well UGW-25 has remained the same as in December (1.1 feet thick). The amount of floating product in the cluster of wells that include PW-6 and MW-1 has remained nearly the same as in December.

4.0 FREE PRODUCT RECOVERY PROGRESS

Two product recovery systems have been installed at the Tow Way Fuel Farm. The first system, installed as an emergency measure by Terra Vac, consisted of free product skimming. This system was also used for the testing of single, dual, and triple-phase free-product recovery. The second system, installed by McLaren/Hart (formerly ICHOR, under contract to J.A. Jones) was installed as an ICM under Resource Conservation and Recovery Act (RCRA) corrective action for free product recovery at the TWFF. The varying success of each of these recovery systems is discussed in the following paragraphs.

4.1 Terra Vac Product Recovery Testing

Terra Vac=s product recovery testing started with product-only skimming pumps in several of the existing wells at the TWFF (including UGW-1, UGW-3, UGW-5, UGW-12, UGW-13, and UGW-17). In 1994 and 1995 Terra Vac performed a small-scale pilot test of recovery systems which included extraction of single, dual and triple phases (product skimming only, product skimming with groundwater table depression, and product skimming with groundwater table depression assisted by vacuum extraction of the vapor phase, respectively). As a part of the program six recovery wells (PW-series) and four monitoring wells (MW-series) were installed.

The conclusions from testing stated that the triple-phase recovery was the most effective means of removing the product (i.e., it had the highest rate of gallons removed over time). The total product volume recovered in 1994 and 1995 by Terra Vac was reported to be 12,630 gallons.

4.2 McLaren/Hart Product Recovery

The McLaren/Hart product recovery system was under construction (which includes the commissioning phase) until April 30, 1997. The system originally proposed to have eight oil-skimming (single-phase) recovery wells in operation (RW-1, RW-2, RW-3/UGW-22, RW-4, RW-5,

RW-6, RW-7, RW-8). Ultimately, the recovery pump was not installed in RW-3/UGW-22 because there was no significant accumulation of product.

Monthly progress reports of the J.A. Jones/McLaren/Hart recovery system for November and December 1999 and January 2000 are included in Appendix A. As of October 1999, recovery wells reside in PW-6, RW-1 and RW-4. However, the system has been shut down since October 31, 1999 to allow the pneumatic fracturing pilot test to be conducted. The pilot studies will be completed around June 2000.

The operation of two new 2-inch recovery wells in PW-4 and PW-6 was initiated on August 7, 1998. An additional vault was constructed at PW-3 should recovery at this well become necessary. Resurveying may be necessary if the installation of the well vaults changed the elevation of the measuring points.

The recovery system is a skimming-only (single-phase) system and has been extracting product and nuisance water since its start up in December 1996. Product recovery in individual wells is not gauged. Groundwater and product elevations in the recovery wells are monitored at least monthly.

The total amount of product removed using the Terra Vac system in 1994 and 1995 was 12,630 gallons. In 1996, the Terra Vac system recovered 1,143 gallons. The monthly volume of product removed using the McLaren/Hart recovery system in December 1996 was 178 gallons (see Table 4-1). For 1997, the annual volume of product recovered was 974 gallons. For 1998, the annual volume of product recovered was 654 gallons. For 1999, the annual volume of product recovered was 201 gallons. Currently, there are no product recovery efforts taking place and the total volume recovered for 2000 is zero gallons. The system has been off-line since October 1999 and bailing of product has also been suspended to allow product and groundwater levels to stabilize during the pneumatic fracturing pilot studies. The total volume of oil recovered monthly and cumulatively since start-up is, therefore, 15,780 gallons as indicated in Table 4-1.

5.0 RECOVERY SYSTEM ANALYSIS

There remains a large discrepancy between the recovery volumes of the Terra Vac multi-phase recovery system testing (1995) and the newer McLaren/Hart (formerly ICHOR) single-phase system of product recovery. Only about 1,800 gallons were recovered in 1996 through July 1999 with the single-phase system, compared to over 12,000 gallons from the combined single, dual, and triple-phase systems in 1995. The most likely explanation for this is that the multi-phase recovery is much more effective than single phase recovery. This was the conclusion of the testing completed in 1995 by Terra Vac. Another possible explanation is that the volume reported from the multi-phase recovery system included nuisance water; however, according to Terra Vac personnel (personal communication, February 1998), only free product actually recovered was reported.

The Terra Vac system used different wells (PW-series) and produced much better recoveries than the current system. Local heterogeneities in soils can also cause remarkable differences in product thicknesses over short distances, suggesting that the locations of the former Terra Vac wells were better placed than are those in the current system. It should be noted that two new 2-inch recovery pumps and well vaults were installed in monitoring wells PW-4 and PW-6. However, none of the pumps operated during this quarter. The system has been shut down since October 31, 1999.

The McLaren/Hart single-phase product recovery system completed its start-up and commissioning phase on April 30, 1997 and has since been in operation. Due to the continued heavy rains in November 1998 the water table was unusually high. As a result, the product thickness in the recovery wells was limited. As of December 1998, pumps were operating in wells RW-1, RW-5, RW-8, and PW-6. Then in January 1999, the pump was removed from RW-1 to facilitate the ManTech pilot study and a recovery pump was installed in RW-7. In May 1999 the pump from RW-7 was then removed and placed in RW-4. A pump resided temporarily in well RW-8 in August and September 1999. Wells RW-1, RW-4 and PW-6 contain the only recovery pumps. However, none of these pumps were in operation this quarter.

5.1 Evaluation of Effectiveness to Date

To evaluate the recovery system during this phase, product thickness trends over time in individual wells were reviewed. Some monitoring wells that are very near to recovery wells are still registering large thicknesses of floating product while the recovery wells themselves have comparatively small or no product thicknesses. Specific examples of this are shown in Table 5-1. Figures 5-1 through 5-9 present the graphical analysis of these trends.

These observations may be explained by a relatively low efficiency in the product recovery wells. That is, the air-to-product interface would be very steep coming into a particular recovery well and the product=s Acone of depression@ (depending solely on gravity to move the product) would not extend laterally very far from the recovery well. The viscosity of the product and the granularity of the soil are also major controlling factors in determining how far a Acapture zone@ will extend from each well and how much product can ultimately be recovered. Recovery well construction is probably not responsible for the low volumes because it has little effect on the two aforementioned controlling factors. The reported heterogeneity of soil and fill materials would also make conditions right for highly variable product thicknesses over short distances.

Also, when floating product is removed from a single-phase recovery well and the water table remains essentially flat (with no pumping of water), there is no increased hydraulic gradient for the product in the formation to replace the removed product. Therefore, replacement of the product in the wells is slow. If the water were extracted to increase the gradient into the well, the mobile (free) product would replace the removed product faster; however, the trade-off would be that a zone of smearing would develop caused by the moving water table and more of the product would become immobilized as residual which would subsequently be impossible to remove. However, such residual product would be subject to natural or enhanced biodegradation.

Figure 5-1 shows the product thicknesses in monitoring wells UGW-3 and UGW-25 and in recovery well RW-1. These monitoring wells are 35 and 142 feet from RW-1, respectively. UGW-3 is almost directly upgradient of RW-1 and had, until April 1998, shown a somewhat inverse correlation to the

thicknesses trends in RW-1. Since April 1998, however, the product thickness in UGW-3 has steadily decreased, perhaps in response to active recovery in RW-1. It should be noted that nearly three feet of product was removed from UGW-3 on April 20, 1998 during the groundwater sampling event conducted for the Corrective Measures Study Investigation (Baker, 1998). It is difficult to tell whether the hurricane also contributed to the decrease in product thickness in UGW-3 after September, but it is possible. The lack of sympathetic responses in UGW-25 prior to September 1998 indicates that the width of the capture zone for RW-1 does not extend 142 feet to the west. It also indicates that the decrease noted after September 1998 was in response to flooding by the hurricane. Starting in January 1999 no product was detected in any of the three wells. In January 1999, the CleanOx Pilot Test was conducted and therefore, no readings were taken from RW-1 until the test was completed. During a previous quarter there was a significant increase in free product thickness in all of the wells. This increase is attributed to recharge that occurred after the CleanOx Pilot Test terminated. During last quarter there was a significant decrease in measured product in UGW-3 and RW-1. UGW-25 had returned to historic product levels. The decrease in product thickness could be attributed to the increased rainfall that had occurred during last quarter. This quarter, UGW-25 increased slightly in November 1999 and then decreased slightly in December 1999 and January 2000. RW-1 remained nearly the same this quarter, only increasing slightly.

Figure 5-2 shows that RW-2 has very little measurable product while the nearest monitoring well (UGW-4) at a distance of 26 feet of RW-2 has had about 10 feet of product thickness until April 1998. On April 20, 1998 approximately eight feet of product was removed from UGW-4 during the groundwater sampling event conducted as part of the Corrective Measure Study Investigation (Baker, 1998). RW-2 has been off-line for several months due to lack of product. No product was measured in these wells for several quarters, including this quarter.

Figure 5-3 indicates that, until July 1998, product thicknesses had been increasing in five of the seven wells downgradient of RW-2 (wells UGW-1, PW-5, PW-4, PW-3, & MW-3). With the exceptions of PW-6 and MW-4, these wells had increasing trends in product thickness over time. It should be noted that approximately 1.6 feet of product was removed from MW-4 on April 19, 1998 during the Corrective Measure Study Investigation (Baker, 1998). After July 1998, with the addition of product

recovery in wells PW-4 and PW-6, the product thicknesses in four of the seven wells (PW-4, PW-6, MW-3, and UGW-1) have decreased substantially. After the hurricane in September, PW-4 and PW-6 went off-line due to flooding. In November, PW-6 was brought back on-line. Product thicknesses in wells PW-3 and PW-5 continued to increase after the hurricane until December; in January the product thicknesses in these two wells decreased dramatically. This decrease may be in belated response to recovery in PW-6. PW-4 remains off-line due to clogging. There has not been much change in product thickness after January. This observation, along with continued monitoring will help to confirm the hypothesis that PW-6 caused the decrease in PW-3 and PW-5. During May, PW-6 was not gauged due to well clogging from adjacent construction activities. This clogging caused an increase in measured product in PW-3. Then PW-6 resumed pumping in June and a skimmer pump was temporarily installed in PW-3. As a result, the product level in PW-3 decreased. PW-6 continued to pump last quarter and product levels remained low, although increasing slightly. UGW-1 had decreased from about two feet to around one half of a foot of product. The reason for this cannot yet be determined. Further observation will allow a reasonable conclusion to be made. This quarter, product levels remained very low or did not exist. There was a decrease in product in PW-4 in November due to the system being shut off in October.

Figure 5-4 shows that the cluster of wells along the eastern side of the access road near RW-3/UGW-22 typically contains less than 2 feet of product. However, during March 1999, wells PW-2 and MW-1 recovered over 2 feet of product. Last quarter, wells PW-2 and MW-1 returned to product levels below 2 feet. The increase in product in the last two quarters, as compared to previous quarters, indicates that the bulk of the product is likely moving toward Forrestal Drive through another pathway, probably west of the access road. It is not very likely that the floating product is moving farther east beneath the hillside; it's more likely to be moving southwest directly toward Forrestal Drive before it turns southeastward. RW-3 has never been used to recover floating product due to lack of product. Last quarter there was a decrease to no recovered product in August. This was probably due to increased rainfall at the site. A gradual increase, although still less than one foot of product, was then seen in September and October as the product recovered to its normal level. This quarter, most wells remained at normal levels. Most of the wells showed a slight overall increase in product levels.

Figure 5-5 shows no direct relationship between recovery operations in RW-4 and product thicknesses in UGW-12 (27 feet away). RW-4 was off-line until this quarter because little or no product was found. UGW-12 continues to have a very thick layer of floating product despite the lack of product in RW-4. During previous quarters starting in December 1998, a significant drop in product thickness was seen in UGW-12. Last quarter well UGW-12 continued to decrease dramatically in product thickness until August. Then in September and October, a dramatic increase was seen and product levels resumed to near 10 feet. This quarter, levels increased to around 11 feet in UGW-12 and then decreased to above 8 feet in December and January. RW-4 remained at zero feet of product for the entire quarter.

Figure 5-6 shows that until July 1998, product thicknesses had been increasing in RW-5, but a dramatic decrease occurred during September 1998, perhaps due to the hurricane. It should be noted that approximately six feet of product was removed from UGW-13 on April 21, 1998 as part of the groundwater sampling event conducted during the Corrective Measures Study Investigation (Baker, 1998). During the previous two quarters, product thickness increased slightly in RW-5. Product thicknesses decreased dramatically from December 1998 to April 1999 from approximately 12.5 feet to approximately seven feet in UGW-13 (25 feet away) due to the reactivation of RW-5. During May, product thickness in UGW-13 increased to 10.27. This may have occurred because the pump in RW-4 was removed early in May allowing product to migrate into UGW-13. Well RW-4 was put back on-line in late May. This combined with the installation of a skimmer pump in UGW-13 caused a decrease in product for June. Last quarter, no product was recovered from UGW-13 in August. A skimmer pump was installed in well UGW-13 in August and a dramatic increase, to above 11 feet, occurred in September. A decrease of nearly the same proportion occurred in October. This quarter, a huge increase was seen between October and November when the system shut off and the levels remained around 9 feet thick. Thickness in RW-5 has decreased to zero.

Figure 5-7 shows that UGW-17 (16 feet away from RW-6) had been showing a marked decrease in product thickness from January until July 1998. On April 21, 1998 approximately six feet of product was removed from UGW-17 as part of the Corrective Measures Study Investigation. There has been a dramatic increase since then in UGW-17; almost 10 feet of product has been measured. This may

be an indication that the product in this area is moving *en masse* in response to the flooding and increased rainfall over the past months. However, such a theory does not account for the absence of product in RW-6. RW-6 has been off-line for the past several months due to lack of product. Product thicknesses had begun to decrease significantly in UGW-17. Previously the product thickness had increased greatly in May and June, and then began a decrease in July. Last quarter product thicknesses continued to decrease until there was no product measured in August. An increase then occurred in September and October. This quarter, a large increase to around 9 feet was seen in UGW-17 after the system was shut off in October. Then a decrease to below 4 feet occurred in December and remained the same in January. Product levels remained at zero in RW-6 for the entire quarter.

Figure 5-8 shows that some relationship had existed between recovery operations in RW-7 and product thicknesses in UGW-19 (10 feet away), especially from August to October 1997. This does not appear to have been a long-term relationship, however, since RW-7 had been off-line from October 1997 until January 1999 due to lack of product. A pump remained in RW-7 until May 1999, when the pump was moved to RW-4. Last quarter less than 1 foot of product was found in RW-7 while product thickness in UGW-19 was near 1.5 feet. However, a pump did reside briefly in RW-7 during May, but no effect was seen on measured product. RW-7 has since been off-line. Last quarter no product was measured in August, but there was a slight increase in product that occurred in September and October. This quarter, product levels remained the same (less than 1 foot) since the shut off of the pumps in October.

Figure 5-9 shows no relationship between recovery operations in RW-8 and product thicknesses in UGW-21 (12 feet away). Generally, the product thickness in UGW-21 appears to be consistently greater than two feet while the thickness in RW-8 fluctuates between 0 and 4 feet (depending upon the status of the recovery operation). However, during last quarter the product thickness in UGW-21 increased to almost 8 feet. Because the pump in RW-8 was not operating in May, product was allowed to migrate into UGW-21 in June. Then when the RW-8 resumed pumping in June, the product level in UGW-21 decreased to just above 2 feet. A pump resided in RW-8 until September, and the product thickness in UGW-21 decreased in August and then increased in September and October. This

quarter, product increased in UGW-21 to above 4 feet. This is due to the shut off of the system in October. Product levels remained above 4 feet in January. Levels in RW-8 remained just above zero feet.

There are a number of reasons which could account for the apparent anomalies and lack of responses to recovery efforts, some of which include:

- Product Viscosity and Soil Granularity: The most influential factors in determining how viscous oil flows through the overburden are the grain size of the porous medium and the viscosity of the non-aqueous phase fluid. Severe heterogeneities in the soil and fill materials would most likely produce highly variable product thicknesses over short distances.

- Well Diameter: The monitoring wells are either 2 or 4 inches in diameter. The recovery wells are 6 inches in diameter. There may be some capillary influences to account for the differential product thickness readings.

- Measurement Methods: Field personnel may not allow adequate time between system shut-down and product measurements. Inadequate recharge time for the recovery wells may account for the differential product readings.

- Screened Intervals: Logs from the recovery wells and the nearby monitoring wells should be compared to evaluate if differences in screened intervals could be causing the apparent discrepancies.

5.2 Hydraulic Characteristics Evaluation

McLaren/Hart, Inc. (the operator of the TWFF ICM) recently performed some limited pump testing in certain wells at the TWFF. The efforts were undertaken in response to a request for such testing made by the EPA. Appendix B of Report No. 10 contains the McLaren/Hart report of this testing.

Pumping/drawdown tests were done in RW-4 and PW-3. The pumping rates for both wells were set at the approximate capacity of each well which was found to be 0.13 gpm for RW-4 and 0.009 gpm for PW-03. Effect of the pumping at wells PW-3 and RW-4 failed to develop an appreciable hydraulic gradient in the subsurface, especially in the wells located near the utility corridor along Forestal Drive (Wells UGW-12 and UGW-13). The calculated radius of influence for well PW-3 is approximately 25 feet defined by a drawdown of 0.02 feet.

In addition, the results of the pumping tests confirm that the subsurface conditions in the area north of the equipment compound are different from the area along Forestal Drive and the third plume area near RW-1. The pumping test results also indicate that the subsurface conditions change dramatically moving laterally from Forestal Drive due to the steeply sloping and undulating rock surface.

5.3 Summary and Conclusions

The single-phase recovery system completed its commissioning and start-up period on April 30, 1997 and has been in full operation for 27 months. A review of the operation of the recovery system to date and its impact on the free product plume indicates that product thicknesses as measured in the monitoring wells are not being consistently affected by the system operation, with the exception of the newly included recovery in wells PW-4 and PW-6. Individual single-phase recovery wells may have sporadic periods or localized areas in which floating product can be captured; however, the single-phase system as a whole is not capable of containing the bulk of the floating product. The system has been shut off since October 31, 1999 due to the operation of the pneumatic fracturing pilot test. Product levels and groundwater are still in the process of returning to normal. Due to lack of pumping in recovery wells, some increases in product in monitoring wells were seen. However, some decreases were seen in measured product. Since this is a transition period for both the groundwater and the floating product as they return to normal conditions, future quarters will allow further determination of the site's response to the lack of activity. The system will not be in operation until June 2000 at the completion of the pilot study.

5.4 Recommendations

No recommendations with respect to the ICM are applicable this quarter due to the system being shut off for the entire quarter. Recommendations will be added when pumping resumes for the ICM. It is recommended that the future Quarterly Reports for the TWFF only consist of reporting of the groundwater and free product levels without the detailed analysis. Once the recovery operations resume at the TWFF the Quarterly Reporting will then resume with the detailed analysis.

6.0 REFERENCES

Baker Environmental, Inc. (Baker), 1998. Draft Corrective Measures Study Investigations, Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. June 30, 1998. Coraopolis, Pennsylvania.

Environmental Systems and Technologies, Inc. 1996. ARMOS - Areal Multiphase Organic Simulator for Free-Phase Hydrocarbon Migration and Recovery. User and Technical Guide. Blacksburg, VA.

Tables

TABLE 3-1

SUMMARY OF MONITORING WELLS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Identification Number	Date Installed	Installation Company	Diameter (inches)	General Information
7MW01A	2 May 1996	Baker Environmental	2	Remedial Field Investigation
7MW02A	21 April 1996	Baker Environmental	2	Remedial Field Investigation
7MW03	8 April 1996 (1)	Baker Environmental	2	Remedial Field Investigation
7MW04	16 April 1996	Baker Environmental	2	Remedial Field Investigation
7MW05	22 October 1997	Baker Environmental	2	Interim Corrective Measure
7MW06	23 October 1997	Baker Environmental	2	Interim Corrective Measure
7MW07	22 October 1997	Baker Environmental	6	Interim Corrective Measure
7MW08	28 October 1997	Baker Environmental	6	Interim Corrective Measure
7MW09	24 October 1997	Baker Environmental	6	Interim Corrective Measure
470-MW1 (2)	unknown	unknown	unknown	UST Removal
470-MW3 (2)	unknown	unknown	unknown	UST Removal
GW-02 (2)	unknown	unknown	unknown	Confirmation Study - requires verification
GW-03 (2)	unknown	unknown	unknown	Confirmation Study - requires verification
GW-04 (2)	unknown	unknown	unknown	Confirmation Study - requires verification
GW-06 (2)	unknown	unknown	unknown	Confirmation Study - requires verification
UGW-1/B-1	26 February 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-2/B-10	5 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-3	6 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-4	7 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-5	7 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-6	20 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-7	20 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-8	21 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-9	22 March 1991	O'Brien and Gere	2	Underground Fuel Investigation

TABLE 3-1 (Continued)

SUMMARY OF MONITORING WELLS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Identification Number	Date Installed	Installation Company	Diameter (inches)	General Information
UGW-10	25 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-11	25 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-12	26 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-13	26 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-14	27 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-15	28 March 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-16	2 April 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-17	2 April 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-18	3 April 1991	O'Brien and Gere	2	Underground Fuel Investigation
UGW-19	15 November 1993	BB&L	2	Site Characterization Study
UGW-20	17 November 1993	BB&L	2	Site Characterization Study
UGW-20R	unknown	Baker	unknown	Replacement Well for GW-05 and UGW-20
UGW-21	18 November 1993	BB&L	2	Site Characterization Study
UGW-22 (3) /RW-3	18 November 1993	BB&L	6	Site Characterization Study
UGW-23	11 December 1993	BB&L	4	Site Characterization Study
UGW-24	16 December 1993	BB&L	4	Site Characterization Study
UGW-25	17 December 1993	BB&L	4	Site Characterization Study
UGW-26	16 December 1993	BB&L	4	Site Characterization Study
PW-1	26 September 1995	Terra Vac	4	Product recovery wells
PW-2	20 September 1995	Terra Vac	4	Product recovery wells
PW-3	22 September 1995	Terra Vac	4	Product recovery wells
PW-4	25 September 1995	Terra Vac	4	Product recovery wells
PW-5	23 September 1995	Terra Vac	4	Product recovery wells
PW-6	26 September 1995	Terra Vac	4	Product recovery wells

TABLE 3-1 (Continued)

SUMMARY OF MONITORING WELLS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Identification Number	Date Installed	Installation Company	Diameter (inches)	General Information
MW-1	19 September 1995	Terra Vac	2	Wells to monitor effects of recovery system
MW-2	12 September 1995	Terra Vac	2	Wells to monitor effects of recovery system
MW-3	25 September 1995	Terra Vac	2	Wells to monitor effects of recovery system
MW-4	22 September 1995	Terra Vac	2	Wells to monitor effects of recovery system
RW-1	17 October 1996	ICHOR	6 (4)	Installed for Interim Corrective Measure Product Recovery System
RW-2	16 October 1996	ICHOR	6 (4)	Installed for Interim Corrective Measure Product Recovery System
RW-3/UGW-22 (3)	1996 (3)	ICHOR	6 (4)	Installed for Interim Corrective Measure Product Recovery System
RW-4	23 October 1996	ICHOR	6 (4)	Installed for Interim Corrective Measure Product Recovery System
RW-5	25 October 1996	ICHOR	6 (4)	Installed for Interim Corrective Measure Product Recovery System
RW-6	28 October 1996	ICHOR	6 (4)	Installed for Interim Corrective Measure Product Recovery System
RW-7	18 October 1996	ICHOR	6 (4)	Installed for Interim Corrective Measure Product Recovery System
RW-8	21 October 1996	ICHOR	6 (4)	Installed for Interim Corrective Measure Product Recovery System

Notes:

(1) Finish date not given on log, begin date shown.
(2) No log available.
(3) Monitoring well UGW-22 converted into Product Recovery Well RW-3. No record of retrofit was available, date uncertain.
(4) Well diameter not on log, but value shown was field-verified.

TABLE 3-2

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	Ground Elevation	WELL RISER	Reference Point	01/28/97		02/25/97		04/21/97		05/22/97		06/17/97	
Number	ft NGVD + 100 ft	HEIGHT IN FT	Elevation	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
UGW-1	114.81	1.76	116.57	12.55	14.91	12.9	15.3	12.5	14.9	13.66	16.22	13.73	16.35
UGW-2	160.53	1.58	162.11	54.73	54.73	54.73	54.73	54.74	54.74	56	56.18	56.15	56.42
UGW-3	123.24	1.97	125.21	19.61	25.71	19.8	25.76	19.63	25.79	20.94	20.94	21.37	21.37
UGW-4	119.24	1.42	120.66	14.69	26	14.71	26.02	14.7	26.02	16	25.82	16.18	25.89
UGW-5	114.54	2.01	116.55	10.48	12.83	8.2	8.5	12.41	12.82	13.82	14.17	13.88	14.25
UGW-6	109.75	1.75	111.50			8.11	8.24	10.23	10.23	10.4	10.4	10.47	10.47
UGW-7	108.38	1.66	110.04	7.65	7.65	7.55	7.55	8.33	8.33	8.7	8.7	8.78	8.78
UGW-8	108.59	1.65	110.24	7.56	7.56	7.54	7.54	9.04	9.04	9.14	9.14	9.26	9.26
UGW-9	109.69	-0.24	109.45	7.65	7.65	7.64	7.64	9.7	9.7				
UGW-10	109.13	1.60	110.73	9.35	9.35	9.34	9.34	9.75	9.75			10.09	10.09
UGW-11	108.03	1.61	109.64	8.85	8.85	8.86	8.86	9.1	9.1			9.18	9.18
UGW-12	112.67	1.55	114.22	9.61	18.8	9.6	18.6	10.36	18.95	10.8	19.29	11	19.37
UGW-13	112.11	1.47	113.58	10.23	17.9	10.23	17.8	10.3	18	11.64	17.8	11.62	18.2
UGW-14	118.18	1.41	119.59	15.9	15.9	15.88	15.88	15.85	15.85	16.9	16.9	17.04	17.04
UGW-15	110.83	1.69	112.52	11.73	11.73	11.7	11.7	11.92	11.92	11.45	14.37	11.58	13.99
UGW-16	112.25	1.58	113.83	12.38	12.38	12.37	12.37	12.62	12.62	12.93	12.93	12.96	12.96
UGW-17	110.93	1.69	112.62	9.94	14.74	9.92	14.74	10	14.7	11	15.05	11.16	15.34
UGW-18	113.02	1.53	114.55	12.77	12.77	12.5	12.5	12.7	12.7	13.38	13.38	13.44	13.44
UGW-19	111.02	1.45	112.47	10.25	14	10.19	13.93	10.32	14.02			12.12	12.12
UGW-20	109.73	2.41	112.14	11.61	11.61	11.57	11.57	11.82	11.82	11.96	11.96	11.97	11.97
UGW-20R													
UGW-21	111.15	2.26	113.41	11.74	13.89	11.69	13.83	12.28	14.28	12.53	14.27	12.59	14.37
UGW-22	113.10	-2.80	110.30	5.34	5.34	5.6	5.6	6.64	6.64	6.68	6.68	7.91	7.91
UGW-23	166.97	2.41	169.38	64.57	64.57	64.5	64.5	64.6	64.6	65.79	65.79	66.03	66.03
UGW-24	176.96	2.04	179.00	74.95	74.95	74.95	74.95	74.97	74.97	75.25	75.25	75.67	75.67
UGW-25	151.65	2.52	154.17	49.38	50.96	49.38	50.49	49.4	50.96	50.58	52.4	50.92	52.9
UGW-26	111.09	-0.30	110.79	8.3	8.3	8.27	8.27	8.73	8.73				
PW-1	113.78	1.60	115.38	9.1	9.1	9	9	9.07	9.07	12.44	12.56	12.55	12.69
PW-2	113.46	2.23	115.69	11.24	12.1	11.3	12	11.2	12.08	12.21	13.42	12.46	13.83
PW-3	115.14	2.19	117.33	13.28	16.95	13.33	17.55	13.3	17	13.79	19.75	13.81	20.2
PW-4	113.51	2.14	115.65	11.84	13.58	11.84	13.58	11.87	13.62	12.8	15.18	12.76	15.74
PW-5	114.90	2.52	117.42	13.03	18.13	12.96	18.75	13.01	18.1	13.57	20.6	13.63	20.88
PW-6	115.48	2.21	117.69	12.28	23	12.33	23.26	12.3	22.97	13.44	23.45	13.53	23.45
MW-1	113.69	2.25	115.94	11.2	11.2	11	11	11.18	11.18	11.25	11.25	11.3	11.3

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	Ground Elevation	WELL RISER	Reference Point	01/28/97		02/25/97		04/21/97		05/22/97		06/17/97	
Number	ft NGVD + 100 ft	HEIGHT IN FT	Elevation	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
MW-2	113.56	2.00	115.56	10.85	10.85	10.5	10.5	10.9	10.9	11.96	12.13	12.65	12.94
MW-3	115.21	2.01	117.22	13.46	15.73	13.6	16.1	13.5	15.75	14.34	17.5	14.37	17.68
MW-4	114.35	2.21	116.56	9.8	12.1	10.9	13.2	9.85	12.17	11.55	13.68	12.72	15.12
RW-1	121.25	-0.70	120.55	15.22	23.32	16.65	19.63	16.36	22.35	16.53	23.94	16.72	24.15
RW-2	118.85	-0.84	118.01	12.03	12.93	14.3	14.75	14.8	15.19	12.58	14.01	15.27	15.36
RW-3		(see UGW-22)		5.34	5.34	5.6	5.6	6.64	6.64	6.68	6.68	7.91	7.91
RW-4	111.96	-0.87	111.09	8.6	9.17	8.8	8.8	9.94	10.7	8.97	12.07	9.65	9.75
RW-5	111.87	-1.52	110.35	8.29	8.55	8.7	9.25	8.87	11.1	8.47	14.11	9.4	10.55
RW-6	111.45	-1.63	109.82	8.09	8.26	8.5	8.67	8.9	9.1	9.22	9.44	9.23	9.44
RW-7	111.22	-2.63	108.59	6.6	9.12	7.35	7.72	7.46	10.13	7.62	10.24	8.07	8.76
RW-8	111.50	-1.61	109.89	8.49	8.8	8.8	9.05	9.22	9.24	9.41	9.64	9.35	10.18
GW-01	108.94	2.58	111.52										
GW-02	112.06	1.88	113.94										
GW-03	111.39	2.01	113.40										
GW-04	111.00	2.06	113.06										
GW-05	108.75	(clogged)		Debris in well		Debris in well		Debris in well		Debris in well		Debris in well	
GW-06	108.90	2.05	110.95										
470-MW1	130.13	3.01	133.14										
470-MW3	120.63	2.52	123.15										
7MW-01A	125.78	2.63	128.41										
7MW-02A	145.59	2.91	148.50										
7MW-03	176.98	2.33	179.31										
7MW-04	180.62	1.94	182.56										
7MW-05	112.14	1.99	114.13										
7MW-06	108.45	-0.20	108.25										
7MW-07	113.32	2.03	115.35										
7MW-08	111.58	-0.25	111.33										
7MW-09	159.16	2.18	161.34										

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	06/30/97		07/30/97		09/03/97		09/26/97		10/30/97		11/25/97	
Number	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
UGW-1	13.65	16.24	13.25	15.8	13.31	16.24	13.44	16.13	10.35	13.06	11.45	14.22
UGW-2	56.32	56.63	56.14	56.41	56.18	56.8	56.7	57.05	54.9	55.02	54.35	54.35
UGW-3	21.5	21.5	21.8	26.83	21.57	26.87	22	27.05	19.9	23.95	18.84	23.85
UGW-4	16.2	25.92	16.2	25.61	15.43	25.53	16.14	25.52	11.83	21.58	13.63	23.29
UGW-5	13.91	14.27	13.59	13.78	12.8	13.8	13.17	13.41	10.64	10.69	11.67	11.77
UGW-6	10.38	10.38	10.09	10.09	10	10	10.15	10.15	9	9	9.53	9.53
UGW-7	8.73	8.73	8.52	8.52	8.29	8.29	8.45	8.45	7	7	7.6	7.6
UGW-8	9.25	9.25	9.15	9.15	8.98	8.98	8.96	8.96	7.75	7.75	8.23	8.23
UGW-9	NA	NA			8.18	8.18	8.15	8.15	6.8	6.8	7.51	7.51
UGW-10	9.98	9.98	9.74	9.74	9.74	9.74	9.75	9.75	9.27	9.27	9.71	9.71
UGW-11	9.1	9.1	8.91	8.91	8.85	8.85	8.9	8.9	8.61	8.61	8.83	8.83
UGW-12	10.88	19.23	10.84	19.06	10.49	19.1	10.55	18.5	7.8	18.18	9	18.25
UGW-13	11.58	17.92	11	18.4	10.54	18.5	10.55	16.91	9.19	19.31	10.41	17.71
UGW-14	17.05	17.05	16.94	16.94	16.97	16.97	16.95	16.95	12.96	12.96	14.61	14.61
UGW-15	11.43	13.97	11.87	11.87	14.74	14.74	11.85	11.85	10.69	10.69	11.25	11.25
UGW-16	12.9	12.9	12.72	12.72	12.65	12.65	12.62	12.62	11.84	11.84	11.28	11.28
UGW-17	11.02	15.05	10.54	15.24	10.53	15.53	10.35	14.84	8.94	15.45	9.51	16.3
UGW-18	13.43	13.43	13.25	13.25	13.18	13.18	13.13	13.13	11.93	11.93	12.54	12.54
UGW-19	12.1	12.1	11.15	13.57	8.75	13.7	11.06	13.73	10.1	10.43	10.7	12.63
UGW-20	11.92	11.92	11.56	11.56	14.6	14.6	11.6	11.6	10.78	10.78	11.33	11.33
UGW-20R												
UGW-21	12.46	14.39	12.16	14.2	11.3	14.4	12.21	14.38	11.4	13.52	11.87	13.95
UGW-22	7.14	7.14	6.56	6.56	5.58	5.59			4.8	4.8	4.62	4.62
UGW-23	66.1	66.1	66.04	66.04	66.11	66.11	66.2	66.2	59.45	59.45	62.4	62.4
UGW-24	75.82	75.82	76.1	76.1	75.82	75.82	76.31	76.31	74.97	74.97	74.35	74.35
UGW-25	51.1	53.12	51.25	53.19	51.2	54.1	51.45	53.62	49.24	51.06	49.2	50.97
UGW-26	9.14	9.14	8.92	8.92	8.88	8.88	8.85	8.85	7.28	7.28	7.98	7.98
PW-1	12.58	12.65	12.6	12.67	9.9	10.25	12.55	12.62	9.29	10.06	9.39	9.5
PW-2	12.37	13.7	12.08	13.17	11.82	13.3	10.36	11.38	9.64	10.27	9.3	9.9
PW-3	13.83	20.4	13.46	20.44	13.27	21.25	13.41	21.03	10.15	18.9	11.25	20.37
PW-4	12.71	15.35	12.47	15.14	12.31	15.79	12.4	15.52	9.57	12.93	10.63	14
PW-5	13.58	20.93	13.34	20.74	12.17	20.12	13.32	21.1	10.18	18.35	11.35	19.75
PW-6	13.61	23.39	13.33	23.16	13.29	23.4	13.39	23.18	9.67	22.85	11.95	23.81
MW-1	10.72	10.72	10.24	10.24	11.82	12.92	9.84	9.84	8.47	8.47	8.75	8.75

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	06/30/97		07/30/97		09/03/97		09/26/97		10/30/97		11/25/97	
Number	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
MW-2	12.12	12.42	11.79	11.82	11.41	12.01	12.4	13.21	9.3	9.3	8.75	8.75
MW-3	14.33	17.69	14.2	17.89	13.8	18.1	13.92	18.13	10.98	15.2	12.04	16.53
MW-4	11.84	14.26	11.49	13.43	11.01	13.41	9.24	11.71	6.6	9.92	7.82	10.78
RW-1	16.75	24.13	16.7	23.88	16.42	24.2	16.63	24.18	13.37	14.2	14.72	17.6
RW-2	14.255	14.72	13	13	12.94	12.94			10.85	10.85		
RW-3	7.14	7.14	6.56	6.56	5.58	5.59			4.8	4.8	4.62	4.62
RW-4	9.42	9.95	9.3	9.31	9.19	9.4			7.7	7.7	8.1	8.1
RW-5	8.69	13.11	9.1	9.22	9.15	10.1			7.78	7.98	8.43	8.5
RW-6	9.19	9.42	8.82	8.82	8.2	9.29	7.7	7.7	7.56	7.56	8.28	8.28
RW-7	7.7	9.69	7.69	7.69	7.4	9.5	7.51	8.45	6.56	6.82	7.2	7.2
RW-8	8.93	11.42	9.06	9.19	9.2	11.45	9.06	9.25	8.32	8.36	8.7	8.7
GW-01					12.31	12.31	11.97	11.97	9.83	9.83	9.99	9.99
GW-02	11.92	11.92	11.8	11.8	11.7	11.7	11.68	11.68	9.51	9.51	10.32	10.32
GW-03	11.59	11.59	11.58	11.58	11.32	11.32	11.27	11.27	9.51	9.51	10.23	10.23
GW-04	9.42	9.72	9.07	9.13	8.73	9.28	9.42	9.71	8.14	8.44	8.27	8.45
GW-05	Debris in well		Debris in well		Debris in well		Debris in well		Debris in well		Debris in well	
GW-06	9.87	9.87	9.79	9.79	9.61	9.61	9.69	9.69	8.86	8.86	9.27	9.27
470-MW1												
470-MW3												
7MW-01A					26.35	26.35	26.33	26.33	24.11	24.11	24.95	24.95
7MW-02A	45.45	45.45	45.4	45.4	45.5	45.5	45.45	45.45	38.05	38.05	41.65	41.65
7MW-03	74.07	74.07	74.25	74.25	74.56	74.56	74.42	74.42	70.66	70.66	71.4	71.4
7MW-04	79.82	79.82	80.05	80.05	80.03	80.03	80.29	80.29	78.5	78.5	78.12	78.12
7MW-05									13.73	13.73		
7MW-06									7.1	7.1	7.53	7.53
7MW-07									13.73	13.73	14.06	14.06
7MW-08									9.97	9.97	10.47	10.47
7MW-09									52	52	54.82	54.82

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	12/23/97		01/26/98		02/25/98		03/24/98		04/29/98		06/03/98		07/07/98	
Number	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
UGW-1	10.97	13.69	11.45	14.25	12.00	14.80	12.80	15.59	12.56	15.31	12.83	15.60	12.97	15.75
UGW-2	53.44	53.45	53.61	53.61	53.93	53.93	54.45	54.49	55.32	55.48	55.70	56.12	56.10	56.62
UGW-3	19.3	23.6	19.25	23.30	19.47	23.44	19.95	23.90	20.48	22.52	20.51	22.53	20.33	22.33
UGW-4	13.01	22.6	13.66	23.89	14.39	24.60	15.04	25.25	17.25	17.30	17.32	17.33	17.43	17.46
UGW-5	11.52	11.74	12.00	12.20	12.59	12.80	13.09	13.15	13.17	13.17	13.24	13.40	13.53	13.74
UGW-6	9.38	9.38	9.50	9.50	9.74	9.74	9.98	9.98	9.98	9.98	9.96	9.96	9.96	9.96
UGW-7	7.39	7.39	7.37	7.37	7.81	7.81	8.23	8.23	8.11	8.11	8.17	8.17	8.16	8.16
UGW-8	8.13	8.13	8.10	8.10	8.34	8.34	8.71	8.71	8.65	8.65	8.68	8.68	8.68	8.68
UGW-9	7.4	7.4	7.50	7.50	7.72	7.72	8.05	8.05	8.11	8.11	8.15	8.15	8.23	8.23
UGW-10	9.63	9.63	9.54	9.54	9.74	9.74	10.01	10.01	8.99	8.99	9.84	9.84	9.84	9.84
UGW-11	8.74	8.74	8.75	8.75	8.85	8.85	9.03	9.03			8.94	8.94	8.97	8.97
UGW-12	8.68	17.86	9.17	18.03	9.71	18.18	10.21	18.40	10.28	18.40	10.43	18.17	10.58	18.33
UGW-13	10.06	17.49	10.37	17.85	10.88	12.75	11.25	17.70	10.98	17.92	11.03	13.29	11.53	18.28
UGW-14	13.98	13.98	14.70	14.70	15.40	15.40	15.43	15.43	16.30	16.30	16.48	16.48	16.49	16.49
UGW-15	11.22	11.22	11.29	11.29	11.48	11.48	11.70	11.70	11.76	11.76	11.72	11.72	11.75	11.75
UGW-16	12.13	12.13	12.27	12.27	12.43	12.43	12.67	12.67	12.65	12.65	12.16	12.16	12.72	12.72
UGW-17	9.11	16.42	9.40	17.10	9.78	17.30	10.33	16.33	10.93	13.01	10.98	13.26	11.03	13.56
UGW-18	12.4	12.4	12.55	12.55	12.82	12.82	13.07	13.07	13.09	13.09	13.11	13.11	13.15	13.15
UGW-19	10.23	11.31	10.83	12.47	11.00	13.12	11.20	13.45	11.09	12.72	11.10	13.57	11.21	13.53
UGW-20	11.27	11.27	11.29	11.29	11.46	11.46	11.67	11.67	11.72	11.72	Well destroyed		Well destroyed	
UGW-20R														
UGW-21	11.5	13.7	11.76	14.78	11.95	14.32	11.97	14.36	12.09	14.30	12.04	14.30	12.12	14.26
UGW-22	4.16	4.16	5.95	5.95	6.45	6.45	6.95	6.95	7.80	7.80	7.13	7.13	7.40	7.40
UGW-23	61.1	61.1	62.55	62.55	63.62	63.62	64.48	64.48	65.08	65.08	65.30	65.30	65.50	65.50
UGW-24	73.78	73.78	73.60	73.60	73.65	73.65	74.00	74.00	74.12	74.14	74.20	74.20	74.19	74.19
UGW-25	48.68	50.3	48.63	50.14	48.86	50.42	49.25	50.91	49.48	51.52	49.49	51.23	49.30	51.05
UGW-26	7.8	7.8	8.00	8.00	8.30	8.30	8.65	8.65	8.78	8.78	8.78	8.78	8.83	8.83
PW-1	9.86	10.65	9.41	9.52	9.37	9.53	9.35	9.54	10.41	10.41	10.72	10.72	11.20	11.20
PW-2	9.64	10.36	10.77	11.50	11.30	12.05	11.76	12.56	11.84	12.70	12.00	12.87	12.17	13.14
PW-3	10.69	20.45	11.20	21.15	11.73	21.53	12.32	22.09	12.42	22.27	12.48	22.33	12.58	22.42
PW-4	10.12	13.59	10.64	14.19	11.14	14.76	11.65	15.31	11.75	15.52	11.88	15.61	11.86	15.75
PW-5	10.75	19.6	11.25	20.22	11.80	20.75	12.42	21.27	12.60	21.48	12.66	21.58	12.78	21.70
PW-6	10.5	23.7	11.16	23.60	11.83	23.50	12.50	23.42	12.70	23.38	12.78	23.35	12.93	22.32
MW-1	8.75	8.75	19.71	19.71	9.63	9.63	10.34	10.34	11.70	12.56	11.88	12.00	12.03	13.17

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	12/23/97		01/26/98		02/25/98		03/24/98		04/29/98		06/03/98		07/07/98	
Number	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
MW-2	9.13	9.13	10.50	10.50	11.00	11.00	11.53	11.53	11.45	11.52	11.70	11.78	11.98	12.10
MW-3	11.53	16.16	12.00	17.03	12.45	17.87	13.05	18.40	13.05	18.91	13.14	19.15	13.21	19.41
MW-4	5.62	8.86	7.52	10.44	8.48	10.93	11.17	13.14	10.52	11.03	10.61	11.14	11.16	11.88
RW-1	14.4	15.42	14.97	18.10	15.51	20.14	15.78	21.67	15.84	22.32	15.88	22.45	16.08	23.24
RW-2			12.30	12.30	13.05	13.05	13.80	13.90	13.71	13.93	13.60	13.60	14.32	14.69
RW-3	4.16	4.16	5.95	5.95	6.45	6.45	6.95	6.95	7.80	7.80	7.13	7.13	7.40	7.40
RW-4	7.58	7.58	8.09	8.09	8.50	8.50	8.30	8.30	8.90	8.90	7.70	7.70	9.03	9.05
RW-5	8.03	8.14	8.40	8.60	8.80	9.18	8.68	11.23	8.40	10.82	8.41	10.81	8.57	10.98
RW-6	7.9	7.9	8.23	8.23	8.52	8.52	8.85	8.85	9.56	9.56	8.91	8.91	8.90	8.90
RW-7	6.65	6.65	7.10	7.12	7.50	7.50	7.65	7.65	7.38	7.41	7.52	7.52	7.71	7.71
RW-8	8.34	8.34	8.70	8.70	8.90	9.02	8.91	10.98	8.24	11.65	8.40	11.77	9.32	12.86
GW-01											10.1	10.11	10.10	10.12
GW-02	10	10							11.24	11.24	11.25	11.25	11.37	11.37
GW-03	9.98	9.98							11.09	11.09	11.08	11.08	11.21	11.21
GW-04	8.4	8.68							8.94	8.94	8.8	8.82	9.19	9.21
GW-05	Debris in well		Debris in well		Debris in well		Debris in well		Debris in well		Debris in well		Debris in well	
GW-06	9.17	9.17							9.69	9.69	9.65	9.65	9.72	9.72
470-MW1									29.89	29.98	29.81	29.92	30.90	31.13
470-MW3									20.64	20.64	20.66	20.66	20.73	20.73
7MW-01A	20.31	20.31			25.36	25.36	25.76	25.76	25.90	25.90	27.92	27.92	25.99	25.99
7MW-02A	40.37	40.37			42.95	42.95	43.87	43.87	44.39	44.39	44.61	44.61	44.14	44.14
7MW-03									72.99	72.99	73.44	73.44	73.82	73.82
7MW-04											78.26	78.26	78.18	78.18
7MW-05											12.4	12.4	12.53	12.53
7MW-06	7.48	7.48			7.57	7.57	7.77	7.77			7.71	7.71	7.75	7.75
7MW-07	13.73	13.73			14.23	14.23			14.06	14.06				
7MW-08	10.15	10.15			10.75	10.75	10.69	10.69			10.92	10.92	10.88	10.88
7MW-09	53.63	53.63					56.75	56.75	57.32	57.32	57.79	57.79	57.67	57.67

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	08/12/98		11/16/98		12/09/98		01/25/99		02/23/99		03/29/99	
Number	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
UGW-1	13.80	14.41	8.75	10.15	7.50	8.89	9.65	11.35	11.43	13.11	12.13	13.87
UGW-2	56.48	57.10	51.85	51.85	49.88	49.88	49.28	49.28	50.17	50.17	51.27	51.28
UGW-3	20.9	21.47	18.25	18.80	16.84	17.40			blocked			
UGW-4	17.8	17.82	12.66	12.67	10.22	10.23	11.95	11.95	15.47	15.47	16.32	16.32
UGW-5	14.00	14.34	10.20	10.45	9.21	9.45	11.40	11.70	12.25	12.45	12.80	12.99
UGW-6	10.10	10.10	6.90	6.90	8.60	8.60	9.25	9.25	9.76	9.76	9.99	9.99
UGW-7	8.37	8.40	6.20	6.20	6.35	6.35	8.70	8.70	7.10	7.10	8.98	8.98
UGW-8	9.75	9.76	6.90	6.90	6.80	6.80	7.46	7.46	8.05	8.05	8.42	8.43
UGW-9	8.30	8.32	6.40	6.40	5.85	5.85	7.10	7.11	0.00	0.00	7.97	7.98
UGW-10	10.00	10.00	9.00	9.00	9.87	9.87	9.65	9.65	9.02	9.02	10.06	10.07
UGW-11	9.00	9.00	8.65	8.65	8.55	8.55	8.82	8.82	9.97	9.97	9.14	9.15
UGW-12	10.92	18.50	7.20	16.90	5.60	16.85	8.24	16.90	9.40	17.41	9.94	17.60
UGW-13	11.46	18.25	8.25	19.20	7.40	19.70	9.70	18.50	10.64	18.06	10.80	17.85
UGW-14	16.85	16.86	11.95	11.95	9.58	9.59	11.17	11.17	14.85	14.85	15.44	15.44
UGW-15	11.82	11.84	8.10	8.10	10.34	10.34	11.12	11.12	11.47	11.47	11.75	11.75
UGW-16	11.25	11.25	10.45	10.45	11.23	11.23	12.00	12.00	12.42	12.42	12.56	12.57
UGW-17	11.46	12.85	8.25	12.10	7.38	14.20	9.11	18.80	9.92	16.08	10.20	15.40
UGW-18	13.33	13.33	11.60	11.60	10.96	10.96	12.08	12.08	12.62	12.62	12.92	12.92
UGW-19	11.45	13.65	8.45	9.81	8.60	9.97	10.15	11.32	11.00	12.25	11.00	11.50
UGW-20	Well destroyed		Well destroyed		Well destroyed		Replaced w/ UGW20R					
UGW-20R									8.52	8.52	8.69	8.70
UGW-21	12.27	14.30	10.10	13.00	10.07	12.70	11.38	14.28	12.11	14.25	11.94	14.31
UGW-22	8.17	8.17	3.30	3.30	2.21	2.21	4.40	4.40	6.15	6.15	6.88	6.88
UGW-23	65.90	65.90	57.25	57.25	51.76	51.76	59.51	59.51	61.90	61.90	63.25	63.26
UGW-24	74.56	74.56	72.30	72.30	71.05	71.05	70.35	70.35	70.94	70.94	71.24	71.24
UGW-25	49.58	51.40	6.70	6.70	6.35	6.35			blocked			
UGW-26	9.00	9.00					7.75	7.75	8.10	8.10	8.53	8.53
PW-1	12.35	13.50			7.46	7.46			9.52	9.52	10.12	10.12
PW-2	12.42	13.50	8.40	9.70	7.46	9.05	9.50	11.15	10.74	12.45	10.30	12.96
PW-3	13.50	21.21	8.82	18.35	7.30	17.18	11.50	12.35	12.65	13.55	13.40	14.30
PW-4	10.33	10.51	flooded		4.27	4.27	overflow		pump		clogged	
PW-5	13.55	20.25	9.23	16.60	7.83	15.20	11.28	12.40	12.63	13.92	13.35	14.64
PW-6	12.10	13.23	9.75	9.75	9.83	9.83	9.20	9.30	pump		11.16	11.21
MW-1	11.75	11.76	8.00	8.00	7.16	8.45	9.60	11.05	10.51	10.85	10.10	12.40

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	08/12/98		11/16/98		12/09/98		01/25/99		02/23/99		03/29/99	
Number	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
MW-2	12.25	12.42	8.30	8.30	7.68	7.68	9.50	9.50	10.66	10.66	11.11	11.11
MW-3							11.60	12.35			9.75	10.47
MW-4	12.35	12.90	4.00	5.20	4.44	5.68	4.40	5.70	8.25	9.15	8.83	9.49
RW-1			12.00	12.05	8.74	8.74			blocked		blocked	
RW-2	14.82	15.25	1.00	1.00	1.15	1.15	7.20	7.20	12.01	12.01	13.54	13.54
RW-3	8.17	8.17	3.30	3.30	2.21	2.21	4.40	4.40	6.15	6.15	6.68	6.68
RW-4	8.62	8.62	4.95	4.95	2.35	2.35	5.10	5.10	7.77	7.77	7.95	7.95
RW-5	8.60	13.20	6.60	6.65	5.06	5.07	7.90	8.00	8.80	9.10	9.00	9.38
RW-6	9.08	9.10	3.55	3.97	2.33	2.35	6.85	6.85	8.75	8.75	8.69	8.69
RW-7	7.63	9.00	5.00	5.40	3.30	3.45	6.30	6.65	7.10	7.20	6.95	7.03
RW-8			7.20	7.30	6.40	6.40	8.25	8.27	8.90	8.90	9.15	9.23
GW-01									not found			
GW-02	11.67	11.67	8.88	8.88	7.99	7.99	9.60	9.60	10.33	10.33	10.85	10.85
GW-03	11.47	11.47			8.17	8.18	9.65	9.65	10.50	10.50	10.76	10.77
GW-04	9.15	9.37	8.12	8.20	7.53	7.59	8.87	8.87	7.99	8.05	8.33	8.39
GW-05	Debris in well		Debris in well		Debris in well		Replaced w/ UGW20R					
GW-06			8.60	8.60	8.34	8.34	8.98	8.98	9.36	9.36	9.59	9.60
470-MW1	30.90	31.13			24.84	25.04	27.62	27.81	28.59	28.89		
470-MW3	20.73	20.73			17.20	17.20	18.92	18.92	19.70	19.70	20.20	20.20
7MW-01A	26.27	26.30	23.45	23.45	22.40	22.40					24.49	24.49
7MW-02A	45.21	45.21	37.10	37.10	31.99	31.99			41.47	41.47	42.80	42.80
7MW-03	74.25	74.25	68.05	68.05	65.47	65.47	66.51	66.51	67.87	67.87	69.18	69.18
7MW-04	78.48	78.48	75.95	75.95	74.76	74.76	74.87	74.87	74.98	74.98	75.87	75.87
7MW-05	12.75	12.75			9.87	9.87	11.21	11.21	11.80	11.80	12.15	12.16
7MW-06	7.75	7.75	6.90	6.90	6.72	6.72	7.43	7.43	7.70	7.70	7.84	7.85
7MW-07			12.85	12.85					14.29	14.29	14.25	14.25
7MW-08									10.80	10.80	10.90	10.90
7MW-09			50.61	50.61	46.37	46.37	52.35	52.35	54.53	54.53	55.75	55.75

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	04/27/99		05/21/99		06/29/99		07/29/99		08/30/99		09/29/99		10/27/99	
Number	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
UGW-1	12.39	14.12	12.49	14.20	12.66	14.43	12.65	14.45	13.28	13.29	9.55	9.60	4.80	5.10
UGW-2	52.18	52.19	53.66	53.66	54.30	54.30	55.00	55.20	55.44	55.95	54.20	54.85	52.85	52.85
UGW-3			20.54	20.54			19.50	25.40	20.51	21.15	19.20	19.92	19.03	19.60
UGW-4	16.60	16.61	14.10	14.10	17.05	17.05	17.13	17.13	17.30	17.30	14.00	14.00	12.90	12.90
UGW-5	12.88	13.08	12.47	12.55	12.68	12.74	12.77	12.95	11.11	11.11			10.20	10.35
UGW-6	10.10	10.10	10.07	10.07	10.05	10.05	8.86	8.86	9.15	9.15	8.15	8.15	8.70	8.70
UGW-7	8.30	8.30	8.44	8.44	8.30	8.30	7.94	7.94	7.00	7.00	6.85	6.85	6.17	6.17
UGW-8	8.48	8.49	8.65	8.65	8.45	8.45	8.15	8.15	7.30	7.30	6.92	6.92	8.50	8.50
UGW-9	8.06	8.06	8.15	8.15	7.98	7.98	8.00	8.00	7.32	7.32	6.60	6.60	5.00	5.00
UGW-10	10.11	10.11	10.00	10.00	9.92	9.92	7.94	7.94	8.94	8.94	6.68	6.68	8.25	8.25
UGW-11	9.16	9.16	9.07	9.07	9.06	9.06	8.95	8.95	8.57	8.57	7.15	7.15	8.70	8.70
UGW-12	10.10	17.88	10.09	17.90	10.81	16.67	10.98	16.96	11.62	12.36	8.00	16.85	7.55	17.30
UGW-13	10.97	17.92	9.92	20.19	10.90	17.10	10.87	17.87	10.30	10.35	8.00	19.38	8.45	8.95
UGW-14	15.73	15.73	16.05	16.05	16.16	16.16	16.20	16.20	9.46	9.46	14.45	14.45	12.18	12.18
UGW-15	11.81	11.81	11.86	11.86	11.75	11.75	11.70	11.70	11.23	11.23	9.90	9.90	10.82	10.82
UGW-16	12.65	12.65	12.58	12.58	12.64	12.64	12.50	12.50	11.68	11.68	10.15	10.15	11.60	11.60
UGW-17	10.33	15.50	9.46	16.81	10.01	18.92	9.87	17.10	9.27	9.27	8.55	11.05	8.77	11.85
UGW-18	12.99	12.99	12.98	12.98	13.01	13.01	12.90	12.90	damaged		10.24	10.24	11.60	11.60
UGW-19	10.85	11.34	10.87	11.76	10.82	12.02	11.10	12.55	9.80	9.80	8.00	8.20	9.40	9.72
UGW-20													10.30	10.30
UGW-20R	8.78	8.78	8.63	8.63	8.62	8.62	8.23	8.23	7.90	7.90	8.05	8.05	8.05	10.00
UGW-21	12.07	14.30	11.60	14.27	9.51	17.20	11.91	14.28	10.15	10.55	10.02	11.30	10.80	12.16
UGW-22	7.10	7.11	7.56	7.56	5.43	5.43	5.94	5.94	1.34	1.34			3.45	3.45
UGW-23	62.24	62.24	64.64	64.64	64.77	64.77	65.02	65.02	64.98	64.98	58.30	58.30	57.65	57.65
UGW-24	72.41	72.41	73.39	73.39	73.76	73.76	74.10	74.10	74.38	74.38	73.15	73.15	72.14	72.15
UGW-25					49.00	50.35	49.23	50.75	49.25	50.70	48.90	50.40	46.85	48.05
UGW-26	8.53	8.53	10.05	10.05	8.65	8.65	8.45	8.45	8.05	8.05	8.10	8.10	6.25	6.25
PW-1	10.35	10.35	8.98	8.98	9.56	9.56	9.66	9.66	6.70	6.70	6.65	6.65	7.70	7.70
PW-2	11.94	11.94	11.20	12.82	11.51	13.30	11.60	13.42	10.62	10.65	8.54	9.25	8.60	9.35
PW-3	7.10	7.11	13.67	16.02	14.00	14.16	13.92	14.12	13.27	13.29	10.45	10.55	6.70	6.80
PW-4	clogged		clogged		clogged		clogged		damaged		damaged		damaged	
PW-5	13.83	14.13	14.15	14.43	13.95	14.25	13.92	14.25	13.45	13.50	10.36	10.45	10.22	10.30
PW-6	11.45	11.51	11.28	11.48	11.60	11.76	11.55	11.70	11.05	11.15	8.20	8.80	7.70	8.50
MW-1	11.31	12.67	10.90	12.30	11.15	12.55	11.19	12.55	10.77	10.81	8.55	8.85	8.45	9.02

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	04/27/99		05/21/99		06/29/99		07/29/99		08/30/99		09/29/99		10/27/99	
Number	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water	Product	Water
MW-2	11.94	11.94	10.90	10.90	11.27	11.28	11.45	11.45	7.54	7.64	6.45	6.45	8.10	8.10
MW-3	10.08	10.85	10.35	10.97	10.04	10.58	10.10	10.70	9.80	9.80	7.30	7.32	10.13	10.16
MW-4	10.24	10.97	10.64	11.33	10.70	11.30	9.87	10.35	6.47	6.47	4.50	4.70	9.15	9.23
RW-1	blocked		blocked		blocked		16.15	19.35	15.90	18.33			12.20	12.43
RW-2	13.50	13.54	13.87	13.93	12.40	12.40	13.40	13.40	4.50	4.50			5.95	5.95
RW-3	7.10	7.11	7.56	7.56	5.43	5.43	5.94	5.94	1.34	1.34			3.45	3.45
RW-4	Well purged		8.97	9.25	8.66	8.68	8.63	8.64	0.10	0.19			5.93	5.93
RW-5	8.96	9.30	9.30	9.65	8.50	8.76	8.90	9.14	7.43	7.66			6.40	6.58
RW-6	8.62	8.63	8.75	8.75	7.94	7.94	8.45	8.45	2.37	2.37			2.65	2.65
RW-7	7.40	7.55	7.62	7.67	6.96	6.96	7.00	7.00	4.00	4.00			5.07	5.07
RW-8	9.06	9.21	9.25	9.75	8.70	8.91	8.96	9.35	6.80	7.20			7.32	7.53
GW-01														
GW-02	10.99	10.99	11.15	11.15	11.11	11.11	11.10	11.10	10.50	10.50	8.85	8.85	9.65	9.65
GW-03	10.89	10.90	10.92	10.92	11.00	11.00	10.90	10.90	10.30	10.30	8.42	8.42	9.61	9.61
GW-04			10.04	10.08	9.93	10.00	9.77	9.77	11.10	11.10	8.60	8.60	7.38	7.38
GW-05									damaged		clogged		clogged	
GW-06			8.60	8.60	9.62	9.62	8.46	8.46	9.00	9.00	7.45	7.45	8.45	8.45
470-MW1	29.57	29.85			29.85	30.07	29.86	30.04	27.52	27.71	26.86	27.06	27.65	28.06
470-MW3	20.34	20.34			20.51	20.51	20.70	20.70	19.91	19.91	18.30	18.30	19.77	19.77
7MW-01A	29.59	29.60	25.75	25.75	25.71	25.71	25.75	25.75	27.11	27.11	24.78	24.78	24.35	24.35
7MW-02A	43.28	43.29	44.05	44.05	44.17	44.17	44.36	44.36	44.23	44.23	39.60	39.60	37.14	37.14
7MW-03	70.06	70.06	71.53	71.53	73.20	73.20	72.75	72.75	73.20	73.20	70.45	70.45	68.54	68.54
7MW-04	76.46	76.47	72.41	72.41	73.96	73.96	78.00	78.00	78.70	78.70	77.00	77.00	75.98	75.98
7MW-05	12.26	12.26	12.36	12.36	12.27	12.27	12.26	12.26	11.21	11.21	8.65	8.65	12.11	12.11
7MW-06	7.90	7.90	7.76	7.77	7.77	7.77	7.70	7.70	7.27	7.27	6.35	6.35	7.54	7.54
7MW-07	14.40	14.40	14.14	14.14	14.36	14.36	14.22	14.22	12.60	12.60	12.73	12.73	13.14	13.14
7MW-08	10.85	10.85	10.65	10.65	10.90	10.90	10.82	10.82	6.62	6.62	8.65	8.65	9.15	9.15
7MW-09	56.21	56.21	56.93	56.93	57.05	57.05	57.23	57.23	64.10	64.10	57.60	57.60	50.70	50.70

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	12/01/99		12/23/99		01/28/00	
Number	Product	Water	Product	Water	Product	Water
UGW-1	6.10	6.20	10.00	10.10	10.18	10.30
UGW-2	not gauged		46.38	46.38	46.50	46.50
UGW-3	14.70	15.35	13.50	13.50	15.70	15.71
UGW-4	8.02	8.02	13.05	13.05	13.17	13.17
UGW-5	6.45	6.65	10.70	10.95	10.75	11.00
UGW-6	7.95	7.95	9.25	9.25	9.38	9.38
UGW-7	6.00	6.00	7.20	7.20	7.26	7.26
UGW-8	4.90	4.90	6.75	6.75	6.95	6.95
UGW-9	4.56	4.56	6.80	6.80	7.02	7.02
UGW-10	7.85	7.85	9.45	9.45	9.60	9.60
UGW-11	8.16	8.16	8.94	8.95	9.00	9.00
UGW-12	4.15	15.10	7.45	15.85	7.56	15.90
UGW-13	4.52	13.40	8.50	17.20	8.55	17.30
UGW-14	7.60	7.60	12.10	12.10	12.30	12.30
UGW-15	9.50	9.50	9.10	9.10	9.30	9.30
UGW-16	10.05	10.05	11.66	11.66	11.75	11.75
UGW-17	5.30	14.30	8.45	12.10	8.65	12.40
UGW-18	damaged		11.65	11.65	11.72	11.72
UGW-19	4.20	4.55	9.35	9.65	9.45	9.80
UGW-20	6.35	6.35	8.00	8.00	8.12	8.12
UGW-20R						
UGW-21	6.15	7.40	7.40	11.55	7.53	11.72
UGW-22	overflow		5.20	5.20	5.23	5.23
UGW-23	48.20	48.20	58.10	58.10	58.40	58.40
UGW-24	68.90	68.90	68.36	68.37	68.58	68.59
UGW-25	47.60	49.20	44.00	45.10	44.23	45.33
UGW-26	5.70	5.70	6.80	6.80	6.95	6.95
PW-1	5.20	5.80	9.10	9.10	9.25	9.25
PW-2	5.22	6.40	9.42	10.42	9.65	10.70
PW-3	6.10	6.10	10.55	10.59	10.62	10.67
PW-4	damaged		damaged		damaged	
PW-5	7.10	7.15	10.60	10.65	10.70	10.77
PW-6	3.50	3.50	8.40	8.40	8.55	8.55
MW-1	3.80	3.80	9.17	9.71	9.30	9.85

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-2 (continued)

MONITORING WELL MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION, ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well	12/01/99		12/23/99		01/28/00	
Number	Product	Water	Product	Water	Product	Water
MW-2	4.95	4.95	9.50	9.50	9.60	9.60
MW-3	1.30	1.30	6.90	6.95	6.95	7.00
MW-4	3.35	3.60	10.40	10.42	10.55	10.60
RW-1	5.10	5.25	0.00	0.00	12.50	12.75
RW-2	overflow		9.55	9.55	9.60	9.60
RW-3	overflow		5.20	5.20	5.23	5.23
RW-4	overflow		6.75	6.76	6.82	6.83
RW-5	overflow		6.85	6.90	6.87	6.91
RW-6	overflow		6.53	6.53	6.55	6.55
RW-7	overflow		5.50	5.50	5.70	5.70
RW-8	overflow		7.00	7.05	7.15	7.20
GW-01	not gauged		not gauged		not gauged	
GW-02	6.60	6.60	9.10	9.10	9.22	9.22
GW-03	7.00	7.00	9.20	9.20	9.25	9.25
GW-04	7.10	7.10	8.46	8.46	8.55	8.55
GW-05	not gauged		not gauged		not gauged	
GW-06	7.95	7.95	8.48	8.48	8.55	8.55
470-MW1	21.80	22.10	24.30	25.32	24.60	25.65
470-MW3	15.30	15.30	16.31	16.31	16.45	16.45
7MW-01A	20.40	20.40	23.63	23.63	23.70	23.70
7MW-02A	10.70	10.70				
7MW-03	73.30	73.30				
7MW-04	not gauged		72.36	72.63	72.45	72.45
7MW-05	8.51	8.51				
7MW-06	7.65	7.65	7.55	7.55	7.67	7.67
7MW-07	7.15	7.15	13.05	13.05	13.14	13.14
7MW-08	6.42	6.42	8.90	8.90	8.98	8.98
7MW-09	43.80	43.80	51.03	51.03	51.20	51.20

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-3

PRODUCT THICKNESS MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Number	1/28/97	2/25/97	4/21/97	5/22/97	6/17/97	6/30/97	7/30/97	9/3/97	9/26/97
UGW-1	2.36	2.40	2.40	2.56	2.62	2.59	2.55	2.93	2.69
UGW-2	0.00	0.00	0.00	0.18	0.27	0.31	0.27	0.62	0.35
UGW-3	6.10	5.96	6.16	0.00	0.00	0.00	5.03	5.30	5.05
UGW-4	11.31	11.31	11.32	9.82	9.71	9.72	9.41	10.10	9.38
UGW-5	2.35	0.30	0.41	0.35	0.37	0.36	0.19	1.00	0.24
UGW-6		0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-9	0.00	0.00	0.00					0.00	0.00
UGW-10	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
UGW-11	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
UGW-12	9.19	9.00	8.59	8.49	8.37	8.35	8.22	8.61	7.95
UGW-13	7.67	7.57	7.70	6.16	6.58	6.34	7.40	7.96	6.36
UGW-14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-15	0.00	0.00	0.00	2.92	2.41	2.54	0.00	0.00	0.00
UGW-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-17	4.80	4.82	4.70	4.05	4.18	4.03	4.70	5.00	4.49
UGW-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-19	3.75	3.74	3.70		0.00	0.00	2.42	4.95	2.67
UGW-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-20R									
UGW-21	2.15	2.14	2.00	1.74	1.78	1.93	2.04	3.10	2.17
UGW-22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	
UGW-23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-25	1.58	1.11	1.56	1.82	1.98	2.02	1.94	2.90	2.17
UGW-26	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
PW-1	0.00	0.00	0.00	0.12	0.14	0.07	0.07	0.35	0.07
PW-2	0.86	0.70	0.88	1.21	1.37	1.33	1.09	1.48	1.02
PW-3	3.67	4.22	3.70	5.96	6.39	6.57	6.98	7.98	7.62
PW-4	1.74	1.74	1.75	2.38	2.98	2.64	2.67	3.48	3.12
PW-5	5.10	5.79	5.09	7.03	7.25	7.35	7.40	7.95	7.78
PW-6	10.72	10.93	10.67	10.01	9.92	9.78	9.83	10.11	9.79
MW-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.10	0.00
MW-2	0.00	0.00	0.00	0.17	0.29	0.30	0.03	0.60	0.81
MW-3	2.27	2.50	2.25	3.16	3.31	3.36	3.69	4.30	4.21
MW-4	2.30	2.30	2.32	2.13	2.40	2.42	1.94	2.40	2.47
RW-1	8.10	2.98	5.99	7.41	7.43	7.38	7.18	7.78	7.55
RW-2	0.90	0.45	0.39	1.43	0.09	0.47	0.00	0.00	
RW-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	
RW-4	0.57	0.00	0.76	3.10	0.10	0.53	0.01	0.21	
RW-5	0.26	0.55	2.23	5.64	1.15	4.42	0.12	0.95	

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-3 (continued)

PRODUCT THICKNESS MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Number	1/28/97	2/25/97	4/21/97	5/22/97	6/17/97	6/30/97	7/30/97	9/3/97	9/26/97
RW-6	0.17	0.17	0.20	0.22	0.21	0.23	0.00	1.09	0.00
RW-7	2.52	0.37	2.67	2.62	0.69	1.99	0.00	2.10	0.94
RW-8	0.31	0.25	0.02	0.23	0.83	2.49	0.13	2.25	0.19
NW-1	0.00	0.00				0.00		0.00	
NW-2	0.00	0.00				0.00		0.00	
470-MW-1						0.30	0.20	1.10	0.29
470-MW-2									0.00
470-MW-3							0.00	0.00	0.00
1995-MW-4									
1995-MW-5						0.00	0.00	0.00	0.00
1995MW-9						0.00	0.00	0.00	0.00
GW-01								0.00	0.00
GW-02						0.00	0.00	0.00	0.00
GW-03						0.00	0.00	0.00	0.00
GW-04						0.30	0.06	0.55	0.29
GW-05									0.00
GW-06						0.00	0.00	0.00	0.00
470-MW1									
470-MW3									
7MW-01A								0.00	0.00
7MW-02A						0.00	0.00	0.00	0.00
7MW-03						0.00	0.00	0.00	0.00
7MW-04						0.00	0.00	0.00	0.00
7MW-05									
7MW-06									
7MW-07									
7MW-08									
7MW-09									

TABLE 3-3 (continued)

PRODUCT THICKNESS MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Number	10/30/97	11/25/97	12/23/97	1/26/98	2/25/98	3/24/98	4/29/98	6/3/98	7/7/98
UGW-1	2.71	2.77	2.72	2.80	2.80	2.79	2.75	2.77	2.78
UGW-2	0.12	0.00	0.01	0.00	0.00	0.04	0.16	0.42	0.52
UGW-3	4.05	5.01	4.30	4.05	3.97	3.95	2.04	2.02	2.00
UGW-4	9.75	9.66	9.59	10.23	10.21	10.21	0.05	0.01	0.03
UGW-5	0.05	0.10	0.22	0.20	0.21	0.06	0.00	0.16	0.21
UGW-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-11	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
UGW-12	10.38	9.25	9.18	8.86	8.47	8.19	8.12	7.74	7.75
UGW-13	10.12	7.30	7.43	7.48	1.87	6.45	6.94	2.26	6.75
UGW-14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-17	6.51	6.79	7.31	7.70	7.52	6.00	2.08	2.28	2.53
UGW-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-19	0.33	1.93	1.08	1.64	2.12	2.25	1.63	2.47	2.32
UGW-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
UGW-20R									
UGW-21	2.12	2.08	2.20	3.02	2.37	2.39	2.21	2.26	2.14
UGW-22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-24	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
UGW-25	1.82	1.77	1.62	1.51	1.56	1.66	2.04	1.74	1.75
UGW-26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PW-1	0.77	0.11	0.79	0.11	0.16	0.19	0.00	0.00	0.00
PW-2	0.63	0.60	0.72	0.73	0.75	0.80	0.86	0.87	0.97
PW-3	8.75	9.12	9.76	9.95	9.80	9.77	9.85	9.85	9.84
PW-4	3.36	3.37	3.47	3.55	3.62	3.66	3.77	3.73	3.89
PW-5	8.17	8.40	8.85	8.97	8.95	8.85	8.88	8.92	8.92
PW-6	13.18	11.86	13.20	12.44	11.67	10.92	10.68	10.57	9.39
MW-1	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.12	1.14
MW-2	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.08	0.12
MW-3	4.22	4.49	4.63	5.03	5.42	5.35	5.86	6.01	6.20
MW-4	3.32	2.96	3.24	2.92	2.45	1.97	0.51	0.53	0.72
RW-1	0.83	2.88	1.02	3.13	4.63	5.89	6.48	6.57	7.16
RW-2	0.00	0.00		0.00	0.00	0.10	0.22	0.00	0.37
RW-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
RW-5	0.20	0.07	0.11	0.20	0.38	2.55	2.42	2.40	2.41

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-3 (continued)

PRODUCT THICKNESS MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Number	10/30/97	11/25/97	12/23/97	1/26/98	2/25/98	3/24/98	4/29/98	6/3/98	7/7/98
RW-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-7	0.26	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
RW-8	0.04	0.00	0.00	0.02	0.12	2.07	3.41	3.37	3.54
NW-1	0.00							0.00	0.00
NW-2	0.00							0.00	0.00
470-MW-1	0.08	0.29	0.28					0.00	0.00
470-MW-2	0.00	0.00						0.00	0.00
470-MW-3	0.00	0.00	0.00					0.00	0.00
1995-MW-4	0.00							0.00	0.00
1995-MW-5	0.00	0.00	0.00					0.00	0.00
1995MW-9	0.00	0.00	0.00					0.00	0.00
GW-01	0.00	0.00						0.01	0.02
GW-02	0.00	0.00	0.00				0.00	0.00	0.00
GW-03	0.00	0.00	0.00				0.00	0.00	0.00
GW-04	0.30	0.18	0.28				0.00	0.02	0.02
GW-05	0.00								
GW-06	0.00	0.00	0.00				0.00	0.00	0.00
470-MW1							0.09	0.11	0.23
470-MW3							0.00	0.00	0.00
7MW-01A	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
7MW-02A	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
7MW-03	0.00	0.00					0.00	0.00	0.00
7MW-04	0.00	0.00					0.00	0.00	0.00
7MW-05	0.00							0.00	0.00
7MW-06	0.00	0.00	0.00		0.00	0.00		0.00	0.00
7MW-07	0.00	0.00	0.00		0.00				
7MW-08	0.00	0.00	0.00		0.00	0.00		0.00	0.00
7MW-09	0.00	0.00	0.00			0.00	0.00	0.00	0.00

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-3 (continued)

PRODUCT THICKNESS MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Number	8/12/98	11/16/98	12/9/98	1/25/99	2/23/99	3/29/99	4/27/99	5/21/99	6/29/99	7/29/99
UGW-1	0.61	1.40	1.39	1.70	1.68	1.74	1.73	1.71	1.77	1.80
UGW-2	0.62	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.20
UGW-3	0.57	0.55	0.56	0.00		0.00	0.00	0.00	0.00	5.90
UGW-4	0.02	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
UGW-5	0.34	0.25	0.24	0.30	0.20	0.19	0.20	0.08	0.06	0.18
UGW-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-7	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-8	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
UGW-9	0.02	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00
UGW-10	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
UGW-11	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
UGW-12	7.58	9.70	11.25	8.66	8.01	7.66	7.78	7.81	5.86	5.98
UGW-13	6.79	10.95	12.30	8.80	7.42	7.05	6.95	10.27	6.20	7.00
UGW-14	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-15	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-16	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
UGW-17	1.39	3.85	6.82	9.69	6.16	5.20	5.17	7.35	8.91	7.23
UGW-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-19	2.20	1.36	1.37	1.17	1.25	0.50	0.49	0.89	1.20	1.45
UGW-20				Monitoring Well Replaced with UGW20R						
UGW-20R					0.00	0.01	0.00	0.00	0.00	0.00
UGW-21	2.03	2.90	2.63	2.90	2.14	2.37	2.23	2.67	7.69	2.37
UGW-22	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
UGW-23	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
UGW-24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-25	1.82	0.00	0.00	0.00		0.00	0.00	0.00	1.35	1.52
UGW-26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PW-1	1.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PW-2	1.08	1.30	1.59	1.65	1.71	2.66	0.00	1.62	1.79	1.82
PW-3	7.71	9.53	9.88	0.85	0.90	0.90	0.01	2.35	0.16	0.20
PW-4	0.18		0.00							
PW-5	6.70	7.37	7.37	1.12	1.29	1.29	0.30	0.28	0.30	0.33
PW-6	1.13	0.00	0.00	0.10		0.05	0.06	0.20	0.16	0.15
MW-1	0.01	0.00	1.29	1.45	0.34	2.30	1.36	1.40	1.40	1.36
MW-2	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
MW-3	0.00	0.00	0.00	0.75	0.00	0.72	0.77	0.62	0.54	0.60
MW-4	0.55	1.20	1.24	1.30	0.90	0.66	0.73	0.69	0.60	0.48
RW-1	0.00	0.05	0.00	0.00						3.20
RW-2	0.43	0.00	0.00	0.00	0.00	0.00	0.04	0.06	0.00	0.00
RW-3	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
RW-4	0.00	0.00	0.00	0.00	0.00	0.00		0.28	0.02	0.01
RW-5	4.60	0.05	0.01	0.10	0.30	0.38	0.34	0.35	0.26	0.24

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-3 (continued)

PRODUCT THICKNESS MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Number	8/12/98	11/16/98	12/9/98	1/25/99	2/23/99	3/29/99	4/27/99	5/21/99	6/29/99	7/29/99
RW-6	0.02	0.42	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00
RW-7	1.37	0.40	0.15	0.35	0.10	0.08	0.15	0.05	0.00	0.00
RW-8	0.00	0.10	0.00	0.02	0.00	0.08	0.15	0.50	0.21	0.39
NW-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NW-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
470-MW-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
470-MW-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
470-MW-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1995-MW-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1995-MW-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1995MW-9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GW-01	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
GW-02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GW-03	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00
GW-04	0.22	0.08	0.06	0.00	0.06	0.06	0.00	0.04	0.07	0.00
GW-05						Monitoring Well Replaced with UGW20R				
GW-06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
470-MW1	0.23	0.00	0.20	0.19	0.30	0.00	0.28	0.00	0.22	0.18
470-MW3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-01A	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
7MW-02A	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
7MW-03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
7MW-05	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
7MW-06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00
7MW-07				0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Data taken from McLaren/Hart Quarterly Progress Report

TABLE 3-3 (continued)

PRODUCT THICKNESS MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Number	8/30/99	9/29/99	10/27/99	12/1/99	12/23/99	1/28/00
UGW-1	0.01	0.05	0.30	0.10	0.10	0.12
UGW-2	0.51	0.65	0.00		0.00	0.00
UGW-3	0.64	0.72	0.57	0.65	0.00	0.01
UGW-4	0.00	0.00	0.00	0.00	0.00	0.00
UGW-5	0.00		0.15	0.20	0.25	0.25
UGW-6	0.00	0.00	0.00	0.00	0.00	0.00
UGW-7	0.00	0.00	0.00	0.00	0.00	0.00
UGW-8	0.00	0.00	0.00	0.00	0.00	0.00
UGW-9	0.00	0.00	0.00	0.00	0.00	0.00
UGW-10	0.00	0.00	0.00	0.00	0.00	0.00
UGW-11	0.00	0.00	0.00	0.00	0.01	0.00
UGW-12	0.74	8.85	9.75	10.95	8.40	8.34
UGW-13	0.05	11.38	0.50	8.88	8.70	8.75
UGW-14	0.00	0.00	0.00	0.00	0.00	0.00
UGW-15	0.00	0.00	0.00	0.00	0.00	0.00
UGW-16	0.00	0.00	0.00	0.00	0.00	0.00
UGW-17	0.00	2.50	3.08	9.00	3.65	3.75
UGW-18			0.00		0.00	0.00
UGW-19	0.00	0.20	0.32	0.35	0.30	0.35
UGW-20			0.00	0.00	0.00	0.00
UGW-20R	0.00	0.00	1.95	0.00		
UGW-21	0.40	1.28	1.36	1.25	4.15	4.19
UGW-22	0.00		0.00		0.00	0.00
UGW-23	0.00	0.00	0.00	0.00	0.00	0.00
UGW-24	0.00	0.00	0.01	0.00	0.01	0.01
UGW-25	1.45	1.50	1.20	1.60	1.10	1.10
UGW-26	0.00	0.00	0.00	0.00	0.00	0.00
PW-1	0.00	0.00	0.00	0.60	0.00	0.00
PW-2	0.03	0.71	0.75	1.18	1.00	1.05
PW-3	0.02	0.10	0.10	0.00	0.04	0.05
PW-4						
PW-5	0.05	0.09	0.08	0.05	0.05	0.07
PW-6	0.10	0.60	0.80	0.00	0.00	0.00
MW-1	0.04	0.30	0.57	0.00	0.54	0.55
MW-2	0.10	0.00	0.00	0.00	0.00	0.00
MW-3	0.00	0.02	0.03	0.00	0.05	0.05
MW-4	0.00	0.20	0.08	0.25	0.02	0.05
RW-1	2.43		0.23	0.15	0.00	0.25
RW-2	0.00		0.00		0.00	0.00
RW-3	0.00		0.00		0.00	0.00
RW-4	0.09		0.00		0.01	0.01
RW-5	0.23		0.18		0.05	0.04

TABLE 3-3

PRODUCT THICKNESS MEASUREMENTS
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Well Number	8/30/99	9/29/99	10/27/99	12/1/99	12/23/99	1/28/00
RW-6	0.00		0.00		0.00	0.00
RW-7	0.00		0.00		0.00	0.00
RW-8	0.40		0.21		0.05	0.05
NW-1	0.00	0.00	0.00	0.00	0.00	0.00
NW-2	0.00	0.00	0.00	0.00	0.00	0.00
470-MW-1	0.00	0.00	0.00	0.00	0.00	0.00
470-MW-2	0.00	0.00	0.00			
470-MW-3	0.00	0.00	0.00	0.00	0.00	0.00
1995-MW-4	0.00	0.00	0.00			
1995-MW-5	0.00	0.00	0.00			
1995MW-9	0.00	0.00	0.00			
GW-01						
GW-02	0.00	0.00	0.00	0.00	0.00	0.00
GW-03	0.00	0.00	0.00	0.00	0.00	0.00
GW-04	0.00	0.00	0.00	0.00	0.00	0.00
GW-05						
GW-06	0.00	0.00	0.00	0.00	0.00	0.00
470-MW1	0.19	0.20	0.41	0.30	1.02	1.05
470-MW3	0.00	0.00	0.00	0.00	0.00	0.00
7MW-01A	0.00	0.00	0.00	0.00	0.00	0.00
7MW-02A	0.00	0.00	0.00	0.00		
7MW-03	0.00	0.00	0.00	0.00		
7MW-04	0.00	0.00	0.00		0.27	0.00
7MW-05	0.00	0.00	0.00	0.00		
7MW-06	0.00	0.00	0.00	0.00	0.00	0.00
7MW-07	0.00	0.00	0.00	0.00	0.00	0.00
7MW-08	0.00	0.00	0.00	0.00	0.00	0.00
7MW-09	0.00	0.00	0.00	0.00	0.00	0.00

Data taken from McLaren/Hart Quarterly Progress Report
2/25/00

TABLE 4-1

PRODUCT RECOVERED FROM 1994 THROUGH JANUARY 2000
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Month/Year	Gallons Recovered	Running Time (days)	Removal Contractor
94 & 95 Cumulative Totals for Terra Vac	12,630 Gallons	* Running Time (days)	
January 96	0	*	Terra Vac
February 96	236	*	Terra Vac
March 96	96	*	Terra Vac
April 96	2	*	Terra Vac
May 96	70	*	Terra Vac
June 96	70	*	Terra Vac
July 96	90	*	Terra Vac
August 96	256	*	Terra Vac
September 96	323	*	Terra Vac
96 Cumulative Totals for Terra Vac	1,143 Gallons in Jan - Sep 1996	* Running Time (days) in Jan - Aug 1996	* Gallons/Day
December 96	178	14	McLaren/Hart
96 Cumulative Totals for McLaren/Hart	178 Gallons in Dec 1996	14 Running Time (days) in Dec 1996	5.9 Gallons/Day
January 97	44	6	McLaren/Hart
February 97	74	6	McLaren/Hart
March 97	146	27	McLaren/Hart
April 97	119	28	McLaren/Hart
May 97	91	32	McLaren/Hart
June 97	202	27	McLaren/Hart
July 97	104	21	McLaren/Hart
August 97	17	29	McLaren/Hart
September 97	95	22	McLaren/Hart
October 97	73	14	McLaren/Hart
November 97	9	22	McLaren/Hart
December 97	0	10	McLaren/Hart
97 Cumulative Totals for McLaren/Hart	974 Gallons in 1997	244 Running Time (days) in 1997	2.7 Gallons/Day

TABLE 4-1

PRODUCT RECOVERED FROM 1994 THROUGH JANUARY 2000
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Month/Year	Gallons Recovered	Running Time (days)	Removal Contractor
January 98	0	14.0	McLaren/Hart
February 98	0	28.0	McLaren/Hart
March 98	24	31.0	McLaren/Hart
April 98	6	2.0	McLaren/Hart
May 98	0	0.0	McLaren/Hart
June 98	20	7.0	McLaren/Hart
July 98	334	30.0	McLaren/Hart
August 98	93	29.0	McLaren/Hart
September 98	0	20.0	McLaren/Hart
October 98	0	10.0	McLaren/Hart
November 98	43	22.0	McLaren/Hart
December 98	134	31.0	McLaren/Hart
98 Cumulative Totals for McLaren/Hart	654 Gallons in 1998	224 Running Time (days) in 1998	2.2 Gallons/Day
January 99	21	31.0	McLaren/Hart
February-99	21	28	McLaren/Hart
March-99	81	31	McLaren/Hart
April-99	0	18	McLaren/Hart
May-99	34	21	McLaren/Hart
June-99	2	30	McLaren/Hart
July-99	3	31	McLaren/Hart
August-99	28	31	McLaren/Hart
September-99	11	8	McLaren/Hart
October-99	0	7	McLaren/Hart
November-99	0	0	McLaren/Hart
December-99	0	0	McLaren/Hart
99 Cumulative Totals for McLaren/Hart	201 Gallons in 1999	236 Running Time (days) in 1999	0.7 Gallons/Day
January-00	0	0	McLaren/Hart
Cumulative Totals for 1994 - 2000	15,780 Gallons		

Note: * - No record of operating days was available.
Source: "Free Product Level Measurement Reports" by Terra Vac and "O & M Reports" by McLaren/Hart

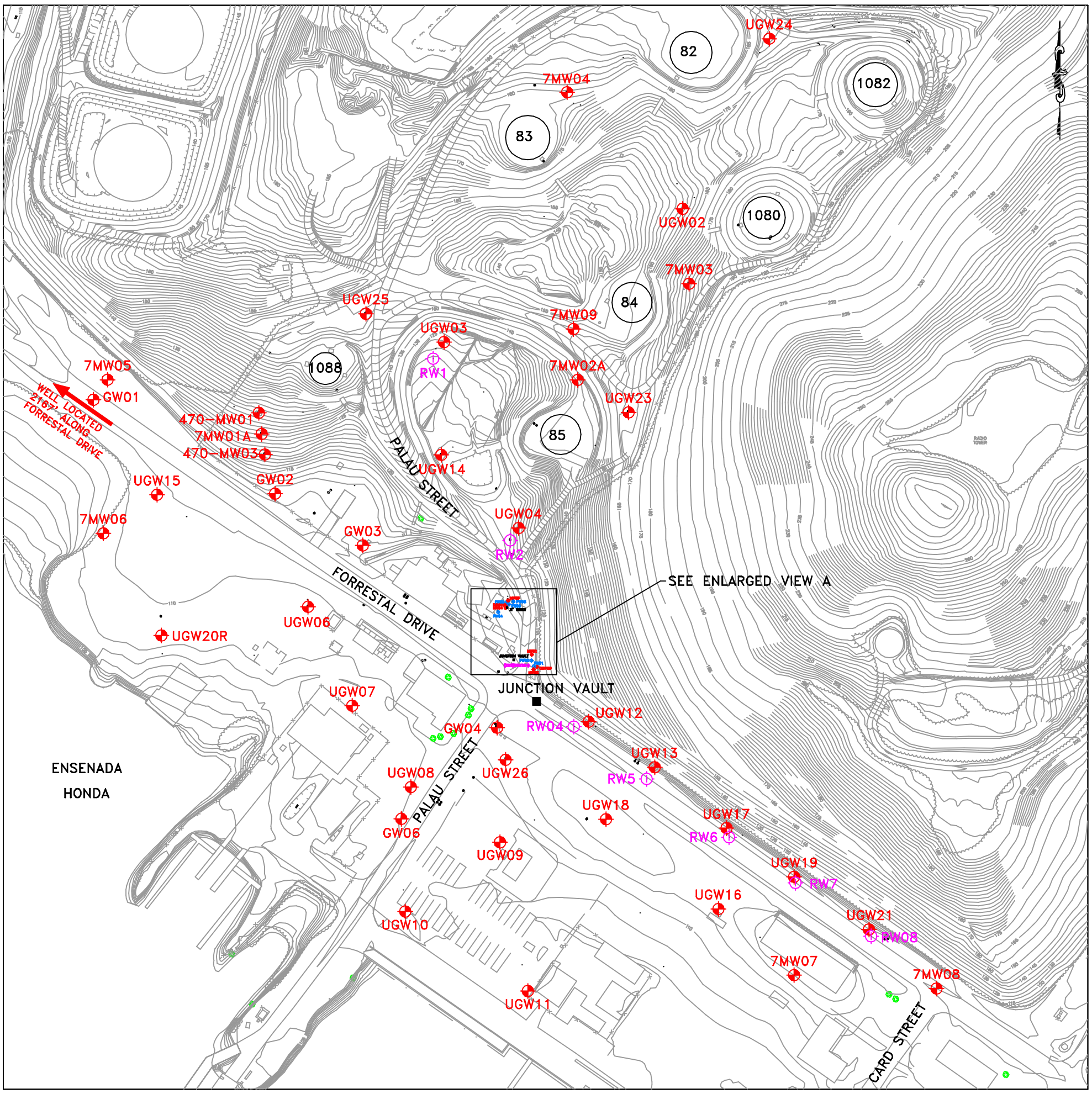
TABLE 5-1

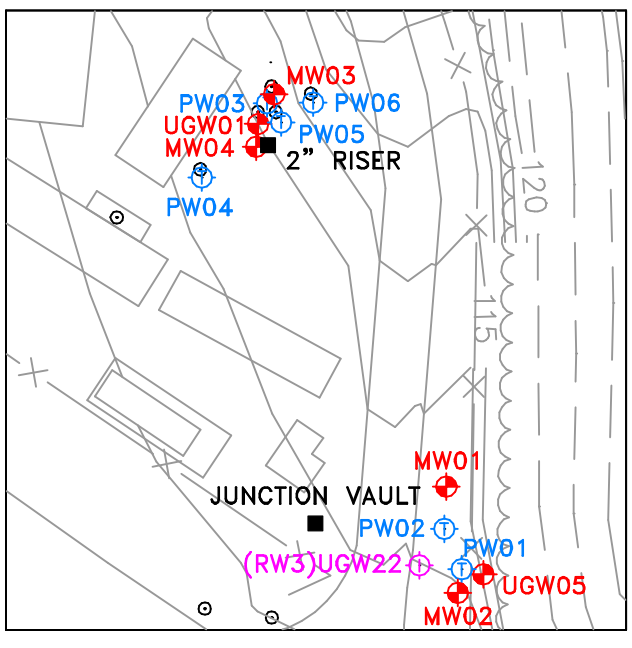
RECOVERY WELL - MONITORING WELL COMPARISON
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

Recovery Well	Free Product Thickness (feet) 1/28/00	Nearby Monitoring Well	Distance from Recovery Well (feet)	Free Product Thickness (feet) 1/28/00
RW-1	0.25	UGW-3	35	0.01
		UGW-25	142	1.10
RW-2	0.00	UGW-4	26	0.00
RW-3/UGW-22	0.00	MW-2	12	0.00
RW-4	0.01	UGW-12	27	8.34
RW-5	0.04	UGW-13	25	8.75
RW-6	0.00	UGW-17	16	3.75
RW-7	0.00	UGW-19	10	0.35
RW-8	0.05	UGW-21	12	4.19

Notes: The system was shut down on October 6, 1999 and has been off since.

Figures





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 ft.

NOTE:
DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

K\CAD\277-TEMP\277916WP

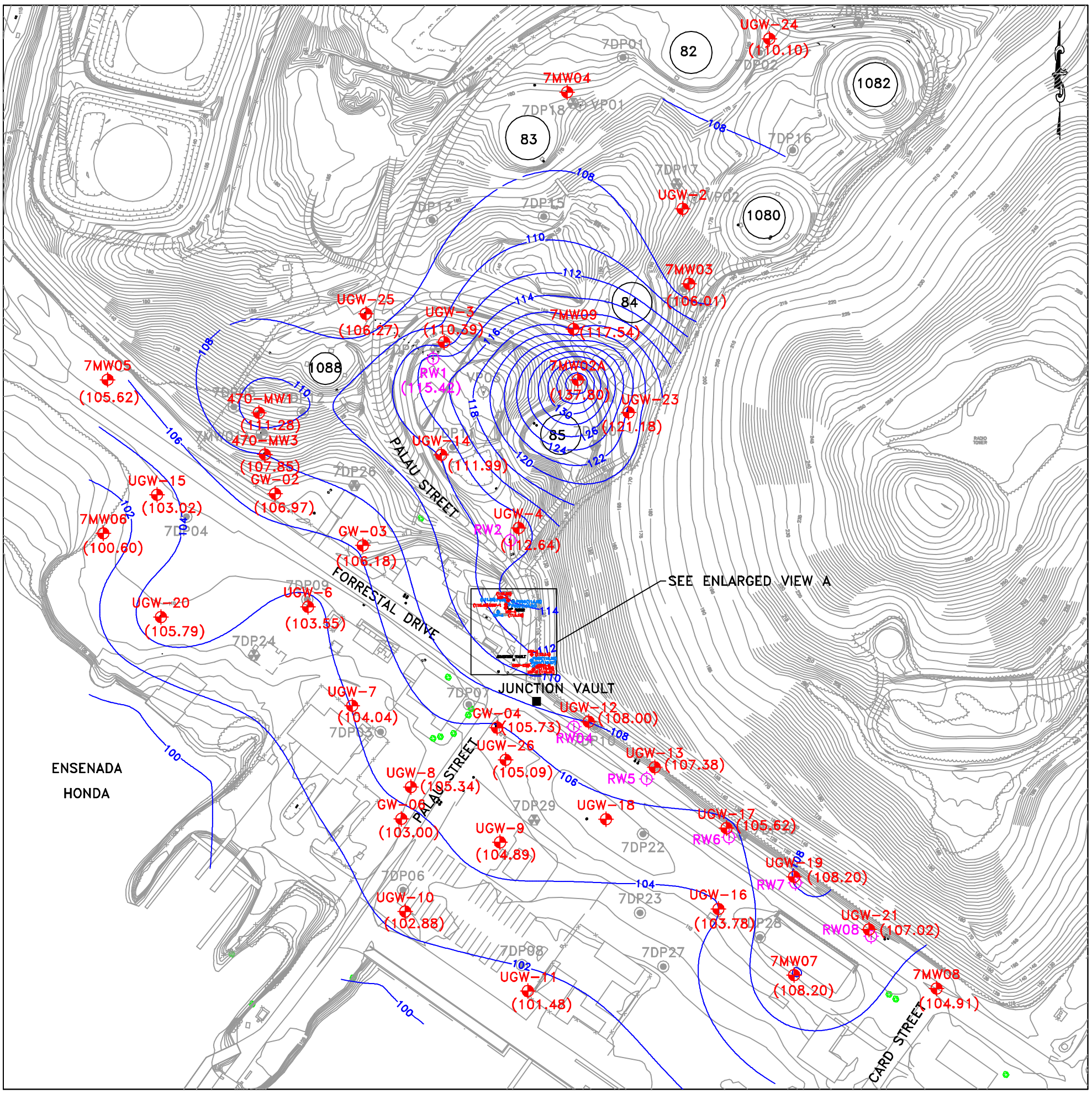
LEGEND

- MONITORING WELL LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-1
SITE PLAN
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



VIEW A

CAD\277-TEMP\277550CM

NOTE:
DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

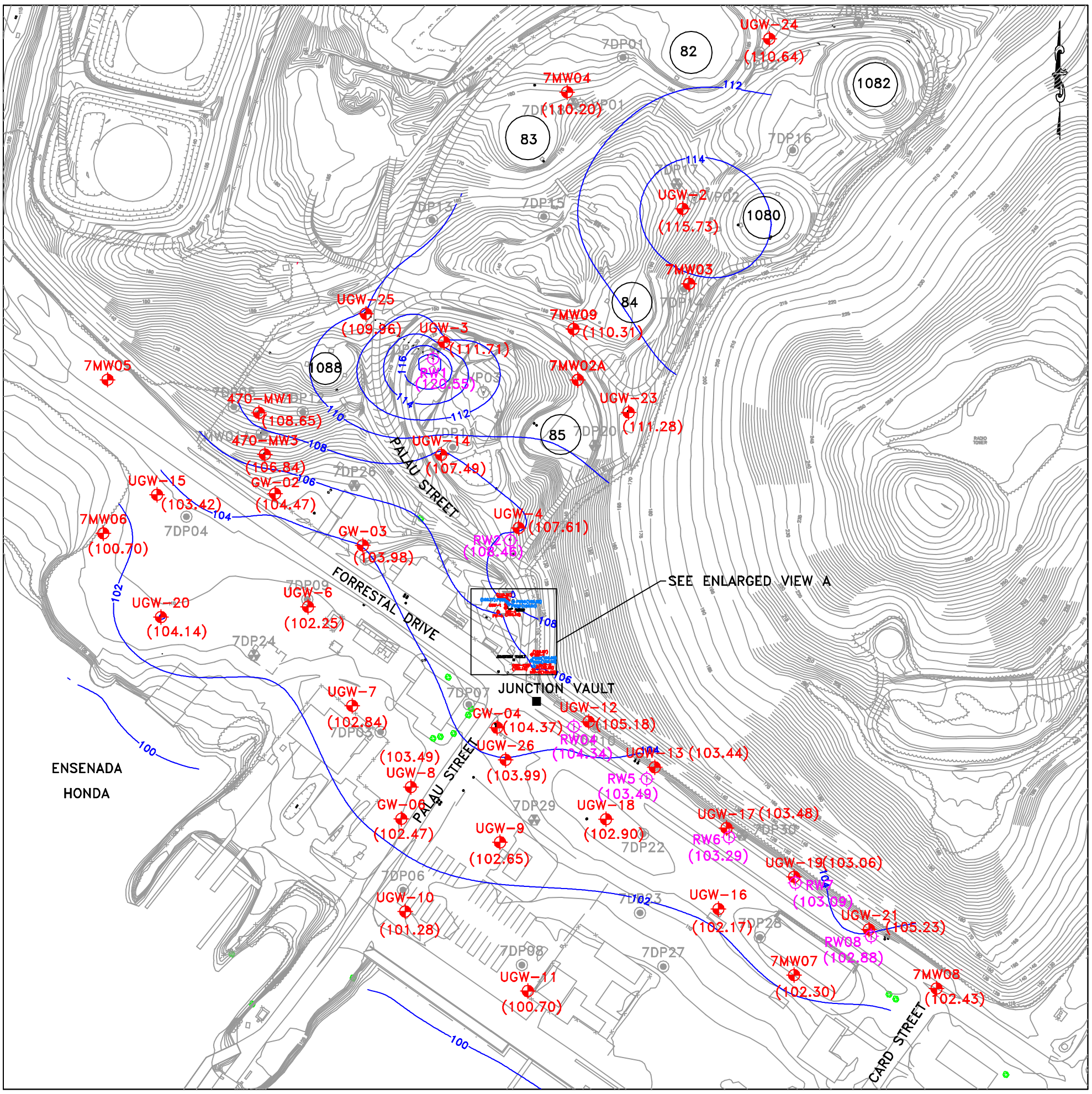
LEGEND

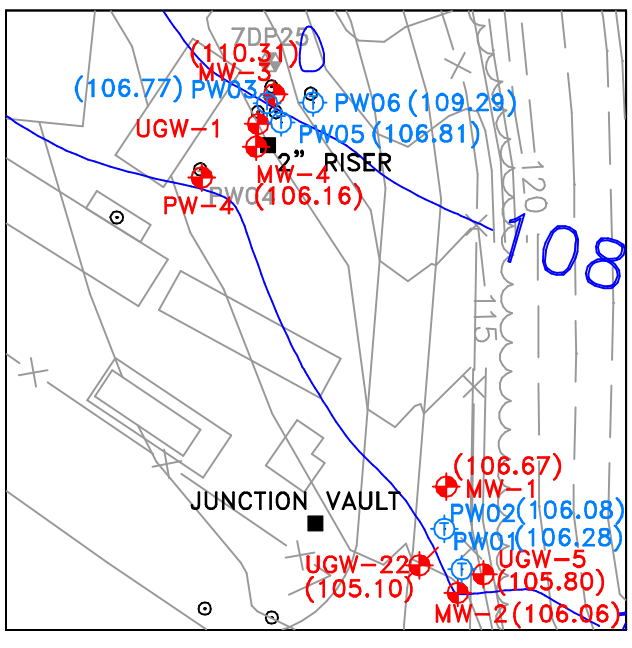
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (101.29) – CORRECTED GROUNDWATER ELEVATION (FT.)
- 101 – ELEVATION (FT.)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-2
CORRECTED GROUNDWATER SURFACE CONTOUR MAP (NOVEMBER 1999)
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 ft.

NOTE:
DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

CAD\277-TEMP\277551CM

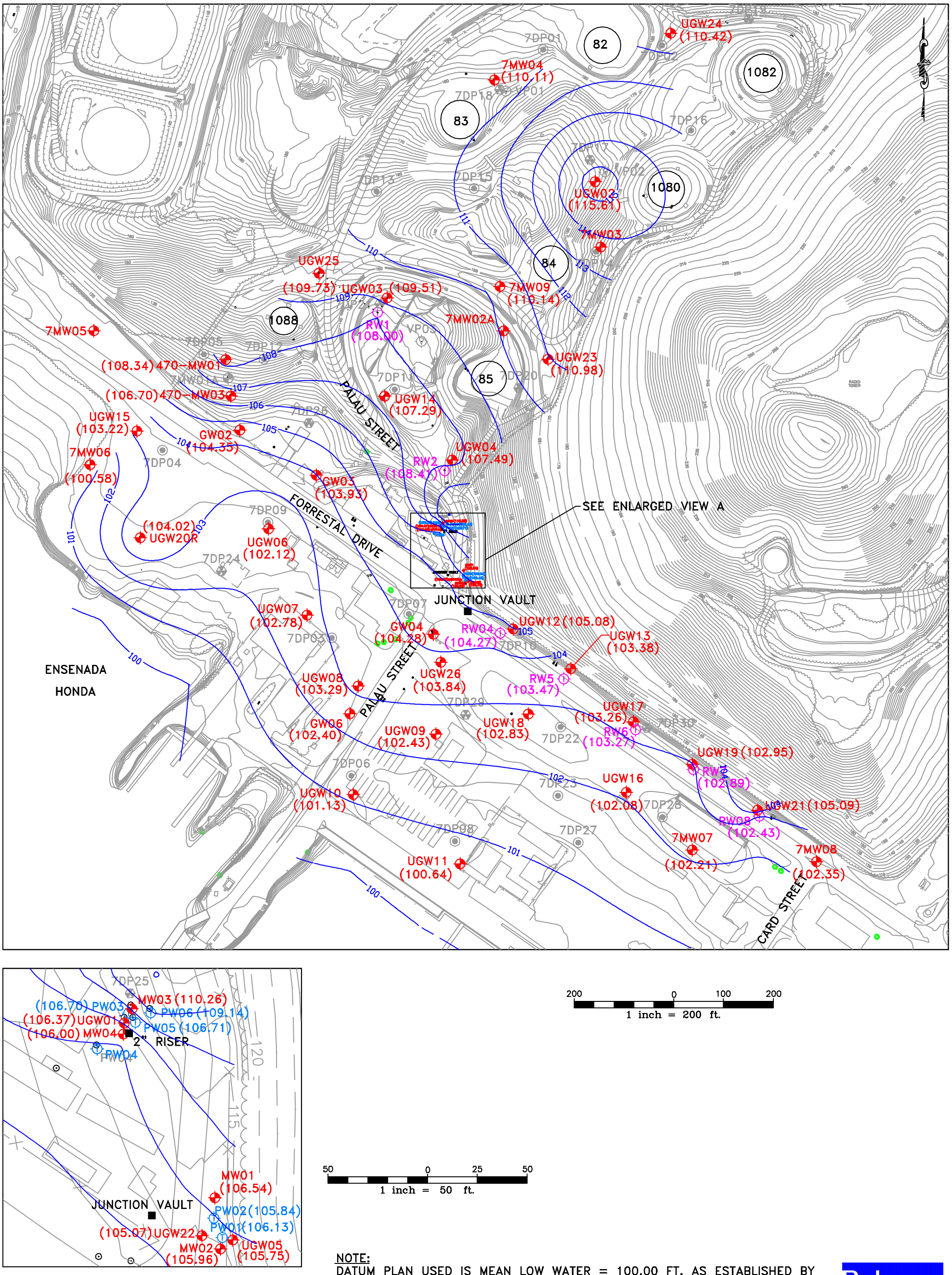
LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (107.01) – CORRECTED GROUNDWATER ELEVATION (FT.)
- 109 – ELEVATION (FT.)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-3
CORRECTED GROUNDWATER SURFACE CONTOUR MAP (DECEMBER, 1999)
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



VIEW A

CAD\277-TEMP\277554CM

NOTE:
DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (111.71) – CORRECTED GROUNDWATER ELEVATION (FT.)
- 108 – ELEVATION (FT.)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-4
CORRECTED GROUNDWATER SURFACE CONTOUR MAP (JANUARY, 2000)
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

SEE ENLARGED VIEW A

JUNCTION VAULT

PALAU STREET

FORRESTAL DRIVE

CARD STREET

ENSENADA HONDA

RADIO TOWER

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 ft.

VIEW A

NOTE:
DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

CAD\277-TEMP\277552CM

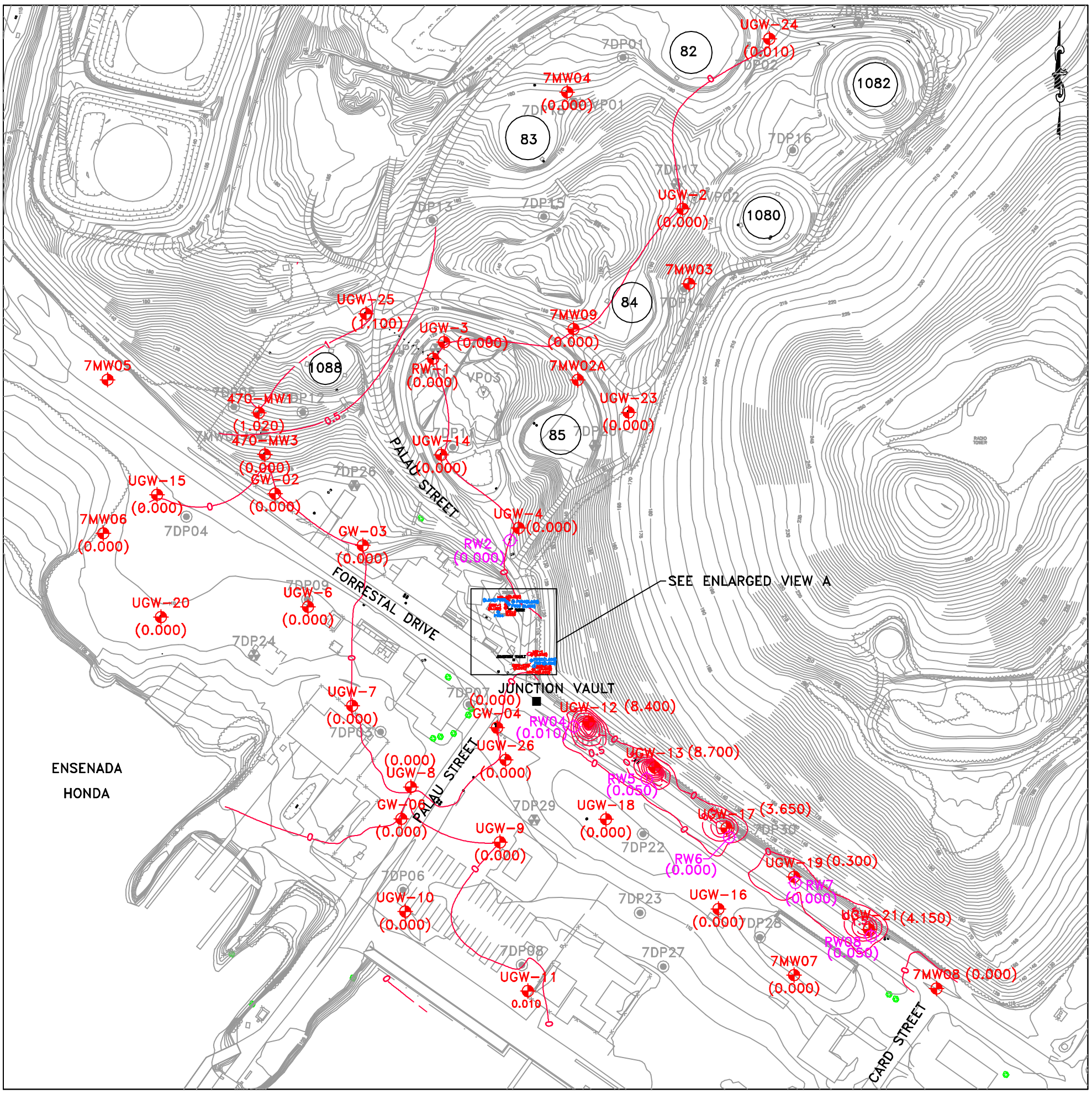
LEGEND

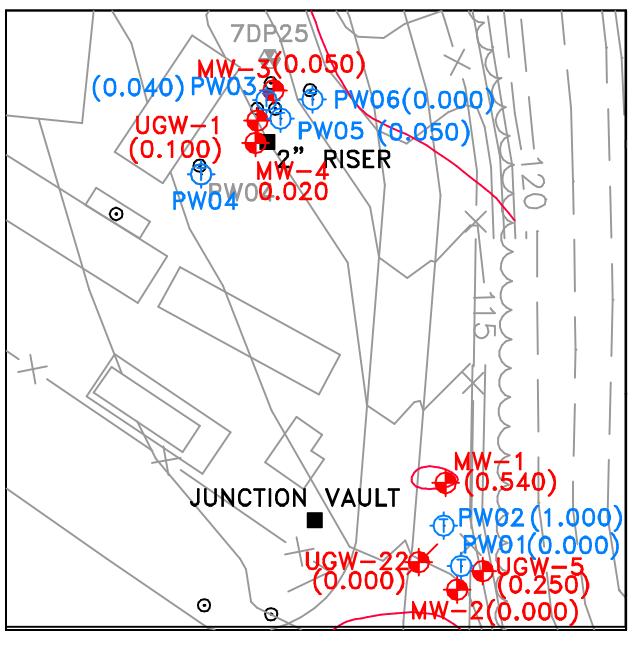
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (0.040) – FREE PRODUCT THICKNESS (FT.)
- —2— – ISOPACH (FT.)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-5
FREE PRODUCT THICKNESS AND EXTENT MAP (NOVEMBER, 1999)
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 ft.

NOTE:
DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

CAD\277-TEMP\277553CM

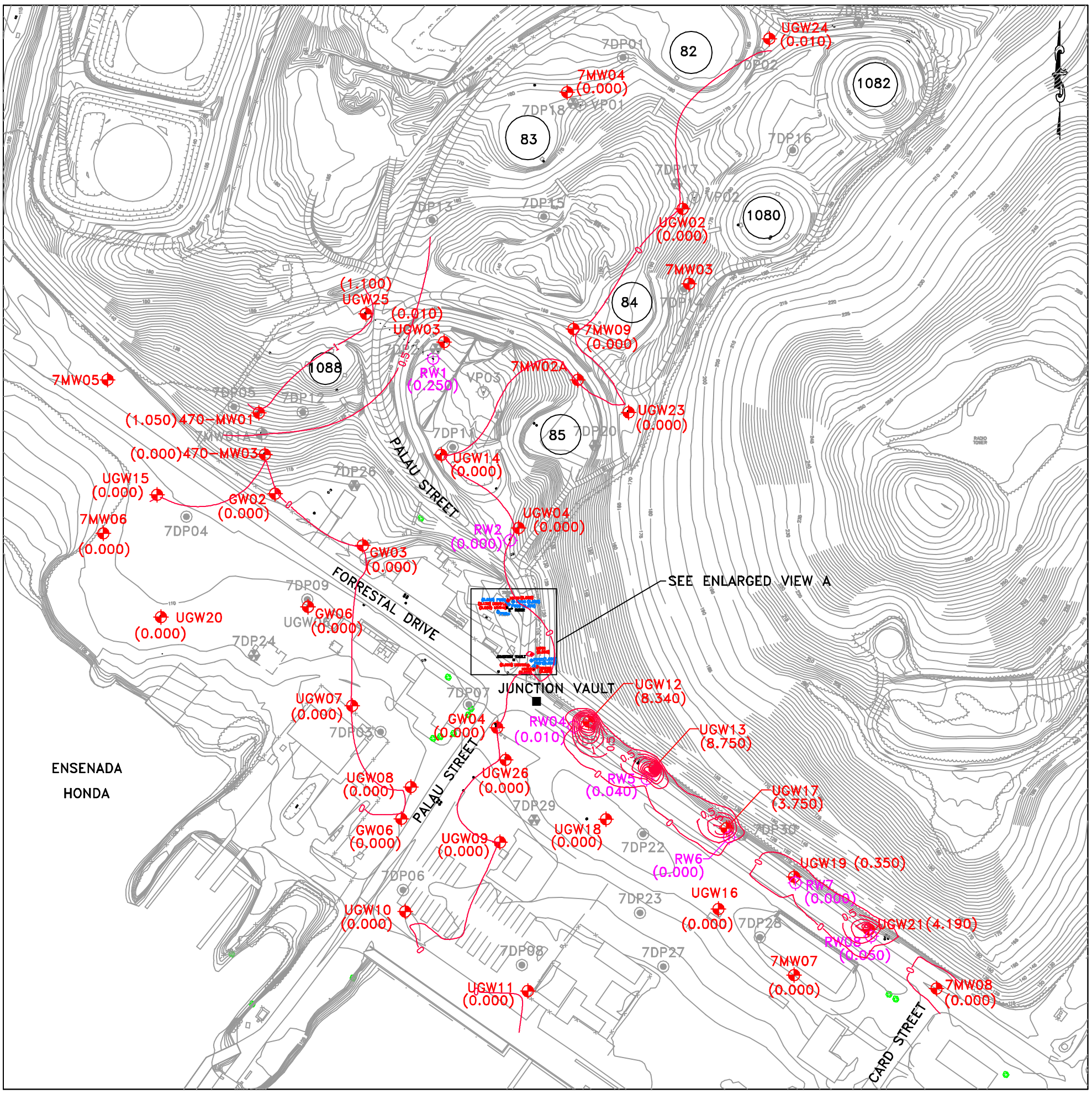
LEGEND

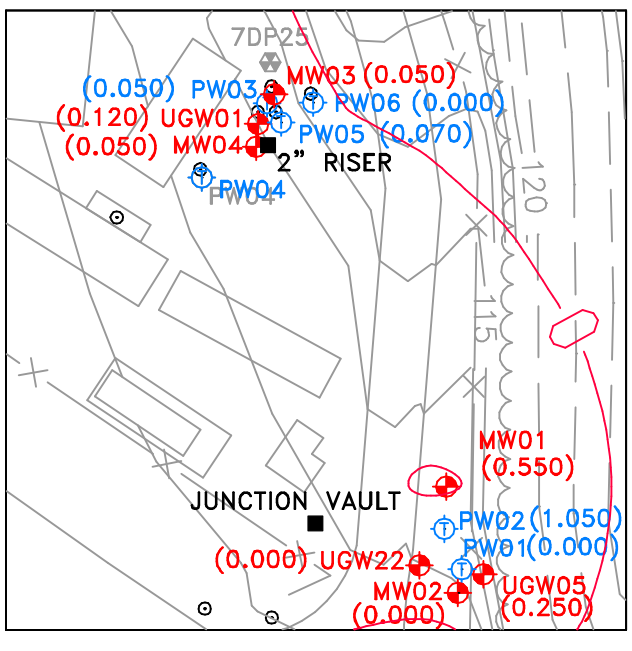
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (2.14) – FREE PRODUCT THICKNESS (FT.)
- 2 – ISOPACH (FT.)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-6
FREE PRODUCT THICKNESS AND EXTENT MAP (DECEMBER, 1999)
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 ft.

NOTE:
DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

CAD\277-TEMP\277555CM

LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (2.14) – FREE PRODUCT THICKNESS (FT.)
- 2 – ISOPACH (FT.)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-7
FREE PRODUCT THICKNESS AND EXTENT MAP (JANUARY, 2000)
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

Figure 5-1 -- Product Thickness vs. Time in UGW-3 & UGW-25 (near RW-1)
Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico

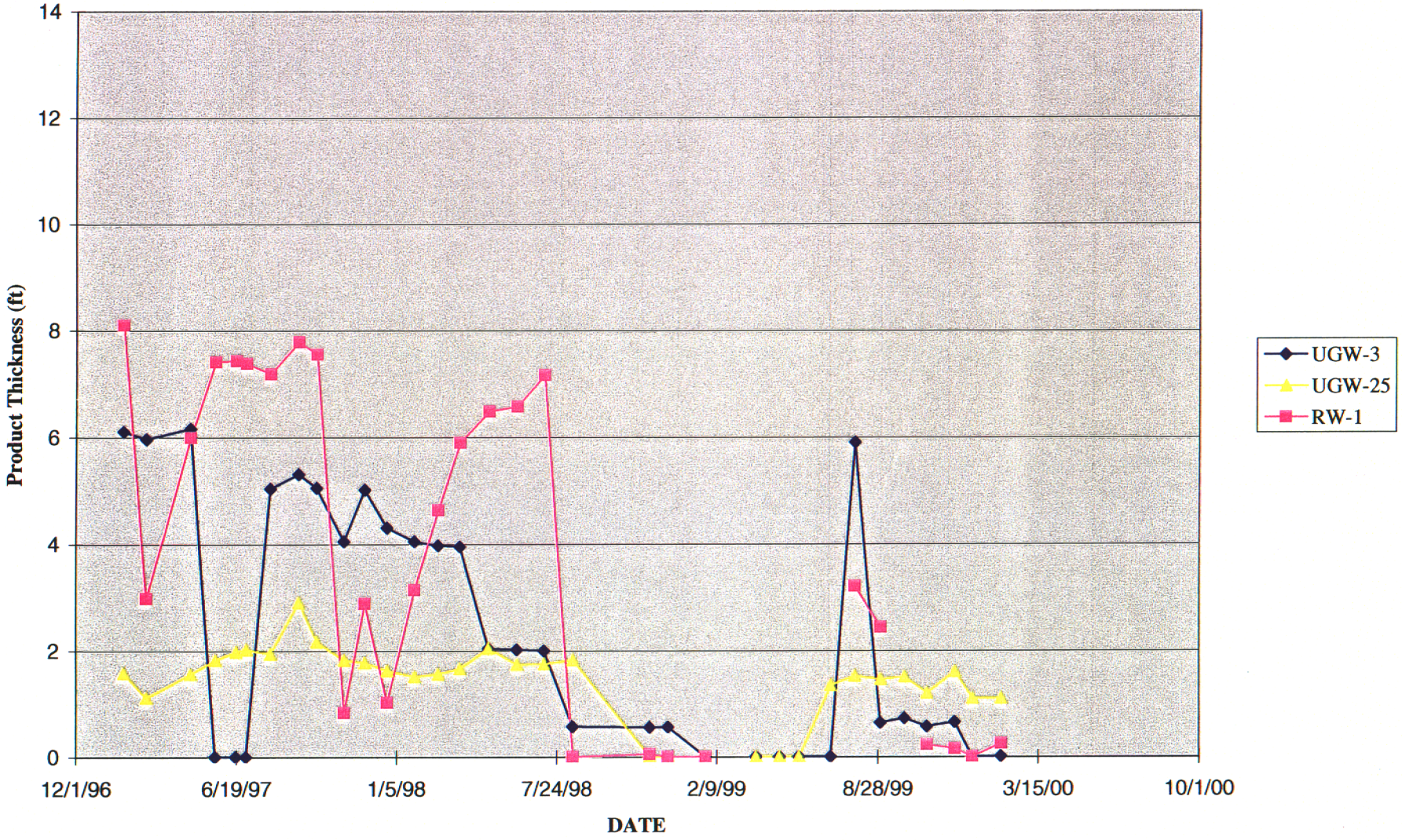


Figure 5-2 -- Product Thickness vs. Time in UGW-4 (near RW-2)
Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico

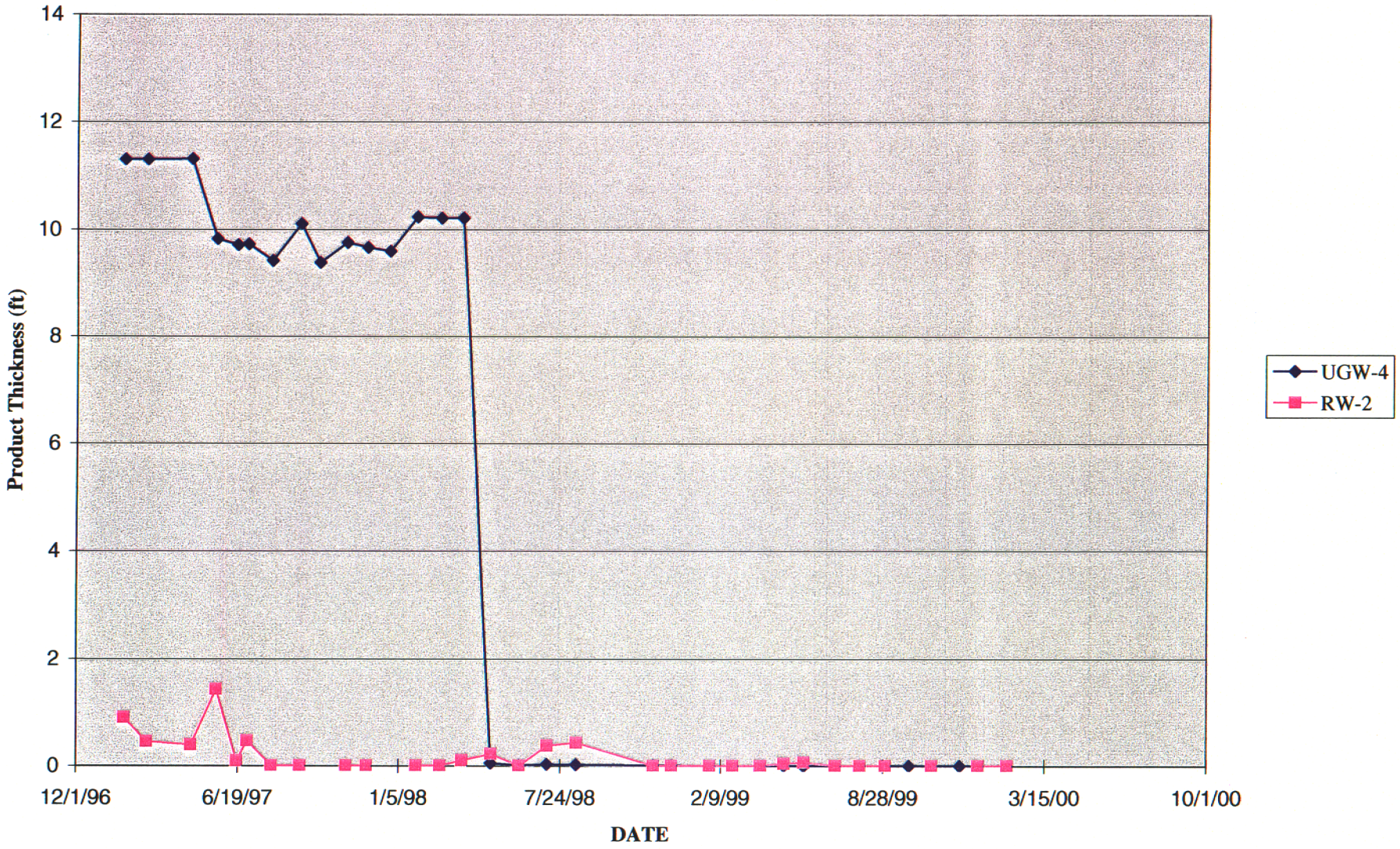


Figure 5-3 -- Product Thickness vs. Time Downgradient of RW-2
Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico

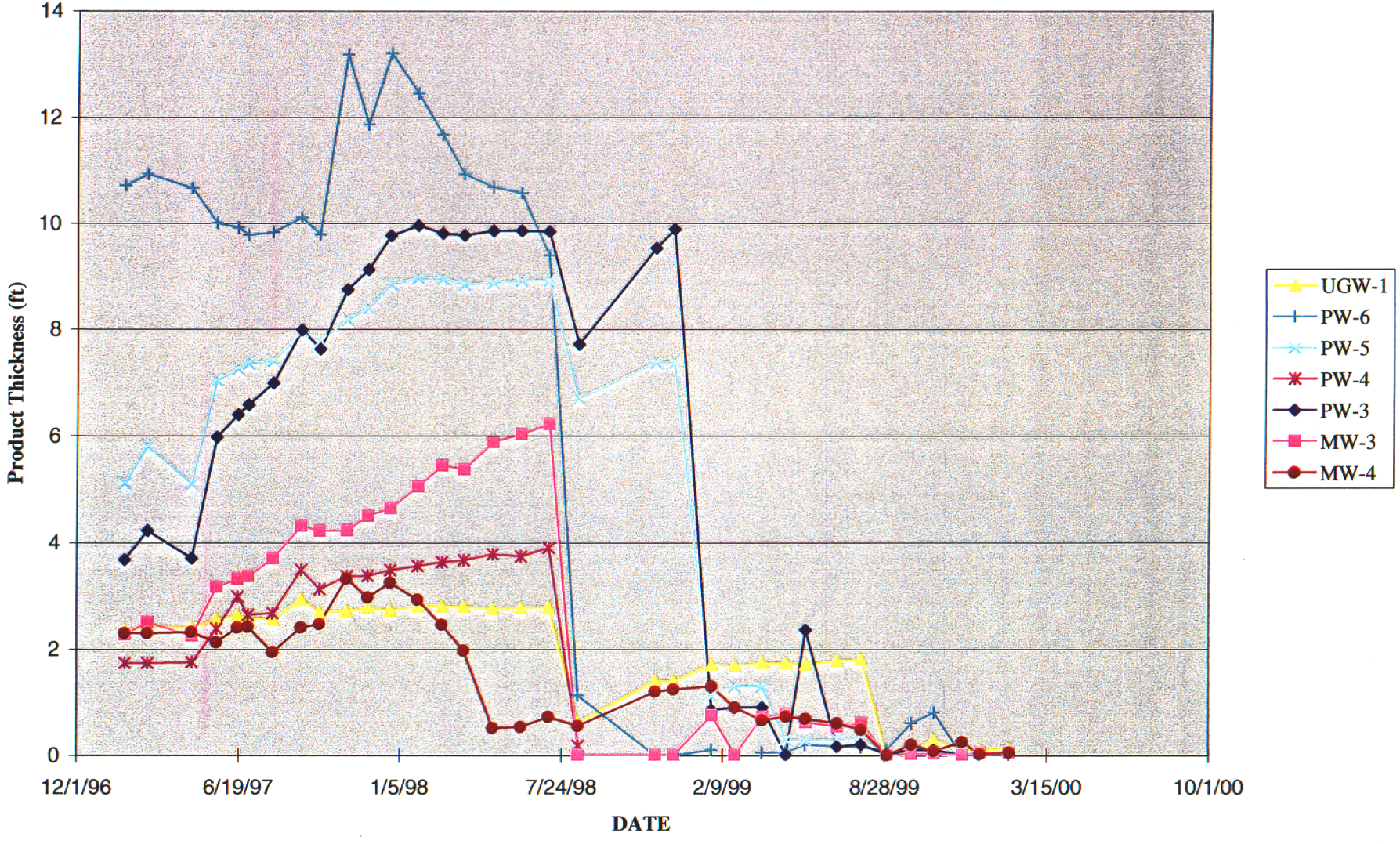


Figure 5-4 -- Product Thickness vs. Time in and around RW-3/UGW-22
Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico

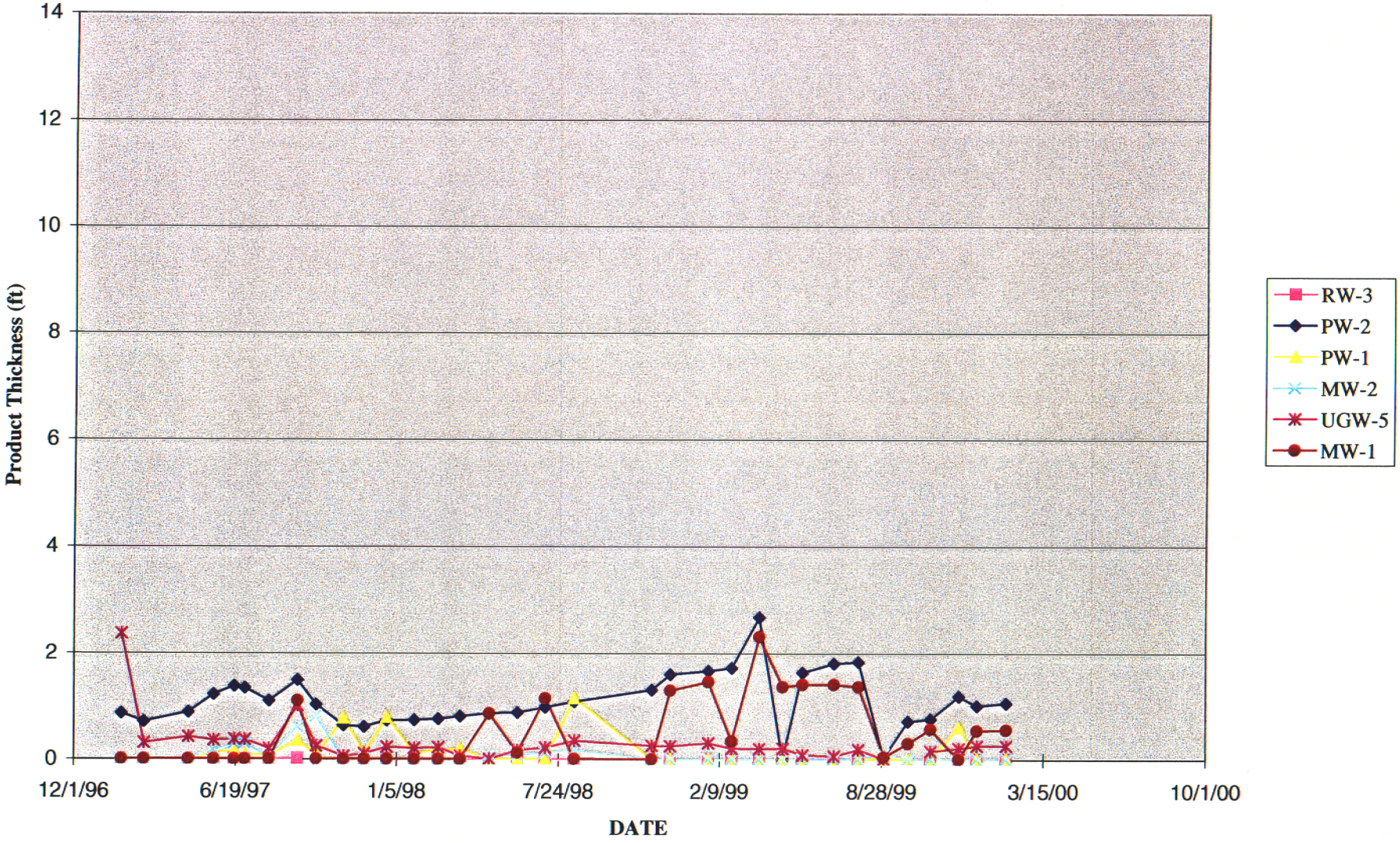


Figure 5-5 -- Product Thickness vs. Time in UGW-12 (near RW-4)
Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico

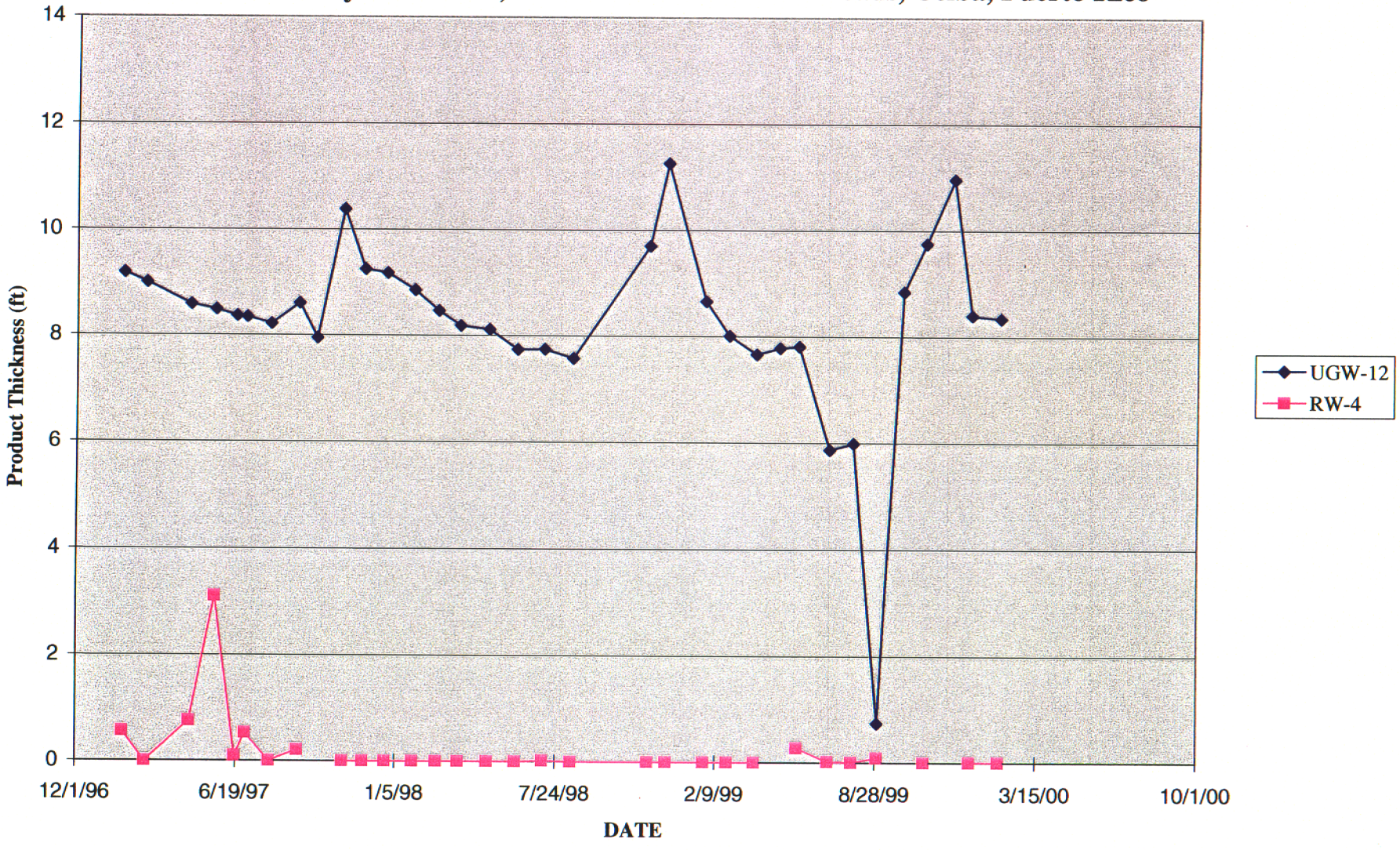


Figure 5-6 -- Product Thickness vs. Time in UGW-13 (near RW-5)
Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico

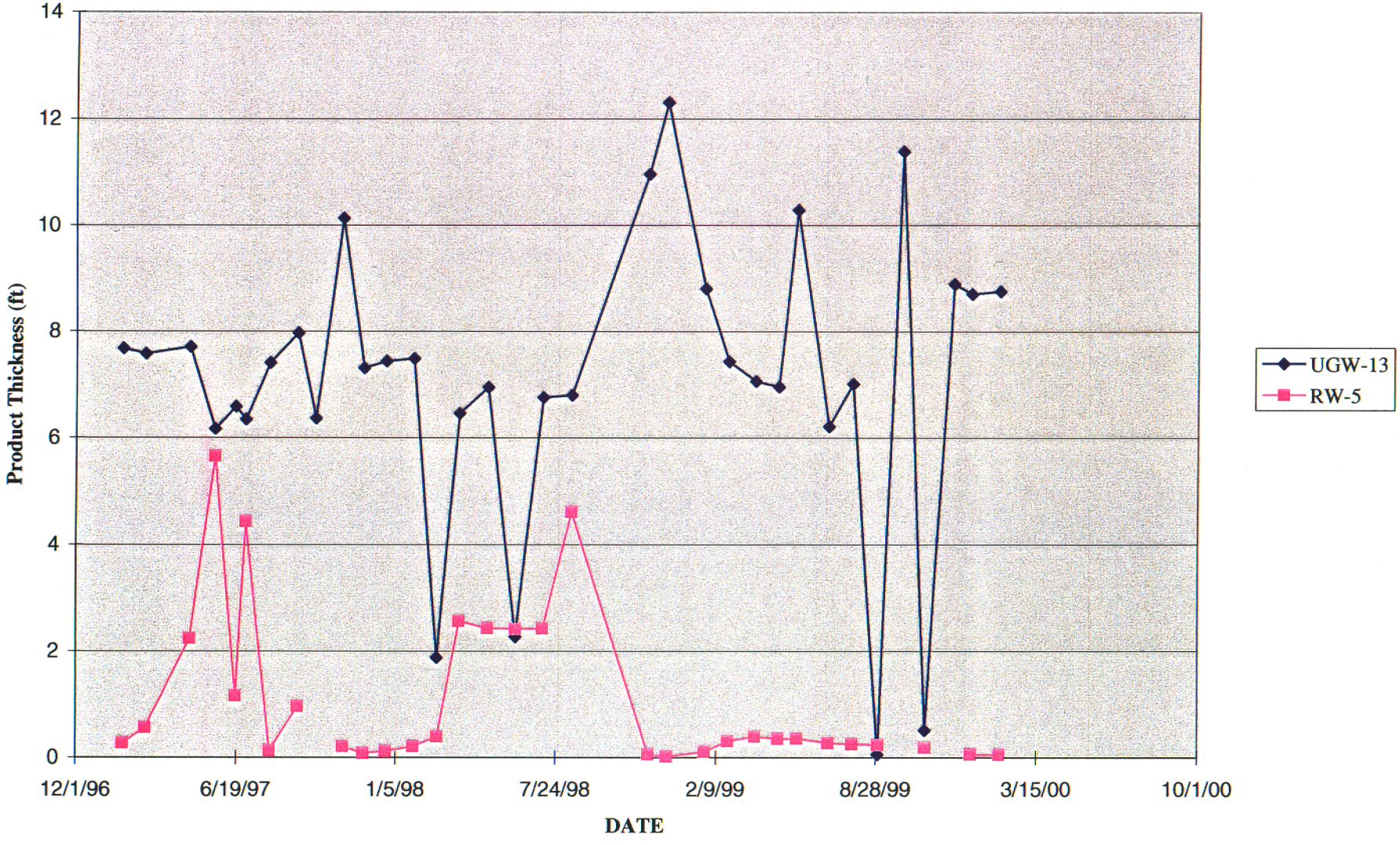


Figure 5-7 -- Product Thickness vs. Time in UGW-17 (near RW-6)
Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico

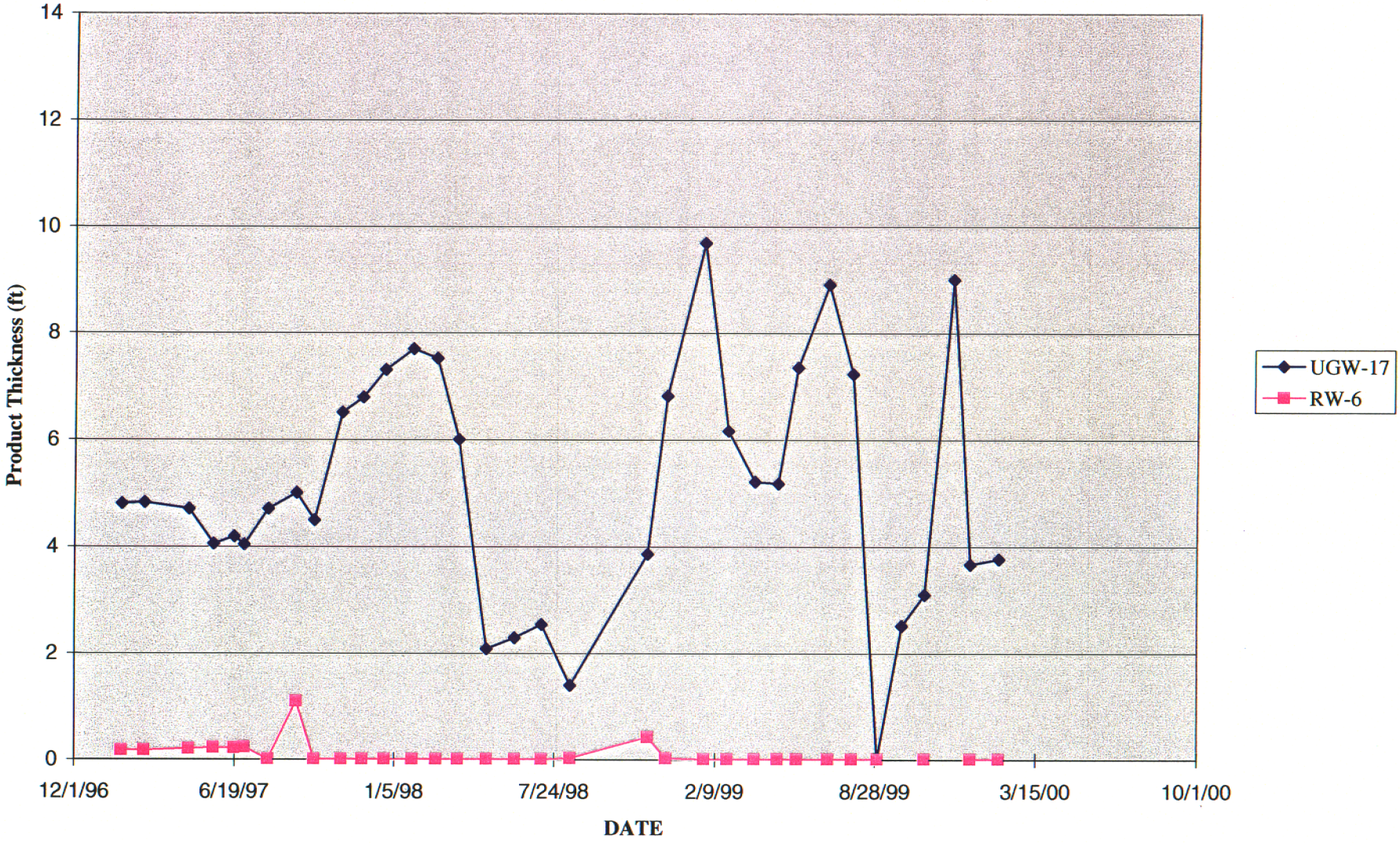


Figure 5-8 -- Product Thickness vs. Time in UGW-19 (near RW-7)
Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico

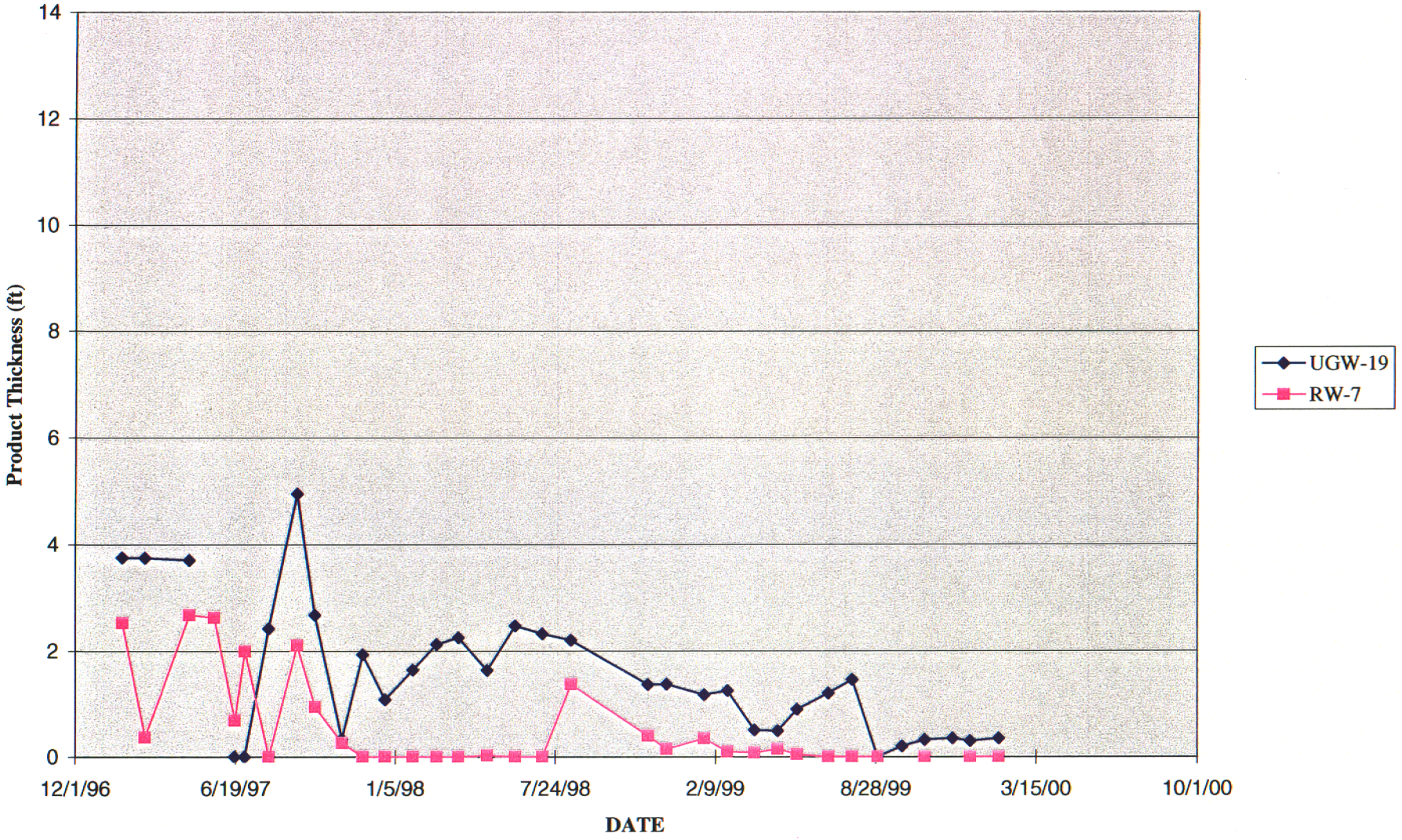
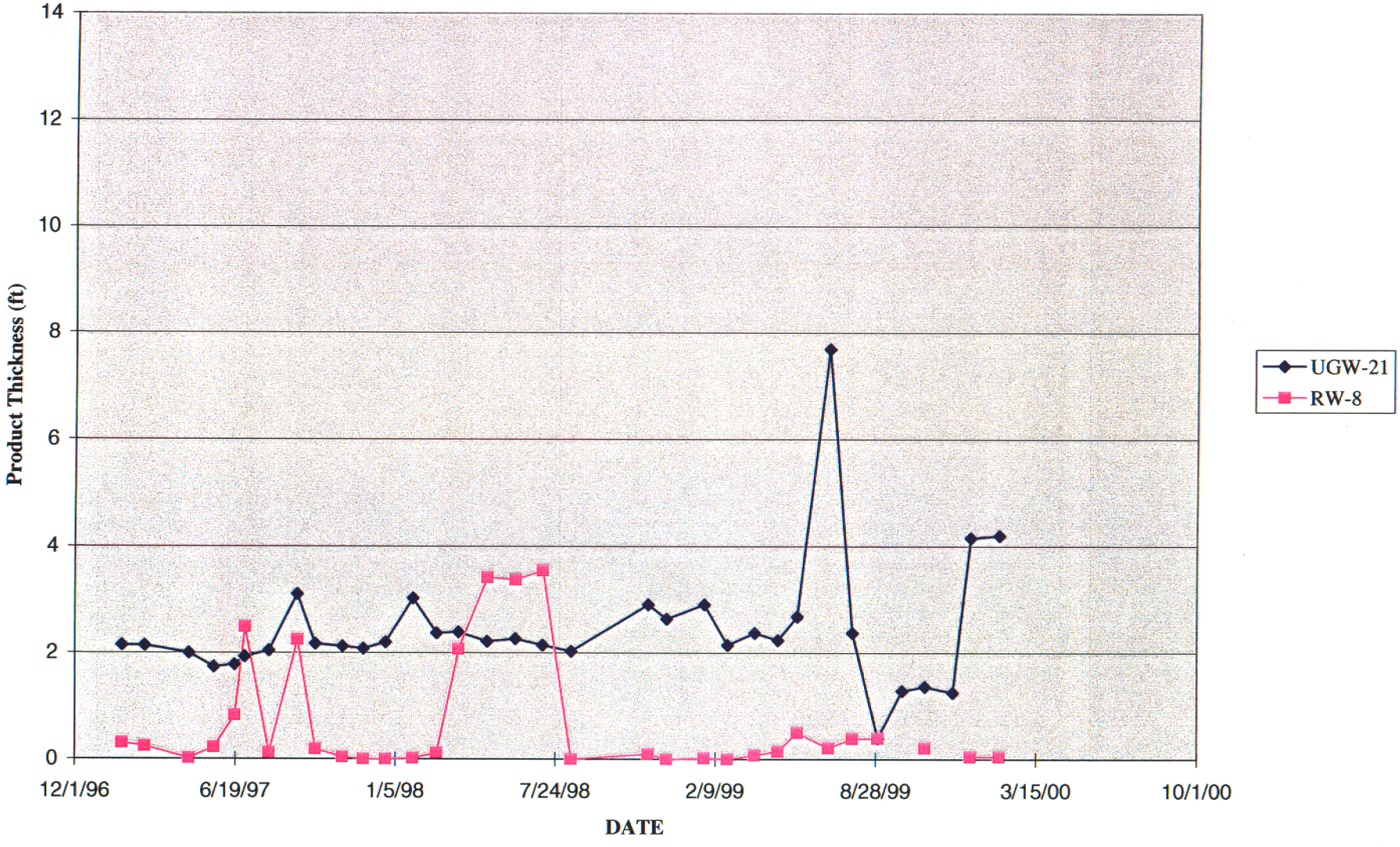


Figure 5-9 -- Product Thickness vs. Time in UGW-21 (near RW-8)
Tow Way Fuel Farm, Naval Station Roosevelt Roads, Ceiba, Puerto Rico



Appendix A

McLaren/Hart Operation and Maintenance Reports

Fourth Quarter 1999 Operation and Maintenance Report

Fourth Quarter 1999 Operation and Maintenance Report
Contract No. N62470-93-D-3033-0009
Free Product Recovery System
Tow Way Fuel Facility
Naval Station Roosevelt Roads
Ceiba, Puerto Rico

McLaren/Hart Project No. 945809

January 28, 2000

Prepared for:

J.A. Jones Environmental Services Company
Park South Drive, Suite 250
Charlotte, North Carolina 28210

Prepared by:

McLaren/Hart
Two North Shore Center
Suite 100
Pittsburgh, PA 15212

Fourth Quarter 1999 Monthly Operation and Maintenance Report
Contract No. N62470-93-D-3033-0009
Free Product Recovery System
Tow Way Fuel Facility
Naval Station Roosevelt Roads
Ceiba, Puerto Rico

INTRODUCTION

This report presents a summary of operations conducted in October, November and December 1999 for the product recovery system installed by McLaren\Hart at the Tow Way Fuel Facility located in Naval Station Roosevelt Roads, Ceiba, Puerto Rico. McLaren\Hart is a team prime contractor with J.A. Jones Environmental Services Company on the LANTDIV Petroleum, Oils and Lubricants Remedial Action Contract (POLRAC). McLaren\Hart is responsible for operation and maintenance of the product recovery system, periodic gauging of monitoring wells in the Tow Way Fuel Facility and monthly reporting. Beginning in April 1998, J. A. Jones Management Services Company personnel have been contracted to provide on-site labor for operation and maintenance services.

OPERATIONS SUMMARY

Operation of the product recovery system and bailing of product from recovery and monitoring wells was suspended on October 31, 1999 so that product and ground water levels in the wells can stabilize prior to the proposed pilot studies.

Date	Activity
October 6, 1999	A technician visited the site for routine maintenance. Product and water measurements were made in the recovery wells and product holding tank. The pump floats in PW-06, RW-1, and RW-4 were cleaned and reset. Three pumps were sent to the manufacturer for evaluation. The system was shut down waiting for product levels to recover and parts to repair air dryer.
October 13, 1999	A technician visited the site for routine maintenance. Product and water measurements were made in the recovery wells and product holding tank. Pumps were installed in RW-1, RW-5 and PW-6. The system remains off due to heavy rains and waiting for part to repair air dryer.

Date	Activity
October 27, 1999	A technician visited the site for routine maintenance. A complete set of product and water measurements were made in the monitoring wells and recovery wells. Product was not bailed from the wells so that the product levels in the wells could recover.
October 31, 1999	The system was shut off so that product levels in the wells can recover prior to the proposed pilot studies.
November 3, 1999	A technician visited the site for routine maintenance. Product and water measurements were made in the recovery wells.
November 10, 1999	A technician visited the site for routine maintenance. Product and water measurements were made in the recovery wells.
December 1, 1999	A technician visited the site for routine maintenance. A complete set of product and water measurements were made in the monitoring wells and recovery wells.
December 7, 1999	A technician visited the site for routine maintenance. Product and water measurements were made in the recovery wells. The McLaren/Hart Project Manager visited the site.
December 19, 1999	Completed product bail down tests on wells containing measurable product to determine "true" product thickness.
December 23, 1999	A technician visited the site for routine maintenance. A complete set of product and water measurements were made in the monitoring wells and recovery wells.

RESULTS AND EVALUATION

No product recovery was measured in the product recovery tank for October 1999. The system was down for most of the month due to heavy rains and a malfunction of the air dryer. A part was ordered and the air dryer was repaired.

A complete set of well gauging was completed on October 27, December 1, and December 23, 1999. The Mantech wells are now being gauged monthly to develop baseline data for the RW-1 Pilot Test Plot Area. Tables 2 and 3 present the results of well gauging and product thickness respectively. A product thickness map is attached.

Approximately 6.43 inches of rainfall was recorded in October, 12.86 inches of rainfall in November and 5.94 in December at the U.S. Naval Station, Roosevelt Roads during the fourth quarter of 1999. As indicated in Table 2, many recovery wells along Forrestal Drive were flooded in December.

The measured product thickness were relatively stable during this quarter. No product was measured in well 7MW-08 indicating that the product plume has not migrated significantly to the east along the utility corridor adjacent to Forrestal Drive. Of greatest concern, is the increase in measured product thickness in well 470MW-01 which increased from 0.30 feet to 1.02 feet thick this quarter. Well 470MW-03 is located down slope from the RW-1 Test Plot Area.

TABLE 1

Fourth Quarter 1999 Monthly Operation and Maintenance Report
Contract No. N62470-93-D-3033-0009
Free Product Recovery System
at the Building 735 and Tank 1995 Site
Naval Station Roosevelt Roads
Ceiba, Puerto Rico

TOTAL PRECIPITATION

Month	Total Rainfall, 1998 (inches)	Total Rainfall 1999 (inches)
January		2.47
February		0.79
March		1.59
April		1.48
May		1.16
June		4.09
July		4.06
August		6.64
September		5.85
October	0.74	6.43
November	5.98	12.86
December	5.24	5.94

Approximately 5.94 inches of rainfall was recorded at the U.S. Naval Station, Roosevelt Roads during the month of December 1999.

TABLE 2
WELL GAUGING DATA

FOURTH QUARTER 1999 OPERATIONS AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft-msl)	6-Oct-99			13-Oct-99			27-Oct-99		
		Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)
RW-1	20.55	13.61	13.63	0.02	12.91	12.92	0.01	12.20	12.43	0.23
RW-2	18.01	1.55	1.55	0.00	1.70	1.70	OVERFLOW	5.95	5.95	0.00
RW-3	10.30	2.20	2.20	0.00	3.00	3.00	OVERFLOW	3.45	3.45	0.00
RW-4	11.09	1.60	1.60	0.00	5.78	5.80	0.02	5.93	5.93	SHEEN
RW-5	10.35	4.95	5.00	0.05	6.25	6.55	0.30	6.40	6.58	0.18
RW-6	9.82	2.10	2.10	0.00	1.95	1.95	0.00	2.65	2.65	0.00
RW-7	8.59	2.90	2.90	0.00	3.90	3.90	0.00	5.07	5.07	0.00
RW-8	9.89	6.30	6.60	0.30	6.90	7.10	0.20	7.32	7.53	0.21
UGW-1	16.57							4.80	5.10	0.30
UGW-2	62.11							52.85	52.85	SHEEN
UGW-3	25.21							19.03	19.60	0.57
UGW-4	20.66							12.90	12.90	0.00
UGW-5	16.55							10.20	10.35	0.15
UGW-6	11.50							8.70	8.70	SHEEN
UGW-7	10.04							6.17	6.17	0.00
UGW-8	10.24							8.50	8.50	0.00
UGW-9	9.45							5.00	5.00	0.00
UGW-10	10.73							8.25	8.25	0.00
UGW-11	9.64							8.70	8.70	0.00
UGW-12	14.22							7.55	17.30	9.75
UGW-13	13.58							8.45	8.95	0.50
UGW-14	19.59							12.18	12.18	0.00
UGW-15	12.52							10.82	10.82	0.00
UGW-16	13.83							11.60	11.60	0.00
UGW-17	12.62							8.77	11.85	3.08
UGW-18	14.55							11.60	11.60	0.00
UGW-19	12.47							9.40	9.72	0.32
UGW-20	12.14							10.30	10.30	0.00
UGW-21	13.41							10.80	12.16	1.36
UGW-22	10.30							3.45	3.45	0.00
UGW-23	69.38							57.65	57.65	0.00
UGW-24	79.00							72.14	72.15	0.01
UGW-25	54.17							46.85	48.05	1.20
UGW-26	10.79							6.25	6.25	0.00
MTMW-1								16.60	19.80	3.20
MTMW-2								14.30	21.45	7.15
MTMW-3								15.60	18.80	3.20
MTMW-4								15.10	20.90	5.80
AW-1								15.50	19.35	3.85
AW-2								14.80	16.20	1.40
PW-1	15.38							7.70	7.70	SHEEN
PW-2	15.69							8.60	9.35	0.75
PW-3	17.33	12.05	12.15	0.10	10.50	10.60	0.10	6.70	6.80	0.10
PW-4	15.65	WELL	DAMAGED		WELL	DAMAGED		WELL	DAMAGED	
PW-5	17.42	11.80	11.95	0.15	10.45	10.52	0.07	10.22	10.30	0.08
PW-6	17.69	13.60	14.10	0.50	9.45	10.20	0.75	7.70	8.50	0.80
MW-1	15.94							8.45	9.02	0.57
MW-2	15.56							8.10	8.10	0.00
MW-3	17.22	8.15	8.25	0.10	7.50	7.55	0.05	10.13	10.16	0.03
MW-4	16.56							9.15	9.23	0.08
470MW-1	33.14							27.65	28.06	0.41
470MW-3	23.15							19.77	19.77	0.00
GW-01										
GW-02	13.57							9.65	9.65	0.00
GW-03	13.18							9.61	9.61	0.00
GW-04	12.83							7.38	7.38	0.00
GW-05	10.70							CLOGGED		
GW-06	10.95							8.45	8.45	SHEEN
7MW-01A	28.41							24.35	24.35	SHEEN
7MW-02A	48.50							37.14	37.14	0.00
7MW-03	79.31							68.54	68.54	SHEEN
7MW-04	82.56							75.98	75.98	0.00
7MW-05	14.13							12.11	12.11	0.00
7MW-06	8.25							7.54	7.54	0.00
7MW-07	15.35							13.14	13.14	0.00
7MW-08	11.33							9.15	9.15	0.00
7MW-09	61.34							50.70	50.70	0.00

TABLE 2
WELL GAUGING DATA

FOURTH QUARTER 1999 OPERATIONS AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft-msl)	3-Nov-99			10-Nov-99			1-Dec-99		
		Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)
RW-1	20.55	11.20	11.38	0.18	10.90	11.15	0.25	5.10	5.25	0.15
RW-2	18.01	6.20	6.20	SHEEN	2.90	2.90	0.00		OVERFLOW	
RW-3	10.30	3.00	3.00	0.00	3.00	3.00	0.00		OVERFLOW	
RW-4	11.09	6.30	6.31	0.01	3.45	3.45	0.00		OVERFLOW	
RW-5	10.35	6.70	6.92	0.22	6.45	6.75	0.30		OVERFLOW	
RW-6	9.82	2.80	2.80	0.00	2.60	2.60	0.00		OVERFLOW	
RW-7	8.59	5.38	5.38	0.00	3.90	3.90	0.00		OVERFLOW	
RW-8	9.89	7.50	7.73	0.23	7.35	7.60	0.25		OVERFLOW	
UGW-1	16.57							6.10	6.20	0.10
UGW-2	62.11							NOT	GAUGED	
UGW-3	25.21				17.90	18.55	0.65	14.70	15.35	0.65
UGW-4	20.66							8.02	8.02	0.00
UGW-5	16.55							6.45	6.65	0.20
UGW-6	11.50							7.95	7.95	SHEEN
UGW-7	10.04							6.00	6.00	0.00
UGW-8	10.24							4.90	4.90	0.00
UGW-9	9.45							4.56	4.56	SHEEN
UGW-10	10.73							7.85	7.85	0.00
UGW-11	9.64							8.16	8.16	0.00
UGW-12	14.22							4.15	15.10	10.95
UGW-13	13.58							4.52	13.40	8.88
UGW-14	19.59							7.60	7.60	0.00
UGW-15	12.52							9.50	9.50	SHEEN
UGW-16	13.83							10.05	10.05	0.00
UGW-17	12.62							5.30	14.30	9.00
UGW-18	14.55							WELL	DAMAGED	
UGW-19	12.47							4.20	4.55	0.35
UGW-20	12.14							6.35	6.35	SHEEN
UGW-21	13.41							6.15	7.40	1.25
UGW-22	10.30								OVERFLOW	
UGW-23	69.38							48.20	48.20	0.00
UGW-24	79.00							68.90	68.90	0.00
UGW-25	54.17							47.60	49.20	1.60
UGW-26	10.79							5.70	5.70	0.00
MTMW-1					15.40	18.60	3.20			
MTMW-2					12.75	20.85	8.10			
MTMW-3					17.10	17.55	0.45			
MTMW-4					12.30	20.35	8.05			
AW-1					14.35	18.20	3.85			
AW-2					12.40	14.30	1.90			
PW-1	15.38							5.20	5.80	0.60
PW-2	15.69							5.22	6.40	1.18
PW-3	17.33	10.04	10.04	0.00	10.13	10.13	0.00	6.10	6.10	0.00
PW-4	15.65	WELL	DAMAGED		WELL	DAMAGED		WELL	DAMAGED	
PW-5	17.42	10.20	10.31	0.11	10.13	10.25	0.12	7.10	7.15	0.05
PW-6	17.69	7.90	8.70	0.80	8.00	8.80	0.80	3.50	3.50	SHEEN
MW-1	15.94							3.80	3.80	0.00
MW-2	15.56							4.95	4.95	0.00
MW-3	17.22	6.60	6.60	0.00	6.78	6.78	0.00	1.30	1.30	0.00
MW-4	16.56							3.35	3.60	0.25
470MW-1	33.14							21.80	22.10	0.30
470MW-3	23.15							15.30	15.30	0.00
GW-01								NOT	GAUGED	
GW-02	13.57							6.60	6.60	0.00
GW-03	13.18							7.00	7.00	0.00
GW-04	12.83							7.10	7.10	0.00
GW-05	10.70							NOT	GAUGED	
GW-06	10.95							7.95	7.95	SHEEN
7MW-01A	28.41							20.40	20.40	0.00
7MW-02A	48.50							10.70	10.70	SHEEN
7MW-03	79.31							73.30	73.30	0.00
7MW-04	82.56							NOT	GAUGED	
7MW-05	14.13							8.51	8.51	0.00
7MW-06	8.25							7.65	7.65	0.00
7MW-07	15.35							7.15	7.15	0.00
7MW-08	11.33							6.42	6.42	0.00
7MW-09	61.34							43.80	43.80	0.00

TABLE 2
WELL GAUGING DATA

FOURTH QUARTER 1999 OPERATIONS AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft-msl)	7-Dec-99			23-Dec-99		
		Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)
RW-1	20.55	4.82	4.95	0.13	0.00	0.00	0.00
RW-2	18.01	WELL	OVERFLOW		9.55	9.55	0.00
RW-3	10.30	WELL	OVERFLOW		5.20	5.20	0.00
RW-4	11.09	WELL	OVERFLOW		6.75	6.76	0.01
RW-5	10.35	WELL	OVERFLOW		6.85	6.90	0.05
RW-6	9.82	WELL	OVERFLOW		6.53	6.53	0.00
RW-7	8.59	WELL	OVERFLOW		5.50	5.50	0.00
RW-8	9.89	WELL	OVERFLOW		7.00	7.05	0.05
UGW-1	16.57				10.00	10.10	0.10
UGW-2	62.11				46.38	46.38	0.00
UGW-3	25.21	17.90	18.55	0.65	13.50	13.50	0.00
UGW-4	20.66				13.05	13.05	0.00
UGW-5	16.55				10.70	10.95	0.25
UGW-6	11.50				9.25	9.25	0.00
UGW-7	10.04				7.20	7.20	0.00
UGW-8	10.24				6.75	6.75	0.00
UGW-9	9.45				6.80	6.80	0.00
UGW-10	10.73				9.45	9.45	0.00
UGW-11	9.64				8.94	8.95	0.01
UGW-12	14.22				7.45	15.85	8.40
UGW-13	13.58				8.50	17.20	8.70
UGW-14	19.59				12.10	12.10	0.00
UGW-15	12.52				9.10	9.10	0.00
UGW-16	13.83				11.66	11.66	0.00
UGW-17	12.62				8.45	12.10	3.65
UGW-18	14.55				11.65	11.65	0.00
UGW-19	12.47				9.35	9.65	0.30
UGW-20	12.14				8.00	8.00	0.00
UGW-21	13.41				7.40	11.55	4.15
UGW-22	10.30				5.20	5.20	0.00
UGW-23	69.38				58.10	58.10	0.00
UGW-24	79.00				68.36	68.37	0.01
UGW-25	54.17				44.00	45.10	1.10
UGW-26	10.79				6.80	6.80	0.00
MTMW-1		15.40	18.60	3.20	13.20	13.25	0.05
MTMW-2		12.75	20.85	8.10	13.75	16.60	2.85
MTMW-3		17.10	17.55	0.45	12.20	12.25	0.05
MTMW-4		12.30	20.35	8.05	13.00	17.15	4.15
AW-1		14.35	18.20	3.85	12.80	12.85	0.05
AW-2		12.40	14.30	1.90	13.10	13.65	0.55
PW-1	15.38				9.10	9.10	0.00
PW-2	15.69				9.42	10.42	1.00
PW-3	17.33	10.13	10.13	0.00	10.55	10.59	0.04
PW-4	15.65	WELL	DAMAGED		WELL	DAMAGED	
PW-5	17.42	10.13	10.25	0.12	10.60	10.65	0.05
PW-6	17.69	8.00	8.80	0.80	8.40	8.40	0.00
MW-1	15.94				9.17	9.71	0.54
MW-2	15.56				9.50	9.50	0.00
MW-3	17.22	6.78	6.78	0.00	6.90	6.95	0.05
MW-4	16.56				10.40	10.42	0.02
470MW-1	33.14				24.30	25.32	1.02
470MW-3	23.15				16.31	16.31	0.00
GW-01							
GW-02	13.57				9.10	9.10	0.00
GW-03	13.18				9.20	9.20	0.00
GW-04	12.83				8.46	8.46	0.00
GW-05	10.70						
GW-06	10.95				8.48	8.48	0.00
7MW-01A	28.41				23.63	23.63	0.00
7MW-02A	48.50						
7MW-03	79.31						
7MW-04	82.56				72.36	72.36	0.00
7MW-05	14.13						
7MW-06	8.25				7.55	7.55	0.00
7MW-07	15.35				13.05	13.05	0.00
7MW-08	11.33				8.90	8.90	0.00
7MW-09	61.34				51.03	51.03	0.00

TABLE 3, page 1 of 3
PRODUCT THICKNESS DATA

FOURTH QUARTER 1999 OPERATIONS AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY SYSTEM
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft)	Apparent Product Thickness (ft)											
		28-Jan-97	25-Feb-97	21-Apr-97	22-May-97	17-Jun-97	30-Jun-97	30-Jul-97	3-Sep-97	26-Sep-97	30-Oct-97	25-Nov-97	23-Dec-97
RW-1	20.55	8.10			7.41	7.43	7.38	7.18	7.78	7.55	0.83	2.88	1.02
RW-2	18.01	0.90			1.43	0.09	0.47	0.00	0.00		0.00	0.00	0.00
RW-4	11.09	0.57			3.10	0.10	0.53	0.01	0.21		0.00	0.00	0.00
RW-5	10.35	0.26			5.64	1.15	4.42	0.12	0.95		0.20	0.07	0.11
RW-6	9.82	0.17			0.22	0.21	0.23	0.00	1.09	0.00	0.00	0.00	0.00
RW-7	8.59	2.52			2.62	0.69	1.99	0.00	2.10	0.94	0.26	0.00	0.00
RW-8	9.89	0.31			0.23	0.83	2.49	0.13	2.25	0.19	0.04	0.00	0.00
UGW-1	16.57	2.36	2.40	2.40	2.56	2.62	2.59	2.55	2.93	2.69	2.71	2.77	2.72
UGW-2	62.11	0.00	0.00	0.00	0.18	0.27	0.31	0.27	0.62	0.35	0.12	0.00	0.01
UGW-3	25.21	6.10	5.96	6.16	0.00	0.00	0.00	5.03	5.30	5.05	4.05	5.01	4.30
UGW-4	20.66	11.31	11.31	11.32	9.82	9.71	9.72	9.41	10.10	9.38	9.75	9.66	9.59
UGW-5	16.55	2.35	0.30	0.41	0.35	0.37	0.36	0.19	1.00	0.24	0.05	0.10	0.22
UGW-6	11.50		0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-7	10.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-8	10.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-9	9.45	0.00							0.00	0.00	0.00	0.00	0.00
UGW-10	10.73	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-11	9.64	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-12	14.22	9.19	9.00	8.59	8.49	8.37	8.35	8.22	8.61	7.95	10.38	9.25	9.18
UGW-13	13.58	7.67	7.57	7.70	6.16	6.58	6.34	7.40	7.96	6.36	10.12	7.30	7.43
UGW-14	19.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-15	12.52	0.00	0.00	0.00	2.92	2.41	2.54	0.00	0.00	0.00	0.00	0.00	0.00
UGW-16	13.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-17	12.62	4.80	4.82	4.70	4.05	4.18	4.03	4.70	5.00	4.49	6.51	6.79	7.31
UGW-18	14.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-19	12.47	3.75	3.74	3.70		0.00	0.00	2.42	4.95	2.67	0.33	1.93	1.08
UGW-20	12.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-21	13.41	2.15	2.14	2.00	1.74	1.78	1.93	2.04	3.10	2.17	2.12	2.08	2.20
UGW-22	10.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01		0.00	0.00	0.00
UGW-23	69.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-24	79.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-25	54.17	1.58	1.11	1.56	1.82	1.98	2.02	1.94	2.90	2.17	1.82	1.77	1.62
UGW-26	10.79	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTMW-1													
MTMW-2													
MTMW-3													
MTMW-4													
AW-1													
AW-2													
PW-1	15.38	0.00			0.12	0.14	0.07	0.07	0.35	0.07	0.77	0.11	0.79
PW-2	15.69	0.86			1.21	1.37	1.33	1.09	1.48	1.02	0.63	0.60	0.72
PW-3	17.33	3.67			5.96	6.39	6.57	6.98	7.98	7.62	8.75	9.12	9.76
PW-4	15.65	1.74			2.38	2.98	2.64	2.67	3.48	3.12	3.36	3.37	3.47
PW-5	17.42	5.10			7.03	7.25	7.35	7.40	7.95	7.78	8.17	8.40	8.85
PW-6	17.69	10.72			10.01	9.92	9.78	9.83	10.11	9.79	13.18	11.86	13.20
MW-1	15.94	0.00			0.00	0.00	0.00	0.00	1.10	0.00	0.00	0.00	0.00
MW-2	15.56	0.00			0.17	0.29	0.30	0.03	0.60	0.81	0.00	0.00	0.00
MW-3	17.22	2.27			3.16	3.31	3.36	3.69	4.30	4.21	4.22	4.49	4.63
MW-4	16.56	2.30			2.13	2.40	2.42	1.94	2.40	2.47	3.32	2.96	3.24
470-MW-1	33.14						0.30	0.20	1.10	0.29	0.08	0.29	
470-MW-3	23.15							0.00	0.00	0.00	0.00	0.00	
GW-01									0.00	0.00	0.00	0.00	
GW-02	13.57						0.00	0.00	0.00	0.00	0.00	0.00	
GW-03	13.18						0.00	0.00	0.00	0.00	0.00	0.00	
GW-04	12.83						0.30	0.06	0.55	0.29	0.30	0.18	
GW-05	10.70									0.00	0.00		
GW-06	10.95						0.00	0.00	0.00	0.00	0.00	0.00	
7MW-01A	28.41												
7MW-02A	48.50												
7MW-03	79.31												
7MW-04	82.56												
7MW-05	14.13												
7MW-06	8.25												
7MW-07	15.35												
7MW-08	11.33												
7MW-09	61.34												

TABLE 3, page 2 of 3

PRODUCT THICKNESS DATA

FOURTH QUARTER 1999 OPERATIONS AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY SYSTEM
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft)	Apparent Product Thickness (ft)									
		26-Jan-98	25-Feb-98	24-Mar-98	29-May-98	3-Jun-98	7-Jul-98	8-Aug-98	8-Sep-98	16-Nov-98	9-Dec-98
RW-1	20.55	3.13	4.63	5.89	6.48	6.57	7.16		0.20	0.05	SHEEN
RW-2	18.01	0.00	0.00	0.10	0.22	0.00	0.37	0.43	0.20	0.00	SHEEN
RW-3	10.30								0.00	0.00	SHEEN
RW-4	11.09	0.00	0.00	0.00	0.00	0.00	0.02	8.62	7.40	0.00	SHEEN
RW-5	10.35	0.20	0.38	2.55	2.42	2.40	2.41	4.60	3.65	0.05	0.01
RW-6	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.02	5.20	0.42	0.02
RW-7	8.59	0.02	0.00	0.00	0.03	0.00	0.00	1.37	0.77	0.40	0.15
RW-8	9.89	0.00	0.12	1.98	3.41	3.37	3.54		0.20	0.10	SHEEN
UGW-1	16.57	2.80	2.80	2.79	2.75	2.77	2.78	0.61	0.65	2.40	1.48
UGW-2	62.11	0.00	0.00	0.04	0.16	0.42	0.52	0.62	0.65	0.00	0.00
UGW-3	25.21	4.05	3.97	3.95	2.04	2.02	2.00	0.57	0.43	0.55	0.56
UGW-4	20.66	10.23	10.21	10.21	0.05	0.01	0.03	0.02	0.01	0.01	0.01
UGW-5	16.55	0.20	0.21	0.06	0.00	0.16	0.21	0.34	0.07	0.25	0.24
UGW-6	11.50	0.00	0.00	0.00	0.00	0.00	0.00	10.10	0.00	0.00	0.00
UGW-7	10.04	0.00	0.00	0.00	0.00	0.00	0.00	0.03	sheen	0.00	0.00
UGW-8	10.24	0.00	0.00	0.00	0.00	0.00	0.00	0.01	sheen	0.00	0.00
UGW-9	9.45	0.00	0.00	0.00	0.00	0.00	0.00	0.02	sheen	0.00	0.00
UGW-10	10.73	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
UGW-11	9.64	0.00	0.00	0.00		0.00	0.00	9.00	0.00	0.00	0.00
UGW-12	14.22	8.86	8.47	8.19	8.12	7.74	7.75	7.58	0.00	9.70	11.25
UGW-13	13.58	7.48	1.87	6.45	6.94	2.26	6.75	6.79	11.38	10.95	12.30
UGW-14	19.59	0.00	0.00	0.00	0.00	0.00	0.00	0.01	8.55	0.00	0.01
UGW-15	12.52	0.00	0.00	0.00	0.00	0.00	0.00	0.02	sheen	0.00	0.01
UGW-16	13.83	0.00	0.00	0.00	0.00	0.00	0.00	11.25	damaged	damaged	0.00
UGW-17	12.62	7.70	7.52	6.00	2.08	2.28	2.53	1.39	1.05	3.85	6.82
UGW-18	14.55	0.00	0.00	0.00	0.00	0.00	0.00	13.33	0.00	0.00	0.00
UGW-19	12.47	1.64	2.12	2.25	1.63	2.47	2.32	2.20	0.70	1.36	1.37
UGW-20	12.14	0.00	0.00	0.00	0.00	(1)			damaged	damaged	damaged
UGW-21	13.41	3.02	2.37	2.39	2.21	2.26	2.14	2.03	3.50	2.90	2.63
UGW-22	10.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHEEN	0.00
UGW-23	69.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHEEN
UGW-24	79.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	SHEEN
UGW-25	54.17	1.51	1.56	1.66	2.04	1.74	1.75	1.82		0.00	0.00
UGW-26	10.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
MTMW-1											
MTMW-2											
MTMW-3											
MTMW-4											
AW-1											
AW-2											
PW-1	15.38	0.11	0.16	0.19	0.00	0.00	0.00	1.15	0.00		SHEEN
PW-2	15.69	0.73	0.75	0.80	0.86	0.87	0.97	1.08	0.53	1.30	1.59
PW-3	17.33	9.95	9.80	9.77	9.85	9.85	9.84	7.81	8.35	9.53	9.88
PW-4	15.65	3.55	3.62	3.66	3.77	3.73	3.89	0.81	0.18	FLOODED	SHEEN
PW-5	17.42	8.97	8.95	8.85	8.88	8.92	8.92	6.70	7.15	7.37	7.37
PW-6	17.69	12.44	11.67	10.92	10.68	10.57	9.39	1.13	1.13	0.00	0.00
MW-1	15.94	0.00	0.00	0.00	0.86	0.12	1.14	0.01	1.56	0.00	1.29
MW-2	15.56	0.00	0.00	0.00	0.07	0.08	0.12	0.17	0.00	0.00	0.00
MW-3	17.22	5.03	5.42	5.35	5.86	6.01	6.20				
MW-4	16.56	2.92	2.45	1.97	0.51	0.53	0.72	0.55	0.50	1.20	1.24
470-MW-1	33.14	0.29			0.09	0.11	0.23	0.24	0.24		0.20
470-MW-3	23.15	0.00			0.00	0.00	0.00			0.00	0.00
GW-01		0.00	0.00			0.01	0.02	location unknown	location unknown	location unknown	location unknown
GW-02	13.57	0.00	0.00		0.00	0.00	0.00	0.00		0.00	SHEEN
GW-03	13.18	0.00	0.00		0.00	0.00	0.00	0.00	0.00		
GW-04	12.83	0.18	0.18		0.00	0.02	0.02	0.00	0.22	0.08	0.06
GW-05	10.70	(2)	(2)	(2)	(2)	(2)		0.22	damaged	damaged	damaged
GW-06	10.95	0.00	0.00		0.00	0.00	0.00			0.00	0.00
7MW-01A	28.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-02A	48.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHEEN	SHEEN
7MW-03	79.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-04	82.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-05	14.13						0.00	0.00	0.00		
7MW-06	8.25	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
7MW-08	11.33	0.00	0.00	0.00		0.00	0.00			0.00	0.00
7MW-09	61.34	0.00	0.00	0.00	0.00	0.00	0.00			0.00	SHEEN

TABLE 3, page 3 of 3

PRODUCT THICKNESS DATA

FOURTH QUARTER 1999 OPERATION AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY SYSTEM
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft)	Apparent Product Thickness (ft)											
		25-Jan-99	23-Feb-99	29-Mar-99	27-Apr-99	21-May-99	29-Jun-99	29-Jul-99	30-Aug-99	29-Sep-99	27-Oct-99	1-Dec-99	23-Dec-99
RW-1	20.55	no access	no access	no access	no access	no access	no access	3.20	2.43	0.00	0.23	0.15	0.00
RW-2	18.01	0.00	0.00	0.00	0.04	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-3	10.30	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-4	11.09	0.00	0.00	0.00	0.00	0.28	0.02	0.01	0.09	0.00	0.00	0.00	0.01
RW-5	10.35	0.10	0.30	0.38	0.34	0.35	0.26	0.24	0.23	0.09	0.18	0.00	0.05
RW-6	9.82	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-7	8.59	0.35	0.10	0.08	0.15	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-8	9.89	0.02	0.00	0.08	0.15	0.50	0.21	0.39	0.40	0.24	0.21	0.00	0.05
UGW-1	16.57	1.70	1.68	1.74	1.73	1.71	1.77	1.80	0.01	0.05	0.30	0.10	0.10
UGW-2	62.11	0.00	0.00	0.01	0.01	0.00	0.00	0.20	0.51	0.65	0.00	0.00	0.00
UGW-3	25.21					0.00		5.90	0.64	0.72	0.57	0.65	0.65
UGW-4	20.66	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-5	16.55	0.30	0.20	0.19	0.20	0.08	0.06	0.18	0.00		0.15	0.20	0.25
UGW-6	11.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-7	10.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-8	10.24	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-9	9.45	0.01		0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-10	10.73	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-11	9.64	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
UGW-12	14.22	8.66	8.01	7.66	7.78	7.81	5.86	5.98	0.74	8.85	9.75	10.95	8.40
UGW-13	13.58	8.80	7.42	7.05	6.95	10.27	6.20	7.00	0.05	11.38	0.50	8.88	8.70
UGW-14	19.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-15	12.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-16	13.83	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-17	12.62	9.69	6.16	5.20	5.17	7.35	8.91	7.23	0.00	2.50	3.08	9.00	3.65
UGW-18	14.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-19	12.47	1.17	1.25	0.50	0.49	0.89	1.20	1.45	0.00	0.20	0.32	0.35	0.30
UGW-20	12.14			0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-21	13.41	2.90	2.14	2.37	2.23	2.67	7.69	2.37	0.40	0.28	1.36	1.25	4.15
UGW-22	10.30	0.00		0.00		0.00		0.00	0.00		0.00	0.00	0.00
UGW-23	69.38	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-24	79.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
UGW-25	54.17	damaged	damaged	damaged	damaged	damaged	1.35	1.52	1.45	1.90	1.20	1.60	1.10
UGW-26	10.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTMW-1											3.20		0.05
MTMW-2											7.15		2.85
MTMW-3											3.20		0.05
MTMW-4											5.80		4.15
AW-1											3.85		0.05
AW-2											1.40		0.55
PW-1	15.38		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00
PW-2	15.69	1.65	1.71	2.66	0.00	1.62	1.79	1.82	0.03	0.71	0.75	1.18	1.00
PW-3	17.33	0.85	0.90	0.90	0.01	2.35	0.16	0.20	0.02	0.10	0.10	0.00	0.04
PW-4	15.65	3.55	damaged	damaged	damaged	damaged	damaged	damaged	damaged	damaged	damaged	0.00	damaged
PW-5	17.42	1.12	1.29	1.29	0.30	0.28	0.30	0.33	0.05	0.09	0.08	0.05	0.05
PW-6	17.69	0.10		0.05	0.06	0.20	0.16	0.15	0.10	0.60	0.80	0.00	0.00
MW-1	15.94	1.45	0.34	2.30	1.36	1.40	1.40	1.36	0.04	0.00	0.57	0.00	0.54
MW-2	15.56	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.00	0.00	0.00	0.00
MW-3	17.22	0.75		0.72	0.77	0.62	0.54	0.60	0.00	0.02	0.03	0.00	0.05
MW-4	16.56	1.30	0.90	0.66	0.73	0.69	0.60	0.48	0.00	0.20	0.08	0.25	0.02
470-MW-1	33.14	0.19	0.30	0.25	0.28	0.20	0.22	0.18	0.19	0.20	0.41	0.30	1.02
470-MW-3	23.15	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
GW-01		location unknown	location unknown	location unknown	location unknown	location unknown	location unknown	location unknown	location unknown	location unknown	0.00	0.00	
GW-02	13.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GW-03	13.18	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GW-04	12.83	0.00	0.06	0.06		0.04	0.07	0.00	0.00	SHEEN	0.00	0.00	0.00
GW-05	10.70	damaged	damaged	damaged	damaged	damaged	damaged	damaged	damaged	damaged	clogged	clogged	
GW-06	10.95	0.00	0.00	0.01		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-01A	28.41			0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-02A	48.50		0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7MW-03	79.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7MW-04	82.56	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-05	14.13	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7MW-06	8.25	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-07	15.35							0.00	0.00	0.00	0.00	0.00	0.00
7MW-08	11.33		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-09	61.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

January 2000 Operation and Maintenance Report

January 2000 Operation and Maintenance Report
Contract No. N62470-93-D-3033-0009
Free Product Recovery System
Tow Way Fuel Facility
Naval Station Roosevelt Roads
Ceiba, Puerto Rico

McLaren/Hart Project No. 945809

February 21, 2000

Prepared for:

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Janaury 2000 Monthly Operation and Maintenance Report
Contract No. N62470-93-D-3033-0009
Free Product Recovery System
Tow Way Fuel Facility
Naval Station Roosevelt Roads
Ceiba, Puerto Rico

INTRODUCTION

This report presents a summary of operations conducted in Janaury 2000 for the product recovery system installed by McLaren\Hart at the Tow Way Fuel Facility located in Naval Station Roosevelt Roads, Ceiba, Puerto Rico. McLaren\Hart is a team prime contractor with J.A. Jones Environmental Services Company on the LANTDIV Petroleum, Oils and Lubricants Remedial Action Contract (POLRAC). McLaren\Hart is responsible for operation and maintenance of the product recovery system, periodic gauging of monitoring wells in the Tow Way Fuel Facility and monthly reporting. Beginning in April 1998, J. A. Jones Management Services Company personnel have been contracted to provide on-site labor for operation and maintenance services.

OPERATIONS SUMMARY

Date	Activity
Janaury 6, 2000	Participated in Monthly JIG Conference Call
January 7, 2000	Mobilized for Pre-pilot study pump performance tests.
January 10, 2000	A technician visited the site for routine maintenance. Product and water measurements were made in the recovery wells and product holding tank. The system is shut off and bailing of product from wells was suspended to allow product and groundwater levels to stabilize.
Janaury 11, 2000	Participated in Monthly JIG Conference Call
Janaury 20, 2000	Participated in Monthly JIG Conference Call
January 24, 2000	A technician visited the site for routine maintenance.
Janaury 28, 2000	A technician visited the site for routine maintenance. Product and water measurements were made in the complete set of monitoring wells and product holding tank.

SYSTEMS OPERATION AND MAINTENANCE DATA

Date	Description of Incident	Corrective Steps Taken
January 6, 2000	The air dryer failed	Ordered part to repair air dryer from IR.
January 7, 2000	The product recovery system air compressor and conveyance lines are being used to operate the recovery pumps for the pilot studies.	None.

PUMP OPERATION DAYS (ESTIMATED)

Month	Operating Days	Cumulative Operating Days
December 1996	14	14
January 1997	6	20
February 1997	6	26
March 1997	27	53
April 1997	28	81
May 1997	32	113
June 1997	27	140
July 1997	21	161
August 1997	29	190
September 1997	22	212
October 1997	14	236
November 1997	22	258
December 1997	10	268
January 1998	14	282
February 1998	28	310
March 1998	31	341
April 1998	2	343
May 1998	0	343
June 1998	7	350
July 1998	30	380
August 1998	29	409
September 1998	20	439
October 1998	10	449
November 1998	22	471
December 1998	31	502
January 1999	31	533
February 1999	28	561
March 1999	31	592
April 1999	18	610
May 1999	21	631
June 1999	30	661
July 1999	31	692
August 1999	31	723
September 1999	8	731
October 1999	7	738
November 1999	0	738
December 1999	0	738
January 2000	0	738

FREE PRODUCT THICKNESS MEASURMENTS

Month	Quantity of Measurements	Cumulative Quantity of Measurements
December 1996	9	9
January 1997	46	55
February 1997	64	119
March 1997	36	155
April 1997	54	209
May 1997	66	275
June 1997	132	407
July 1997	81	488
August 1997	27	515
September 1997	120	735
October 1997	48	783
November 1997	61	844
December 1997	67	911
January 1998	60	971
February 1998	68	1039
March 1998	68	1107
April 1998	84	1191
May 1998	24	1215
June 1998	72	1287
July 1998	72	1359
August 1998	92	1451
September 1998	24	1475
October 1998	29	1504
November 1998	28	1532
December 1998	82	1614
January 1999	79	1693
February 1999	71	1764
March 1999	99	1863
April 1999	84	1947
May 1999	77	2024
June 1999	99	2123
July 1999	89	2212
August 1999	103	2315
September 1999	94	2409
October 1999	85	2494
November 1999	43	2537
December 1999	54	2591
January 2000	54	2645

FREE PRODUCT RECOVERED

Month	Gallons Recovered	Cumulative Recovery
December 1996	178	178
January 1997	44	222
February 1997	74	296
March 1997	146	442
April 1997	119	561
May 1997	91	652
June 1997	202	854
July 1997	104	958
August 1997	17	975
September 1997	95	1070
October 1997	73	1143
November 1997	9	1152
December 1997	0	1152
January 1998	0	1152
February 1998	0	1151
March 1998	24	1175
April 1998	6	1181
May 1998	0	1181
June 1998	20	1201
July 1998	334	1535
August 1998	93	1628
September 1998	0	1628
October 1998	0	1628
November 1998	43	1671
December 1998	4	1675
January 1999	21	1696
February 1999	21	1717
March 1999	81	1797
April 1999	0	1797
May 1999	34	1831
June 1999	2	1833
July 1999	3	1836
August 1999	28	1864
September 1999	11	1875
October 1999	0	1875
November 1999	0	1875
December 1999	0	1875
January 2000	0	1875

TOTAL PRECIPITATION

Month	Total Monthly Rainfall, 1999 (inches)	Total Monthly Rainfall 2000 (inches)
January	2.47	
February	0.79	
March	1.59	
April	1.48	
May	1.16	
June	4.09	
July	4.06	
August	6.64	
September	5.85	
October	6.43	
November		
December		

RESULTS AND EVALUATION

No product recovery was measured in the product recovery tank for Janaury 2000. Operation of the product recovery system was suspended October 31, 1999 during completion of the pilot studies to evaluate enhancement of product recovery using pneumatic fracturing methods. The pilot studies will be completed in June 2000. The system is currently being used to operate recovery pumps for the pilot studies. Bailing of product from the monitoring wells has also been suspended to allow product and groundwater levels to stabilize during the pilot studies.

A complete set of well gauging was completed on January 24. Well gauging measurements were performed in the system recovery wells on two additional dates. Free product greater than 0.1 feet was present in 12 of the wells measured. The product thickness ranged from a sheen to 8.75 feet in UGW-13. Product levels are relatively consistent with December 1999. Tables 2 and 3 present the results of well gauging and product thickness respectively. A product thickness map is attached.

Approximately 2.37 inches of rainfall was recorded at the U.S. Naval Station, Roosevelt Roads. Rainfall was much less for January than for the preceding five months.

TABLES

TABLE 1

TOTAL PRECIPITATION

January 2000 Monthly Operation and Maintenance Report
Contract No. N62470-93-D-3033-0009
Tow Way Fuel Facility
Naval Station Roosevelt Roads
Ceiba, Puerto Rico

Month	Total Monthly Rainfall, 1999 (inches)	Total Monthly Rainfall 2000 (inches)
January	2.47	**2.37**
February	0.79	
March	1.59	
April	1.48	
May	1.16	
June	4.09	
July	4.06	
August	6.64	
September	5.85	
October	6.43	
November	12.86	
December	5.94	

Approximately 2.37 inches of rainfall was recorded at the U.S. Naval Station, Roosevelt Roads during the month of January 2000.

TABLE 1
Fourth Quarter 1999 Operation and Maintenance Report
Contract No. N62470-93-D-3033-0009
Free Product Recovery System
at the Building 735 and Tank 1995 Site
Naval Station Roosevelt Roads
Ceiba, Puerto Rico

TOTAL PRECIPITATION

Month	Total Rainfall, 1998 (inches)	Total Rainfall 1999 (inches)
January		2.47
February		0.79
March		1.59
April		1.48
May		1.16
June		4.09
July		4.06
August		6.64
September		5.85
October	0.74	6.43
November	5.98	12.86
December	5.24	5.94

TABLE 2
WELL GAUGING DATA

JANUARY 2000 OPERATIONS AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft-msl)	24-Jan-00			28-Jan-00		
		Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)	Depth to Product (ft)	Depth to Water (ft)	Apparent Product Thickness (ft)
RW-1	120.55				12.50	12.75	0.25
RW-2	118.01				9.60	9.60	0.00
RW-3	110.30				5.23	5.23	0.00
RW-4	111.09				6.82	6.83	0.01
RW-5	110.35				6.87	6.91	0.04
RW-6	109.82				6.55	6.55	0.00
RW-7	108.59				5.70	5.70	SHEEN
RW-8	109.89				7.15	7.20	0.05
UGW-1	16.34				10.18	10.30	0.12
UGW-2	61.93				46.50	46.50	0.00
UGW-3	24.76				15.70	15.71	0.01
UGW-4	20.21				13.17	13.17	SHEEN
UGW-5	16.04				10.75	11.00	0.25
UGW-6	11.24				9.38	9.38	0.00
UGW-7	9.81				7.26	7.26	0.00
UGW-8	10.03				6.95	6.95	0.00
UGW-9	109.45				7.02	7.02	0.00
UGW-10	10.50				9.60	9.60	0.00
UGW-11	9.45				9.00	9.00	SHEEN
UGW-12	13.97				7.56	15.90	8.34
UGW-13	13.34				8.55	17.30	8.75
UGW-14	19.23				12.30	12.30	0.00
UGW-15	12.33				9.30	9.30	SHEEN
UGW-16	13.63				11.75	11.75	0.00
UGW-17	12.28				8.65	12.40	3.75
UGW-18	14.28				11.72	11.72	0.00
UGW-19	12.27				9.45	9.80	0.35
UGW-20	11.92				8.12	8.12	SHEEN
UGW-21	13.28				7.53	11.72	4.19
UGW-22	15.18				Same	as	RW-3
UGW-23	69.20				58.40	58.40	0.00
UGW-24	78.94				68.58	68.59	0.01
UGW-25	53.92				44.23	45.33	1.10
UGW-26	10.79				6.95	6.95	0.00
MTMW1	123.53	13.62	13.65	0.03			
MTMW2	122.87	14.91	15.22	0.31			
MTMW3	122.42	12.51	13.19	0.68			
MTMW4	122.04	14.40	14.78	0.38			
AW1	122.58	12.94	14.40	1.46			
AW2	121.68	13.53	14.70	1.17			
PW-1	0.38				9.25	9.25	0.00
PW-2	15.69				9.65	10.70	1.05
PW-3	17.33				10.62	10.67	0.05
PW-4	15.65				Well	is	Damaged
PW-5	17.42				10.70	10.77	0.07
PW-6	17.69				8.55	8.55	SHEEN
MW-1	15.94				9.30	9.85	0.55
MW-2	15.56				9.60	9.60	SHEEN
MW-3	17.22				6.95	7.00	0.05
MW-4	16.56				10.55	10.60	0.05
470MW-1	33.14				24.60	25.65	1.05
470MW-2							
470MW-3	23.15				16.45	16.45	SHEEN
GW-01							
GW-02	13.57				9.22	9.22	0.00
GW-03	13.18				9.25	9.25	0.00
GW-04	12.83				8.55	8.55	0.00
GW-05	10.70						
GW-06	10.95				8.55	8.55	0.00
7MW-01A	28.41				23.70	23.70	SHEEN
7MW-02A	48.50						
7MW-03	79.31						
7MW-04	82.56				72.45	72.45	0.00
7MW-05	14.13						
7MW-06	8.25				7.67	7.67	0.00
7MW-07	11.33				13.14	13.14	0.00
7MW-08					8.98	8.98	0.00
7MW-09	61.34				51.20	51.20	0.00

PRODUCT THICKNESS DATA

JANUARY 2000 OPERATIONS AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY SYSTEM
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft)	Apparent Product Thickness (ft)											
		28-Jan-97	25-Feb-97		21-Apr-97	22-May-97	17-Jun-97	30-Jun-97	30-Jul-97	3-Sep-97	30-Oct-97	25-Nov-97	23-Dec-97
RW-1	20.55	8.10				7.41	7.43	7.38	7.18	7.78	0.83	2.88	1.02
RW-2	18.01	0.90				1.43	0.09	0.47	0.00	0.00	0.00	0.00	0.00
RW-4	11.09	0.57				3.10	0.10	0.53	0.01	0.21	0.00	0.00	0.00
RW-5	10.35	0.26				5.64	1.15	4.42	0.12	0.95	0.20	0.07	0.11
RW-6	9.82	0.17				0.22	0.21	0.23	0.00	1.09	0.00	0.00	0.00
RW-7	8.59	2.52				2.62	0.69	1.99	0.00	2.10	0.26	0.00	0.00
RW-8	9.89	0.31				0.23	0.83	2.49	0.13	2.25	0.04	0.00	0.00
UGW-1	16.57	2.36	2.40		2.40	2.56	2.62	2.59	2.55	2.93	2.71	2.77	2.72
UGW-2	62.11	0.00	0.00		0.00	0.18	0.27	0.31	0.27	0.62	0.12	0.00	0.01
UGW-3	25.21	6.10	5.96		6.16	0.00	0.00	0.00	5.03	5.30	4.05	5.01	4.30
UGW-4	20.66	11.31	11.31		11.32	9.82	9.71	9.72	9.41	10.10	9.75	9.66	9.59
UGW-5	16.55	2.35	0.30		0.41	0.35	0.37	0.36	0.19	1.00	0.05	0.10	0.22
UGW-6	11.50		0.13		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-7	10.04	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-8	10.24	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-9	9.45	0.00								0.00	0.00	0.00	0.00
UGW-10	10.73	0.00	0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-11	9.64	0.00	0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-12	14.22	9.19	9.00		8.59	8.49	8.37	8.35	8.22	8.61	10.38	9.25	9.18
UGW-13	13.58	7.67	7.57		7.70	6.16	6.58	6.34	7.40	7.96	10.12	7.30	7.43
UGW-14	19.59	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-15	12.52	0.00	0.00		0.00	2.92	2.41	2.54	0.00	0.00	0.00	0.00	0.00
UGW-16	13.83	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-17	12.62	4.80	4.82		4.70	4.05	4.18	4.03	4.70	5.00	6.51	6.79	7.31
UGW-18	14.55	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-19	12.47	3.75	3.74		3.70		0.00	0.00	2.42	4.95	0.33	1.93	1.08
UGW-20	12.14	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-21	13.41	2.15	2.14		2.00	1.74	1.78	1.93	2.04	3.10	2.12	2.08	2.20
UGW-22	10.30	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
UGW-23	69.38	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-24	79.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-25	54.17	1.58	1.11		1.56	1.82	1.98	2.02	1.94	2.90	1.82	1.77	1.62
UGW-26	10.79	0.00	0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTMW-1													
MTMW-2													
MTMW-3													
MTMW-4													
AW-1													
AW-2													
PW-1	15.38	0.00				0.12	0.14	0.07	0.07	0.35	0.77	0.11	0.79
PW-2	15.69	0.86				1.21	1.37	1.33	1.09	1.48	0.63	0.60	0.72
PW-3	17.33	3.67				5.96	6.39	6.57	6.98	7.98	8.75	9.12	9.76
PW-4	15.65	1.74				2.38	2.98	2.64	2.67	3.48	3.36	3.37	3.47
PW-5	17.42	5.10				7.03	7.25	7.35	7.40	7.95	8.17	8.40	8.85
PW-6	17.69	10.72				10.01	9.92	9.78	9.83	10.11	13.18	11.86	13.20
MW-1	15.94	0.00				0.00	0.00	0.00	0.00	1.10	0.00	0.00	0.00
MW-2	15.56	0.00				0.17	0.29	0.30	0.03	0.60	0.00	0.00	0.00
MW-3	17.22	2.27				3.16	3.31	3.36	3.69	4.30	4.22	4.49	4.63
MW-4	16.56	2.30				2.13	2.40	2.42	1.94	2.40	3.32	2.96	3.24
470-MW-1	33.14							0.30	0.20	1.10	0.08	0.29	
470-MW-3	23.15								0.00	0.00	0.00	0.00	
GW-01										0.00	0.00	0.00	
GW-02	13.57							0.00	0.00	0.00	0.00	0.00	
GW-03	13.18							0.00	0.00	0.00	0.00	0.00	
GW-04	12.83							0.30	0.06	0.55	0.30	0.18	
GW-05	10.70										0.00		
GW-06	10.95							0.00	0.00	0.00	0.00	0.00	
7MW-01A	28.41												
7MW-02A	48.50												
7MW-03	79.31												
7MW-04	82.56												
7MW-05	14.13												
7MW-06	8.25												
7MW-07	15.35												
7MW-08	11.33												
7MW-09	61.34												

TABLE 3, page 2 of 4

PRODUCT THICKNESS DATA

JANUARY 2000 OPERATIONS AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY SYSTEM
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft)	Apparent Product Thickness (ft)											
		26-Jan-98	25-Feb-98	24-Mar-98		29-May-98	3-Jun-98	7-Jul-98	8-Aug-98	8-Sep-98		16-Nov-98	9-Dec-98
RW-1	20.55	3.13	4.63	5.89		6.48	6.57	7.16		0.20		0.05	SHEEN
RW-2	18.01	0.00	0.00	0.10		0.22	0.00	0.37	0.43	0.20		0.00	SHEEN
RW-3	10.30									0.00		0.00	SHEEN
RW-4	11.09	0.00	0.00	0.00		0.00	0.00	0.02	8.62	7.40		0.00	SHEEN
RW-5	10.35	0.20	0.38	2.55		2.42	2.40	2.41	4.60	3.65		0.05	0.01
RW-6	9.82	0.00	0.00	0.00		0.00	0.00	0.00	0.02	5.20		0.42	0.02
RW-7	8.59	0.02	0.00	0.00		0.03	0.00	0.00	1.37	0.77		0.40	0.15
RW-8	9.89	0.00	0.12	1.98		3.41	3.37	3.54		0.20		0.10	SHEEN
UGW-1	16.57	2.80	2.80	2.79		2.75	2.77	2.78	0.61	0.65		2.40	1.48
UGW-2	62.11	0.00	0.00	0.04		0.16	0.42	0.52	0.62	0.65		0.00	0.00
UGW-3	25.21	4.05	3.97	3.95		2.04	2.02	2.00	0.57	0.43		0.55	0.56
UGW-4	20.66	10.23	10.21	10.21		0.05	0.01	0.03	0.02	0.01		0.01	0.01
UGW-5	16.55	0.20	0.21	0.06		0.00	0.16	0.21	0.34	0.07		0.25	0.24
UGW-6	11.50	0.00	0.00	0.00		0.00	0.00	0.00	10.10	0.00		0.00	0.00
UGW-7	10.04	0.00	0.00	0.00		0.00	0.00	0.00	0.03	sheen		0.00	0.00
UGW-8	10.24	0.00	0.00	0.00		0.00	0.00	0.00	0.01	sheen		0.00	0.00
UGW-9	9.45	0.00	0.00	0.00		0.00	0.00	0.00	0.02	sheen		0.00	0.00
UGW-10	10.73	0.00	0.00	0.00		0.00	0.00	0.00	10.00	0.00		0.00	0.00
UGW-11	9.64	0.00	0.00	0.00			0.00	0.00	9.00	0.00		0.00	0.00
UGW-12	14.22	8.86	8.47	8.19		8.12	7.74	7.75	7.58	0.00		9.70	11.25
UGW-13	13.58	7.48	1.87	6.45		6.94	2.26	6.75	6.79	11.38		10.95	12.30
UGW-14	19.59	0.00	0.00	0.00		0.00	0.00	0.00	0.01	8.55		0.00	0.01
UGW-15	12.52	0.00	0.00	0.00		0.00	0.00	0.00	0.02	sheen		0.00	0.01
UGW-16	13.83	0.00	0.00	0.00		0.00	0.00	0.00	11.25	damaged		damaged	0.00
UGW-17	12.62	7.70	7.52	6.00		2.08	2.28	2.53	1.39	1.05		3.85	6.82
UGW-18	14.55	0.00	0.00	0.00		0.00	0.00	0.00	13.33	0.00		0.00	0.00
UGW-19	12.47	1.64	2.12	2.25		1.63	2.47	2.32	2.20	0.70		1.36	1.37
UGW-20	12.14	0.00	0.00	0.00		0.00	(1)			damaged		damaged	damaged
UGW-21	13.41	3.02	2.37	2.39		2.21	2.26	2.14	2.03	3.50		2.90	2.63
UGW-22	10.30	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		SHEEN	0.00
UGW-23	69.38	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	SHEEN
UGW-24	79.00	0.00	0.00	0.00		0.02	0.00	0.00	0.00	0.00		0.00	SHEEN
UGW-25	54.17	1.51	1.56	1.66		2.04	1.74	1.75	1.82			0.00	0.00
UGW-26	10.79	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00			
MTMW-1													
MTMW-2													
MTMW-3													
MTMW-4													
AW-1													
AW-2													
PW-1	15.38	0.11	0.16	0.19		0.00	0.00	0.00	1.15	0.00			SHEEN
PW-2	15.69	0.73	0.75	0.80		0.86	0.87	0.97	1.08	0.53		1.30	1.59
PW-3	17.33	9.95	9.80	9.77		9.85	9.85	9.84	7.81	8.35		9.53	9.88
PW-4	15.65	3.55	3.62	3.66		3.77	3.73	3.89	0.81	0.18		FLOODED	SHEEN
PW-5	17.42	8.97	8.95	8.85		8.88	8.92	8.92	6.70	7.15		7.37	7.37
PW-6	17.69	12.44	11.67	10.92		10.68	10.57	9.39	1.13	1.13		0.00	0.00
MW-1	15.94	0.00	0.00	0.00		0.86	0.12	1.14	0.01	1.56		0.00	1.29
MW-2	15.56	0.00	0.00	0.00		0.07	0.08	0.12	0.17	0.00		0.00	0.00
MW-3	17.22	5.03	5.42	5.35		5.86	6.01	6.20					
MW-4	16.56	2.92	2.45	1.97		0.51	0.53	0.72	0.55	0.50		1.20	1.24
470-MW-1	33.14	0.29				0.09	0.11	0.23	0.24	0.24			0.20
470-MW-3	23.15	0.00				0.00	0.00	0.00				0.00	0.00
GW-01		0.00	0.00				0.01	0.02	location unknown	location unknown		location unknown	location unknown
GW-02	13.57	0.00	0.00			0.00	0.00	0.00	0.00			0.00	SHEEN
GW-03	13.18	0.00	0.00			0.00	0.00	0.00	0.00	0.00			
GW-04	12.83	0.18	0.18			0.00	0.02	0.02	0.00	0.22		0.08	0.06
GW-05	10.70	(2)	(2)	(2)		(2)	(2)		0.22	damaged		damaged	damaged
GW-06	10.95	0.00	0.00			0.00	0.00	0.00				0.00	0.00
7MW-01A	28.41	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
7MW-02A	48.50	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		SHEEN	SHEEN
7MW-03	79.31	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
7MW-04	82.56	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
7MW-05	14.13							0.00	0.00	0.00			
7MW-06	8.25	0.00	0.00	0.00			0.00	0.00	0.00	0.00		0.00	0.00
7MW-08	11.33	0.00	0.00	0.00			0.00	0.00				0.00	0.00
7MW-09	61.34	0.00	0.00	0.00		0.00	0.00	0.00				0.00	SHEEN

TABLE 3, page 3 of 4

PRODUCT THICKNESS DATA

JANUARY 2000 OPERATION AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY SYSTEM
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft)	Apparent Product Thickness (ft)											
		25-Jan-99	23-Feb-99	29-Mar-99	27-Apr-99	21-May-99	29-Jun-99	29-Jul-99	30-Aug-99	29-Sep-99	27-Oct-99	1-Dec-99	23-Dec-99
RW-1	20.55	no access	no access	no access	no access	no access	no access	3.20	2.43	0.00	0.23	0.15	0.00
RW-2	18.01	0.00	0.00	0.00	0.04	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-3	10.30	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-4	11.09	0.00	0.00	0.00	0.00	0.28	0.02	0.01	0.09	0.00	0.00	0.00	0.01
RW-5	10.35	0.10	0.30	0.38	0.34	0.35	0.26	0.24	0.23	0.09	0.18	0.00	0.05
RW-6	9.82	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-7	8.59	0.35	0.10	0.08	0.15	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RW-8	9.89	0.02	0.00	0.08	0.15	0.50	0.21	0.39	0.40	0.24	0.21	0.00	0.05
UGW-1	16.57	1.70	1.68	1.74	1.73	1.71	1.77	1.80	0.01	0.05	0.30	0.10	0.10
UGW-2	62.11	0.00	0.00	0.01	0.01	0.00	0.00	0.20	0.51	0.65	0.00	0.00	0.00
UGW-3	25.21					0.00		5.90	0.64	0.72	0.57	0.65	0.65
UGW-4	20.66	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-5	16.55	0.30	0.20	0.19	0.20	0.08	0.06	0.18	0.00		0.15	0.20	0.25
UGW-6	11.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-7	10.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-8	10.24	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-9	9.45	0.01		0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-10	10.73	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-11	9.64	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
UGW-12	14.22	8.66	8.01	7.66	7.78	7.81	5.86	5.98	0.74	8.85	9.75	10.95	8.40
UGW-13	13.58	8.80	7.42	7.05	6.95	10.27	6.20	7.00	0.05	11.38	0.50	8.88	8.70
UGW-14	19.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-15	12.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-16	13.83	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-17	12.62	9.69	6.16	5.20	5.17	7.35	8.91	7.23	0.00	2.50	3.08	9.00	3.65
UGW-18	14.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-19	12.47	1.17	1.25	0.50	0.49	0.89	1.20	1.45	0.00	0.20	0.32	0.35	0.30
UGW-20	12.14			0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-21	13.41	2.90	2.14	2.37	2.23	2.67	7.69	2.37	0.40	0.28	1.36	1.25	4.15
UGW-22	10.30	0.00		0.00		0.00		0.00	0.00		0.00	0.00	0.00
UGW-23	69.38	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UGW-24	79.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
UGW-25	54.17	damaged	damaged	damaged	damaged	damaged	1.35	1.52	1.45	1.90	1.20	1.60	1.10
UGW-26	10.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MTMW-1											3.20		0.05
MTMW-2											7.15		2.85
MTMW-3											3.20		0.05
MTMW-4											5.80		4.15
AW-1											3.85		0.05
AW-2											1.40		0.55
PW-1	15.38		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00
PW-2	15.69	1.65	1.71	2.66	0.00	1.62	1.79	1.82	0.03	0.71	0.75	1.18	1.00
PW-3	17.33	0.85	0.90	0.90	0.01	2.35	0.16	0.20	0.02	0.10	0.10	0.00	0.04
PW-4	15.65	3.55	damaged	damaged	damaged	damaged	damaged	damaged	damaged	damaged	damaged	0.00	damaged
PW-5	17.42	1.12	1.29	1.29	0.30	0.28	0.30	0.33	0.05	0.09	0.08	0.05	0.05
PW-6	17.69	0.10		0.05	0.06	0.20	0.16	0.15	0.10	0.60	0.80	0.00	0.00
MW-1	15.94	1.45	0.34	2.30	1.36	1.40	1.40	1.36	0.04	0.00	0.57	0.00	0.54
MW-2	15.56	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.00	0.00	0.00	0.00
MW-3	17.22	0.75		0.72	0.77	0.62	0.54	0.60	0.00	0.02	0.03	0.00	0.05
MW-4	16.56	1.30	0.90	0.66	0.73	0.69	0.60	0.48	0.00	0.20	0.08	0.25	0.02
470-MW-1	33.14	0.19	0.30	0.25	0.28	0.20	0.22	0.18	0.19	0.20	0.41	0.30	1.02
470-MW-3	23.15	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
GW-01		location unknown	location unknown	location unknown	location unknown	location unknown	location unknown	location unknown	location unknown	location unknown	0.00	0.00	
GW-02	13.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GW-03	13.18	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GW-04	12.83	0.00	0.06	0.06		0.04	0.07	0.00	0.00	SHEEN	0.00	0.00	0.00
GW-05	10.70	damaged	damaged	damaged	damaged	damaged	damaged	damaged	damaged	damaged	clogged	clogged	
GW-06	10.95	0.00	0.00	0.01		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-01A	28.41			0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-02A	48.50		0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7MW-03	79.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7MW-04	62.56	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-05	14.13	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7MW-06	8.25	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-07	15.35							0.00	0.00	0.00	0.00	0.00	0.00
7MW-08	11.33		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7MW-09	61.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 3, page 4 of 4

PRODUCT THICKNESS DATA

JANUARY 2000 OPERATION AND MAINTENANCE REPORT
FREE PRODUCT RECOVERY SYSTEM
TOW WAY FUEL FACILITY
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO
Contract No. N62470-D-3033-0009
Task Order No. 0009

Well Designation	Top of Casing Elevation (ft)	Apparent Product Thickness (ft)											
		28-Jan-00											
RW-1	20.55	0.03											
RW-2	18.01	0.00											
RW-3	10.30	0.00											
RW-4	11.09	0.01											
RW-5	10.35	0.04											
RW-6	9.82	0.00											
RW-7	8.59	SHEEN											
RW-8	9.89	0.05											
UGW-1	16.57	0.12											
UGW-2	62.11	0.00											
UGW-3	25.21	0.01											
UGW-4	20.66	SHEEN											
UGW-5	16.55	0.25											
UGW-6	11.50	0.00											
UGW-7	10.04	0.00											
UGW-8	10.24	0.00											
UGW-9	9.45	0.00											
UGW-10	10.73	0.00											
UGW-11	9.64	SHEEN											
UGW-12	14.22	8.34											
UGW-13	13.58	8.75											
UGW-14	19.59	0.00											
UGW-15	12.52	SHEEN											
UGW-16	13.83	0.00											
UGW-17	12.62	3.75											
UGW-18	14.55	0.00											
UGW-19	12.47	0.35											
UGW-20	12.14	SHEEN											
UGW-21	13.41	4.19											
UGW-22	10.30	0.00											
UGW-23	69.38	0.00											
UGW-24	79.00	0.01											
UGW-25	54.17	1.10											
UGW-26	10.79	0.00											
MTMW-1	123.53	0.03											
MTMW-2	122.87	0.31											
MTMW-3	122.42	0.68											
MTMW-4	122.04	0.38											
AW-1	122.58	1.46											
AW-2	121.68	1.17											
PW-1	15.38	0.00											
PW-2	15.69	1.05											
PW-3	17.33	0.05											
PW-4	15.65	Damaged											
PW-5	17.42	0.07											
PW-6	17.69	SHEEN											
MW-1	15.94	0.55											
MW-2	15.56	SHEEN											
MW-3	17.22	0.05											
MW-4	16.56	0.05											
470-MW-1	33.14	1.05											
470-MW-3	23.15	SHEEN											
GW-01													
GW-02	13.57	0.00											
GW-03	13.18	0.00											
GW-04	12.83	0.00											
GW-05	10.70												
GW-06	10.95	0.00											
7MW-01A	28.41	SHEEN											
7MW-02A	48.50												
7MW-03	79.31												
7MW-04	82.56	0.00											
7MW-05	14.13												
7MW-06	8.25	0.00											
7MW-07	15.35	0.00											
7MW-08	11.33	0.00											
7MW-09	61.34	0.00											