ENVIRONMENTAL RESOLUTIONS, INC.

December 12, 1996
ERI 200903.W01

Ms. Marla Guensler
Exxon Company, U.S.A.
2300 Clayton Road, Suite 640
Concord, California 94520

Subject: Work Plan to Destroy and Replace Wells at Exxon Service Station 7-0236, 6630 East 14th Street, Oakland, California.

Ms. Guensler:

At the request of Exxon Company, U.S.A. (Exxon), Environmental Resolutions, Inc. (ERI) is submitting this work plan describing the tasks and procedures to destroy and replace wells associated with Exxon Service Station 7-0236 in Oakland, California. Exxon requested that ERI prepare this work plan to destroy groundwater monitoring wells on the property adjacent to the subject site (currently owned by Exxon) to allow for divestment of the adjacent property. ERI will install a new groundwater monitoring well on the existing service station property to replace the two destroyed groundwater monitoring wells. The vadose wells are being destroyed because there are no future plans for their use.

Specific tasks associated with the investigation include: destroying two groundwater monitoring wells and three vadose wells, and installing one replacement groundwater monitoring well; developing, purging, and sampling the new monitoring well; analyzing selected soil samples; contracting a licensed surveyor to survey the well; and preparing a report documenting procedures and results.

BACKGROUND

The site is at the northern side of East 14th Street between Havenscourt Boulevard and 66th Avenue in Oakland, California, as depicted on the Site Vicinity Map (Plate 1). The site is at an elevation of approximately 20 feet above mean sea level (United States Geological Survey [U.S.G.S.] 1980). The approximate configuration of station facilities, existing underground storage tanks, and other pertinent site features are shown on the Generalized Site Plan (Plate 2).

PROPOSED WORK

This investigation is designed to destroy two groundwater monitoring wells and three vadose wells and install one replacement groundwater monitoring well on the subject site. The specific tasks are summarized below. ERI will perform field work in accordance with ERI's standard field protocol included as attachment A, and a site-specific site safety plan. ERI will perform the following tasks:

- Observe a licensed well driller over-drill two groundwater monitoring wells (MW1 and MW7) to depths of approximately 25 feet below grade and three vadose wells (VE1 through VE3) to

depths of approximately 12 feet below grade and pressure grout the borings with a neat cement to the ground surface.

- Observe drilling of one soil boring by a licensed well driller to a maximum depth of 10 feet below first encountered groundwater or approximately 2 to 5 feet into any aquitard encountered beneath the uppermost water-bearing unit. ERI expects groundwater to be encountered approximately 10 to 15 feet below grade. The proposed location of the soil boring is shown on Plate 2.

- Collect and classify relatively undisturbed soil samples from the boring at 5-foot intervals, when obvious changes in soil type occur, and from directly above the first occurrence of groundwater.

- Observe the construction of a 2-inch diameter groundwater monitoring well (MW8) in the boring.

- Contract a licensed land surveyor to survey the elevation of the top of the well casing relative to mean sea level.

- Develop the monitoring well. The well will be sampled during ongoing quarterly monitoring.

- Submit selected soil and groundwater samples to a laboratory certified by the State of California for analysis of total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, and total xylene isomers (BTEX), total extractable petroleum hydrocarbons as diesel (TEPHd), and methyl tert-butyl ether (MTBE). Composite soil samples from the drill cuttings will be analyzed for TPHg, BTEX, TEPHd, and soluble lead.

- Interpret site hydrogeology and field and laboratory data to evaluate soil and groundwater conditions.

- Prepare a report describing subsurface conditions at the site as observed in boring and wells, describing the local geology, summarizing findings, and presenting conclusions and recommendations.

Soil Borings/Monitoring Wells

The location of the proposed soil boring and monitoring well is shown on Plate 2. The location was chosen to replace the two destroyed off-site groundwater monitoring wells. A monitoring well constructed in this location will help to evaluate whether hydrocarbons are present in groundwater near the property boundary in the crossgradient direction of groundwater flow.

Laboratory Analyses

The soil samples analyzed will include the sample producing the highest reading on the photoionization detector (PID) and the sample collected from directly above groundwater in the boring. Selected soil samples will be analyzed for TPHg and TEPHd using Environmental Protection

Agency (EPA) Method 8015 (modified), and BTEX using EPA Method 8020. The water sample collected from monitoring well during quarterly monitoring and sampling will be analyzed for TPHg and TEPHd using EPA Method 8015 (modified), and BTEX and MTBE using EPA Method 8020. Detection limits for the tests requested and concentrations present will be stated on the laboratory reports. Analytical methods and detection limits will conform to California Regional Water Quality Control Board Tri-regional guidelines. Laboratory analyses will be performed by a laboratory certified by the State of California.

Report Preparation

ERI will prepare a report summarizing the soil stratigraphy in the borings and field and laboratory results which will be supplied to Exxon.

SCHEDULE OF OPERATIONS

ERI is prepared to implement the work plan within 1 week upon regulatory approval and obtaining appropriate permits. Exxon and appropriate regulatory agencies will be notified should any delays occur.

PROJECT STAFF

Mr. Steve M. Zigan, a Registered Geologist and Hydrogeologist in the State of California (R.G. 4333 and H.G. 133), will be in charge of this project. Mr. Marc. A. Briggs, Project Manager, will manage field and office operations. ERI employs a staff of geologists, engineers, and technicians who will help complete the project.

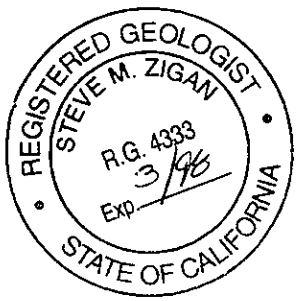
ERI recommends signed copies of this work plan be forwarded to the following:

Mr. John Kaiser
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street
Oakland, California 94612

Mr. Dale Klettke
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502-6577

Please call 415-382-5991 if you have questions regarding this work plan.

Sincerely,
Environmental Resolutions, Inc.



Marc A. Briggs
Project Manager

Steve M. Zigan
R.G. 4333
H.G. 133

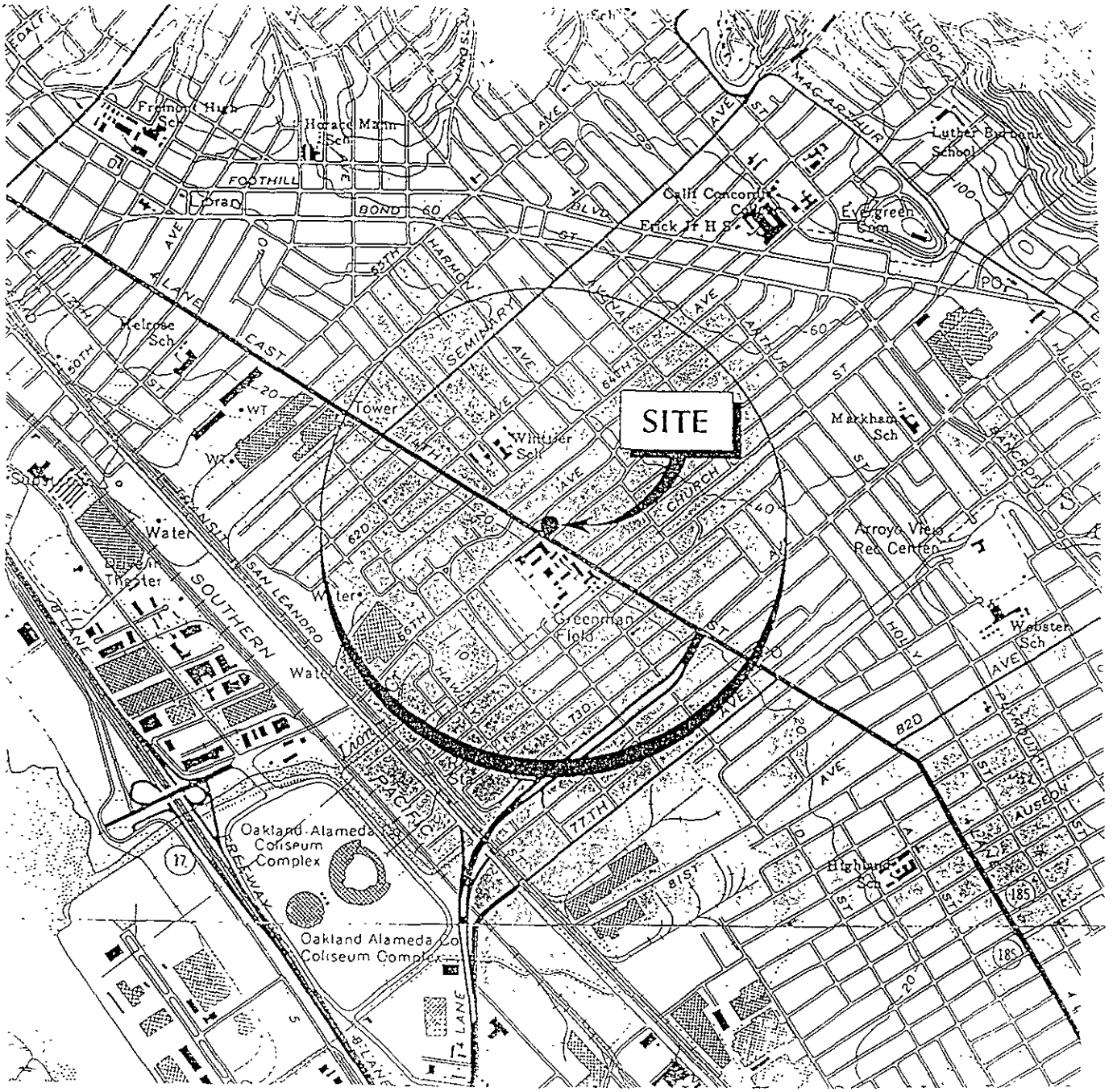
Attachments: Plate 1: Site Vicinity Map
Plate 2: Generalized Site Plan

Attachment A: Field Protocol

REFERENCES

California Regional Water Quality Control Board, North Coast, San Francisco Bay, and Central Valley Regions. 1990. Tri-Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks. August 1991.

United States Geological Survey. 1980. Topographic 7.5-minute quadrangle maps: Oakland East and San Leandro, California.



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APPROXIMATE SCALE

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MILE

Source: U.S.G.S. 7.5 minute topographic quadrangle map Oakland East and San Leandro, Calif. 1980

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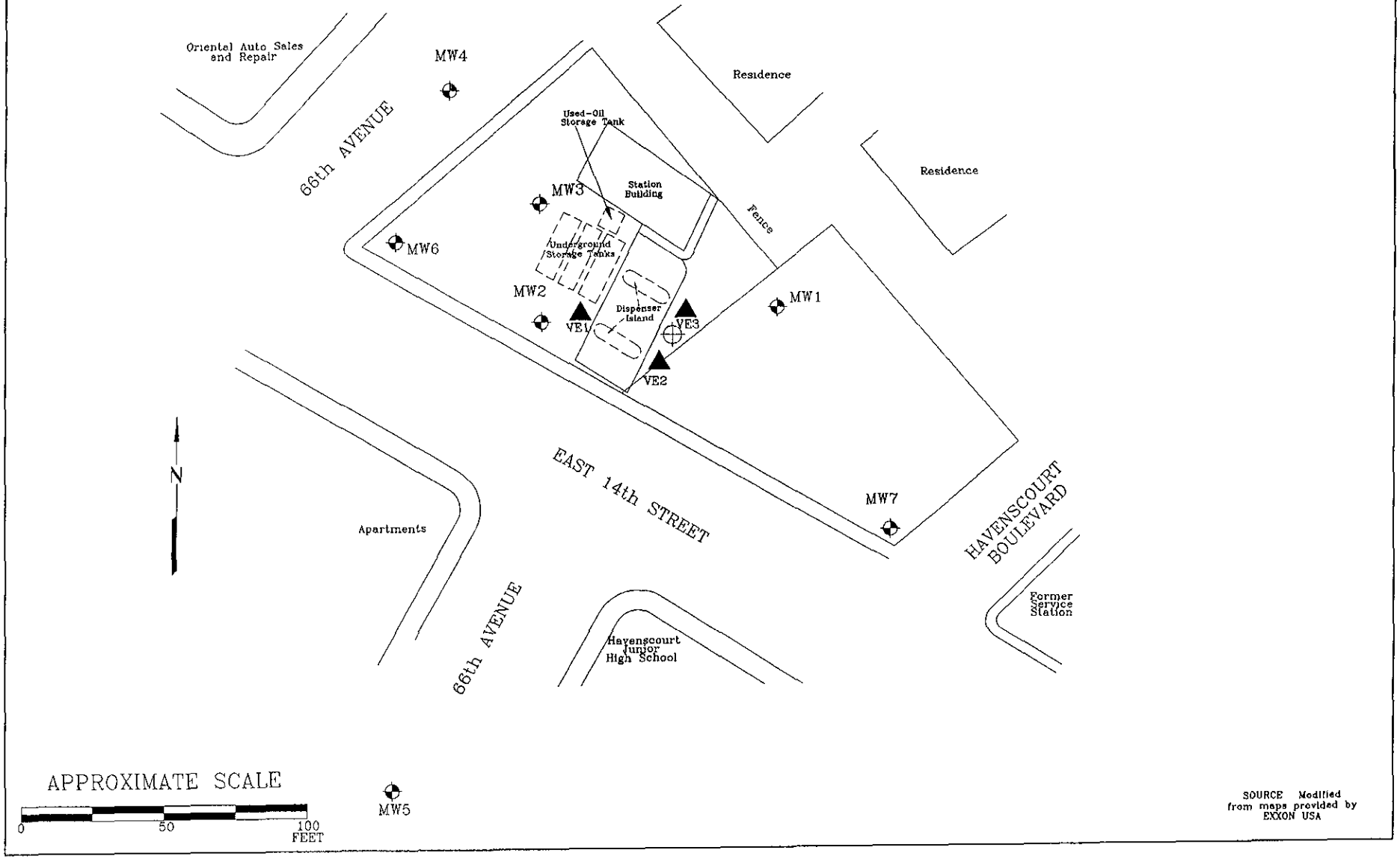
PROJECT ERI 2009

SITE VICINITY MAP

EXXON SERVICE STATION 7-0236
6630 East 14th Street
Oakland, California

PLATE

1



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ERI ENVIRONMENTAL RESOLUTIONS, INC.

GENERALIZED SITE PLAN

EXXON SERVICE STATION 7-0236
6630 East 14th Street
Oakland, California

EXPLANATION

MW7 Groundwater Monitoring Well

VE3 Vapor Extraction Well

Proposed Groundwater Monitoring Well

PROJECT NO.
2009

PLATE
2

DATE: 9/16/96

ATTACHMENT A

FIELD PROTOCOL

FIELD PROTOCOL

Site Safety Plan

Field work will be performed by ERI personnel in accordance with a site safety plan developed for the site. This site safety plan describes the basic safety requirements for the subsurface investigation and the drilling of soil borings at the work site. The site safety plan is applicable to personnel and subcontractors of ERI. Personnel at the site are informed of the contents of the site safety plan before work begins. A copy of the site safety plan is kept at the work site and is available for reference by appropriate parties during the work. The ERI geologist will act as the Site Safety Officer. The site safety plan is attached.

Soil Borings and Sampling

Prior to drilling of borings and construction of wells, ERI will acquire necessary permits from the appropriate agency(ies). Copies of permits are included in the appendix of the project report. ERI will also contact Underground Service Alert (USA) before drilling to help locate public utility lines at the site. ERI will hand-auger boring locations to a depth of approximately 5 feet before drilling to reduce the risk of damaging underground structures.

Soil borings will be drilled with a CME-55 (or similar) drill rig equipped with 8-inch diameter, hollow-stem augers. Auger flights and sampling equipment will be steam-cleaned before use to minimize the possibility of crosshole contamination. The rinseate will be containerized and stored on site. ERI will coordinate with Exxon for appropriate disposal of the rinseate.

Drilling will be performed under the observation of a field geologist, and the earth materials in the borings will be identified using visual and manual methods, and classified as drilling progresses using the Unified Soil Classification System. Soil borings B13 will be drilled to approximately 10 feet below the uppermost zone of saturation or 2 to 5 feet into any competent clay layer (aquitard) encountered beneath the water-bearing zone. If an aquitard is encountered, the boring will be terminated and backfilled with bentonite to the top of the aquitard before installing a groundwater monitoring well.

During drilling, soil samples will be collected at 5-foot intervals, obvious changes in lithology, and just above the groundwater surface. Samples will be collected with a California-modified, split-spoon sampler equipped with laboratory-cleaned brass sleeves. Samples will be collected by advancing the auger to a point just above the sampling depth and driving the sampler into the soil. The sampler will be driven 18 inches with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows required to drive the sampler each successive 6-inch interval will be counted and recorded to give an indication of soil consistency.

Soil samples will be monitored with a photoionization detector (PID), which measures hydrocarbon concentrations in the ambient air or headspace above the soil sample. Field instruments such as the PID are useful for indicating relative levels of hydrocarbon vapors, but do not detect concentrations of hydrocarbons with the same precision as laboratory analyses. Soil samples selected for possible chemical analysis will be sealed promptly with aluminum foil, plastic caps, and tape. The samples

will be labeled and placed in iced storage for transport to the laboratory. Chain of Custody Records will be initiated by the geologist in the field, updated throughout handling of the samples, and sent with the samples to the laboratory. Copies of these records will be in our report. Cuttings generated during drilling will be placed on plastic sheeting and covered and left at the site. ERI will coordinate with Exxon for the soil to be removed to an appropriate disposal facility.

Monitoring Well Construction

A monitoring well will be constructed in boring using thread-jointed, 2-inch diameter, Schedule 40 polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents will be used in well construction. The screened portion of each well will consist of factory-perforated casing with 0.010-inch wide slots. If unconfined aquifer conditions exist, the well screen will be installed from the total depth of each well to approximately 10 feet above the uppermost water-bearing unit. If confined conditions exist, the uppermost water-bearing unit will be screened exclusively. Unperforated casing will be installed from the top of each screen to the ground surface. The annular space in the well will be packed with number 2/12 sand to approximately 1 to 2 feet above the slotted interval. A bentonite plug will be added above the sand pack to prevent cement from entering the well pack. The remaining annulus will be backfilled to grade with a slurry of cement and bentonite powder.

The monitoring well will be protected with a traffic-rated, cast-aluminum utility box equipped with a PVC skirt. The box has a watertight seal to protect against surface-water infiltration and must be opened with a special wrench. The design of this box discourages vandalism and reduces the possibility of accidental disturbance of the well.

Well Development and Sampling

ERI will wait a minimum of 24 hours before development of the monitoring well to allow the grout to seal. Initially, a water sample will be collected for subjective analysis before development of the monitoring wells. This sample will be collected from near the water surface in the well with a new disposable Teflon bailer. If liquid phase petroleum hydrocarbons are not observed, the wells will be developed with a surge block and pump. Well development will continue until the discharge water is clear of silt and sand. Clay-size sediments derived from the screened portion of the formation cannot be eliminated by well development. After the well has been allowed to stabilize, the well will be checked for liquid phase petroleum hydrocarbons using an interface probe. The thickness of any liquid phase petroleum hydrocarbons detected in the well will be recorded. If liquid phase petroleum hydrocarbons are encountered in the well, the well will not be purged, and the water will not be sampled for chemical analysis. Liquid phase petroleum hydrocarbons will be bailed from the well and stored in appropriately labeled drums on site. ERI will apprise Exxon of appropriate disposal options for liquid phase petroleum hydrocarbons bailed from the well, if any.

If no liquid phase petroleum hydrocarbons are detected after development, the well will be purged of stagnant water and a sample will be collected for laboratory analysis. The well will be purged of approximately 3 to 5 well volumes of water with a submersible pump, or until pH, conductivity, and temperature of the purged water have stabilized. Water purged from the wells will be stored in labeled, 55-gallon, steel drums approved for this use by the Department of Transportation until

suitable disposal options can be selected based on laboratory analysis. ERI will coordinate with Exxon for disposal or recycling of the purged water.

The wells will be allowed to recover to at least 80 percent of static conditions or for two hours, which ever occurs first, and a sample of the formation water will be collected with a Teflon bailer cleaned with a laboratory-grade detergent and deionized water. The water will be transferred slowly from the bailer to laboratory-cleaned, 1-liter amber bottles and 40-milliliter glass vials for analyses by the laboratory. The glass vials will contain hydrochloric acid as a preservative. ERI's geologist will check to see if headspace is present. If headspace is present, ERI will collect more samples until none is present. Chain of Custody Records will be initiated in the field by the geologist, updated throughout handling of the samples, and sent along with the samples to the laboratory. Copies of Chain of Custody Records will be included in the final report.

Gradient Evaluation

ERI will evaluate the direction of flow and gradient at the site. The elevation of the top of each well casing will be measured relative to mean sea level by a licensed land surveyor. Water-depth measurements will be made from the top of the casing in the well to the nearest 0.01 foot with an electronic water-level indicator. The well will be vented to atmosphere for a minimum of 0.5 to 1 hour before obtaining depth-to-water measurements. Venting is conducted to allow the groundwater to equilibrate with barometric pressure. These data will be combined to evaluate the relative elevation of the groundwater surface in each well and the slope of the groundwater surface across the site.

Quality Assurance/Quality Control

The sampling and analysis procedures employed by ERI for groundwater monitoring and sampling follow regulatory guidance documents for quality assurance/quality control (QA/QC). Quality control is maintained by site-specific field protocols and quality control checks performed by the laboratory. Laboratory and field handling of samples may be monitored by including QC samples for analysis. QC samples may include any combination of the following. The number and types of QC samples are selected and analyzed on a project-specific basis.

Trip Blanks - Trip blanks are sent to the project site, and travel with samples collected from the project site to the laboratory. They are not opened, and are returned from the project site with the samples for analysis.

Field Blank - Prepared in the field using organic-free water. Field blanks accompany samples collected at the project site to the laboratory and are analyzed periodically for specific chemical compounds present at the project site where they were prepared.

Duplicates - Duplicate samples are collected from a selected well and project site. They are analyzed at two different laboratories, or at the same laboratory under different labels.

Equipment Blank - Periodic QC samples are collected from field equipment rinsate to verify adequate cleaning procedures.