INNOVATIVE TECHNICAL SOLUTIONS, Inc.

ITSI

December 16, 1997

Mr. Dale Klettke
Associate Environmental Scientist
Port of Oakland
530 Water Street
Oakland, California 94607

Workplan for Additional Site Investigation
Former USTs MF25 and MF26
United Airlines Hanger-Economy Parking Lot Site
Metropolitan Oakland International Airport (MOIA), South Field
1100 Airport Drive
Oakland, California

Dear Mr. Klettke:

Innovative Technical Solutions, Inc. (ITSI) is pleased to provide this Workplan for Additional Site Investigation (Workplan) at United Airlines Hanger-Economy Parking Lot Site at the Metropolitan Oakland International Airport (MOIA). This Workplan presents the additional investigation efforts as recommended in the *Findings and Recommendations* report, dated April 25, 1997[1].

BACKGROUND

Phase I and Phase II soil investigations were performed in 1988 by BASELINE in the area of two underground storage tanks (USTs) MF-25 and MF-26 formerly used for the storage of waste oil and solvents. Petroleum hydrocarbons reported as gasoline and jet fuel were identified in soil samples in the area of the USTs.

The USTs were removed in March 1992. Approximately 700 cubic yards of impacted soil was removed and confirmation soil samples were collected following removal of the soil. Monitoring well MW-1 was installed in 1992. TPHd and TPHmo was reported in elevated concetrations in MW-1. Two additional monitoring wells were installed in 1995. Free product was reported in MW-2 and MW-3 starting in 1996.

As part of discussions for closure of this site and adjoining taxiway site with Alameda County, additional characterization of the site was requested, along with recovery of free product. In response, previous activities at the site were reviewed, and an approach was developed for addressing Alameda County concerns, as presented in *Findings and Recommendations, Tanks MF25 and MF26, United Airlines Hangar-Economy Parking Lot Site*, dated April 25, 1997.

Recently completed activities include the following:

- Redeveloped the existing three monitoring wells at the site.

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[1] *Findings and Recommendations, Tanks MF25 and MF26, United Airlines Hangar-Economy Parking Lot Site, MOIA, South Field*, Innovative Technical Solutions, Inc., April 25, 1997.

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- Collected a product sample from two monitoring wells for fuel-fingerprint analysis at the time of well development.
- Completed July 1997 quarterly monitoring event.

Results of the above activities were discussed in the quarterly monitoring report for July 1997[2], and are briefly summarized below.

Product samples of free product collected during redevelopment of the monitoring wells were submitted for fuel fingerprinting at Curtis and Tompkins. According to Curtis and Tompkins, the chromatograms for the free product samples are reportedly consistent with the JP-5 laboratory standard. Also, chromatograms for both samples contained peaks from heavier petroleum hydrocarbons (approximately C26 to C30) which did not match any of their fuel standards.

After redevelopment of the existing monitoring wells, free product was not observed. The monitoring wells will continue to be monitored for free product during future quarterly monitoring events.

Following receipt of the analytical results for free product samples, the chromatograms for groundwater samples collected during July 1997 quarterly monitoring and sampling were re-evaluated by Pace Analytical. The chromatograms for extractable petroleum hydrocarbons were consistent with JP-5 jet fuel.

PROPOSED SCOPE OF WORK

The proposed scope of work includes the following tasks:

- Prepare site-specific Health and Safety Plan.
- Field meet with airport operations, plan and coordinate field activities, and obtain drilling permit from City of Oakland.
- Notify USA and perform subsurface utility clearance of the proposed locations using an independent underground utility locator.
- Installation of four monitoring wells and one remediation well, and reconstruction of existing monitoring well MW-2. Collect soil and groundwater samples and coordinate delivery of samples to laboratory.
- Develop and sample monitoring wells and coordinate delivery of samples to laboratory.
- Survey the vertical and horizontal location of the new and existing monitoring wells.
- Prepare a draft and final report which documents the investigation activities and findings.
- Develop appropriate methodology for use of oxygen-releasing compounds (ORCs), and initiate placement into groundwater, as appropriate.

A brief description of the proposed tasks are presented below.

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[2] *Groundwater Monitoring and Sampling Report, Tanks MF25 and MF26, United Airlines Hangar - Economy Parking Lot Site*, Innovative Technical Solutions, Inc., November 17, 1997.

Task 1 - Preparation of Health and Safety Plan. A site-specific Health and Safety Plan will be prepared for the project and signed by a Certified Industrial Hygienist (CIH). This plan will be in effect for the field activities performed as part of this Workplan.

Task 2 - Field meeting, plan and coordinate field activities and obtain drilling permit. A field meeting/site walk will be performed with the airport operations personnel to discuss field work schedules, safety precautions, vehicular traffic and parking conditions, and potential access limitations. Planning, scheduling and coordination of field activities with subcontractors, Port of Oakland personnel and airport operations will be performed to allow for more efficient field work practices and minimize potential interference with airport operations. A drilling permit for the proposed drilling and sampling activities will be obtained from Alameda County Public Works Agency.

Task 3 - Subsurface utility clearance. USA will be notified prior to initiating drilling activities. Also, an independent utility locating contractor experienced at the Port of Oakland will be utilized to clear the locations of the proposed monitoring wells. Proposed monitoring well locations will be relocated as necessary to avoid underground utilities identified by USA or the utility locating contractor.

Task 4 - Installation of Monitoring Wells. Four 2-inch monitoring wells will be installed in the area, three downgradient and one upgradient, to evaluate the extent of impacted groundwater. A larger diameter (4-inch or larger) remediation well will also be installed in the former tank cavity which could be used for product recovery or placement of ORCs into the groundwater. In addition, existing monitoring well MW-2 (which is presently damaged) will be reconstructed.

Drilling will be performed using a drilling rig equipped with hollow stem augers. Soil samples will be collected from the monitoring well borehole at or near the soil/groundwater interface. An additional soil sample may be collected at the apparent fill/native soil interface at an estimated average depth of 10 feet below ground surface (bgs). Groundwater is expected to be encountered at approximately 4 feet bgs.

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Soil samples will be collected using a spilt spoon sampler equipped with three 6-inch long by 2-inch diameter clean brass sleeves driven with a 140-pound hammer into undisturbed soil. One selected brass sleeve sample will then be capped on each end with a Teflon patch and covered with a plastic friction cap. Each soil sample will be properly labeled with an identification number (borehole/well number and sample depth), date and time of collection, and sampler's initials. The soil samples will be placed in an iced cooler for transport to the laboratory.

A quantity of soil from each sample location will be sealed into plastic bags for field screening using an organic vapor meter equipped with photoionization detector (PID). The concentration of organic vapor in the headspace of each bag will then be measured with the PID and recorded on a boring log. A description of the soil encountered during drilling will be recorded on the boring log using the Unified Soil Classification System (USCS).

Soil samples will be sent for analysis under proper chain-of-custody procedures to Pace Analytical. The soil samples will be analyzed for the following:

- TPHg by Modified EPA Method 8015
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8020
- TEPH by Modified EPA Method 8015 with silica gel cleanup procedure.
- VOCs by EPA Method 8010.

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what else?

Additionally, selected soil samples from the saturated interval will be collected and analyzed for physical properties (e.g., grain-size distribution, permeability, etc.) to evaluate suitability of ORCs and to assist in developing appropriate methodology for potential placement of ORCs.

The groundwater monitoring wells and the remediation well will be constructed of Schedule 40 PVC blank casing and machine slotted 0.020-inch screened casing fitted with an end cap. The proposed screened interval of the monitoring well will be from approximately two feet above to approximately 10 feet below the static water level in the borehole. The screened intervals should allow for seasonal fluctuation of the water table and for separate phase hydrocarbons to enter the well, if present. The filter material will consist of appropriately sized sand placed into the annulus of the monitoring well to approximately six inches above the screened casing interval. A bentonite seal approximately one foot thick will be placed on top of the sand with an annular seal consisting of neat cement grout extending to grade surface. The monitoring wells will be enclosed and finished with traffic-rated EMCO Wheaton well boxes, or similar, and fitted with lockable compression well caps and locked. The remediation well will be enclosed and finished with an appropriately sized traffic-rated vault.

Appropriate quality assurance and quality control (QA/QC) procedures will be followed during the investigation. Non-disposable sampling equipment will be decontaminated prior to collecting each sample by high-temperature pressure washing or by washing with a non-phosphate detergent and double rinsing with distilled water. Rinse water from decontamination of sampling equipment will be temporally stored at the site in a 55-gallon drum. Soil generated during the drilling activities will be placed in a properly labeled 55-gallon drum. Disposal of the rinse water and soil cuttings will be performed by the current Port of Oakland disposal contractor.

Task 5 - Surveying. The groundwater monitoring wells will be surveyed for vertical elevation relative to the Port of Oakland datum, which is 3.2 feet below mean sea level. The horizontal locations will be surveyed relative to fixed site features. Survey work will be performed by a professional land surveyor licensed in the state of California.

Task 6 - Develop and Sample Monitoring Wells. Develop new monitoring wells at least three days following installation. The monitoring wells will be gauged for depth to water and checked for the presence of separate phase hydrocarbons prior to development. Groundwater levels will be measured using a Solinst water level meter, or equivalent, accurate to 0.01 foot, or with an oil/water interface probe, if free product is present. The monitoring wells will be developed using a surge block and bailer until the turbidity of the groundwater is significantly reduced. Physical parameters, including pH, electrical conductivity, and temperature, will be measured approximately every three well volumes and recorded on a Monitoring Well Development Form. Groundwater will be temporally stored at the site in 55-gallon drums. Disposal of the development water will be performed by the current Port of Oakland disposal contractor.

Following development, the new monitoring wells will be sampled, possibly in association with the existing monitoring wells, depending on coordination with quarterly monitoring activities.

After approximately 80 percent of the initial water level in the monitoring well has recovered, groundwater samples will be collected and placed into laboratory provided containers using a disposable bailer. Samples will be properly labeled with the sample number, date and time of collection, and sampler's initials. Groundwater samples will then be placed in an iced cooler for transport to the laboratory. The samples will be sent for analysis under proper chain-of-custody procedures to Pace Analytical. The groundwater samples will be analyzed for the following:

- TPHg by Modified EPA Method 8015
- BTEX by EPA Method 602

- TEPH by Modified EPA Method 8015 with silica gel cleanup procedure
- VOCs by EPA Method 8010
- Total dissolved solids (TDS)

list

The monitoring wells will be evaluated for dissolved oxygen and other bioattenuation parameters as part of the initial sampling activities. As part of the QA/QC procedures, a minimum of one field duplicate sample will be collected from the groundwater, and will be analyzed for volatile target compounds (TPHg, BTEX and VOCs).

Task 7 - Preparation of draft and final investigation report. Upon receipt of laboratory analyses for the soil and groundwater samples, a draft report will be prepared which will include tabulated sample results and a figure showing the boring locations. The report will also include conclusions and recommendations based on the findings of the investigation. Upon review and comment by the Port of Oakland, a final report will be prepared and provided to the Port of Oakland.

Task 8 - Develop ORC methodology and initiate placement into groundwater. Once the results of the additional characterization efforts is completed, specific methodology for placement of ORCs in the groundwater at the site will be developed and implemented. Presently, three options are under consideration:

- Use of solid magnesium peroxide socks in one or more of the monitoring wells.
- Placement or pressure injection of magnesium peroxide grout via several "geoprobe" borings.
- Injection of liquid hydrogen peroxide via lancing into the groundwater

The appropriate methodology may include one or more of the above options, and selection will depend on the concentration and distribution of petroleum hydrocarbons in the groundwater, and physical properties of the saturated soil. Additionally, injection of hydrogen peroxide or magnesium peroxide would require additional biological suitability testing to determine indigenous bacterial populations and calculate the appropriate quantity of oxygen necessary for the application.

Please give me a call if you have any questions or need additional information.

Sincerely,

Jeffrey D. Hess

Jeffrey D. Hess, R.G.
Project Director

MP 23+24

95-113.03F.1-Wells

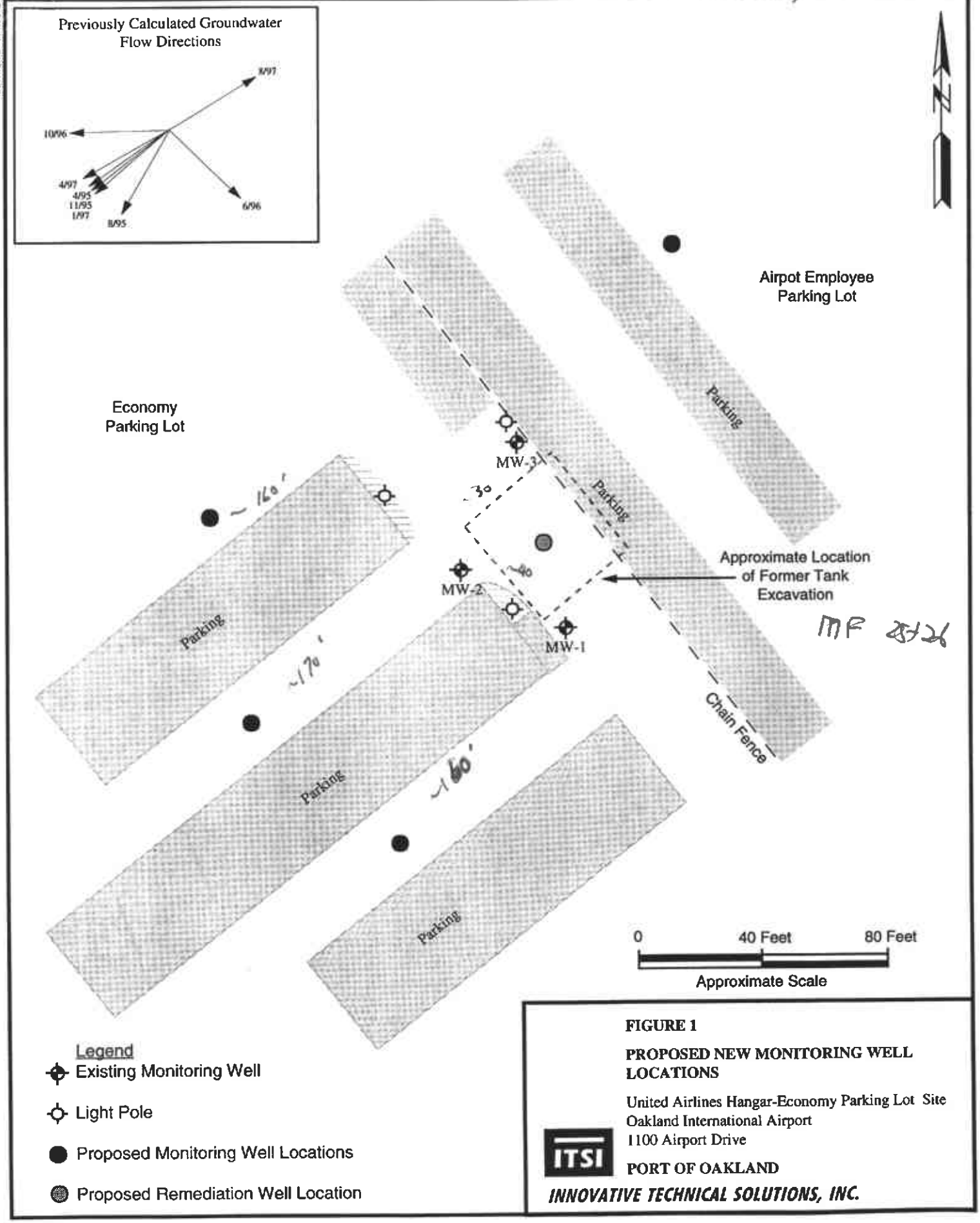

FIGURE 1

PROPOSED NEW MONITORING WELL LOCATIONS

United Airlines Hangar-Economy Parking Lot Site
Oakland International Airport
1100 Airport Drive

PORT OF OAKLAND

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