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Site Name Sinclair Refinery
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Foilable (Yes) No
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Contaminated Surface Soil Delineation Report

for

Sinclair Refinery Site
Wellsville, New York

Prepared for

ARCO

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Prepared by

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February 1992

SINCLAIR REFINERY SITE
CONTAMINATED SURFACE SOIL DELINEATION REPORT

EXECUTIVE SUMMARY

The Record of Decision (ROD) for Operable Unit 2 of the Sinclair Refinery site selected a final remedy for the contaminated surface soils. The remedy specifies excavation of surface soils in excess of 25 ppm arsenic and 1,000 ppm lead and disposal in the Central Elevated Landfill Area (CELA). The Resource Conservation and Recovery Act (RCRA) Land Disposal Restrictions (LDRs) specify that wastes which are determined to be characteristic based on the Toxicity Characteristic Leaching Procedure (TCLP) analyses must be treated to levels such that they are no longer characteristic prior to land disposal. In order to determine the remediation requirements, the contaminated surface soil delineation program was implemented.

The objectives of the program were to better define the areal extent of contaminated surface soil above the arsenic and lead cleanup goals of 25 ppm and 1,000 ppm, respectively, and to determine what portion, if any, of the contaminated surface soil exceed the TCLP regulatory levels for arsenic (5.0 mg/l) and lead (5.0 mg/l) in leachate, thus requiring treatment prior to land disposal.

This report summarizes the contaminated surface soil delineation program including sampling rationale, method of collection and analytical results.

The data collected as part of the program assist in better defining the areal extent of contamination and will provide a better estimate of the volume of soil requiring removal. The soil is not characteristic based on the TCLP results for both composite and discrete samples, and thus does not require any treatment prior to disposal within the CELA. This eliminates the need for implementing the Treatability Study Work Plan and eliminates the need for incorporating any treatment requirements into the CELA and Refinery Surface Soil Remediation.

I. INTRODUCTION

Ebasco Services Incorporated (Ebasco) conducted the contaminated surface soil delineation program during the week of December 2, 1991. The Record of Decision (ROD) for Operable Unit 2 of the Sinclair Refinery Site selected a final remedy for the contaminated surface soils ("defined as soils at a depth from the surface to one foot") in the refinery and swale areas. The remedy specifies "excavation of surface soils in excess of 25 ppm arsenic and 1,000 ppm lead to a depth of one (1) foot to ensure that cleanup goals are met". The excavated surface soils are to be incorporated into the Central Elevated Landfill Area (CELA) as part of the CELA closure. The Resource Conservation and Recovery Act (RCRA) Land Disposal Restrictions (LDRs) specify that wastes that are characteristic may be land disposed only after they have been treated to levels such that they are no longer characteristic. Accordingly, the surface soils must comply with the Toxicity Characteristic Leaching Procedure (TCLP) regulatory levels for arsenic (5.0 mg/l) and lead (5.0 mg/l) in the leachate of the samples.

Therefore, the contaminated surface soil delineation program was designed to meet two key objectives:

1. Provide a better definition of the areal extent of contaminated surface soil above cleanup goal levels, thereby providing a better estimate of the volume of contaminated surface soil to be removed.

2. Determine what portion, if any, of the contaminated surface soils exceed the TCLP regulatory levels for arsenic (5.0 mg/l) and lead (5.0 mg/l) in leachate from these sample thus requiring treatment prior to land disposal.

In order to meet these objectives, ARCO and Ebasco reviewed the existing data base and developed the sampling program to delineate the areas of contamination identified in the ROD as potentially exceeding the cleanup criteria. The areas of contamination, the identifiers and the figures (revised versions of those presented in the Sampling and Analysis Plan) in which they are presented are as follows:

Area	Identifier	Location	Figure
1	DA	Dike Area	3-5
2	ES	South End of Swale	3-6
3	CC	Near Current Controls	3-7
4	PH	Near Powerhouse	3-8
5	OE	Behind Otis Eastern	3-9

In each of these areas, at least one sample was found to be above the criteria. The lead and arsenic surface soil data used to help identify these contaminated areas were all from the RI/FS Report. Sediment data were also evaluated and used to identify the potential extent of contamination on the dike (Area 1). A sampling grid was developed around each contaminated area to provide the data needed to demonstrate the limits of contamination.

II. FIELD PROGRAM

The field program was conducted in accordance with the Sampling and Analysis Plan (SAP) for the Contaminated Surface Soil Delineation Program. This plan had been approved by the United States Environmental Protection Agency (USEPA) on November 26, 1991 with the stipulation that "a primary purpose of this sampling program is to further define the areal extent of contaminated surface soils from pre-existing data sets; therefore, the new data generated by this sampling program shall augment, and not replace, the data generated during the Remedial Investigation." Oversight of the sampling activities was performed by Mike Hrywnak, United States Army Corps of Engineers (USACOE) - Buffalo, New York, on behalf of the USEPA. All sampling activities were performed in accordance with the Health and Safety Plan (HASP) used for the RI and approved by the USEPA. The entire program also complied with the Quality Assurance Plan (QAP) which was approved by the USEPA as part of the Project Operations Plan (August, 1988) for the RI.

The SAP specified the collection of a minimum of 79 discrete surficial samples at a depth interval of 0-1 foot. A total of 79 samples were collected as described below. All samples were analyzed for target analyte list (TAL) arsenic, and samples from the area near Current Controls were also analyzed for TAL lead.

The dike area included collection of 29 samples in an area covering approximately 1000 x 100 feet (Figure 3-5). Four elevated arsenic concentrations were previously reported. Samples from the river side of the dike were not collected from areas that are covered by riprap.

Seven (7) samples were collected and analyzed for arsenic from Area 2, near the south end of the swale (Figure 3-6). The distribution of sample points was elongated parallel to the swale and railroad, since these are the two likely sources.

Arsenic and lead were both previously detected in Area 3 near Current Controls in a discrete sample, and in a composite sample covering a comparatively large area. Twenty seven (27) samples were therefore collected in this area and analyzed for lead and arsenic (Figure 3-7).

Area 4 near the powerhouse covered an area approximately 80' x 80' and seven (7) samples were taken in this area and analyzed for arsenic. The sampling grid assumed that the likely distribution is parallel to the railroad tracks and hence the grid was elongated in that direction (Figure 3-8).

Area 5 behind Otis Eastern covered an area approximately 100' x 100' and nine (9) samples were collected and analyzed for arsenic (Figure 3-9). Arsenic was previously reported in one sample taken in this area.

In addition to the discrete samples collected from each of the five (5) areas described above, one composite sample from each of the areas was collected and analyzed for TCLP arsenic to determine surface soil handling and treatment requirements. The composite sample collected from Area 3 Current Controls, was also analyzed for TCLP lead. Two (2) samples of the stripped surface soil from the North End Dike Extension were also collected from the stockpile in the CELA and analyzed for TCLP arsenic.

The sampling procedure entailed using a clean pick and shovel to break up the surface soils (consisting largely of coarse gravels and cobbles) and create a one foot deep hole. The samples were then obtained using a decontaminated stainless steel spoon to scrape soil from the side of the pit from the surface to a depth of 1 foot. The soil was then transferred into a decontaminated stainless steel bowl and homogenenized thoroughly, prior to placement into appropriate 8-ounce glass bottle sample containers. The gravel and cobbles were removed from the sample prior to placement in the jars. All samples were analyzed by the laboratory for target analyte list (TAL) arsenic and samples from the area near Current Controls were also analyzed for lead.

For the TCLP samples, approximately equal aliquots of surface soils were placed in a stainless steel bowl at each sample location within the five areas. A stainless steel spoon was used to mix and homogenize the sample prior to placing it into the jar for shipment to the lab for TCLP arsenic and/or lead analysis.

Two (2) modifications were made to the field program presented in the approved SAP. First, the procedure for decontamination of sampling equipment presented in the SAP contained an extra step. Since only metals (arsenic and lead) were sampled, <u>not</u> organic compounds, the acetone rinse step (#5) was not required.

Secondly, a deionized water blank was not required during the surface soil sampling since the blank of the deionized water from the separator sampling in November 1991 was used since it was of the same lot number.

The Field Change Request (FCR) for these two modifications are presented in Appendix A.

The sampling points were surveyed so that the data could be used directly in the development of the engineering design drawings and technical specifications for the CELA and Refinery Surface Soil Remediation.

III. RESULTS

Tables 1 through 6 present the analytical results from the contaminated surface soil delineation program. Those values which exceeded the cleanup levels of 25 ppm (MG/KG) for arsenic and 1,000 ppm for lead are underlined for easy reference. These data are also presented graphically on Figures 3-5, 3-6, 3-7, 3-8 and 3-9.

As the surface soil data will be used to determine treatment and disposal requirements, analytical methods were performed at Level 4. This level is characterized by Contract Laboratory Program (CLP) type analytical laboratory methods with full data validation package deliverables. All analyses were performed by Hittman Ebasco Associates Incorporated, an EPA-CLP/NYSDOH approved laboratory which had previously provided analytical services on the Sinclair Refinery Site Project. The data were validated by Ebasco in accordance with EPA Region II Data Validation SOP HW-2 for metals. All sample collection, analysis and data validation was performed in a manner consistent with the EPA approved Quality Assurance Plan (QAP) for the RI.

Table 1 and Figure 3-5 present the analytical data from Area 1, the Dike Area. None of the samples collected as part of this investigation exhibited arsenic concentrations exceeding the cleanup goal of 25 ppm.

Area 2 samples collected from the south end of the swale surrounding the previously measured value of 45 ppm identified during the RI exhibited arsenic concentrations well below the cleanup goal as presented in Table 2 and Figure 3-6.

Four samples exceeded the arsenic cleanup goal of 25 ppm within Area 3. These samples were located within close proximity to the RI sample where arsenic was previously detected (see Figure 3-7 and Table 3). One (1) Area 3 sample exceeded the lead cleanup goal of 1,000 ppm.

Within Area 4, located near the powerhouse (see Figure 3-8 and Table 4), one sample slightly exceeded the arsenic cleanup goal.

Four samples collected in Area 5 behind Otis Eastern exceeded the arsenic cleanup goal, as presented in Figure 3-9 and Table 5.

The composite samples collected from each of the five areas and the two samples from the CELA stockpile of north end dike surface soils were analyzed for TCLP arsenic and the sample from Current Controls was analyzed for TCLP lead. All of these samples exhibited leachate concentrations well below the regulatory levels classifying a waste as characteristic (see Table 6).

In order to confirm that the surface soils are not characteristic based on TCLP leachate values, the discrete samples exhibiting the highest lead and arsenic concentrations were subjected to TCLP analysis for the respective analyte. Sample SR-OE-6 was analyzed for TCLP arsenic and sample SR-CC-6 was analyzed for TCLP lead with the following result:

SR-OE-6	16.4 ug/l	arsenic
SR-CC-6	1,025 ug/l	lead

Both of these concentrations are below the regulatory levels (5,000 ug/l) classifying a waste as characteristic hazardous waste.

IV. CONCLUSION

The objectives of the contaminated surface soil delineation program were to provide a better definition of the areal extent of contaminated surface soil above the cleanup goals and to determine what portion, if any, of the contaminated surface soils require treatment prior to disposal in the CELA. Sampling grids were established within the areas of concern identified in the RI in order to accomplish these objectives.

Samples collected within the dike area (Area 1), and the south end of the swale (Area 2) did not exceed the cleanup goals. Therefore the remediation effort will concentrate on addressing the historical data points which exceeded the cleanup goals.

A portion of the samples collected from Areas 3, 4 and 5 exceed the cleanup goals, thus augmenting the historical data identifying the areas requiring remediation.

The surface soils are not characteristic based on the TCLP data for both composite and discrete samples, and therefore do not require any treatment prior to disposal in the CELA. This eliminates the need for implementing the Treatability Study Work Plan and eliminates the need for incorporating any treatment requirements into the CELA and Refinery Surface Soil Remediation.

TABLE 1

ARSENIC DATA

SURFACE SOILS IN DIKE AREA

Sample	Arsenic Concentration, MG/KG	
SR-DA-1	4.0	
SR-DA-2	7.85 (avg.)	NJ
SR-DA-3	4.6	NJ*
SR-DA-4	5.8	NJ*
SR-DA-5	7.0	NSJ*
SR-DA-6	4.1	NJ*
SR-DA-7	4.9	NJ*
SR-DA-8	3.4	NJ*
SR-DA-9	6.9	NJ*
SR-DA-10	4.0	NJ*
SR-DA-11	0.98	NWJ*
SR-DA-12	4.7	NJ*
SR-DA-13	8.0	SN*J
SR-DA-14	0.77	NW*
SR-DA-15	7.1	SN*J
SR-DA-16	4.6	SN*J
SR-DA-17	6.7	SN*J
SR-DA-18	4.2	SN*J
SR-DA-19	8.5	SN*J
SR-DA-20	2.8	NW*J
SR-DA-21	6.0	N*J
SR-DA-22	3.9	N*J
SR-DA-23	12.2	N*J
SR-DA-24	8.2	N*J
SR-DA-25	7.7	N*J
SR-DA-26	6.9	N*J
SR-DA-27	4.8	N*J
SR-DA-28	5.7	N*J

Notes:
1. Underlined values indicate exceedance of Arsenic Cleanup Level of 25 ppm (MG/KG)
2. Refer to Figure 3-5 for sample locations.
3. Validation Codes

N: Spike Recovery was not within control limits
J: Value reported is estimated
S: MSA ($r \geq 0.995$)
*: Duplicate result was not within control limits
W: Analytical spike was not within control limits

TABLE 2

ARSENIC DATA

SURFACE SOILS AT SOUTH END OF SWALE

Sample	Arsenic Concentration, MG/KG	
SR-ES-1	2.9	NSJ
SR-ES-2	5.8	NJ
SR-ES-3	7.0	NJ
SR-ES-4	4.6	NJ
SR-ES-5 AVG	4.5	NJ 5.6 3.4
SR-ES-6	6.0	NJ
SR-ES-7	6.1	N+J

Notes:
1. Underlined values indicate exceedance of Arsenic Cleanup Level of 25 ppm (MG/KG)
2. Refer to Figure 3-6 for sample locations.
3. Validation Codes

R: Value is unusable (sample is being reanalyzed)
N: Spike Recovery was not within control limits
J: Value reported is estimated
S: MSA ($r \geq 0.995$)
*: Duplicate result was not within control limits
W: Analytical spike was not within control limits
+: MSA ($r \leq 0.995$)

TABLE 3

ARSENIC AND LEAD DATA

SURFACE SOILS NEAR CURRENT CONTROLS

Sample	Arsenic Concentration, MG/KG		Lead Concentration, MG/KG	
SR-CC-1	10.3		258	
SR-CC-2	12.0		64.8	S
SR-CC-3	23.8	J	241	S
SR-CC-4	15.2		176	
SR-CC-5	15.2		775	S
SR-CC-6	23.8		1,280	
SR-CC-7	17.6		94.4	S
SR-CC-8	23.0		838	S
SR-CC-9	23.4		0.81	W
SR-CC-10	26.4		176	
SR-CC-11	24.9		384	S
SR-CC-12	22.0		198	J
SR-CC-13	11.7	S	30.0	W
SR-CC-14	9.4		135	J
SR-CC-15	20.8		150	
SR-CC-16	26.8		181	S
SR-CC-17	9.0		93.8	J
SR-CC-18	19.2		221	
SR-CC-19	20.5 (avg.) 24.9 16.0		240 (avg.) 257 223	S
SR-CC-20	32.6		184	
SR-CC-21	16.7		166	
SR-CC-22	4.9		80.9	J
SR-CC-23	7.2		267	J
SR-CC-24	11.6	S	4.4	J
SR-CC-25	17.1		410	EJ
SR-CC-26	21.3	S	116	SJ
SR-CC-27	8.9	S	29.8	SJ

Notes:

1. Underlined values indicate exceedance of Arsenic Cleanup Level of 25 ppm (MG/KG) and Lead Cleanup Level of 1,000 ppm (MG/KG)
2. Refer to Figure 3-7 for sample locations.
3. Validation Codes

N: Spike Recovery was not within control limits
J: Value reported is estimated
S: MSA ($r \geq 0.995$)
*: Duplicate result was not within control limits
W: Analytical spike was not within control limits
+: MSA ($r \leq 0.995$)

TABLE 4

ARSENIC DATA

SURFACE SOILS NEAR POWERHOUSE

Sample	Arsenic Concentration, MG/KG	
SR-PH-1	22.7	
SR-PH-2	17.3	
SR-PH-3	15.1 (avg.)	S 9.9 20.2
SR-PH-4	11.6	
SR-PH-5	12.3	S
SR-PH-6	25.9	
SR-PH-7	12.4	S

Notes:
1. Underlined values indicate exceedance of Arsenic Cleanup Level of 25 ppm (MG/KG)
2. Refer to Figure 3-8 for sample locations.
3. Validation Codes

R: Value is unusable (sample is being reanalyzed)
N: Spike Recovery was not within control limits
J: Value reported is estimated
S: MSA ($r \geq 0.995$)
*: Duplicate result was not within control limits
W: Analytical spike was not within control limits
+: MSA ($r \leq 0.995$)

TABLE 5

ARSENIC DATA

SURFACE SOILS BEHIND OTIS EASTERN

Sample	Arsenic Concentration, MG/KG	
SR-OE-1	0.75	W
SR-OE-2	16.7	N+J
SR-OE-3	33.4	J
SR-OE-4	12.1	+J
SR-OE-5	8.3	J
SR-OE-6	100	
SR-OE-7	12.0	SJ
SR-OE-8	52.9	
SR-OE-9	31 (avg.)	J .79 61.1

Notes:
1. Underlined values indicate exceedance of Arsenic Cleanup Level of 25 ppm (MG/KG)
2. Refer to Figure 3-9 for sample locations.
3. Validation Codes

R: Value is unusable (sample is being reanalyzed)
N: Spike Recovery was not within control limits
J: Value reported is estimated
S: MSA ($r \geq 0.995$)
*: Duplicate result was not within control limits
W: Analytical spike was not within control limits
+: MSA ($r \leq 0.995$)

TABLE 6

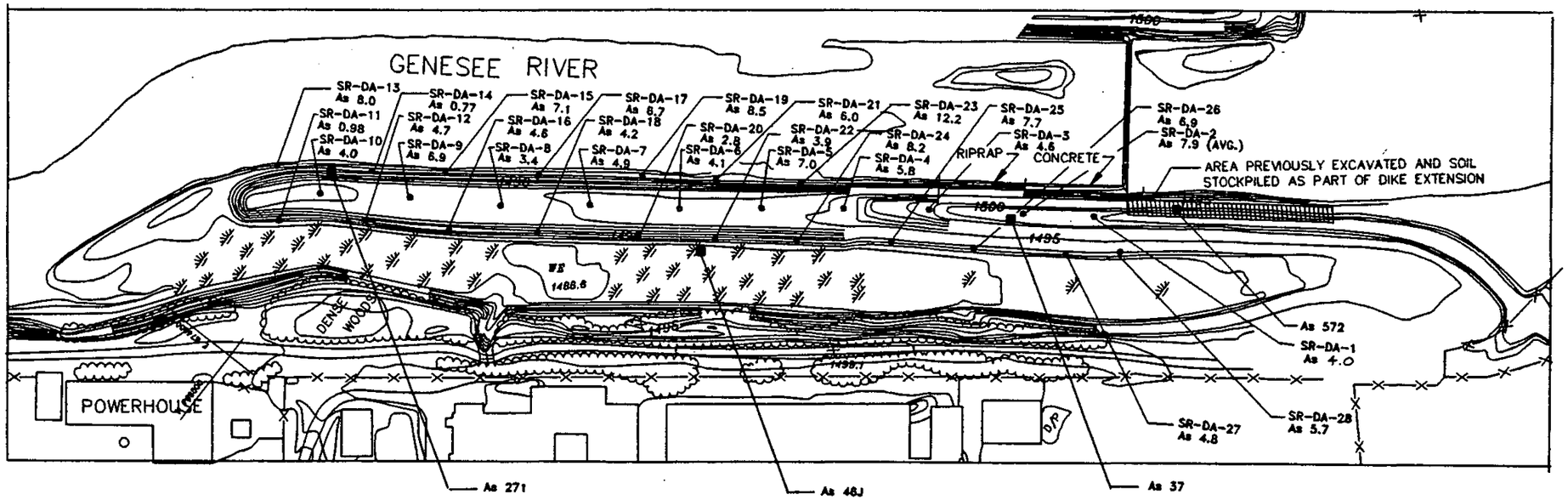
TCLP ARSENIC AND LEAD DATA

SURFACE SOILS

Sample	TCLP Arsenic Concentration, ug/L		TCLP Lead Concentration, ug/L	
SR-DA-CMP	1.18	J	NA	
SR-ES-CMP	4.00	J	NA	
SR-CC-CMP-01	3.3	J	61.8	J
SR-CC-CMP-02	3.3	J	109	J
SR-CC-CMP-03	3.3	J	16.3	J
SR-PH-CMP	3.4	JW	NA	
SR-OE-CMP	3.3	J	NA	
SR-ND-1-CMP	3.3	J	NA	
SR-ND-2-CMP	3.3	JW	NA	
SR-OE-6	16.4		NA	
SR-CC-6	NA		1,025	S

Notes:
1. NA = Not Applicable
2. TCLP Limits are 5,000 ug/L (5.0 mg/L) for both Arsenic and Lead
3. ND-1-CMP and ND-2-CMP refer to samples collected from the CELA stockpile of north end dike surface soils.
4. Validation Codes

   J: Value reported is estimated.
   W: Analytical spike was not within control limits.
   S: MSA ($r \geq 0.995$)



LEGEND

■ PREVIOUSLY MEASURED ARSENIC LOCATIONS (ABOVE 25 ppm)
LOCATION ESTIMATED

● ARSENIC SAMPLING LOCATIONS – APPROXIMATE 100 FOOT CENTERS

As CONCENTRATIONS ARE IN mg/Kg (ppm)

NOTE: REFER TO TABLE 1 FOR SUMMARYOF DATA, INCLUDING DATA VALIDATION QUALIFIERS

0 150 300 450

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C	2/14/92	SO	NG	

EBASCO SERVICES INCORPORATED

DEPT 940 DR DSW
DATE 2/14/92 CH NG
SCALE AS NOTED
APPROVED

SINCLAIR REFINERY SITE
WELLSVILLE, N.Y.

ARSENIC SAMPLING LOCATIONS
DIKE AREA

FIGURE 3-5

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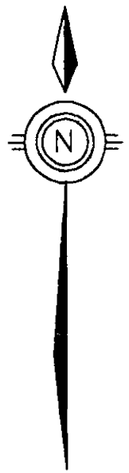

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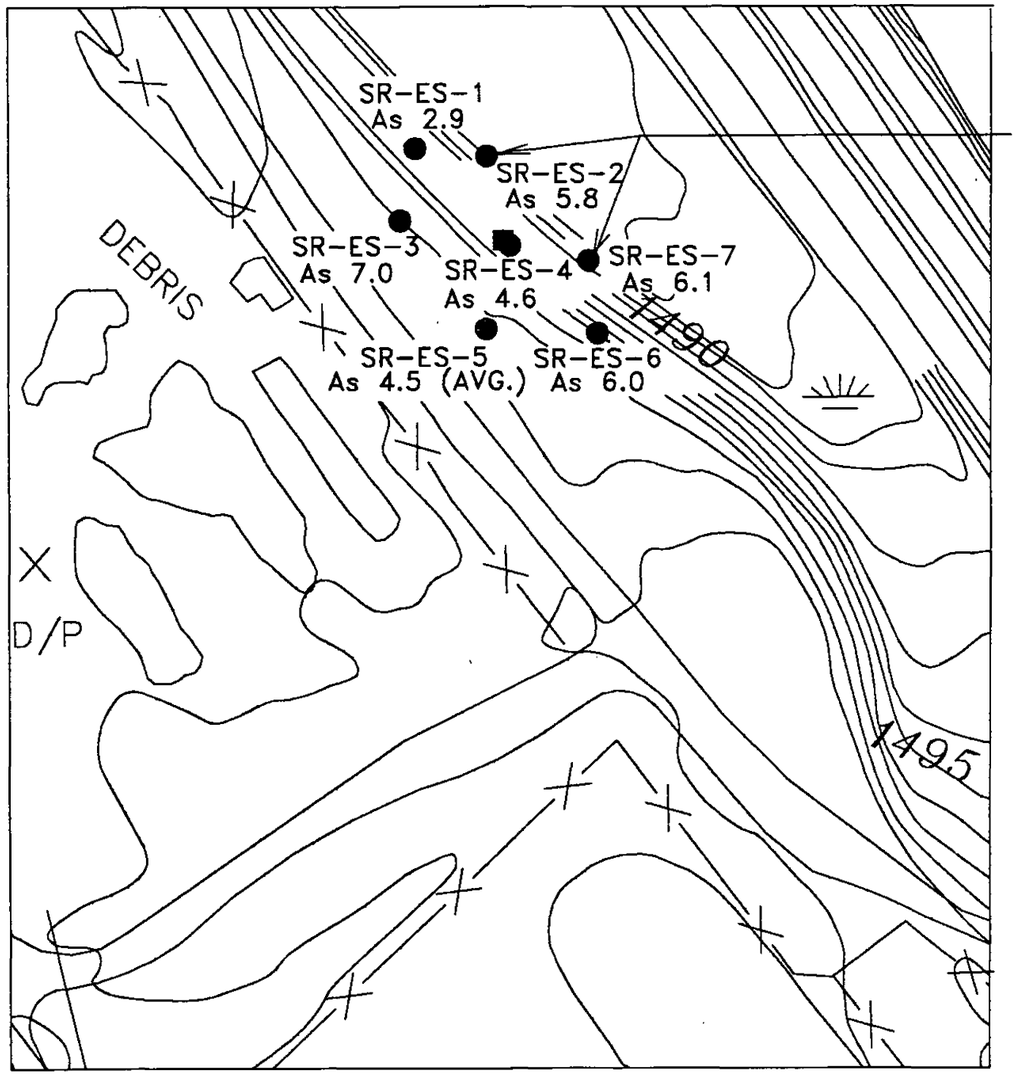

SAMPLE LOCATION ABOVE WATER LINE IN SWALE

LEGEND

- ■ ARSENIC AT 45 ppm. LOCATION ESTIMATED FROM PREVIOUS MAP
- ● ARSENIC SAMPLING LOCATIONS
  As CONCENTRATIONS ARE IN mg/Kg (ppm)

NOTE: REFER TO TABLE 2 FOR SUMMARY OF DATA, INCLUDING DATA VALIDATION QUALIFIERS

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EBASCO SERVICES INCORPORATED

DEPT 940 DR DSW
DATE 1/27/92 CH NG
SCALE AS NOTED

APPROVED

SINCLAIR REFINERY SITE
WELLSVILLE, N.Y.

ARSENIC SAMPLING LOCATIONS
SOUTH END OF SWALE

FIGURE 3-6

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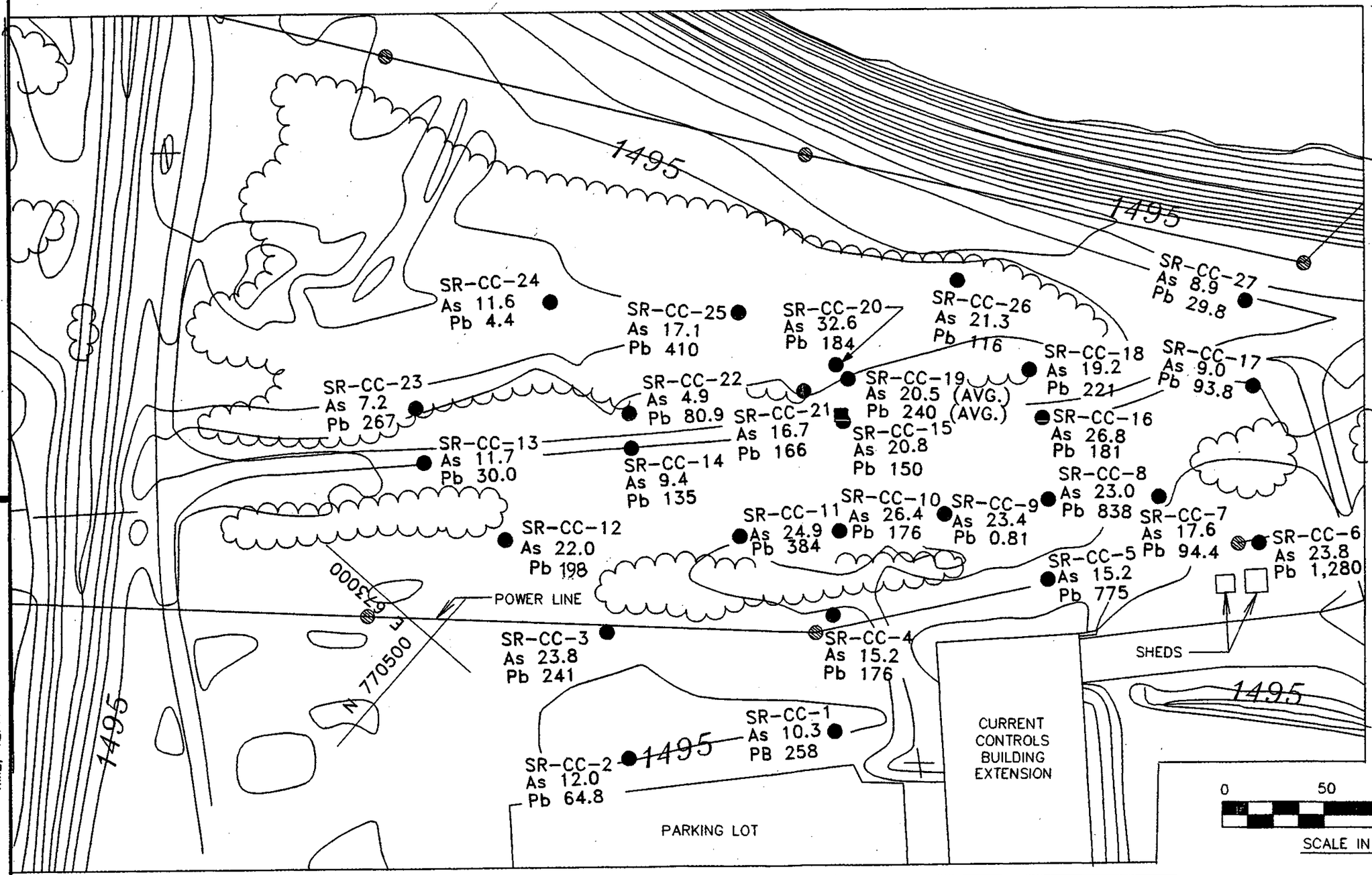
ARCR4B.DWG 11X17

NOTE:

REFER TO TABLE 3, FOR SUMMARY OF DATA, INCLUDING DATA VALIDATION QUALIFIERS



LEGEND

- ■ PRIOR LEAD (1020 ppm) AND ARSENIC (39 ppm) LOCATIONS
- ● SOIL SAMPLE LOCATIONS, ANALYSIS FOR LEAD AND ARSENIC

As, Pb CONCENTRATIONS ARE IN mg/Kg (ppm)

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EBASCO SERVICES INCORPORATED

DEPT 940 DR DSW
DATE 2/14/92 CH NG
SCALE AS NOTED

APPROVED

SINCLAIR REFINERY SITE
WELLSVILLE, N.Y.

LEAD AND ARSENIC SOIL SAMPLING LOCATIONS NEAR CURRENT CONTROLS

FIGURE 3-7

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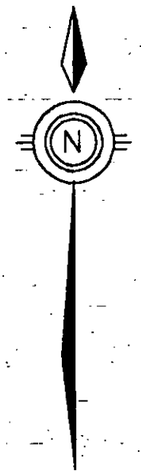
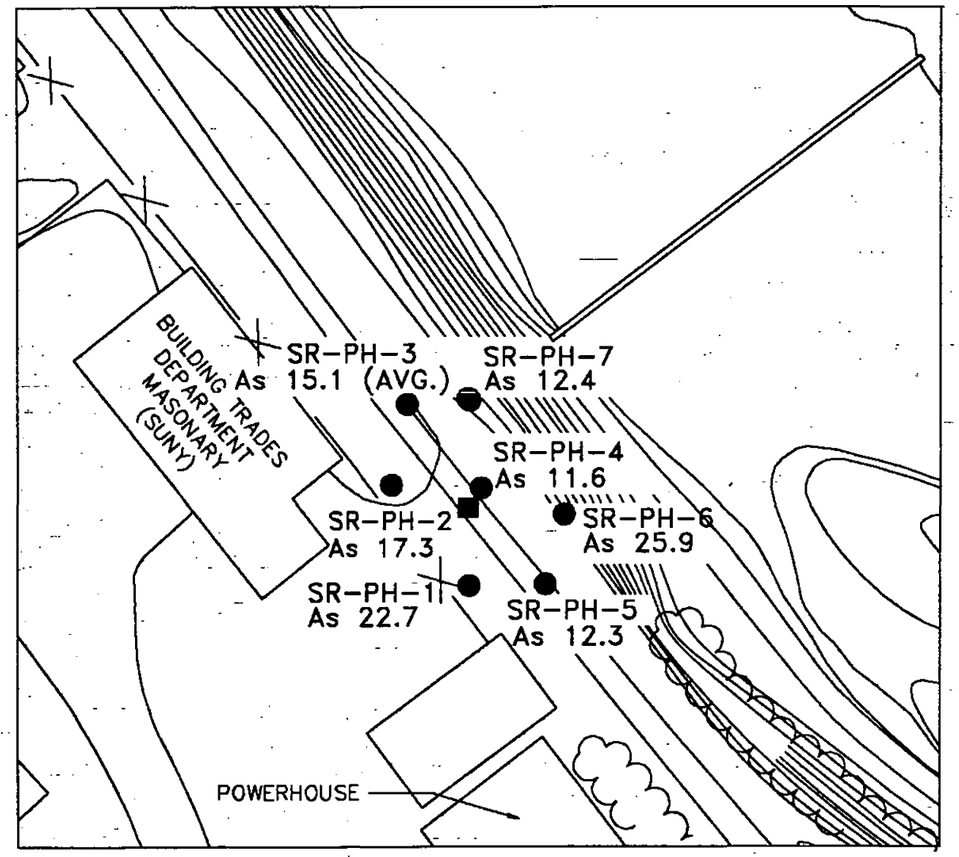


LEGEND

- ■ PRIOR BORING AB–54, ARSENIC REPORTED AT 29 ppm
- ● SAMPLE LOCATIONS (ARSENIC ANALYSIS)
  As CONCENTRATIONS ARE IN mg/Kg (ppm)

NOTE: REFER TO TABLE 4 FOR SUMMARY OF DATA, INCLUDING DATA VALIDATION QUALIFIERS



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DEPT 940 DR DSW APPROVED
DATE 1/27/92 CH NG
SCALE AS NOTED

SINCLAIR REFINERY SITE
WELLSVILLE, N.Y.

ARSENIC SAMPLING LOCATIONS
NEAR POWERHOUSE

FIGURE 3–8

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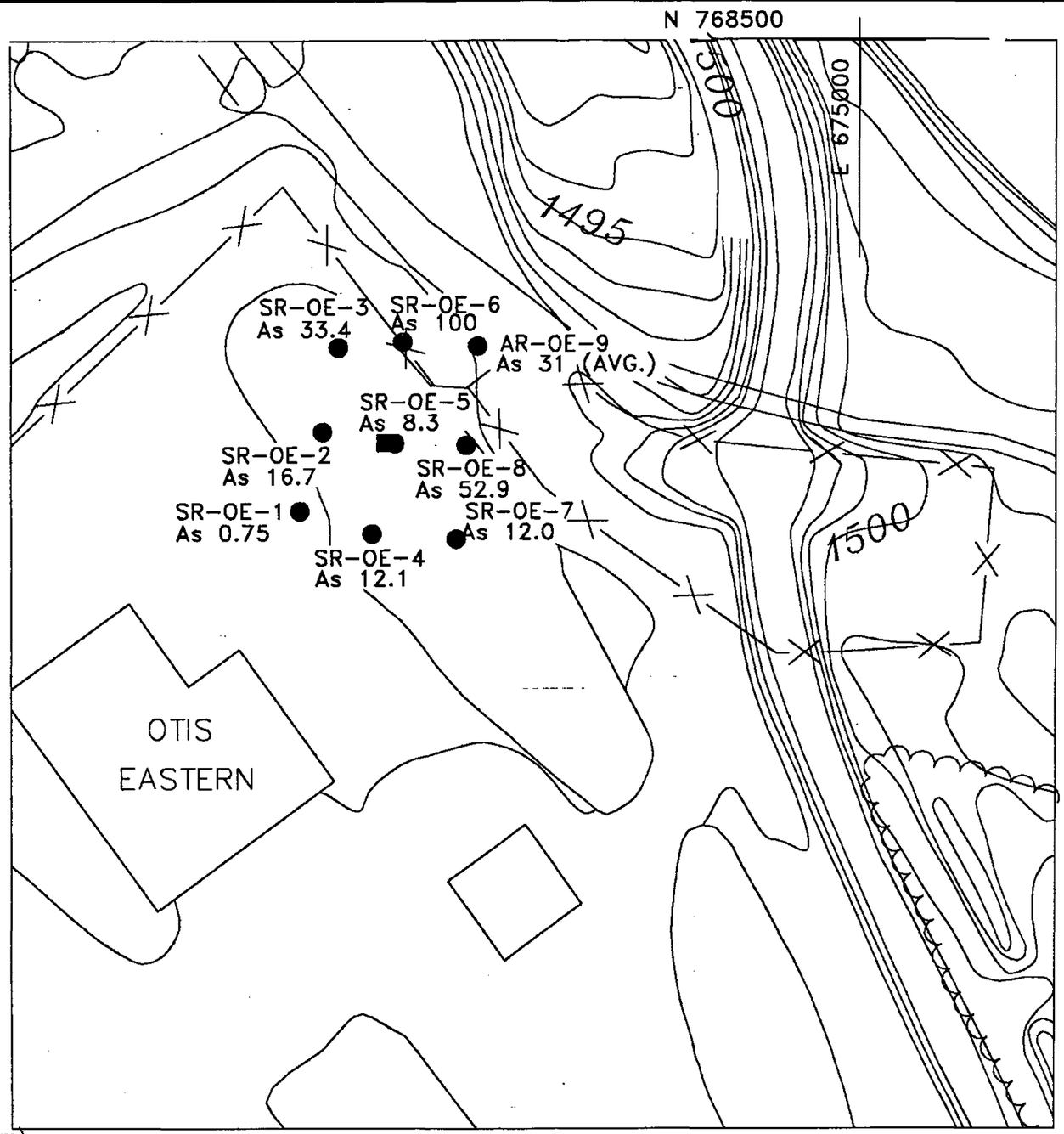

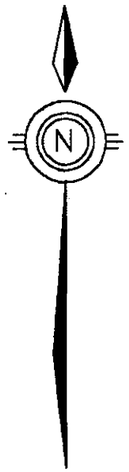

LEGEND

- ■ PRIOR SURFACE SAMPLE AB-61, ARSENIC REPORTED AT 43 ppm
- ● SAMPLE LOCATIONS (ARSENIC ANALYSIS)

As CONCENTRATIONS ARE IN mg/Kg (ppm)

NOTE: REFER TO TABLE 5 FOR SUMMARY OF DATA, INCLUDING DATA VALIDATION QUALIFIERS

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REV	DATE	BY	CH	APPROVED
A	1/11/92	DSW	NG	
B	1/27/92	DSW	NG	

EBASCO SERVICES INCORPORATED

DEPT 940 DR DSW
DATE 1/27/92 CH NG
SCALE AS NOTED

APPROVED

SINCLAIR REFINERY SITE
WELLSVILLE, N.Y.

ARSENIC SAMPLING LOCATIONS
BEHIND OTIS EASTERN

FIGURE 3-9

00

ARCR4C.DWG 11X17

APPENDIX A

FIELD CHANGE REQUEST

EBASCO SERVICES INCORPORATED
FIELD CHANGE REQUEST

Project Name	Ebasco Work Charge Number	Field Change No.
Sinclair Refinery Wellsville	1088.919	S01

To Neil Geevers Location Lyndhurst, 2nd Floor Date 12/02/91

Description:

The decontamination procedure for sampling equipment contains an extra step. Since only metals are being sampled (no organics) the acetone rinse Step (#5) is not required.

Recommended Disposition:

Remove the acetone rinse step from the decontamination procedure.

Field Operations Leader (Signature) Paul W. Anderson Date 12/2/91

Disposition:

Implement FOL's recommendation and institute revised decon procedure.

Site Manager Neil Geevers Date 12/2/91

Distribution: EPA Project Manager
ARCO Project Manager
Quality Assurance Manager
EBASCO Project Manager
Field Operations Leader

Others as Required _____

EBASCO SERVICES INCORPORATED
FIELD CHANGE REQUEST

Sinclair Refinery Wellsville	1088.919	S02
Project Name	Ebasco Work Charge Number	Field Change No.

To Neil Geevers Location Lyndhurst, 2nd Floor Date 12/2/91

Description:

A deionized water blank will not be taken during surface soil sampling. A blank of the deionized water which was used for the separator sampling and which will be used during the surface soil sampling was taken between the two field events.

Recommended Disposition:

Do not take another deionized water blank. Data from the blank taken will be applicable for the surface soil sampling event since it is of the same deionized water lot number.

Field Operations Leader (Signature) Paul W Anderson Date 12/2/91

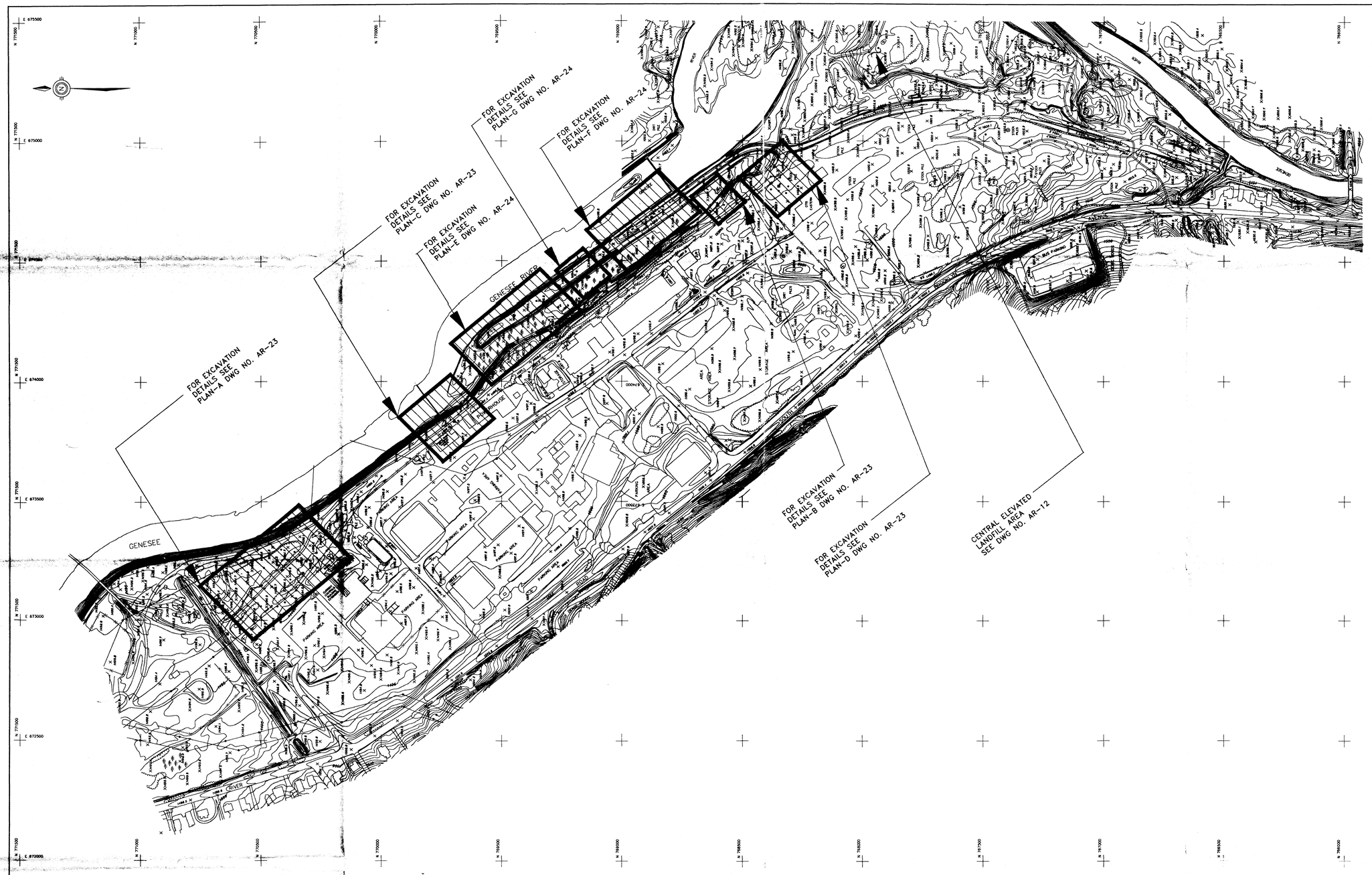
Disposition:

Implement FOL's recommendation.

Site Manager Neil Geevers Date 12/2/91

Distribution: EPA Project Manager
ARCO Project Manager
Quality Assurance Manager
EBASCO Project Manager
Field Operations Leader

Others as Required _____



NOTES:

1. NOTES ON THIS DRAWING APPLY TO DRAWINGS AR-22, AR-23, AND AR-24 ONLY.
2. SEE NOTE 1 ON DRAWING AR-15
3. SEE NOTE 2 ON DRAWING AR-15
4. SEE NOTE 5 ON DRAWING AR-15
5. SEE NOTE 7 ON DRAWING AR-15
6. FOR MATERIALS AND CONSTRUCTION REQUIREMENTS SEE THE TECHNICAL SECTIONS OF THE CONTRACT SPECIFICATIONS.
7. THE CONTRACTOR SHALL DETERMINE THE LIMITS OF CLEARING. CLEARING OUTSIDE THE EXCAVATION AREA SHALL BE KEPT TO A MINIMUM.
8. CONTRACTOR SHALL BACKFILL AND GRADE THE EXCAVATED AREA IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 02225 OF TECHNICAL SPECIFICATION. THE BACKFILL GRADE SHALL BE AS CLOSE AS POSSIBLE TO THAT WHICH EXISTED BEFORE EXCAVATION.

REFERENCE DRAWINGS:	DRAWING NO.
SITE GENERAL LAYOUT	AR-12
CELA CAP SECTIONS & DETAILS SH.1	AR-15
REFINERY SURFACE SOIL REMEDIATION EXCAVATION AND BACKFILL PLAN, SECTS & DETAILS SH.1	AR-23
REFINERY SURFACE SOIL REMEDIATION EXCAVATION AND BACKFILL PLAN, SECTS & DETAILS SH.2	AR-24

REFERENCE SPECIFICATIONS:

TITLE	SECTION NO.
DUST AND VAPOR CONTROL	02040
SITE CLEARING AND GRUBBING	02110
PLACEMENT OF MATERIAL IN CELA	02200
REFINERY AREA EARTHWORK	02225
EROSION & SEDIMENT CONTROL	02485
TEMPORARY CONTROLS/ ENVIRONMENTAL PROTECTION	01560

SYMBOLS:

- ARSENIC SAMPLING LOCATIONS SURVEYED BY D.C. MYERS DEC. 1991
- PREVIOUSLY MEASURED ARSENIC LOCATIONS (LOCATION ESTIMATED)
- CATCH BASIN
- DROP INLET
- EVERGREEN TREE
- FENCE
- FIRE ALARM BOX
- FIRE HYDRANT
- FLAG POLE
- GUIDERAIL
- LAMP POST (PVT)
- LIGHT POLE
- MAILBOX
- MANHOLE
- POLICE ALARM BOX
- VALVE
- POST
- RAILROAD CROSSING
- SINGLE SHRUB
- SIGN
- STONE WALL
- SWAMP
- TELEPHONE
- TRAFFIC CONTROL BOX
- TRAFFIC CONTROL TRFD
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL OH
- SINGLE TREE
- UTILITY POLE
- UTILITY POLE W/LIGHT

SURVEY BY LUDGATE ENGINEERING CORPORATION TRANSMITTED 4-5-91

NO.	DATE	REVISION	BY	CH	APPROVED
C	2/14/92	TO EPA FOR APPROVAL	DSW	VP	
B	1/31/92	TO EPA FOR APPROVAL	DSW	VP	
A	1/11/92	TO ARCO FOR REVIEW AND COMMENT	DSW	VP	

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ARCO
SINCLAIR REFINERY SITE

REFINERY SURFACE SOIL REMEDIATION
GENERAL EXCAVATION PLAN

EBASCO SERVICES INCORPORATED

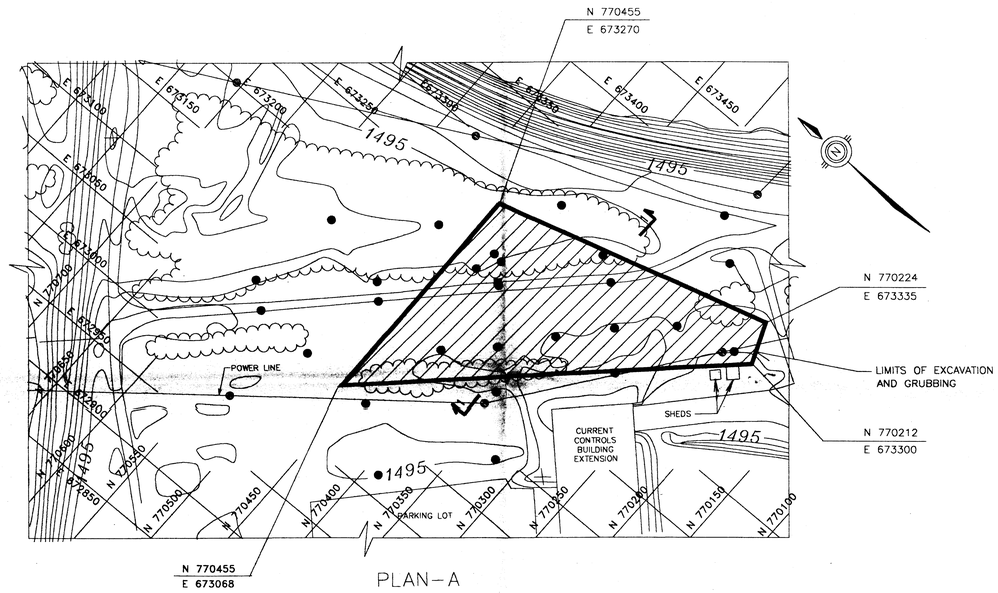
SCALE: AS NOTED
DW: SAD
DR: DSW
CH:
APPROVED
DATE

AR-22

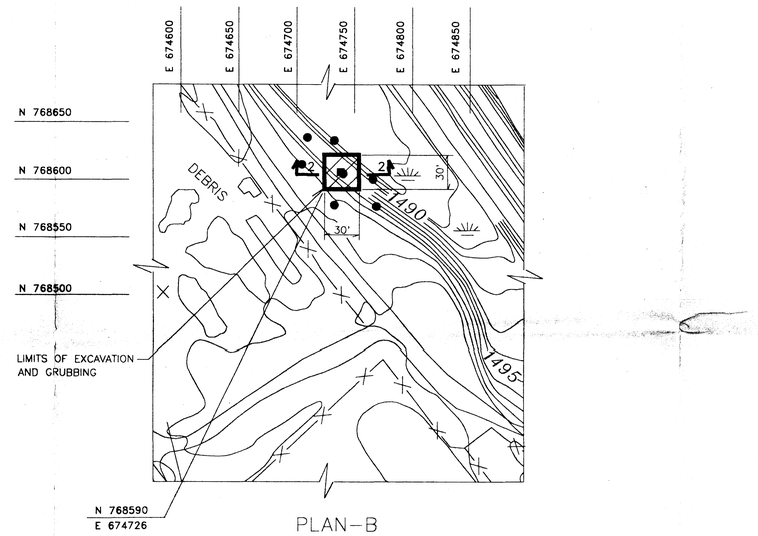
CAD FILE NAME: ARCRAE.DWG DATE: 2/14/92
PLOT SCALE: 1=150 TIME: 2:47 PM
ARCXLDWG
URDNEW.DWG

NOTES:

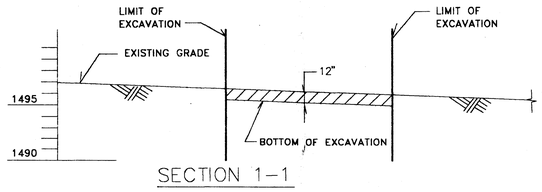
1. FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE DWG NO. AR-22
2. FOR LOCATION OF PLANS SEE DWG NO. AR-22



PLAN-A
CURRENT CONTROLS BUILDING

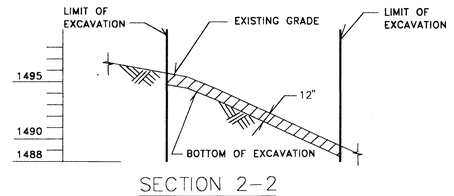


PLAN-B
SOUTH END OF SWALE



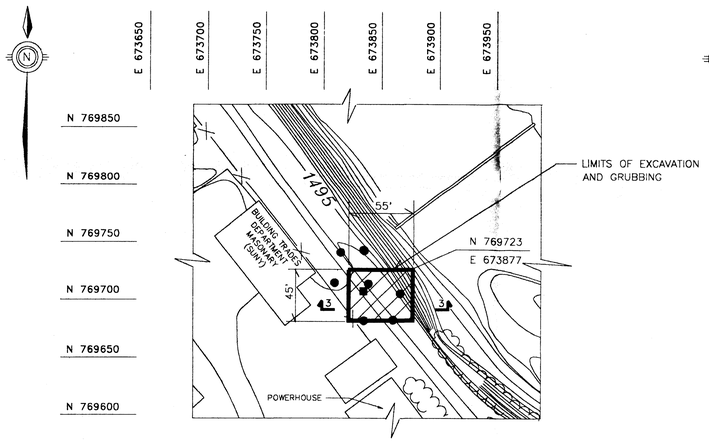
SECTION 1-1

SCALE: HORIZ. 1"=20'
VERT. 1"=5'

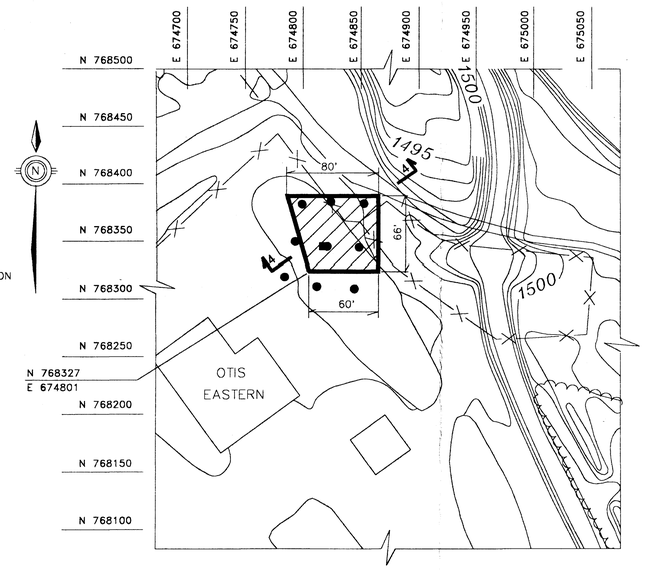


SECTION 2-2

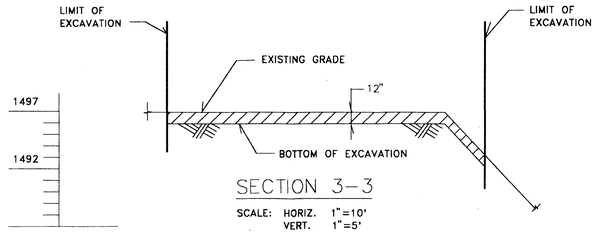
SCALE: HORIZ. 1"=10'
VERT. 1"=5'



PLAN-C
NEAR POWERHOUSE

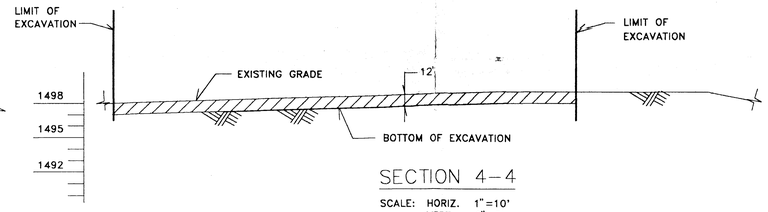


PLAN-D
BEHIND OTIS EASTERN PROPERTY



SECTION 3-3

SCALE: HORIZ. 1"=10'
VERT. 1"=5'



SECTION 4-4

SCALE: HORIZ. 1"=10'
VERT. 1"=5'

0 50 100 150
SCALE IN FEET

NO.	DATE	REVISION	BY	CH	APPROVED
B	1/31/92	TO EPA FOR APPROVAL	DSW	VP	
A	1/11/92	TO ARCO FOR REVIEW AND COMMENT	DSW	VP	

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ARCO
SINCLAIR REFINERY SITE

REFINERY SURFACE SOIL REMEDIATION
EXCAVATION AND BACKFILL PLAN
SECTS & DETAILS SH.1

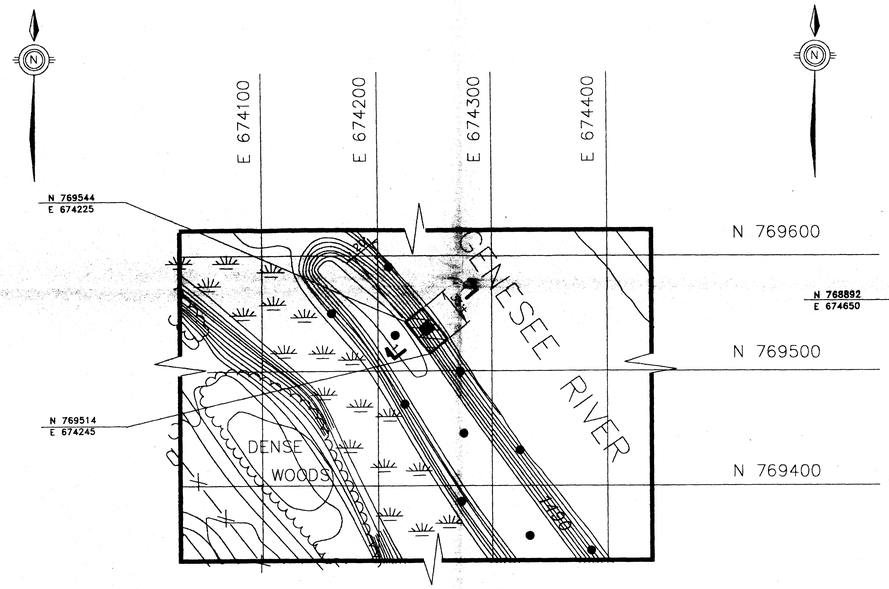
EBASCO SERVICES INCORPORATED

SCALE: AS NOTED
DW 940
DR EK/DSW
CH
APPROVED
DATE
AR-23

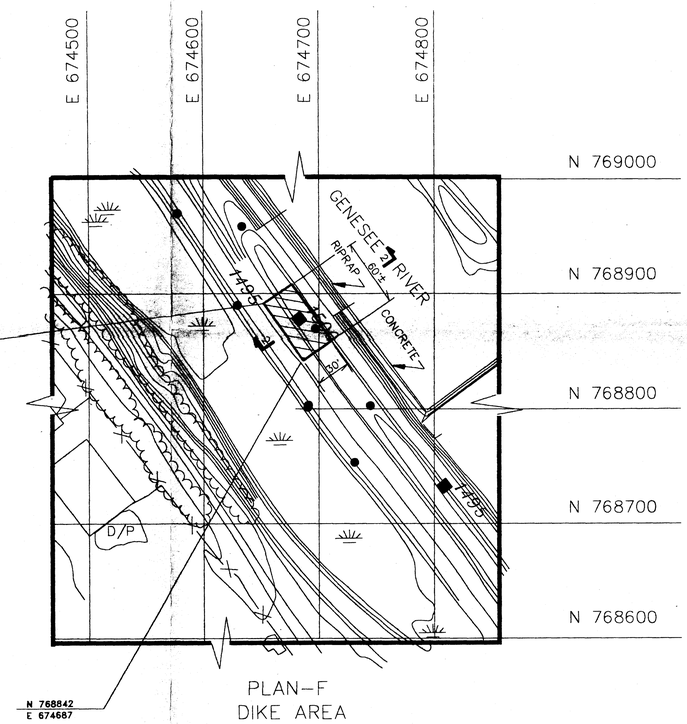
CAD FILE NAME: ARCO.DWG
PLOT SCALE: 1" =50'
DATE: 2/13/92
TIME: 10:16 AM

NOTES:

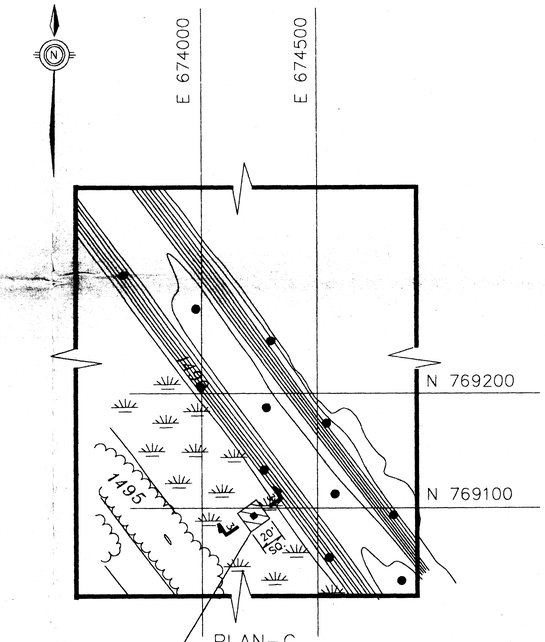
1. FOR GENERAL NOTES AND REFERNECE DRAWINGS SEE DWG NO. AR-22
2. FOR LOCATION OF PLAN SEE DWG NO. AR-22



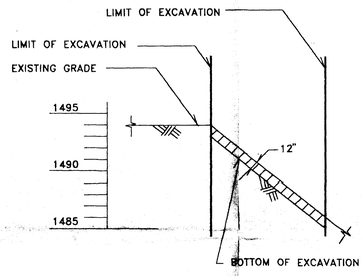
PLAN-E
DIKE AREA



PLAN-F
DIKE AREA

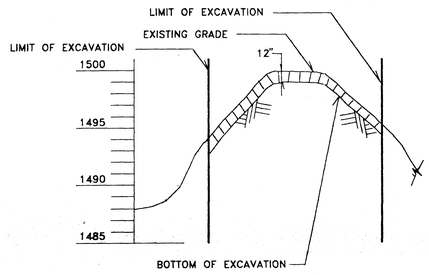


PLAN-G
DIKE AREA



SECTION 1-1

SCALE: HORIZ. 1"=10'
VERT. 1"=5'



SECTION 2-2

SCALE: HORIZ. 1"=10'
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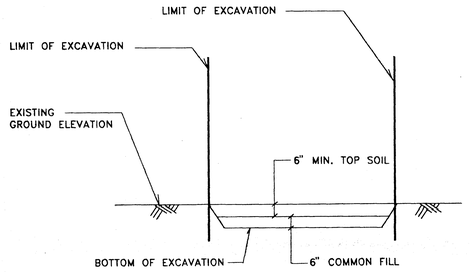
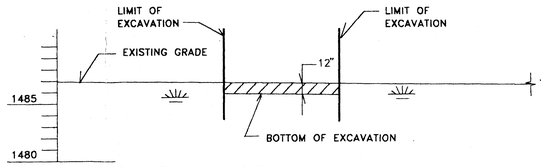


BACKFILL DETAIL
(TYPICAL)



SECTION 3-3

SCALE: HORIZ. 1"=20'
VERT. 1"=5'

0 50 100 150
SCALE IN FEET

NO.	DATE	REVISION	BY	CH	APPROVED
C	2/14/92	TO EPA FOR APPROVAL	DSW	VP	
B	1/31/92	TO EPA FOR APPROVAL	DSW	VP	
A	1/11/92	TO ARCO FOR REVIEW AND COMMENT	DSW	VP	

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ARCO
SINCLAIR REFINERY SITE

REFINERY SURFACE SOIL REMEDIATON
EXCAVATION AND BACKFILL PLAN
SECTS & DETAILS SH.2

EBASCO SERVICES INCORPORATED

SCALE: AS NOTED
DIV 940
DR EK/DSW
CH

APPROVED

DATE

AR-24

CAD FILE NAME: ARCO1.DWG
PLOT SCALE: 1"=50'
DATE: 2/18/92
TIME: 12:01 PM