Ultramar

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6/23/95 looks good - to vapor extr. + air sparge on site (phase I) then + add'l vap extr + air sparge (phase II) at LASC.
Add'l MW's should be installed at edge of plume, eg mid way along 1st St bet P + Q. I assume there are wells at LASR. at edge of D.G. plume. These should be shown in future site plans.

June 8, 1995

Ms. Eva Chu
Department of Environmental Health
Alameda County Health Care Services
1131 Harbor Bay Parkway, Room 250
Alameda, CA 94502-6577

SUBJECT: BEACON STATION NO. 604, 1619 FIRST STREET, LIVERMORE, CALIFORNIA

Dear Ms. Chu:

Enclosed is a copy of the Revised Remediation System Implementation Work Plan for the above-referenced Ultramar facility. The consultant, GCL, feels that groundwater extraction will not be necessary and that remediation can be achieved by vapor extraction and air sparging.

Please call if you have any questions regarding this site.

Sincerely,

ULTRAMAR INC.

Terrence A. Fox

Terrence A. Fox
Senior Project Manager
Marketing Environmental Department

cc: Mr. Cecil Fox, San Francisco Bay Region, RWQCB
Mr. Jim Ellis, Ellis Partners Inc., 351 California Street, Suite 1120, San Francisco, CA 94104

GCL
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May 5, 1995

Mr. Terrance A. Fox
Ultramar Inc.
Senior Project Manager
Marketing Environmental Department
P.O. Box 466
525 W. Third Street
Hanford, California 93232-0466

RE: REVISED REMEDIATION SYSTEM IMPLEMENTATION WORK PLAN FOR BEACON SERVICE STATION NO. 604, 1619 FIRST STREET, LIVERMORE, CALIFORNIA

Dear Mr. Fox:

Geoscience Consultants, Ltd. (GCL) is pleased to submit this revised work plan for resolution of environmental issues at the above-referenced site. We have revised the February work plan based upon our meeting in March and significant modifications of our original conceptual design and scope of work. GCL is presenting the costs for the design, implementation, and monitoring as time and materials costs not to exceed projected estimates for the installation and operation of Phase I and Phase II systems. Per your discussion, we have eliminated all direct costs for remediation equipment, labor associated with interaction with the agency and Ellis Partners and due to recent evaluation of our PCE remediation performance, we also eliminated a large element of the conceptual design. If during the operation of the Phase I system warrants any design modifications for the Phase II installation a subsequent cost estimate will be provided. The remainder of this letter is essentially identical to our previous submission with the incorporated changes in scope.

The proposed technical scope of work presented herein was developed after careful review of the December 14, 1994 remedial action plan (RAP) prepared by Acton, Mickelson and van Dam (AMV). We also employed our extensive knowledge of the immediate area. Initial response from the adjacent property owners (Ellis Partners) is favorable for the proposed remedial system layout and construction.

GCL hereby submits a task-based work plan to implement a groundwater recovery and treatment and air injection/soil-vapor extraction reclamation system. GCL understands only GCL labor, estimated installation, and drilling costs will be provided in this estimate. System equipment laboratory testing, meeting time with Ellis Partners and the county, and costs related to the previously costed groundwater recovery system have been deleted in this revised scope and cost estimate. Site reclamation will be addressed as a Phased approach to installation. The Phase I reclamation system is intended to address the source area of dissolved BTEX constituents at the Beacon Service Station. The Phase II reclamation system addresses the impacted groundwater and vadose zone soils in the LASC parking area. An engineering cost estimate for construction of the Phase I and Phase II reclamation system incorporating modifications based upon your comments from the original conceptual design during our March meeting and our telephone conservation on May 3, 1995 is provided in Attachment A.

The objectives of the proposed remediation system is to remediate the vadose zone plume, eliminate the threat caused by the dissolved-phase groundwater plume and the remainder of the dissolved-phase groundwater plume at the Livermore Arcade Shopping Center. Phase I activities include installation of a air injection/vacuum extraction system at the Beacon station. During system operation, the effectiveness of the Phase I system will be evaluated. System effectiveness of the Phase I system will assist in any necessary system modifications and refinements prior to the installation of the Phase II system.

General System Description

Previously reported background data and soil/groundwater chemistry have been taken into consideration for the design of the remediation system. Impacts associated with gasoline-related volatile organic compounds (VOCs) are amenable to phase transfer and the remedial approach included in the following sections. Figure 1 is a site vicinity map showing the observed groundwater flow direction based upon the most recent data, the horizontal extent of the dissolved-phase hydrocarbon plume, capture zone and the proposed Phase I remediation system layout. Figure 2 shows the proposed Phase II remedial system layout.

Phase I: Source Area (Beacon Site) Remediation

The proposed source area remedial system shown in Figure 1 includes soil-vapor extraction and air injection in the vicinity of the station. The objectives of the proposed source area remediation system is to accomplish the following:

- Remediation of residual hydrocarbon-affected soils and associated subsurface soil vapors in the vicinity of the former Beacon Service Station
- Remediation of the source area portion of the dissolved-phase groundwater plume
- Oxygenation of groundwater and subsequent passive remediation of the downgradient off-site dissolved-phase hydrocarbon plume

The proposed active air injection and vapor extraction remediation system, enhanced by passive bioremediation, will efficiently accomplish each of the above objectives by allowing mechanical in situ stripping, volatilization, subsequent mobilization of the vapor-phase hydrocarbons, and passive bioremediation (hyperoxygenation) to act together to remediate the dissolved-phase hydrocarbons present in the soils and groundwater. The air injection/vapor extraction treatment system offers a reliable alternative to traditional on-site pump-and-treat technology. By employing a phased approach, future system modifications will be tailored to site conditions resulting in cost effective closure.

The proposed air injection system will consist of well locations incorporating the areas of highest dissolved-phase hydrocarbon concentrations. The air injection wells will be constructed 10 feet below the historical groundwater lows. The air injection wells will be manifolded together and will be connected to a high capacity high-pressure air compressor. The compressor will be sized to overcome the expected hydrostatic pressure exerted by the column of water over the air injection location.

Phase I Vapor Extraction and Air Injection System Specifications - The proposed site remediation system involves the creation of negative and positive pressure cells within the subsurface soils and groundwater. The positive pressure (air injection) will be used to strip dissolved hydrocarbon compounds from the groundwater and mitigate any phase-separated hydrocarbons (should they occur) in the affected area of the site. The air injection activity will also increase the dissolved oxygen concentration and relative moisture content in the subsurface, thereby stimulating microbiological activity and promoting metabolic consumption of hydrocarbons. The negative pressure cells will provide the removal of the hydrocarbon vapors (by vacuum displacement) generated from the site subsurface materials. The proposed system will include:

- Installation of 5 vapor extraction wells.
- Installation of 9 air injection wells.
- Construction of air injection and vapor extraction manifolds below ground from the blower(s)/compressor(s) to the wells.
- Installation of an air injection compressor and a blower equipped catalytic oxidizer unit.
- Connection to the manifold from the air injection compressor and vacuum extraction blower unit inside a secured treatment system stockade.
- Installation of system monitoring and control equipment.

GCL anticipates that this design will effectively remediate all phases of released hydrocarbons in the subsurface adjacent to the release source. GCL reserves the opportunity to make blower/compressor specification modifications and is willing to incorporate system hardware owned by Ultramar if the basic design specifications are met.

Phase II: Livermore Arcade Shopping Center Remediation

The design information used to develop the Phase I system was also used as a basis for the Phase II system. Figure 2 is a site vicinity map showing the observed groundwater flow direction based upon the most recent data, the horizontal distribution of the dissolved-phase hydrocarbon plume, and the proposed Phase II remediation system layout.

The proposed system will include:

- Installation of 10 vapor extraction wells.
- Installation of 20 air injection wells.
- Construction of air injection and vapor extraction manifolds below ground from the blower(s)/compressor(s) to the wells.

- Installation of an air injection compressor and a blower equipped catalytic oxidizer unit.
- Connection to the manifold from the air injection compressor and vacuum extraction blower unit inside a secured treatment system stockade.
- Installation of system monitoring and control equipment.

Work Plan Tasks

The following tasks have been identified for this project:

Task 1 - System Design/Permits
Task 2 - Phase I System Installation
Task 3 - Phase II System Installation
Task 4 - Start up Report
Task 5 - Operation and Maintenance
Task 6 - 1 Year Site Monitoring

A description of the work to be performed for each of the identified tasks is described below.

Task 1 - System Design/Permits

GCL will prepare a design for the reclamation system that will include the plans and specifications for the construction of the proposed groundwater recovery and treatment and air injection/soil-vapor extraction system. GCL and/or its subcontractors will also obtain permits for construction, well drilling, and air emissions, as necessary and will provide a health and safety plan.

Task 2 - Phase I System Installation

GCL will provide construction management during the installation process to monitor compliance with the design specifications. This construction management will be provided by GCL's resident construction inspector (RCI), as well as by staff hydrogeologists and the project manager, as needed. GCL will be on site continuously during well construction, then periodically for construction inspection at key construction points to monitor installation status with the design plans and specifications. The Phase I system will include source area remediation and downgradient groundwater containment. The system will operate for a short duration and data will be collected and evaluated to determine any necessary modification to the Phase II installation.

In conjunction with the completion of the installation of the Phase I reclamation system, GCL will conduct a system start-up test to determine optimal performance of the system flow rates. System/equipment operational data will be collected for future assessment. The air emission monitoring schedule will conform to the permit requirements. It is assumed that a vapor control emission treatment system is required and the system will incorporate a thermal catalytic oxidizer unit. This method for emission treatment was preliminarily selected based upon the observed lower explosive levels (LEL) data collected during the vapor extraction pilot test.

Task 3 - Phase II System Installation

The proposed Phase II system installation will incorporate similar air injection/vapor extraction methodologies discussed previously. The conceptual full-scale system will include the installation of approximately 20 air injection wells and 10 vapor extraction wells (Figure 2). Phase II system implementation will be incorporated in stages based upon reduction in dissolved-phase hydrocarbon concentration observed during Phase I operation at the site.

Task 4 - Start up Report

In conjunction with the completion of the installation of the Phase I and Phase II reclamation system, GCL will conduct a system start-up test to determine optimal performance of the system flow rates. System/equipment operational data will be collected for future assessment. An air emission monitoring schedule will be implemented and will conform to the permit requirements. The evaluation of air monitoring data will assist in the determination of the mass of hydrocarbons recovered as remedial efforts continue. The start up report will serve as the baseline document establishing the parameters for system evaluation and will be updated quarterly to maintain the status of the system operating criteria.

Task 5 - Operation and Maintenance

Operation and Maintenance is scheduled to begin after completion of Phase I installation. The system will be automatic in operation, with continuous monitoring and reporting capabilities. The system will shut down automatically in case of a malfunction, and alarm messages will be relayed to our office by fax. Monitoring of the proposed system will include:

- Automatic monitoring of operating voltages, temperatures, pressures, and flow rates of the various system components.
- The outlet air temperature and VOC levels from the vapor extraction system.
- Effectiveness of the oxygen injection system.
- Monthly site monitoring - The vapor extraction and oxygen injection system will be inspected and off-gas concentrations at the vapor extraction system will be measured using a photoionization detector (PID). Carbon dioxide production and dissolved oxygen content in selected on-site monitoring wells (indicator of microbiological activity) will be measured using carbon dioxide and dissolved oxygen meters.

All site monitoring results will be provided in quarterly reports. Additionally, it may be possible to evaluate progression of site remediation by measuring influent benzene concentrations from the pumping well system. Aqueous benzene concentrations vs. time will be plotted to determine preliminary evaluation of the reduction of the dissolved phase benzene plume. The compliance standard referenced for groundwater samples will be the RWQCB's groundwater standards for listed compounds.

Based upon the previous monitoring results, system effectiveness will be evaluated and adjusted as needed to conform to operating guidelines set forth by permit requirements. When a history of acceptable discharge is established, monitoring of system effluent will be conducted on a quarterly basis.

Ongoing operation and maintenance activities will include collecting vapor and water samples to verify proper operation and perform scheduled maintenance, such as lubrication of moving parts. Pressure and vacuum readings will also be monitored on a regular basis, as will air flow and water flow measurements. It will be necessary to clean the air stripper to remove scale that may accumulate on the packing. Circulation of a cleaning solution through the stripper may be used. The adjustment of pH will also tend to remove the accumulation of minerals in the air stripper and other components.

Monthly equipment maintenance will be conducted for the system in conjunction with the monthly site monitoring. Future maintenance schedules for the system will be based upon system performance, determined during initial full-scale system operation.

Task 6 - 1 Year Quarterly Monitoring

Groundwater samples will be collected from appropriate monitoring wells every quarter along with the regular monthly evaluations.

Prior to well sampling, all monitoring wells will be gauged to determine groundwater levels. A decontaminated oil/water interface probe will be utilized to compile the water level readings to the nearest 0.01 foot.

Groundwater samples will be collected from compliance monitoring wells. These wells will be purged of a minimum of three well volumes and then sampled pursuant to GCL standard operating procedures. The collected water samples will be placed in new 40-milliliter glass appropriately sized laboratory containers, placed on ice, documented with chain-of-custody forms, and sent by overnight courier to the selected laboratory. These samples will be analyzed by Environmental Protection Agency (EPA) Test Method 602 for BTEX and TPH (gasoline).

Following completion of the field activities and receipt of analytical results, GCL will prepare and submit detailed reports that will contain the following key elements:

- Well/site location map
- Current groundwater elevation map
- Analytical laboratory reports
- Summary of water quality data
- Isopleth maps for selected dissolved-phase groundwater compounds
- Benzene concentrations in groundwater and air emissions vs. time graphs
- Evaluation of the reclamation system
- Current results and conclusions

Staffing

GCL has assembled a team of specialists experienced with remedial design, construction inspection, and troubleshooting of the operations and maintenance of system equipment. Mr Leon Crain from our Dublin, California office has been designated as project manager. Mr Crain will be responsible for subcontractor and staff coordination, cost and budgetary control, scheduling and communication with the Department of Environmental Health and the RWQCB, as appropriate. Mr. Claude Schleyer, PE, will serve as principal engineer and provide design and construction oversight. Mr. Jeffery Firebaugh will serve as project hydrogeologist primarily responsible for coordination of the technical aspects of the remedial system design, monitoring and modeling reports, and evaluation of system efficiency.

Mr. Steve Beavers, GCL's health and safety officer, will prepare a site-specific health and safety plan in cooperation with the project manager for the system installation, construction monitoring, and system monitoring activities to be performed at the facility.

GCL will designate senior engineering and technical staff members to serve as quality assurance/ quality control officers for this project. These individuals will be responsible for reviewing all procedures and deliverables, including engineering contract documents, for technical quality and completeness, and be available for consultation on an ongoing basis during the completion of this project.

Project Schedule

GCL has determined that the remedial contractor can begin installing the system within two weeks of receipt of notice to proceed. An estimated construction completion date for the pilot-scale system will be approximately 60 days after beginning construction. The start-up of the system will be dependent upon the delivery and installation of the emission control, air stripper, and blower unit.

Standard of Care

The services provided by GCL will be performed in accordance with generally accepted professional engineering practice when and where the proposed project services are rendered.

Cost Estimate

GCL is proposing to perform the project workscope on a time and materials not to exceed basis. The tasks, lump sum costs, and activities for each task have been presented as Attachment A. This conceptual design cost estimate reflects the GCL labor, other direct costs, and outside professional services. This type of invoicing will minimize administrative and management costs. These savings are reflected in the project budget/upper limit. The labor hours are an estimate to provide the services discussed in the Tasks. If Ultramar owns system hardware that can be utilized for this project we would be happy to deduct the capital expenses as shown on the spreadsheet. The costs for operating the equipment is based upon known utility usage and hook up charges. The capital expense of the

system hardware is presented as the purchase price of the equipment. These costs are presented for comparison purposes and, if a lease arrangement is preferred, we can provide a monthly lease cost instead. GCL will evaluate the cost of a water reinjection system and will determine if implementation will reflect a cost savings of the POTW expenditures.

Please contact us at (505) 842-0001 if you have any questions regarding this work plan or the subject site. We are prepared to move forward with Task 1, Task 2, portions of Task 5 and Task 6 at this time and will prepare a revised cost estimate for the remaining tasks after finalization of the Phase II design. If preferred we can move forward with all tasks based upon the conceptual design and estimated costs provided herein.

Sincerely,
Geoscience Consultants, Ltd. (GCL)

Claude Schleyer P.E.
Project Manager/Engineer

Jeffery E. Firebaugh
Project Hydrogeologist

Randall H. Hicks CPG
Vice President

RMARKET/PROP95/AQ95024B.PRO

cc: Leon Crain, GCL-Dublin
Ellis Partners

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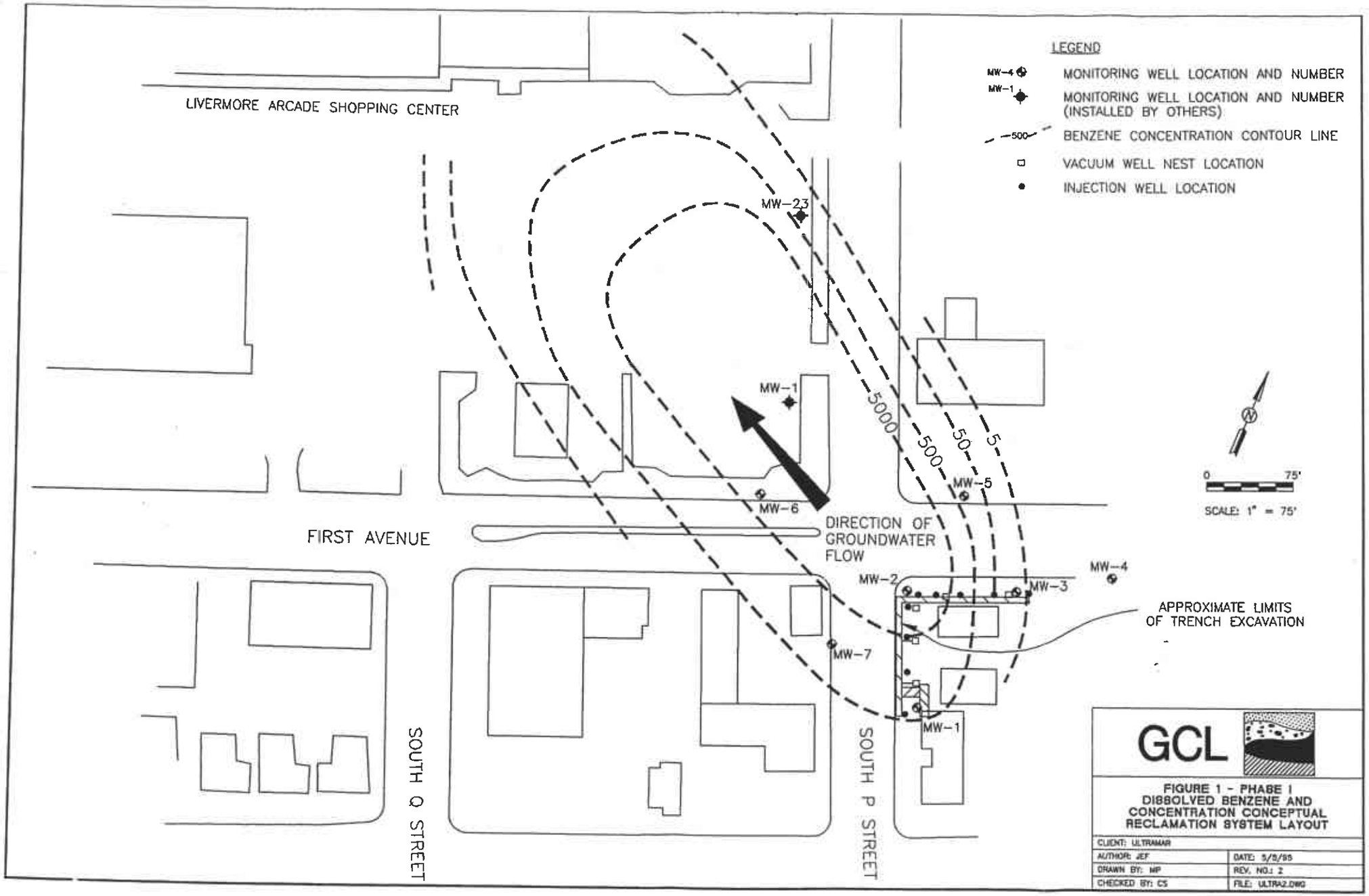
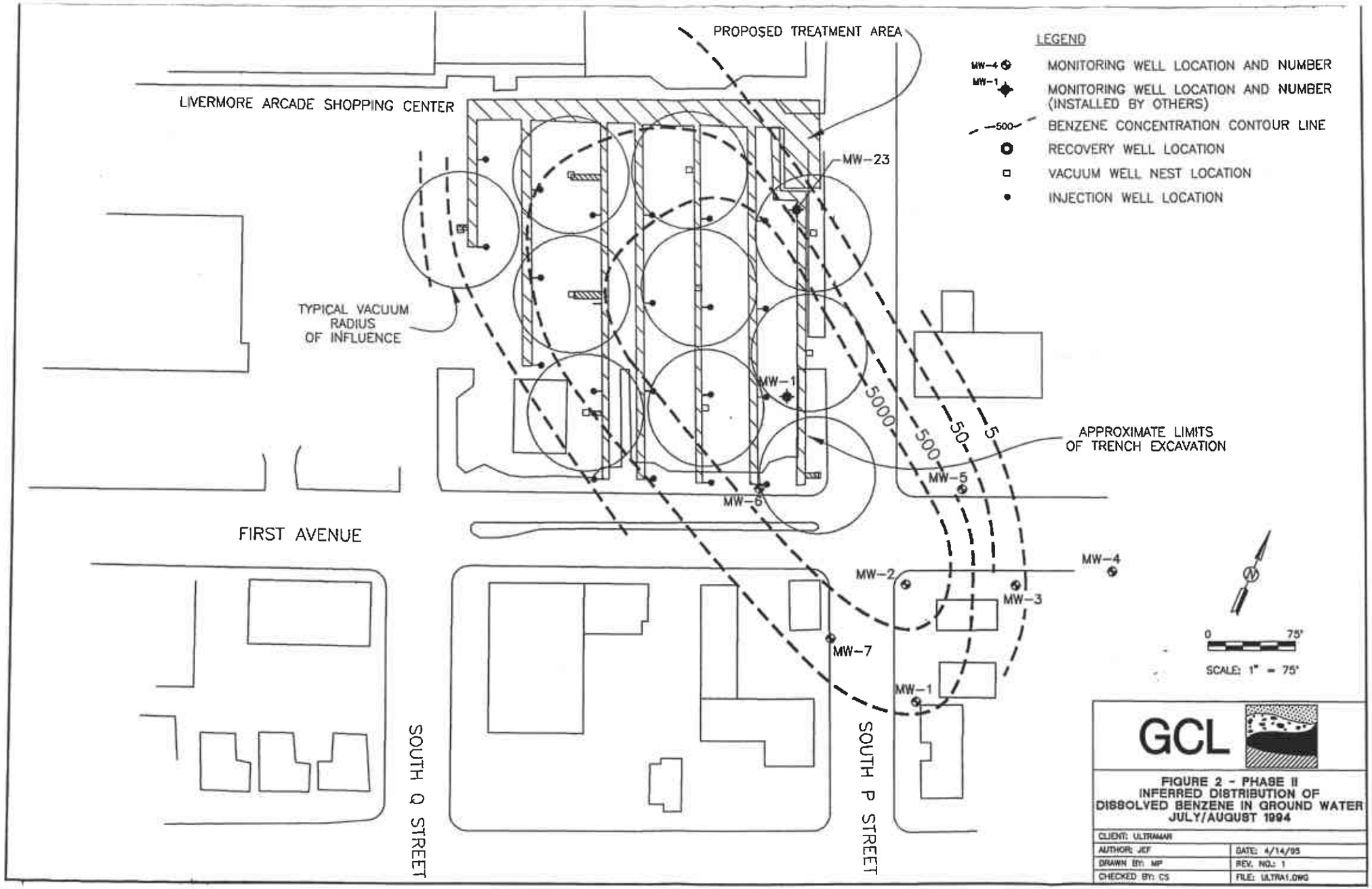

LEGEND
MW-4 MONITORING WELL LOCATION AND NUMBER
MW-1 MONITORING WELL LOCATION AND NUMBER (INSTALLED BY OTHERS)
500 BENZENE CONCENTRATION CONTOUR LINE
VACUUM WELL NEST LOCATION
INJECTION WELL LOCATION
LIVERMORE ARCADE SHOPPING CENTER
MW-23
MW-1
MW-6
MW-5
MW-4
MW-2
MW-3
MW-7
MW-1
5000
500
50
5
FIRST AVENUE
DIRECTION OF GROUNDWATER FLOW
APPROXIMATE LIMITS OF TRENCH EXCAVATION
SOUTH Q STREET
SOUTH P STREET
0 75'
SCALE: 1" = 75'
GCL
FIGURE 1 - PHASE I
DISSOLVED BENZENE AND
CONCENTRATION CONCEPTUAL
RECLAMATION SYSTEM LAYOUT
CLIENT: ULTRAMAR
AUTHOR: JEF
DATE: 5/5/95
DRAWN BY: MP
REV. NO.: 2
CHECKED BY: CS
FILE: ULTRA2.DWG


PROPOSED TREATMENT AREA
LEGEND
MW-4 MONITORING WELL LOCATION AND NUMBER
MW-1 MONITORING WELL LOCATION AND NUMBER (INSTALLED BY OTHERS)
500 BENZENE CONCENTRATION CONTOUR LINE
RECOVERY WELL LOCATION
VACUUM WELL NEST LOCATION
INJECTION WELL LOCATION
LIVERMORE ARCADE SHOPPING CENTER
MW-23
TYPICAL VACUUM RADIUS OF INFLUENCE
MW-1
5000
500
50
5
APPROXIMATE LIMITS OF TRENCH EXCAVATION
MW-5
MW-6
FIRST AVENUE
MW-4
MW-2
MW-3
MW-7
MW-1
SOUTH Q STREET
SOUTH P STREET
N
0 75'
SCALE: 1" = 75'
GCL
FIGURE 2 - PHASE II
INFERRED DISTRIBUTION OF
DISSOLVED BENZENE IN GROUND WATER
JULY/AUGUST 1994
CLIENT: ULTRAMAR
AUTHOR: JEF
DATE: 4/14/95
DRAWN BY: MP
REV. NO.: 1
CHECKED BY: CS
FILE: ULTRA1.DWG