CHEMICAL PROCESSORS, INC.
Northern California Division

CHEMPRO SM
A Burlington Environmental Inc. Company

June 4, 1990
Project No. 1203

Rodger C. Witham
Applied GeoSystems
42501 Albrae Street, Suite 100
Fremont, California 94538

Re: WORKPLAN FOR SOIL REMEDIATION
Exxon Service Station No. 7-3399
2991 Hopyard Road
Pleasanton, California

Dear Mr. Witham:

Chemical Processors, Inc. (Chempro) is pleased to submit this workplan for soil remediation at Exxon Service Station No. 7-3399, located at 2991 Hopyard Road, Pleasanton, California.

Applied GeoSystems (AGS) has requested that Chempro design and install a soil treatment system based on design parameters supplied by AGS. The proposed treatment system is designed to remove volatile hydrocarbons from the soils underlying the site. The scope of work includes connecting six existing extraction wells to a soil vapor extraction system and installing a catalytic oxidation (CatOx) unit to treat the extracted soil vapors. In addition, piping for groundwater extraction will be installed to two of the extraction wells to accommodate an expansion of the existing groundwater extraction system.

1.0 SITE DESCRIPTION

The project site, located at the intersection of Hopyard Road and Valley Avenue, is presently occupied by an operating Exxon service station. The site location is shown on Figure 1.

The service station dispenses gasoline and provides automotive repair services. The service station has three underground fuel storage tanks (UFTs) located at the north end of the site, and a waste oil tank at the south end of the site (see Figure 2).

Soils underlying the site have been characterized as clayey silts and silty clays with fine to coarse sand stringers, underlain by sands and gravels approximately 37 feet below ground level (BGL). Groundwater occurs at approximately 50 feet BGL.

950 Gilman Street, Suite B
Berkeley, California 94710
(415) 524-9372

Subsurface investigations conducted at this site have reported petroleum hydrocarbons in the soils and groundwater underlying the site. Based on the available information, AGS installed a groundwater and soil remediation system at the site. This system was originally designed to extract groundwater from MW-7 and soil vapors from VR-1 (see Figure 2). The extracted groundwater passed through a phase separator before being discharged to the sewer system. The extracted soil vapors were passed through two vapor phase carbon units in series. The groundwater extraction and treatment system is still in operation, while the soil vapor extraction and treatment system has been determined by AGS to be insufficient and has been shut down until modifications can be made.

2.0 PROPOSED REMEDIAL ACTION

Based on the available data, AGS has determined that the existing soil treatment system should be modified to better handle the soil contamination encountered at this site. The proposed soil remediation system is described below.

2.1 Soil Vapor Extraction System Design and Installation

The proposed soil vapor extraction (SVE) system will consist of six existing extraction wells connected to a vacuum blower. Vapor recovery wells VR-1, VR-2, VR-3, and VR-4 are to be used exclusively for vapor extraction, while monitor wells MW-1 and MW-9 are to be used as dual groundwater/soil vapor extraction wells (see Figures 2 and 3).

The extraction wells will be connected, via underground piping, to a 5-horsepower, positive displacement vacuum blower located in the treatment system compound. The vacuum blower is capable of extracting 100 cubic feet per minute of soil vapor at 12 inches of mercury vacuum.

Each extraction well will have a vacuum gauge, sample tap, and ball valve at the well box. This will allow the vacuum levels exerted on the individual wells to be varied as desired.

The extraction piping from each vapor recovery well will be manifolded into a common pipe that will then convey the extracted soil vapors to the treatment system compound. In addition, groundwater extraction piping will be installed connecting wells MW-1 and MW-9 to the treatment system compound, to facilitate the expansion of the groundwater treatment system. The below grade sections of the groundwater extraction piping will be double contained.

2.2 Soil Vapor Treatment System Design and Installation

Vapor treatment will be provided by a 100 standard cubic feet per minute (scfm) CatOx unit. Catalytic oxidation is a process by which hydrocarbon vapors are oxidized to carbon dioxide and water by passing the hydrocarbon vapors over a platinum catalyst at 500 °F to 900 °F. The platinum metal catalyst lowers the activation energy required for reaction, thereby allowing the hydrocarbon oxidation reaction to occur at a lower temperature than is normally required (approximately 1400 °F to 2000 °F). The lower reaction temperature eliminates the formation of

nitrogen oxides and reduces the heat input required. An exhaust air-to-inlet air heat exchanger will be used to further reduce the energy required for operation.

The maximum recommended catalyst bed temperature is approximately 900 °F. If the catalytic oxidizer operates above this temperature for a sustained period of time the catalyst material will overheat and become damaged. The minimum recommended catalyst bed temperature for adequate oxidation is 600 °F. For this reason, the CatOx unit will always be operated in the 600 °F to 900 °F range. A control system linked to thermocouples and an air dilution valve is provided to ensure that the catalyst bed operates only in the desired temperature range. If the catalyst bed temperature is not within the desired operating range, the control system will shut the SVE/CatOx system down. The catalyst bed temperature will be recorded by a strip chart recorder to provide continuous monitoring of the operating temperature.

2.3 Permitting

Chempro will obtain all permits required to install and operate the soil treatment system including:

- Planning, building, electrical, and plumbing permits from the City of Pleasanton
- An Authority to Construct/Permit to Operate a soil treatment system from the Bay Area Air Quality Management District (BAAQMD)
- A Transportable Treatment Unit (TTU) Permit by Rule Notification from the California Department of Health Services (DHS)

All permit applications will be completed by Chempro in the name of Exxon USA, Inc., and presented to Exxon via AGS for review and signature.

2.4 Remediation System Operation

The soil remediation system maintenance will include air dilution valve and vacuum level adjustments if required, and air filter element replacement. A chart recorder will continuously record the catalyst bed temperature to ensure that the CatOx is operating in the desired temperature range.

At system start up, bag samples of the system influent and effluent will be obtained and analyze for TPH and BTEX to document proper operation of the system.

The proposed soil vapor extraction and treatment system will include automatic controls to shut the entire system down in case of a process upset. A remote telephone dialer calls Chempro operations at Berkeley if a system shutdown occurs.

2.5 Construction Details

The vapor treatment system will be placed on a 10 x 15-foot concrete pad. This concrete pad will be located 10-feet away from the existing concrete pad that the groundwater treatment system is located on to comply with National Fire Codes. Both equipment pads will be enclosed by a 6-foot-high stucco wall with locking gate. This will make the treatment equipment inconspicuous and will prevent unauthorized entry to the treatment system compound.

All piping and conduit will be set below grade, except for the piping within the treatment system compound. All trenching will use 100% import fill sand and Class 2 base rock. Excavated soils from trenching will be stockpiled onsite for analysis and disposal by AGS. All work will be performed in accordance with state and local building code regulations.

3.0 SCHEDULE

The duration of this project is estimated as follows:

- Acceptance of Workplan: Week 0
- Order Equipment, Prepare Construction Plans, Prepare Permit Applications: Week 1
- Submit BAAQMD Permit Application to AGS: Week 2
- Obtain Approval of Workplan and Construction Plans from Exxon: Week 3
- Obtain Building Permits and Begin Site Construction: Week 4
- Complete Site Construction: Week 6
- Obtain BAAQMD Authority to Construct: Week 15
- Prepare TTU Notification: Week 16
- Test System/Obtain Permit to Operate: Week 16

This schedule assumes that all required permits can be obtained in a timely manner. Any delays imposed by the regulatory agencies will affect the start-up date.

If you have any questions regarding this workplan, please do not hesitate to call.

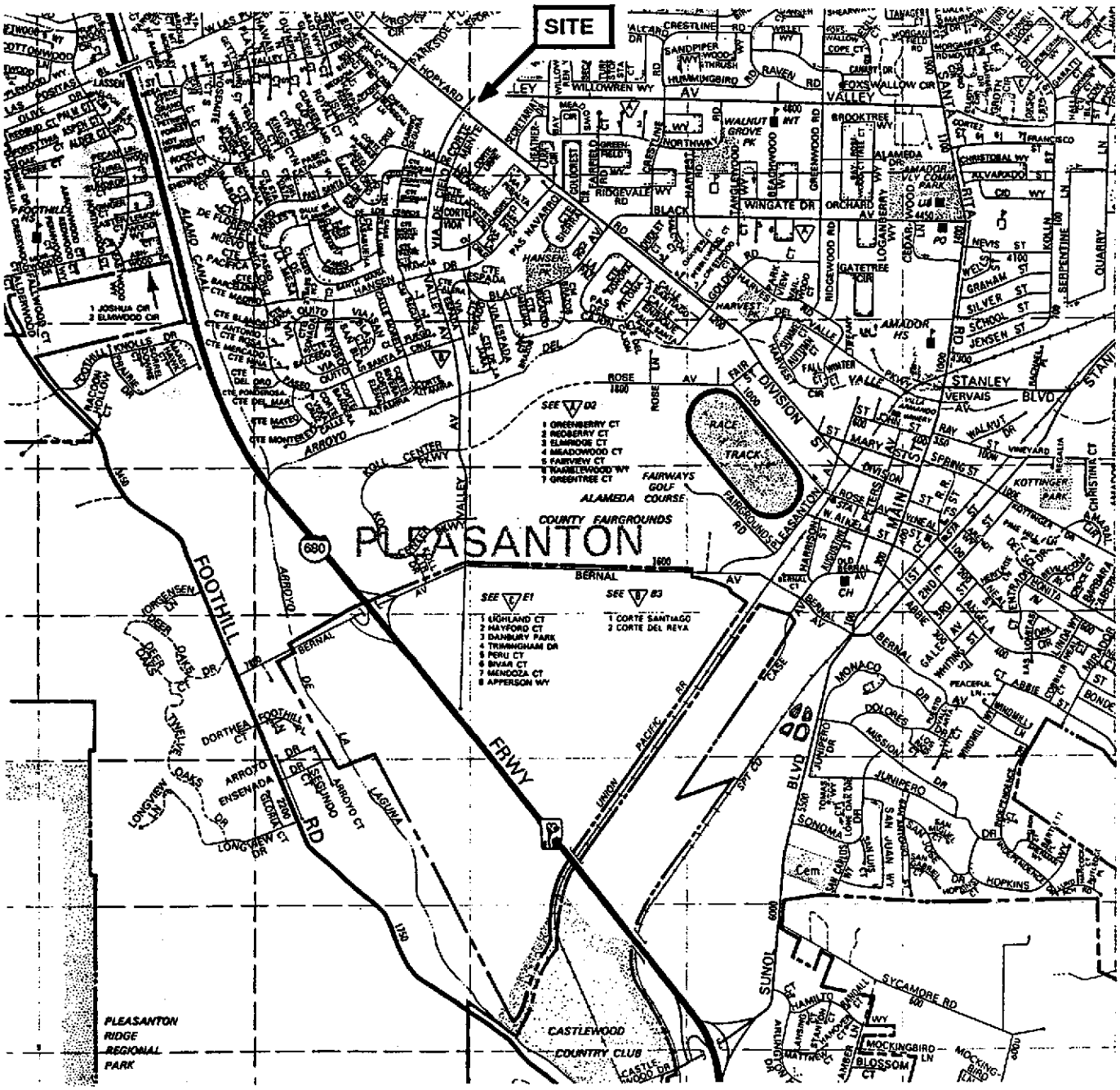
Very truly yours,
CHEMICAL PROCESSORS, INC.

Justin L. Hawkins
Staff Engineer

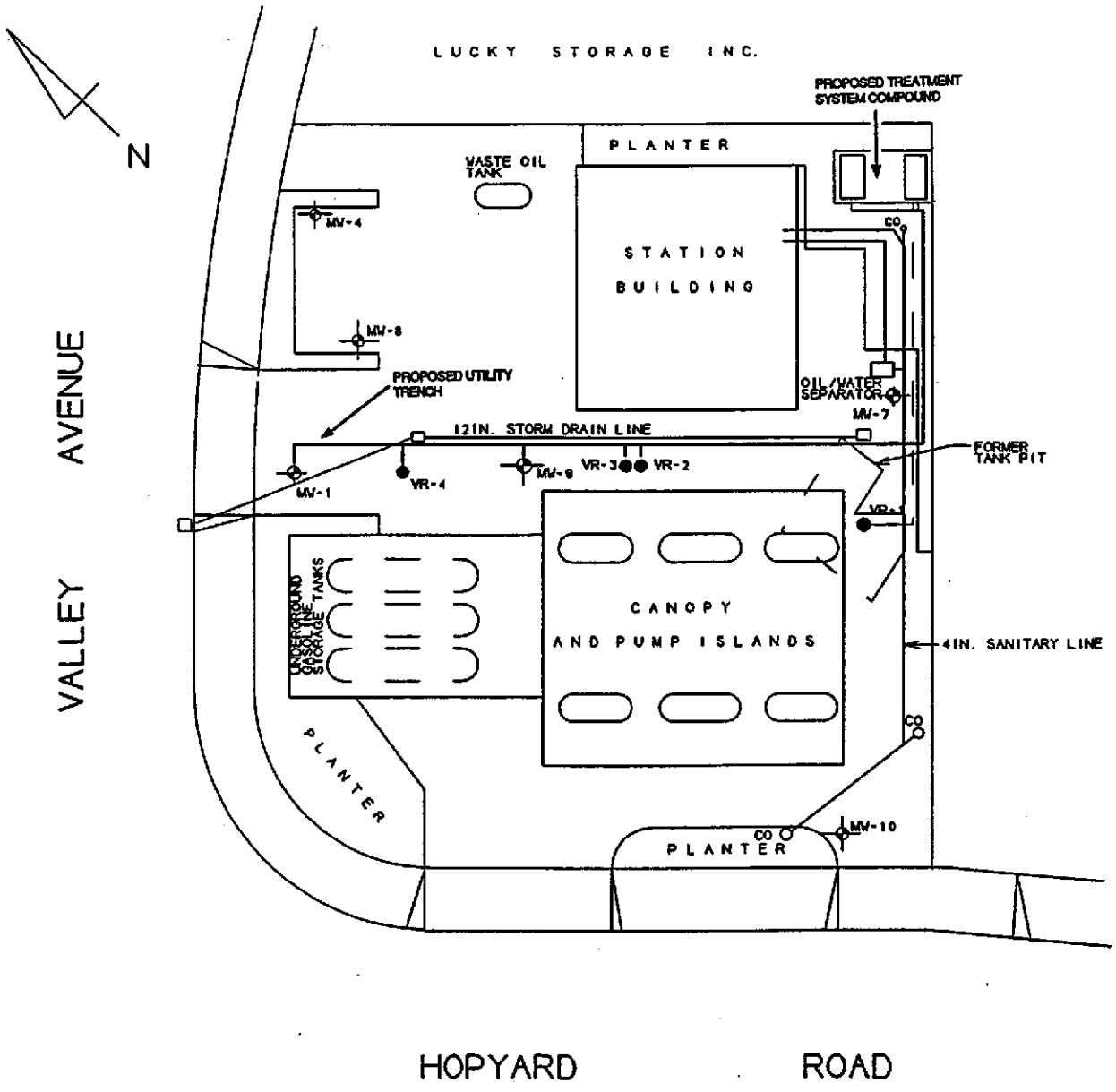
David C. Tight
Site Remediation Manager
R.G. No. 4603

Enclosures

Figure 1 - Site Location
Figure 2 - Site Plan
Figure 3 - Extraction Well Detail



CHEMPRO CHEMICAL PROCESSORS, INC. Job: 1203 Dwg By: JRP Date: 6/4/90	SITE LOCATION MAP EXXON SS NO. 7-3399 PLEASANTON, CALIFORNIA	FIGURE 1



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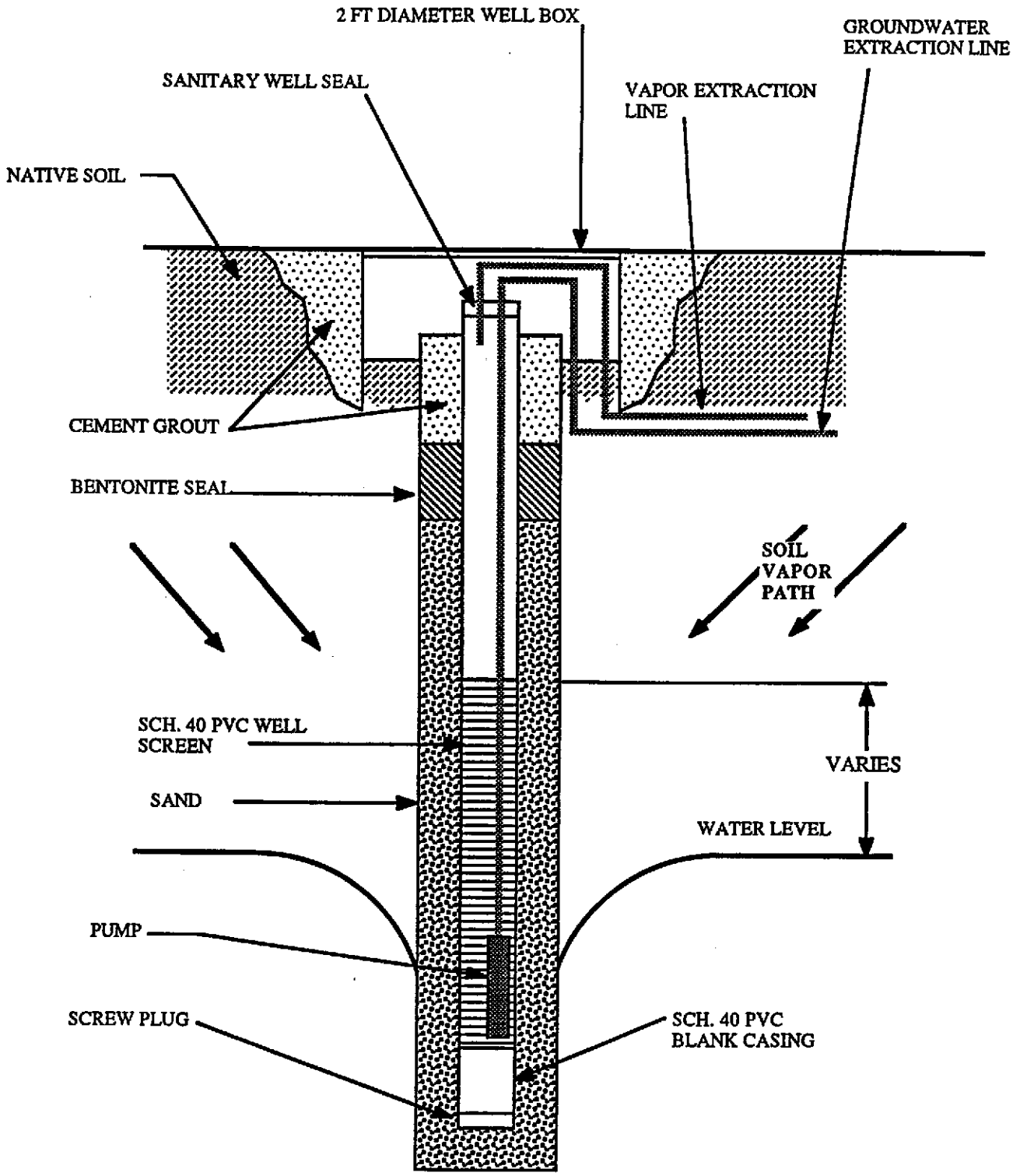
SITE DIAGRAM
EXXON SS NO. 7-3399
PLEASANTON, CALIFORNIA

FIGURE
2



NOTE: DRAWING NOT TO SCALE

CHEMPRO CHEMICAL PROCESSORS, INC. Job No.:1203 Dwg by:JRP Date: 6/4/90	EXTRACTION WELL SCHEMATIC EXXON SS NO. 7-3399 PLEASANTON, CALIFORNIA	FIGURE 3