SAB INTERNATIONAL TECHNOLOGY ENTERPRISES, INC.
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December 26, 1990

Larry Seto
Senior Hazardous Materials Specialist
Alameda County Department of Health Services
80 Swan Way, Room 200
Oakland, Ca. 94621

Dear Mr. Seto:

Please find attached the Remedial Action and Safety Health and Emergency Response Plans for remedial activities at CUROCO STEEL SYSTEMS, 536 CLEVELAND AVENUE, ALBANY, CA. 94710. It would be greatly appreciated if you could direct your immediate attention to the approval of these plans.

Thank you for your time. Please don't hesitate to call if you have questions regarding site activities.

Very truly yours,

Shawn Sabharwal
Vice President

Reviewed and Approved by :

Khalique A. Khan, PHD, P.E.
Ensotech Inc.
Director of Operations and Remediation Services

SITE INC.

REMEDIAL ACTION PLAN
FOR SOIL REMEDIATION

AT

CUROCO STEEL SYSTEMS
536 CLEVELAND AVENUE
ALBANY, CA. 94710

SUBMITTED TO:

ALEMEDA COUNTY DEPARTMENT OF HEALTH SERVICES
ATTENTION : LARRY SETO

PREPARED

BY

SITE INC.
1240 BAYSHORE HWY., #305
BURLINGAME, CALIFORNIA 94010
(415) 348-5505

SUBCONTRACTOR: ENSOTECH INC.

December 26, 1990

SHAWN SABHARWAL
Preparer's Name

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INTRODUCTION

It is estimated that approximately 380 cubic yards of metal (Chromium, Lead, and Zinc) contaminated soil require treatment at the CUROCO STEEL SYSTEMS site. The metals contaminated soil will be remediated on-site using Ensotech's ENSOL/LANDTREAT process. All soils will be remediated using the MOBILE ENVIRONMENTAL TREATMENT SYSTEM (METS). (Diagram APPENDIX A).

BACKGROUND

For many years CUROCO STEEL SYSTEMS had discharged paint chips and overspray in their rear yard and along the tracks of Southern Pacific railroad. This paint debris is mainly composed of chromium, lead, and zinc. A token clean-up of contaminated soils took place in 1985. New management was informed in January 1989 of these past activities. Bay Area Environmental investigated the CUROCO site in 1989, verifying that contamination exists in the rear of the CUROCO plant. ENVIRON CORP. has further classified this area, defining hazardous and non-hazardous areas for treatment and disposal (see APPENDIX B).

SUMMARY OF WORK DESCRIPTION

SITE Inc. shall prepare all Health and Safety Plans and any other such plans necessary to meet regulatory compliance. All work will be performed in strict compliance with the approved site Health and Safety Plan.

1. Remove separately the soil within the hazardous and non-hazardous areas (displayed in APPENDIX B); place in the storage zone. These excavation areas have been defined by ENVIRON CORP. and will be sampled during excavation by ENVIRON CORP. to verify levels of contaminants and boundaries of excavation.

2. Load and transport metals contaminated soils exceeding TTLC criteria to a Class I landfill facility.

3. Treat material from non-hazardous area. Perform sampling and analysis and obtain Class III landfill or on-site disposal approval. Transport and dispose of material as necessary.

4. Dewater during excavation activities and store on-site in Baker storage tanks. Treat water if necessary and dispose in an appropriate manner.

5. Restore site. Material for backfill shall be placed in lifts or horizontal layers not exceeding eight (8) inches in uncompacted thickness, and each lift shall be compacted to a density of not less than ninety (90) percent of maximum dry density as determined by the procedure set forth in ASTM Designation D1 557.

PROCESS DESCRIPTION

A brief description of treatment is as follows:

The remediation process will meet regulatory compliance regarding this operation.

ENSOL/LANDTREAT Chemical Fixation Process for Metals Contaminated Soils

ENSOL is a proprietary product of Ensotech. It reacts with heavy metals to form insoluble metal silicates via two mechanisms. ENSOL contains both sodium silicate and a proprietary chelating agent. Sodium silicate reacts with soluble metals under alkaline conditions to produce metal hydroxide - silicate complexes. These complexes then react with the chelating agent. The reaction is rapid and, essentially, irreversible due to the low solubility and high stability of the metal hydroxide silicate complex.

The chelating agent is an organic polymer containing heteroatoms with free electron pairs. Each molecule contains several "active sites" along its polymeric backbone and each active site has two pairs of free electrons for metal bonding. Two active sites on the same or adjacent polymer molecule will react with each metal ion, forming a total of four coordinate covalent bonds with the metal ion. These bonds are very stable and will not dissociate even under acidic conditions, such as that used in the CAM WET test.

The last step of the fixation involves further solidifying the

chelated metal hydroxide silicate complexes and producing a non leachable final product through the addition of Ensotech's patented product, LANDTREAT. LANDTREAT is an insoluble polysilicate with large adsorptive capability and active surface area. It retains the excessive chelating agent on its surface to act as a preventive mechanism against any future soluble metals occurrence in the soil. The reaction sequence in the fixation of metals is as follows:

1. $MeX_2 + Na_2SiO_2 + \text{Chelating agent (Ensol)} + H_2O$
   Alkaline Cond.
   ----------> $[Me(OH)_2.SiO_2.\text{Chelating agent}] + 2NaX$
   Fast & Irreversible
2. $3MeO.Ie_2O_3 + 6H_2O$ ----------> $3MeO.Ie_2O_3.6H_2O$

3. $[Me(OH)_2.SiO_2.\text{Chelating agent}] + \text{Landtreat} + H_2O$
   ----------> $[wMeO \cdot xIe_2O_3 \cdot yH_2O \cdot zSiO_2 \cdot$ Chelated metal hydroxide silicates]

Where Me: divalent metals
X: monovalent anions
Ie: ion exchanger

The final product of the fixation process is a chemically inert, multi-bound metal silicate complex which has excellent long-term stability and will pass the California WET Test. Over 99% reduction of the solubility has been observed.

TREATMENT OPERATIONS

Before the treatment of the contaminated soil begins, the site will be prepared for treatment operations. A Site Health and Safety Plan will be prepared and all personnel will be made aware of the contents of the plan and its provisions.

Areas of hot zone, contamination reduction zone and support zone will be identified and marked. Emergency exists (escape routes), storage areas and decontamination areas will be provided. The METS unit will be used to enable the treatment to take place in an enclosed environment.

The overall activities are planned and scheduled by the Project Manager. The Field Supervisor reports directly to the Project Manager. All personnel on-site and their activities are managed, directed and coordinated by the Field Supervisor.

The contaminated soil is loaded into the main hopper of the METS unit with a front end loader. The soil is moved on a conveyor belt through an adjustable exit door to measure volume. The soil then enters the reaction chamber, where it is mixed with LANDTREAT by a power driven auger and is sprayed by ENSOL. After a controlled retention time, the treated soil is ejected from the other end and is stockpiled using another front end loader.

Personnel

The overall operation planning and coordination with the regulatory agencies and clients is the responsibility of the Project Manager.

The work party will consist of following personnel:

TITLE	FUNCTION
Project Manager Geologic Consultant	Organize job, coordinate between agencies, client, interest parties, and laboratory.
Field Supervisor Quality Controller	Arrange personnel and equipment, organize job, supervise work. Quality Control; perform sampling.
Site Safety Officer	Monitor and enforce safety on-site, stop work if hazardous condition exists.
METS operator	Start-up, operate and shut down of the METS unit.
Equipment Operators	Loading untreated soil to the METS unit and stockpiling treated material.
Worker Worker Worker	Prepare ENSOL, LANDTREAT replenishment; Decontaminate equipment and personnel; back up and replacement for each other.

The work party will be given preparatory instructions and training off site and will be briefed on the contents of this plan at the site

prior to commencing operations. All on-site personnel are required to have the necessary 40 hour OSHA training as required by law.

During work, all personnel are given frequent breaks (5 minutes after each 1 hour of work) to avoid heat stress. One person assigned to a certain type of work can be substituted by another person with similar training and experience.

Site Preparation

The initial preparation of the site is the responsibility of the Project Manager assisted by the Field Supervisor, who will schedule, order and follow-up the following activities:

1) Insuring the property is properly fenced and the fencing is covering with black plastic sheeting, establishing gates, entrance, safety escape and assure water supply connection.

2) Erecting the berms according to the Site Health and Safety Plan.

3) Mobilization of the equipment and tools, including front loaders, trackhoe, fork lifts, safety supplies, storage trailers, etc.

4) Positioning the METS unit, the chemicals and other supplies according to the operation plan layout.

METS Operating Variables

Optimum treatment of contaminated soil can be achieved by varying the following operation parameters of the METS unit:

a) The soil feed rate can be controlled by changing the speed of the conveyor belt via the conveyor belt hydraulic valve, and the size of the hopper exit door.

b) The LANDTREAT feed rate can be controlled by changing the speed of the feeder via its electrically driven motor.

c) The spray rate of the ENSOL can be controlled by changing the flow rate of the centrifugal pump via its manually operated valve.

d) The retention time inside the mixing and reaction chamber can be controlled by changing the speed of the auger via its respective hydraulic valve.

In addition to the hydraulic control valves, an on-off valve is also provided for each motor for emergency shut off. All valves are clearly tagged.

SAMPLING PROCEDURES

The untreated, unexcavated soil samples will be collected and sampled by ENVIRON CORP.

The treated and untreated stockpiled soil samples will be collected using a method of combining four point samples to make one composite sample for each fifty yards stockpiled. All samples acquired by SITE Inc. will be placed in glass jars with plastic screw tops, labeled, and transported to a State Certified Analytical Laboratory for analysis.

All samples are labeled with permanent markers on plastic coated labels.

Label information is as follows:

company name and address
field identification number
lab identification number
date
time
sampled location
collectors signature

Chain of Custody

Chain of custody forms are filled out for the samples collected given to a State Certified Laboratory. The forms include the following information:

contact person and phone number
client name and address
site name and address
lab number
field number
date sampled
time sampled
type of sample
priority ranking
sample description and location
number of containers
analyses required
field observations

Sample Analysis

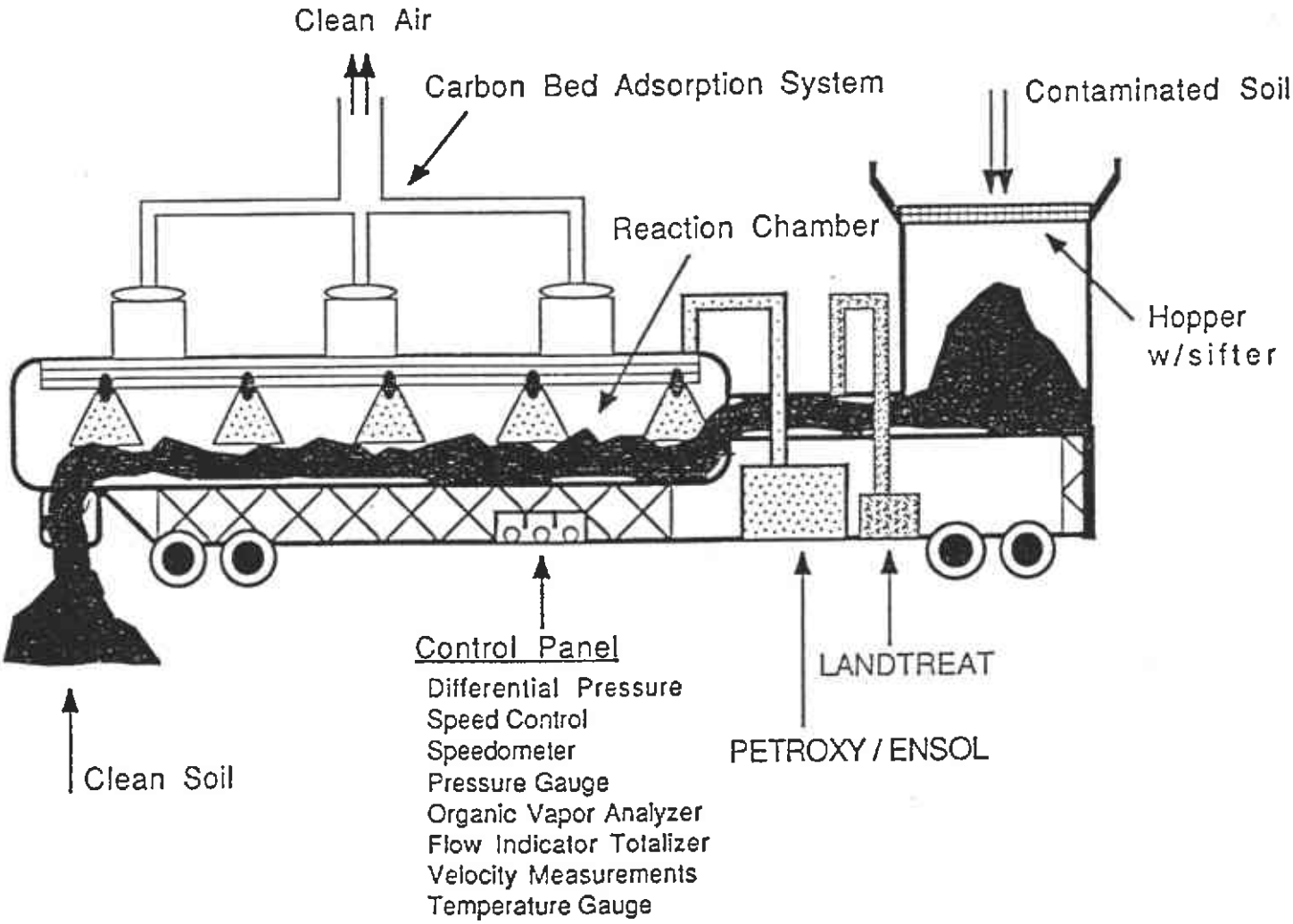
The treated samples will be analyzed for Chromium, Lead, and Zinc by California WET or TCLP analysis. The soils will be considered remediated when the action levels, as established by landfill acceptability, the county, or water board have been achieved.

SITE CLOSURE

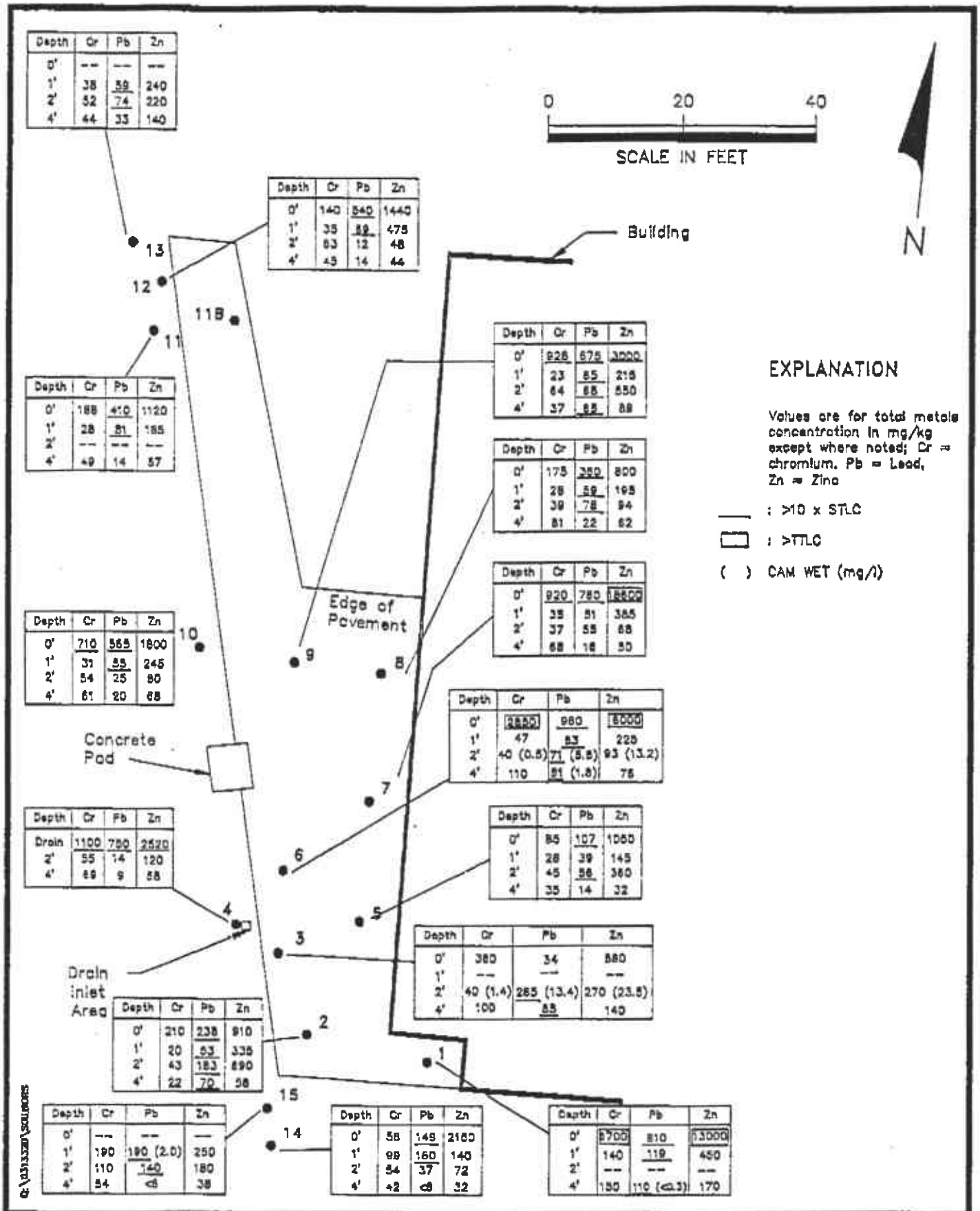
Equipment will be decontaminated. All materials and supplies on site resulting from remedial activities will be removed.

APPENDIX
A

Mobile Environmental Treatment System (METS)



APPENDIX
B



Depth	Cr	Pb	Zn
0'	--	--	--
1'	38	59	240
2'	52	74	220
4'	44	33	140

Depth	Cr	Pb	Zn
0'	140	540	1440
1'	35	89	475
2'	83	12	48
4'	45	14	44

Depth	Cr	Pb	Zn
0'	188	410	1120
1'	28	81	185
2'	--	--	--
4'	49	14	57

Depth	Cr	Pb	Zn
0'	926	675	3000
1'	23	85	215
2'	64	68	550
4'	37	85	88

Depth	Cr	Pb	Zn
0'	175	350	800
1'	28	59	195
2'	39	78	94
4'	81	22	82

Depth	Cr	Pb	Zn
0'	920	780	18600
1'	35	51	385
2'	37	55	68
4'	68	16	50

Depth	Cr	Pb	Zn
0'	710	565	1800
1'	31	55	245
2'	54	25	80
4'	61	20	68

Depth	Cr	Pb	Zn
0'	2850	980	6000
1'	47	83	225
2'	40 (0.6)	71 (5.5)	93 (13.2)
4'	110	91 (1.8)	75

Depth	Cr	Pb	Zn
Drain	1100	790	2520
2'	55	14	120
4'	89	9	58

Depth	Cr	Pb	Zn
0'	85	107	1060
1'	28	39	145
2'	45	58	360
4'	35	14	32

Depth	Cr	Pb	Zn
0'	380	34	880
1'	--	--	--
2'	40 (1.4)	285 (13.4)	270 (23.8)
4'	100	85	140

Depth	Cr	Pb	Zn
0'	210	238	910
1'	20	63	335
2'	43	183	890
4'	22	70	58

Depth	Cr	Pb	Zn
0'	--	--	--
1'	190	190 (2.0)	250
2'	110	140	180
4'	54	<8	38

Depth	Cr	Pb	Zn
0'	58	148	2160
1'	98	160	140
2'	54	37	72
4'	42	<8	32

Depth	Cr	Pb	Zn
0'	8700	810	13000
1'	140	119	450
2'	--	--	--
4'	150	110 (<0.3)	170

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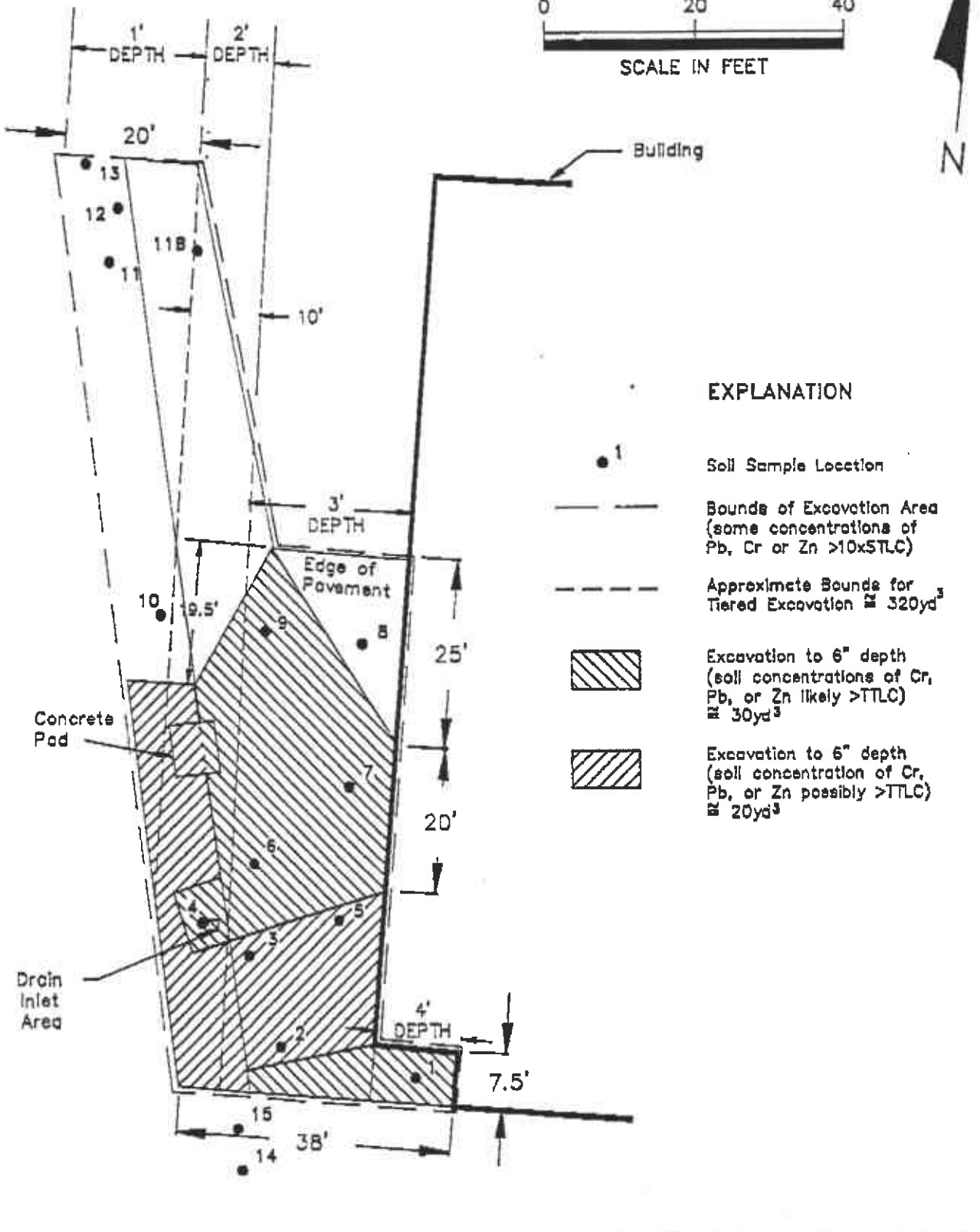
ENVIRON Counsel in Health and Environmental Science	Soil Boring Locations and Concentrations of Cr, Pb and Zn with Depth Curoco Steel Systems Albany, California	Figure 1
Drafter: EH	Date: 12/90 Contract Number: 03-1332D Approved: TG Revised:	



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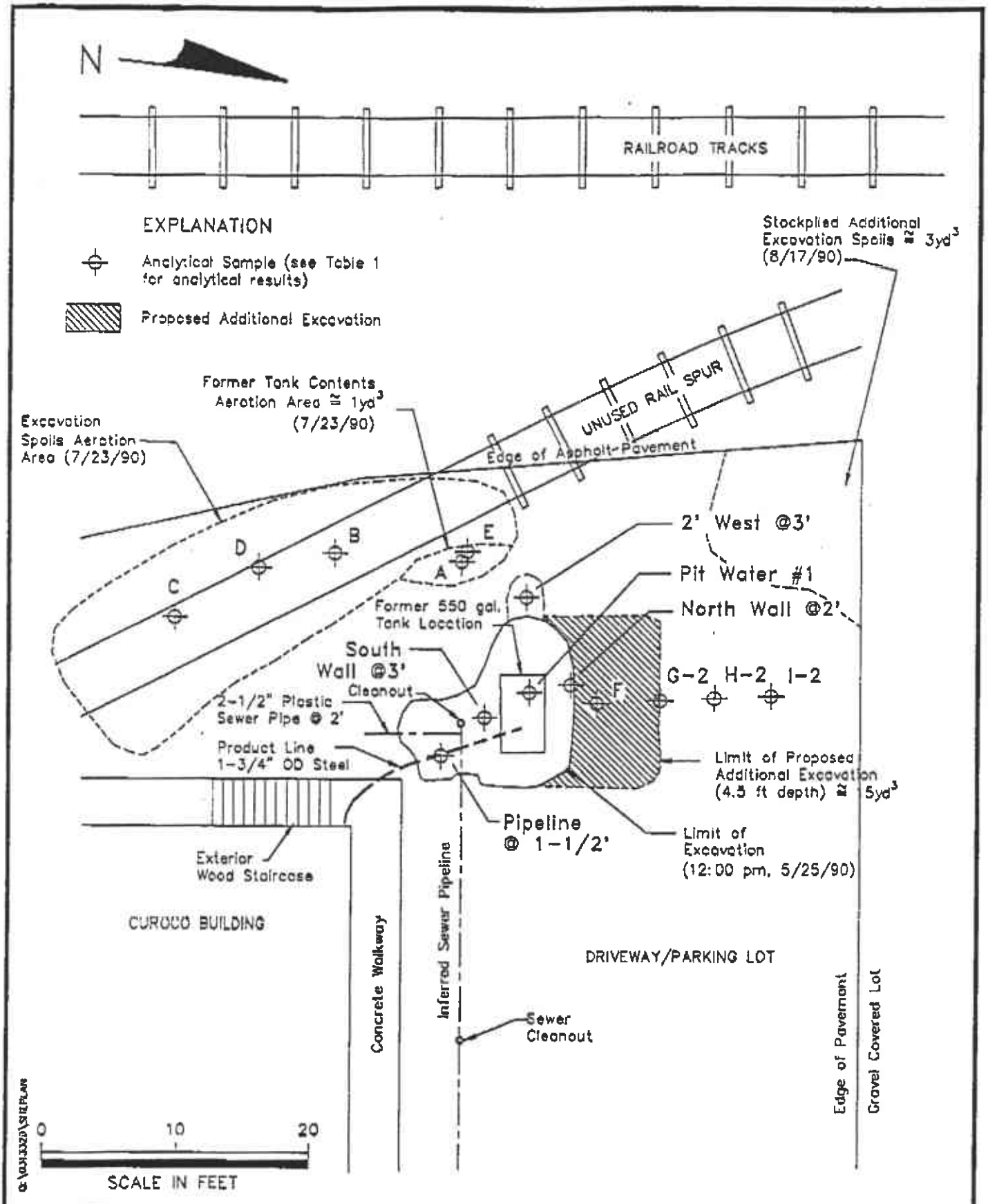
Soil Boring Locations and Excavation Areas
Curoco Steel Systems
Albany, California

Figure 2

Drafter: EH | Date: 12/90 | Contract Number: 03-13320 | Approved: | Revised:



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Sample Locations and Proposed Additional Excavation
Underground Storage Tank Removal
Curoco Steel Systems
Albany, California

Figure 3

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