RESNA
Working To Restore Nature

42501 Albrae Street
Fremont, CA 94538
Phone: (510) 440-3300
FAX: (510) 651-2233

TRANSMITTAL

DATE: February 10, 1993

TO: Alameda County Health Care Services
Department of Environmental Health
Hazardous Materials Program
80 Swan Way Center, Suite 200
Oakland, CA 94621-1439

ATTN: Mr. Kevin Tinsley

SUBJECT: 500 Maitland Drive, Alameda, California

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	03/24/92	Work Plan for Soil and Groundwater Investigation for Harbor Bay Isle Associates, 500 Maitland Drive, California.

THESE ARE TRANSMITTED as checked below:

[ ] For review and comment [√] As requested [ ] For your files [ ] For approval

REMARKS:

Gary Pischke
Project Manager

WORK PLAN FOR A SOIL AND GROUNDWATER INVESTIGATION

FOR

HARBOR BAY ISLE ASSOCIATES SITE
500 MAITLAND DRIVE
ALAMEDA, CALIFORNIA

Quote No. 8721G
March 1992

RESNA
42501 Albrae Street
Fremont, California 94538
(510) 440-3300

RESNA
Working to Restore Nature

42501 Albrae Street
Fremont, California 94538
Phone: (510) 440-3300
FAX: (510) 651-2233

March 24, 1992
Quote No. 8721G

Harbor Bay Isle Associates
1141 Harbor Bay Parkway
P.O. Box 1450
Alameda, CA 94501

Attention: Mr. Aidan Barry

Subject: Work Plan for Soil and Groundwater Investigation
500 Maitland Drive, Alameda, California

Dear Mr. Barry:

RESNA Industries Inc. is pleased to present this work plan in response to the Alameda County Health Department's letter dated May 8, 1991. RESNA recommends that Harbor Bay Isle Associates submit the work plan to the agency and wait for comments. If need be, RESNA will schedule a meeting with the agency to work out a compromise for the scope of work.

If you have any questions, please call.

Sincerely,
RESNA Industries Inc.

ORIGINAL SIGNED BY

Gary R. Mulkey
Manager, Geoscience Department

ORIGINAL SIGNED BY

Christopher M. Palmer, C.E.G. 1262
Senior Program Geologist

GRM/CMP/sw
Enclosures

Table of Contents

WORK PLAN FOR A SOIL AND GROUNDWATER INVESTIGATION

FOR

HARBOR BAY ISLE ASSOCIATES
500 MAITLAND DRIVE
ALAMEDA, CALIFORNIA

RESNA Industries Inc. is pleased to provide this work plan for gathering additional data at the property located at 500 Maitland Drive in the City of Alameda, Alameda County, California. This property is owned by the City Alameda, and Harbor Bay Isle Association is the leasee. This work plan is in response to Alameda County Health Care Services letter dated May 8, 1991.

BRIEF HISTORY

The property is located on the northwest corner of Maitland and Harbor Bay Parkway on the Bay Farm Island portion of Alameda. The 5-acre site has been used as a shooting range for approximately the last 60 years. When the range first opened in 1926, the site had standing water for most of the non-summer months. In the early 1960s, fill material was imported and added to the property. The fill material was derived from builders who wanted to dispose of excess soil from their construction sites.

TECHNICAL APPROACH AND PROPOSED SCOPE OF WORK

This technical approach is proposed to respond to the Alameda County Health Departments letter dated May 8, 1991. The purpose of the study is to ascertain the extent of copper, lead, and clay pigeon site litter and its possible contaminant impact. There is no evidence of contamination at the site with regard to polynuclear aromatics (PNAs), and only copper and lead were detected in relatively high levels from the previous investigation at the site. RESNA recommends a limited soil and groundwater investigation be conducted at the site to ascertain whether a problem exists from these materials during the site's past use. Three groundwater monitoring wells will be installed at the most suspect contaminated areas. Evidence of contamination at the site indicates only a potential surface impact. Our past experience with these types of contaminants is that they would have migrated to only a very limited extent in the clayey site soils. An upgradient well is not included. However, regional water quality data will be collected from an existing well on the Normandy Homeowners Tract 4495 located about 3,000 feet west-northwest of the site. This data will be used to compare "natural" groundwater quality.

The proposed scope of work includes the following:

- Installation of three groundwater monitoring wells for site gradient and quality information. Regional water quality data will be gained from an existing off-site monitoring well.
- Collecting surficial (about 1 foot deep) and deeper borehole soil samples for analysis of copper and lead (TTLC and STLC)
- Analysis of clay pigeon samples for PNAs

Soil Sampling

In order to verify the copper and lead content of the imported fill at the site, RESNA will collect 15 near surface soil samples from the site. Soil samples from the site will be collected randomly following guidelines presented in Chapter 9 of the United States Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 (EPA, 1986).

To select the sample locations, a simple random sampling plan will be implemented as follows:

1. An imaginary sampling grid will be superimposed over the 5-acre parcel.
2. The cells will be numbered consecutively, beginning with 1.
3. A random number table will be used (Snedecor and Cochran, 1967) to select a number of cells for sampling.
4. In each of the cells selected in Step 3, a soil sample will be collected in a brass liner from the approximate midpoint of the cell and at depth 0 to 6 inches and 6 to 12 inches below the ground surface. A total of 15 cells will be sampled.
5. Each brass liner containing the sample will be capped, labeled, logged on a chain-of-custody form, and placed in a chilled ice chest for transport to a state-certified laboratory for analysis. Exceltech's soil sampling protocol can be found in Appendix A.

Laboratory Analysis of Soil Samples

A total of 30 soil samples will be collected. The soil samples from 0 to 6 and 6 to 12 inches will be composited into 15 samples for analysis by the laboratory and analyzed for TTLC and STLC concentrations of copper and lead. In addition, some of the soil samples will be screened with a 100 micron filter prior to analysis to remove any scrap metal that may be present in the soil.

Monitoring Well Installation

RESNA will install three groundwater monitoring wells in the proposed location shown in Figure 1. These locations are in areas where clay pigeon and shell casing scrap was noticed or contaminants are suspected. Wells are also arranged so a groundwater gradient can be determined. An off-site well is not needed at this time. However, regional groundwater quality data will be collected from an existing well on Tract 4495 (Normandy Homeowners). The purpose of the on-site wells is to ascertain if the shallow groundwater is being impacted by PNAs and copper and lead.

The exploratory borings will be drilled with a truck-mounted drill rig and hollow-stem auger. The auger and other tools used in the hole will be steam cleaned before use and between borings to minimize the possibility of cross-contamination. Relatively undisturbed soil samples will be collected at 2-foot depth intervals or just above the shallow groundwater using a modified California split spoon sampler, equipped with three internal brass tubes, each 6 inches long and 2 inches in diameter. The sampler will be advanced 18 inches into undisturbed soil with a 140-pound hammer. Samples taken below water level will be collected using a 1-1/2-inch inside diameter, standard penetration sampler. This type of sampler has no internal brass liners and will be used primarily for soil logging. All soil cuttings from the drilling will be placed on and covered by plastic and left at the site. Once analytical results are known, the soil will be disposed of properly by the client.

After recovery from the borehole, the lowermost sample liner will be preserved for chemical analysis. All soil samples collected above the saturated zone will be analyzed for PNAs using EPA 8250 Test Method and TTLC and STLC for copper and lead. The soils in the remaining two brass liners will be visually characterized and then tested with a portable photoionization detector (PID) for the presence of volatile hydrocarbons.

The sample liner retained for chemical analysis will be preserved in the following manner. Both ends of the liner will be covered with aluminum foil and a plastic cap. It will then be labeled with a unique sample number and pertinent sample information, placed in a plastic "Ziploc" bag, entered on a chain-of-custody form, and packed in a chilled ice chest for transport to a laboratory certified by the State of California to analyze hazardous materials.

The geologist will prepare a log of the subsurface conditions encountered during drilling and will classify the soils according to the Unified Soil Classification System and Munsell Soil Color Charts. All log sheets will be signed by a registered geologist.

Groundwater Monitoring Well Construction

After the soil sampling is completed, RESNA will install the monitoring wells in the exploratory boring. The wells will be constructed of 2-inch-diameter, schedule 40,

flush-threaded polyvinyl chloride (PVC) casing; no glues or solvents will be used. After drilling the borings to the desired depth, the PVC casing will be installed through the drill rig's hollow-stem auger. As the auger is withdrawn, sand will be poured down the borehole annular space to approximately 2 feet above the slotted screen section, above which approximately 1 foot of bentonite will be used as a seal. The remaining portion of the annular space will be sealed with neat cement and bentonite grout. The top of the wells will be set in a traffic-rated vault box at grade with an internal steel casing and locking cover to provide security and protect the PVC wellhead. A concrete surface seal will be installed to complete the well construction.

Well Development

After construction, the wells will be developed using a surge block to agitate and set the sand pack around the annulus of the well casing. A bailer will be used to remove water manually after each surge. Well development (a) removes residual silts and clays left from the drilling, and (b) improves the hydraulic conductivity between the wells and the natural formation. After development, the well will be allowed to recharge with water from the surrounding formation (approximately 24 hours), enabling RESNA to collect a representative water sample and to measure the thickness of any floating product encountered. All important well development information will be included in the final report. The information will include pH, temperature, conductivity, and water volume removed.

All water collected during well development will be placed in drums (Department of Transportation [DOT], 17E) and left on-site until laboratory analyses are complete. At that time, the drums may be properly disposed of by the client.

Groundwater Sampling

Before groundwater sampling, a sample technician will measure depth to water in each well and field-check each monitoring well using an interface probe or a clear acrylic bailer to checked for the presence of free-floating product. Where no floating product is observed, the well will be purged of at least four well casing volumes of groundwater before sampling. Purge water will also be placed in DOT 17E drums. Samples will be collected from each well with a clean bailer and transferred to appropriate laboratory-supplied bottles for analysis of PNAs following EPA 8250 Test Method, salinity (total dissolved solids) and TTLC and STLC for copper and lead.

Clay Pigeon Sampling

Samples of the clay pigeon debris will be collected from two locations on the site. A few pieces of clay pigeon debris will be collected and analyzed for PNAs using EPA 8250 Test Method.

Sampling During First Quarter

In order to speed the creation of a database for on-site monitoring wells, the three wells will be sampled monthly. Hence, the sampling event from well installation, and two monthly events thereafter, will cover the initial quarter. All three wells will be sampled and analyzed as described above. Following the third sampling event of the first quarter, the periodic sampling program will be re-evaluated.

SITE INVESTIGATION REPORT PREPARATION

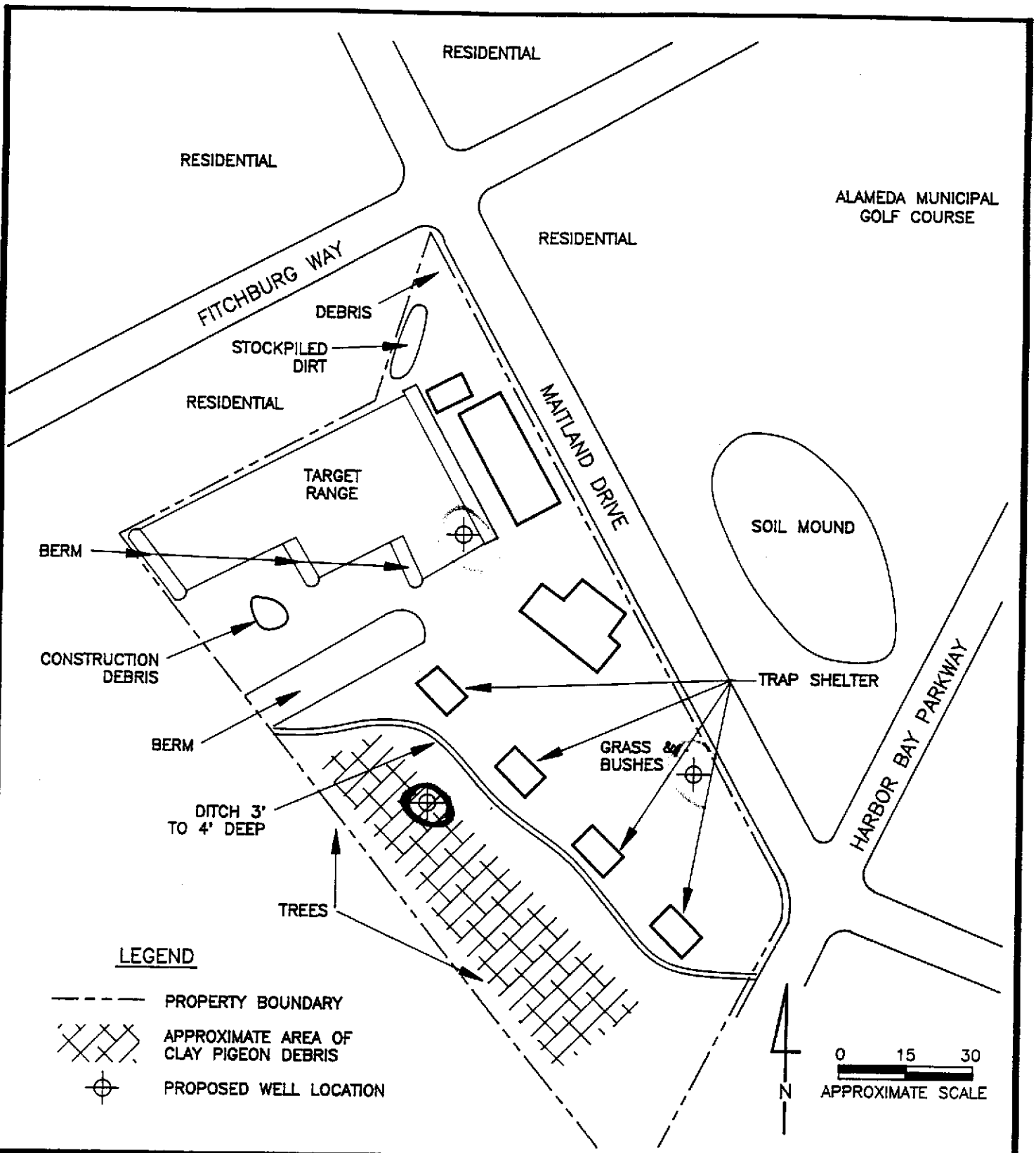
RESNA will prepare a site investigation report presenting findings of the investigation. The report will include:

- Field procedures for the random soil sampling, drilling and water sampling.
- Results of all analytical testing.
- A site map showing features relevant to the investigation.
- Exploratory boring logs and well construction details.
- Groundwater potentiometric map showing groundwater contours.
- Conclusions and recommendations.

REFERENCES

Kleinfelder, "Phase I Environmental Assessment Report with Soil and Asbestos Sampling," Island City Gun Club, 500 Maitland Drive, Alameda, California, May 17, 1990.

Letter From Exceltech, Inc., by Danny Mercer to Doric Construction, Inc. dated August 28, 1990, regarding review of Environmental Site Assessment conducted at Island City Gun Club, 500 Maitland Drive, Alameda, California.



REVIEWED BY:	**SITE PLAN**	RESNA
	FORMER ISLAND GUN CLUB SITE	
APPROVED BY: CWP	500 MAITLAND DRIVE	JOB #: 8721G / DRAWN BY: J.D.S.
	ALAMEDA, CALIFORNIA	DATE: 3/20/92 / DRAWING #: FIG. 1

APPENDIX A

SOIL AND GROUNDWATER SAMPLING PROTOCOL

RESNA

Soil Sampling Protocol

SOIL SAMPLING PROTOCOL

I. SOIL SAMPLING BY DRILLING RIG

1) Review site proposal for boring locations and special instructions. Confirm boring locations in field with client. Have Underground Service Alert (USA) mark utilities in area prior to drilling.

2) Prior to initiating an exploratory boring, all equipment to be used during drilling and sampling operation is steam cleaned. Such equipment includes, but is not limited to, augers, bits, drilling rod, and soil samplers. Additionally, before each sampling event, the sampler and any sample liners are thoroughly cleaned with a dilute trisodium phosphate solution and rinsed with clean tap water or distilled water. Additional decontamination procedures are implemented as needed by specific projects.

3) Each exploratory boring is drilled with a truck-mounted drilling rig using either solid flight or hollow stem augers. The boring is advanced to the desired sampling depth and the sampler is lowered to the bottom of the hole. The sampler is driven a maximum of 18 inches into the undisturbed soils ahead of the auger by a 140-pound, rig-operated hammer falling 30 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the boring log. When necessary, the sampler may be pushed by the drill rig hydraulics. In this case, the pressure exerted (in pounds per square inch) is recorded. After the sampler has penetrated the full depth, it is retrieved to the surface.

4) The samplers commonly used are either a California modified sampler (3 inch or 2.5 inch O.D.) or a standard penetrometer (2 inch O.D.). The standard penetrometer does not contain sample liners and is used to determine soil strength characteristics and visually characterize the subsurface materials. If samples are collected for laboratory analysis the California modified sampler, equipped with brass liners, is used except when the analysis will include copper or zinc. In this instance, the sample should be taken with the standard penetrometer and placed in a labeled plastic bag.

Upon retrieval, the sampler is disassembled into its component parts. One or more of the liners is selected for chemical analysis. The ends of the selected liner(s) are sealed with aluminum foil or teflon tape, capped with plastic caps, labeled, logged on chain-of-custody forms and stored in a chilled ice chest for preservation in the field and during transport to the analytical laboratory. All labels are pre-written to the extent possible with indelible ink to minimize handling time.

5) Samples not sealed for chemical analysis are checked for the presence of contamination in the field by the geologist. Any discoloration or odor is noted on the boring log. Each sample is classified in the field by a geologist using the Unified Soil Classification System and a Munsell soil color chart. In addition, samples may also be field-screened with a photoionization detector (calibrated daily) or threshold limit value sniffer. In either case, the instrument probe is held adjacent to freshly crumbled soil and the stabilized reading value is recorded on the log. Values of volatile vapors measured in the field are reconnaissance only and are not meant to supplant chemical analysis in a certified laboratory. Other visual screening techniques include examination of the sample under hand-lens magnification as-well-as floating sheen inspection resulting from immersion in water.

   Lithology logging will collect geologic data as required, using conventional geologic and hydrogeologic terminology. When rock is logged, a GSA Rock Color Chart and appropriate terminology will be employed to describe rock, fractures, bedding, etc. Soil or rock coring may be specified by the supervising geologist on a project-specific basis.

6) Samples are held in the possession of RESNA personnel until transferred to the analytical laboratory. Transfer to the laboratory is accomplished with either delivery by RESNA personnel, pick-up by laboratory personnel, or transfer by a personal delivery service. Each transfer of responsibility is recorded on a chain-of-custody record that accompanies the samples.

7) Conditions occasionally arise when other drilling equipment are used given site-specific formation conditions. Rotary drilling may be selected if coring or bearing conditions arise. Rotary or casing hammer may be used as deep drilling, flowing sands, or formation-specific conditions require.

8) When drilling though an aquifer known to be contaminated, a staged drilling approach will be used. This would involve using either a temporary or

permanent conductor casing placed adjacent to the contaminated aquifer and pressed or advanced slightly into the underlying aquitard. The cased hole will be cleaned as necessary, following which, a smaller diameter drill bit/auger will be advanced to the next underlying water bearing stratum. An impermeable seal will be placed in the borehole or annular space as appropriate upon completion of exploratory boring/well construction.

II. SOIL SAMPLING BY HAND

1) Some situations require that samples be collected by hand without the assistance of a drill rig (e.g., soil stock piles, excavation sidewall sampling, etc.). When possible, soil samples will be collected using a steel core sampler equipped with clean brass liners which is advanced into the soil with a slide hammer. In other cases, the outer surface of the soil is removed and a brass liner is driven into the soil by hand or with a hammer. To avoid damaging the liner, a block of wood can be held next to the liner so that the hammer strikes the block rather than the liner. The liner is removed and handled as described above. In deep excavations where safety factors preclude the direct sampling of the bottom or side wall, soil is retrieved by a backhoe bucket and this soil is sampled.

RESNA

Groundwater Sampling Protocol

GROUNDWATER SAMPLING PROTOCOL

Sampling of groundwater is performed by RESNA Industries, Inc. sampling technicians. Monitoring well sampling procedures are summarized as follows:

1. Wells are sampled in approximate order of increasing contamination.
2. Proceed to first well with clean and decontaminated equipment.
3. Measurements depths to liquid surface(s) in the well, and total depth of monitoring well. Note presence of sediment.
4. Field check for presence of floating product; measure apparent thickness.
5. Calculate minimum purge volume (well volumes) then purge well.
6. Monitor groundwater for temperature, pH, and specific conductance during purging. Following stabilization of parameters and removal of minimum volume, allow well to recover adequately.
7. Collect samples using Environmental Protection Agency (EPA) approved sample collection devices, i.e., teflon or stainless steel bailers or pumps.
8. Transfer samples into laboratory-supplied EPA-approved containers.
9. Label samples and log onto chain-of-custody form.
10. Store samples in a chilled ice chest for shipment to a state-certified analytical laboratory.
11. Secure wellhead.
12. Decontaminate equipment prior to sampling next well.

Equipment Cleaning and Decontamination

All water samples are placed in precleaned laboratory-supplied bottles. Sample bottles and caps remain sealed until actual usage at the site. All equipment which comes in contact with the interior of the well or groundwater is thoroughly cleaned with either a steam cleaner, a trisodium phosphate (TSP) solution or an Alconox™ solution and rinsed with deionized or distilled water before use at the site. This cleaning procedure is followed between each well sampled. If a teflon cord is used, the cord is cleaned. If a nylon or cotton cord is used, a new cord is used in each well.

All equipment blanks are collected prior to sampling. The blanks are analyzed periodically to ensure proper cleaning procedures are used.

Water Level Measurements

Depth to groundwater is measured in each well using a sealed sampling tape or scaled electric sounder prior to purging or sampling. If the well is known or suspected of containing free-phase petroleum hydrocarbons, either an optical interface probe or a bailer is used to measure the hydrocarbon thickness. Measurements are collected and recorded to the nearest 0.01 foot. Each monitoring well's total depth will be measured; this will allow a relative judgement of well sedimentation and need for redevelopment to be made.

Bailer Sheen Check

If no measurable free-phase petroleum hydrocarbons are detected, a clear acrylic bailer is used to determine the presence of a sheen. The color of the water and any film or obvious odor are recorded.

Groundwater Sampling

Prior to groundwater sampling, each well is purged of "standing" groundwater. Either a bailer, hand pump, or submersible pump is used to purge the well. The amount of purging is dependent on the well hydraulics. Samples will be collected when temperature, pH, and specific conductance stabilize and a minimum of three well-casing volumes of water have been removed. Field measurements will be taken after purging each well volume. Physical parameter measurements (temperature, pH, and specific conductance) are closely monitored throughout the well purging process and are used as

indicators for assessing sufficient purging. The purging parameters are measured to observe stabilization to a range of values typical for that aquifer and well. Stable field parameters are recognized as indicative of groundwater aquifer chemistry entering the well. Specific conductance (conductivity) meters are read to the nearest ±10 umhos/cm and are calibrated daily. pH meters are read to the nearest ±0.1 pH units and are calibrated daily. Temperature is read to the nearest 0.1 °F. Calibration of physical parameter meters will follow manufacturer's specifications. Collected field data during purging activities will be entered on the Well Sampling Field Data Sheet.

Following purging, the well is allowed to recharge prior to sampling. When recovery to 80% of the static water level is estimated or observed to exceed two hours, a sample will be collected when sufficient volume is available to fill all sample containers. The well will be purged slowly enough to minimize the volatilization of organic contaminants during well recharge.

In wells where free-phase hydrocarbons are detected, the free-phase portion will be bailed from the well and its volume recorded. If free-phase hydrocarbons persist through bailing, a groundwater sample will not be collected.

Volatile organic groundwater samples are collected so that air passage through the sample does not occur or is minimal (to prevent volatiles from being stripped from the samples). Sample bottles are filled by slowly running the sample down the side of the bottle until there is a positive convex meniscus over the mouth of the bottle. The teflon side of the septum (in cap) is then positioned against the meniscus, the cap is screwed on tightly, the sample is inverted, and the bottle is lightly tapped. If a bubble is evident, the cap is removed, more sample is added, and the bottle is resealed.

Chain-of-Custody

Groundwater sample containers are labeled with a unique sample number, location, and date of collection. All samples are logged into a chain-of-custody form and placed in a secure, chilled ice chest for shipment to a laboratory certified by the State of California.

Sample Storage

Groundwater samples collected in the field are stored in an ice chest cooled to approximately 4 °C while in transit to the office or analytical laboratory. Samples are stored in a refrigerator overnight and during weekends and holidays. The refrigerator is set to 4 °C and is locked with access controlled by a designated sample custodian.

Quality Assurance/Quality Control Objectives

The sampling and analysis procedures employed by RESNA for groundwater sampling and monitoring follow regulatory guidance for quality assurance/quality control (QA/QC). Quality assurance objectives have been established to develop and implement procedures for obtaining and evaluating water quality and field data in an accurate, precise, and complete manner. In this way, sampling procedures and field measurements provide information that is comparable and representative of actual field conditions. Quality control (QC) is maintained by site-specific field protocols and by requiring the analytical laboratory to perform internal and external QC checks. The goal is to provide data that are accurate, precise, complete, comparable, and representative. The definitions as developed by overseeing federal, state, and local agency guidance documents for accuracy, precision, completeness, comparability, and representativeness are:

- **Accuracy** — the degree of agreement of a measurement with an accepted reference or true value.
- **Precision** — a measure of agreement among individual measurements under similar conditions. Usually expressed in terms of the standard deviation.
- **Completeness** — the amount of valid data obtained from a measurement system compared to the amount that was expected to meet the project data goals.
- **Comparability** — express the confidence with which one data set can be compared to another.
- **Representativeness** — a sample or group of samples that reflect the characteristics of the media at the sampling point.

Laboratory and field handling procedures of samples may be monitored by including QC samples for analysis. QC samples may include any combination of the following:

- **Trip Blanks:** Trip blanks are sent to the project site, and travel with project site samples. Trip blanks are **not** opened, and are returned from a project site with the project site samples for analysis.

- **Field Blank:** Prepared in the field using organic-free water. Field blanks accompany project site samples to the laboratory and are analyzed for specific chemical parameters unique to the project site where they were prepared.

- **Duplicates:** Duplicated samples are collected "second samples" from a selected well and project site. They are collected as either split samples or second-run samples collected from the same well.

- **Equipment Blank:** Periodic QC samples collected from field equipment rinseate to verify decontamination procedures.

The number and types of QC samples are determined and analyzed on a project-specific basis.

Shallow Groundwater Survey

A shallow groundwater survey employs reconnaissance field sampling and chemical analysis for rapid plume mapping. A state-certified mobile laboratory may be used. The subcontractor would sample for analysis at locations marked by the RESNA field geologist. The thin-diameter probes from which groundwater is collected are advanced to the water bearing stratum and a groundwater sample is withdrawn to the surface, and analyzed immediately thereafter. Probe holes are backfilled with a grout slurry or as the local permitting agency requires. The contractor will report the details and results sampling, purging, and chemical analysis to RESNA. RESNA considers this type of shallow probe mapping (together with shallow groundwater sampling) to be a reconnaissance technique only.