AIRPORT FUEL FARM PHASE II

#R7-1

## Council Agenda Item: #R7

**SUMMARY:**

Presentation of the Final Report of the Phase II Environmental Assessment for Addison Airport Fuel Farm from Washington Group International, Inc.

**BACKGROUND:**

Washington Group International has completed the work for the Airport Fuel Farm Phase II Environmental Assessment. The work included a soil vapor survey, push probe soil sampling, ground water sampling, installation of monitoring wells, documents review, site reconnaissance, personnel interviews, and report documentation. Preliminary results of this work were reported to Council at a meeting on March 6, 2002.

Ron Bowlin with Washington Group will present to the Council the final report of the Environmental Phase II Assessment and a recommended course of action based on the results of the assessment. An Executive Summary of the findings is attached.

Attachment: Executive Summary - Final Report: Phase II Environmental Assessment

#R7-2

Washington

# EXECUTIVE SUMMARY

## SOIL VAPOR PROGRAM

- Three hydrocarbon plumes have been identified in the fuel farm area
- Previously unknown releases have occurred at the former fuel dispenser
- Strong methane signature indicates active intrinsic biodegradation of hydrocarbons
- No evidence that contamination has migrated under Addison Road

## SOIL SAMPLE PROGRAM

- Samples have been collected from 17 boring locations based on the soil vapor surveys
- Twenty-three samples were selected for analysis
- Bedrock was encountered at depths ranging from 3 ft to 11 ft
- Only one sample reported benzene greater than the PST target level
- Seven samples reported total petroleum hydrocarbons at concentrations greater than the PST target level
- No polynuclear aromatic hydrocarbons (PAH) were reported above PST target levels
- Contamination appears to be caused from surface releases from current operational practices
- The most extensive area of contamination is at the former fuel dispenser

## GROUNDWATER SAMPLE PROGRAM

- Groundwater was encountered in only two boring locations
- Groundwater was not encountered above the bedrock surface
- Groundwater appears to be under perched and confined conditions
- Groundwater does show evidence of contamination. One PAH constituent was reported at levels greater than the PST target level
- Nine monitoring wells are present onsite that were not sampled
- No free-phase product was observed

## CONCLUSIONS

- Low concentrations of contaminants in soil and groundwater should qualify this site for a Plan A closure
- Stricter TNRCC requirements will apply to LPST sites in 2003 if new releases occur
- Future releases to the environment must be mitigated to qualify for Plan A closure
- Intrinsic biodegradation of hydrocarbons is actively occurring onsite.
- Natural attenuation for a corrective action is applicable
- The groundwater plume must be verified that it is contained and degrading
- Plan A closure for the entire site cannot be submitted to the TNRCC until such time that current fueling operations are halted


Washington

# FINAL REPORT
# PHASE II ENVIRONMENTAL ASSESSMENT

## ADDISON AIRPORT
## ADDISON, TEXAS

**PREPARED FOR:**

**TOWN OF ADDISON**
**16801 WESTGROVE DRIVE**
**ADDISON, TEXAS**

**PREPARED BY:**

**WASHINGTON GROUP INTERNATIONAL, INC.**
**HOUSTON, TEXAS**

**SEPTEMBER 2002**

Washington

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## PROJECT LOCATION AND DESCRIPTION

The Addison Airport is a general aviation airport with a single runway that occupies about 368 acres of land within Addison, Texas, just north of Dallas. The airport is owned by the Town of Addison and is currently operated and maintained by the joint venture of Washington Staubach. The airport supports general aviation activities for corporate jets and private aircraft. It is one of the largest and busiest general aviation airports in the country. The airport contains several fixed base operators (FBO), office buildings, maintenance shops, hangars, and fuel farms. A site location map is presented as Figure 1.

## PROJECT BACKGROUND AND PURPOSE

The Addison Airport has four fuel storage areas located in the southeastern corner of the property (Figure 2). From the information available, and initially based on a Phase I Environmental Site Assessment Update developed by Camp Dresser & McKee (CDM), there are currently 29 registered underground storage tanks (USTs) located at the airport fuel storage areas. Ten of these USTs are inactive; the remaining 19 active USTs are currently being used by on-site FBO's. There has also been concern that additional unregistered underground fuel storage tanks may be on the airport property.

According to Town of Addison Fire Department drawings, dated February 28, 2001, there are four fuel storage areas operated by six operators: Mercury Air (Storage Areas #1 and #3), Million Air (Storage Area #1), Stern Air (Storage Area #2), Addison Express (Storage Area #3), R. Stern (Storage Area #3), and Cherry Air (Storage Area #4). Current airport management personnel indicate that only Million Air, Mercury Air, Addison Express, and Cherry Air are currently operating tanks at the airport. Layouts of the fuel storage areas as recorded by the Addison Fire Department Operations Division are included as Figures 3 through 6.

Vertical

The objective of this project was to obtain sufficient data to delineate the lateral extent of contamination at the fuel storage area. Our technical approach consisted of a combination of invasive field exploration through soil vapor analysis, subsurface soil and groundwater sample collection and analysis, document review, and interviews with knowledgeable persons. The data were studied to establish an understanding of the environmental and physical conditions of the tank farms and adjacent areas at the airport. Discussions of each technical program are discussed in the following sections.

## SOIL VAPOR PROGRAM

A initial soil vapor survey was conducted in the fuel storage areas from December 14 through 18, 2001 by Exploration Technologies, Inc. (ETI), from Houston, Texas, under the oversight of Washington. Soil vapor samples were collected at 89 locations within and around the fuel storage and former dispenser areas. A second round of soil vapor samples were collected by ETI at 48 additional locations on July 22 throng 25, 2002 to further define the hydrocarbon plumes on the airport property and to evaluate potential migration beneath Addison Road (Figure 7). Soil vapor samples were collected on a grid spacing of about 40 ft. Some adjustment to the grid was required based on surface structures and field screening measurements. Soil vapors were collected by advancing a collection rod to a depth of around 4 ft below ground surface (bgs). Vapor that exists within the interstices of the soil was drawn out and collected in an evacuated glass sample container. On-site qualitative analysis for methane, oxygen, and carbon dioxide assisted in the field placement of collection locations.

The primary purpose of the soil vapor survey was to assist in determining the lateral extent and concentrations of organic hydrocarbon compounds that may be present in the soils and/or groundwater. The survey included the determination and quantification of C1 to C4 hydrocarbon (methane, ethane, propane, and butanes) and C5+ hydrocarbon (pentanes through xylenes) vapors in the subsurface environment. Two dominant product signatures were noted: aviation gasoline and jet fuel. The complete ETI report discussing field procedures, laboratory protocol, and analytical results is included as Attachment A. The ETI report discusses five areas of concern. These areas are shown and numbered on the plume maps and used in this text for discussion.

Methane is a major component of natural gas; however, liquid petroleum products such as aviation gasoline and jet fuel contain no, or trace levels, of methane. Methane is generated from the anaerobic biodegradation of organic compounds, including fuel-related compounds. Because methane is such a light gas it migrates vertically easily through even relatively impermeable soils, such as clays. The methane isoconcentration map (Figure 8) shows areas consistent with anaerobic biodegradation of petroleum hydrocarbons in subsurface soils.

Propane and n-butane have relatively high volatility and tend to indicate more recent releases to, or within, the subsurface environment. Propane and n-butane are never generated biogenically and are useful in mapping vapor trails associated with hydrocarbon

products. The propane and n-butane isoconcentration maps (Figures 9 and 10, respectively) indicate relatively recent release activity.

C5+ hydrocarbons compounds have low to moderate solubility and volatility compared to the other compounds and tend to remain closer to petroleum product sources since they are basically liquids rather than gases at standard temperature and pressure. They are therefore good indicators of past and present episodes of release. The C5+ isoconcentration map is presented as Figure 11.

**Areas 1 and 2.** These two areas are located in the southern part of the fuel farm. The C5+ and methane plume maps indicate a relatively large hydrocarbon plume with three primary areas of concentrated or elevated soil vapors. The elevated methane areas are consistent with anaerobic biodegradation of petroleum hydrocarbons in the subsurface soils. The lack of significant propane and n-butane signatures indicate these plumes are from relatively older releases. A propane and n-butane signature is present at sampling point 85 that does not show any anomalous C5+ or methane signatures. This most likely represents a release from an aircraft stored in the adjoining T-hangar. Based on the location and past operational history of these tanks, the plume generated in Area 1 is the older of the releases, based on size and methane results. C5+ and methane concentrations in Area 2 occur at locations known to have very recent releases from tank filling operations. The shape and concentration of the plume indicates that soil vapors from subsurface contamination are slowly migrating to the west. There is no evidence to suggest that contamination extends eastward beneath Addison Road.

**Area 3.** Areas 3 contains elevated concentrations of C5+ hydrocarbons, methane, propane, and n-butane. Comparison of the plume maps indicate that recent release(s) have occurred just west of the northern part of Area 3. Moderate biodegradation is occurring west of the northern part of Area 3 where C5+, propane, and n-butane signatures are present.

**Area 4.** Relatively large C5+ and methane plumes are present around and west of Area 4. C5+ hydrocarbons appear to be concentrated and traverse the northern portion of the Area 4 tank farm. The presence of the elevated C5+ hydrocarbons, which remain in the subsurface soils for a extended period of time, suggest the presence of relatively older petroleum hydrocarbons. A lobate extension to the north follows the path of abandoned fuel lines to the former dispenser in Area 5. The methane signature indicates that significant biodegradation of the hydrocarbons is occurring. N-butane concentrations are present in the northern portion of the Area 4 tanks and west of the tank area at the T-hangar fenceline. Propane signatures are also strong along the fenceline. This suggests that there

has been recent releases from spillage during operations adjoining the tank area, and that releases have occurred from vehicles parked along the fence line. No offsite migration of hydrocarbons is indicated from the soil vapor data; however, while concentrations are decreasing to the north and west, the C5+ and methane plumes are still open.

**Area 5.** Area 5 is located north of the fuel storage tanks, in the area of the former fuel dispenser. Although the C5+ hydrocarbon map does not indicate substantial contamination from older releases, the methane map indicates that significant anerobic biodegradation is occurring in an east-west line centered on the dispenser. The C5+ and methane plumes suggest that past releases have occurred during filling of aircraft at the dispenser and from fuel line leaks. An additional area of methane generation is present northwest of the former dispenser, near the hangars. Area 5 differs from the other areas in that it is capped with concrete and asphalt. The concentration of C5+ hydrocarbons would be expected to be lower since the dispenser is now closed and biodegradation activity appears to be significant. The propane and n-butane maps also indicate anomalous concentrations in the area. The area in front of the hangars was historically and is currently used to fuel aircraft. This would account for the plume extending northward. The concrete/asphalt cap would also reduce volatilization of the propane and n-butane and allow for lateral migration beneath the cap as releases found their way through surface joints and cracks. No offsite migration is indicated from the soil vapor data; however, the C5+ and methane plumes are open to the north and west.

**Summary.** Three distinct hydrocarbon plumes have been identified in the survey area. The soil vapor concentrations of C5+ hydrocarbons indicate releases in the surface and/or subsurface have occurred over an undetermined period of time. Methane concentrations are also elevated in the areas of C5+ contamination, indicating that biodegradation is active in the destruction of the petroleum compounds. This strongly suggests that natural attenuation is occurring in the subsurface. Elevated levels of propane and n-butane indicate that recent releases have occurred within the fuel storage areas.

Results of the soil vapor program indicate that contamination has not migrated east under Addison Road. The southern plume (Areas 1 and 2) is closed in all directions. The central plume (Areas 3 and 4) remains open to the west under the T-hangars for C5+ and methane; however, the low vapor concentrations suggest that closure of the isocontours does not extend much further. The Area 5 plume is also open to the west and to the north. Decreasing isoconcentrations suggest that closure exists in the near lateral direction.

## SOIL SAMPLING PROGRAM

Soil samples were collected during two separate sampling efforts using direct-push technology. The direct push method was selected for its cost efficient way of collecting the maximum number of soil samples possible in a short time period, and produce limited drilling wastes. The results of the soil vapor analysis were used to identify the most appropriate surface locations to collect subsurface soil samples for analytical testing.

**Soil Sample Collection.** During the first soil sampling effort 10 surface locations for sampling (PB-1 through PB-10) were identified based on the real-time field methane and early laboratory results of the soil vapor survey. Soil samples were collected continuously at each location and logged for soil type, color and other visual characteristics, olfactory sensation, and headspace (organic vapor response) analysis using a photoionization detector (PID). The soil sample with the greatest headspace reading was selected for analysis. Soil samples were collected at seven locations during the second effort (PB-11 through PB-17) based on the combined soil vapor studies. Two samples were selected from each boring location, where possible, based the headspace reading, depth, and visual inspection. Soil sampling locations are shown on Figure 12.

The direct-push sampling method consisted of a mounted hydraulic hammer system used to advance a 4-ft split-spoon sampler into the subsurface. The 4-ft sampler allowed for ease and speed in collection of continuous samples. The split-spoon was then extracted and the sample was exposed for logging, observation, and sample collection. The sampling effort hit refusal depths ranging from 6 ft to 11 ft. Refusal was defined when the hydraulic hammer could no longer advance while the sampler was empty. Soil collected from the subsurface was visually logged for lithology and other observable details by a qualified geologist. Soil logs are included as Attachment B.

A sample from each 2-ft soil interval was collected for organic vapor response. Maximum organic vapor responses were recorded for each sample interval. No organic vapor responses were recorded for any sample intervals at PB-5, 7, 8, and 17. These locations correspond with areas of very limited C5+ hydrocarbon vapor signatures. The greatest organic vapor responses recorded were at PB-3, 9, 10, 13, and 14, with responses of 275 ppm, 250 ppm, 300 ppm, 268 ppm, and 374 ppm, respectively. Maximum organic vapor responses at each location and the depth of sample are shown on the analytical result table (Table 1). Organic vapor responses at each sampling interval are also shown on the soil boring logs.

## TABLE 1 - SUMMARY OF ANALYTICAL RESULTS (MG/KG)

| Parameter | SAMPLE LOCATION | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Location | PB-1 | PB-2 | PB-3 | PB-4 | PB-5 | PB-6 | PB-7 | PB-8 | PB-9 | PB-10 | PB-4W |
| Depth, ft (PID, ppm) | 5-6 (96) | 7-8 (93) | 2-4 (275) | 6-7 (3) | 5-6 (0) | 5-6 (130) | 3-4 (0) | 4-5 (0) | 3-4 (250) | 4-5 (300) | (mg/L) |
| Benzene | ND | ND | ND | ND | ND | ND | ND | ND | 2.2 | ND | ND |
| Toluene | 0.005 | 0.005J | 0.005 | 0.009 | 0.012 | 0.012 | 0.006J | 0.008 | 0.170J | 0.11 | ND |
| Ethylbenzene | ND | ND | 0.065 | ND | ND | ND | ND | ND | 6.2 | ND | ND |
| Xylenes + | 0.002J | 0.002J | 0.002J | 0.003J | 0.002J | 0.002J | ND | ND | 1.75 | ND | ND |
| MTBE | ND | ND | ND | ND | ND | ND | ND | ND | 2.4 | ND | ND |
| TPH: C6 – C12 | 440 | ND | 570 | ND | ND | 59 | ND | ND | 42 | 480 | ND |
| TPH: C12 – C28 | 1000 | ND | 1200 | ND | ND | 100 | ND | ND | ND | 1200 | 2 |

**TNRCC PST Target Levels:**

| | Soil | Groundwater |
|---|---|---|
| **Benzene:** | **0.74 mg/kg** | **0.0294 mg/L** |
| **Toluene:** | **503 mg/kg** | **7.3 mg/L** |
| **Ethylbenzene:** | **835 mg/kg** | **3.65 mg/L** |
| **Xylenes:** | **968 mg/kg** | **73 mg/L** |
| **MTBE:** | **37 mg/kg** | **0.37 mg/L** |
| **TPH:** | **100 mg/kg** | **.5 mg/L** |

Note: Target Levels are defined by the TNRCC PST (petroleum storage tank) Division as those hydrocarbon concentrations for soil and groundwater that indicate a need for further investigation and/or remediation.
ND = Not Detected

## TABLE 1 - SUMMARY OF ANALYTICAL RESULTS (MG/KG)

| Parameter | SAMPLE LOCATION | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Location | PB-11A | PB-11B | PB-12A | PB-12B | PB-13A | PB-13B | PB-14A | PB-14B | PB-15A | PB-16A | PB-17A | PB-17B | OW-A | OW-A |
| Depth, ft (PID, ppm) | 1-2 (2) | 4-5 (4) | 0-2 (4) | 6-7 (62) | 2-4 (210) | 6-8 (268) | 2-4 (374) | 6-8 (145) | 2-3 (65) | 2-3.5 (78) | 2-4 (0) | 5-7 (0) | 13-14 (108) | (mg/L) |
| Benzene | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.015 | ND |
| Toluene | ND | 0.001J | ND | ND | ND | 0.001J | ND | ND | 0.003 | ND | ND | ND | 0.015 | ND |
| Ethylbenzene | ND | ND | ND | ND | ND | 0.004 | 0.002J | ND | ND | ND | ND | ND | 0.003J | ND |
| Xylenes + | ND | ND | ND | ND | ND | 0.002J | 0.003J | 0.003J | ND | ND | ND | ND | 0.007 | ND |
| MTBE | ND | ND | ND | ND | ND | ND | ND | ND | 0.003J | ND | ND | ND | ND | 0.021 |
| TPH: C6 – C12 | ND | ND | ND | 56 | ND | 320 | 840 | 14 | ND | 98 | ND | ND | ND | 0.0062 |
| TPH: C12 – C28 | ND | ND | ND | 22 | ND | 170 | 410 | 14 | ND | 43 | ND | ND | ND | 0.0055 |
| 2-Methylnaphthalene | NA | ND | NA | ND | NA | 3.80 | 3.00 | NA | ND | ND | ND | NA | ND | 0.087 |

| TNRCC PST Target Levels: | Soil | Groundwater |
|---|---|---|
| Benzene: | 0.74 mg/kg | 0.0294 mg/L |
| Toluene: | 503 mg/kg | 7.3 mg/L |
| Ethylbenzene: | 835 mg/kg | 3.65 mg/L |
| Xylenes: | 968 mg/kg | 73 mg/L |
| MTBE: | 37 mg/kg | 0.37 mg/L |
| TPH: | 100 mg/kg | 5 mg/L |
| 2-Methylnaphthalene: | 73 mg/kg | 0.073 mg/L |

an issue after Sept '03 under TRRP

Note: Target Levels are defined by TNRCC PST (petroleum storage tank) Division as those hydrocarbon concentrations for soil and groundwater that indicate a need for further investigation and/or remediation.
ND = Not Detected
NA = Not Analyzed

All sample handling equipment was cleaned between soil sample intervals. After boring completion, the borings were grouted with cement, bentonite, or other acceptable material to inhibit stratigraphic cross-contamination. Drilling and sampling wastes were collected in a 55-gallon drum and sealed.

**Subsurface Conditions.** Where refusal was encountered, the bedrock generally consisted of a laminated, weathered (friable) limy siltstone. Occasionally, refusal was encountered in a weathered chalky material. The upper 1 ft to 2 ft consisted of a sandy loam, fill material. From 2 ft to refusal the subsurface soil consisted of interbedded dark brown silty clay and clayey sand, tan sandy silt, and tan sands. All granular materials were dry and showed no indications of recent percolation of precipitation. The cohesive clayey soils tended to have greater moisture contents in the northern portion of the study area.

A file review conducted of past boring activity produced boring logs scattered throughout the fuel storage areas. These boring logs were used to identify the approximate depth to bedrock across the site. A structure contour map based on depth to bedrock is presented as Figure 13. The contour lines indicate approximate depth to bedrock. The map indicates that there are three areas where bedrock reaches a depth of about 7 feet below ground surface (bgs). The two areas in the north have enough control to show that they are closed depressions with a elevated "saddle" between them. It is important to note that these two areas correspond very closely to the areas identified by the soil vapor survey as the areas of greatest hydrocarbon accumulation. These areas could likely act as "bathtubs" allowing hydrocarbon releases to accumulate from surface or subsurface releases. The structure contour map was used in conjunction with the soil vapor maps for selecting the boring locations for the second soil sampling event.

**Analytical Results.** One sample from each boring at locations PB-1 through PB-10 was selected for analysis based on organic vapor response and/or visual observation. Two samples were selected from each boring at locations PB-11 through PB-17, where depth to bedrock allowed. Soil samples were placed in laboratory-cleaned glass jars with appropriate labels and placed in an ice-filled cooler for transport to the laboratory. Selected soil samples were analyzed and reported for benzene, toluene, ethylbenzene, total xylenes (BTEX), and methyl-t-butyl ether (MTBE) by Method 8260, total petroleum hydrocarbons (TPH) by TNRCC Method 1005, and polynuclear aromatic hydrocarbons (PAH) by Method 8270C. Chain-of-custody documents accompanied the samples. A summary of the reported analytical results is presented in Table 1. The concentrations of

detected constituents and their location to the site is presented on Figure 14. The full analytical report is included as Attachment C.

Table 1 also includes the TNRCC Petroleum Storage Tank (PST) target concentration levels for soil and groundwater. A target concentration is the maximum allowable contaminant concentration in a particular contaminated media. If measured site contaminant levels exceed a target concentration the site must address that media and constituent for further action (remediation, institutional controls, attenuation).

**Areas 1 and 2.** Areas 1 and 2 included borings PB-1, 2, 3, 4, and 15. Reported concentrations for BTEX constituents are 4 to 5 orders of magnitude less than the PST target levels. The greatest concentrations reported were 0.009 mg/kg (toluene), 0.065 mg/kg (ethylbenzene), and 0.003J mg/kg (total xylenes), with target concentration levels of 503 mg/kg, 835 mg/kg, and 968 mg/kg, respectively. No benzene was identified in the samples collected from Areas 1 and 2. MTBE was reported at a concentration of 0.065 mg/kg, and has a target level of 37 mg/kg. TPH concentrations did exceed the PST target level of 100 mg/kg for soil at PB-1 and PB-3 at concentrations of 1440 mg/kg and 1770 mg/kg, respectively. The soil sample at PB-3 was collected at a depth of 2 ft to 4 ft bgs. This is an area of occasional historic surface releases. The PID reading at this sampling interval was 275 ppm, decreasing to 10 ppm at the bottom of the borehole (7 ft). A drainline has been documented in the vicinity of the PB-3 location that exits just southwest of PB-1. The drainline empties into an unlined surface drainage feature. A visual line break is present close to the PB-1 location. Surface releases from the fuel storage area have been documented to have entered the drain line and entered the drainage ditch. TPH concentrations at PB-1 are most likely historically related to these incidents.

**Areas 3 and 4.** Soil contamination for Areas 3 and 4 were characterized by samples from PB-5, 8, 9, 10, and 14. Only one sample location was placed in Area 3 (PB-5) because of the low soil vapor signatures; a minor concentration of C5+ vapors were identified (4 ppmv). This was used as a control point to compare low soil vapor signatures to the quantitative soil analyses. PB-8 was located north of the Area 3 and 4 plume to assess potential releases along the fuel line and as an additional control point. PB-5 and 8 reported minor concentrations of toluene, 0.012 mg/kg and 0.008 mg/kg, respectively. During the first collection event, borings PB-9 and 10 were located within the area of greater C5+ vapor signatures. PB-9, at a depth of 3 ft to 4 ft, reported the greatest concentrations of BTEX and MTBE constituents at 2.2 mg/kg, 0.017J mg/kg, 6.2 mg/kg, 1.75 mg/kg, and 2.4 mg/kg, respectively; only benzene exceed the target

concentration for soil of 0.74 mg/kg. TPH was reported at both PB-9 (42 mg/kg) and PB-10 (1680 mg/kg); with PB-10 exceeding the target soil level of 100 mg/kg.

Based on the final round of the soil vapor survey a borehole (PB-14) was located in the area of greatest C5+ concentration. Samples were collected at depths of 2 to 4 ft and 6 to 8 ft. BTEX and MTBE were either not detected or less than the PQL. In the 2 to 4 ft sample, TPH results were reported at 1250 mg/kg. This sample was also analyzed for PAH compounds and identified 2-methylnaphthalene at 3 mg/kg. The target level for 2-methylnephthalene in soil is 73 mg/kg. TPH results for the 6 to 8 ft sample were 28 mg/kg.

As will be discussed in the section on groundwater sampling, the boring at PB-14 was extended below the top of bedrock to a depth of 15 ft. A continuous core of the bedrock from 7 to 15 ft was collected and logged. A sample was selected for analysis from the very bottom of the core sample. Analytical results reported BTEX concentrations of 0.015 mg/kg, 0.015 mg/kg, 0.003J mg/kg, and 0.007 mg/kg, respectively. No TPH or PAH compounds were reported.

**Area 5.** The hydrocarbon plume in Area 5 is generally centered around a former dispenser island. The dispenser was supplied with aviation gasoline from two underground tanks at the northern storage tank area in Area 4. Borings (PB-6, 7, 11, 12, 13, 16, and 17) were located in Area 5 based on the soil vapor survey to sample the areas of greatest C5+ and methane concentrations, and to assist in adding closure to the vapor plume maps.

Borings PB-6, 12, and 13 were located within the area of greatest C5+ and methane signatures from the soil vapor survey; located south, west, and east of the dispenser, respectively. The greatest reported concentrations were at PB-6 and PB-13. At PB-6, at depth of 5 to 6 ft, combined BTEX concentrations were 0.014 mg/kg, with a TPH concentration of 159 mg/kg. PB-13 is located along the fuel supply line and reported concentrations, at a depth of 6 to 8 ft, of combined BTEX at 0.007 mg/kg and TPH at 490 mg/kg. PAH analysis on the TPH sample reported 2-methylnaphthalene at 3.80 mg/kg. Samples from PB-13 at a depth of 2 to 4 ft did not report any detectable compounds. West of the dispenser at PB-12, no compounds were identified at a depth of 0 to 2 ft, and only a TPH concentration of 78 mg/kg was reported from the 6 to 7 ft soil sample.

Soil samples were collected at the edges of the open soil vapor plume of Area 5. PB-7 was collected at a depth of 3 to 4 ft and reported only toluene at 0.006J mg/kg.

Borings PB-11 and PB-17 were located at the open edges of the Area 5 plumes. The only reported constituent from soil samples at these locations was toluene at 0.001J mg/kg at PB-11 (4 to 5 ft). The C5+ soil vapor plume was open to the west in Area 5. PB-16 reached bedrock at a depth of 3.5 ft. The soil sample collected at this depth reported a TPH concentration of 141 mg/kg. PAH analysis reported no detectable compounds.

An addition boring (OW-B) was drilled to a depth of 15 ft at location PB-13 to determine if groundwater was present below top of bedrock in the area of the lowest structure contour. The bedrock was sampled continuously with a core barrel from top of bedrock to terminal depth (7 to 15 ft). The stratigraphy consisted of chalky siltstone, weathered silty clays, and laminated shale. No organic vapor responses were recorded from any interval below top of bedrock.

**Summary.** Soil sample locations were based on the results of the soil vapor surveys. Final locations were selected to evaluate the vertical and lateral extent of contamination. Soil samples were collected in areas showing the greatest signatures of hydrocarbon vapors and at locations to evaluate the open soil vapor plumes. Areas 1 and 2 presents how the occurrence of surface releases, even subsequent to corrective action following the release, has continued to migrate both vertically and to the west. At Areas 1 and 2 there is no deterrent to contain surface releases from entering the soils except at the containment pads where the tanker trucks off-load. Only TPH levels exceed the PST target levels; however, based on PAH concentrations related to the presence of TPH data from other locations at the fuel farm, it is very unlikely that any PAH constituents will exceed target levels. No evidence of free-phase product was observed in Areas 1 or 2.

Areas 3 and 4 are indicative of areas that have experienced numerous surface releases, with no provision for containment except for off-loading pads. The areas of contamination are similar to the geometry of the underlying bedrock surface. This would allow for accumulation and concentration of hydrocarbons. Significant anerobic biodegradation is occurring throughout the plume area. Although TPH concentrations exceed PST target levels, the PAH analyses shows no cause for action. No evidence of free-phase product was observed in Areas 3 or 4.

Area 5 is an area of contamination not documented prior to this study. The geometry of the C5+ and methane soil vapor plumes indicate that the release to the soils was most likely caused from leaking fuel supply lines. The fuel lines no longer supply product to the dispenser. Borings were located in areas that served as both the greatest hydrocarbon concentration and the lowest surface for top of bedrock. Perimeter borings

indicate the area of contamination is contained. No evidence of free-phase product was observed in Area 5.

There is a marked reversal when the plumes from Area 4 and Area 5 are compared. Area 4 shows higher C5+ and lower methane vapor signatures than Area 5. Area 5 no longer has an active source for potential releases; therefore, the C5+ signature is decreasing while the biodegradation is allowed to continue. The asphalt and concrete cover also serves to somewhat contain the soil vapors. In Area 4, while anerobic degradation of the hydrocarbons is occurring, the operation of the fuel farm still allow for occasional releases of fresh hydrocarbons elevating the C5+ signature.

## GROUNDWATER SAMPLING PROGRAM

The site hydrogeology is dominated by the Austin Group of Upper Cretaceous age (66 to 90 million years before present). The Austin Chalk member is the unit that underlies the airport. It is a non-water bearing unit, generally impermeable, consisting of impure chalk, marl, and siltstone. This unit forms the bedrock surface beneath the weathered surface soils. The impermeability of the Austin Chalk mitigates groundwater from vertical migration. This can cause local perching of groundwater water in areas were percolation of precipitation and surface water is present. The Austin Chalk is not classified as a major or minor aquifer system within the State of Texas by the Texas Bureau of Economic Geology.

Nine existing monitoring wells have been identified in and throughout the fuel storage area. The wells are owned by various operators and were installed subsequent to TNRCC requests following release determinations. Some of them are waiting on approval from the TNRCC to abandoned and remove the wells. Evaluating the condition of these monitoring wells or collecting samples from them was not part of this study.

During the first set of field activities groundwater was only encountered at PB-4; located where the tank removal and closure of the Texas Pro Air fuel storage farm occurred. During the soil sampling program groundwater was encountered at a depth of 9 ft. One-inch diameter PVC casing, with 5 ft of screen, was inserted into the boring to the final depth of the boring at 11 ft. The water level was allowed to stabilize for two hours, where it reached a level of 7 ft bgs. Because the prolific nature of the perched water was unknown, only two gallons of water were purged from the well before sample collection began to assure adequate sample was available. The water was noticeably clearer after the purging. After collection of the water sample, the casing was pulled and the borehole grouted with bentonite pellets. The groundwater sample was analyzed for

BTEX, MTBE, and TPH. The only compound reported was TPH at 2 mg/L. The PST target level for TPH in groundwater is 5 mg/L.

No groundwater was encountered above the bedrock contact in any other soil borings. Because of the similar geometry of the hydrocarbon plume maps and the structure contour maps, two well locations were selected: at the location of PB-14 (Area 4) and near PB-13 (Area 5). The well/borehole at PB-14 was designated as OW-A. The soils were very dry until groundwater was encountered at 11 ft. The borehole was terminated at a depth of 15 ft. A 2-in. PVC well was installed with 10 ft of slotted screen and completed flush with the ground surface in accordance with TNRCC guidance. The monitoring well log sheet and well report form are included in Attachment B following the log of boring for PB-14.

The well was developed using a submersible pump until the groundwater was clear and pH and conductivity stabilized. The well was purged until fully evacuated then allowed to recharge. Each evacuation produced about 10 gallons. A total of 45 gallons was purged. The monitoring well was allowed to stabilize for 2 hours prior to sampling. The static water level was measured at 3.2 ft below the top of the well casing. The groundwater sample was collected using a peristaltic pump and analyzed for BTEX, MTBE, TPH, and PAHs. No free-phase product or sheen was observed. The analytical results reported no BTEX constituents detected, MTBE at 0.021 mg/L, TPH at 0.0117 mg/L, and 2-methylnaphthalene at 0.087 mg/L. Only the 2-methylnaphthalene exceeded PST target levels for groundwater of 0.073 mg/L.

## DOCUMENT REVIEW AND SITE RECONNAISSANCE

As part of this initial study, a review of available documents and a visual reconnaissance of the fuel storage areas were conducted. The four fuel storage areas were previously presented as Figures 2 through 6.

**Document Review.** Available files from the airport and Town were reviewed, along with a regulatory database search conducted by Environmental Data Resources, Inc. (EDR). In addition, where available, files at the TNRCC in Austin, Texas were reviewed. The EDR database search did not identify any new actions or events since the August 2001 Phase I ESA. The complete report of the regulatory database search findings within the search radii is included as Attachment D. A set of aerial photographs (1942, 1958, 1970, 1984, and 1994) were obtained with the database search and are included in this report in Attachment E.

Review of both the TNRCC and Town files provided numerous records confirming surface spills that occurred at the fuel farm by various operators. Many of these were greater than the TNRCC-specified reportable quantity for petroleum products and were assigned a LRST (leaking registered storage tank) number for corrective action tracking. No records were identified that documented leakage of petroleum storage tanks in the subsurface. Old boring logs and an electromagnetic survey of the fuel farm area were also present.

The existing storage tanks have been installed at dates ranging from 1957 through 1985. Current registration of the tanks with the TNRCC has occurred from 1986 through 1998. Only the Million Air fuel farm (storage area #2) was compliant with tank release detection (TRD) requirements by using groundwater monitoring. All other operators have reported inventory control, static inventory reconciliation, and tightness testing as their primary and secondary methods of TRD. By December 1998, the TNRCC also required that a cathodic protection system (CPS) be installed on all steel underground storage tanks that were not wrapped in fiberglass. Only Million Air, Addison Express, R. Stern, and Cherry Air have reported that a CPS is installed at their facilities. Current regulations regarding underground storage tanks also require spill and overflow protection (SOP). The current operators have reported SOP systems to include shut-off valves, flow restrictor valves, and spill container/liquid tight sumps. Table 2 presents a brief equipment summary of the items reported by the operators to the TNRCC.

**Site Reconnaissance.** A site reconnaissance was conducted during the soil vapor and soil sampling programs to visually observe conditions of the fuel storage areas. The purpose of the reconnaissance was to assist in evaluating the site-specific conditions that could possibly contribute to hydrocarbon contamination in the surface and subsurface soils and groundwater.

Initial inspection showed that each of the four fuel storage areas had a curbed containment area for off-loading of the fuel tankers. However, most of the past reported surface spills were caused by overflowing and spillage within the tank area. None of the current fuel farms has spill control measures to mitigate spread of hydrocarbons to the surface and eventual subsurface soils when a spill occurs. Any spills or overfill events are discharged directly onto the ground surface. During a recent spill at the Addison Express fuel area (storage area #3), it was identified that a surface drain existed along the nearest T-hangar that led directly to a storm water diversion ditch. Spills of significant amounts could flow across the ground surface and asphalt/concrete to the storm water

drainage pipe and into the ditch. Records also indicate that spills at storage area #4 (Cherry Air) have shown up in the ditch also.

Ten of the 29 USTs within the four fuel storage areas have not been actively receiving and distributing fuel for over 12 months. Inactive tanks are required to be taken out of service. Discussions with the tank operators indicate that fuel is probably still present in these tanks. If the tanks are not brought back into service in the very near future, closure plans should be made to remove the fuel and tanks completely. However, tanks left in the ground without any fuel in the interim run the possibility of being pushed upward, out of the ground by the buoyant soils below.

Another item that may contribute to continued contamination is the filling operations. Fueling suppliers have 24 hours access to the fuel farm areas. Spills have occurred through misunderstanding of which tanks are in need of fuel, and inadvertently filling a full or near-full tank. Based on the spill records available it is also very questionable whether the overflow prevention and warning equipment is adequate or even operating.

INSERT TABLE 2

## TABLE 2 - TANK EQUIPMENT SUMMARY

| | Tank # | Operator | Size | Contents | Installed | Registered | TRD #1 | TRD #2 | Tank CPS | Spill/Overflow | Vapor Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AREA #1 | 1 | *Millennium - OS* | 4,000 | MoGas | 1/1/57 | 5/8/86 | IC | SIR | – | SOV | – |
| | 2 | *Fairway - OS* | 12,000 | Jet A | 1/1/57 | 5/8/86 | IC | SIR | – | SOV | – |
| | 3 | *Fairway - OS* | 12,000 | Jet A | 1/1/57 | 5/8/86 | IC | SIR | – | SOV | – |
| | 4 | *Millennium - OS* | 12,000 | AvGas | 1/1/57 | 5/8/86 | IC | SIR | – | SOV | – |
| | 5 | *Millennium - OS* | 12,000 | AvGas | 1/1/57 | 5/8/86 | IC | SIR | – | SOV | – |
| | 6 | Mercury | 17,000 | Jet A | 1/1/57 | 1/12/99 | IC | SIR | – | FRV | – |
| | 7 | Mercury | 12,000 | Jet A | 1/1/79 | 5/8/86 | IC | SIR | – | FRV | – |
| | 8 | *Millennium - OS* | 12,000 | Jet A | 1/1/79 | 5/8/86 | IC | SIR | – | FRV | – |
| | 9 | *Millennium - OS* | 12,000 | Jet A | 1/1/79 | 5/8/86 | IC | SIR | – | FRV | – |
| AREA #2 | 1 | Million Air | 12,000 | AvGas | 1/1/84 | 5/8/86 | GM | IC | X | SC | – |
| | 2 | Million Air | 12,000 | AvGas | 1/1/84 | 5/8/86 | GM | IC | X | SC | – |
| | 3 | Million Air | 5,000 | MoGas | 1/1/84 | 5/8/86 | GM | IC | X | SC | – |
| | 4 | Million Air | 12,000 | Jet A | 1/1/84 | 5/8/86 | GM | IC | X | SC | – |
| | 5 | Million Air | 12,000 | Jet A | 1/1/84 | 5/8/86 | GM | IC | X | SC | – |
| | 6 | *Stern - OS* | 12,000 | AvGas | 1/1/84 | 5/16/86 | – | – | – | – | – |
| | 7 | *Stern - OS* | 12,000 | AvGas | 1/1/84 | 5/16/86 | – | – | – | – | – |
| AREA #3 | 1 | Mercury | 4,000 | MoGas | 1/1/85 | 11/10/92 | IC | SIR | – | FRV | – |
| | 2 | Mercury | 12,000 | AvGas | 1/1/85 | 11/10/92 | IC | SIR | – | FRV | – |
| | 3 | Mercury | 12,000 | AvGas | 1/1/85 | 11/10/92 | IC | SIR | – | FRV | – |
| | 4 | Addison Express | 4,000 | MoGas | 1/1/82 | 4/27/98 | – | – | X | – | – |
| | 5 | Addison Express | 12,000 | AvGas | 1/1/82 | 4/27/98 | IC | TT | X | FRV | – |
| | 6 | Addison Express | 12,000 | AvGas | 1/1/82 | 4/27/98 | IC | TT | X | FRV | – |
| | 7 | Addison Express | 12,000 | Jet A | 1/1/82 | 4/27/98 | IC | TT | X | FRV | – |
| | 8 | Addison Express | 12,000 | Jet A | 1/1/82 | 4/27/98 | IC | TT | X | FRV | – |
| | 9 | Addison Express | 12,000 | Jet A | 1/1/82 | 4/27/98 | IC | TT | X | FRV | – |
| | 10 | *R. Stern - OS* | 12,000 | Jet A | 1/1/82 | 5/16/86 | – | – | X | – | – |
| | 11 | *R. Stern - OS* | 12,000 | Jet A | 1/1/82 | 5/16/86 | – | – | X | – | – |
| AREA #4 | 1 | Cherry Air | 12,000 | Jet A | 1/1/83 | 2/12/90 | IC | TT | X | SOV | – |
| | 2 | Cherry Air | 12,000 | Jet A | 1/1/83 | 2/12/90 | IC | TT | X | SOV | – |

TDR = Tank Release Detection; IC = Inventory Control; SIR = Static Inventory Reconciliation; OS = Out of Service;
CPS = Cathodic Protection System; SOV = Shut-off Valve; FRV = Flow Restrictor Valve; TT= Tightness Testing
GM = Groundwater Monitoring; SC = Spill Container/Liquid-Tight Sump
– = Not Present

## SUMMARY OF FINDINGS

The following represent our findings based on the study items conducted:

1. Subsurface soils are contaminated with petroleum hydrocarbons at the fuel storage tank and dispenser areas.
2. Contamination has occurred through operational surface spills over an extended period of time, and possibly through leaking underground storage tanks.
3. Contamination does not appear to have migrated offsite, including under Addison Road to the east.
4. Contamination in the area of the former fuel dispenser has not been previously reported to the TNRCC. A Release Determination Report is now required to be submitted based on the results of this study.
5. Analytical results of the soil vapor survey indicate that natural attenuation and biodegradation is occurring in the subsurface soils where petroleum hydrocarbons have been identified.
6. Hydrocarbons in the soil have been identified at concentrations greater than TNRCC-PST target levels.
7. Groundwater was not encountered in the area of the former dispenser. Contaminated groundwater was identified west of Area 4 below the top of bedrock.
8. Groundwater beneath the site appears to be under both confined and perched conditions.
9. The current fuel storage areas operated by the FBO's do not fully comply with current TNRCC petroleum storage tank regulations.

## CONCLUSIONS

This report serves as a summary of Tasks 1 through 7 for our proposed scope of work for the Phase II Environmental Site Assessment. The objective of the Phase II study was to obtain sufficient data to delineate the extent of contamination in the fuel farm area. Based on our findings, the following items are submitted as the next course of action to be taken by the Town of Addison.

The TNRCC has developed rules to implement a risk-based corrective action program for Leaking Petroleum Storage Tank (LPST) sites. The goal of this program is to get low risk sites to closure quickly and appropriately. Closure is initially conducted under a Plan A site evaluation. If after the Plan A evaluation, the exit criteria do not close individual pathways, then "further corrective action" may be required. This could consist

of a Plan B evaluation, site cleanup (including natural attenuation), or implementation of controls. Closing the pathway with controls means the immediate placement of an institutional control that would be the basis for immediate closure of that pathway. We believe the data collected for the fuel farm provide the ability to seek closure under the Plan A evaluation with implementation of natural attenuation where addition action may be necessary.

**PLAN A EVALUATION.** This Phase II environmental site assessment, in conjunction with the requirements of the Petroleum Storage Tank Division Assessment Report Form (TNRCC-0562), would constitute a Plan A evaluation. The completed form and study include a series of flow charts and exit criteria evaluate and document whether exposure pathways (air, soil, and groundwater) can be closed. The exit criteria will close individual exposure pathways that either 1) do not exceed Plan A target concentrations, or 2) can be qualitatively determined to have no likely potential for current or future exposure. Closure of a pathway does not mean closure of the case. Only when all pathways can be closed, is complete site closure appropriate.

The assessment report form is completed for all releases to the environment. These forms have been completed in the past for the individual releases the tank operators have experienced over the years; allowing each individual release to be closed. This would continue to be the case if the fuel farm remains to operating under its currently condition. However, beginning in 2003 releases that occur at LPST sites will no longer be handled under the PST target guidelines, but will be administered under the Texas Risk Reduction Program (TRRP). The TRRP program has more conservative target and action levels than the current PST program, and requires more documentation and trend analysis for natural attenuation alternatives to be accepted. Most of the fuel farm could be grandfathered into the PST program should corrective action be conducted after TRRP becomes effective for LPST sites. If new releases commingle with older releases or contamination, or they cannot be differentiated, then the more conservative TRRP guidelines and corrective action program will need to be followed. This could affect the closure program for the entire site. A brief summary of the items within the Plan A assessment report that have an affect on this program are discussed below.

**PLAN A SURVEYS.** These surveys consist of items that are either readily available or can be found in current documentation. A receptor survey and water well inventory would identify the potential receptors and exposure pathways, should any exist. It is used to determine the final target cleanup level. Combined with the site assessment the potential migration pathways that require evaluation are selected.

**SOIL ASSESSMENT.** The Phase II study characterized the subsurface soils of the source areas. Besides one incident of benzene, TPH was the only other constituent to exceed the PST target level for soil. The TPH target level of 100 mg/kg is an indication that PAH analyses may be required to achieve construction worker protection. Samples selected for PAH analysis only identified one PAH constituent (2-methylnapathalene) at levels well below the target level. The overall low contaminant levels in the soil, impervious cover over a large majority of the affected soil area, and the lack of known receptors that could be exposed, sets a strong basis for natural attenuation. Soil vapor analyses also show that active anerobic biodegradation is occurring in the subsurface soils were hydrocarbon contamination is present.

An essential point for closing the soil pathway under Plan A is the mitigation of potential releases. As long as surface spills following current operational practices occur the site will not be eligible for closure under the PST Plan A guidelines. A scenario of no future releases is necessary.

**GROUNDWATER ASSESSMENT.** Target groundwater concentrations are established to be protective of impacts to wells that supply drinking water or other domestic use where ingestion is a pathway, or inhalation of volatiles and dermal exposure to construction workers. The Plan A evaluation will need to document that the contaminated groundwater plume has stabilized, hydrocarbon concentrations are decreasing, and vapors do not cause a potential hazard to any receptors.

Generally four sampling events for contaminants and two rounds of natural attenuation parameters are required to show that groundwater has been contained. This could be accomplished with quarterly sampling. Additional wells may be required to define the extent of contaminated groundwater. However, with the additional wells from previous operator activities it is possible that the combination of all wells, based on the current understanding of the hydrogeology, could satisfy monitoring requirements. Mitigation of future releases would be required for the Town to proceed with closure requirements for groundwater.

**NATURAL ATTENUATION.** Natural attenuation is the reduction in mass or concentration of a chemical of concern over time or distance from the source due to naturally occurring physical, chemical, and biological processes, such as: biodegradation, dispersion, dilution, adsorption, and volatilization.

Natural attenuation in soils is generally accepted by the TNRCC at LPST sites if nonaqueous-phase hydrocarbons are not present, future releases are mitigated, and risk

to the construction worker has been evaluated. The soil conditions and concentrations of hydrocarbons at the airport fuel farm meet these initial criteria. Natural attenuation is also a likely remedial alternative for contaminated groundwater at the site. For the purposes of this study only two groundwater locations (PB-11 and OW-A) yielded a sample for analysis. There are nine additional wells identified in the fuel farm area that may be in adequate condition for monitoring the groundwater parameters. Additional documentation of hydrocarbon degradation in groundwater will probably be required. The TNRCC requires four sampling events to establish a decline in hydrocarbon concentrations, and at least two events of natural attenuation parameters, such as dissolved oxygen, iron (II), oxidation-reduction potential, and pH.

SUMMARY. This site is an ideal candidate for the obtaining closure through the PST Plan A guidelines if surface releases can be mitigated. This is not likely to occur until a new fuel farm is constructed and the existing storage area is no longer operating. Every new release episode will make it more difficult to close under the PST guidelines instead of the upcoming TRRP.

Because of the low hydrocarbon concentrations in the soil and groundwater, active anerobic biodegradation, lack of a prolific aquifer, no free-phase product, and no receptors in the vicinity, acceptance of a natural attenuation scenario would provide the most cost efficient and scientific alternative to remediation. The minor exceedance of the PST target levels can be handled with simple controls and short-term monitoring of the soil and groundwater media.

ESTIMATED COSTS OF NATURAL ATTENUATION SCENARIO. Costs associated with developing a natural alternative scenario to present to the TNRCC are discussed briefly in this section. The estimates are provided to give the Town a general idea of the level of effort and appropriation that might be required to close the site under the PST Plan A guidelines. It does not take into account additional risk evaluations (Plan B) should conditions change or if TRRP guidelines are required. Our estimated costs for closure under a natural attenuation scenario is between $65,000 and $80,000. This does not include any construction, demolition, tank removal, or quality control that may be required.

Items that will and/or may be required to complete the Plan A are shown below:

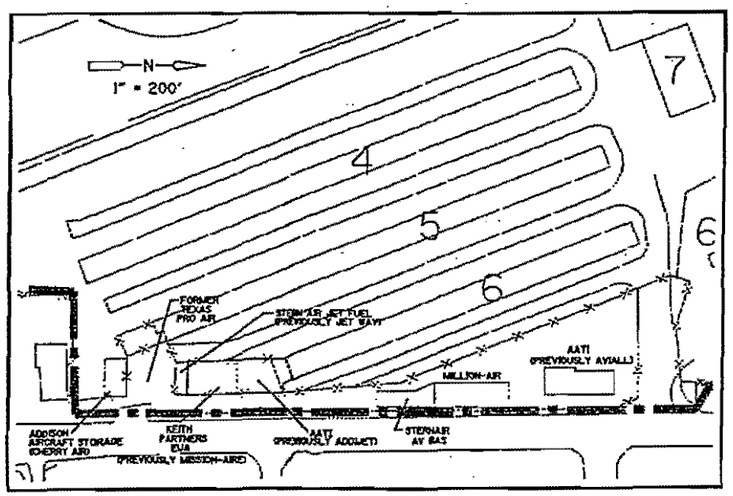
- Stop future releases to soil and groundwater (this may require current fueling operations and practices to cease)
- Evaluate if existing wells are adequate for groundwater monitoring

- Collect first round of contaminant and natural attenuation indicator parameters
- Notify TNRCC of intent to submit a Plan A closure and schedule a meeting
- Conduct necessary field tasks based on the TNRCC meeting
- Submittal of Plan A documentation and Corrective Action Plan
- Monitor conditions for approximately one year (four quarterly sampling events)
- Submit request for closure

The Environmental Assessment study and Assessment Report Form (Plan A) need to be submitted to the TNRCC along with a proposed Corrective Action Plan (CAP). The CAP will outline the rationale of the program based on the closure or potential closure of the contaminated media at the site. Meetings with the TNRCC should occur prior to beginning the Assessment Report Form, during interim sampling of groundwater, and prior to presenting the closure request documentation. The initial meeting with the TNRCC will help in defining whether additional monitoring wells will be required to define the extent of groundwater contamination in the upper bedrock.

## LIMITATIONS

The information, data, interpretations, conclusions, and recommendations presented in this report are based upon the scope of work agreed to between Washington Group International and the Town of Addison and have been presented under use of standard engineering practices and care. This report should not be used for any purpose other than for what it was intended.




ENLARGED PLAN - FUEL FARMS




ADDISON AIRPORT
ADDISON, TEXAS

# SITE LAYOUT PLAN

FIGURE 1

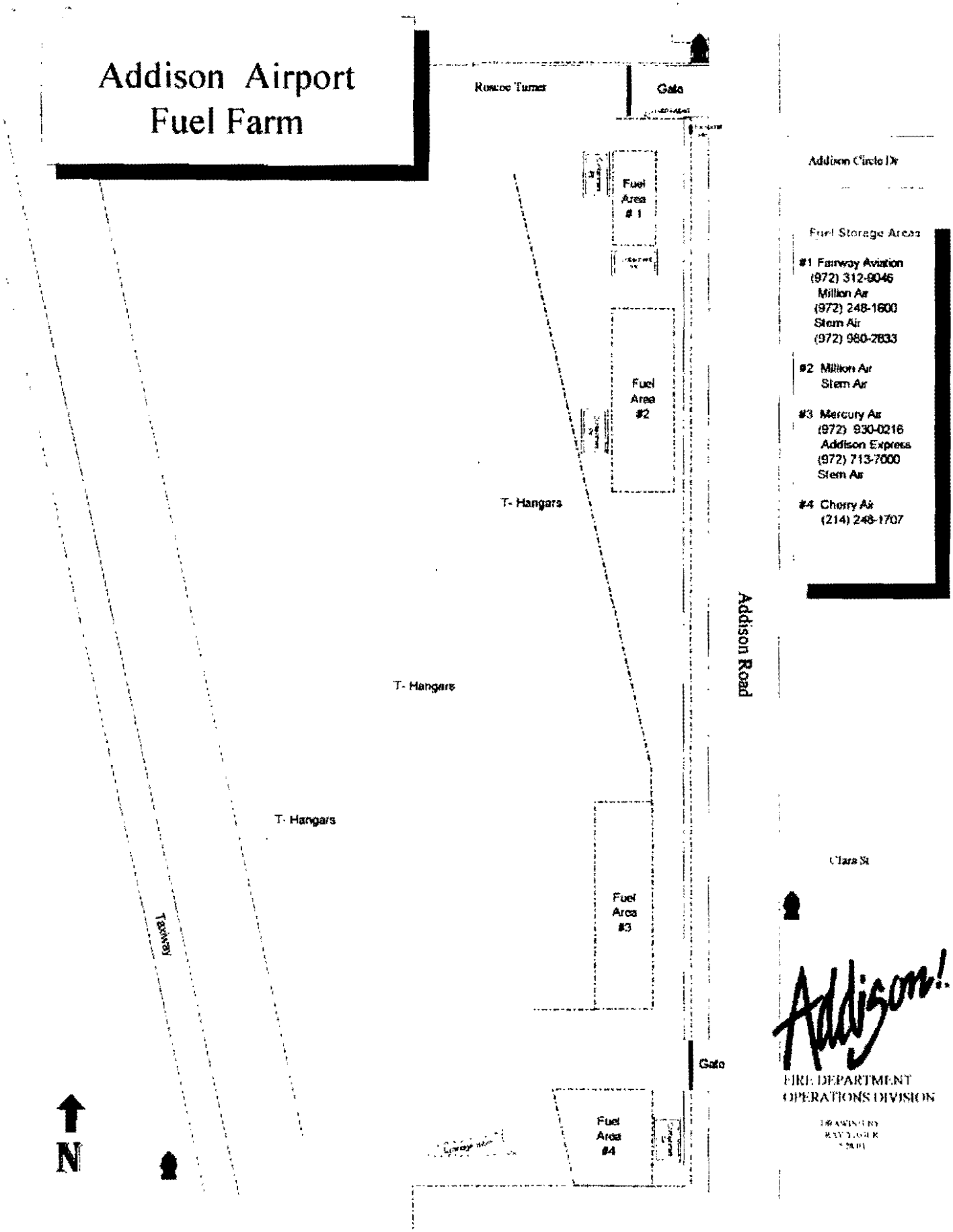

Addison Airport
Fuel Farm
Roscoe Turner
Gate
Addison Circle Dr
Fuel Area # 1
Fuel Area #2
T- Hangars
T- Hangars
T- Hangars
Addison Road
Fuel Area #3
Gate
Fuel Area #4
Taxiway
N
Fuel Storage Areas
#1 Fairway Aviation
(972) 312-9046
Million Air
(972) 248-1600
Stem Air
(972) 980-2833
#2 Million Air
Stem Air
#3 Mercury Air
(972) 930-0216
Addison Express
(972) 713-7000
Stem Air
#4 Cherry Air
(214) 248-1707
Clara St
Addison!
FIRE DEPARTMENT
OPERATIONS DIVISION

Figure 2

# Addison Airport
# Fuel Farm
# Fuel Storage area #1

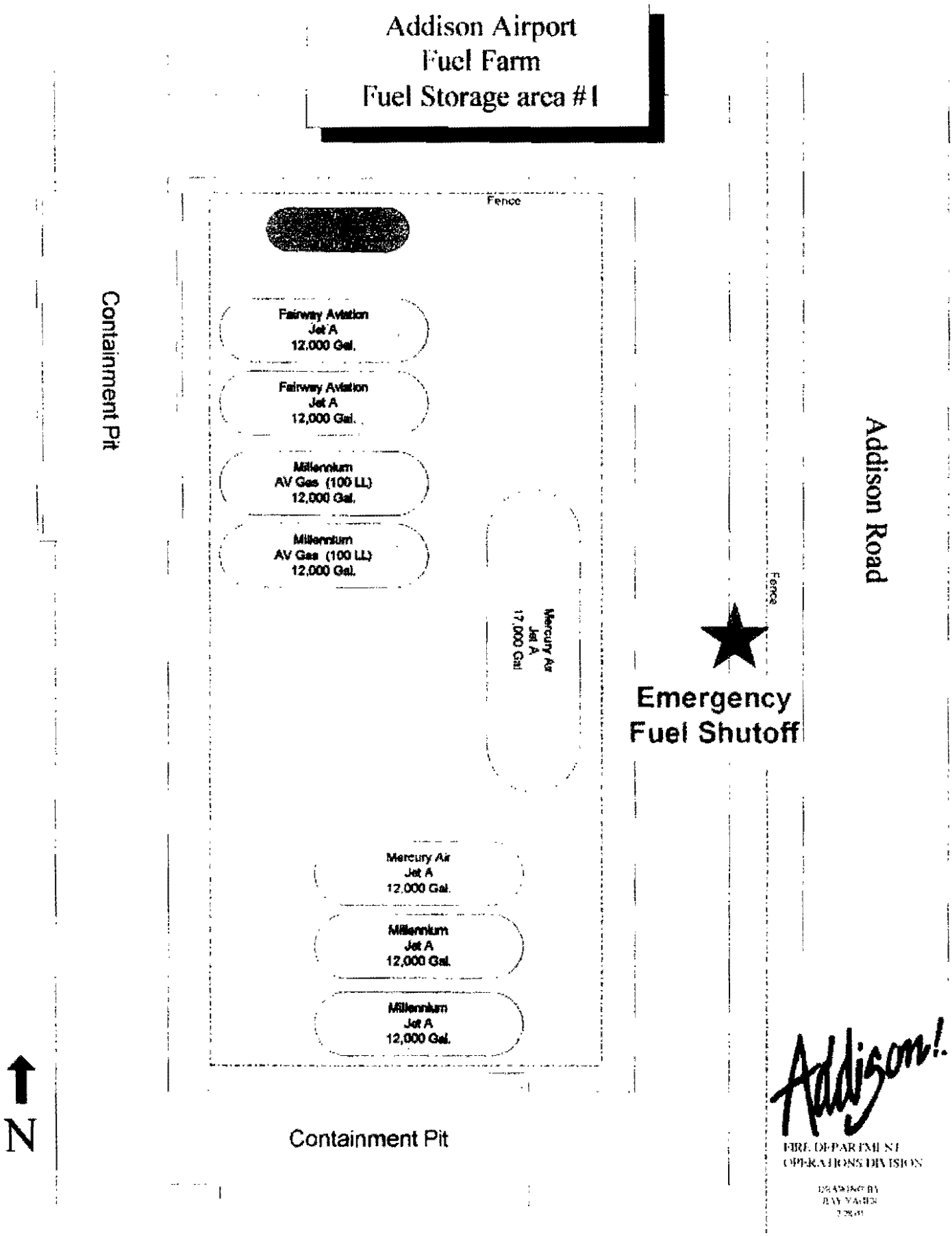



Figure 3

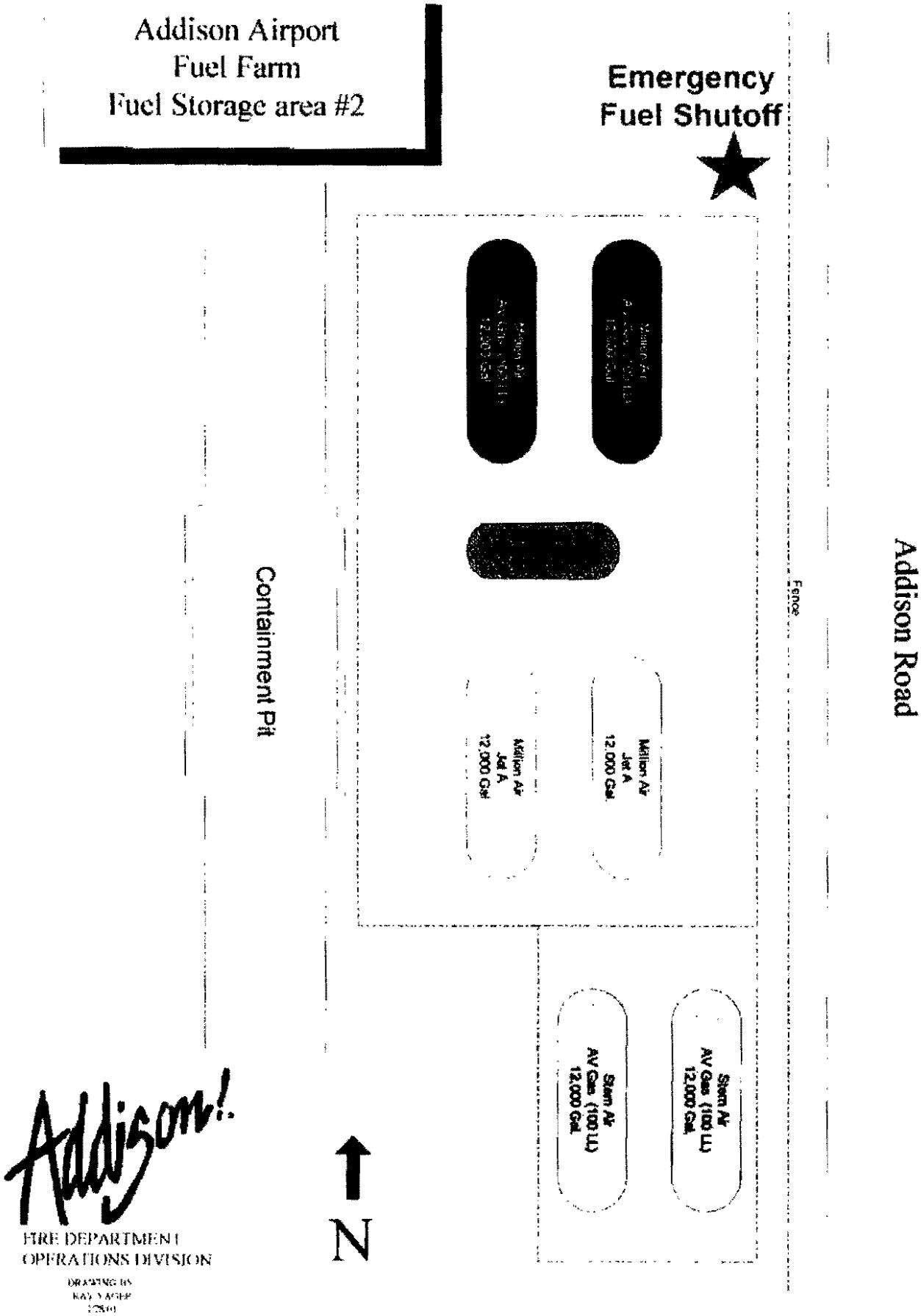

Addison Airport
Fuel Farm
Fuel Storage area #2
Emergency
Fuel Shutoff
Addison Road
Containment Pit
Fence
Million Air
Jet A
12,000 Gal
Million Air
Jet A
12,000 Gal
Stem Air
Av Gas (100 LL)
12,000 Gal
Stem Air
Av Gas (100 LL)
12,000 Gal
N
Addison!
FIRE DEPARTMENT
OPERATIONS DIVISION

Figure 4

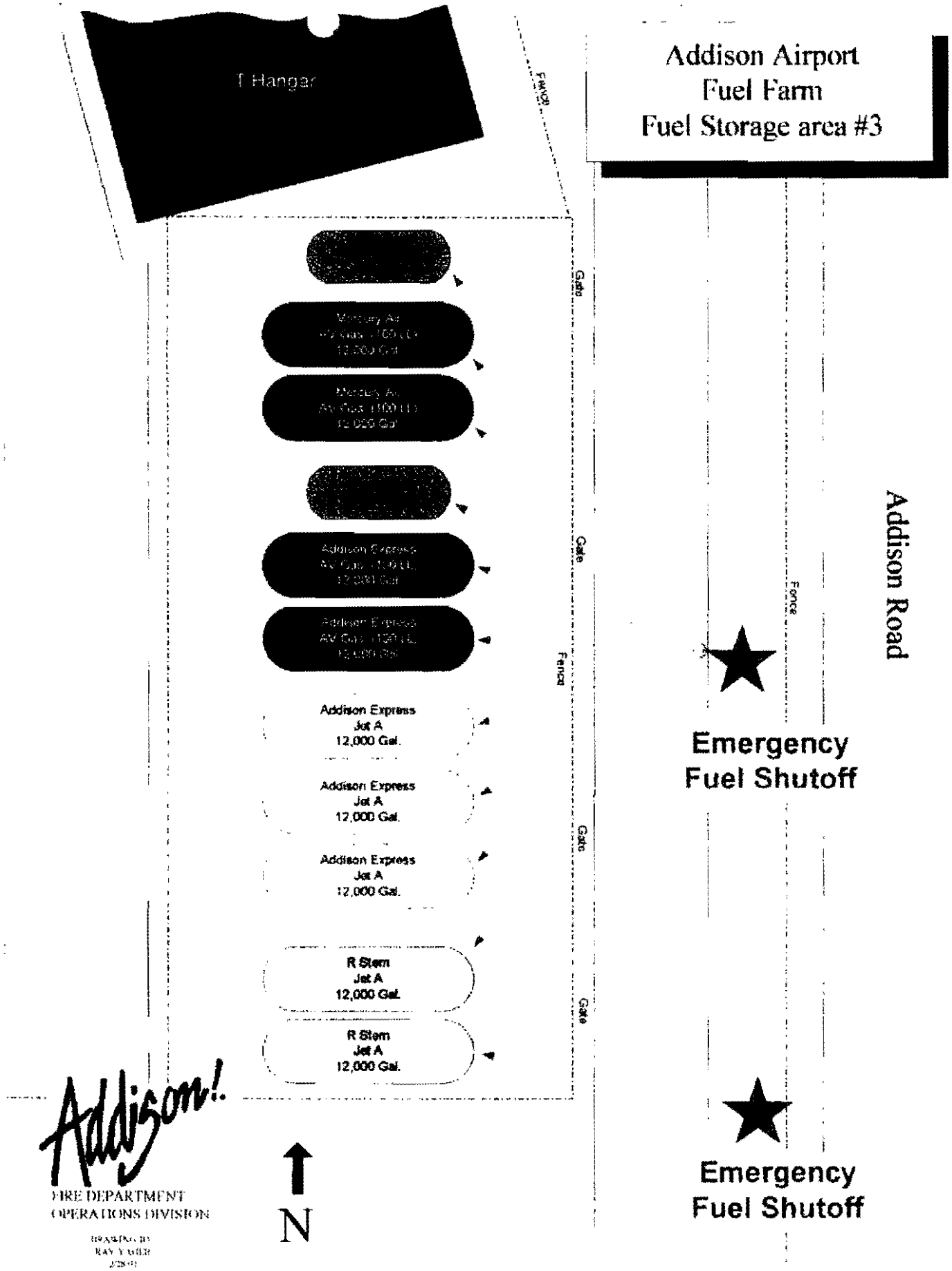

Addison Airport
Fuel Farm
Fuel Storage area #3
T Hangar
Fence
Gate
Addison Express
Jet A
12,000 Gal.
Addison Express
Jet A
12,000 Gal.
Addison Express
Jet A
12,000 Gal.
R Stem
Jet A
12,000 Gal.
R Stem
Jet A
12,000 Gal.
Addison Road
Emergency
Fuel Shutoff
Emergency
Fuel Shutoff
N
Addison!
FIRE DEPARTMENT
OPERATIONS DIVISION

Figure 5

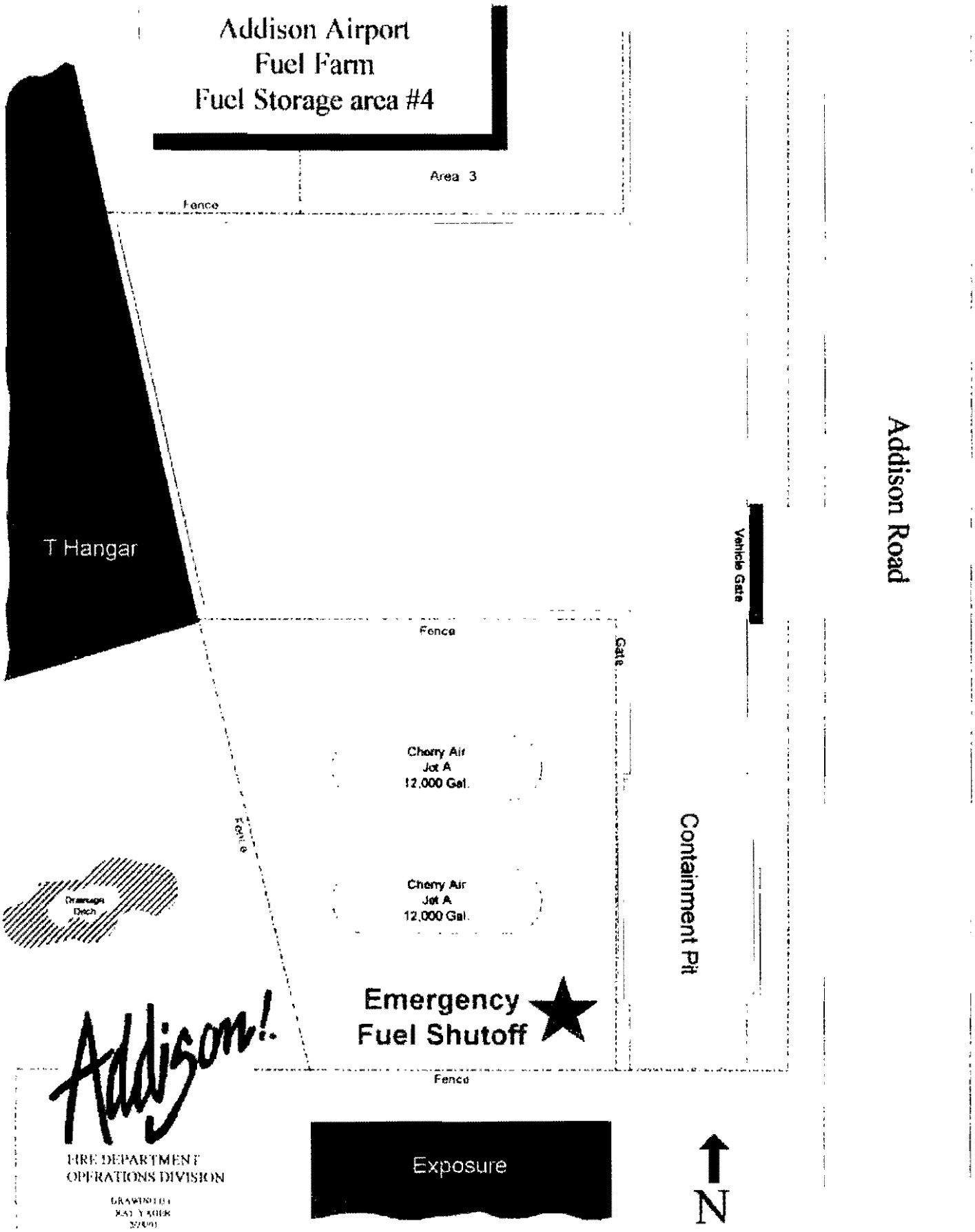
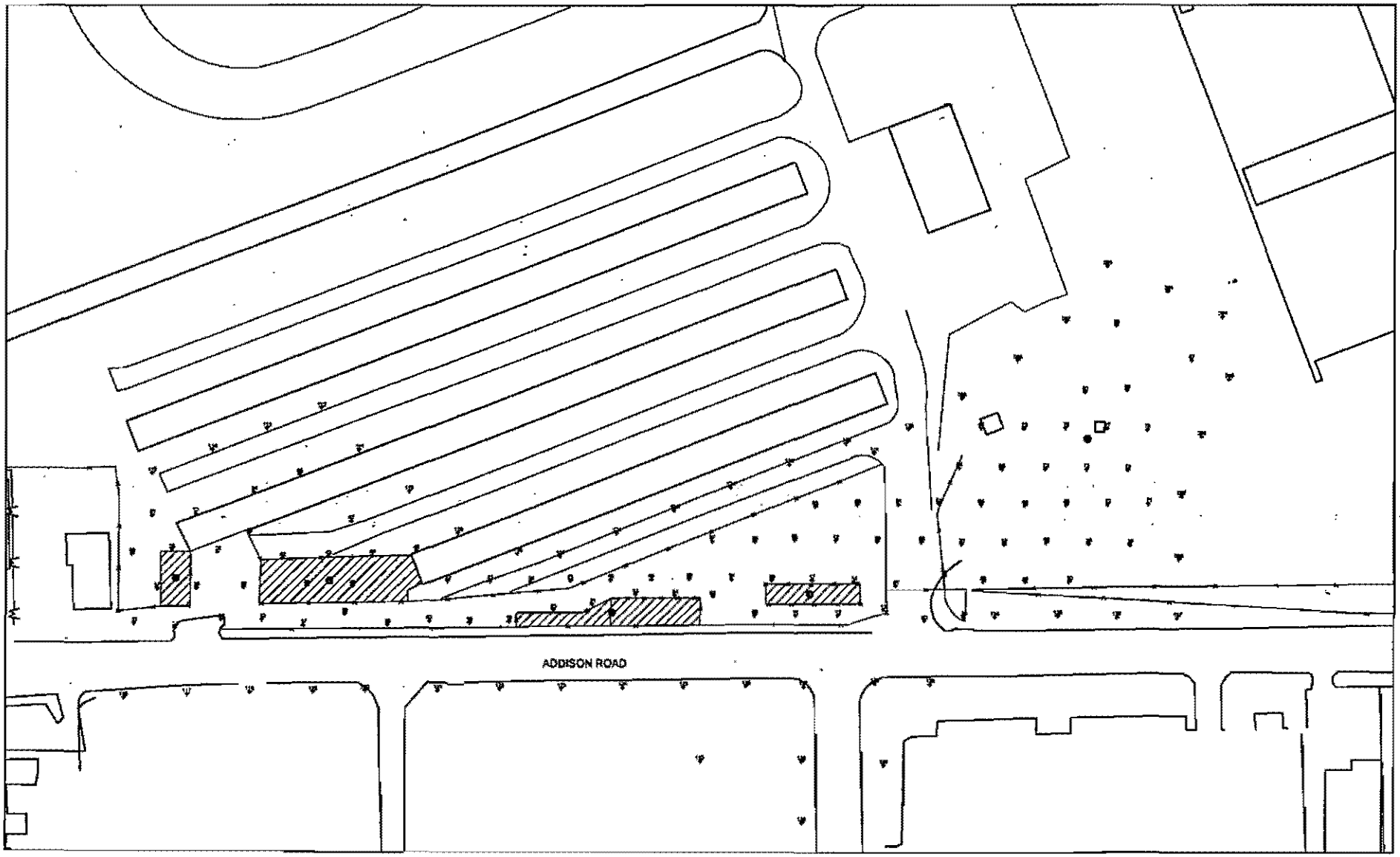

Addison Airport
Fuel Farm
Fuel Storage area #4
Area 3
Fence
T Hangar
Addison Road
Vehicle Gate
Fence
Gate
Cherry Air
Jet A
12,000 Gal.
Fence
Containment Pit
Drainage Ditch
Cherry Air
Jet A
12,000 Gal.
Emergency
Fuel Shutoff
Addison!
Fence
FIRE DEPARTMENT
OPERATIONS DIVISION
Exposure
N

Figure 6




N

0 50 100
GRAPHIC SCALE IN FEET

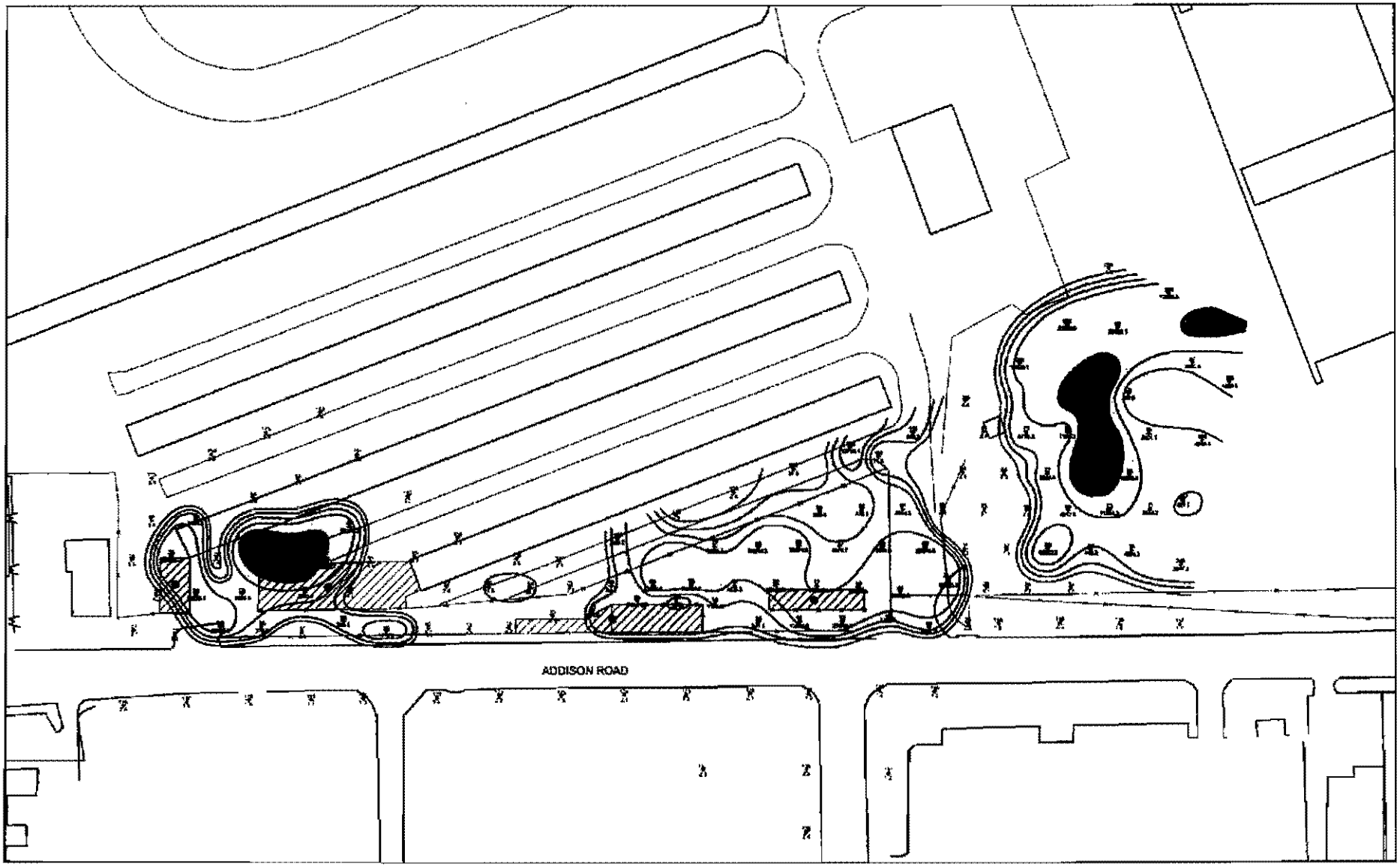
LEGEND
Areas Containing USTs

Exploration Technologies, Inc.

Plate 1
Soil Vapor Sampling Locations

Addison Airport
Addison, Texas
Prepared For:
Washington Group International

Base Map Modified After:
Survey Outfitting & Company, Tulsa, OK (May, 1999)




N

0 50 100
GRAPHIC SCALE IN FEET

**LEGEND**
Areas Containing USTs

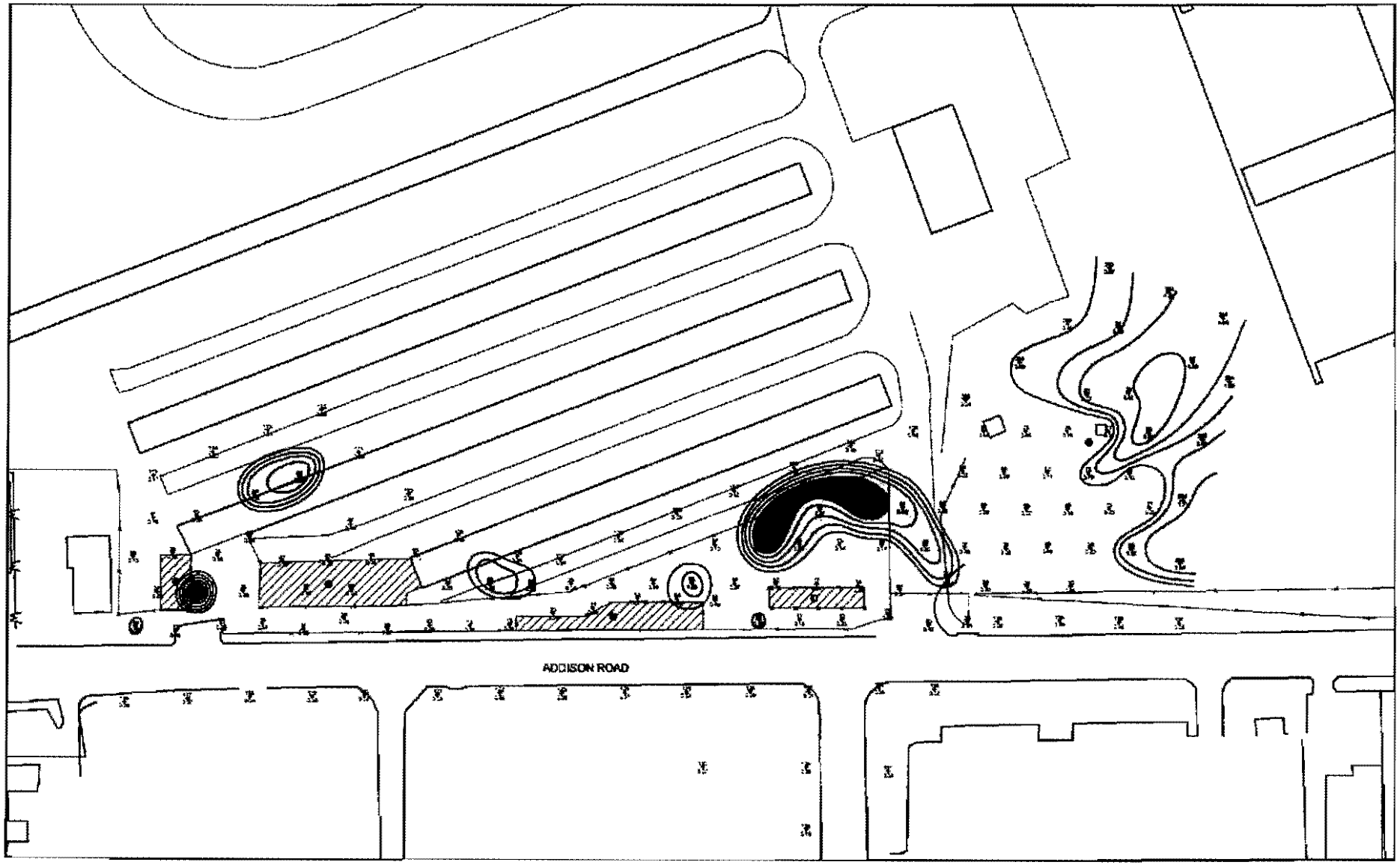
**METHANE CONCENTRATIONS (ppmv)**
- > 200,000
- 100,000 - 200,000
- 10,000 - 100,000
- 1,000 - 10,000
- 100 - 1,000
- 10 - 100
- < 10

Exploration Technologies, Inc.

Plate 2
Methane Concentrations (ppmv)

Addison Airport
Addison, Texas
Prepared for
Washington Group International

Base Map Modified from
Barnard Dunkelberg & Company - Tyler, TX (May, 1995)




N

0 50 100

GRAPHIC SCALE IN FEET

LEGEND

Areas Containing USTs

PROPANE CONCENTRATIONS (ppmv)

> 10.0
5.0 - 10.0
2.0 - 5.0
1.0 - 2.0
0.5 - 1.0
< 0.5

Exploration Technologies, Inc.

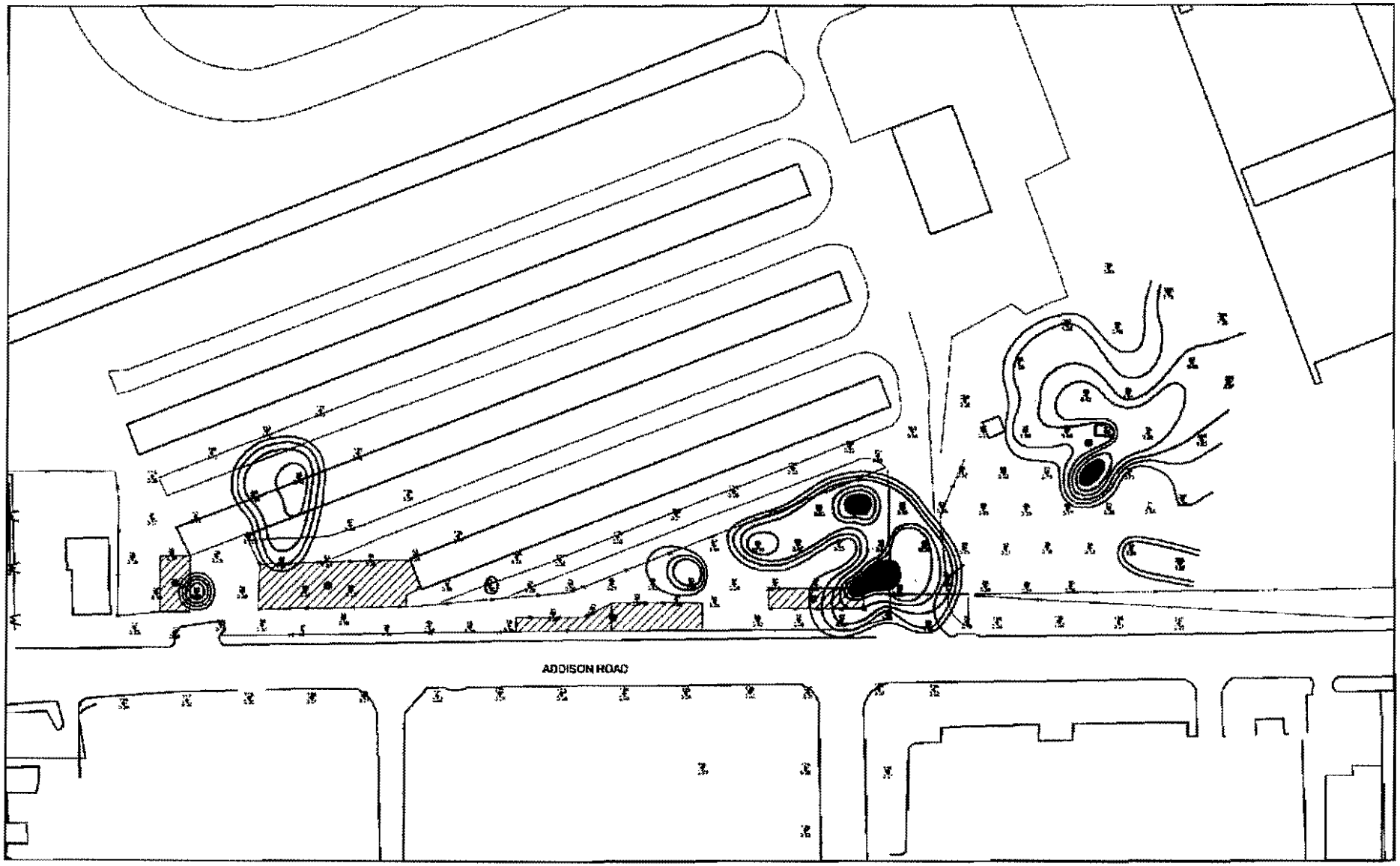
Plate 3

Propane Concentrations (ppmv)

Addison Airport
Addison, Texas

Prepared For

Bernard Consulting & Company - Tulsa, OK (May, 1994)




N

0 50 100
GRAPHIC SCALE IN FEET

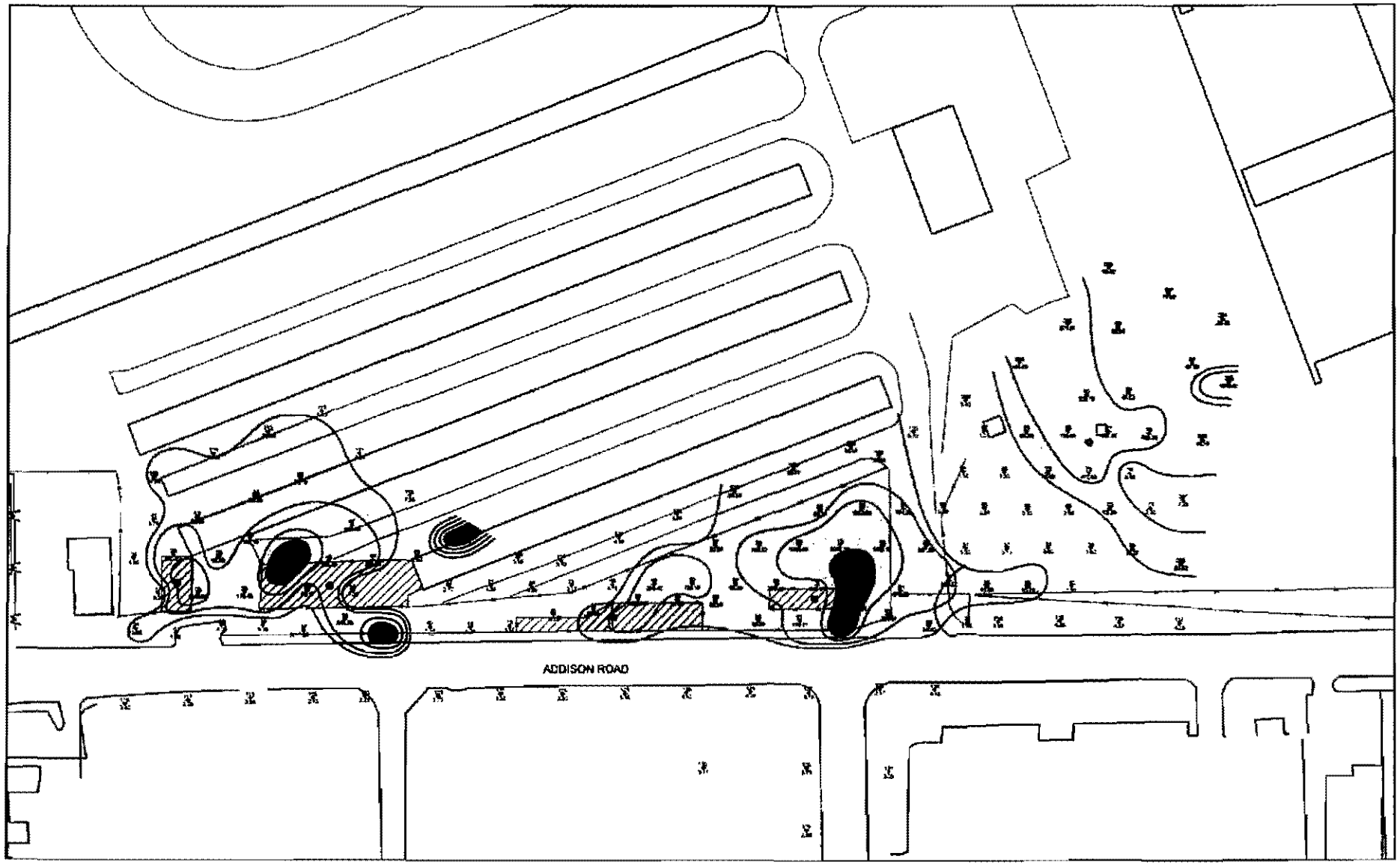
LEGEND
Areas Containing USTs

N-BUTANE CONCENTRATIONS (ppmv)
> 30.0
15.0 - 30.0
5.0 - 15.0
2.0 - 5.0
1.0 - 2.0
0.5 - 1.0
< 0.5

Exploration Technologies, Inc.

Plate 4
N-Butane Concentrations (ppmv)

Addison Airport
Addison, Texas




N

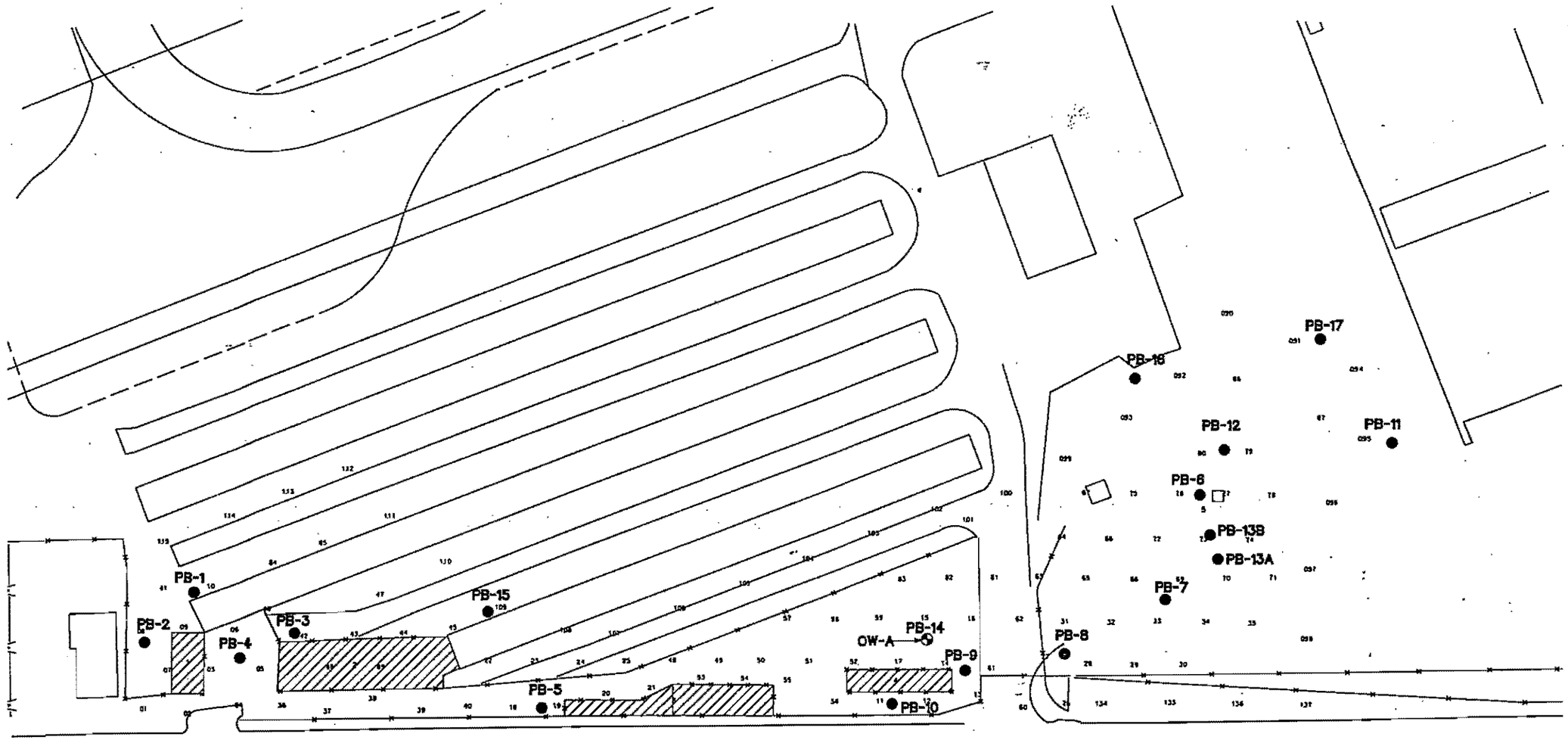
0 50 100
GRAPHIC SCALE IN FEET

LEGEND
Areas Containing LNTs

C5+ CONCENTRATIONS (ppmv)
> 3,000
1,000 - 3,000
100 - 1,000
10 - 100
< 10

Exploration Technologies, Inc.

Plate 5
C5+ Concentrations (ppmv)




TEMPLATE PROVIDED BY
EXPLORATION TECHNOLOGIES, INC.
HOUSTON, TX

FIGURE 12

| NO. | DATE | REVISION | APPRVD |
|---|---|---|---|
| | | | |

Washington
Infrastructure Services
1011 Richmond Avenue Suite 500
Houston, TX 77042 (281)529-3100

EXPLORATION TECHNOLOGIES, INC.
3898 WESTCHASE DR.
HOUSTON, TX 77042

BORING LOCATION MAP

ADDISON AIRPORT
FUEL FARM AREA
ADDISON, TEXAS

| | |
|---|---|
| Designed | Horz. Scale: |
| Drawn | Vert. Scale: |
| Checked | Date: |
| Contract No. | Sheet No.: |

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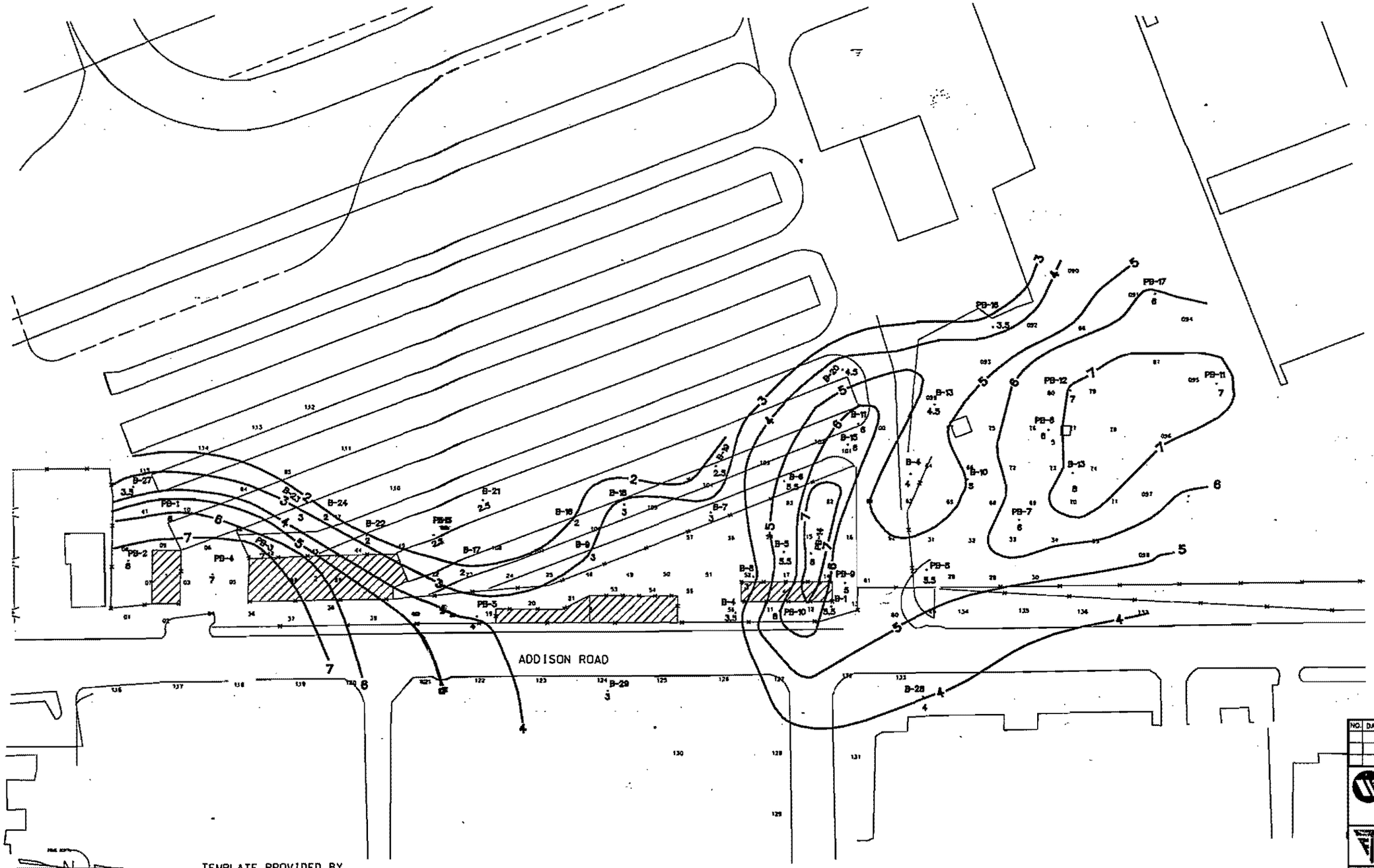


FIGURE 13

| NO. | DATE | REVISION | APPR'D |
|---|---|---|---|
| | | | |

Washington
Infrastructure Services
11011 Richmond Avenue Suite 500
Houston, TX 77042 (281)529-3100

EXPLORATION TECHNOLOGIES, INC.
5858 WESTCHASE DR.
HOUSTON, TX 77042

STRUCTURE CONTOUR MAP
TOP OF BEDROCK
ADDISON AIRPORT
FUEL FARM AREA
ADDISON, TEXAS

| | |
|---|---|
| Designed | Horz. Scale: |
| Drawn | Vert. Scale: |
| Checked | Date: |
| Contract No. | Sheet No.: |

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OW-A (mg/L)
MTBE: 0.021
C6 - C12: 0.0062
C12 - C28: 0.0055
2-Methylnaphthalene: 0.087

OW-A
(13-14 ft)
Benzene: 0.015
Toluene: 0.015
Ethylbenzene: 0.003J
Xylenes+: 0.007

PB-1
(5-6 ft)
Toluene: 0.005
Xylenes+: 0.002J
C6 - C12: 440
C12 - C28: 1000

PB-2
(7-8 ft)
Toluene: 0.005J
Xylenes+: 0.002J

PB-3
(2-4 ft)
Toluene: 0.005
Ethylbenzene: 0.065
Xylenes+: 0.002J
C6 - C12: 570
C12 - C28: 1200

PB-4
(6-7 ft)
Toluene: 0.009
Xylenes+: 0.003J

PB-5
(5-6 ft)
Toluene: 0.012
Xylenes+: 0.002J

PB-9
(3-4 ft)
Benzene: 2.2
Toluene: 0.170J
Ethylbenzene: 6.2
Xylenes+: 1.75
MTBE: 2.4
C6 - C12: 42

PB-10
(4-5 ft)
Toluene: 0.11
C6 - C12: 480
C12 - C28: 1200

PB-14
(2-4 ft)
Ethylbenzene: 0.002J
Xylenes+: 0.003J
C6 - C12: 840
C12 - C28: 410
2-Methylnaphthalene: 3.00
(6-8 ft)
Xylenes+: 0.003J
C6 - C12: 14
C12 - C28: 14

PB-15
(2-3 ft)
Toluene: 0.003
MTBE: 0.003J

PB-16
(2-3.5 ft)
C6 - C12: 98
C12 - C28: 43

PB-17
(2-4 ft)
No Parameters Detected
(5-7 ft)
No Parameters Detected

PB-12
(0-2 ft)
No Parameters Detected
(6-7 ft)
C6 - C12: 56
C12 - C28: 22

PB-11
(1-2 ft)
No Parameters Detected
(4-5 ft)
Toluene: 0.001J

PB-6
(5-6 ft)
Toluene: 0.012
Xylenes+: 0.002J
C6 - C12: 59
C12 - C28: 100

PB-13
(6-8 ft)
Toluene: 0.001J
Ethylbenzene: 0.004
Xylenes+: 0.002J
C6 - C12: 320
C12 - C28: 170
2-Methylnaphthalene: 3.80
(2-4 ft)
No Parameters Detected

PB-7
(3-4 ft)
Toluene: 0.006J

PB-8
(4-5 ft)
Toluene: 0.008

ADDISON ROAD

TEMPLATE PROVIDED BY
EXPLORATION TECHNOLOGIES, INC.
HOUSTON, TX

0 50 100
GRAPHIC SCALE IN FEET

LEGEND
Areas Containing USTs

NOTE: ALL VALUES ARE IN MG/KG UNLESS OTHERWISE NOTED

FIGURE 14

| NO. | DATE | REVISION | APPRV'D |
|---|---|---|---|
| | | | |

Washington
Infrastructure Services
1011 Richmond Avenue Suite 500
Houston, TX 77042 (280529-3900

EXPLORATION TECHNOLOGIES, INC.
3698 WESTCHASE DR.
HOUSTON, TX 77042

ANALYTICAL RESULTS

ADDISON AIRPORT
FUEL FARM AREA
ADDISON, TEXAS

| | |
|---|---|
| Designed | Horz. Scale: |
| Drawn | Vert. Scale: |
| Checked | Date: |
| Contract No. | Sheet No.: |

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# ATTACHMENT A

# ETI REPORT

Note: One copy of the original ETI report has been submitted under separate cover. A copy is included as an Attachment for ease in review.

# NEAR-SURFACE GEOCHEMICAL INVESTIGATION OF PETROLEUM HYDROCARBON GAS CONSTITUENTS

ADDISON AIRPORT

ADDISON, TEXAS

Prepared For:

Washington Group International

Houston, Texas

August 2002

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## Tables



## List of Plates



## Appendices

## 1.0 INTRODUCTION

Exploration Technologies, Inc. (ETI), Houston, Texas was contracted by Washington Group International (WGI) of Houston, Texas to conduct a near-surface geochemical investigation on the fuel farms and former dispenser located in the southeastern corner of Addison Airport located in Addison, Texas (Plate 1). According to a Phase I Environmental Site Assessment Update by Camp Dresser & McKee (CDM) there are 29 registered underground storage tanks (USTs) located in the fuel farms. Eleven of the USTs are currently inactive; the remaining 18 active USTs are scheduled to remain in service until a new bulk fuel storage/dispensing facility is constructed.

A soil vapor survey was conducted in the southeastern corner of the airport property, in and around the fuel farms and former dispenser area in December 2001, to aid in establishing baseline environmental conditions. The primary purpose of ETI's geochemical assessment was to determine the areal extent and concentrations of volatile organic compounds (VOCs) contained in subsurface soils and/or groundwater. Since the areal extent of VOCs was not fully delineated during the initial survey, a follow-up survey was conducted in June 2002. The surveys included the determination and quantification of C1-C4 (methane, ethane, propane and butanes) and C5+ (pentane-xylenes+) hydrocarbon vapors and carbon dioxide in the subsurface environment. The locations at which soil vapor samples were collected are shown on Plate 1.

## 2.0 SCOPE OF WORK

The scope of work performed by ETI to date includes:

1) collection of soil vapor samples (December 14 - 18, 2001) at 89 locations,
2) collection of soil vapor samples (June 18-21, 2002) at 48 locations
3) field screening analyses of samples for methane, carbon dioxide and oxygen,
4) analysis of samples for C1-C4 and C5+ hydrocarbons, and carbon dioxide in ETI's central laboratory,
5) preparation of contour "plume" maps for various hydrocarbon and biogenic gas constituents, and
6) interpretation of the data/results.

## 3.0 SOIL VAPOR SURVEY

### 3.1 Sampling Methodology

At each sample location, a field blank (ambient air) sample was collected through the sampling probe into an evacuated 125-cc septum top glass bottle prior to inserting the probe into near-surface soils. This procedure provides a background air sample for analysis to test field decontamination procedures and ambient air quality. Following the collection of the blank, a manually operated ½-inch OD steel pounder-bar was advanced to a depth of four feet below ground surface. It was necessary to drill a ¾ inch diameter hole through road base, concrete, and/or asphalt surfaces at the majority of sampling locations prior to advancing the pounder-bar. Upon removal of the pounder-bar, a 4-foot long, ½-inch OD stainless steel sampling probe with a perforated tip was inserted into the sampling hole. The sampling probe is designed to fit and seal the walls of the hole made by the pounder-bar. An attempt was made to advance the sampling probe to a depth of four feet at all locations to ensure uniformity in sampling conditions. In some instances, the high moisture content of the near-surface soils necessitated sample collection at depths shallower than anticipated. The actual depths from which samples were obtained are shown on Table 1.

After purging the probe of ambient air, an evacuated 125-cc septum top glass bottle was placed on a needle affixed to the top of the probe to collect the soil vapor sample. A three-way valve was opened to allow the soil vapors to flow through the probe into the evacuated bottle. Subsequent to filling the bottle with 125 cc of soil vapor, an additional 60 cc of vapor were added using a 60-cc syringe attached to the three-way valve to over-pressure the sample bottle. The positive pressure in the bottle prevents the influx of ambient air into the bottle during transportation to the laboratory and subsequent handling of the sample. In the event leakage should occur, gas will leak out of the bottle, thus preserving the integrity of the sample. Following collection of the sample, the bottle was removed from the needle and the puncture hole in the septum was sealed with a silicone rubber adhesive sealant. The sampling hole at each location was backfilled with bentonite, and a vinyl based concrete path material was used to provide a hard, color compatible seal flush with the (concrete or asphalt) ground surface.

All samples were recorded on chain of custody logs immediately following collection. Chain of custody logs are included in Appendix A.

The steel pounder-bar was washed with a biodegradable soap solution and rinsed with tap water prior to the collection of a soil vapor sample at each location. The stainless steel sampling probe was similarly washed outside, and inside by injecting the biodegradable soap solution through the probe, followed by a water rinse. The probe was then flushed internally with compressed breathing air for 10 seconds at a pressure of approximately 25 psi.

### 3.2 Sample Analyses

All soil vapor samples were initially analyzed (screened) in the field for methane, carbon dioxide ($CO_2$) and oxygen using an infrared gas analyzer. The results of these screening analyses were used to adjust the sampling grid and to add additional sample locations in areas where elevated biological gases were detected.

All soil vapor samples collected were analyzed in Exploration Technologies, Inc.'s Houston, Texas laboratory for C1-C4 (methane, ethane, propane, iso-butane and normal-butane) and C5+ (pentane-xylenes+) hydrocarbon constituents using two independent flame ionization detector (FID) gas chromatographs. The actual compounds present, concentrations, component ratios, and chromatographic signatures are utilized to identify the source(s), extent, and/or migration pathways. Results (Table 1) are reported in parts per million by volume (ppmv).

Light (C1-C4) hydrocarbon analyses measure the lightest, most volatile compounds present in natural and refined products. Light hydrocarbon analyses allow for the identification and differentiation of methane (both thermogenic and biogenic), and other naturally occurring and refined hydrocarbon products. C5+ (pentane-xylenes+) hydrocarbon analyses yield a quantitative measure of the actual concentrations of petroleum hydrocarbon vapors present in shallow subsurface soils. Due to the large number of individual hydrocarbon compounds present in naturally occurring and

processed petroleum products (such as crude oil, fuel oil, aviation fuel, diesel, gasoline, etc.), the results of C5+ hydrocarbon analyses are grouped according to the relative boiling points of the various compounds. C5+ results are presented for the following four groups of hydrocarbon compounds: pentane to benzene (C5-BZ), benzene to toluene (BZ-TL), toluene to xylene (TL-XYL), and xylenes+ (XYL+). Results of these analyses are presented in parts per million by volume (ppmv) in Table 1. The FID gas chromatograph used for C5+ hydrocarbon analyses contains a high-resolution capillary column, allowing for the identification and separation of individual compounds (such as BTEX) and identification of specific product signatures. BTEX analyses were performed for the initial survey samples; these results (Table 2) are reported in parts per million by volume (ppmv).

Carbon dioxide ($CO_2$) analyses were performed using a gas chromatograph equipped with a thermal conductivity detector (TCD). Results are reported in percent (%) by volume. When petroleum products are released to subsurface soils and/or groundwater, biodegradation of the hydrocarbon compounds can occur. The degradation of hydrocarbon compounds by aerobic and/or anaerobic bacteria can generate significant concentrations of carbon dioxide and/or methane in the subsurface environment. Measurements of methane and $CO_2$, therefore, provide additional site-specific information regarding the presence of hydrocarbon constituents and the likelihood and degree to which intrinsic bioremediation is occurring in the subsurface environment.

Trip blanks and ten percent of ambient air blanks (collected prior to each soil vapor sample) are analyzed for quality assurance/quality control (QA/QC). These blanks are analyzed applying the same procedures and protocols used for the actual soil vapor samples. The laboratory and QA/QC procedures utilized by ETI are included in Appendix B.

### 3.3 Data Interpretation

Methane is a major component of natural gas, however, liquid petroleum products (such as aviation gasoline, jet fuel, gasoline, diesel, etc.) contain no (or trace levels of) methane. Methane is generated from the anaerobic biodegradation of organic substrates. In soil vapor samples, methane is a very useful trace gas since it essentially does not

occur naturally in large quantities in the subsurface except within areas containing significant levels of hydrocarbon contaminated soils and/or groundwater. Methane is also the lightest gas associated with subsurface contamination, and therefore, migrates vertically even through relatively impermeable sediments.

In contrast to methane, ethane, propane and butanes are never biogenically generated. These light gases indicate the presence of hydrocarbon products. Although ethane, propane and butane are essentially removed in refineries (and sold as separate products), their solubility in processed products (aviation gasoline, gasoline, jet fuel, diesel, etc.) prevents these compounds from being removed entirely from processed products. These compounds remain as very volatile tracers that allow the mapping of vapor trails associated with products that have leaked from USTs, distribution lines, etc. These light gases are always vapors at normal temperatures and pressures, and thus can be detected at some distance from free product (if present) because of their volatility.

The C5+ (pentane-xylenes+) compounds are less volatile and less soluble, and therefore, tend to remain closer to petroleum product sources since they are basically liquids rather than gases. Because of these relationships, a combination of soil vapor plume maps provide an excellent way to locate subsurface contamination and migration pathways followed by the lost products as they move through the subsurface environment.

Carbon dioxide, which can be generated through the aerobic biodegradation of hydrocarbons, can also be a useful gas for identifying subsurface contamination. Although $CO_2$ concentrations were elevated in some vapor samples, the overwhelming majority of samples contained concentrations at or below background levels (<5%). The $CO_2$ data derived from this survey were not used in the interpretation due to the limited number of elevated data points.

It should be noted that soil vapor surveys do not yield false positives when samples are properly collected and analyzed. The various vapor components measured do not occur naturally in elevated concentrations and can only be sourced by a petroleum product release/loss. The presence of elevated levels of these components in shallow soil vapors indicates the presence of a shallow hydrocarbon source or hydrocarbon contamination. Elevated hydrocarbon vapors will either represent a cone of dispersion from a local

source (leak or spill) or represent a vapor trail (migration pathway) followed by subsurface contamination that underlies a given site. The vertical distribution of the subsurface contamination can only be determined by analyzing the vertical distribution of the petroleum products from soil cores and/or liquids collected during drilling operations. The vertical extent of subsurface contamination can not be determined from soil vapor data only.

## 4.0 DISCUSSION OF RESULTS

Analytical results of soil vapor samples collected in the fuel farm and the former fuel dispenser areas (in the northernmost part of the survey area) of the airport indicate elevated concentrations of petroleum hydrocarbon and biogenic gas (methane) vapors in subsurface soils and/or groundwater (Table 1). Concentrations of various hydrocarbon constituents were posted on the base map and contoured to display the areal extent of petroleum and biogenic gases in the subsurface environment. "Plume" maps generated (for the lightest to heaviest molecular weight constituents) for methane, propane, normal-butane (n-butane), and C5+ (pentane-xylenes+) hydrocarbons are included as Plates 2, 3, 4, and 5, respectively. For purposes of this report, the fuel farm and former fuel dispenser (near sample location 77) areas have been assigned numbers from 1 to 5 (from south to north). These numbers (areas) are shown on Plates 1 through 5.

The methane map (Plate 2) shows areas where anaerobic biodegradation of petroleum hydrocarbons has occurred. Propane and normal-butane (n-butane) maps (Plates 3 and 4) were prepared to show concentrations and locations of relatively highly volatile hydrocarbon constituents present in subsurface soils. The C5+ hydrocarbons map (Plate 5) was constructed to show the distribution of heavier molecular weight volatile petroleum compounds that remain in subsurface soils for an extended period of time.

### 4.1 Areas 1 and 2

Areas 1 and 2 (southern part of the survey area) contain elevated concentrations of methane, propane, n-butane and C5+ hydrocarbons. A relatively large C5+ plume (approximately 240 feet x 200 feet) and a smaller C5+ plume (approximately 40 feet x 40

feet) were delineated in this part of the survey area (Plate 5). C5+ concentrations up to 17,594 ppmv (site location 109) and 4,617 ppmv (sample location 39) were measured in the small and large plumes, respectively. The methane plume (Plate 2) present in Areas 1 and 2, although smaller in areal extent, is located in the same general vicinity of the site. The highest methane concentration was measured at sample location 42 (242,436 ppmv or 24.2 %). The high methane concentrations are consistent with the anaerobic biodegradation of petroleum hydrocarbons in subsurface soils (and/or groundwater).

Above background to moderate concentrations of propane (Plate 3) and n-butane (Plate 4) were also measured in samples collected in Areas 1 and 2. These highly volatile constituents exhibit plume geometries with limited areal extents. The moderate concentrations of propane (Plate 3) and n-butane (Plate 4) are suggestive of relatively fresh petroleum hydrocarbons since these compounds generally dissipate/biodegrade rapidly in near-surface soils.

The elevated C5+ and methane concentrations and the resulting plumes (Plates 5 and 2, respectively) indicate Areas 1 and 2 contain relatively old petroleum hydrocarbons that were released to subsurface soils and/or groundwater. The similarities in the C5+ and methane plumes are consistent with the continued anaerobic biodegradation of petroleum hydrocarbons that have remained in subsurface soils over an extended period of time. Although portions of Areas 1and 2 also contain more volatile constituents (propane and n-butane), the extent of these constituents are very limited and suggest isolated areas where "fresher" petroleum contaminants are present in the subsurface environment. It is not uncommon for propane and n-butane to be present, and the respective plumes to be similar in areas that contain less volatilized and/or degraded contaminants. No off-site migration of contaminants is indicated in Areas 1 and 2. Except for the small C5+ plume in the vicinity of sample location 109, all constituent plumes are closed.

### 4.2 Areas 3 and 4

Areas 3 and 4 (central part of the survey area) contain elevated concentrations of methane, propane, n-butane and C5+ hydrocarbons. The southernmost portion of this region contains low magnitude propane, n-butane and methane plumes (in the vicinity of

sample location 23) having limited areal extents (Plates 2, 3, and 4). All plumes are closed and are not considered significant.

Relatively large C5+ and methane plumes (measuring approximately 400 feet x 200 feet) were mapped in the central and northern portions of Areas 3 and 4 (Plates 2 and 5). C5+ concentrations up to 3,315 ppmv (site location 12) and methane concentrations up to 86,880 ppmv or 8.7 % (sample location 27) were measured in this relatively large plume. The plumes are located in the same general region and are similar in overall areal extents.

Low to elevated concentrations of propane (Plate 3) and n-butane (Plate 4) were also measured in samples collected in Areas 3 and 4. These highly volatile constituents exhibit relatively large areal extents, measuring up to 200 feet x 150 feet (n-butane plume). Concentrations of propane and n-butane up to 20 ppmv and 43 ppmv, respectively, were measured in samples collected in these areas. These concentrations of propane (Plate 3) and n-butane (Plate 4) suggest relatively fresh petroleum hydrocarbon products in Areas 3 and 4 (as opposed to Areas 1 and 2) since these compounds dissipate rapidly and biodegrade readily in near-surface soils. Since there are no known unloading operations in Areas 3 and 4, the presence of these volatile constituents suggest the possible migration of contaminants (in soils and/or groundwater) to the west.

The presence of elevated C5+ hydrocarbons, which remain in subsurface soils for an extended period of time, and elevated (anaerobic) methane in the region suggest the presence of relatively old petroleum hydrocarbons. Multiple releases of petroleum products in Areas 3 and 4 are likely; the elevated C5+ and methane indicate older losses, while the propane and n-butane indicate more recent losses.

No off-site migration of contaminants is indicated in Areas 3 and 4. The more volatile component (propane and n-butane) plumes are closed. Although the C5+ and methane concentrations generally decrease to the west, both the C5+ and methane plumes are open to the west (Plates 5 and 2, respectively).

### 4.3 Area 5

Area 5 (northern part of the survey area), the vicinity of the site where the former fuel dispenser was located, contains elevated concentrations of all the constituents discussed above (methane, propane, n-butane and C5+ hydrocarbons). The constituent plumes in Area 5 exhibit large areal extents (Plates 2, 3, 4 and 5), measuring up to 200 feet x 300 feet (methane plume).

Low to moderate concentrations of propane (up to 7 ppmv at location 78) and n-butane (up to 35 ppmv at location 73) were measured in the vicinity of the former fuel dispenser (Plates 3 and 4). The propane and n-butane concentrations/plumes suggest the limited presence of relatively fresh petroleum hydrocarbon contaminants in near-surface soils and/or groundwater.

The areal extents of the various constituent plumes are similar in Area 5. The C5+ concentrations in the area are moderate to high; the highest C5+ concentration was measured in sample 95 (1,715 ppmv) located at the northern edge of the survey area. The highest concentrations of methane measured in the survey area are located in Area 5 (Plate 2). Methane concentrations of 296,215 ppmv (or 29.6%) and 266,661 ppmv (or 26.7%) were measured at sample locations 80 and 73, respectively. The highest methane concentrations trend east west across Area 5 and encompass the former fuel dispenser.

The elevated C5+ hydrocarbons, which remain in subsurface soils for an extended period of time, and the high (anaerobic) methane concentrations present in Area 5 suggest a history of releases in the vicinity of the former fuel dispenser. In general, the releases appear to be relatively old since the propane and n-butane in the vicinity are modest.

No off-site migration of contaminants to the east is indicated in Area 5. The methane, propane, n-butane, and C5+ hydrocarbons plumes, however, are open to the north and west based on data collected to date (Plates 2-5).

### 4.4 Product Types

Chromatograms were generated for each of the soil vapor samples to identify individual hydrocarbon compounds and determine product signatures (or "fingerprints"). Two dominant product type signatures were noted: aviation gasoline and jet fuel. A third signature noted in the soil vapor samples was an aviation gasoline and jet fuel mix. The majority of the hydrocarbon contamination detected in fuel farm areas (Areas 2, 3 and 4), and the former dispenser (Area 5) is attributable to the loss or losses of aviation gasoline. Sample chromatograms showing aviation gasoline signatures for samples 3 (Area 1), 42 (Area 2), 53 (Area 3), 58 and 62 (Area 4), and 76 (Area 5) are included in Appendix C.

A jet fuel signature is dominant in samples collected at locations 9, 10 and 46 (Areas 1 and 2) and location 77, adjacent to the former fuel dispenser (Area 5). Chromatograms for these samples are included in Appendix C. An aviation gasoline/jet fuel mix is apparent on the northern side of Area 3 (samples 50 and 55), in close proximity to the USTs in Area 4 (samples 52 and 61), and east of the former dispenser in Area 5 (sample 73). The aviation gasoline is dominant in all samples that contain a mixture of products. In general, the aviation gasoline, jet fuel, and product mix signatures show a moderate degree of volatilization and or weathering.

## 5.0 SUMMARY AND CONCLUSIONS

Exploration Technologies, Inc. (ETI) conducted a near-surface geochemical investigation in the southeastern corner of Addison Airport, in the vicinity of the fuel farms and former dispenser area, to aid in establishing baseline environmental conditions. The primary purpose of ETI's assessment was to determine the concentrations and areal extent of volatile organic compounds (VOCs) contained in subsurface soils and/or groundwater. Soil vapor surveys (initial and follow-up surveys) were conducted on the airport property using ETI's proprietary collection equipment/system. The surveys included the determination and quantification of C1-C4 (methane, ethane, propane and butanes) and C5+ (pentane-xylenes+) hydrocarbon vapors and carbon dioxide in the subsurface environment.

Analytical laboratory results of soil vapor samples collected on the airport property indicate elevated concentrations of C1-C4 and C5+ hydrocarbon constituents. These vapor constituents are included in subsurface soils and/or groundwater beneath a large part of the survey area. Contour plume maps (Plates 2-5) were prepared to graphically illustrate the concentration gradients and areal extents of hydrocarbon vapors (methane, propane, normal-butane, and C5+) contained in the subsurface environment.

The propane and normal-butane (n-butane) maps (Plates 3 and 4, respectively) show concentrations and locations of highly volatile hydrocarbon constituents present in near-surface soils. The C5+ hydrocarbons map (Plate 5) shows the distribution of heavier molecular weight volatile petroleum compounds that remain in subsurface soils for an extended period of time. The methane map (Plate 2) shows concentrations and areas in which anaerobic degradation of petroleum hydrocarbons has occurred.

The C5+ (pentane-xylenes+) hydrocarbons map exhibits three discrete substantial plumes in the survey area. Elevated concentrations of C5+ hydrocarbons were measured in the vicinity of the fuel farms (Areas 1 and 2, and Areas 3 and 4) and the former fuel dispenser (Area 5). The highest C5+ concentrations vary from 1,715 ppmv (Area 5) and 17,595 ppmv (Area 2). These elevated C5+ concentrations indicate releases of petroleum hydrocarbon products on the airport property over an undetermined period of time.

Methane concentrations are high in those areas containing high C5+ concentrations; methane plume geometries (Plate 2) are also similar to those of C5+ (Plate 5). High concentrations of methane vary from 86,880 (or 8.7%) in Areas 3 and 4 to 242,435 ppmv (or 24.2 %) in Areas 1 and 2 to 296,215 ppmv (or 29.6%) in Area 5. These methane concentrations are consistent with the anaerobic biodegradation of petroleum hydrocarbons represented by C5+ (and propane, n-butane, etc.) measured in near-surface soils.

Elevated concentrations of propane (Plate 3) and n-butane (Plate 4) are commonly associated with either relatively recent releases of petroleum products or the presence of relatively "fresh" hydrocarbon contaminants present in near surface soils and/or

groundwater. Significant propane and n-butane concentrations were measured at several sample locations in Areas 1, 2, 4 and 5. The areal extents of the propane and n-butane plumes, however, are smaller and unlike those of the C5+ and methane plumes. Small isolated areas within the various plumes located in Areas 1 and 2, Areas 3 and 4, and Area 5 contain hydrocarbon contaminants that appear to be relatively fresh and or related to relatively recent releases of hydrocarbons.

The additional soil vapor data gathered during the follow-up survey (May 2002) were very helpful in better delineating the various constituent plumes. All hydrocarbon and biogenic gas plumes mapped using the soil vapor data are closed to the east, and therefore, no off-site migration of contaminants beneath or across Addison Road is indicated. The C5+ and methane plumes remain open to the north and west in Areas 3 and 4, and Area 5. The n-butane plume is also open to the north and west in Area 5.

Based on the soil vapor sample chromatograms, the majority of the hydrocarbon contamination detected in the fuel farm areas (Areas 2, 3 and 4), and the former fuel dispenser area (Area 5) is the result of losses/releases of aviation gasoline. Losses of jet fuel are also apparent in Areas 1 and 2, and in the vicinity of the former fuel dispenser (Area 5). A mixture of aviation gasoline and jet fuel was also noted in several of the soil vapor samples. Where a product mix is evident, the aviation gasoline signatures dominate the samples.

The hydrocarbon vapors detected suggest multiple losses of petroleum hydrocarbon fuels (aviation gasoline and jet fuel) over an undetermined period of time. A moderate degree of volatilization and/or weathering of the various products (and product mix) is evident in the sample chromatograms. Sample chromatograms are included in Appendix C.

Natural attenuation of the petroleum hydrocarbon products released/lost in the fuel farm and dispenser areas is strongly suggested by the high concentrations of biogenic methane. Although the soil vapor constituent data indicate natural attenuation has occurred, the rate at which biodegradation (methanogenesis) is proceeding, the actual contaminant concentrations that remain in the subsurface soils and/or groundwater, and/or the relative timing of the losses can not be ascertained with the data collected to

date. Historical information regarding site operations is the key to determining the relative timing of specific releases/losses of specific products.

A soil vapor survey is an excellent technique for delineating the relative magnitudes, sources, and areal distribution of petroleum hydrocarbons and biogenic gases (methane) contained in subsurface soils and groundwater. The concentrations and distribution of these soil vapors are important in defining areas containing subsurface hydrocarbon contamination that require additional investigation and evaluation. The actual degree to which soils and groundwater have been impacted (and whether free product exists) cannot unequivocally be determined from the soil vapor data. There is no substitute for the drilling/sampling of borings and/or monitoring wells. The soil vapor data and plume maps should be used as guides for the placement of borings and monitoring wells during future assessment activities.

Submitted this 6th day of August, 2002

EXPLORATION TECHNOLOGIES, INC.
Environmental Division

Patrick N. Agostino, Ph.D.
Vice President

# ATTACHMENT B

# BORING LOGS

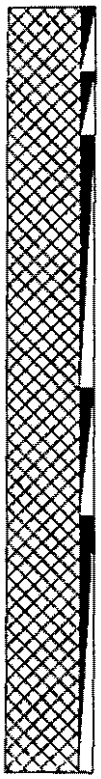
# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Client : Town of Addison
Addison, Texas

Boring No. : PB-1
File No. : 25361
Date : 1-18-02
Elevation : ft

Dry Augered 0 to 6 ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 |  | Loamy Fill<br>PID = 0<br>Friable, Compacted Sand<br>PID = 0<br>Dark Brown, Silty Clay (CL) No Odor PID = 0 | | | | | | | |
| 1.5 | | | | | | | | | |
| 3 | | Light Brown, Silty Sand (SM)<br>Dry, Blocky, PID = 0 | | | | | | | |
| 4.5 | | SAA, w/ occ. white chalk seams,<br>Odor present, PID = 96 | | | | | | | |
| 6 | | Refusal @ 6 ft | | | | | | | |
| 7.5 | | | | | | | | | |
| 9 | | | | | | | | | |

Direct Push Drilling

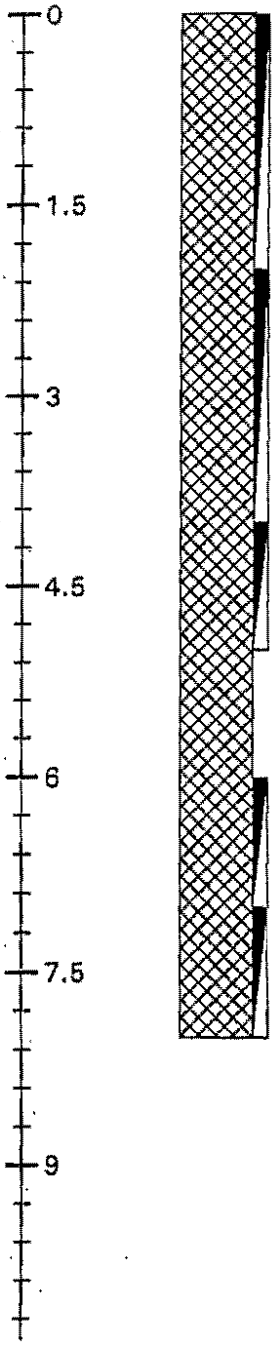
# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-2
File No. : 25361
Date : 1-18-02
Elevation : ft

Client : Town of Addison
Addison, Texas

Dry Augered 0 to 8 ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.




| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| | | Friable Sand, Fill<br>PID = 0 | | | | | | | |
| | | Dark Brown to Black, Organic, Silty Clay (CL), bec. Brown @ 3 ft, w/ Fe and chalk nodles @ 4 ft, PID = 0 | | | | | | | |
| | | Lt. Brown to Gray, Very Silty Sand (SM), friable, v. dry, odor, PID = 5 | | | | | | | |
| | | SAA, Brown @ 6 ft, w/ occ. chalk seams, odor, PID = 92 | | | | | | | |
| | | SAA, w/ occ. white chalk seams, Odor present, PID = 93 | | | | | | | |
| | | Refusal @ 8 ft | | | | | | | |

Direct Push Drilling

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-3
File No. : 25361
Date : 1/18/2002
Elevation : ft

Client : Town of Addison
Addison, Texas

Dry Augered 0 to 7 ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | Black Loamy Fill, PID = 0 | | | | | | | |
| | | Tan, Sandy Fill, Dry, Hard, PID = 0 | | | | | | | |
| | | Black, Organic, Clay Fill, PID = 4 | | | | | | | |
| 1.5 | | Gray/Tan Sandstone, Friable, Dry, PID = 275 | | | | | | | |
| 3 | | | | | | | | | |
| | | Light Brown, Silty/Clayey Sand (SC), PID = 40 | | | | | | | |
| 4.5 | | w/ organic seams @ 5 ft, PID = 11 | | | | | | | |
| 6 | | bec. Light Gray at 6 ft, PID = 10 | | | | | | | |
| | | Refusal @ 7 ft | | | | | | | |
| 7.5 | | | | | | | | | |
| 9 | | | | | | | | | |

Direct Push Sampling

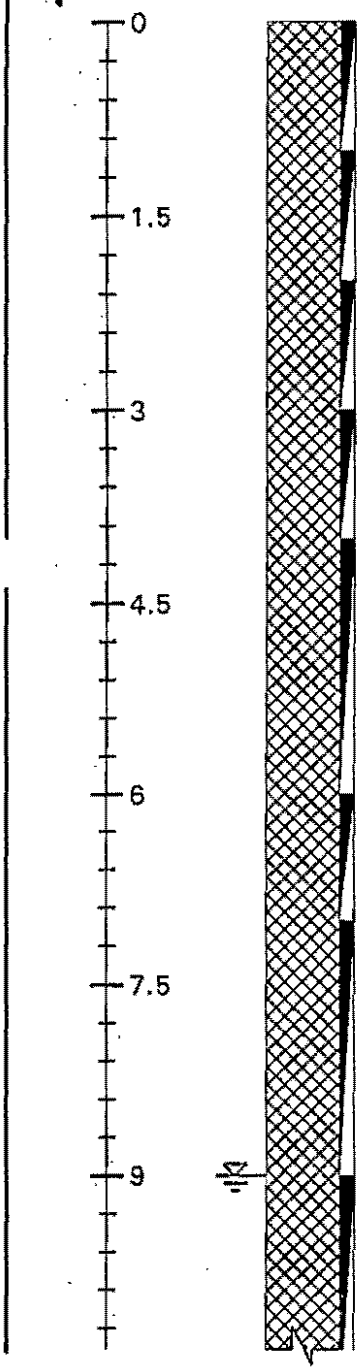
# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-4
File No. : 25361
Date : 1/18/2002
Elevation : ft

Client : Town of Addison
Addison, Texas

Dry Augered 0 to 11 ft Water at 9 ft Caving at ft
Wash Bored to ft Water at ft after hrs.



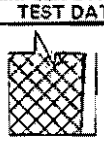

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| | | Gravel/Sand Fill, PID = 0 | | | | | | | |
| | | Dark Gray to Black Clayey Sand (SC) Fill, No Odor, PID = 1 | | | | | | | |
| | | bec. Light Gray to Light Brown, PID = 1 | | | | | | | |
| | | SAA, PID = 2 | | | | | | | |
| | | Brown Sandstone, Friable, Dry, No Odor, PID = 1 | | | | | | | |
| | | Light Gray Silty Clay (CL), Slight Odor, PID = 1 | | | | | | | |
| | | Gray Siltstone, Friable, Dry, thin bedded, slight odor, PID = 3 | | | | | | | |
| | | SAA, wet at 10 ft | | | | | | | |

Direct Push Drilling, Water at 11 ft, Static at 9 ft after 30 min.

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-4
File No. : 25361

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 10.5 |  | | | | | | | | |
| | | Refusal @ 11 ft | | | | | | | |
| 12 | | | | | | | | | |
| 13.5 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16.5 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19.5 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22.5 | | | | | | | | | |

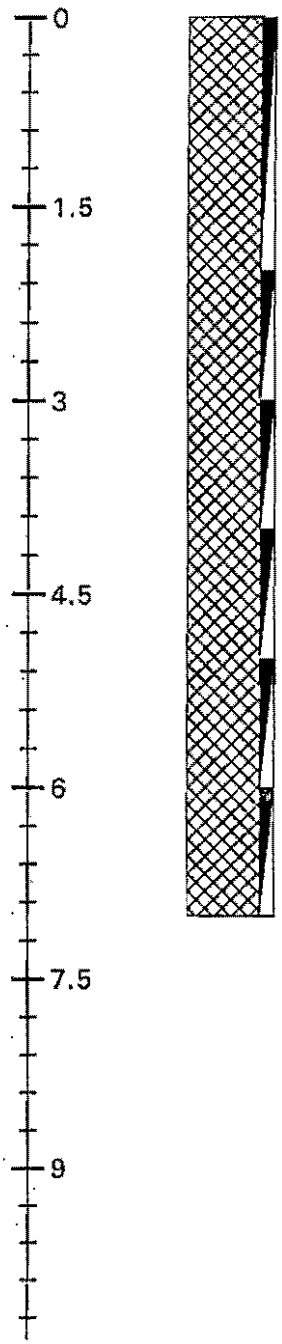
# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-5
File No. : 25361
Date : 1/18/2002
Elevation : ft

Client : Town of Addison
Addison, Texas

Dry Augered 0 to 7 ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.




| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| | | Gravel/Sand Fill | | | | | | | |
| | | Black Silty Clay (CL), Fill, PID = 0 | | | | | | | |
| | | Light Brown Clayey Sand (SC), Fill, PID = 0 | | | | | | | |
| | | Tan Siltstone, Dry, Friable, PID = 0 | | | | | | | |
| | | SAA | | | | | | | |
| | | SAA, bec. Gray @ 6.75 ft | | | | | | | |
| | | Refusal @ 7 ft | | | | | | | |

Direct Push Drilling

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-6
File No. : 25361
Date : 1/18/2002
Elevation : ft

Client : Town of Addison
Addison, Texas

Dry Augered 0 to 6 ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | Asphalt | | | | | | | |
| | | Dark Brown Sandy Fill, PID = 15 | | | | | | | |
| 1.5 | | Black, Firm, Silty Clay (CL), Odor, PID = 85 | | | | | | | |
| 3 | | | | | | | | | |
| 4.5 | | Black Chalk/Clay, interbedded, Odor, PID = 130 | | | | | | | |
| 6 | | Refusal @ 6 ft | | | | | | | |
| 7.5 | | | | | | | | | |
| 9 | | | | | | | | | |

Direct Push Drillig

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Client : Town of Addison
Addison, Texas

Boring No. : PB-7
File No. : 25361
Date : 1/18/2002
Elevation : ft

Dry Augered 0 to 6 ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | Asphalt | | | | | | | |
| | | Dark Brown Sandy Fill, PID = 0 | | | | | | | |
| 1.5 | | Black, Firm, Silty Clay (CL), Odor, PID = 0 | | | | | | | |
| 3 | | | | | | | | | |
| 4.5 | | Black Chalk/Clay, interbedded, Odor, PID = 0 | | | | | | | |
| 6 | | Refusal @ 6 ft | | | | | | | |
| 7.5 | | | | | | | | | |
| 9 | | | | | | | | | |

Direct Push Drillig

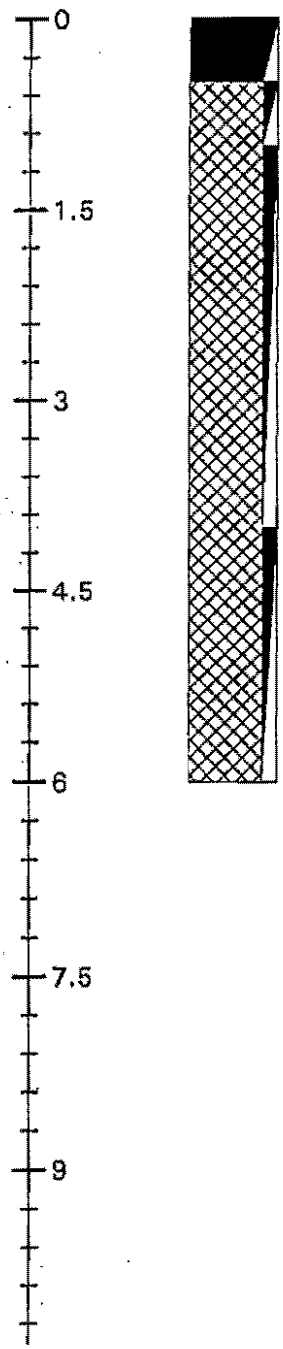
# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-8
File No. : 25361
Date : 1/18/2002
Elevation : ft

Client : Town of Addison
Addison, Texas

Dry Augered 0 to 6 ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.




| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| | | Asphalt | | | | | | | |
| | | Dark Brown Sandy Fill, PID = 0<br><br>Dark Brown Clay (CH), Firm, No Odor, w/ calcareous nodules, PID = 0 | | | | | | | |
| | | Tan Siltstone, Dry, Friable, PID = 0 | | | | | | | |
| | | Refusal @ 6 ft | | | | | | | |

Direct Push Drillig

# LOG OF BORING

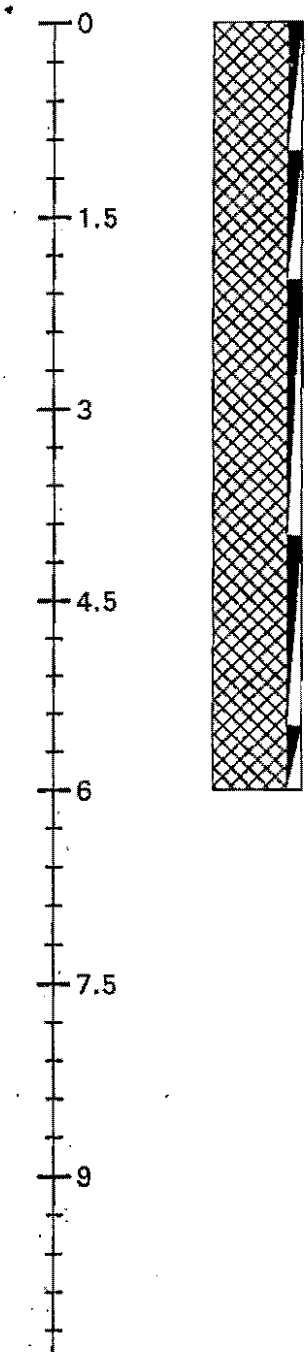
Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-9
File No. : 25361
Date : 1/18/2002

Client : Town of Addison
Addison, Texas

Elevation : ft

Dry Augered 0 to 6 ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.




| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| | | Gravel/Sand Base | | | | | | | |
| | | Brown Sand, dry, friable, strong odor, PID = 230 | | | | | | | |
| | | Dark Gray Clay (CH), strong odor, bec. light gray @ 4 ft, w/ calcareos and chalk nodules, PID = 250 | | | | | | | |
| | | Brown/Gray Siltstone, hard, dry, odor, PID = 110 | | | | | | | |
| | | SAA, PID = 100 | | | | | | | |
| | | Refusal @ 6 ft, PID = 10 | | | | | | | |

Direct Push Drilling

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Client : Town of Addison
Addison, Texas

Boring No. : PB-10
File No. : 25361
Date : 1/18/2002
Elevation : ft

Dry Augered 0 to 6 ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | Sand/Gravel Base, Fill | | | | | | | |
| 1.5 | | Black Clay (CH), strong odor, firm, PID = 150 | | | | | | | |
| 3 | | | | | | | | | |
| 4.5 | | Gray and Brown Silty Clay (CL), hard, dry, friable, PID = 300 | | | | | | | |
| | | SAA, PID = 80 | | | | | | | |
| 6 | | Refusal @ 6 ft | | | | | | | |
| 7.5 | | | | | | | | | |
| 9 | | | | | | | | | |

Direct Push Drilling

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Client : Town of Addison
Addison, Texas

Boring No. : PB-11
File No. : 25361
Date : 7/22/02
Elevation : ft

Dry Augered to ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | Asphalt w/ Shell Base | | | | | | | |
| 2 | | Fill: Becomes Black to Dark Gray Clay @ 1 ft. w/ rock fragments<br>PID=0 @ 2 ft.<br>PID=0 @ 3 ft.<br>PID=0 @ 4 ft. | | | | | | | |
| 4 | | | | | | | | | |
| 6 | | Black, Dark Gray & Brown CLAY (CH) w/ calcareous nodules @ 5 ft. PID=4 @ 5 ft.<br>PID=2 @ 6 ft.<br>Gray & Brown Silty CLAY (CL) w/ calcareous nodules<br>PID=0 @ 7 ft.<br>Brown Siltstone (Weathered)<br>PID=0 @ 7 ft. | | | | | | | |
| 8 | | Refusal @ 8 ft. | | | | | | | |
| 10 | | | | | | | | | |
| 12 | | | | | | | | | |

Boring Terminated @ 8 ft.

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-12
File No. : 25361
Date : 7/22/02
Elevation : ft

Client : Town of Addison
Addison, Texas

Dry Augered to ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | Asphalt w/ shell base | | | | | | | |
| | | FILL: Becomes Black CLAY @ 1 ft.<br>PID=4 | | | | | | | |
| 2 | | Brown Clayey SAND (SC) w/ occasional calcareous nodules<br>PID=6 | | | | | | | |
| 4 | | Brown Silty CLAY (CL) w/ siltstone nodules<br>- w/ silt seams @ 5 ft.<br>PID=24 | | | | | | | |
| 6 | | PID=62 @ 6 ft.<br>- Becomes Tan Siltstone @ 6.8 ft. very dry | | | | | | | |
| | | Refusal @ 7 ft. | | | | | | | |
| 8 | | | | | | | | | |
| 10 | | | | | | | | | |
| 12 | | | | | | | | | |

Boring Terminated @ 7 ft.

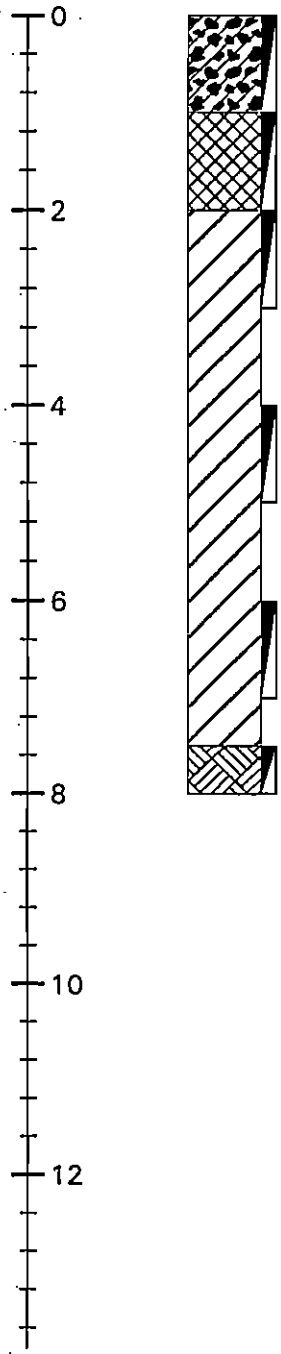
# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Client : Town of Addison
Addison, Texas

Boring No. : PB-13A
File No. : 25361
Date : 7/22/02
Elevation : ft

Dry Augered to ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.




| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| | | Asphalt w/ shell base | | | | | | | |
| | | FILL: Black Clay w/ rock pieces @ 1 ft., slight odor PID=25 | | | | | | | |
| | | Light Brown & Gray CLAY (CH) w/ silt pockets, strong odor PID=210 | | | | | | | |
| | | PID=125 @ 4 ft. | | | | | | | |
| | | - Becomes dark gray @ 6 ft. PID=268 | | | | | | | |
| | | Tan Siltstone @ 7.8 ft., very dry | | | | | | | |
| | | Refusal @ 8 ft. | | | | | | | |

Boring Terminated @ 8 ft.

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-13B
File No. : 25361
Date : 7/22/02
Elevation : ft

Client : Town of Addison
Addison, Texas

Dry Augered to ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | | Brown Chalky Siltstone very hard, dry<br>- Dark Gray Shale seam @ 7.5 to 8.0 ft.<br>- Weathered Silty Clay Seam @ 8.5 ft. | | | | | | | |
| | | Gray Shale, very dry, laminated and fissile | | | | | | | |
| 10 | | - w/ clay seam @ 9.5 ft. to 9.75 ft. PID=0 @ 10 ft. | | | | | | | |
| | | PID=0 @ 11 FT. | | | | | | | |
| 12 | | | | | | | | | |
| | | - Becomes Light Gray, chalky @ 13.5 ft., very dry<br>PID=0 | | | | | | | |
| 14 | | | | | | | | | |
| 16 | | | | | | | | | |
| 18 | | | | | | | | | |
| 20 | | | | | | | | | |

Boring Terminated @ 14 ft.

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Client : Town of Addison
Addison, Texas

Boring No. : PB-14A
File No. : 25361
Date : 7/22/02
Elevation : ft

Dry Augered to ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | Rock/Shell Base | | | | | | | |
| 2 | | FILL: Brown & Gray Sandy CLAY @ 2 ft. w/ rock fragments and odor<br>PID=374 @ 3 ft. | | | | | | | |
| 4 | | Brown Silty CLAY (CL) very dry, fissile and slight odor<br>PID=33 @ 4 ft. | | | | | | | |
| 6 | | PID=145 @ 6 ft.<br>PID=40 @ 7.5 ft. | | | | | | | |
| 8 | | Refusal @ 8 ft. | | | | | | | |
| 10 | | | | | | | | | |
| 12 | | | | | | | | | |

Boring Terminated @ 8 ft.

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Client : Town of Addison
Addison, Texas

Boring No. : PB-14B
File No. : 25361
Date : 7/22/02
Elevation : ft

Dry Augered to ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 8 | | Dark Gray Shale, dry w/ tan siltstone layers | | | | | | | |
| | | - w/ slight odor PID=35 @ 9 ft, | | | | | | | |
| 10 | | Brown & Gray Silty Clay (weathered) | | | | | | | |
| | | - w/ strong odor and wet @ 12 ft. | | | | | | | |
| 12 | | PID=210 @ 12 ft. | | | | | | | |
| | | Tan siltstone w/ weathered seams, very hard & dry | | | | | | | |
| 14 | | PID=108 @ 14 ft. | | | | | | | |
| 16 | | | | | | | | | |
| 18 | | | | | | | | | |
| 20 | | | | | | | | | |

Boring Terminated @ 15 ft.

Attention Owner:
Confidentiality Privilege Notice on reverse side of owner's copy.

# Texas Department of License and Regulation

*Water Well Driller/Pump Installer Program*
*P.O. Box 12157 Austin, Texas 78711 (512) 463-7880 FAX (512) 463-8616*
*Toll free (800) 803-9202*
Email address: water.well@license.state.tx.us

This form must be completed and filed with the department and owner within 60 days upon completion of the well.

## WELL REPORT

### A. WELL IDENTIFICATION AND LOCATION DATA

**1) OWNER**

| Name | Address | City | State | Zip |
|---|---|---|---|---|
| Town of Addison | 16801 Westgrove Drive | Addison | TX | 75001 |

**2) WELL LOCATION**

| County | Physical Address | City | State | Zip |
|---|---|---|---|---|
| Dallas | 4651 Airport Parkway | Addison | TX | 75001 |

**3) Type of Work** ☒ New Well ☐ Deepening ☐ Reconditioning PB-14

**Lat.** 32 57 58 **Long.** 96 49 51 **Grid #**

**4) Proposed Use (check)** ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

**5)** N↑

**6) Drilling Date**
Started 7/22/02
Completed 7/22/02

**Diameter of Hole**

| Dia. (in) | From (ft) | To (ft) |
|---|---|---|
| 2 | SURFACE | 8.0 |

**7) Drilling Method (check)** ☐ Driven ☐ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☒ Other Direct Push

| From (ft) | To (ft) | Description and color of formation material |
|---|---|---|
| 0 | 2 | Rock shell base – FILL |
| 2 | 3 | Brown & gray SANDY CLAY |
| 3 | 8 | Brown SILTY CLAY |

(Use reverse side of Well Owner's copy, if necessary)

**8) Borehole Completion** ☐ Open Hole ☐ Straight Wall ☐ Under-reamed ☐ Gravel Packed ☒ Other PLUGGED
If Gravel Packed give the interval from ft. to ft.

**Casing, Blank Pipe, and Well Screen Data**

| Dia. (in.) | New Or Used | Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial | Setting (ft) From | Setting (ft) To | Gage Casing Screen |
|---|---|---|---|---|---|
| | | N/A | | | |

**9) Cementing Data**
Cementing from 0 ft. to 8.0 ft. # of sacks used ½
ft. to ft. # of sacks used
Method Used TREMIE
Cementing By ALFREDO PALACIOS
Distance to septic system field or other concentrated contamination ft.
Method of verification of above distance

**13) Plugged** ☐ Well plugged within 48 hours N/A

Casing left in well:

| From (ft) | To (ft) | Sacks used |
|---|---|---|
| | | |
| | | |
| | | |

Cement/Bentonite placed in well:

| From (ft) | To (ft) |
|---|---|
| | |
| | |
| | |

**10) Surface Completion** N/A
☐ Specified Surface Slab Installed
☐ Specified Surface Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

**14) Typepump** N/A
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc., ft.

**11) Water Level**
Static level ft. below Date / /
Artesian Flow gpm. Date / /

**15) Water Test** N/A
Typetest ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: gpm with ft. drawdown after hrs.

**16) Water Quality**
Did you knowingly penetrate any strata which contain undesirable constituents?
☐ Yes X NO If yes, did you submit a REPORT OF UNDESIRABLE WATER?
Type of water Depth of Strata
Was a chemical analysis made? ☐ Yes ☐ No

**12) Packers**

| Type | Depth |
|---|---|
| N/A | |

Company or Individual's Name (type or print) BEST DRILLING SERVICES, INC. Lic. No. 5036-M

Address P.O. BOX 845 City FRIENDSWOOD State TX Zip 77549

Signature Licensed Driller/Pump Installer — 8/7/02 Date
Signature Apprentice — / / Date

TDLR FORM 004WWD — Copies to TDLR - Owner - Driller/Pump Installer — Form provided by Forms On-A-Disk, Inc. ( Dallas, Texas ( (214) 340-9429

Attention Owner:
Confidentiality Privilege Notice
on reverse side of owner's copy.

# Texas Department of License and Regulation

*Water Well Driller/Pump Installer Program*
*P.O. Box 12157 Austin, Texas 78711 (512) 463-7880 FAX (512) 463-8616*
*Toll free (800) 803-9202*
Email address: water.well@license.state.tx.us

## WELL REPORT

This form must be completed and filed with the department and owner within 60 days upon completion of the well.

### A. WELL IDENTIFICATION AND LOCATION DATA

**1) OWNER**

| Name | Address | City | State | Zip |
|---|---|---|---|---|
| Town of Addison | 16801 Westgrove Drive | Addison | TX | 75001 |

**2) WELL LOCATION**

| County | Physical Address | City | State | Zip |
|---|---|---|---|---|
| Dallas | 4651 Airport Parkway | Addison | TX | 75001 |

**3) Type of Work**
☒ New Well ☐ Deepening ☐ Reconditioning
PB-14B

| Lat. | | | Long. | | | Grid # |
|---|---|---|---|---|---|---|
| 32 | 57 | 58 | 96 | 49 | 51 | |

**4) Proposed Use (check)** ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

**5)** N↑

**6) Drilling Date**
Started 7/22/02
Completed 7/22/02

**Diameter of Hole**

| Dia. (in) | From (ft) | To (ft) |
|---|---|---|
| 2 | SURFACE | 15.0 |

**7) Drilling Method (check)** ☐ Driven ☐ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ✻ Other Direct Push

| From (ft) | To (ft) | Description and color of formation material |
|---|---|---|
| 0 | 10 | Drk. gray shale |
| 10 | 13 | Brown & gray SILTY CLAY |
| 13 | 15 | Tan SILT STONE |

(Use reverse side of Well Owner's copy, if necessary)

**8) Borehole Completion** ☐ Open Hole ☐ Straight Wall ☐ Under-reamed ☐ Gravel Packed ☒ Other PLUGGED
If Gravel Packed give the interval from ft. to ft.

**Casing, Blank Pipe, and Well Screen Data**

| Dia. (in.) | New Or Used | Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial | Setting (ft) From | Setting (ft) To | Gage Casing Screen |
|---|---|---|---|---|---|
| | | N/A | | | |

**9) Cementing Data**
Cementing from 0 ft. to 15.0 ft. # of sacks used 1
ft. to ft. # of sacks used
Method Used TREMIE
Cementing By ALFREDO PALACIOS
Distance to septic system field or other concentrated contamination ft.
Method of verification of above distance

**13) Plugged** ☐ Well plugged within 48 hours N/A
Casing left in well: Cement/Bentonite placed in well:

| From (ft) | To (ft) | From (ft) | To (ft) | Sacks used |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

**10) Surface Completion** N/A
☐ Specified Surface Slab Installed
☐ Specified Surface Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

**14) Typepump** N/A
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc., ft.

**11) Water Level**
Static level ft. below Date / /
Artesian Flow gpm. Date / /

**15) Water Test** N/A
Typetest ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: gpm with ft. drawdown after hrs.

**16) Water Quality**
Did you knowingly penetrate any strata which contain undesirable constituents?
☐ Yes X NO If yes, did you submit a REPORT OF UNDESIRABLE WATER?
Type of water Depth of Strata
Was a chemical analysis made? ☐ Yes ☐ No

**12) Packers**

| Type | Depth |
|---|---|
| N/A | |

Company or Individual's Name (type or print) BEST DRILLING SERVICES, INC. Lic. No. 5036-M

Address P.O. BOX 845 City FRIENDSWOOD State TX Zip 77549

Signature [signature] 8/9/02
Licensed Driller/Pump Installer Date

Signature / /
Apprentice Date

TDLR FORM 004WWD Copies to: TDLR, Owner, Driller/Pump Installer Form provided by Forms On-A-Disk, Inc. ( Dallas, Texas ( (214) 340-9429

OWNER

Attention Owner:
Confidentiality Privilege Notice
on reverse side of owner's copy.

# Texas Department of License and Regulation

*Water Well Driller/Pump Installer Program*
*P.O. Box 12157 Austin, Texas 78711 (512) 463-7880 FAX (512) 463-8616*
*Toll free (800) 803-9202*
Email address: water.well@license.state.tx.us

This form must be completed and filed with the department and owner within 60 days upon completion of the well.

## WELL REPORT

### A. WELL IDENTIFICATION AND LOCATION DATA

**1) OWNER**

| Name | Address | City | State | Zip |
|---|---|---|---|---|
| Town of Addison | 16801 Westgrove Drive | Addison | TX | 75001 |

**2) WELL LOCATION**

| County | Physical Address | City | State | Zip |
|---|---|---|---|---|
| Dallas | 4651 Airport Parkway | Addison | TX | 75001 |

**3) Type of Work**
☒ New Well ☐ Deepening
☐ Reconditioning
OW-A

**Lat.** 32 | 57 | 58 **Long.** 96 | 49 | 51 **Grid #**

**4) Proposed Use (check)** ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic
☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

**5)** N↑

**6) Drilling Date**
Started 7/2302
Completed 7/2302

**Diameter of Hole**

| Dia. (in) | From (ft) | To (ft) |
|---|---|---|
| | | |
| 8 | SURFACE | 15.0 |
| | | |

**7) Drilling Method (check)** ☐ Driven
☐ Air Rotary ☐ Mud Rotary ☐ Bored
☐ Air Hammer ☐ Cable Tool ☐ Jetted
☒ Other Hollow Stem Auger

| From (ft) | To (ft) | Description and color of formation material |
|---|---|---|
| 0 | 10 | Drk. gray shale |
| 10 | 13 | Brown & gray SILTY CLAY |
| 13 | 15 | Tan SILT STONE |

(Use reverse side of Well Owner's copy, If necessary)

**8) Borehole Completion** ☐ Open Hole ☐ Straight Wall
☐ Under-reamed ☒ Gravel Packed ☐ Other
If Gravel Packed give the interval from 3.0 ft. to 15.0 ft.

**Casing, Blank Pipe, and Well Screen Data**

| Dia. (in.) | New Or Used | Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial | Setting (ft) From | Setting (ft) To | Gage Casing Screen |
|---|---|---|---|---|---|
| 2 | N | SCHL 40 PVC | 0 | 5 | |
| 2 | N | SCHL 40 PVC | 5 | 15 | 0.010 |
| | | | | | |
| | | | | | |

**9) Cementing Data**
Cementing from 0 ft. to 2.0 ft. # of sacks used ½
ft. to ft. # of sacks used
Method Used TREMIE
Cementing By ALFREDO PALACIOS
Distance to septic system field or other concentrated contamination ft.
Method of verification of above distance

**13) Plugged** ☐ Well plugged within 48 hours N/A
Casing left in well: Cement/Bentonite placed in well:

| From (ft) | To (ft) | From (ft) | To (ft) | Sacks used |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

**10) Surface Completion**
☒ Specified Surface Slab Installed
☐ Specified Surface Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

**14) Typepump** N/A
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other
Depth to pump bowls, cylinder, jet, etc., ft.

**11) Water Level**
Static level ft. below Date / /
Artesian Flow gpm. Date / /

**15) Water Test** N/A
Typetest ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: gpm with ft. drawdown after hrs.

**16) Water Quality**
Did you knowingly penetrate any strata which contain undesirable constituents?
☐ Yes X NO If yes, did you submit a REPORT OF UNDESIRABLE WATER?
Type of water Depth of Strata
Was a chemical analysis made? ☐ Yes ☐ No

**12) Packers**

| Type | Depth |
|---|---|
| BENTONITE | 2.0 TO 3.0 |

Company or Individual's Name (type or print) BEST DRILLING SERVICES, INC. Lic. No. 5036-M

Address P.O. BOX 845 City FRIENDSWOOD State TX Zip 77549

Signature [signature] 8/07/02
Licensed Driller/Pump Installer Date

Signature / /
Apprentice Date

TDLR FORM 004WWD Copies to TDLR - Owner - Driller/Pump Installer Form provided by Forms On-A-Disk, Inc. ( Dallas, Texas ( (214) 340-9429

Owner

# Monitor Well Data Sheet

Permittee or Site Name: Town of Addison
County: Dallas
Date of Monitor Well Installation: 7/22/02
Monitor Well Latitude: 32.57.69 Longitude: 96.49.83
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

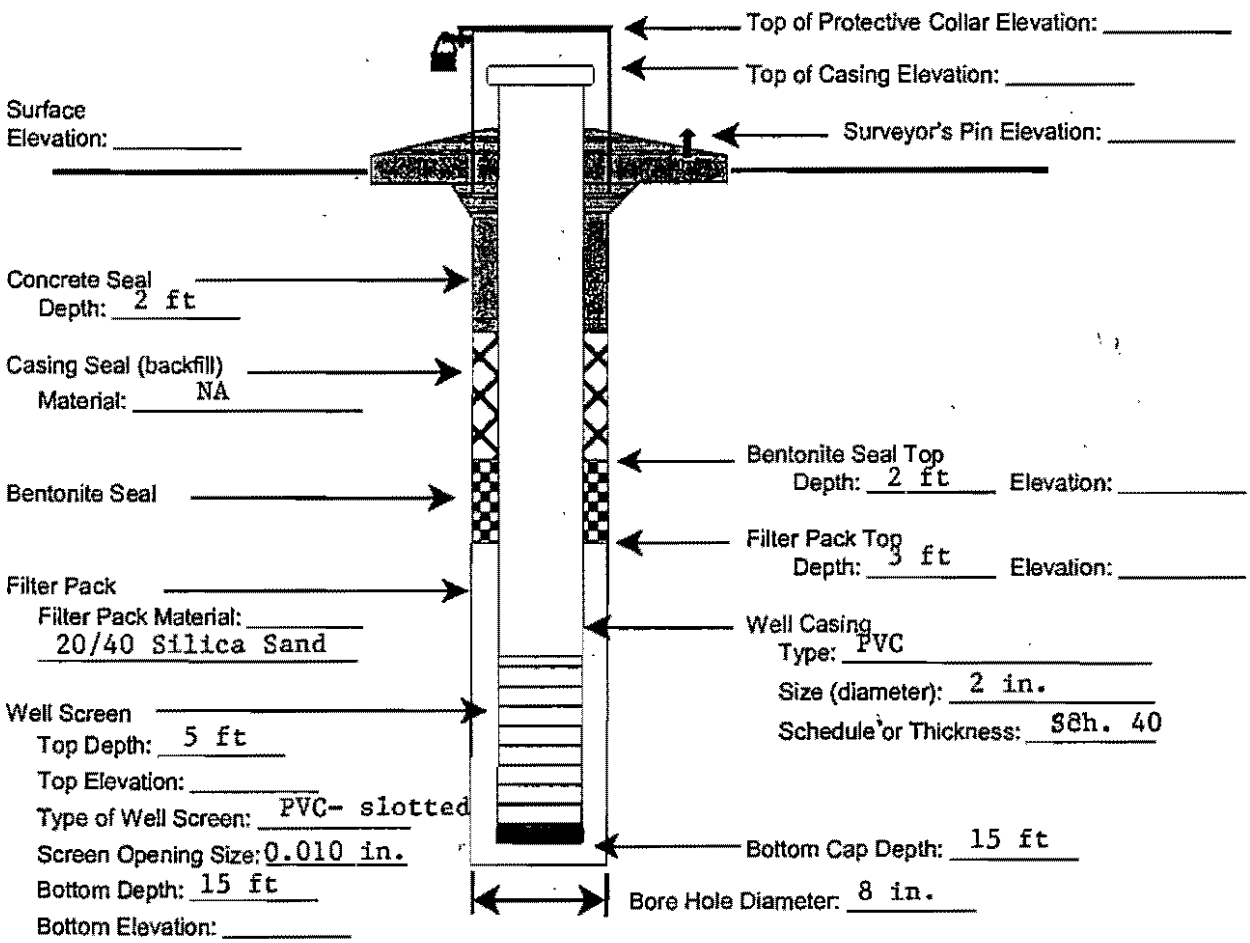
MSW Permit No.: NA
Monitor Well I.D. No.: OW-A
Date of Monitor Well Development: 7/23/02
Monitor Well Driller Name: Best Drilling Services
License No.: 5036-M

**NOTES:**

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Ronald A. Bowlin
Static Water Level Elevation (with respect to MSL) after Well Development: _____
Name of Geologic Formation(s) in which Well is completed: Austin Chalk - residual weathered material

Type of Locking Device: Screw-plug seal Type of Casing Protection: Steel - flush mounted
Concrete Surface Pad (with steel reinforcement) Dimensions: 4 ft x 4 ft



# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Boring No. : PB-15
File No. : 25361
Date : 7/22/02
Elevation : ft

Client : Town of Addison
Addison, Texas

Dry Augered to ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | FILL: Brown Sand w/ clay, dry | | | | | | | |
| | | PID=0 | | | | | | | |
| 2 | | PID=0 @ 2 ft. | | | | | | | |
| | | Gray Siltstone, friable laminated, slight odor PID=65 | | | | | | | |
| | | Refusal @ 3 ft. | | | | | | | |
| 4 | | | | | | | | | |
| 6 | | | | | | | | | |
| 8 | | | | | | | | | |
| 10 | | | | | | | | | |
| 12 | | | | | | | | | |

Boring Terminated @ 3 ft.

# LOG OF BORING

Project : Phase II - ESA (Fuel Farm Area)

Client : Town of Addison
Addison, Texas

Boring No. : PB-16
File No. : 25361
Date : 7/22/02
Elevation : ft

Dry Augered to ft Water at ft Caving at ft
Wash Bored to ft Water at ft after hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 |  | Asphalt w/ sand & shell base | | | | | | | |
| | | FILL: Becomes Black Clay @ 1 ft. PID=0 | | | | | | | |
| 2 | | - Becomes Brown Silty Clay @ 2 ft. PID=0 | | | | | | | |
| | | Brown CLAY (CH) w/ silt pockets PID=78 | | | | | | | |
| | | Refusal @ 3.5 ft. | | | | | | | |
| 4 | | | | | | | | | |
| 6 | | | | | | | | | |
| 8 | | | | | | | | | |
| 10 | | | | | | | | | |
| 12 | | | | | | | | | |

Boring Terminated @ 3.5 ft.

# LOG OF BORING

**Project** : Phase II - ESA (Fuel Farm Area)

**Boring No.** : PB-17
**File No.** : 25361
**Date** : 7/22/02
**Elevation** : ft

**Client** : Town of Addison
Addison, Texas

**Dry Augered** to ft **Water at** ft **Caving at** ft
**Wash Bored** to ft **Water at** ft **after** hrs.

| ELEV./ DEPTH | SOIL SYMBOLS SAMPLER SYMBOLS TEST DATA | Description | WC (%) | Dens. (pcf) | QU or UU (tsf) | Str (%) | LL | PI | #200 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | Asphalt w/ shell and sand base | | | | | | | |
| | | FILL: Becomes Black Clay @ 1 ft. w/ rock pieces PID=0 | | | | | | | |
| 2 | | PID=0 @ 3 ft. and very dry | | | | | | | |
| 4 | | PID=0 @ 5 ft. | | | | | | | |
| 6 | | Tan Siltstone, very dry @ 7 ft. PID=0 | | | | | | | |
| | | Refusal @ 7 ft. | | | | | | | |
| 8 | | | | | | | | | |
| 10 | | | | | | | | | |
| 12 | | | | | | | | | |

Boring Terminated @ 7 ft.

# ATTACHMENT C

# ANALYTICAL REPORTS

THE WASHINGTON GROUP
ENVIRONMENTAL SERVICES LABORATORY

301 Chelsea Parkway
Boothwyn, Pa. 19061
(610) 497-8000

**Report For:**

WGI-Houston (Addison)RE: 25361.001
Mr. Ron Bowlin
9433 Kirby Dr.
Houston TX 77054

**Job Number**

78310232

**Summary Number**

69681

August 08, 2002

Reviewed by_____ 8/20/02
Project Manager Elizabeth Witouski

| | | |
|---|---|---|
| NJ ID# PA343 | EPA ID# PA00078 | PA ID# 23-272 |
| CA ID# 02105CA | RI ID# 238 | CT ID# PH0687 |
| NY ID# 11345 | MD ID# 286 | MA ID# M-PA078 |

**Total Pages = 206**

The Washington Group International
Environmental Services Laboratory Data Summary 08/16/02 10:28:17
Summary # 69681 Project# 78310232 WGI-Houston (Addison)RE: 25361.001

| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289140A | PB-11A | G01 | Benzene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289140A | PB-11A | G01 | Ethylbenzene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289140A | PB-11A | G01 | Toluene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289140A | PB-11A | G01 | Xylenes-Meta&Para | ND | 4 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289140A | PB-11A | G01 | Xylenes-Ortho | ND | 4 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289140B | PB-11A | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289140B | PB-11A | G11TX | >nC12 to nC28 | ND | 16 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | M |
| 289140B | PB-11A | G11TX | nC6 to nC12 | ND | 16 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MX |
| 289140C | PB-11A | S06 | WATER BY EVAP | 23.6 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | MCH |
| 289141A | PB-11B | G01 | Benzene | ND | 5 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289141A | PB-11B | G01 | Ethylbenzene | ND | 5 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289141A | PB-11B | G01 | Toluene | 1 J | 5 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289141A | PB-11B | G01 | Xylenes-Meta&Para | ND | 5 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289141A | PB-11B | G01 | Xylenes-Ortho | ND | 5 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289141B | PB-11B | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289141B | PB-11B | G11TX | >nC12 to nC28 | ND | 19 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289141B | PB-11B | G11TX | nC6 to nC12 | ND | 19 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289141C | PB-11B | 760 | EXT BN SOLIDS | | | COMPLETE | 07/22/2002 | 07/25/2002 | 07/25/2002 | JYL |
| 289141C | PB-11B | G10 | 2-Methylnaphthalene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | S |
| 289141C | PB-11B | G10 | Acenaphthene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Acenaphthylene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Anthracene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Benz(a)anthracene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Benzo(a)pyrene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Benzo(b)fluoranthene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |

The Washington Group International
Environmental Services Laboratory Data Summary 08/16/02 10:28:17
Summary # 69681 Project# 78310232 WGI-Houston (Addison)RE: 25361.001

| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289141C | PB-11B | G10 | Benzo(ghi)perylene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Benzo(k)fluoranthene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Chrysene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Dibenz(a,h)anthracene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Fluoranthene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Fluorene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Indeno(1,2,3-cd)pyrene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Naphthalene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Phenanthrene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289141C | PB-11B | G10 | Pyrene | ND | 460 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SA |
| 289141C | PB-11B | S06 | WATER BY EVAP | 27.3 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | HCH |
| 289142A | PB-12A | G01 | Benzene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289142A | PB-12A | G01 | Ethylbenzene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289142A | PB-12A | G01 | Toluene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289142A | PB-12A | G01 | Xylenes-Meta&Para | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289142A | PB-12A | G01 | Xylenes-Ortho | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289142B | PB-12A | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289142B | PB-12A | G11TX | >nC12 to nC28 | ND | 17 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289142B | PB-12A | G11TX | nC6 to nC12 | ND | 17 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289142C | PB-12A | S06 | WATER BY EVAP | 22.3 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | HCH |
| 289143A | PB-12B | G01 | Benzene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289143A | PB-12B | G01 | Ethylbenzene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PS |
| 289143A | PB-12B | G01 | Toluene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289143A | PB-12B | G01 | Xylenes-Meta&Para | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289143A | PB-12B | G01 | Xylenes-Ortho | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289143B | PB-12B | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289143B | PB-12B | G11TX | >nC12 to nC28 | 56 | 10 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |

The Washington Group International
Environmental Services Laboratory Data Summary 08/16/02 10:28:17
Summary # 69681 Project# 78310232 WGI-Houston (Addison)RE: 25361.001

| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289143B | PB-12B | G11TX | nC6 to nC12 | 22 | 10 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289143C | PB-12B | 760 | EXT BN SOLIDS | | | COMPLETE | 07/22/2002 | 07/25/2002 | 07/25/2002 | JYL |
| 289143C | PB-12B | G10 | 2-Methylnaphthalene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Acenaphthene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Acenaphthylene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Anthracene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Benz(a)anthracene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Benzo(a)pyrene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAP |
| 289143C | PB-12B | G10 | Benzo(b)fluoranthene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAL |
| 289143C | PB-12B | G10 | Benzo(ghi)perylene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Benzo(k)fluoranthene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Chrysene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Dibenz(a,h)anthracene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Fluoranthene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Fluorene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Indeno(1,2,3-cd)pyrene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Naphthalene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Phenanthrene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | G10 | Pyrene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289143C | PB-12B | S06 | WATER BY EVAP | 21.2 | | % as received | 07/22/2002 | 07/26/2002 | 07/28/2002 | JST |
| 289144A | PB-13A | G01 | Benzene | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289144A | PB-13A | G01 | Ethylbenzene | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289144A | PB-13A | G01 | Toluene | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289144A | PB-13A | G01 | Xylenes-Meta&Para | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289144A | PB-13A | G01 | Xylenes-Ortho | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289144B | PB-13A | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289144B | PB-13A | G11TX | >nC12 to nC28 | ND | 10 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289144B | PB-13A | G11TX | nC6 to nC12 | ND | 10 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |

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| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289144C | PB-13A | S06 | WATER BY EVAP | 24.0 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | MCH |
| 289145A | PB-13B | G01 | Benzene | ND | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289145A | PB-13B | G01 | Ethylbenzene | ND | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289145A | PB-13B | G01 | Toluene | ND | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289145A | PB-13B | G01 | Xylenes-Meta&Para | ND | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289145A | PB-13B | G01 | Xylenes-Ortho | ND | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289145B | PB-13B | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MX |
| 289145B | PB-13B | G11TX | >nC12 to nC28 | ND | 21 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289145B | PB-13B | G11TX | nC6 to nC12 | ND | 21 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289145C | PB-13B | 760 | EXT BN SOLIDS | | | COMPLETE | 07/22/2002 | 07/25/2002 | 07/25/2002 | JYL |
| 289145C | PB-13B | G10 | 2-Methylnaphthalene | 3800 | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Acenaphthene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Acenaphthylene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Anthracene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Benz(a)anthracene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Benzo(a)pyrene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Benzo(b)fluoranthene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Benzo(ghi)perylene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Benzo(k)fluorenthene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Chrysene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Dibenz(e,h)anthracene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Fluoranthene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Fluorene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Indeno(1,2,3-cd)pyrene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Naphthalene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Phenanthrene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | G10 | Pyrene | ND | 430 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289145C | PB-13B | S06 | WATER BY EVAP | 22.8 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | MCH |

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| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289146A | PB-14A | G01 | Benzene | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289146A | PB-14A | G01 | Ethylbenzene | 2 J | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289146A | PB-14A | G01 | Toluene | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289146A | PB-14A | G01 | Xylenes-Meta&Para | 1 J | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289146A | PB-14A | G01 | Xylenes-Ortho | 2 J | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289146B | PB-14A | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289146B | PB-14A | G11TX | >nC12 to nC28 | 840 D | 20 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MX |
| 289146B | PB-14A | G11TX | nC6 to nC12 | 410 | 10 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | M. |
| 289146C | PB-14A | 760 | EXT BN SOLIDS | | | COMPLETE | 07/22/2002 | 07/25/2002 | 07/25/2002 | JYL |
| 289146C | PB-14A | G10 | 2-Methylnaphthalene | 3000 | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Acenaphthene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Acenaphthylene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Anthracene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Benz(a)anthracene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Benzo(a)pyrene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Benzo(b)fluoranthene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Benzo(ghi)perylene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Benzo(k)fluoranthene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Chrysene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Dibenz(a,h)anthracene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Fluoranthene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Fluorene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Indeno(1,2,3-cd)pyrene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SA |
| 289146C | PB-14A | G10 | Naphthalene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SA |
| 289146C | PB-14A | G10 | Phenanthrene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | G10 | Pyrene | ND | 420 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289146C | PB-14A | S06 | WATER BY EVAP | 19.9 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | MCH |
| 289147A | PB-14B | G01 | Benzene | ND | 6 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289147A | PB-14B | G01 | Ethylbenzene | ND | 6 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |

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| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289147A | PB-14B | G01 | Toluene | ND | 6 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289147A | PB-14B | G01 | Xylenes-Meta&Para | 3 J | 6 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289147A | PB-14B | G01 | Xylenes-Ortho | ND | 6 | ug/kg-dry | 07/22/2002 | 08/02/2002 | 08/02/2002 | PSS |
| 289147B | PB-14B | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289147B | PB-14B | G11TX | >nC12 to nC28 | 14 | 10 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289147B | PB-14B | G11TX | nC6 to nC12 | 14 | 10 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289147C | PB-14B | S06 | WATER BY EVAP | 10.5 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | ML |
| 289148A | PB-15A | G01 | Benzene | 4 | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289148A | PB-15A | G01 | Ethylbenzene | ND | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289148A | PB-15A | G01 | Toluene | 3 | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289148A | PB-15A | G01 | Xylenes-Meta&Para | ND | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289148A | PB-15A | G01 | Xylenes-Ortho | ND | 3 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289148B | PB-15A | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289148B | PB-15A | G11TX | >nC12 to nC28 | ND | 17 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289148B | PB-15A | G11TX | nC6 to nC12 | ND | 17 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289148C | PB-15A | 760 | EXT BN SOLIDS | | | COMPLETE | 07/22/2002 | 07/25/2002 | 07/25/2002 | JYL |
| 289148C | PB-15A | G10 | 2-Methylnaphthalene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Acenaphthene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Acenaphthylene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Anthracene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Benz(a)anthracene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Benzo(a)pyrene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Benzo(b)fluoranthene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Benzo(ghi)perylene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Benzo(k)fluoranthene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Chrysene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Dibenz(a,h)anthracene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |

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| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289148C | PB-15A | G10 | Fluoranthene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Fluorene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Indeno(1,2,3-cd)pyrene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Naphthalene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Phenanthrene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | G10 | Pyrene | ND | 380 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289148C | PB-15A | S06 | WATER BY EVAP | 11.4 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | MCH |
| 289149A | PB-16A | G01 | Benzene | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | F |
| 289149A | PB-16A | G01 | Ethylbenzene | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289149A | PB-16A | G01 | Toluene | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289149A | PB-16A | G01 | Xylenes-Meta&Para | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289149A | PB-16A | G01 | Xylenes-Ortho | ND | 2 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289149B | PB-16A | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289149B | PB-16A | G11TX | >nC12 to nC28 | 98 | 10 | mg/kg-dry | 07/22/2002 | 07/31/2002 | 07/31/2002 | MXH |
| 289149B | PB-16A | G11TX | nC6 to nC12 | 43 | 10 | mg/kg-dry | 07/22/2002 | 07/31/2002 | 07/31/2002 | MXH |
| 289149C | PB-16A | 760 | EXT BN SOLIDS | | | COMPLETE | 07/22/2002 | 07/25/2002 | 07/25/2002 | JYL |
| 289149C | PB-16A | G10 | 2-Methylnaphthalene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Acenaphthene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Acenaphthylene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Anthracene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Benz(a)anthracene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SA |
| 289149C | PB-16A | G10 | Benzo(a)pyrene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | S. |
| 289149C | PB-16A | G10 | Benzo(b)fluoranthene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Benzo(ghi)perylene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Benzo(k)fluoranthene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Chrysene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Dibenz(a,h)anthracene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Fluoranthene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Fluorene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |

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| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289149C | PB-16A | G10 | Indeno(1,2,3-cd)pyrene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Naphthalene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Phenanthrene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | G10 | Pyrene | ND | 370 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289149C | PB-16A | S06 | WATER BY EVAP | 10.5 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | HCH |
| 289150A | PB-17A | G01 | Benzene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289150A | PB-17A | G01 | Ethylbenzene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PS |
| 289150A | PB-17A | G01 | Toluene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PS. |
| 289150A | PB-17A | G01 | Xylenes-Meta&Para | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289150A | PB-17A | G01 | Xylenes-Ortho | ND | 4 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289150B | PB-17A | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | HXH |
| 289150B | PB-17A | G11TX | >nC12 to nC28 | ND | 20 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | HXH |
| 289150B | PB-17A | G11TX | nC6 to nC12 | ND | 20 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | HXH |
| 289150C | PB-17A | 760 | EXT BN SOLIDS | | | COMPLETE | 07/22/2002 | 07/25/2002 | 07/25/2002 | JYL |
| 289150C | PB-17A | G10 | 2-Methylnaphthalene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Acenaphthene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Acenaphthylene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Anthracene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Benz(a)anthracene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Benzo(a)pyrene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Benzo(b)fluoranthene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SA |
| 289150C | PB-17A | G10 | Benzo(ghi)perylene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Benzo(k)fluoranthene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Chrysene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Dibenz(a,h)anthracene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Fluoranthene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Fluorene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Indeno(1,2,3-cd)pyrene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Naphthalene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |

The Washington Group International
Environmental Services Laboratory Data Summary 08/16/02 10:28:17
Summary # 69681 Project# 78310232 WGI-Houston (Addison)RE: 25361.001

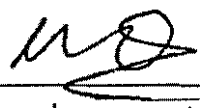
| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289150C | PB-17A | G10 | Phenanthrene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | G10 | Pyrene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289150C | PB-17A | S06 | WATER BY EVAP | 24.5 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | MCH |
| 289151A | PB-17B | G01 | Benzene | ND | 5 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289151A | PB-17B | G01 | Ethylbenzene | ND | 5 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289151A | PB-17B | G01 | Toluene | ND | 5 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289151A | PB-17B | G01 | Xylenes-Meta&Para | ND | 5 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289151A | PB-17B | G01 | Xylenes-Ortho | ND | 5 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289151B | PB-17B | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289151B | PB-17B | G11TX | >nC12 to nC28 | ND | 21 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289151B | PB-17B | G11TX | nC6 to nC12 | ND | 21 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289151C | PB-17B | S06 | WATER BY EVAP | 25.2 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | MCH |
| 289152A | OW-A | G01 | Benzene | 15 | 3 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289152A | OW-A | G01 | Ethylbenzene | 3 J | 3 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289152A | OW-A | G01 | Toluene | 15 | 3 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289152A | OW-A | G01 | Xylenes-Meta&Para | 5 | 3 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289152A | OW-A | G01 | Xylenes-Ortho | 2 J | 3 | ug/kg-dry | 07/22/2002 | 08/03/2002 | 08/03/2002 | PSS |
| 289152B | OW-A | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289152B | OW-A | G11TX | >nC12 to nC28 | ND | 14 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289152B | OW-A | G11TX | nC6 to nC12 | ND | 14 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289152C | OW-A | 760 | EXT BN SOLIDS | | | COMPLETE | 07/22/2002 | 07/25/2002 | 07/25/2002 | JYL |
| 289152C | OW-A | G10 | 2-Methylnaphthalene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Acenaphthene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Acenaphthylene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Anthracene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |

The Washington Group International
Environmental Services Laboratory Data Summary 08/16/02 10:28:17
Summary # 69681 Project# 78310232 WGI-Houston (Addison)RE: 25361.001

| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289152C | OW-A | G10 | Benz(a)anthracene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Benzo(a)pyrene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Benzo(b)fluoranthene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Benzo(ghi)perylene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Benzo(k)fluoranthene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Chrysene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Dibenz(a,h)anthracene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Fluoranthene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Fluorene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SA |
| 289152C | OW-A | G10 | Indeno(1,2,3-cd)pyrene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SA |
| 289152C | OW-A | G10 | Naphthalene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Phenanthrene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | G10 | Pyrene | ND | 390 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289152C | OW-A | S06 | WATER BY EVAP | 13.9 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | MCH |
| 289153A | DUP2 | G01 | Benzene | ND | 4 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289153A | DUP2 | G01 | Ethylbenzene | 4 | 4 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289153A | DUP2 | G01 | Toluene | 1 J | 4 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289153A | DUP2 | G01 | Xylenes-Meta&Para | ND | 4 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289153A | DUP2 | G01 | Xylenes-Ortho | 2 J | 4 | ug/kg-dry | 07/22/2002 | 08/04/2002 | 08/04/2002 | PSS |
| 289153B | DUP2 | 763TS | EXT-TPH TX SOIL | | | Complete | 07/22/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289153B | DUP2 | G11TX | >nC12 to nC28 | 320 | 15 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289153B | DUP2 | G11TX | nC6 to nC12 | 170 | 15 | mg/kg-dry | 07/22/2002 | 07/30/2002 | 07/30/2002 | MXH |
| 289153C | DUP2 | 760 | EXT BN SOLIDS | | | COMPLETE | 07/22/2002 | 07/25/2002 | 07/25/2002 | JYL |
| 289153C | DUP2 | G10 | 2-Methylnaphthalene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Acenaphthene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Acenaphthylene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Anthracene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Benz(a)anthracene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Benzo(a)pyrene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |

The Washington Group International
Environmental Services Laboratory Data Summary 08/16/02 10:28:17
Summary # 69681 Project# 78310232 WGI-Houston (Addison)RE: 25361.001

| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289153C | DUP2 | G10 | Benzo(b)fluoranthene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Benzo(ghi)perylene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Benzo(k)fluoranthene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Chrysene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Dibenz(a,h)anthracene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Fluoranthene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Fluorene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Indeno(1,2,3-cd)pyrene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | G10 | Naphthalene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SA[illegible] |
| 289153C | DUP2 | G10 | Phenanthrene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | S[illegible] |
| 289153C | DUP2 | G10 | Pyrene | ND | 440 | ug/kg-dry | 07/22/2002 | 07/27/2002 | 07/27/2002 | SAB |
| 289153C | DUP2 | S06 | WATER BY EVAP | 23.8 | | % as received | 07/22/2002 | 07/25/2002 | 07/25/2002 | MCH |

Approved by: 

Report Prep: M. Hamalak

THE WASHINGTON GROUP
ENVIRONMENTAL LABORATORY

69681

Methods Used for Summary# 69681:

| Code | Description |
|---|---|
| 760 | Ext.Proc.-Sonication BN (Solids) SW 846 Method 3550B-mod. |
| 763TS | Extraction for TPH Soil/Texas TNRCC Method 1005 |
| G01PA | SW-846 5035/8260B/PA UST VOCs - BTEX;Cumene;Naph.;EDB;EDC |
| G10 | Polynuclear aromatics (PAH) by GC/MS/SW-846 Method 8270C mod |
| G11TX | TPH by GC-FID/Texas TNRCC Method 1005 |
| S06 | Water by evaporation/ EPA-600 Mtd 160.3 |

## DATA QUALIFIERS

The following list shows data qualifiers that may appear in this report, and the meaning of each.

| Qualifier | Meaning |
|---|---|
| B | Compound was detected in the associated blank. |
| D | Result was obtained from a different dilution than other analytes. |
| E | Result is estimated. Usually, this qualifier indeicates that the result is above the calibrated range of the instrument |
| J | Result is estimated. Usually this qualifier indicates the reported concentration is below the laboratory's reporting limit. |
| N | Indicates a Tentatively Identified Compound. |
| ND | Analyte was not detected. |
| U | Analyte was not detected (U and ND qualifiers are interchangable). |

## ABBREVIATIONS

The following list shows abbreviations that commonly occur in analytical reports.

| Abbreviation | Meaning |
|---|---|
| DL | Dilution |
| LCS | Laboratory Control Sample |
| LCSS | Laboratory Control Sample (soil) |
| LCSW | Laboratory Control Sample (water) |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| NR | No Recovery |
| PB | Preparation Blank |
| PS | Post-Digestion Spike |
| RE | Reanalysis |
| RPD | Relative Percent Difference |
| SR | Serial Dilution |

2 of 2

**Washington** — **Laboratory Chain Of Custody**

Quote No:

Ship To:

**Washington Group Laboratory**
301 Chelsea Parkway
Boothwyn, PA 19061
Phone: 610-497-8000
Fax: 610-497-8005

Lab Job No:

Client/Office: WASHINGTON GROUP Phone: 713-752-3038

Send invoice to: RON BOWLIN

Address: 9433 KIRBY DR. HOUSTON TX 77054

Address:

Send report to: RON BOWLIN Fax: 713-393-9149

P.O. No:

Project Description: ADDISON GS4

TAT (for data): Identify number of working days below); ...or Date-->:

☐ Rush 1 2 3 4 5 days ☒ ~~Firm~~(6-12) ___ ☐ Std.(~12) ___ ☐ Other ___

Lab Staffer confirming Rush/Firm: Hardcopy TAT Date?:

Report Type: ☒ ~~Results only~~ ☐ Data +QC ☐ Reduced Deliv. ☐ Other:
☐ Regulatory Format (CLP like) ☐ Electronic/disk->(Format?)

Regulatory Samples? ☒ ~~YES~~ ☐ NO — If YES?: ☐ Act II ☒ ~~UST~~ ☐ RCRA ☐ NPDES ☒ ~~Phase I/II~~ ☐ ISRA ☐ Other:

Analytical Protocol: ☐ SW846 ☐ EPA600 ☐ Drinking H2O ☐ ASTM ☐ Other:

Lab Use Only
Rec. 10/12/pe
Due Date:
Cooler Tmp 2 deg C
Custody seal yes no No:
Summary No. 69681
Lab Log No.

Analysis Required: BTEX-8260 (XXX) · TPH-1005 (XXX) · PAH-8270C (XXX)

| Sample Data (NJ HAZITE disk deliverable limits sample ID to 7 Characters) | | | | | | | Container Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ID (NJ limit=7 characters) | date | time | matrix | grab | comp | type | no. | preservative | pH | Lab Log No. |
| DUP2 | 7.22 | 1200 | SOIL | X | | | | | | 289538-12/B-12/B |
| MS2 | 7.22 | 1230 | | | | | | | | 289147 |
| MSD2 | 7.22 | 1230 | | | | | | | | 289148 |
| DUP2 | | 1500 | | | | | | | | 289153C |
| MS2 | | 1500 | | | | | | | | 289149 |
| MSD2 | | 1500 | | | | | | | | 289150 |
| TRIP BLANK | | | | | | | | | | X |

Comments/Special Handling/Storage/Disposal-->: MS/MSD BTEX → PB-14B
MS/MSD TPH → PB-14A
MS/MSD PAH → PB-17A

Sampled by: RON BOWLIN

Phone no:

| Relinquished By: | | Received By: | | Method of Shipment |
|---|---|---|---|---|
| Name: RON BOWLIN | Date: 7.22.02 | Name: K WU | Date: 7/24/02 | Airbill No. 506088894 |
| Organization: WGI | Time: 1600 | Organization: TWGINT | Time: 0930 | |
| Name: | Date: | Name: | Date: | |
| Organization: | Time: | Organization: | Time: | |
| Name: | Date: | Name: | Date: | |
| Organization: | Time: | Organization: | Time: | |

THE WASHINGTON GROUP
ENVIRONMENTAL SERVICES LABORATORY

301 Chelsea Parkway
Boothwyn, Pa. 19061
(610) 497-8000

**Report For:**

WGI-Houston (Addison)RE: 25361.001
Mr. Ron Bowlin
9433 Kirby Dr.
Houston TX 77054

**Job Number**

78310232

**Summary Number**

69680

August 08, 2002

Reviewed by
Project Manager Elizabeth Witouski

| | | |
|---|---|---|
| NJ ID# PA343 | EPA ID# PA00078 | PA ID# 23-272 |
| CA ID# 02105CA | RI ID# 238 | CT ID# PH0687 |
| NY ID# 11345 | MD ID# 286 | MA ID# M-PA078 |

**Total Pages = 42**

The Washington Group International
Environmental Services Laboratory Data Summary 08/16/02 09:59:24
Summary # 69680 Project# 78310232 WGI-Houston (Addison)RE: 25361.001

| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289138A | OW-A | G01 | Benzene | ND | 5 | ug/L | 07/23/2002 | 08/05/2002 | 08/05/2002 | PSS |
| 289138A | OW-A | G01 | Ethylbenzene | ND | 5 | ug/L | 07/23/2002 | 08/05/2002 | 08/05/2002 | PSS |
| 289138A | OW-A | G01 | Toluene | ND | 5 | ug/L | 07/23/2002 | 08/05/2002 | 08/05/2002 | PSS |
| 289138A | OW-A | G01 | Xylenes-Meta&Para | ND | 5 | ug/L | 07/23/2002 | 08/05/2002 | 08/05/2002 | PSS |
| 289138A | OW-A | G01 | Xylenes-Ortho | ND | 5 | ug/L | 07/23/2002 | 08/05/2002 | 08/05/2002 | PSS |
| 289138B | OW-A | 763TW | EXT-TPH TX H2O | | | Complete | 07/23/2002 | 07/28/2002 | 07/28/2002 | MXH |
| 289138B | OW-A | G11TX | >nC12 to nC28 | 6.2 | 2 | mg/L | 07/23/2002 | 07/29/2002 | 07/29/2002 | M. |
| 289138B | OW-A | G11TX | nC6 to nC12 | 5.5 | 2 | mg/L | 07/23/2002 | 07/29/2002 | 07/29/2002 | MXH |
| 289138C | OW-A | 759 | EXT BN H2O | | | COMPLETE | 07/23/2002 | 07/25/2002 | 07/29/2002 | DJN |
| 289138C | OW-A | G10 | 2-Methylnaphthalene | 87 | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Acenaphthene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Acenaphthylene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Anthracene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Benz(a)anthracene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Benzo(a)pyrene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Benzo(b)fluoranthene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Benzo(ghi)perylene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Benzo(k)fluoranthene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Chrysene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Dibenz(a,h)anthracene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Fluoranthene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Fluorene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | S |
| 289138C | OW-A | G10 | Indeno(1,2,3-cd)pyrene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SA |
| 289138C | OW-A | G10 | Naphthalene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Phenanthrene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289138C | OW-A | G10 | Pyrene | ND | 10 | ug/L | 07/23/2002 | 07/30/2002 | 07/30/2002 | SAB |
| 289139 | Trip Blank | G01 | Benzene | ND | 5 | ug/L | 07/23/2002 | 08/06/2002 | 08/06/2002 | PSS |
| 289139 | Trip Blank | G01 | Ethylbenzene | ND | 5 | ug/L | 07/23/2002 | 08/06/2002 | 08/06/2002 | PSS |

The Washington Group International
Environmental Services Laboratory Data Summary 08/16/02 09:59:24
Summary # 69680 Project# 78310232 WGI-Houston (Addison)RE: 25361.001

| Log | Description | Code | Parameter | Result | Limit | Units | Sampled | Started | Complete | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| 289139 | Trip Blank | G01 | Toluene | ND | 5 | ug/L | 07/23/2002 | 08/06/2002 | 08/06/2002 | PSS |
| 289139 | Trip Blank | G01 | Xylenes-Meta&Para | ND | 5 | ug/L | 07/23/2002 | 08/06/2002 | 08/06/2002 | PSS |
| 289139 | Trip Blank | G01 | Xylenes-Ortho | ND | 5 | ug/L | 07/23/2002 | 08/06/2002 | 08/06/2002 | PSS |

Approved by: _____

Report Prep: M. Hamalak

THE WASHINGTON GROUP
ENVIRONMENTAL LABORATORY

69680

Methods Used for Summary# 69680:

| Code | Description |
|---|---|
| 759 | Extraction Base/Neutral (H2O) SW-846 Method 3520C |
| 763TW | Extraction for TPH Aqueous/Texax TNRCC Method 1005 |
| G01PA | SW-846 5035/8260B/PA UST VOCs - BTEX;Cumene;Naph.;EDB;EDC |
| G10 | Polynuclear aromatics (PAH) by GC/MS/SW-846 Method 8270C mod |
| G11TX | TPH by GC-FID/Texas TNRCC Method 1005 |

**The Washington Group**
**Environmental Laboratory**

## DATA QUALIFIERS

The following list shows data qualifiers that may appear in this report, and the meaning of each.

| Qualifier | Meaning |
|---|---|
| B | Compound was detected in the associated blank. |
| D | Result was obtained from a different dilution than other analytes. |
| E | Result is estimated. Usually, this qualifier indeicates that the result is above the calibrated range of the instrument |
| J | Result is estimated. Usually this qualifier indicates the reported concentration is below the laboratory's reporting limit. |
| N | Indicates a Tentatively Identified Compound. |
| ND | Analyte was not detected. |
| U | Analyte was not detected (U and ND qualifiers are interchangable). |

## ABBREVIATIONS

The following list shows abbreviations that commonly occur in analytical reports.

| Abbreviation | Meaning |
|---|---|
| DL | Dilution |
| LCS | Laboratory Control Sample |
| LCSS | Laboratory Control Sample (soil) |
| LCSW | Laboratory Control Sample (water) |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| NR | No Recovery |
| PB | Preparation Blank |
| PS | Post-Digestion Spike |
| RE | Reanalysis |
| RPD | Relative Percent Difference |
| SR | Serial Dilution |

1 of 1

**Washington** Laboratory Chain Of Custody

Ship To:

**Washington Group Laboratory**
301 Chelsea Parkway
Boothwyn, PA. 19061
Phone: 610-497-8000
Fax: 610-497-8005

Quote No:

Lab Job No:

Client/Office: WASHINGTON GROUP Phone: 713-852-3033

Send invoice to: RON BOWLIN

Address: 9433 KIRBY DRIVE HOUSTON 77054

Address:

Send report to: RON BOWLIN Fax: 713-383-7149

P.O. No:

Project Description: ADDISON ESA

TAT (for data): Identify number of working days below);...or Date-->:

☐ Rush 1 2 3 4 5 days ☒ Firm(6-12) ____ ☐ Std.(~12) ____ ☐ Other ____

Lab Staffer confirming Rush/Firm: ____ Hardcopy TAT Date?: ____

Report Type: ☐ Results only ☒ Data +QC ☐ Reduced Deliv. ☐ Other: ____
☐ Regulatory Format (CLP like) ☐ Electronic/disk->(Format?) ____

Regulatory Samples? ☒ YES ☐ NO If YES?: ☐ Act II ~~☒ UST~~ ☐ RCRA ☐ NPDES ☒ Phase I/II ☐ ISRA ☐ Other: ____

Analytical Protocol: ☒ SW846 ☐ EPA600 ☐ Drinking H2O ☐ ASTM ☐ Other: ____

Lab Use Only
rev. 10/12/99
Due Date:
Cooler Temp: 7 deg C
custody seal: yes no
no:
Summary No: G9680
Lab Log No: 28913B-1,2,3/B-1,2 C-1,2

Analysis Required: BTEX - 8260 (X) TPH - 1005 (X) PAH - 8270C (X)

| Sample Data (NJ HAZITE disk deliverable limits sample ID to 7 Characters) | | | | | | Container Data | | | |
|---|---|---|---|---|---|---|---|---|---|
| ID (NJ limit=7 characters) | date | time | matrix | grab | comp | type | no. | preservative | pH |
| GW-A | 7-23 | 1600 | W | X | | SEE Below | | | |
| TRIP BLANK | | | | | | 40G | 2 | HCL | |

(ONE VIAL had headspace) KW 7/24/02

Comments/Special Handling/Storage/Disposal-->: A-BTEX HCL 40 ml (3)
B-TPH HCL 40 ml (2) ONE VIAL had headspace
C - PAH 1000 A/G

Sampled by: RON BOWLIN

Phone no:

| Relinquished By: | | Received By: | | Method of Shipment |
|---|---|---|---|---|
| Name: | Date: 7-23-02 | Name: K Wells | Date: 7/24/02 | Airbill No. 5060884894 |
| Organization: WGI | Time: 1600 | Organization: TWISTNT | Time: 0930 | |
| Name: | Date: | Name: | Date: | |
| Organization: | Time: | Organization: | Time: | |
| Name: | Date: | Name: | Date: | |
| Organization: | Time: | Organization: | Time: | |

# HP LaserJet 3200se

invent

TOALASERJET 3200
9724502837
JAN-29-2002 11:01AM

## Fax Call Report

| Job | Date | Time | Type | Identification | Duration | Pages | Result |
|---|---|---|---|---|---|---|---|
| 56 | 1/29/2002 | 11:00:53AM | Send | 917137976578 | 1:00 | 2 | OK |

TOWN OF
**ADDISON** **PUBLIC WORKS**

To: Paul Wild
Company: Washington
FAX #: 1-713-797-6578
Date: 1-29-02
# of pages (including cover): 2
Re: Addison Airport Fuel Farm

From: Jim Pierce, P.E.
Asst. Public Wks. Dir.
Phone: 972/450-2879
FAX: 972/450-2837
jpierce@ci.addison.tx.us

16801 Westgrove
P.O.Box 9010
Addison, TX 75001-9010

☐ Original in mail ☐ Per your request ☐ FYI ☐ Call me

Comments: The attached should give you an idea of info available from our files.

Jim

1-29-02

Addison Airport
Summary of Files Relevent to Fuel Farm

6-16-98 Notes from Leak-Tech Corp Assessment Report — Addison Aviation Svcs, Inc.

3-14-01 TNRCC Letter to S. Stuart re AATI Fuel Farm corrective action

3-17-98 Cherry Air Fuel Spill letter & documents

6-5-97 TNRCC PSTD Assessment Report — Addison Airport Fuel Farm

5-19-98 Addison Airport Action Plan — Response to Airport Phase I Environmental Assessment

— — — Thick file re Cherry Air / Ray Stern Fuel Farm

11-8-01 — Fuel Farm Operators comments on the Phase I Env. Assessment

11-12-01 Ditto

9-13-01 Covers re LPST # 91471 (Previously sent to P. Wild)

TOWN OF ADDISON

**Public Works / Engineering**
16801 Westgrove • P.O. Box 9010
Addison, Texas 75001
Telephone: (972) 450-2871 • Fax: (972) 450-2837

# LETTER OF TRANSMITTAL

| DATE 12-31-01 | JOB NO. |
|---|---|
| ATTENTION | |
| RE: Addison Airport Phase II Environmental Assessment | |

TO Paul Wild
Washington Int'l Group

**GENTLEMAN:**

**WE ARE SENDING YOU** ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | | Signed Proposal For Phase II Environmental assessment |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**THESE ARE TRANSMITTED as checked below:**

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

**REMARKS** Please consider this your notice to proceed.

**COPY TO** Mark Acevedo

**SIGNED:** J. Ratliff

*If enclosures are not as noted, please notify us at once.*

# LETTER OF TRANSMITTAL

TOWN OF ADDISON

**Public Works / Engineering**
16801 Westgrove • P.O. Box 9010
Addison, Texas 75001
Telephone: (972) 450-2871 • Fax: (972) 450-2837

| DATE 12-31-01 | JOB NO. |
|---|---|
| ATTENTION | |
| RE: Addison Airport Phase II | |
| Environmental Assessment | |
| | |
| | |
| | |

TO Carmen Moran
Town Hall

**GENTLEMAN:**

**WE ARE SENDING YOU** ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | | Original Signed proposal for above |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**THESE ARE TRANSMITTED as checked below:**

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☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

**REMARKS** _____

**COPY TO** _____

**SIGNED:** _____

*If enclosures are not as noted, please notify us at once.*

Pulled

DATE SUBMITTED: November 16, 2001
FOR COUNCIL MEETING: November 27, 2001

**Council Agenda Item:_____**

**SUMMARY:**

This Item is to award a contract to conduct a Phase II Environmental Assessment of the Addison Airport Fuel Farm.

**FINANCIAL IMPACT:**

Funds Available: $85,000

Cost: $119,500

Funding Source: Airport Fund

**BACKGROUND:**

The Airport Phase I Environmental Assessment Update of the Airport that was completed in August 2001 by Camp, Dresser and McKee, recommended that a Phase II Environmental Assessment be performed on the Airport Fuel Farm. The purpose of a Phase II is to determine the extent of soil and groundwater contamination, if any, as a result of operations at the fuel farm.

The Town solicited statements of qualifications from interested firms, and received ten responses. The Town evaluated the responses and selected Washington Group International to submit a proposal to do the work. The Town requested that Washington prepare their proposal to include all of the likely activities that may be required with the current knowledge we have about the fuel farm. A copy of Washington's proposal is attached.

The total cost of the proposal ($119,500 with one round of sampling) exceeds the amount budgeted by $34,500, and this is because Washington's proposal is "all inclusive" as requested by the Town. However, staff believes that the project may come within the budgeted amount if what we suspect is true, i.e., soil contamination is not serious, groundwater has not been affected, and additional rounds of sampling are not required. Task Items 1-3 will produce basic information on the extent of contamination and will be used to guide the remaining activities. If contamination is not serious, Tasks 4, 5, and 6 will be minimal. Task 7 is needed regardless of contamination, as a good site plan of the existing fuel farm is essential for future planning and operations. Tasks 8 and 9 result from all of the prior work.

As of this writing, our Attorney is negotiating the Work Authorization Terms with Washington.

**RECOMMENDATION:**

Staff recommends that the City Manager be authorized to contract with Washington Group International for Tasks 1 through 3, and Task 7, for an amount of $42,600, as well as the appropriate portion of Tasks 4, 5, 6, 8, and 9, as approved by staff, for a total amount not to exceed the budgeted amount of $85,000. All subject to approval of the Work Authorization Terms by the City Attorney.

Administrative Recommendation:

Administration recommends approval.

charges?

---

Item #R14 - Acceptance and approval of Rates and Changes for Addison Airport for calendar year 2002.

Tiedowns & Hangers
Land leases based on appraised values

Attachments:

1. Council Agenda Item Overview
2. Memorandum from Mark Acevedo
3. Addison Airport Rental Rates

Administrative Recommendation:

Administration recommends approval.

---

Item #R15 - Acceptance and approval of the final report of the Fuel Farm Committee related to the site relocation and operating methodology of the Addison Airport Fuel Farm.

Attachments:

1. Council Agenda Item Overview
2. Memorandum from Mark Acevedo
3. Recommendation to City Council
4. Airport Development Concept Drawing
5. Environmental Assessment Update
6. Addison Airport Fuel Farm Storage Drawings

Administrative Recommendation:

Administration recommends approval of the new location for the fuel farm as proposed by the committee. Town agrees to finance building of fuel farm with construction costs passed on to those who lease the tanks.

---

**EXECUTIVE SESSION**

---

Item #ES-1 - Closed (Executive) session of the City Council as authorized by Section 551.071 of the Texas Government Code to consult with and seek the advice of the City Attorney regarding pending litigation, to wit: Shara

11-8-01
Dave, Chris, Mark, Jim F., Mike,
This is their latest deal. I am prepared to address this at Council.
Ron

November 8, 2001

Town of Addison
5300 Belt Line Road
Addison, TX 75001

Dear Addison Council Members,

As the current fuel farm operators at Addison Airport, we would appreciate the opportunity to bring forth information to your attention concerning the existing condition of the current fuel farms. Enclosed are the recommendations from the phase I environmental assessment prepared by Camp, Dressor & McKee concerning the environmental compliance of the fuel farms. Responses to those recommendations with back-up information in the Exhibit A are included as well.

I am confident after reviewing this information we will come to a mutual agreement there is not a contamination issue with the current fuel farms. Nor are there any operational or safety issues at the current fuel farms. Therefore it should not be necessary to spend millions of dollars to relocate the farm at the fuel farm operator's or the Town of Addison's expense. We appreciate the opportunity to work with you and the airport management on resolving this issue.

Sincerely,

Jack Hopkins
General Manger
Million Air Dallas

Ray Stern
Partner
R. Stern FBO, LP

Kenneth Donaldson
President
Cherry Air

Vincent Hilgeman
General Manager
Mercury Air Center

Edward Morales
General Manager
Addison Express

TOWN OF ADDISON

# LETTER OF TRANSMITTAL

**Public Works / Engineering**
16801 Westgrove • P.O. Box 9010
Addison, Texas 75001-9010
Telephone: (972) 450-2871 • Fax: (972) 450-2837

| DATE 11-12-01 | JOB NO. |
|---|---|
| ATTENTION | |
| RE: Addison Airport Fuel Farm | |

TO Paul Wild
Washington Group

**GENTLEMAN:**

**WE ARE SENDING YOU** ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | | Letter of Nov 8, 2000 to Addison Council from Fuel Farm Operators with attachments |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**THESE ARE TRANSMITTED as checked below:**

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

**REMARKS** This information may be useful to you in understanding background issues at the fuel farm.

**COPY TO** _____

**SIGNED:** _____

*If enclosures are not as noted, please notify us at once.*

Airport Fuel Farm
Phase II

10-10-01

Telecon with Bob Lazarus, our insurance/
Risk management consultant.

For the Washington contract we need;

Professional Liability Coverage (for the consulting portion – report, etc.)

$1,000,000

Pollution Liability Coverage

$1,000,000

as separate polices.

If put together in one "package" limits should be $2,000,000

## Jim Pierce

**From:** HILL, JOHN [jhill@cowlesthompson.com]
**Sent:** Saturday, September 29, 2001 7:26 AM
**To:** 'jpierce@ci.addison.tx.us'
**Cc:** DIPPEL, KEN
**Subject:** Phase II Environmental Site Assessment


<<Addison - Scope of Work for Environmental Site Assessment (Airport Phase
II) (fuel farm).DOC>>

Jim--attached is a red-lined copy of the work authorization terms of the proposal from Washington regarding the Phase II environmental site assessment at the fuel farm. Please review and let me know if you would like to discuss.

A few notes regarding the proposal letter:

1. Under "Background", the third sentence provides that the Town is to provide baseline conditions in the fuel farm area, "specifically the presence or abasence of hydrocarbon contamination". Is that correct?

2. Under "Technical Approach", the first sentence states that there is to be only "limited invasive field exploration." Is that correct?

Also, the second sentence provides that the "objective will be to establish a reasonable understanding of environmental and physical conditions of the tank farms and adjacnet areas at the airport." Depending on what the Town expects Washington to do, a better word than reasonable might be "extensive" or "thorough".

3. Note that under "Price", paragraph 1 provides that the "Town will provide unrestricted access to Fuel Areas..." We need to make sure that we can provide such access.

Please let me know if you have any questions or comment.

John

# LETTER OF TRANSMITTAL

TOWN OF ADDISON

**Public Works / Engineering**
16801 Westgrove • P.O. Box 9010
Addison, Texas 75001-9010
Telephone: (972) 450-2871 • Fax: (972) 450-2837

| DATE 9-14-01 | JOB NO. |
|---|---|
| ATTENTION | |
| RE: Addison Airport Fuel Farm. | |

TO Paul Wild
Washington

**GENTLEMAN:**

**WE ARE SENDING YOU** ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | | Correspondence from TNRCC, EA and Addison Airport re LPST#91471 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**THESE ARE TRANSMITTED as checked below:**

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

**REMARKS** FYI. Do you think we should obtain samples from the 4 monitoring wells before they are plugged? Or could you get past sampling data which would suffice?

**COPY TO** _____

**SIGNED:** Jim Pierce

*If enclosures are not as noted, please notify us at once.*

# ADDISON AIRPORT

September 13, 2001

David Pearce
Airport Manager, Addison Airport
4651 Airport Parkway
Addison, TX 75001

HAND DELIVERED 9/13/01

RE: Closure of LPST #91471 at Addison Airport Fuel Farm

Dear David:

I would like to respond to last Friday's discussion regarding closure of the entire Addison Airport Fuel Farm area. I am very concerned to learn on Friday that to your knowledge no action had been taken by you or the Town on the LPST case on the Town's fuel tanks. Enclosed you will find a copy of the letter and enclosures sent to you from EA Engineering, Science, & Technology, Inc. This letter indicated in its second paragraph that you had 180 days from case closure to plug and abandon the four wells referenced and to prepare the Final Site Closure Report. According to the enclosed TNRCC letter, you may have missed the simple opportunity to obtain this final closure. However, I did take the liberty and contact Applied Earth Sciences, Inc. at their offices on Trinity Mills, as indicated by the TNRCC letter, page two, last paragraph. I spoke with a Frank Clark who indicated that he could arrange a crew to plug and abandon the monitor wells with as little as 48 hours notice.

This information was passed on to you Monday, September 10 via your voice message on the telephone. The only person available was Darci Nuezil. She indicated you were in the office but busy and that she would forward the information to you. You have yet to call me back. You also have EA Engineering's reference should you desire to contact them for help in closing the site.

As you may or may not know, the process for closure of an LPST such as exists in the Addison Airport Fuel Farm area can be fairly complex and lengthy. Hopefully there is still a good chance to obtain immediate closure if you act quickly and with proper assistance. Should you choose to delay an immediate attempt at final closure, the likely hood of additional unnecessary delays and added expense are a high probability.

ADDISON AIRPORT OF TEXAS, INC. • 4505 CLAIRE CHENNAULT • DALLAS, TEXAS 75248 • 972/248-7733
FAX 972/248-2416

Please let me know what you or the Town have done or plan to do concerning this LPST. Also, what funding source will be used for any costs associated with this? If I can assist you in any way, please feel free to contact me at any time.

Sincerely,

Sam Stuart
President
Addison Airport of Texas, Inc.

Cc: Mark Acevedo-Public Works, Town of Addison
Chris Terry-Asst. City Manager, Town of Addison
Bob Barrett-City Council and Fuel Farm Site Location committee member
Mike Tiller-President, Addison Airport Aviation Business Association

EA Engineering, Science, & Technology, Inc.
1420 Valwood Parkway, Suite 170
Carrollton, Texas 75006
Phone: (972) 484-1420 Fax (972) 247-7220

April 17, 2001

Mr. David Pierce
Addison Airport
4651 Airport Parkway
Addison, Texas 75001

Re: Closure of Leaking Petroleum Storage Tank (LPST) Case, Fuel Farm Located at Southwest Corner of Addison Road at Roscoe Turner Street, Addison, Dallas (Dallas County), Texas (LPST ID No. 91471, Facility ID No. 0000022).

Dear Mr. Pierce:

EA Engineering, Science, and Technology (EA) has provided environmental consulting services to the former Addison Airport of Texas, Inc. (AATI, Sam Stuart) associated with the referenced LPST case. In December, 2000 EA submitted a Site Closure Request Form to the TNRCC, along with a Cost Preapproval Proposal and Work Plan for the plugging and abandonment (P&A) of four monitor wells associated with the LPST case, and preparation of the Final Site Closure Report. On March 13, 2001 the TNRCC submitted a Corrective Action Response Form approving the proposed costs for the P&A of the monitor wells and the preparation of the Final Site Closure Report to Mr. Stuart of the former AATI. On March 20, 2001 Mr. Stuart received a letter from the TNRCC concurring that the LPST case at the site has met closure requirements and the monitor wells should be removed.

EA contacted Mr. Stuart and was informed that AATI is no longer responsible for management of Addison Airport and was directed to contact you about the P&A of the monitor wells. Mr. Stuart told EA that Washington Staubach Addison Airport Joint Venture was the Responsible Party for the remaining activities associated with the LPST case. Per the Texas Water Code, all of the monitor wells must be plugged within 180 days of case closure. The Final Site Closure Report should be submitted to the TNRCC within 30 days of the P&activities.

Attached are the TNRCC CARF, Letter of Concurrence, and the Cost Preapproval Proposal for Site Closure Activities. EA will perform the P&A of the monitor wells and complete the Final Site Closure Report for the TNRCC approved amount of $3,342. Also attached are EA's Standard Terms and Conditions. The TNRCC Cost Preapproval Proposal approved by the TNRCC will serve as Exhibit A. **In order to authorize EA to perform the P&A activities, please sign the terms and conditions and fax the signed copy to EA. Retain the original for your files.** If you have any questions, please feel free to call Roger Place or me at (972) 484-1420.

Sincerely,

Todd Frazee
Project Manager
CAPM 01237

cc: Mr. Sam Stuart
(4505 Claire Chennault, Dallas, Texas 75248)

attachments

# TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

*Protecting Texas by Reducing and Preventing Pollution*

March 14, 2001

Mr. Sam Stuart
Addison Airport of Texas, Inc.
4505 Claire Chennault
Dallas, Texas 75248

Re: File Review for Closure of Subsurface Release of Hydrocarbons at AATI Fuel Farm, 4788 Roscoe Turner, Dallas (Dallas County), Texas
(LPST ID No. 91471 - Facility ID No. 0000022 - Priority 4.1) R-4

Dear Mr. Stuart:

This letter confirms the completion of corrective action requirements for the release incident at the above-referenced facility. Based upon the submitted information and with the provision that the documentation provided to this agency was accurate and representative of site conditions, we concur with your recommendation that the site has met closure requirements. Therefore, no further corrective action is necessary. The criteria includes, but are not limited to the following:

- groundwater concentrations indicate the contaminant plume is stable and declining;
- groundwater concentrations in all wells (except MW-2) are less than Category II, Plan A target levels;
- concentrations detected in MW-2 appear to be steady or declining;
- soil and groundwater contaminant levels are considered protective for construction workers based on calculated site specific target levels for this site; and
- soil contaminant levels are less than health based soil concentrations.

Please note that financial assurance must be maintained for all operational storage tanks at this site. Please be aware that case closure is based on identified exposure pathways and that any remaining contaminant levels and potential exposure pathways should be evaluated when conducting any future soil excavation or construction activities at this site. Please ensure that any wastes generated from these activities are handled in compliance with all applicable regulations.

Please be advised that all monitor wells which are not now in use and/or will not be used in the next 180 days must be properly plugged and abandoned pursuant to Chapter 32.017 of the Texas Water Code and in accordance with Title Title 16, Texas Administrative Code (TAC), Section 76.1004.

A State of Texas Plugging Report (Form No. TNRCC-0055) is required to be submitted to the Water Well Drillers Section of the Texas Department of Licensing and Regulation, P.O. Box 12157, Capitol Station, Austin, Texas 78711, within thirty (30) days of plugging completion. If you have any questions regarding the future use of an existing monitor well, please contact the Texas Department of Licensing and Regulation at 512/463-7880 or 800/803-9202.

If there are to be any other necessary site restoration activities performed to complete site closure, complete a *Final Site Closure Report* and submit the report to the Texas Natural Resource Conservation Commission (TNRCC) Central Office in Austin to document actual site closure. For sites eligible for reimbursement through the Petroleum Storage Tank Remediation Fund, written preapproval should be obtained prior to initiation of site closure activities. Reimbursement claims for activities that are not preapproved will not be paid until all claims for preapproved work are processed and paid.

Please note that the *Final Site Closure Report*, if necessary, will be the last submittal associated with this case. This letter signifies the completion of corrective action associated with the release. No subsequent TNRCC correspondence will be issued in response to the *Final Site Closure Report*.

Please note that all correspondence must include the LPST and Facility ID Numbers and must be submitted to the TNRCC Central Office in Austin.

Should you have any questions, please contact Curt Champlin of Applied Earth Sciences, Inc (PST Privatization Contractor) at 512/990-7467 ext. 205. **Please reference this LPST ID Number when making inquiries.** Your cooperation in this matter has been appreciated.

Sincerely,

Dennis Rogers
TNRCC Onsite Representative
Petroleum Storage Tank-Responsible Party Remediation Section

DRR/scc
91471.fnn

# TNRCC FAX TRANSMITTAL

DATE: 3-13-01 NO. OF PAGES *(including this sheet)*: 3

TO:
Name: MR BRANDON GRIESEL
Organization: ADDISON AIRPORT
Fax Number: (972) 248-2416

FROM: TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Name: Curt Champlin
Coordinator-AES, Inc.
Telephone: 512/990-7467
Fax Number: 512/239-2216
Mail: MC-137, PO Box 13087, Austin, Tx 78711-3087

NOTES: Response to Corrective Action Proposal(s) for **LPST #: 091471 , Facility ID: 0000022.**
If you have any problems receiving this fax, please call 512/990-7467 .

**Please note that new Corrective Action Preapproval Forms have been required since September 1,1995.** The forms are available at no cost by downloading from the TNRCC Bulletin Board Services (BBS) (512/239-0700), or over the Internet at http://www.tnrcc.state.tx.us. You may also order the forms on diskette from the TNRCC, MC-195, P.O. Box 13088, Austin, TX 78711-3088 (please specify the Corrective Action Preapproval Forms on diskette). A pamphlet with reproducible forms is available at no cost by calling TNRCC Publications at 512/239-0028.

Please note that all LPST corrective action proposals and reports need to be prepared by an environmental contracting/consulting firm registered as a Corrective Action Specialist (CAS) **and need to have the the signatures and registration numbers of both the CAS and registered Corrective Action Project Manager (CAPM) included** pursuant to Title 30, Texas Administrative Code (TAC), Subchapter J. Any proposal that has been prepared by a consulting firm not registered as a CAS by the Texas Natural Resource Conservation Commission (TNRCC) or which does not include the signature and registration number of the Project Manager may be rejected. **Please reserve the use of the telefax machines for submitting proposals and data for LPST cases that rank as new priority 1's and for emergency abatement activities.**

# TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
# LPST CORRECTIVE ACTION RESPONSE FORM

**LPST-ID: 091471**
**12/26/2000 Proposal For: SITE CLOSURE**

| GENERAL INFORMATION | | | |
|---|---|---|---|
| LPST-ID | : 091471 Priority: 4.1 | | |
| Responsible Party | : ADDISON AIRPORT | Tel: 972/248-7733 | |
| Facility # & Name | : 0000022 ADDISON AIRPORT | | |
| Facility Address | : 4788 ROSCOE TURNER | | |
| Facility City | : DALLAS | County: DALLAS | |
| CAPM & Name | : CAPM01366 TODD NICKERSON | | |
| RCAS & Name | : RCAS00127 EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. | | |

## TNRCC TECHNICAL RESPONSE

Proposed activity is approved as proposed.

Approval is for the plugging and abandonment of the four monitor wells. Please provide the required documentation upon completion of the project.

| ACTIVITY COST SUMMARY | | | |
|---|---|---|---|
| Proposed Cost: | 3,342.00 | Maximum Pre-Approved: | 3,342.00 |

Signature: _____ Date: 3/09/01 Telephone: 512/990-7467
Curt Champlin
Coordinator-AES, Inc.

Approval: _____
Jeff Freeman
Project Manager, AES, Inc.

_____
Emmanuel Ekpo or Maria Lebron or Dennis Rogers
TNRCC On-site Representative
Responsible Party Remediation Section

# TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
# LPST CORRECTIVE ACTION RESPONSE FORM

**LPST-ID: 091471**
**12/26/2000 Proposal For: SITE CLOSURE**

Pursuant to 30 TAC Section 334.82 (b), you are required to notify all parties affected by the contamination. If you determine that contamination from the release has migrated off-site, or if you are required by the TNRCC to conduct further assessment or other corrective actions off-site, then you are required to notify the affected landowner(s) within 30 days of documenting the impact. Please note that landowners may include state and local owners of right-of-way properties. For the purpose of this requirement, notice shall be through any means described in 30 TAC Section 334.82 (a). Please provide documentation that the affected landowner(s) has/have been notified within 30 days of notification. **Please note that failure to notify affected parties as required herein is grounds for formal enforcement proceedings.**

Please note that preapproval of this activity DOES NOT guarantee reimbursement. Eligiblity is determined at the time of reimbursement application review. If the release is eligible, the preapproved amount is the maximum allowable for the proposed activities. The actual amount of reimbursement will be determined after the completed reimbursement application and all related receipts and invoices are submitted, and the completed activity is subject to technical and and reimbursable cost review. In all instances, the completed work must be technically justifiable and should serve to advance the site in the corrective action process. The amount of preapproved work performed should be based on completion of the activity's objectives. Additionally, please also note that preapproved amounts include all eligible markup.

Claims for reimbursement should only be submitted after the completion of an annual cycle for remediation system operation and maintenance, and quarterly groundwater monitoring unless a more frequent filing period is previously approved by the PST Reimbursement Section. The Reimbursement Section can be reached at 512/239-2001.

EA Engineering, Science, and Technology, Inc.

# CONSULTING SERVICES AGREEMENT

EA as used herein means EA Engineering, Science, and Technology, Inc.

Client as used herein means the other party to this Agreement.

**WHEREAS,** EA provides an extensive range of integrated and comprehensive consulting, engineering, scientific, and analytical services; and

**WHEREAS,** Client desires to utilize EA's services.

**NOW, THEREFORE,** for good and valuable consideration, EA agrees to provide the professional services described herein, and Client agrees to accept and pay for such services, all in accordance with the following terms and conditions:

1. **Definitions**

   The following terms shall have the meanings set forth below whenever they are used in this Agreement:

   a) "Scope of Work" (SOW) shall mean the description of the services to be provided by EA as mutually agreed upon by EA and Client, and will be performed on either a fixed price or time and materials basis. The SOW and the Price will be set out in the attached Exhibit "A" (or EA's Proposal letter), incorporated by reference into this Agreement.

   b) "Documentation" shall mean deliverable documentation as described in the SOW.

   c) "Equipment" shall mean all indoor and outdoor equipment used by EA at Client sites for the purpose of providing services as described in the SOW.

   d) "Proprietary Information" shall mean all data, information, manuals, materials, trade secrets, patents, products, processes, plans, whether in written, graphic or oral form, and similar proprietary know-how of EA.

2. **Compensation/Billing**

   EA's invoices will be issued at least monthly and are payable upon receipt. Balances thirty (30) days past due are subject to interest at 1.5% per month. After five (5) days written notice, EA may suspend services under any Client Agreement until all past due accounts have been paid.

   The SOW is often not fully definable prior to the execution of this Agreement as investigation may uncover additional facts and information requiring an alteration in the SOW and/or the Price for the services. For services on a time and materials basis, the proposed fees are EA's best estimate of the charges required to complete the SOW. EA will inform Client of any material changes to either the SOW or the Price that may be required and which may alter the terms of this Agreement.

   Costs and schedule commitments are subject to renegotiation for unreasonable delays caused by Client's failure to provide free access to sampling areas, specified facilities, or information, or for delays caused by unpredictable occurrences, or force majeure, such as fires, floods, strikes, riots, unavailability of labor or materials or services, acts of God or of the public enemy, or acts or regulations of any governmental agency. Temporary work stoppage caused by any of the above may result in additional cost beyond that outlined in this Agreement.

   In the event EA is required to respond to a subpoena, government inquiry or other legal process related to the services in connection with a proceeding to which it is not a party, Client shall reimburse EA for its costs and compensate EA at its then standard rates for the time spent gathering information and documents. Client agrees to compensate EA at the rate of one and one-half times EA's then current hourly rates for time spent in any deposition, hearing, proceeding or trial.

   For services provided on a time-and-materials basis, the minimum time segment for field work is four (4) hours and one hour for work done at any of EA's offices. The rental or use of EA's Equipment will be charged to the project in accordance with EA's "Corporate Equipment Rate Billing Schedule" which is either incorporated into the rates shown in Exhibit B, or is available upon Client's request. Rates are subject to annual adjustment each September. EA's labor rates for services provided on a time-and-materials basis, are fixed for one year with annual adjustment upon notice to Client.

   Expenses related to the services and reimbursable by Client ("Other Direct Costs") include without limitation, travel and living expenses, phone, FAX, overnight delivery services, postage, shipping, and production costs; identifiable drafting and word processing supplies; equipment usage and rental fees; and expendable materials and supplies. Other Direct Costs are reimbursable by Client and are billed at EA's cost plus 20 percent.

   Required subconsultant and/or subcontractor costs are reimbursable by Client and are billed at EA's cost plus 20%. Any local or state taxes or fees (except state income taxes), such costs are in addition to any quoted Price.

3. **Termination**

   This Agreement may be terminated by either party in the event of substantial failure by the other party to fulfill its obligations under this Agreement through no fault of the terminating party. Such termination is effected upon providing: (1) not less than thirty (30) calendar days written notice, and (2) an opportunity for consultation with the terminating party prior to termination. Client will be responsible for all services and direct expenses associated with the project through the effective date of cancellation, plus reasonable fee(s) and/or expenses for reallocation and demobilization of personnel and equipment.

4. **Confidential Information/Inventions**

   All Proprietary Information furnished by EA in connection with this Agreement, but not developed as a result of work under this Agreement or under prior agreements between Client and EA, shall be held confidential by Client, and returned to EA within thirty (30) days of the completion of the services or conclusion of the litigation wherein EA's services were provided.

   All inventions, techniques, and improvements held by EA to be proprietary or trade secrets of EA prior to any use on behalf of Client, as well as all inventions, techniques, and improvements developed by EA independent of the services rendered to Client under this Agreement, remain the property of EA. Documents provided by Client will remain the Client's property, but EA may retain one confidential file copy.

5. **Governing Law**

   This Agreement shall be deemed made in, and in all respects interpreted, construed, and governed by, the laws of the State of Maryland, U.S.A.. All disputes arising hereunder are to be resolved in the state and federal courts having jurisdiction of such disputes sitting in the State of Maryland or hearing appeals therefrom. Both parties consent to the jurisdiction of such courts over them for the purposes of this Agreement, and agree to accept service of process by registered mail.

6. **Standard of Care**

   EA will prepare all work and provide services in accordance with generally accepted professional practices ordinarily exercised by reputable companies performing the same or similar services in the same geographic area. NO WARRANTIES OR GUARANTIES, EXPRESS OR IMPLIED, ARE MADE WITH RESPECT TO ANY GOODS OR SERVICES PROVIDED UNDER THIS AGREEMENT, AND ANY IMPLIED WARRANTIES

OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED.

Client shall furnish documents or information reasonably within Client's control and deemed necessary by EA for proper performance of its services. EA may rely upon Client-provided documents in performing the services required under this Agreement and EA assumes no responsibility or liability for their accuracy.

Client agrees to advise EA, no later than upon the execution of this Agreement, of any hazardous substance or any condition, known or that reasonably should be known by Client, existing in, on, or near the site where EA's services are to be performed, that presents a potential danger to human health, the environment, or EA's equipment. Client agrees to a continuing obligation to provide EA related information as it becomes available to the Client. By virtue of entering into this Agreement or providing services hereunder, EA does not assume control of, or responsibility as an operator or otherwise for, the site or the person(s) in charge of the site, or undertake responsibility for reporting to any federal, state or local public agencies any conditions at the site that may present a potential danger to public health, safety or the environment. Client agrees to notify the appropriate federal, state or local public agencies as required by law; or otherwise to disclose, in a timely manner, any information that may be necessary to prevent damage to human health, safety, or the environment.

Upon Client's request, EA's work product may be provided on magnetic media. By such request, Client agrees that the written copy retained by EA in its files shall be the official base document. The Client will retain one conformed written copy. EA makes no warranty or representation to Client that the magnetic copy is accurate or complete. Any modifications of such magnetic copy by Client shall be Client's risk and without liability to EA. Such magnetic copy is subject to all conditions of this Agreement.

7. **Indemnification**

Each party shall indemnify, defend and hold harmless the other party from and against all liability, loss, cost, expense, or damage caused by the indemnifying party's negligent acts or negligent omissions in the performance of this contract. However in the event of any loss, damage or liability, whether to person or to property, arising out of the sole negligence of either EA or Client, such party will assume full responsibility for any liability arising thereof and hold harmless the other party. EA and Client further agree that if either EA or Client engages in willful misconduct, such party shall assume full responsibility for any liability arising thereof irrespective of the nature and degree of the other party's negligence, and will indemnify and hold harmless the other party. In no event shall EA be liable for any special, incidental, economic, or consequential damages whatsoever, regardless of the legal theory under which such damages may be incurred. In no event will EA's liability under this provision or Agreement exceed the lesser of the fees actually paid to EA under this Agreement or $50,000.

For claims related to or involving pollution, toxic substances or hazardous wastes or for any other claims arising from underground hazards, Client agrees to release, defend, indemnify and hold harmless EA and its officers, directors, employees, agents, consultants, and subcontractors from all claims, damages, losses, and expenses, including, but not limited to, reasonable fees and expenses of attorneys and consultants, and court costs, arising out of the performance of this Agreement. Such indemnification and release includes claims which arise out of the actual, alleged, or threatened dispersal, escape, or release of chemicals, wastes, liquids, gases or any other material, irritant, contaminant or pollutant regardless of the legal theory under which such damages may be incurred.

EA's field personnel will avoid hazards or utilities which are visible to them at the site. EA is not responsible for any damage or loss to property owned by Client or third parties due undisclosed or unknown surface or subsurface conditions, except to the extent such damage or loss is a direct result of EA's negligence.

8. **Severability**

If any term or provision of this Agreement is held or deemed to be invalid or unenforceable, in whole or in part, by a court of competent jurisdiction, this Agreement shall be ineffective to the extent of such invalidity or unenforceability without rendering invalid or unenforceable the remaining terms and provisions of this Agreement.

9. **Third Party Rights**

EA's services under this Agreement are being performed solely for the benefit of Client, and no other entity shall have any claim against EA because of this Agreement or the performance or nonperformance of services provided by EA hereunder.

10. **Entire Agreement**

This Agreement contains the entire agreement of the parties. It may not be modified or terminated orally. Any modification to these terms and conditions without the written approval of EA shall be null and void. In no event will the terms of any purchase order, work order or any other document provided by Client modify or amend this Agreement, even if it is signed by EA, unless EA signs a written statement expressly indicating that such terms supersede the terms of this Agreement. Any such terms are expressly rejected by EA.

11. **Assignment**

EA reserves the right to assign this Agreement to its affiliates, subsidiaries, or successors as necessary in order to effectively carry out and complete the services specified by this Agreement.

ATTACHMENTS

Exhibit A -

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

By:_____

Name:_____

Title:_____

Date:_____

CLIENT

By:_____

Name:_____

Title:_____

Date:_____

# Plan B, CAP, and Site Closure Cost Proposal

**LPST #** 91471 **Facility ID** 00022

Responsible Party: Addison Airport of Texas, Inc

Facility Name and Address: AATI Fuel Farm, 4798 Roscoe Turner, Dallas, Texas

Mark Appropriate Activity: ___ 05-2 Plan B Assessment ___ 06-1 Corrective Action Plan Preparation X 11-1 Site Closure

Print

## Plan B Assessment or Corrective Action Plan

| Plan B Assessment | | Sub | | Total |
|---|---|---|---|---|
| | Basic Report Only | ___ | = | $0 |
| | Groundwater Ingestion | | | |
| | a) On-Site (Vert. F&T Modeling only) | ___ | = | $0 |
| | b) Off -Site (Vert. + Lat. F&T Modeling to POE) | ___ | = | $0 |
| | Construction Worker | | | |
| | a) Off -Site (Vert. + Lat. F&T Modeling to POE) | ___ | = | $0 |
| | Indoor Air | | | |
| | a) Soil to Air | ___ | = | $0 |
| | b) Groundwater to Air | ___ | = | $0 |
| | Outdoor Air | | | |
| | a) Soil to Air | ___ | = | $0 |
| | b) Groundwater to Air | ___ | = | $0 |

| Plan B Assessment (continued) | | Sub | | Total |
|---|---|---|---|---|
| | Soil Ingestion | ___ | = | 0 |
| | Subtotal Subcontracted Personnel = | 0 | | |
| | Subcontractor Markup % | ___ | = | 0 |
| | Total | | = | $0 |

| Corrective Action Plan | | | |
|---|---|---|---|
| | CAP Preparation - No Remediation System | ___ | = $0 |
| | CAP Preparation - With Remediation System | ___ | = $0 |
| | Subtotal Subcontracted Personnel = | $0 | |
| | Subcontractor Markup % | ___ | = $0 |
| | Total | | = $0 |

## Site Closure

### A. Personnel

| | Units | | $/Unit | Sub | | Total |
|---|---|---|---|---|---|---|
| Office Costs | | | | | | |
| Site Closure Request | 1 | x | $270 | ___ | = | $270 |
| Project Manager | 2 | x | $80 | ___ | = | $160 |
| Final Closure Report | 1 | x | $195 | ___ | = | $195 |
| Field Costs | | | | | | |
| PSA First well | 1 | x | $135 | ___ | = | $135 |
| PSA add. wells <100' deep | 3 | x | $90 | ___ | = | $270 |
| PSA add. wells >100' deep | ___ | x | $0 | ___ | = | $0 |
| Remove Remediation System | 0 | x | $300 | ___ | = | $0 |
| Subtotal Subcontracted Personnel = | | | $0 | | | |
| Subcontractor Markup % | | | ___ | | = | $0 |
| Cost Proposal Preparation | | | | | = | $120 |
| **A. Total Personnel** | | | | | | **$1,150** |

### B. Rig Costs

| | Units | | $/Unit | Sub | | Total |
|---|---|---|---|---|---|---|
| Mobilization (<100 mi. rt.) | 1 | x | $245 | ___ | = | $245 |
| Mileage (>100 mi. rt.) | ___ | x | $0 | ___ | = | $0 |
| PSA Wells (first 02') | 4 | x | $300 | ___ | = | $1,200 |
| PSA Wells (add. footage 20'-100') | ___ | x | $0 | ___ | = | $0 |
| PSA Wells (add. footage >100') | ___ | x | $0 | ___ | = | $0 |
| Drill Crew Per Diem | ___ | x | $0 | ___ | = | $0 |
| Subtotal Subcontracted Rig Costs = | | | $1,445 | | | |
| Subcontractor Markup % | | | 15% | | = | $217 |
| **B. Total Rig Costs** | | | | | | **$1,662** |

### C. Other Costs

| | Units | | $/Unit | Sub | | Total |
|---|---|---|---|---|---|---|
| Disposal of Wastes | 1 | x | $195 | ___ | = | $195 |
| Small items | 1 | x | $20 | ___ | = | $20 |
| _____ | _____ | x | $0 | ___ | = | $0 |
| _____ | _____ | x | $0 | ___ | = | $0 |
| _____ | _____ | x | $0 | ___ | = | $0 |
| _____ | _____ | x | $0 | ___ | = | $0 |
| _____ | _____ | x | $0 | ___ | = | $0 |
| Subtotal Subcontracted Other = | | | $215 | | | |
| Subcontractor Markup % | | | 15% | | = | $32 |
| **C. Total Other** | | | | | | **$323** |

### D. Travel

| | Units | | $/Unit | Sub | | Amount |
|---|---|---|---|---|---|---|
| Equipment Truck | 1 | x | $140 | ___ | = | $140 |
| One way mileage to site | 20 | | ___ | | | $0 |
| Mileage (>100 rt.) | ___ | x | $0.30 | ___ | = | $0 |
| Travel Time | 1.5 | x | $40 | ___ | = | $60 |
| Per Diem | ___ | x | $0 | ___ | = | $0 |
| Airfare | ___ | x | $0 | ___ | = | $0 |
| Subtotal Subcontracted Travel = | | | $0 | | | |
| Subcontractor Markup % | | | ___ | | = | $0 |
| **D. Total Travel** | | | | | | **$206** |

**E. Total Site Closure Proposed Cost**

A + B + C + D = **$3,342**

| | | | |
|---|---|---|---|
| Todd A. McKenzie | / | / SA Engineering, Science and Technology | / |
| (CAPM Name, Printed) | (Signature) | (Company) | (Date) |
| 972-484-1420 / 972-247-7220 | | 1388 / | 06/28/01 |
| (Phone #) | (Fax #) | (CAPM #) | (Exp. Date) |
| Roger W. Pace / | | / SA Engineering, Science and Technology / | |
| (RCAS Rep. Name, Printed) | (Signature of Representative) | (Company) | (Date) |
| 972-484-1420 / 972-247-7220 | | 0137 / | 12/09/01 |
| (Phone #) | (Fax #) | (RCAS #) | (Exp. Date) |

I acknowledge that the TNRCC may reimburse corrective action costs that are at or below the maximum reimbursable amount published in 30 TAC Chapter 334, Subchapter M. The maximum reimbursable cost will be the amount approved for the activity unless the Executive Director determines that sound justification for a cost surplus exists. I understand that this certification is not intended to limit what a Registered Corrective Action Specialist, Corrective Action Project Manager, or Contractor may charge. I further understand that the amount of the reimbursement for the above activity will be determined after all receipts are submitted and subjected to technical and reimbursable cost review. I certify that this TNRCC form has not been altered.

| | | | |
|---|---|---|---|
| Addison Airport of Texas, Inc. / | / | Beau Stuart / | Addison Airport of Texas, Inc. |
| (Name of Responsible Party) | (Signature of Representative) | (Name Printed) | (Company) |
| 972-380-7729 / | 972-248-2418 / | | |
| (Phone #) | (Fax #) | | (Date) |

TNRCC-0635e 10/23/97