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Clayton
ENVIRONMENTAL
CONSULTANTS

March 27, 1998

Ms. Loretta K. Barsamian
San Francisco Bay Region
Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612
Attention: Mr. Derek Lee

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway
Alameda, California 94501

Clayton Project No. 70-97203.00.600

Re: Workplan to Perform Additional Remedial Investigation and Prepare a Risk Assessment for the Coliseum Way Properties, Oakland, California

Clayton Environmental Consultants, a division of Clayton Group Services, Inc. (Clayton), is pleased to present this workplan to fulfill requests by the San Francisco Bay Regional Water Quality Control Board (RWQCB) to perform additional remedial investigation and prepare a risk assessment for the Coliseum Way Properties (5050, 5051, and 5200 Coliseum Way and 750 50th Avenue) in Oakland, California (subject properties; Figure 1). This workplan is designed to provide additional technical information to assist the RWQCB in evaluation of impacts to soil and groundwater to establish risk management requirements for the site. The workplan addresses the issues outlined in the RWQCB's letter to Millennium Holdings, Inc., dated February 11, 1998 (RWQCB File No: 2223.09). → 2/12/98

The scope of work for this workplan addresses the issues outlined in item A of the above referenced letter including:

- Providing additional data to address the "background" total dissolved solids (TDS) concentrations in groundwater at the subject properties to assist the RWQCB in determining if the groundwater in the area could be considered a potential source of drinking water.

- Providing additional groundwater elevation data to better define the groundwater gradients across the property, particularly the southeasterly flow component at the 5200 Coliseum Way property.

- Defining the lateral and vertical extent of pollutants in the soil and groundwater around the perimeter of the properties. Data generated from this investigation will be used in estimating potential future pollutant migration pathways.

- Preparing a risk assessment for industrial or commercial uses of the subject properties to identify any restrictions on the future use or management of the land; the possible receptors of interest; and potential exposure pathways. The risk assessment will provide a toxicity assessment, exposure assessment, and risk characterization.

SCOPE OF WORK

Clayton's workplan will provide additional data that will assist the RWQCB in evaluating the Coliseum Way Properties and addresses the issues outlined in the February 11, 1998 letter to Millennium Holdings, Inc. The scope of work outline incorporates essentially the same tasks proposed in Geomatrix's Soil Boring and Shallow Groundwater Investigation Work Plan (December 3, 1996); Levine-Fricke-Recon's (LFR's) Work Plan to Evaluate Possible Groundwater Migration Pathways (November 12, 1996); and LFR's Addendum to the November 12, 1996 Work Plan dated December 13, 1996. Clayton has made minor changes to these workplans and proposes additional tasks as outlined below.

- Clayton will incorporate TDS sampling and analysis into the existing quarterly groundwater monitoring program including new well installations. OK

- Clayton proposes to install two groundwater monitoring wells (CW-6 and CW-7) along the southeast property boundary of the 5200 Coliseum Way property (Figure 2). The wells will likely be located in the Alameda County Flood Control District right-of-way. Groundwater elevation data from these wells will be used to address concerns of the RWQCB regarding changes in the groundwater gradient at the 5200 Coliseum Way property. OK

- Clayton proposes to install two groundwater monitoring wells (CW-8 and CW-9) on the EBMUD Property southeast of the 5051 Coliseum Way property. Data from these two wells will be used to evaluate the groundwater flow direction in this area.

- Clayton proposes to install three groundwater monitoring wells (CW-10 through CW-12) near the intersection of Coliseum Way and 50th Avenue in areas of public right-of-way controlled by the City of Oakland. Clayton also proposes to install one groundwater monitoring well (CW-13) between the Second Line G Culvert and the Courtland Creek Subsurface Culvert. Data from these wells will further define the potential for contaminants to follow the culvert base materials that may act as a conduit to surface waters.

  Seven soil borings will also be drilled (CSB-1 through CSB-7) as proposed by LFR along the northwest property boundary of the 750 50th Avenue and 5050 Coliseum Way properties (along 50th Avenue north of and near the intersection of Coliseum Way). Samples will be collected from the seven proposed soil borings for lithologic descriptions to define possible backfill areas and describe soil conditions, including pH characteristics. It is anticipated that up to two soil samples and one grab-groundwater sample will be submitted for chemical analysis from each soil boring.

- Clayton proposes to expand monitoring of the petroleum hydrocarbon plume identified at the 5200 Coliseum Way property. Clayton proposes to submit additional groundwater samples for total petroleum hydrocarbon (TPH) analyses for gasoline, diesel, motor oil and BTEX. TPH analyses will also be conducted on groundwater samples collected from the proposed new wells (CW-6 and CW-7) along the southeast property boundary of the 5200 property, and from wells MWA-1, MWA-2, and MW-6 across Coliseum Way to the southwest on the 5051 property. TPH analyses will also be conducted on groundwater samples collected from wells LF-4, LF-7, LF-8, and LF-13 on the adjacent 5050 property to the northwest.

- Clayton will evaluate pollutants identified and future pollutant migration pathways. The evaluation will include analyzing historic environmental data, including new data generated during the proposed investigation including groundwater pH and TDS concentrations from all wells, for the Coliseum Way Properties.

- A risk assessment (RA) that incorporates industrial or commercial use of the site will be prepared for the Coliseum Way Properties. The RA will utilize all historic environmental sampling data and data generated from this remedial investigation in making its assessments of toxicity, exposure, and risk characterization. A Risk Assessment Workplan, dated 19 March 1998, has been prepared by RATECH Resources and is included as Attachment 3.

Workplan Implementation

Clayton will perform the following scope of work:

- Task 1: Prefield Activities
- Task 2: Collect Soil and Groundwater Samples
- Task 3: Analyze Samples
- Task 4: Prepare a Report

These tasks are described in the following sections.

Task 1: Prefield Activities

Prior to initiating the field portion of this remedial investigation, Clayton will obtain all appropriate permits and obtain and schedule access for the various properties involved. Clayton will obtain a drilling permit with the Alameda County Public Works Agency for 15 soil borings, 8 of the 15 borings will be completed as monitoring wells (CW-6 through CW-13). Seven of the 15 soil borings (CSB-1 through CSB-7) will be located along 50th Avenue on the 5050 Coliseum Way property which includes the 750 50th Avenue property and on public property near the intersection of 50th Avenue and Coliseum Way. The soil boring locations are shown on the attached Figure 2.

An encroachment permit will be obtained from the City of Oakland Public Works Department to drill on public property near the intersection of 50th Avenue and Coliseum Way (wells CW-10 through CW-13 and soil borings CSB-1 through CSB-3). The Zone 7 Flood Control District will also be contacted to obtain permission to install two wells (CW-6 and CW-7) along an access road that parallels the drainage ditch along the southwest property boundary to the 5200 Coliseum Way property.

As required by law, Clayton will outline the drilling areas in white paint and contact Underground Service Alert (USA) at least 48 hours before drilling to identify the utilities leading to the site and in the vicinity of the proposed drilling locations. The identified utilities will be marked on the ground. Clayton will not drill within 3 feet of a known utility line. Clayton will also subcontract an underground utility locating company to survey the property and clear a safe area for each proposed boring.

A site-specific health and safety plan (HSP) will be prepared for the planned work, in accordance with the requirements of the State of California General Industry Safety Order (GISO) 5192 and Title 29 of the Code of Federal Regulations, Section 1926.65 (29 CFR 1926.65). A copy of the HSP will be kept onsite during Clayton's activities and will be reviewed and signed by all subcontractors that are involved in the project that may be exposed to subsurface soils or groundwater.

Task 2: Collect Soil and Groundwater Samples

The soil borings will be advanced using hollow-stem auger equipment. During the advancement of the borings, soil characteristics such as color, soil texture, and relative soil moisture content will be noted and entered onto boring logs in the field. Drilling and sampling activities will be conducted in accordance with Alameda County Public Works Agency guidelines, Regional Water Quality Control Board (RWQCB) guidelines, and Clayton's drilling, well construction and sampling protocols for borehole/monitoring well installation (Attachment 4), under the supervision of a Clayton geologist registered in the State of California.

All borings will be continuously logged to determine soil characteristics. Soil samples will be collected from each boring at five-foot intervals or at any significant lithologic changes using a split spoon sampler for potential chemical analysis until groundwater is encountered. The samples will be collected in 2-inch diameter by 6-inch long stainless steel tubes that will be sealed using aluminum foil or Teflon™ sheets and plastic end caps, labeled, and placed into a chilled cooler for transport to Clayton's State-certified laboratory located in Pleasanton, California. Clayton anticipates submitting up to two soil samples from each boring for chemical analysis. Legal chain-of-custody documentation will be followed for the handling of the samples.

The maximum total depth of the borings is anticipated to be between 15 and 20 feet below the ground surface (bgs). The borings will be drilled through the surficial soils, backfill materials and into "bay muds" that are typically encountered in this area as native soils.

The depth to groundwater at the Coliseum properties has been reported at depths that typically range between about 2 and 10 feet bgs, with one exception at more than 17 feet bgs (well MW-7 at the 5051 property). Soil borings CSB-1 through CSB-7 will not be completed as wells, however, a grab-groundwater sample will be collected from each of these borings prior to being sealed with a neat cement grout. Borings CW-6 through CW-13 will be completed as wells and will be properly developed, surged, and purged prior to collecting groundwater samples.

Monitoring wells will be constructed of 2-inch diameter schedule 40 polyvinyl chloride (PVC) casing. The screened interval of 0.010 slotted casing will be about 15 feet in length with 2 to 5 feet above and 10 to 13 feet below the groundwater table. The length of the screened interval may be shortened if "bay muds" are encountered at less than 15 feet bgs. The annular sand pack will consist of washed and dried 2/16 Lonestar sand from the base of the boring to 1-foot above the screened interval. A 1-foot thick seal of bentonite pellets will be placed on top of the sand pack and hydrated with clean

tap water. A neat cement grout surface seal will be placed over the bentonite seal up to the surface. All wells will be protected with traffic rated well boxes and the casings will be capped with sealing and locking well caps.

Grab-groundwater samples will be collected from the soil borings not completed as permanent wells. Samples will be collected from temporary wells constructed of 1-inch diameter PVC casing. The temporary wells will be constructed of 0.010- or 0.020-inch slotted screened sections 5 to 10 feet long placed into the lower portion of the boring. PVC blank casing will be used to construct the remainder of each well to the ground surface. Samples will be collected with new PVC or stainless steel bailers and the samples will be decanted into laboratory prepared sample containers. After sample collection each boring will be sealed using a tremie pipe to install cement grout with approximately 5% bentonite. The well sealing will be observed by an Alameda County inspector according to the well permit guidelines, if required.

Based on field screening results, soil samples will be selected for laboratory analysis. Soil cores will be field screened by a PID. If no specific indication of potential contaminants are detected by observation or PID readings, select soil samples will be collected between the surface and the saturated zone. If elevated PID readings are detected or observations indicate contamination during field screening, the number of soil samples submitted for laboratory analysis may vary and the boring may be extended.

Please note that the waste drill cuttings, purge water, and decontamination fluids will be containerized, labeled, and left onsite. All containerized wastes will be disposed of in accordance with applicable regulations pending analytical results.

Task 3: Analyze Samples

Clayton anticipates collecting one groundwater sample from each boring plus one duplicate sample, totaling 16 water samples. Clayton also anticipates submitting up to two soil samples from each boring plus two duplicate samples, totaling 32 soil samples. All samples will be submitted to Clayton's state certified laboratory in Pleasanton, California for the following United States Environmental Protection Agency (USEPA) analytical method:

- USEPA Methods 200.7 and 245.2 for California Assessment Manual (CAM-17) Metals

All groundwater samples collected from fully developed permanent wells, 8 samples total, will be submitted for the following United States Environmental Protection Agency (USEPA) analytical method:

- USEPA Method 160.1 for total dissolved solids (TDS)

Select groundwater samples (estimated total of 3; wells CW-6 through CW-8) will be submitted for the following USEPA analytical methods:

- USEPA Methods 8015 (modified) for total petroleum hydrocarbons as gasoline (TPH-G)
- USEPA Methods 8015 (modified) for total petroleum hydrocarbons as diesel and motor oil (TPH-D/O)
- USEPA Method 8020 for benzene, toluene, ethylbenzene, and total xylenes (BTEX)

Clayton will also measure groundwater pH at each sampling location at the time of sample collection, in addition to measuring pH during routine quarterly groundwater sampling events.

The presence of non-petroleum hydrocarbons caused by the presence of decaying vegetable and animal matter can affect the detected concentrations of TPH-D/O when the samples are analyzed. Because of this, the sample extracts will be passed through silica gel cleanup process prior to analysis to remove non-petroleum compounds.

Task 4: Prepare Report

Once all analytical results have been received, Clayton will prepare a report describing the findings, conclusions, and any recommendations, if warranted. The report will include the findings of the remedial investigation proposed herein and the risk assessment. The report will include:

- Sample Techniques and Field Observations
- Summary of Analytical Methods and Results
- Groundwater Elevation Tables
- Summary Tables of Soil and Groundwater Results
- Boring Logs and Well Logs
- Sample Location Map
- Drilling Permits
- Field Sampling Sheets
- Certified Analytical Results
- Risk Assessment Methods and Conclusions

SCHEDULE

Clayton has prepared a Schedule for Additional Remedial Investigation and Risk Assessment for the Coliseum Properties, Oakland, California, which is presented as Attachment 5. The schedule is designed to comply with the September 30, 1998 date for completion of the remedial investigation and risk assessment as requested by the RWQCB in its February 11, 1998 letter to Millennium Holdings, Inc.

Clayton's workplan is designed to provide additional data that will allow for completion of the Remediation/Risk Management Plan for the Coliseum Way Properties, to be submitted by the compliance date of October 31, 1998.

Thank you for the opportunity to submit our workplan. We look forward to working with you on this project.

Sincerely,

Donald A. Ashton, R.G., REA
Senior Geologist

Richard W. Day, R.G., C.E.G., C.H.G.
Manager, Environmental Risk Management and Remediation
San Francisco Regional Office

Dwight R. Hoenig
Vice President, Western Regional Director
Environmental Risk Management and Remediation
San Francisco Regional Office

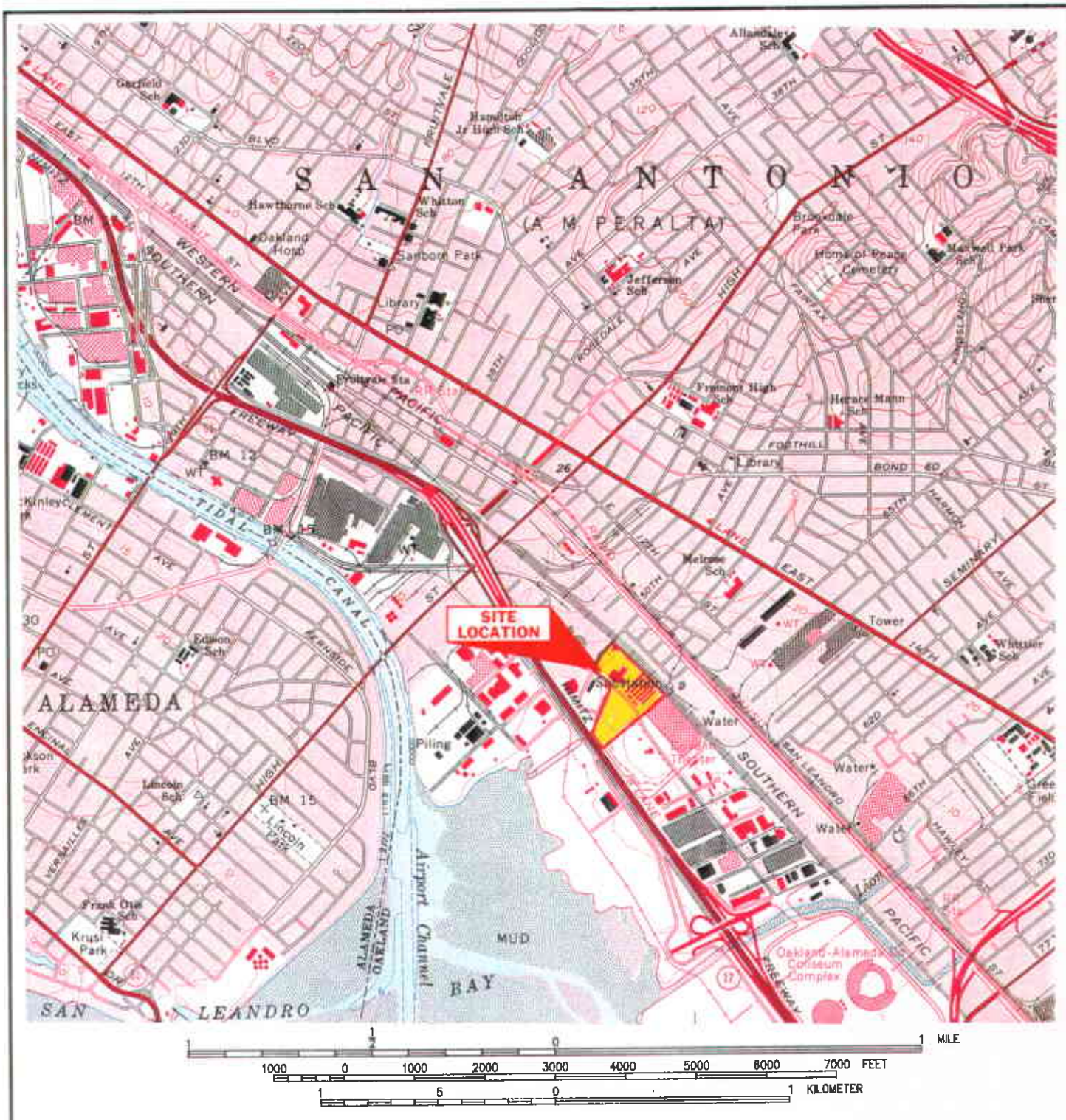
Attachments:
- Attachment 1 - Site Location Map
- Attachment 2 - Location of Proposed Soil Borings and Monitoring Wells
- Attachment 3 - RATECH Resources Risk Assessment Workplan
- Attachment 4 - Drilling, Well Construction, and Sampling Protocols for Borehole/Monitoring Well Installation
- Attachment 5 - Schedule

ATTACHMENT 1

SITE LOCATION MAP

ATTACHMENT 2

LOCATION OF PROPOSED SOIL BORINGS AND MONITORING WELLS



Portion of 7.5–Minute Oakland East, California Quadrangle Map
United States Department of the Interior
Geological Survey
1959
Photorevised 1980

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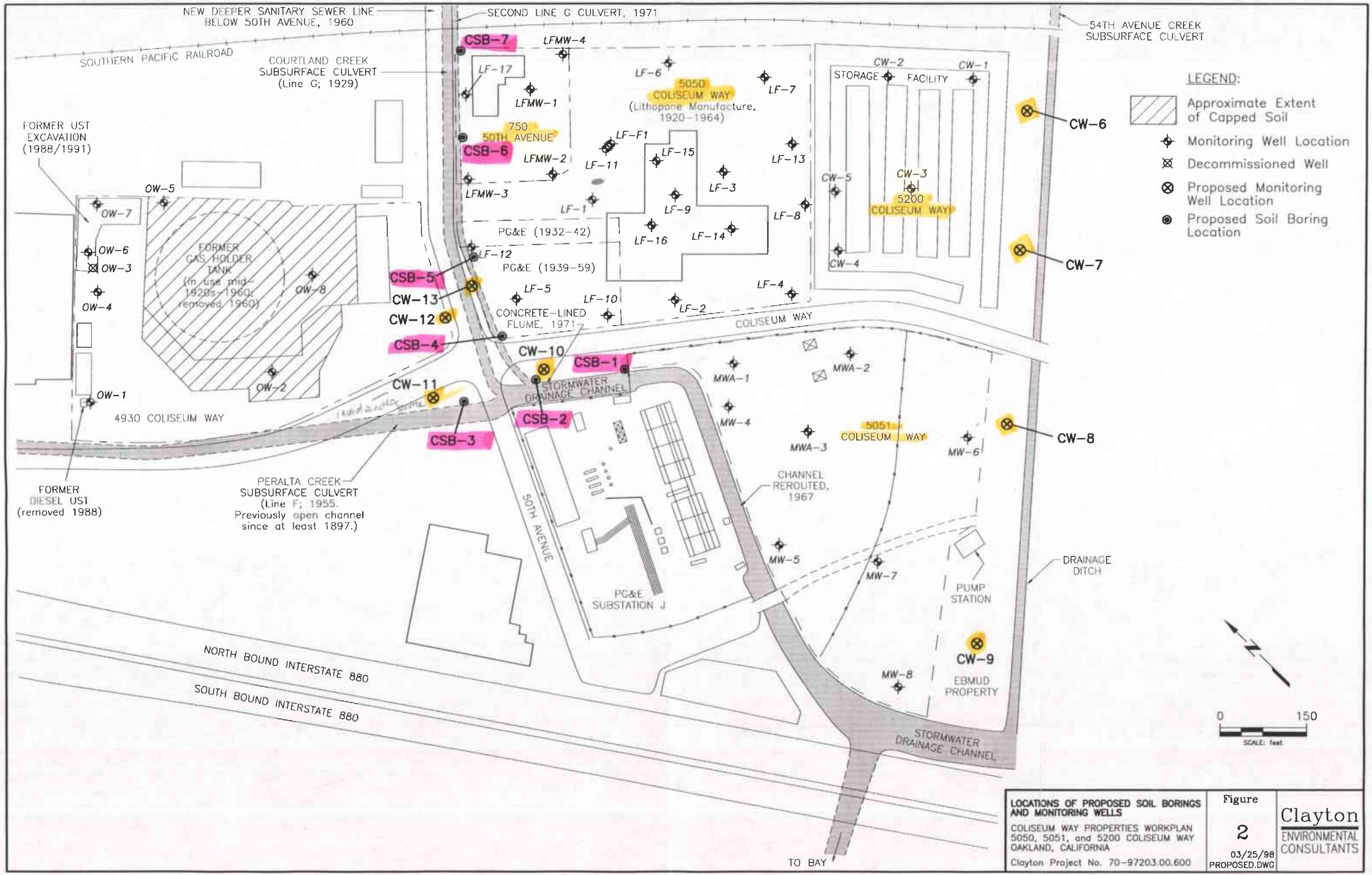
SITE LOCATION MAP Coliseum Way Properties Oakland, California Client: Lempres & Wulfsberg Clayton Project No. 70–97203.00.600	Figure 1 97203–6–16	Clayton ENVIRONMENTAL CONSULTANTS



LOCATIONS OF PROPOSED SOIL BORINGS AND MONITORING WELLS

COLISEUM WAY PROPERTIES WORKPLAN
5050, 5051, and 5200 COLISEUM WAY
OAKLAND, CALIFORNIA

Clayton Project No. 70-97203.00.600

Figure 2

03/25/98
PROPOSED.DWG

Clayton ENVIRONMENTAL CONSULTANTS

ATTACHMENT 3

RATECH RESOURCES RISK ASSESSMENT WORKPLAN

Risk Assessment Workplan
Coliseum Properties
Oakland, California

prepared for:

Millennium Holdings, Inc.

March 19, 1998

prepared by:

RATECH Resources
2211 Martin, Suite 113
Irvine, California 92612-1427

in association with:

Clayton Group Services
1252 Quarry Lane
Pleasanton, California 94566

DRAFT

RISK ASSESSMENT WORKPLAN
COLISUEM PROPERTIES
OAKLAND, CALIFORNIA

19 March, 1998

DRAFT

1. Introduction

Millennium Holdings, Inc. (Millennium) has undertaken the responsibility for the contaminant investigation and clean-up at the properties located on 5850, 5051, and 5200 Coliseum Way, Oakland, Alameda County.

A variety of manufacturing processes have historically occurred at the Site location since the turn of the century. Onsite data have already been collected by several consultants, and currently the regulatory oversight agency at the Site is the San Francisco Bay Regional Water Quality Control Board (SFRWQCB). On February 18, 1998, SFRWQCB issued a letter requesting several Technical Reports to assist with, 1) investigation of soil and groundwater pollution in the vicinity and, 2) facility cleanup and/or risk management of the pollution.

As part of SFRWQCB requirements, a *Risk Assessment Workplan (Workplan)*, and *Risk Assessment Report (RA)* must be completed. This document represents the *Workplan* phase of the overall *RA*, and contains a summary of the main approach to the *RA*, and the guidance that will be used in completing the *RA*.

Because the *RA* must serve as a tool in the overall *Site Management Plan*, it must provide and information that can be used to define the need for, and extent of, potential site mitigation. This *Workplan* therefore includes a description an RA consisting of following components

- exposure scenarios
- the receptors of interest
- exposure assessment
- toxicity assessment
- exposure assessment
- risk characterization results

2. Proposed Approach

This *Workplan* offers an approach to the *RA* that can fulfill the requirements of SFRWQCB, and allow Millennium to properly prepare for site-related risk management decisions. The approach is based on regulatory guidance found in the following documents:

> Cal/EPA. 1992. *Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste and Permitted Facilities.* Office of the Science Advisor.
>
> U.S. EPA. 1989. Risk Assessment Guidance for Superfund (RAGS) Volume I: Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002. December, 1989.

Because there are several properties under the jurisdiction of Millennium it is anticipated that each location will be treated as an Area of Concern (AOC). Detected contaminants will therefore be AOC-specific, and will not be incorrectly assumed to exist at each location, unless detected. Data for each location will be independently treated for statistical distribution, and the exposure concentrations in each location will then be used to estimate AOC-specific risks and hazards for each relevant exposure scenario.

2.1 Exposure Assessment

Based upon a) the land use, b) evaluation of complete exposure pathways, and c) the fate and transport potential of the detected constituents, an exposure assessment will be prepared. The exposure assessment will be predicated on existing Site data as presented in the *Remedial Investigation*. Additional data obtained during the course of the *RA* will be added where applicable.

2.1.1 Exposure Scenarios

The *RA* must address potential health impacts to human receptors based on current and future assumed industrial/commercial conditions. This typically depicts an individual as being exposed to site-wide contaminants while working under routine industrial conditions. As indicated in Section 2.0 the AOC-specific approach will identify location specific exposures that are most likely to reflect current and future use.

Under current conditions exposures to subsurface soil contamination can not occur because access to the soil is prevented by the existing concrete and asphalt.

Under future conditions, if construction and excavation activities are not restricted and regulated, exposure to subsurface site contamination could occur.

2.1.2 Receptors of Interest

It is anticipated that the only current receptors of interest are those employed at the impacted property. Potential future receptors of interest may include maintenance personnel who may contact the impacted soils through short-term trenching and excavation exercises (e.g., sewer line or electrical service maintenance).

2.1.3 Exposure Pathways

An exposure pathway analysis will be performed to identify the existing complete exposure pathways. Only those pathways that can be considered complete, under the current and potential land use, will be considered for further evaluation in the risk analysis. It will be assumed that:

- Exposures to subsurface soil contamination can currently occur.
- Exposures will be limited to onsite receptors.
- Drinking water is provided by a public provider thus no direct drinking water exposures to groundwater.

To properly assess the anticipated exposure pathways, it will be necessary to quantify exposure point concentrations in air, both outdoor and indoor. To estimate outdoor concentration of particulates and volatile organic compounds (VOCs), the models presented in the U.S. EPA, *Soil Screening Guidance* will be used:

> U.S. EPA. 1996. *Soil Screening Guidance: User's Guide and Technical Background Document*. Office of Solid Waste and Emergency Response. EPA/540/R-96/018; EPA/540/R-95/128.

If it is necessary to estimate indoor air concentrations of VOCs, the potential exposure concentrations will be made using the assumptions and models of Johnson and Ettinger (1991):

> Johnson and Ettinger. 1991. *Heuristic Model for Predicting the Intrusion Rate of Contaminant Vapors into Buildings*. Environmental Science and Technology. 25(6): 1445-1452.

2.1.4 Exposure Factors

Exposure factors will be obtained from reference sources that are known to be acceptable to Cal/EPA. Because potential exposures at the property may differ from "typical exposures," it will be necessary to identify the most applicable, site-specific exposure parameters available. The risk assessment will therefore review the following regulatory guidance documents for relevant and appropriate exposure factors:

> Cal/EPA. 1992. *Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste and Permitted Facilities*. Office of the Science Advisor.

U.S. EPA. 1996. *Exposure Factors Handbook, Volumes I, II, and III*. Office of Research and Development National Center for Environmental Assessment. EPA/600/P-95/002Ba; EPA/600/P-95/002Bb; EPA/600/P-95/002Bc.

Hawley, J.K. 1985. *Assessment of Health Risk from Exposure to Contaminated Soil*. Risk Analysis, Vol. 5, No.4, 1985.

2.2 Toxicity Assessment

The data sources/databases recognized by the SFRWQCB for use in the toxicity assessment will be the most recent versions of the following published document hierarchy:

- Cal/EPA Criteria for Carcinogens
- U.S. EPA Integrated Risk Information System
- U.S. EPA Health Effects Assessment Summary Tables

Currently it is anticipated that all the toxicity data can be taken from these sources since the compounds detected onsite include metals, and semi-volatile and volatile organic compounds. However, if additional data sources, other than those listed above are required, SFRWQCB will be consulted prior to using the toxicity factors.

2.3 Risk Characterization

Risk characterization results will be summarized in tables for report presentation. A set of results will be provided for each AOC. All carcinogenic risk and noncarcinogenic hazard calculations will be prepared as an appendix to the *RA*. Discussions will include the identification of the COC resulting in the greatest carcinogenic risks and noncarcinogenic hazards, and the exposure pathways and routes of greatest concern.

2.3.1 Carcinogens

The calculation of carcinogenic (cancer) risk probability is the product of a compound-specific SF, and the estimated exposure dose (i.e., compound intake) of that same compound. In any given scenario, multiple potential exposure pathways and COI exist. An independent cancer risk calculation is made for each compound, in each pathway that it may be present. The overall cancer risk, under a specific scenario, is the sum of the independent cancer risks for each compound, along all potential exposure routes.

The formula that will be used for calculating the cancer risk probability is:

$$\text{Cancer Risk Probability} = SF * \text{Exposure Dose}$$

2.3.2 Noncarcinogens

A quantitative description of potential noncarcinogenic (noncancer) health impacts is a ratio defined as a Hazard Quotient (HQ). The HQ is a ratio of an exposure point concentration or exposure dose of a specific COC divided by the compound-specific RfD or RfC. The overall cumulative Hazard Index (HI), under any scenario is the sum of the independent HQs for each compound, along all potential exposure routes.

The formula that will be used for calculating noncancer HQ is:

$$HQ = \text{Exposure Dose} / \text{RfD or RfC}$$

and:

$$HI = HQ_1 + HQ_2 + \ldots HQ_n$$

3. Risk Assessment Reports

A Draft *RA* Report will allow SFRWQCB an opportunity to review and comment on the content and methods employed in the *RA*, and to obtain an understanding of the final results. If SFRWQCB comments on Draft *RA* Report required a revised document, a Final *RA* Report will be produced. If SFRWQCB comments can be responded to in letter format, the Draft RA Report will not be revised, and a formal letter response will be submitted instead.

ATTACHMENT 4

DRILLING, WELL CONSTRUCTION, AND SAMPLING PROTOCOLS FOR BOREHOLE/MONITORING WELL INSTALLATION

DRILLING, WELL CONSTRUCTION, AND SAMPLING PROTOCOLS FOR BOREHOLE/MONITORING WELL INSTALLATION

BOREHOLE INSTALLATION

Clayton Environmental Consultants, Inc. acquires the proper governmental agency permits to bore, drill, or destroy all proposed boreholes and monitoring wells that intersect with groundwater aquifers and writes a health and safety plan.

Clayton subcontracts only with drillers who possess a current C-57 water well contractor's license issued by the State of California and whose personnel have attended the OSHA 40-hour Hazardous Materials Safety Training. Prior to starting work, a "tailgate" safety meeting including discussion of the safety hazards and precautions relevant to the particular job will be held with all personnel working on the job. Well drillers are identified on permit applications.

Borings are drilled dry by hollow- or solid-stem, continuous flight augers. Augers, drill rods, and other working components of the drilling rig are steam-cleaned before arriving onsite to prevent the introduction of contaminants. These components are also steam-cleaned between borings away from boring locations. Cleaned augers, rods, and other components are stored, and/or covered when not in use.

Our bore logs include a detailed description of subsurface stratigraphy. Clayton examines the soil brought to the surface by drilling operations, and samples undisturbed soil every 5 feet or as otherwise specified. Soil cuttings are screened for hydrocarbon contamination using a photoionization detector. Boring logs are filled out in the field by a professional geologist, civil engineer, engineering geologist who is registered by the State of California, or a technician who is trained and working under the supervision of one of the previously mentioned persons, using the Unified Soil Classification System.

SOIL SAMPLING

Soil samples are taken every 5 feet, at areas of obvious contamination, or as otherwise specified, with a California modified split-spoon sampler that is lined with three six-inch brass tubes. The sampler and rod are inserted into the borehole to the current depth and a hammer of known weight and height above the sampler are allowed to free-fall onto the rod, advancing the assembly 18 inches into undisturbed soil. Clayton uses the number of blows necessary to drive the sampler into the ground to help evaluate the consistency of materials encountered. The sampler is then pulled from the borehole and disassembled, and the three brass tubes are separated for inspection and labeling.

Clayton uses new brass liners or liners cleaned with a trisodium phosphate (TSP) solution, double rinsed with clean tap water, and air dried prior to each sampling. The sampler is also cleaned with TSP and rinsed with tap water between sampling events.

Soil samples selected for laboratory analysis are left in the brass liners, sealed with aluminum foil and plastic caps, taped for air tightness, labeled, and immediately placed into a pre-cooled ice chest chilled to less than 4•C. Labels contain the following information: site name, date and time sampled, borehole number and depth, and the sampler's initials. The samples are transported under chain-of-custody to a state-certified laboratory. The laboratory analyzes soil samples within the prescribed holding time, storing them at temperatures below 4•C at all times.

Pending results of laboratory analysis, excess drilling and sampling cuttings are placed into

Department of Transportation (DOT)-approved drums, labeled with the name of the site, address, and well number, and left at the site. Uncontaminated soil may be disposed of by the client. Soil found to contain levels of contaminants above local or state action levels will require that the client dispose of it in accordance with hazardous waste regulations. At the client's request, we will assist with the disposal of contaminated soil.

WELL CONSTRUCTION

Boreholes are converted to monitoring wells by placing 2-inch or 4-inch diameter well casing with flush-threaded joints and slotted screen into the borehole. Construction materials include polyvinyl chloride (PVC), stainless steel, or low carbon steel. The most suitable material for a particular installation will depend on the parameters to be monitored. All screens and casings used are in a contaminant-free condition when placed in the ground. No thread lubrication is used, other than teflon tape, for connecting the casing segments.

Wells extend at least 10 feet into the upper saturated zone, but do not extend through any clay layers greater than 5 feet that are below the shallow water table. The standard practice for wells installed at hydrocarbon contamination sites is to construct a well with a 20-foot long perforated interval extending 15 feet below and 5 feet above the water table in an unconfined aquifer. The top of the well is solid casing. The annular space of the borehole is backfilled with washed, kiln-dried sand to a point at least 1 foot above the slotted screen. A seal above the filter pack is formed by placing a 1- to 2-foot layer of bentonite pellets on top of the sand. The bentonite pellets are moistened by pouring clean tap water down the hole so that they can expand and seal the annulus. A neat cement grout is placed above the bentonite seal and brought to the ground surface.

Well casings are protected from surface contamination, accidental damage, and unauthorized entry or tampering with water-tight locking caps on the well casings. The caps are usually surrounded by a concrete vault. Wells are clearly identified with a metal tag or other device where the following information is recorded: well number, depth to water, depth of well, casing data including location of screened interval.

WELL DEVELOPMENT

The well seal in newly developed wells must set up for 48 to 72 hours prior to development. Since development of the well can volatilize contaminants present, the well must also settle for at least 48 to 72 hours between development and the first purging/sampling incident.

All monitoring wells are initially developed to clean the well and stabilize sand, gravel, and disturbed aquifer materials around the screened internal perforations. Wells are developed by pumping (or bailing) and surging until water turbidity and specific conductance stabilize. In some cases, where wells are installed in low permeability formations and the wells purge dry, the well is allowed to recover and is purged dry three times. Clean tap water is introduced into the well if it does not recover rapidly enough.

Pending results by laboratory analysis, purge water from well development and sampling is placed into DOT-approved drums, labeled with the name of the site, address, well number, and left at the site. Uncontaminated water may be disposed of by the client. Water found to contain levels of contaminants above local or state action levels requires that the client dispose of it in accordance with hazardous waste requirements. At the client's request, we can assist with the disposal of contaminated purge water.

GROUNDWATER SAMPLING

To collect a representative sample of the groundwater, stagnant water within the well casing and filter material must be purged and fresh aquifer water allowed to replace it. The water is purged from the well by pumping or bailing at least three well volumes. Well volumes are calculated by measuring depth to groundwater to the nearest 0.01 foot upon arrival at the well before any purging has begun. Groundwater samples are collected only after purging has been of sufficient duration for pH, temperature, and electrical conductivity to stabilize. When purging low-yield wells, the wells are purged to dryness. When the well recovers to 80% of the depth measured upon arrival, samples are collected.

Field sampling logs maintained for each well include:

- Monitoring well identification
- Static water level, before and after pumping
- Well depth
- Condition of water prior to purging (e.g., amount of free product)
- Purge rate and volume
- pH, temperature, and conductivity during purging
- Time purged
- Time of sample collection
- Sampling method
- Name of sampler
- Climatic conditions

Water samples are collected using clean teflon bailers. All equipment that contacts samples is thoroughly cleaned before arrival at the site and between sampling events.

Water is collected in clean laboratory-supplied containers, labeled, placed immediately into an ice chest pre-cooled to 4•C, and transported to Clayton's laboratory for analysis. One trip blank will be furnished in accordance with our quality assurance/quality control (QA/QC) program.

All samples are collected in such a manner so as to minimize the volatilization of a sample due to agitation and/or transfer from bailer to sample container. Samples are collected so that contaminants most sensitive to volatilization are sampled first.

Preservatives are not added to any sample, unless instructed. If requested, they are supplied by Clayton's laboratory.

All sample containers are labeled in the field. Labels contain the following information: project name, sample identification number, project number, date and time of collection, and sampler's initials.

Under no circumstances are sealed sample containers opened by anyone other than the laboratory personnel who perform the requested analyses. If it is necessary for samples or sample chests to leave the immediate control of the sampler prior to delivery to the laboratory, for example during shipment by an overnight shipper, a custody seal is placed on each sample container and/or sample chest to ensure that the samples have not been tampered with during transportation. The custody seal is signed by the sampler, and the date and time that the seal was placed is recorded. The elapsed time between sample collection and delivery to the laboratory never exceeds 48 hours. Water samples are not held for more than 14 days prior to analysis and are kept at 4•C at all times.

To document and trace samples from time of collection, a signed chain-of-custody record is filled out by the sampler and accompanies the samples through the laboratory analyses. The completed chain-of-custody is included with the analytical report from the laboratory.

REFERENCES

Groundwater Monitoring Guidelines, Revised February 1990. Alameda County District Groundwater Protection Program.

Leaking Underground Fuel Tank (LUFT) Field Manual: Guidelines for Site Assessment, Cleanup, and Underground Tank Closure, May 1988. State of California LUFT Task Force.

Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks, Revised November 1989. North Coast, San Francisco Bay, and Central Valley regions of the California State Water Quality Control Board.

Standards for the Construction and Destruction of Wells and Other Deep Excavations in Santa Clara County, Revised June 1989. Santa Clara Valley Water District.

ATTACHMENT 5

SCHEDULE

Schedule for Additional Remedial Investigation and Risk Assessment
Coliseum Way Properties, Oakland, California

Task Name	Duration	Start	Finish
Submit Workplan to RWQCB	1d	Tue 3/31/98	Tue 3/31/98
RWQCB Review and Approval	18d	Wed 4/1/98	Fri 4/24/98
Permitting	3w	Mon 4/27/98	Fri 5/15/98
Perform Field Activities	4w	Mon 5/18/98	Fri 6/12/98
Laboratory Analysis	6w	Mon 5/18/98	Fri 6/26/98
Data Analysis	2w	Mon 6/29/98	Fri 7/10/98
Additional Field Activities	2w	Mon 7/13/98	Fri 7/24/98
Additional Lab Analysis	3w	Mon 7/13/98	Fri 7/31/98
Additional Data Analysis	2w	Mon 8/3/98	Fri 8/14/98
Fate and Transport Analysis	10w	Mon 6/29/98	Fri 9/4/98
Risk Assessment Analysis	10w	Mon 6/29/98	Fri 9/4/98
Report Preparation	8w	Mon 7/13/98	Fri 9/4/98
Client Review	2w	Mon 9/7/98	Fri 9/18/98
Finalize Report	8d	Mon 9/21/98	Wed 9/30/98
Submit Report to RWQCB	1d	Wed 9/30/98	Wed 9/30/98