

GW - 114

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## WORK PLANS

SOIL VAPOR EXTRACTION

**SOIL VAPOR EXTRACTION  
SYSTEM EXPANSION  
AT THE  
DOWELL SCHLUMBERGER INCORPORATED  
FACILITY, ARTESIA, NEW MEXICO**

**January 3, 1995**


Prepared For:

Dowell Schlumberger Incorporated  
300 Schlumberger Drive  
Sugar Land, TX 77478

Submitted To:

New Mexico Environment Department  
Groundwater Protection and Remediation Bureau  
Harold Runnels Building  
1190 St. Francis Drive  
Santa Fe, NM 87502

Prepared By:

Western  
Water  
Consultants, Inc. 

611 Skyline Road  
Laramie, Wyoming 82070

701 Antler Drive  
Casper, WY 82601

1901 Energy Court  
Gillette, WY 82716

1949 Sugarland Drive  
Sheridan, WY 82801

Western  
Water  
Consultants, Inc.

Western Water Consultants, Inc. has conducted its work and presents these findings in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation and no warranty or guarantee is made or intended.

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## **1.0 INTRODUCTION**

## 1.0 INTRODUCTION

Dowell Schlumberger Incorporated (Dowell) has been operating a remediation system at the Artesia, New Mexico facility since February 1, 1994. As a result of additional investigations Dowell proposes to expand that system to cover an adjacent right-of-way. The remediation system was installed pursuant to a work plan approval from the New Mexico Environment Department (NMED) dated October 26, 1993. A report to NMED dated March 29, 1994 detailed construction and startup of the remediation system.

## 2.0 INVESTIGATION

## 2.0 INVESTIGATION

On October 10 and 11, 1994, WWC personnel supervised drilling and installation of 20 additional soil vapor extraction (SVE) wells north of the northeast corner of the facility. These wells are located in a 50-foot by 90-foot area of the platted and dedicated Eddy County right-of-way adjacent to the existing washbay SVE system as shown on the Drawings. The purpose of the 20 borings was to evaluate the lateral and vertical extent of hydrocarbon contamination in soil above the water table in this area. Since contamination was detected in the interval from 10 to 15 feet below surface in all borings, SVE wells were installed to allow remediation of this area. Soil samples of cuttings from 13 to 15 feet below surface were collected from 9 of the 20 borings. Samples were analyzed for volatile organics by EPA Method 8240. Laboratory analytical results are presented in Table 1. Copies of the laboratory reports are included in Appendix A.



TABLE 1. ANALYTICAL RESULTS OF SOIL SAMPLES FROM NEW SOIL VAPOR EXTRACTION WELLS,  
DOWELL SCHLUMBERGER INCORPORATED FACILITY, ARTESIA, NEW MEXICO

SVE WELL	DATE	ETHYL-		XYLENES (mg/kg)	1,1-DCA (mg/kg)	1,1-DCE (mg/kg)	1,2-DCE (mg/kg)	1,1,1-TCA (mg/kg)	PCE (mg/kg)	ACETONE (mg/kg)	CARBON DISULFIDE (mg/kg)
		BENZENE (mg/kg)	BENZENE (mg/kg)								
F1	10/10/94	0.006J	0.76	0.32	21	ND(0.025)	ND(0.025)	0.014J	0.069	0.025J	ND(0.5)
F4	10/10/94	0.1	26	31	230	ND(0.05)	ND(0.05)	0.18	0.62	ND(1)	ND(1)
F7	10/10/94	0.073	12	9.1	130	ND(0.025)	0.005J	0.16	0.31	0.061J	0.007J
E2	10/11/94	0.051	4.4	2.3	94	ND(0.025)	ND(0.025)	0.14	0.25	0.72J	ND(0.5)
E5	10/11/94	0.048	3.4	2.8	45	ND(0.025)	ND(0.025)	0.11	0.21	0.082J	ND(0.5)
E6	10/11/94	0.17	8.6	11	86	ND(0.025)	ND(0.025)	0.32	0.28	0.037J	ND(0.5)
D3	10/11/94	0.37	23	12	210	0.066	0.008J	0.33	0.28	0.032J	0.014J
D4	10/11/94	0.046	7.7	4.7	110	ND(0.025)	ND(0.025)	0.18	0.22	0.049J	ND(0.5)
D6	10/11/94	0.021J	5.2	2.8	70	ND(0.025)	ND(0.025)	0.2	0.3	0.072J	ND(0.5)

NOTES: 1,1-DCA = 1,1-dichloroethane

1,1-DCE = 1,1-dichloroethene

TOTAL 1,2-DCE = total 1,2-dichloroethene

1,1,1-TCA = 1,1,1-trichloroethane

PCE = tetrachloroethene

mg/kg = milligrams per kilogram (equivalent to parts per million)

ND(0.025) = chemical not detected at method detection limit in parentheses

J = chemical detected at concentration below method detection limit

### **3.0 REMEDIATION**

### 3.0 REMEDIATION

#### 3.1 Design

Based on the effectiveness of SVE in removing contaminants from an adjacent area on Dowell property it is proposed to use SVE for this right-of-way area. The operational characteristics of the existing SVE system are presented in quarterly reports submitted to NMED. Since the right-of-way area is adjacent to an existing SVE system on Dowell property it is proposed to expand the existing SVE system by adding new zones and increasing the size of the blower.

This arrangement allows for the use of the existing building, electrical, plumbing and control systems. The larger blower will have twice the capacity of the existing blower. Therefore, one existing zone and one new zone can be operated simultaneously. Under these conditions the existing system operation remains unchanged. The system expansion is detailed on the attached construction drawings. Specifications for construction of the system are included in Appendix B.

#### 3.2 Air Quality

Air emissions from the SVE system will continue to be very low. The effluent will still be treated using activated carbon. Even without treatment, the emissions fall below the requirements of AQCR 703.1, Notice of Intent and AQCR 702 Part III, Permits for Toxic Air Pollutant Emissions. For example the following calculations are provided:

Flow Rate: (DR 707 Blower @50" W.C.) 180 scfm  
Vapor Concentration: (Assume highest reading) 200 ppm  
Weight of Air: .075 lbs./Ft.<sup>3</sup>  
Molecular Weight of Air: 29  
Molecular Weight of Contaminant: 106

$$180 \frac{\text{Ft.}^3}{\text{min.}} \times .075 \frac{\text{lbs.}}{\text{Ft.}^3} \times \frac{200}{1,000,000} \times \frac{106}{29} \times \frac{60 \text{ min.}}{\text{Hr.}} = .59 \text{ lbs./Hr.}$$

$$.59 \text{ lbs./Hr.} = 14 \text{ lbs./Day} = 2.6 \text{ Tons/Year}$$

These rates are less than the 10 lbs./Hr. and 10 Tons/Year limit under AQCR 703.1 and less than the 29 lbs./Hr. for Xylene under AQCR 702 Part III.

A copy of the initial letter to the Air Quality Bureau and their response is included in Appendix C.

**APPENDIX A**

**LABORATORY ANALYSIS**

# HYDROLOGIC LABORATORIES, INC

November 30, 1994

Ms. Robin Daily  
Western Water Consultants  
611 Skyline Road  
Laramie, WY 82070

Dear Robin,

In response to our telephone conversation today I have enclosed an update report. I have also responded to the other questions that you had.

Our sample number 7231 was received with a crack in the container. We did go ahead and analyze the sample for VOA 8240. The detection limits for Acetone, Carbon disulfide, and 1,1,1-Trichloroethane should have been reported at 500 ug/kg.

On our sample 7230, we did discover some typo's and have amended these results. If you should have any addition questions or concerns, please do not hesitate to cal me at (303)-659-0497.

Sincerely,



Robert Gomez  
Senior Account Representative

# HYDROLOGIC LABORATORIES, INC

October 29, 1994

## REPORTING:

Western Water Consultants  
611 Skyline Road  
Laramie, WY 82070

Attention: Kevin Mattson

## INVOICING:

Western Water Consultants  
611 Skyline Road  
Laramie, WY 82070

Attention: Kevin Mattson

CENREF PROJECT NUMBER: PR941692

DATE COMPLETED: October 29, 1994

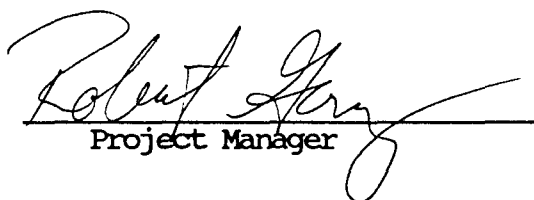
DATE RECEIVED: October 13, 1994

## PROJECT DESCRIPTION:

9 solid samples for Western Water Consultants taken 10-10,10-11-94.  
Project 90-0125L.4.

Enclosed is the laboratory report for the project described above. If you have any questions or if we can be of further assistance, please feel free to contact us. We appreciate your business and look forward to serving you again soon.

Respectfully,

  
Project Manager

COMPANY NAME: Western Water Consultants

CENREF PROJECT NUMBER: PR941692

SAMPLE IDENTIFICATION

CROSS REFERENCE SHEET

<u>CENREF SAMPLE NUMBER</u>	<u>CLIENT SAMPLE IDENTIFICATION</u>	<u>SAMPLE DATE</u>
VMBB9410191	Method blank	
VMBB9410211	Method blank	
VVBB9410221	Method blank	
VMBB9410241	Method blank	
VMBB9410251	Method blank	
7228	#O125-F1.10/94	10/10/94
7229	#O125-F4.10/94	10/10/94
7230	#O125-F7.10/94	10/10/94
7231	#O125-E5.10/94	10/11/94
7232	#O125-E2.10/94	10/11/94
7233	#O125-E6.10/94	10/11/94
7234	#D-3 at 14'	10/11/94
7235	#D-4 at 14'	10/11/94
7236	#D-6	10/11/94



FINAL  
RESULTS

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692

HYDROLOGIC ID: VMBB9410191

CLIENT ID: Method Blank

DATE SAMPLED: N/A

DATE/TIME ANALYZED: 10/19/94 1134

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	10	BDL
Bromomethane	74-83-9	10	BDL
Vinyl Chloride	75-01-4	10	BDL
Chloroethane	75-00-3	10	BDL
Trichlorofluoromethane	75-69-4	5	BDL
Methylene Chloride	75-09-2	5	BDL
Acetone	67-64-1	100	BDL
Carbon Disulfide	75-15-0	100	BDL
1,1-Dichloroethene	75-35-4	5	BDL
1,1-Dichloroethane	75-34-3	5	BDL
Total-1,2-Dichloroethene	540-59-0	5	BDL
Chloroform	67-66-3	5	BDL
1,2-Dichloroethane	107-06-2	5	BDL
2-Butanone	78-93-3	100	BDL
1,1,1-Trichloroethane	75-55-6	5	BDL
Carbon Tetrachloride	56-23-5	5	BDL
Vinyl Acetate	108-05-4	50	BDL
Bromodichloromethane	75-27-4	5	BDL
1,2-Dichloropropane	78-87-5	5	BDL
2-Chloroethyl Vinyl Ether	110-75-8	10	BDL
cis-1,3-Dichloropropene	10061-01-5	5	BDL
Trichloroethene	79-01-6	5	BDL
Dibromochloromethane	124-48-1	5	BDL
1,1,2-Trichloroethane	79-00-5	5	BDL
Benzene	71-43-2	5	BDL
trans-1,3-Dichloropropene	10061-02-6	5	BDL
Bromoform	75-25-2	5	BDL
4-Methyl-2-Pentanone	108-10-1	50	BDL
2-Hexanone	591-78-6	50	BDL
Tetrachloroethene	127-18-4	5	BDL
1,1,2,2-Tetrachloroethane	79-34-5	5	BDL
Toluene	108-88-3	5	BDL
Chlorobenzene	108-90-7	5	BDL
Ethylbenzene	100-41-4	5	BDL
Styrene	100-42-5	5	BDL
Xylenes (total)	1330-20-7	5	BDL
1,2-Dichlorobenzene	95-50-1	10	BDL
1,3-Dichlorobenzene	541-73-1	10	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS:

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692

HYDROLOGIC ID: VMBB9410211

CLIENT ID: Method Blank

DATE SAMPLED: N/A

DATE/TIME ANALYZED: 10/21/94 1824

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	10	BDL
Bromomethane	74-83-9	10	BDL
Vinyl Chloride	75-01-4	10	BDL
Chloroethane	75-00-3	10	BDL
Trichlorofluoromethane	75-69-4	5	BDL
Methylene Chloride	75-09-2	5	BDL
Acetone	67-64-1	100	BDL
Carbon Disulfide	75-15-0	100	BDL
1,1-Dichloroethene	75-35-4	5	BDL
1,1-Dichloroethane	75-34-3	5	BDL
Total-1,2-Dichloroethene	540-59-0	5	BDL
Chloroform	67-66-3	5	BDL
1,2-Dichloroethane	107-06-2	5	BDL
2-Butanone	78-93-3	100	BDL
1,1,1-Trichloroethane	75-55-6	5	BDL
Carbon Tetrachloride	56-23-5	5	BDL
Vinyl Acetate	108-05-4	50	BDL
Bromodichloromethane	75-27-4	5	BDL
1,2-Dichloropropane	78-87-5	5	BDL
2-Chloroethyl Vinyl Ether	110-75-8	10	BDL
cis-1,3-Dichloropropene	10061-01-5	5	BDL
Trichloroethene	79-01-6	5	BDL
Dibromochloromethane	124-48-1	5	BDL
1,1,2-Trichloroethane	79-00-5	5	BDL
Benzene	71-43-2	5	BDL
trans-1,3-Dichloropropene	10061-02-6	5	BDL
Bromoform	75-25-2	5	BDL
4-Methyl-2-Pentanone	108-10-1	50	BDL
2-Hexanone	591-78-6	50	BDL
Tetrachloroethene	127-18-4	5	BDL
1,1,2,2-Tetrachloroethane	79-34-5	5	BDL
Toluene	108-88-3	5	BDL
Chlorobenzene	108-90-7	5	BDL
Ethylbenzene	100-41-4	5	BDL
Styrene	100-42-5	5	BDL
Xylenes (total)	1330-20-7	5	BDL
1,2-Dichlorobenzene	95-50-1	10	BDL
1,3-Dichlorobenzene	541-73-1	10	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS:

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692

HYDROLOGIC ID: VMBB9410221

CLIENT ID: Method Blank

DATE SAMPLED: N/A

DATE/TIME ANALYZED: 10/22/94 1734

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	10	BDL
Bromomethane	74-83-9	10	BDL
Vinyl Chloride	75-01-4	10	BDL
Chloroethane	75-00-3	10	BDL
Trichlorofluoromethane	75-69-4	5	BDL
Methylene Chloride	75-09-2	5	BDL
Acetone	67-64-1	100	BDL
Carbon Disulfide	75-15-0	100	BDL
1,1-Dichloroethene	75-35-4	5	BDL
1,1-Dichloroethane	75-34-3	5	BDL
Total-1,2-Dichloroethene	540-59-0	5	BDL
Chloroform	67-66-3	5	BDL
1,2-Dichloroethane	107-06-2	5	BDL
2-Butanone	78-93-3	100	BDL
1,1,1-Trichloroethane	75-55-6	5	BDL
Carbon Tetrachloride	56-23-5	5	BDL
Vinyl Acetate	108-05-4	50	BDL
Bromodichloromethane	75-27-4	5	BDL
1,2-Dichloropropane	78-87-5	5	BDL
2-Chloroethyl Vinyl Ether	110-75-8	10	BDL
cis-1,3-Dichloropropene	10061-01-5	5	BDL
Trichloroethene	79-01-6	5	BDL
Dibromochloromethane	124-48-1	5	BDL
1,1,2-Trichloroethane	79-00-5	5	BDL
Benzene	71-43-2	5	BDL
trans-1,3-Dichloropropene	10061-02-6	5	BDL
Bromoform	75-25-2	5	BDL
4-Methyl-2-Pentanone	108-10-1	50	BDL
2-Hexanone	591-78-6	50	BDL
Tetrachloroethene	127-18-4	5	BDL
1,1,2,2-Tetrachloroethane	79-34-5	5	BDL
Toluene	108-88-3	5	BDL
Chlorobenzene	108-90-7	5	BDL
Ethylbenzene	100-41-4	5	BDL
Styrene	100-42-5	5	BDL
Xylenes (total)	1330-20-7	5	BDL
1,2-Dichlorobenzene	95-50-1	10	BDL
1,3-Dichlorobenzene	541-73-1	10	BDL

BDL = Below Sample Detection Limit  
 SDL = Sample Detection Limit

COMMENTS:

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692

HYDROLOGIC ID: VMBB9410241

CLIENT ID: Method Blank

DATE SAMPLED: N/A

DATE/TIME ANALYZED: 10/24/94 1126

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	10	BDL
Bromomethane	74-83-9	10	BDL
Vinyl Chloride	75-01-4	10	BDL
Chloroethane	75-00-3	10	BDL
Trichlorofluoromethane	75-69-4	5	BDL
Methylene Chloride	75-09-2	5	BDL
Acetone	67-64-1	100	BDL
Carbon Disulfide	75-15-0	100	BDL
1,1-Dichloroethene	75-35-4	5	BDL
1,1-Dichloroethane	75-34-3	5	BDL
Total-1,2-Dichloroethene	540-59-0	5	BDL
Chloroform	67-66-3	5	BDL
1,2-Dichloroethane	107-06-2	5	BDL
2-Butanone	78-93-3	100	BDL
1,1,1-Trichloroethane	75-55-6	5	BDL
Carbon Tetrachloride	56-23-5	5	BDL
Vinyl Acetate	108-05-4	50	BDL
Bromodichloromethane	75-27-4	5	BDL
1,2-Dichloropropane	78-87-5	5	BDL
2-Chloroethyl Vinyl Ether	110-75-8	10	BDL
cis-1,3-Dichloropropene	10061-01-5	5	BDL
Trichloroethene	79-01-6	5	BDL
Dibromochloromethane	124-48-1	5	BDL
1,1,2-Trichloroethane	79-00-5	5	BDL
Benzene	71-43-2	5	BDL
trans-1,3-Dichloropropene	10061-02-6	5	BDL
Bromoform	75-25-2	5	BDL
4-Methyl-2-Pentanone	108-10-1	50	BDL
2-Hexanone	591-78-6	50	BDL
Tetrachloroethene	127-18-4	5	BDL
1,1,2,2-Tetrachloroethane	79-34-5	5	BDL
Toluene	108-88-3	5	BDL
Chlorobenzene	108-90-7	5	BDL
Ethylbenzene	100-41-4	5	BDL
Styrene	100-42-5	5	BDL
Xylenes (total)	1330-20-7	5	BDL
1,2-Dichlorobenzene	95-50-1	10	BDL
1,3-Dichlorobenzene	541-73-1	10	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS:

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692

HYDROLOGIC ID: VMBB9410251

CLIENT ID: Method Blank

DATE SAMPLED: N/A

DATE/TIME ANALYZED: 10/25/94 1336

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	10	BDL
Bromomethane	74-83-9	10	BDL
Vinyl Chloride	75-01-4	10	BDL
Chloroethane	75-00-3	10	BDL
Trichlorofluoromethane	75-69-4	5	BDL
Methylene Chloride	75-09-2	5	BDL
Acetone	67-64-1	100	BDL
Carbon Disulfide	75-15-0	100	BDL
1,1-Dichloroethene	75-35-4	5	BDL
1,1-Dichloroethane	75-34-3	5	BDL
Total-1,2-Dichloroethene	540-59-0	5	BDL
Chloroform	67-66-3	5	BDL
1,2-Dichloroethane	107-06-2	5	BDL
2-Butanone	78-93-3	100	BDL
1,1,1-Trichloroethane	75-55-6	5	BDL
Carbon Tetrachloride	56-23-5	5	BDL
Vinyl Acetate	108-05-4	50	BDL
Bromodichloromethane	75-27-4	5	BDL
1,2-Dichloropropane	78-87-5	5	BDL
2-Chloroethyl Vinyl Ether	110-75-8	10	BDL
cis-1,3-Dichloropropene	10061-01-5	5	BDL
Trichloroethene	79-01-6	5	BDL
Dibromochloromethane	124-48-1	5	BDL
1,1,2-Trichloroethane	79-00-5	5	BDL
Benzene	71-43-2	5	BDL
trans-1,3-Dichloropropene	10061-02-6	5	BDL
Bromoform	75-25-2	5	BDL
4-Methyl-2-Pentanone	108-10-1	50	BDL
2-Hexanone	591-78-6	50	BDL
Tetrachloroethene	127-18-4	5	BDL
1,1,2,2-Tetrachloroethane	79-34-5	5	BDL
Toluene	108-88-3	5	BDL
Chlorobenzene	108-90-7	5	BDL
Ethylbenzene	100-41-4	5	BDL
Styrene	100-42-5	5	BDL
Xylenes (total)	1330-20-7	5	BDL
1,2-Dichlorobenzene	95-50-1	10	BDL
1,3-Dichlorobenzene	541-73-1	10	BDL

BDL = Below Sample Detection Limit  
 SDL = Sample Detection Limit

COMMENTS: \_\_\_\_\_

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER:

PR941692

HYDROLOGIC ID:

7228

CLIENT ID:

0125-F1.10/94

DATE SAMPLED:

10/10/94

DATE/TIME ANALYZED:

10/22/94 1842

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	50	BDL
Bromomethane	74-83-9	50	BDL
Vinyl Chloride	75-01-4	50	BDL
Chloroethane	75-00-3	50	BDL
Trichlorofluoromethane	75-69-4	25	BDL
Methylene Chloride	75-09-2	25	BDL
Acetone	67-64-1	500	25 J
Carbon Disulfide	75-15-0	500	BDL
1,1-Dichloroethene	75-35-4	25	BDL
1,1-Dichloroethane	75-34-3	25	BDL
Total-1,2-Dichloroethene	540-59-0	25	BDL
Chloroform	67-66-3	25	BDL
1,2-Dichloroethane	107-06-2	25	BDL
2-Butanone	78-93-3	500	BDL
1,1,1-Trichloroethane	75-55-6	25	14 J
Carbon Tetrachloride	56-23-5	25	BDL
Vinyl Acetate	108-05-4	250	BDL
Bromodichloromethane	75-27-4	25	BDL
1,2-Dichloropropane	78-87-5	25	BDL
2-Chloroethyl Vinyl Ether	110-75-8	50	BDL
cis-1,3-Dichloropropene	10061-01-5	25	BDL
Trichloroethene	79-01-6	25	BDL
Dibromochloromethane	124-48-1	25	BDL
1,1,2-Trichloroethane	79-00-5	25	BDL
Benzene	71-43-2	25	6 J
trans-1,3-Dichloropropene	10061-02-6	25	BDL
Bromoform	75-25-2	25	BDL
4-Methyl-2-Pentanone	108-10-1	250	BDL
2-Hexanone	591-78-6	250	BDL
Tetrachloroethene	127-18-4	25	69
1,1,2,2-Tetrachloroethane	79-34-5	25	BDL
Toluene	108-88-3	25	320
Chlorobenzene	108-90-7	25	BDL
Ethylbenzene	100-41-4	25	760
Styrene	100-42-5	25	BDL
Xylenes (total)	1330-20-7	25	E
1,2-Dichlorobenzene	95-50-1	50	BDL
1,3-Dichlorobenzene	541-73-1	50	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.E = Detected but quantitated amount exceeds instrument linear range.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7228DL  
CLIENT ID: 0125-F1.10/94  
DATE SAMPLED: 10/10/94  
DATE/TIME ANALYZED: 10/24/94 1325

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	1250	BDL
Bromomethane	74-83-9	1250	BDL
Vinyl Chloride	75-01-4	1250	BDL
Chloroethane	75-00-3	1250	BDL
Trichlorofluoromethane	75-69-4	625	BDL
Methylene Chloride	75-09-2	625	BDL
Acetone	67-64-1	12500	BDL
Carbon Disulfide	75-15-0	12500	BDL
1,1-Dichloroethene	75-35-4	625	BDL
1,1-Dichloroethane	75-34-3	625	BDL
Total-1,2-Dichloroethene	540-59-0	625	BDL
Chloroform	67-66-3	625	BDL
1,2-Dichloroethane	107-06-2	625	BDL
2-Butanone	78-93-3	12500	BDL
1,1,1-Trichloroethane	75-55-6	625	BDL
Carbon Tetrachloride	56-23-5	625	BDL
Vinyl Acetate	108-05-4	6250	BDL
Bromodichloromethane	75-27-4	625	BDL
1,2-Dichloropropane	78-87-5	625	BDL
2-Chloroethyl Vinyl Ether	110-75-8	1250	BDL
cis-1,3-Dichloropropene	10061-01-5	625	BDL
Trichloroethene	79-01-6	625	BDL
Dibromochloromethane	124-48-1	625	BDL
1,1,2-Trichloroethane	79-00-5	625	BDL
Benzene	71-43-2	625	BDL
trans-1,3-Dichloropropene	10061-02-6	625	BDL
Bromoform	75-25-2	625	BDL
4-Methyl-2-Pentanone	108-10-1	6250	BDL
2-Hexanone	591-78-6	6250	BDL
Tetrachloroethene	127-18-4	625	BDL
1,1,2,2-Tetrachloroethane	79-34-5	625	BDL
Toluene	108-88-3	625	330 J
Chlorobenzene	108-90-7	625	BDL
Ethylbenzene	100-41-4	625	1100
Styrene	100-42-5	625	BDL
Xylenes (total)	1330-20-7	625	21000
1,2-Dichlorobenzene	95-50-1	1250	BDL
1,3-Dichlorobenzene	541-73-1	1250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.



COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7228DL2  
CLIENT ID: 0125-F4.10/94  
DATE SAMPLED: 10/10/94  
DATE/TIME ANALYZED: 10/25/94 1420

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	6250	BDL
Bromomethane	74-83-9	6250	BDL
Vinyl Chloride	75-01-4	6250	BDL
Chloroethane	75-00-3	6250	BDL
Trichlorofluoromethane	75-69-4	3125	BDL
Methylene Chloride	75-09-2	3125	BDL
Acetone	67-64-1	62500	BDL
Carbon Disulfide	75-15-0	62500	BDL
1,1-Dichloroethene	75-35-4	3125	BDL
1,1-Dichloroethane	75-34-3	3125	BDL
Total-1,2-Dichloroethene	540-59-0	3125	BDL
Chloroform	67-66-3	3125	BDL
1,2-Dichloroethane	107-06-2	3125	BDL
2-Butanone	78-93-3	62500	BDL
1,1,1-Trichloroethane	75-55-6	3125	BDL
Carbon Tetrachloride	56-23-5	3125	BDL
Vinyl Acetate	108-05-4	31250	BDL
Bromodichloromethane	75-27-4	3125	BDL
1,2-Dichloropropane	78-87-5	3125	BDL
2-Chloroethyl Vinyl Ether	110-75-8	6250	BDL
cis-1,3-Dichloropropene	10061-01-5	3125	BDL
Trichloroethene	79-01-6	3215	BDL
Dibromochloromethane	124-48-1	3125	BDL
1,1,2-Trichloroethane	79-00-5	3125	BDL
Benzene	71-43-2	3125	BDL
trans-1,3-Dichloropropene	10061-02-6	3125	BDL
Bromoform	75-25-2	3125	BDL
4-Methyl-2-Pentanone	108-10-1	31250	BDL
2-Hexanone	591-78-6	31250	BDL
Tetrachloroethene	127-18-4	3125	1800 J
1,1,2,2-Tetrachloroethane	79-34-5	3125	BDL
Toluene	108-88-3	3125	31000
Chlorobenzene	108-90-7	3125	BDL
Ethylbenzene	100-41-4	3125	22000
Styrene	100-42-5	3125	BDL
Xylenes (total)	1330-20-7	3125	230000
1,2-Dichlorobenzene	95-50-1	31250	BDL
1,3-Dichlorobenzene	541-73-1	31250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7229  
CLIENT ID: 0125-F4.10/94  
DATE SAMPLED: 10/10/94  
DATE/TIME ANALYZED: 10/19/94 1134

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	100	BDL
Bromomethane	74-83-9	100	BDL
Vinyl Chloride	75-01-4	100	BDL
Chloroethane	75-00-3	100	BDL
Trichlorofluoromethane	75-69-4	50	BDL
Methylene Chloride	75-09-2	50	BDL
Acetone	67-64-1	1000	BDL
Carbon Disulfide	75-15-0	1000	BDL
1,1-Dichloroethene	75-35-4	50	BDL
1,1-Dichloroethane	75-34-3	50	BDL
Total-1,2-Dichloroethene	540-59-0	50	BDL
Chloroform	67-66-3	50	BDL
1,2-Dichloroethane	107-06-2	50	BDL
2-Butanone	78-93-3	1000	BDL
1,1,1-Trichloroethane	75-55-6	50	180
Carbon Tetrachloride	56-23-5	50	BDL
Vinyl Acetate	108-05-4	500	BDL
Bromodichloromethane	75-27-4	50	BDL
1,2-Dichloropropane	78-87-5	50	BDL
2-Chloroethyl Vinyl Ether	110-75-8	100	BDL
cis-1,3-Dichloropropene	10061-01-5	50	BDL
Trichloroethene	79-01-6	50	BDL
Dibromochloromethane	124-48-1	50	BDL
1,1,2-Trichloroethane	79-00-5	50	BDL
Benzene	71-43-2	50	100
trans-1,3-Dichloropropene	10061-02-6	50	BDL
Bromoform	75-25-2	50	BDL
4-Methyl-2-Pentanone	108-10-1	500	BDL
2-Hexanone	591-78-6	500	BDL
Tetrachloroethene	127-18-4	50	620
1,1,2,2-Tetrachloroethane	79-34-5	50	BDL
Toluene	108-88-3	50	E
Chlorobenzene	108-90-7	50	BDL
Ethylbenzene	100-41-4	50	E
Styrene	100-42-5	50	BDL
Xylenes (total)	1330-20-7	50	E
1,2-Dichlorobenzene	95-50-1	100	BDL
1,3-Dichlorobenzene	541-73-1	100	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: E = analyte detected but quantitated amount exceeds linear range of instrument. See DL sheet.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7229DL  
CLIENT ID: 0125-F4.10/94  
DATE SAMPLED: 10/10/94  
DATE/TIME ANALYZED: 10/24/94 1403

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	1250	BDL
Bromomethane	74-83-9	1250	BDL
Vinyl Chloride	75-01-4	1250	BDL
Chloroethane	75-00-3	1250	BDL
Trichlorofluoromethane	75-69-4	625	BDL
Methylene Chloride	75-09-2	625	BDL
Acetone	67-64-1	12500	BDL
Carbon Disulfide	75-15-0	12500	BDL
1,1-Dichloroethene	75-35-4	625	BDL
1,1-Dichloroethane	75-34-3	625	BDL
Total-1,2-Dichloroethene	540-59-0	625	BDL
Chloroform	67-66-3	625	BDL
1,2-Dichloroethane	107-06-2	625	BDL
2-Butanone	78-93-3	12500	BDL
1,1,1-Trichloroethane	75-55-6	625	390 J
Carbon Tetrachloride	56-23-5	625	BDL
Vinyl Acetate	108-05-4	6250	BDL
Bromodichloromethane	75-27-4	625	BDL
1,2-Dichloropropane	78-87-5	625	BDL
2-Chloroethyl Vinyl Ether	110-75-8	1250	BDL
cis-1,3-Dichloropropene	10061-01-5	625	BDL
Trichloroethene	79-01-6	625	BDL
Dibromochloromethane	124-48-1	625	BDL
1,1,2-Trichloroethane	79-00-5	625	BDL
Benzene	71-43-2	625	220 J
trans-1,3-Dichloropropene	10061-02-6	625	BDL
Bromoform	75-25-2	625	BDL
4-Methyl-2-Pentanone	108-10-1	6250	BDL
2-Hexanone	591-78-6	6250	BDL
Tetrachloroethene	127-18-4	625	2200
1,1,2,2-Tetrachloroethane	79-34-5	625	BDL
Toluene	108-88-3	625	E
Chlorobenzene	108-90-7	625	BDL
Ethylbenzene	100-41-4	625	26000
Styrene	100-42-5	625	BDL
Xylenes (total)	1330-20-7	625	E
1,2-Dichlorobenzene	95-50-1	1250	BDL
1,3-Dichlorobenzene	541-73-1	1250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = analyte detected but quantitated amount exceeds linear  
range of instrument.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7230  
CLIENT ID: 0125-F7.10/94  
DATE SAMPLED: 10/10/94  
DATE/TIME ANALYZED: 10/22/94 1958

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	50	BDL
Bromomethane	74-83-9	50	BDL
Vinyl Chloride	75-01-4	50	BDL
Chloroethane	75-00-3	50	BDL
Trichlorofluoromethane	75-69-4	25	BDL
Methylene Chloride	75-09-2	25	BDL
Acetone	67-64-1	500	61 J
Carbon Disulfide	75-15-0	500	7 J
1,1-Dichloroethene	75-35-4	25	5 J
1,1-Dichloroethane	75-34-3	25	BDL
Total-1,2-Dichloroethene	540-59-0	25	5 J
Chloroform	67-66-3	25	BDL
1,2-Dichloroethane	107-06-2	25	BDL
2-Butanone	78-93-3	500	BDL
1,1,1-Trichloroethane	75-55-6	25	160
Carbon Tetrachloride	56-23-5	25	BDL
Vinyl Acetate	108-05-4	250	BDL
Bromodichloromethane	75-27-4	25	BDL
1,2-Dichloropropane	78-87-5	25	BDL
2-Chloroethyl Vinyl Ether	110-75-8	50	BDL
cis-1,3-Dichloropropene	10061-01-5	25	BDL
Trichloroethene	79-01-6	25	BDL
Dibromochloromethane	124-48-1	25	BDL
1,1,2-Trichloroethane	79-00-5	25	BDL
Benzene	71-43-2	25	73
trans-1,3-Dichloropropene	10061-02-6	25	BDL
Bromoform	75-25-2	25	BDL
4-Methyl-2-Pentanone	108-10-1	250	BDL
2-Hexanone	591-78-6	250	BDL
Tetrachloroethene	127-18-4	25	310
1,1,2,2-Tetrachloroethane	79-34-5	25	BDL
Toluene	108-88-3	25	E
Chlorobenzene	108-90-7	25	BDL
Ethylbenzene	100-41-4	25	E
Styrene	100-42-5	25	BDL
Xylenes (total)	1330-20-7	25	E
1,2-Dichlorobenzene	95-50-1	50	BDL
1,3-Dichlorobenzene	541-73-1	50	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = Analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7230DL  
CLIENT ID: 0125-F7.10/94  
DATE SAMPLED: 10/10/94  
DATE/TIME ANALYZED: 10/24/94 1441

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	1250	BDL
Bromomethane	74-83-9	1250	BDL
Vinyl Chloride	75-01-4	1250	BDL
Chloroethane	75-00-3	1250	BDL
Trichlorofluoromethane	75-69-4	625	BDL
Methylene Chloride	75-09-2	625	BDL
Acetone	67-64-1	12500	BDL
Carbon Disulfide	75-15-0	12500	BDL
1,1-Dichloroethene	75-35-4	625	BDL
1,1-Dichloroethane	75-34-3	625	BDL
Total-1,2-Dichloroethene	540-59-0	625	BDL
Chloroform	67-66-3	625	BDL
1,2-Dichloroethane	107-06-2	625	BDL
2-Butanone	78-93-3	12500	BDL
1,1,1-Trichloroethane	75-55-6	625	BDL
Carbon Tetrachloride	56-23-5	625	BDL
Vinyl Acetate	108-05-4	6250	BDL
Bromodichloromethane	75-27-4	625	BDL
1,2-Dichloropropane	78-87-5	625	BDL
2-Chloroethyl Vinyl Ether	110-75-8	1250	BDL
cis-1,3-Dichloropropene	10061-01-5	625	BDL
Trichloroethene	79-01-6	625	BDL
Dibromochloromethane	124-48-1	625	BDL
1,1,2-Trichloroethane	79-00-5	625	BDL
Benzene	71-43-2	625	BDL
trans-1,3-Dichloropropene	10061-02-6	625	BDL
Bromoform	75-25-2	625	BDL
4-Methyl-2-Pentanone	108-10-1	6250	BDL
2-Hexanone	591-78-6	6250	BDL
Tetrachloroethene	127-18-4	625	740
1,1,2,2-Tetrachloroethane	79-34-5	625	BDL
Toluene	108-88-3	625	9100
Chlorobenzene	108-90-7	625	BDL
Ethylbenzene	100-41-4	625	12000
Styrene	100-42-5	625	BDL
Xylenes (total)	1330-20-7	625	E
1,2-Dichlorobenzene	95-50-1	1250	BDL
1,3-Dichlorobenzene	541-73-1	1250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7230DL2  
CLIENT ID: 0125-F7.10/94  
DATE SAMPLED: 10/10/94  
DATE/TIME ANALYZED: 10/25/94 1459

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	6250	BDL
Bromomethane	74-83-9	6250	BDL
Vinyl Chloride	75-01-4	6250	BDL
Chloroethane	75-00-3	6250	BDL
Trichlorofluoromethane	75-69-4	3125	BDL
Methylene Chloride	75-09-2	3125	BDL
Acetone	67-64-1	62500	BDL
Carbon Disulfide	75-15-0	62500	BDL
1,1-Dichloroethene	75-35-4	3125	BDL
1,1-Dichloroethane	75-34-3	3125	BDL
Total-1,2-Dichloroethene	540-59-0	3125	BDL
Chloroform	67-66-3	3125	BDL
1,2-Dichloroethane	107-06-2	3125	BDL
2-Butanone	78-93-3	62500	BDL
1,1,1-Trichloroethane	75-55-6	3125	BDL
Carbon Tetrachloride	56-23-5	3125	BDL
Vinyl Acetate	108-05-4	31250	BDL
Bromodichloromethane	75-27-4	3125	BDL
1,2-Dichloropropane	78-87-5	3125	BDL
2-Chloroethyl Vinyl Ether	110-75-8	6250	BDL
cis-1,3-Dichloropropene	10061-01-5	3125	BDL
Trichloroethene	79-01-6	3215	BDL
Dibromochloromethane	124-48-1	3125	BDL
1,1,2-Trichloroethane	79-00-5	3125	BDL
Benzene	71-43-2	3125	BDL
trans-1,3-Dichloropropene	10061-02-6	3125	BDL
Bromoform	75-25-2	3125	BDL
4-Methyl-2-Pentanone	108-10-1	31250	BDL
2-Hexanone	591-78-6	31250	BDL
Tetrachloroethene	127-18-4	3125	BDL
1,1,2,2-Tetrachloroethane	79-34-5	3125	BDL
Toluene	108-88-3	3125	7600
Chlorobenzene	108-90-7	3125	BDL
Ethylbenzene	100-41-4	3125	10000
Styrene	100-42-5	3125	BDL
Xylenes (total)	1330-20-7	3125	130000
1,2-Dichlorobenzene	95-50-1	31250	BDL
1,3-Dichlorobenzene	541-73-1	31250	BDL

BDL = Below Sample Detection Limit  
SDL = Sample Detection Limit

COMMENTS:

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7231  
CLIENT ID: 0125-E5.10/94  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/22/94 2037

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	50	BDL
Bromomethane	74-83-9	50	BDL
Vinyl Chloride	75-01-4	50	BDL
Chloroethane	75-00-3	50	BDL
Trichlorofluoromethane	75-69-4	25	BDL
Methylene Chloride	75-09-2	25	BDL
Acetone	67-64-1	500	82 J
Carbon Disulfide	75-15-0	500	BDL
1,1-Dichloroethene	75-35-4	25	BDL
1,1-Dichloroethane	75-34-3	25	BDL
Total-1,2-Dichloroethene	540-59-0	25	BDL
Chloroform	67-66-3	25	BDL
1,2-Dichloroethane	107-06-2	25	BDL
2-Butanone	78-93-3	500	BDL
1,1,1-Trichloroethane	75-55-6	25	110
Carbon Tetrachloride	56-23-5	25	BDL
Vinyl Acetate	108-05-4	250	BDL
Bromodichloromethane	75-27-4	25	BDL
1,2-Dichloropropane	78-87-5	25	BDL
2-Chloroethyl Vinyl Ether	110-75-8	50	BDL
cis-1,3-Dichloropropene	10061-01-5	25	BDL
Trichloroethene	79-01-6	25	BDL
Dibromochloromethane	124-48-1	25	BDL
1,1,2-Trichloroethane	79-00-5	25	BDL
Benzene	71-43-2	25	48
trans-1,3-Dichloropropene	10061-02-6	25	BDL
Bromoform	75-25-2	25	BDL
4-Methyl-2-Pentanone	108-10-1	250	BDL
2-Hexanone	591-78-6	250	BDL
Tetrachloroethene	127-18-4	25	210
1,1,2,2-Tetrachloroethane	79-34-5	25	BDL
Toluene	108-88-3	25	E
Chlorobenzene	108-90-7	25	BDL
Ethylbenzene	100-41-4	25	E
Styrene	100-42-5	25	BDL
Xylenes (total)	1330-20-7	25	E
1,2-Dichlorobenzene	95-50-1	50	BDL
1,3-Dichlorobenzene	541-73-1	50	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = Analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7231DL  
CLIENT ID: 0125-E5.10/94  
DATE SAMPLED: 10/10/94  
DATE/TIME ANALYZED: 10/24/94 1591

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	1250	BDL
Bromomethane	74-83-9	1250	BDL
Vinyl Chloride	75-01-4	1250	BDL
Chloroethane	75-00-3	1250	BDL
Trichlorofluoromethane	75-69-4	625	BDL
Methylene Chloride	75-09-2	625	BDL
Acetone	67-64-1	1250	BDL
Carbon Disulfide	75-15-0	1250	BDL
1,1-Dichloroethene	75-35-4	625	BDL
1,1-Dichloroethane	75-34-3	625	BDL
Total-1,2-Dichloroethene	540-59-0	625	BDL
Chloroform	67-66-3	625	BDL
1,2-Dichloroethane	107-06-2	625	BDL
2-Butanone	78-93-3	1250	BDL
1,1,1-Trichloroethane	75-55-6	625	BDL
Carbon Tetrachloride	56-23-5	625	BDL
Vinyl Acetate	108-05-4	6250	BDL
Bromodichloromethane	75-27-4	625	BDL
1,2-Dichloropropane	78-87-5	625	BDL
2-Chloroethyl Vinyl Ether	110-75-8	1250	BDL
cis-1,3-Dichloropropene	10061-01-5	625	BDL
Trichloroethene	79-01-6	625	BDL
Dibromochloromethane	124-48-1	625	BDL
1,1,2-Trichloroethane	79-00-5	625	BDL
Benzene	71-43-2	625	BDL
trans-1,3-Dichloropropene	10061-02-6	625	BDL
Bromoform	75-25-2	625	BDL
4-Methyl-2-Pentanone	108-10-1	6250	BDL
2-Hexanone	591-78-6	6250	BDL
Tetrachloroethene	127-18-4	625	270 J
1,1,2,2-Tetrachloroethane	79-34-5	625	BDL
Toluene	108-88-3	625	2800
Chlorobenzene	108-90-7	625	BDL
Ethylbenzene	100-41-4	625	3400
Styrene	100-42-5	625	BDL
Xylenes (total)	1330-20-7	625	E
1,2-Dichlorobenzene	95-50-1	1250	BDL
1,3-Dichlorobenzene	541-73-1	1250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = analyte detected but quantitated amount exceeds linear  
range of instrument.



COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER:

PR941692

HYDROLOGIC ID:

7231DL2

CLIENT ID:

0125-E5.10/94

DATE SAMPLED:

10/11/94

DATE/TIME ANALYZED:

10/25/94 1538

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	2500	BDL
Bromomethane	74-83-9	2500	BDL
Vinyl Chloride	75-01-4	2500	BDL
Chloroethane	75-00-3	2500	BDL
Trichlorofluoromethane	75-69-4	1250	BDL
Methylene Chloride	75-09-2	1250	BDL
Acetone	67-64-1	25000	BDL
Carbon Disulfide	75-15-0	25000	BDL
1,1-Dichloroethene	75-35-4	1250	BDL
1,1-Dichloroethane	75-34-3	1250	BDL
Total-1,2-Dichloroethene	540-59-0	1250	BDL
Chloroform	67-66-3	1250	BDL
1,2-Dichloroethane	107-06-2	1250	BDL
2-Butanone	78-93-3	25000	BDL
1,1,1-Trichloroethane	75-55-6	1250	BDL
Carbon Tetrachloride	56-23-5	1250	BDL
Vinyl Acetate	108-05-4	12500	BDL
Bromodichloromethane	75-27-4	1250	BDL
1,2-Dichloropropane	78-87-5	1250	BDL
2-Chloroethyl Vinyl Ether	110-75-8	2500	BDL
cis-1,3-Dichloropropene	10061-01-5	1250	BDL
Trichloroethene	79-01-6	1250	BDL
Dibromochloromethane	124-48-1	1250	BDL
1,1,2-Trichloroethane	79-00-5	1250	BDL
Benzene	71-43-2	1250	BDL
trans-1,3-Dichloropropene	10061-02-6	1250	BDL
Bromoform	75-25-2	1250	BDL
4-Methyl-2-Pentanone	108-10-1	12500	BDL
2-Hexanone	591-78-6	12500	BDL
Tetrachloroethene	127-18-4	1250	BDL
1,1,2,2-Tetrachloroethane	79-34-5	1250	BDL
Toluene	108-88-3	1250	2800
Chlorobenzene	108-90-7	1250	BDL
Ethylbenzene	100-41-4	1250	3200
Styrene	100-42-5	1250	BDL
Xylenes (total)	1330-20-7	1250	45000
1,2-Dichlorobenzene	95-50-1	2500	BDL
1,3-Dichlorobenzene	541-73-1	2500	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS:

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7232  
CLIENT ID: 0125-E2.10/94  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/22/94 2115

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	50	BDL
Bromomethane	74-83-9	50	BDL
Vinyl Chloride	75-01-4	50	BDL
Chloroethane	75-00-3	50	BDL
Trichlorofluoromethane	75-69-4	25	BDL
Methylene Chloride	75-09-2	25	BDL
Acetone	67-64-1	500	72 J
Carbon Disulfide	75-15-0	500	BDL
1,1-Dichloroethene	75-35-4	25	BDL
1,1-Dichloroethane	75-34-3	25	BDL
Total-1,2-Dichloroethene	540-59-0	25	BDL
Chloroform	67-66-3	25	BDL
1,2-Dichloroethane	107-06-2	25	BDL
2-Butanone	78-93-3	500	BDL
1,1,1-Trichloroethane	75-55-6	25	140
Carbon Tetrachloride	56-23-5	25	BDL
Vinyl Acetate	108-05-4	250	BDL
Bromodichloromethane	75-27-4	25	BDL
1,2-Dichloropropane	78-87-5	25	BDL
2-Chloroethyl Vinyl Ether	110-75-8	50	BDL
cis-1,3-Dichloropropene	10061-01-5	25	BDL
Trichloroethene	79-01-6	25	BDL
Dibromochloromethane	124-48-1	25	BDL
1,1,2-Trichloroethane	79-00-5	25	BDL
Benzene	71-43-2	25	51
trans-1,3-Dichloropropene	10061-02-6	25	BDL
Bromoform	75-25-2	25	BDL
4-Methyl-2-Pentanone	108-10-1	250	BDL
2-Hexanone	591-78-6	250	BDL
Tetrachloroethene	127-18-4	25	250
1,1,2,2-Tetrachloroethane	79-34-5	25	BDL
Toluene	108-88-3	25	E
Chlorobenzene	108-90-7	25	BDL
Ethylbenzene	100-41-4	25	E
Styrene	100-42-5	25	BDL
Xylenes (total)	1330-20-7	25	E
1,2-Dichlorobenzene	95-50-1	50	BDL
1,3-Dichlorobenzene	541-73-1	50	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = Analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692

HYDROLOGIC ID: 7232DL

CLIENT ID: 0125-E2.10/94

DATE SAMPLED: 10/11/94

DATE/TIME ANALYZED: 10/24/94 1557

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	1250	BDL
Bromomethane	74-83-9	1250	BDL
Vinyl Chloride	75-01-4	1250	BDL
Chloroethane	75-00-3	1250	BDL
Trichlorofluoromethane	75-69-4	625	BDL
Methylene Chloride	75-09-2	625	BDL
Acetone	67-64-1	12500	BDL
Carbon Disulfide	75-15-0	12500	BDL
1,1-Dichloroethene	75-35-4	625	BDL
1,1-Dichloroethane	75-34-3	625	BDL
Total-1,2-Dichloroethene	540-59-0	625	BDL
Chloroform	67-66-3	625	BDL
1,2-Dichloroethane	107-06-2	625	BDL
2-Butanone	78-93-3	12500	BDL
1,1,1-Trichloroethane	75-55-6	625	BDL
Carbon Tetrachloride	56-23-5	625	BDL
Vinyl Acetate	108-05-4	6250	BDL
Bromodichloromethane	75-27-4	625	BDL
1,2-Dichloropropane	78-87-5	625	BDL
2-Chloroethyl Vinyl Ether	110-75-8	1250	BDL
cis-1,3-Dichloropropene	10061-01-5	625	BDL
Trichloroethene	79-01-6	625	BDL
Dibromochloromethane	124-48-1	625	BDL
1,1,2-Trichloroethane	79-00-5	625	BDL
Benzene	71-43-2	625	BDL
trans-1,3-Dichloropropene	10061-02-6	625	BDL
Bromoform	75-25-2	625	BDL
4-Methyl-2-Pentanone	108-10-1	6250	BDL
2-Hexanone	591-78-6	6250	BDL
Tetrachloroethene	127-18-4	625	490 J
1,1,2,2-Tetrachloroethane	79-34-5	625	BDL
Toluene	108-88-3	625	2300
Chlorobenzene	108-90-7	625	BDL
Ethylbenzene	100-41-4	625	4400
Styrene	100-42-5	625	BDL
Xylenes (total)	1330-20-7	625	E
1,2-Dichlorobenzene	95-50-1	1250	BDL
1,3-Dichlorobenzene	541-73-1	1250	BDL

BDL = Below Sample Detection Limit  
 SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.  
E = analyte detected but quantitated amount exceeds linear  
range of instrument.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER:

PR941692

HYDROLOGIC ID:

7232DL2

CLIENT ID:

0125-E2.10/94

DATE SAMPLED:

10/11/94

DATE/TIME ANALYZED:

10/25/94 1617

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	6250	BDL
Bromomethane	74-83-9	6250	BDL
Vinyl Chloride	75-01-4	6250	BDL
Chloroethane	75-00-3	6250	BDL
Trichlorofluoromethane	75-69-4	3125	BDL
Methylene Chloride	75-09-2	3125	BDL
Acetone	67-64-1	62500	BDL
Carbon Disulfide	75-15-0	62500	BDL
1,1-Dichloroethene	75-35-4	3125	BDL
1,1-Dichloroethane	75-34-3	3125	BDL
Total-1,2-Dichloroethene	540-59-0	3125	BDL
Chloroform	67-66-3	3125	BDL
1,2-Dichloroethane	107-06-2	3125	BDL
2-Butanone	78-93-3	62500	BDL
1,1,1-Trichloroethane	75-55-6	3125	BDL
Carbon Tetrachloride	56-23-5	3125	BDL
Vinyl Acetate	108-05-4	31250	BDL
Bromodichloromethane	75-27-4	3125	BDL
1,2-Dichloropropane	78-87-5	3125	BDL
2-Chloroethyl Vinyl Ether	110-75-8	6250	BDL
cis-1,3-Dichloropropene	10061-01-5	3125	BDL
Trichloroethene	79-01-6	3215	BDL
Dibromochloromethane	124-48-1	3125	BDL
1,1,2-Trichloroethane	79-00-5	3125	BDL
Benzene	71-43-2	3125	BDL
trans-1,3-Dichloropropene	10061-02-6	3125	BDL
Bromoform	75-25-2	3125	BDL
4-Methyl-2-Pentanone	108-10-1	31250	BDL
2-Hexanone	591-78-6	31250	BDL
Tetrachloroethene	127-18-4	3125	BDL
1,1,2,2-Tetrachloroethane	79-34-5	3125	BDL
Toluene	108-88-3	3125	2200
Chlorobenzene	108-90-7	3125	BDL
Ethylbenzene	100-41-4	3125	3200
Styrene	100-42-5	3125	BDL
Xylenes (total)	1330-20-7	3125	94000
1,2-Dichlorobenzene	95-50-1	31250	BDL
1,3-Dichlorobenzene	541-73-1	31250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS:

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7233  
CLIENT ID: 0125-E6.10/94  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/22/94 2153

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	50	BDL
Bromomethane	74-83-9	50	BDL
Vinyl Chloride	75-01-4	50	BDL
Chloroethane	75-00-3	50	BDL
Trichlorofluoromethane	75-69-4	25	BDL
Methylene Chloride	75-09-2	25	BDL
Acetone	67-64-1	500	37 J
Carbon Disulfide	75-15-0	500	BDL
1,1-Dichloroethene	75-35-4	25	BDL
1,1-Dichloroethane	75-34-3	25	BDL
Total-1,2-Dichloroethene	540-59-0	25	BDL
Chloroform	67-66-3	25	BDL
1,2-Dichloroethane	107-06-2	25	BDL
2-Butanone	78-93-3	500	BDL
1,1,1-Trichloroethane	75-55-6	25	320
Carbon Tetrachloride	56-23-5	25	BDL
Vinyl Acetate	108-05-4	250	BDL
Bromodichloromethane	75-27-4	25	BDL
1,2-Dichloropropane	78-87-5	25	BDL
2-Chloroethyl Vinyl Ether	110-75-8	50	BDL
cis-1,3-Dichloropropene	10061-01-5	25	BDL
Trichloroethene	79-01-6	25	BDL
Dibromochloromethane	124-48-1	25	BDL
1,1,2-Trichloroethane	79-00-5	25	BDL
Benzene	71-43-2	25	170
trans-1,3-Dichloropropene	10061-02-6	25	BDL
Bromoform	75-25-2	25	BDL
4-Methyl-2-Pentanone	108-10-1	250	BDL
2-Hexanone	591-78-6	250	BDL
Tetrachloroethene	127-18-4	25	280
1,1,2,2-Tetrachloroethane	79-34-5	25	BDL
Toluene	108-88-3	25	E
Chlorobenzene	108-90-7	25	BDL
Ethylbenzene	100-41-4	25	E
Styrene	100-42-5	25	BDL
Xylenes (total)	1330-20-7	25	E
1,2-Dichlorobenzene	95-50-1	50	BDL
1,3-Dichlorobenzene	541-73-1	50	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = Analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7233DL  
CLIENT ID: 0125-E6.10/94  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/24/94 1635

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	1250	BDL
Bromomethane	74-83-9	1250	BDL
Vinyl Chloride	75-01-4	1250	BDL
Chloroethane	75-00-3	1250	BDL
Trichlorofluoromethane	75-69-4	625	BDL
Methylene Chloride	75-09-2	625	BDL
Acetone	67-64-1	12500	BDL
Carbon Disulfide	75-15-0	12500	BDL
1,1-Dichloroethene	75-35-4	625	BDL
1,1-Dichloroethane	75-34-3	625	BDL
Total-1,2-Dichloroethene	540-59-0	625	BDL
Chloroform	67-66-3	625	BDL
1,2-Dichloroethane	107-06-2	625	BDL
2-Butanone	78-93-3	12500	BDL
1,1,1-Trichloroethane	75-55-6	625	240 J
Carbon Tetrachloride	56-23-5	625	BDL
Vinyl Acetate	108-05-4	6250	BDL
Bromodichloromethane	75-27-4	625	BDL
1,2-Dichloropropane	78-87-5	625	BDL
2-Chloroethyl Vinyl Ether	110-75-8	1250	BDL
cis-1,3-Dichloropropene	10061-01-5	625	BDL
Trichloroethene	79-01-6	625	BDL
Dibromochloromethane	124-48-1	625	BDL
1,1,2-Trichloroethane	79-00-5	625	BDL
Benzene	71-43-2	625	BDL
trans-1,3-Dichloropropene	10061-02-6	625	BDL
Bromoform	75-25-2	625	BDL
4-Methyl-2-Pentanone	108-10-1	6250	BDL
2-Hexanone	591-78-6	6250	BDL
Tetrachloroethene	127-18-4	625	730
1,1,2,2-Tetrachloroethane	79-34-5	625	BDL
Toluene	108-88-3	625	11000
Chlorobenzene	108-90-7	625	BDL
Ethylbenzene	100-41-4	625	8600
Styrene	100-42-5	625	BDL
Xylenes (total)	1330-20-7	625	E
1,2-Dichlorobenzene	95-50-1	1250	BDL
1,3-Dichlorobenzene	541-73-1	1250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7233DL2  
CLIENT ID: 0125-E6.10/94  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/25/94 1655

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	6250	BDL
Bromomethane	74-83-9	6250	BDL
Vinyl Chloride	75-01-4	6250	BDL
Chloroethane	75-00-3	6250	BDL
Trichlorofluoromethane	75-69-4	3125	BDL
Methylene Chloride	75-09-2	3125	BDL
Acetone	67-64-1	62500	BDL
Carbon Disulfide	75-15-0	62500	BDL
1,1-Dichloroethene	75-35-4	3125	BDL
1,1-Dichloroethane	75-34-3	3125	BDL
Total-1,2-Dichloroethene	540-59-0	3125	BDL
Chloroform	67-66-3	3125	BDL
1,2-Dichloroethane	107-06-2	3125	BDL
2-Butanone	78-93-3	62500	BDL
1,1,1-Trichloroethane	75-55-6	3125	BDL
Carbon Tetrachloride	56-23-5	3125	BDL
Vinyl Acetate	108-05-4	31250	BDL
Bromodichloromethane	75-27-4	3125	BDL
1,2-Dichloropropane	78-87-5	3125	BDL
2-Chloroethyl Vinyl Ether	110-75-8	6250	BDL
cis-1,3-Dichloropropene	10061-01-5	3125	BDL
Trichloroethene	79-01-6	3215	BDL
Dibromochloromethane	124-48-1	3125	BDL
1,1,2-Trichloroethane	79-00-5	3125	BDL
Benzene	71-43-2	3125	BDL
trans-1,3-Dichloropropene	10061-02-6	3125	BDL
Bromoform	75-25-2	3125	BDL
4-Methyl-2-Pentanone	108-10-1	31250	BDL
2-Hexanone	591-78-6	31250	BDL
Tetrachloroethene	127-18-4	3125	BDL
1,1,2,2-Tetrachloroethane	79-34-5	3125	BDL
Toluene	108-88-3	3125	9700
Chlorobenzene	108-90-7	3125	BDL
Ethylbenzene	100-41-4	3125	6000
Styrene	100-42-5	3125	BDL
Xylenes (total)	1330-20-7	3125	86000
1,2-Dichlorobenzene	95-50-1	6250	BDL
1,3-Dichlorobenzene	541-73-1	6250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS:

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7234  
CLIENT ID: D-3 at 14'  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/22/94 2231

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	50	BDL
Bromomethane	74-83-9	50	BDL
Vinyl Chloride	75-01-4	50	BDL
Chloroethane	75-00-3	50	BDL
Trichlorofluoromethane	75-69-4	25	BDL
Methylene Chloride	75-09-2	25	BDL
Acetone	67-64-1	500	32 J
Carbon Disulfide	75-15-0	500	14 J
1,1-Dichloroethene	75-35-4	25	8 J
1,1-Dichloroethane	75-34-3	25	66
Total-1,2-Dichloroethene	540-59-0	25	8 J
Chloroform	67-66-3	25	BDL
1,2-Dichloroethane	107-06-2	25	BDL
2-Butanone	78-93-3	500	BDL
1,1,1-Trichloroethane	75-55-6	25	330
Carbon Tetrachloride	56-23-5	25	BDL
Vinyl Acetate	108-05-4	250	BDL
Bromodichloromethane	75-27-4	25	BDL
1,2-Dichloropropane	78-87-5	25	BDL
2-Chloroethyl Vinyl Ether	110-75-8	50	BDL
cis-1,3-Dichloropropene	10061-01-5	25	BDL
Trichloroethene	79-01-6	25	BDL
Dibromochloromethane	124-48-1	25	BDL
1,1,2-Trichloroethane	79-00-5	25	BDL
Benzene	71-43-2	25	370
trans-1,3-Dichloropropene	10061-02-6	25	BDL
Bromoform	75-25-2	25	BDL
4-Methyl-2-Pentanone	108-10-1	250	BDL
2-Hexanone	591-78-6	250	BDL
Tetrachloroethene	127-18-4	25	280
1,1,2,2-Tetrachloroethane	79-34-5	25	BDL
Toluene	108-88-3	25	E
Chlorobenzene	108-90-7	25	BDL
Ethylbenzene	100-41-4	25	E
Styrene	100-42-5	25	BDL
Xylenes (total)	1330-20-7	25	E
1,2-Dichlorobenzene	95-50-1	50	BDL
1,3-Dichlorobenzene	541-73-1	50	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = Analyte detected but quantitated amount exceeds linear range of instrument.



COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER:

PR941692

HYDROLOGIC ID:

7234DL

CLIENT ID:

D-3 at 14'

DATE SAMPLED:

10/11/94

DATE/TIME ANALYZED:

10/24/94 1731

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	1250	BDL
Bromomethane	74-83-9	1250	BDL
Vinyl Chloride	75-01-4	1250	BDL
Chloroethane	75-00-3	1250	BDL
Trichlorofluoromethane	75-69-4	625	BDL
Methylene Chloride	75-09-2	625	BDL
Acetone	67-64-1	12500	BDL
Carbon Disulfide	75-15-0	12500	BDL
1,1-Dichloroethene	75-35-4	625	BDL
1,1-Dichloroethane	75-34-3	625	BDL
Total-1,2-Dichloroethene	540-59-0	625	BDL
Chloroform	67-66-3	625	BDL
1,2-Dichloroethane	107-06-2	625	BDL
2-Butanone	78-93-3	12500	BDL
1,1,1-Trichloroethane	75-55-6	625	360 J
Carbon Tetrachloride	56-23-5	625	BDL
Vinyl Acetate	108-05-4	6250	BDL
Bromodichloromethane	75-27-4	625	BDL
1,2-Dichloropropane	78-87-5	625	BDL
2-Chloroethyl Vinyl Ether	110-75-8	1250	BDL
cis-1,3-Dichloropropene	10061-01-5	625	BDL
Trichloroethene	79-01-6	625	BDL
Dibromochloromethane	124-48-1	625	BDL
1,1,2-Trichloroethane	79-00-5	625	BDL
Benzene	71-43-2	625	290 J
trans-1,3-Dichloropropene	10061-02-6	625	BDL
Bromoform	75-25-2	625	BDL
4-Methyl-2-Pentanone	108-10-1	6250	BDL
2-Hexanone	591-78-6	6250	BDL
Tetrachloroethene	127-18-4	625	1400
1,1,2,2-Tetrachloroethane	79-34-5	625	BDL
Toluene	108-88-3	625	12000
Chlorobenzene	108-90-7	625	BDL
Ethylbenzene	100-41-4	625	23000
Styrene	100-42-5	625	BDL
Xylenes (total)	1330-20-7	625	E
1,2-Dichlorobenzene	95-50-1	1250	BDL
1,3-Dichlorobenzene	541-73-1	1250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = analyte detected but quantitated amount exceeds linear  
range of instrument.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7234DL2  
CLIENT ID: D-3 at 14'  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/25/94 1734

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	12500	BDL
Bromomethane	74-83-9	12500	BDL
Vinyl Chloride	75-01-4	12500	BDL
Chloroethane	75-00-3	12500	BDL
Trichlorofluoromethane	75-69-4	6250	BDL
Methylene Chloride	75-09-2	6250	BDL
Acetone	67-64-1	125000	BDL
Carbon Disulfide	75-15-0	125000	BDL
1,1-Dichloroethene	75-35-4	6250	BDL
1,1-Dichloroethane	75-34-3	6250	BDL
Total-1,2-Dichloroethene	540-59-0	6250	BDL
Chloroform	67-66-3	6250	BDL
1,2-Dichloroethane	107-06-2	6250	BDL
2-Butanone	78-93-3	125000	BDL
1,1,1-Trichloroethane	75-55-6	6250	BDL
Carbon Tetrachloride	56-23-5	6250	BDL
Vinyl Acetate	108-05-4	62500	BDL
Bromodichloromethane	75-27-4	6250	BDL
1,2-Dichloropropane	78-87-5	6250	BDL
2-Chloroethyl Vinyl Ether	110-75-8	12500	BDL
cis-1,3-Dichloropropene	10061-01-5	6250	BDL
Trichloroethene	79-01-6	6250	BDL
Dibromochloromethane	124-48-1	6250	BDL
1,1,2-Trichloroethane	79-00-5	6250	BDL
Benzene	71-43-2	6250	BDL
trans-1,3-Dichloropropene	10061-02-6	6250	BDL
Bromoform	75-25-2	6250	BDL
4-Methyl-2-Pentanone	108-10-1	62500	BDL
2-Hexanone	591-78-6	62500	BDL
Tetrachloroethene	127-18-4	6250	BDL
1,1,2,2-Tetrachloroethane	79-34-5	6250	BDL
Toluene	108-88-3	6250	10000
Chlorobenzene	108-90-7	6250	BDL
Ethylbenzene	100-41-4	6250	16000
Styrene	100-42-5	6250	BDL
Xylenes (total)	1330-20-7	6250	210000
1,2-Dichlorobenzene	95-50-1	12500	BDL
1,3-Dichlorobenzene	541-73-1	12500	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7235  
CLIENT ID: D-4 at 14'  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/22/94 2309

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	50	BDL
Bromomethane	74-83-9	50	BDL
Vinyl Chloride	75-01-4	50	BDL
Chloroethane	75-00-3	50	BDL
Trichlorofluoromethane	75-69-4	25	BDL
Methylene Chloride	75-09-2	25	BDL
Acetone	67-64-1	500	49 J
Carbon Disulfide	75-15-0	500	BDL
1,1-Dichloroethene	75-35-4	25	BDL
1,1-Dichloroethane	75-34-3	25	BDL
Total-1,2-Dichloroethene	540-59-0	25	BDL
Chloroform	67-66-3	25	BDL
1,2-Dichloroethane	107-06-2	25	BDL
2-Butanone	78-93-3	500	BDL
1,1,1-Trichloroethane	75-55-6	25	180
Carbon Tetrachloride	56-23-5	25	BDL
Vinyl Acetate	108-05-4	250	BDL
Bromodichloromethane	75-27-4	25	BDL
1,2-Dichloropropane	78-87-5	25	BDL
2-Chloroethyl Vinyl Ether	110-75-8	50	BDL
cis-1,3-Dichloropropene	10061-01-5	25	BDL
Trichloroethene	79-01-6	25	BDL
Dibromochloromethane	124-48-1	25	BDL
1,1,2-Trichloroethane	79-00-5	25	BDL
Benzene	71-43-2	25	46
trans-1,3-Dichloropropene	10061-02-6	25	BDL
Bromoform	75-25-2	25	BDL
4-Methyl-2-Pentanone	108-10-1	250	BDL
2-Hexanone	591-78-6	250	BDL
Tetrachloroethene	127-18-4	25	220
1,1,2,2-Tetrachloroethane	79-34-5	25	BDL
Toluene	108-88-3	25	E
Chlorobenzene	108-90-7	25	BDL
Ethylbenzene	100-41-4	25	E
Styrene	100-42-5	25	BDL
Xylenes (total)	1330-20-7	25	E
1,2-Dichlorobenzene	95-50-1	50	BDL
1,3-Dichlorobenzene	541-73-1	50	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

E = Analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7235DL  
CLIENT ID: D-4 at 14'  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/24/94 1809

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	1250	BDL
Bromomethane	74-83-9	1250	BDL
Vinyl Chloride	75-01-4	1250	BDL
Chloroethane	75-00-3	1250	BDL
Trichlorofluoromethane	75-69-4	625	BDL
Methylene Chloride	75-09-2	625	BDL
Acetone	67-64-1	12500	BDL
Carbon Disulfide	75-15-0	12500	BDL
1,1-Dichloroethene	75-35-4	625	BDL
1,1-Dichloroethane	75-34-3	625	BDL
Total-1,2-Dichloroethene	540-59-0	625	BDL
Chloroform	67-66-3	625	BDL
1,2-Dichloroethane	107-06-2	625	BDL
2-Butanone	78-93-3	12500	BDL
1,1,1-Trichloroethane	75-55-6	625	BDL
Carbon Tetrachloride	56-23-5	625	BDL
Vinyl Acetate	108-05-4	6250	BDL
Bromodichloromethane	75-27-4	625	BDL
1,2-Dichloropropane	78-87-5	625	BDL
2-Chloroethyl Vinyl Ether	110-75-8	1250	BDL
cis-1,3-Dichloropropene	10061-01-5	625	BDL
Trichloroethene	79-01-6	625	BDL
Dibromochloromethane	124-48-1	625	BDL
1,1,2-Trichloroethane	79-00-5	625	BDL
Benzene	71-43-2	625	BDL
trans-1,3-Dichloropropene	10061-02-6	625	BDL
Bromoform	75-25-2	625	BDL
4-Methyl-2-Pentanone	108-10-1	6250	BDL
2-Hexanone	591-78-6	6250	BDL
Tetrachloroethene	127-18-4	625	450 J
1,1,2,2-Tetrachloroethane	79-34-5	625	BDL
Toluene	108-88-3	625	4700
Chlorobenzene	108-90-7	625	BDL
Ethylbenzene	100-41-4	625	7700
Styrene	100-42-5	625	BDL
Xylenes (total)	1330-20-7	625	E
1,2-Dichlorobenzene	95-50-1	1250	BDL
1,3-Dichlorobenzene	541-73-1	1250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.E = analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692

HYDROLOGIC ID: 7235DL2

CLIENT ID: D-4 at 14'

DATE SAMPLED: 10/11/94

DATE/TIME ANALYZED: 10/25/94 1813

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	5000	BDL
Bromomethane	74-83-9	5000	BDL
Vinyl Chloride	75-01-4	5000	BDL
Chloroethane	75-00-3	5000	BDL
Trichlorofluoromethane	75-69-4	2500	BDL
Methylene Chloride	75-09-2	2500	BDL
Acetone	67-64-1	50000	BDL
Carbon Disulfide	75-15-0	50000	BDL
1,1-Dichloroethene	75-35-4	2500	BDL
1,1-Dichloroethane	75-34-3	2500	BDL
Total-1,2-Dichloroethene	540-59-0	2500	BDL
Chloroform	67-66-3	2500	BDL
1,2-Dichloroethane	107-06-2	2500	BDL
2-Butanone	78-93-3	50000	BDL
1,1,1-Trichloroethane	75-55-6	2500	BDL
Carbon Tetrachloride	56-23-5	2500	BDL
Vinyl Acetate	108-05-4	25000	BDL
Bromodichloromethane	75-27-4	2500	BDL
1,2-Dichloropropane	78-87-5	2500	BDL
2-Chloroethyl Vinyl Ether	110-75-8	5000	BDL
cis-1,3-Dichloropropene	10061-01-5	2500	BDL
Trichloroethene	79-01-6	2500	BDL
Dibromochloromethane	124-48-1	2500	BDL
1,1,2-Trichloroethane	79-00-5	2500	BDL
Benzene	71-43-2	2500	BDL
trans-1,3-Dichloropropene	10061-02-6	2500	BDL
Bromoform	75-25-2	2500	BDL
4-Methyl-2-Pentanone	108-10-1	25000	BDL
2-Hexanone	591-78-6	25000	BDL
Tetrachloroethene	127-18-4	2500	540 J
1,1,2,2-Tetrachloroethane	79-34-5	2500	BDL
Toluene	108-88-3	2500	5000
Chlorobenzene	108-90-7	2500	BDL
Ethylbenzene	100-41-4	2500	8700
Styrene	100-42-5	2500	BDL
Xylenes (total)	1330-20-7	2500	110000
1,2-Dichlorobenzene	95-50-1	5000	BDL
1,3-Dichlorobenzene	541-73-1	5000	BDL

BDL = Below Sample Detection Limit  
 SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.

COMPANY NAME: WESTERN WATER CONSULTANTS  
 HYDROLOGIC PROJECT NUMBER: PR941692  
 HYDROLOGIC ID: 7236  
 CLIENT ID: D-6  
 DATE SAMPLED: 10/11/94  
 DATE/TIME ANALYZED: 10/22/94 2347

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	50	BDL
Bromomethane	74-83-9	50	BDL
Vinyl Chloride	75-01-4	50	BDL
Chloroethane	75-00-3	50	BDL
Trichlorofluoromethane	75-69-4	25	BDL
Methylene Chloride	75-09-2	25	BDL
Acetone	67-64-1	500	72 J
Carbon Disulfide	75-15-0	500	BDL
1,1-Dichloroethene	75-35-4	25	BDL
1,1-Dichloroethane	75-34-3	25	BDL
Total-1,2-Dichloroethene	540-59-0	25	BDL
Chloroform	67-66-3	25	BDL
1,2-Dichloroethane	107-06-2	25	BDL
2-Butanone	78-93-3	500	BDL
1,1,1-Trichloroethane	75-55-6	25	200
Carbon Tetrachloride	56-23-5	25	BDL
Vinyl Acetate	108-05-4	250	BDL
Bromodichloromethane	75-27-4	25	BDL
1,2-Dichloropropane	78-87-5	25	BDL
2-Chloroethyl Vinyl Ether	110-75-8	50	BDL
cis-1,3-Dichloropropene	10061-01-5	25	BDL
Trichloroethene	79-01-6	25	BDL
Dibromochloromethane	124-48-1	25	BDL
1,1,2-Trichloroethane	79-00-5	25	BDL
Benzene	71-43-2	25	21 J
trans-1,3-Dichloropropene	10061-02-6	25	BDL
Bromoform	75-25-2	25	BDL
4-Methyl-2-Pentanone	108-10-1	250	BDL
2-Hexanone	591-78-6	250	BDL
Tetrachloroethene	127-18-4	25	300
1,1,2,2-Tetrachloroethane	79-34-5	25	BDL
Toluene	108-88-3	25	E
Chlorobenzene	108-90-7	25	BDL
Ethylbenzene	100-41-4	25	E
Styrene	100-42-5	25	BDL
Xylenes (total)	1330-20-7	25	E
1,2-Dichlorobenzene	95-50-1	50	BDL
1,3-Dichlorobenzene	541-73-1	50	BDL

BDL = Below Sample Detection Limit  
 SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.  
 E = Analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME:

WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692  
HYDROLOGIC ID: 7236DL  
CLIENT ID: D-6  
DATE SAMPLED: 10/11/94  
DATE/TIME ANALYZED: 10/24/94 1847

## EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	1250	BDL
Bromomethane	74-83-9	1250	BDL
Vinyl Chloride	75-01-4	1250	BDL
Chloroethane	75-00-3	1250	BDL
Trichlorofluoromethane	75-69-4	625	BDL
Methylene Chloride	75-09-2	625	BDL
Acetone	67-64-1	12500	BDL
Carbon Disulfide	75-15-0	12500	BDL
1,1-Dichloroethene	75-35-4	625	BDL
1,1-Dichloroethane	75-34-3	625	BDL
Total-1,2-Dichloroethene	540-59-0	625	BDL
Chloroform	67-66-3	625	BDL
1,2-Dichloroethane	107-06-2	625	BDL
2-Butanone	78-93-3	12500	BDL
1,1,1-Trichloroethane	75-55-6	625	BDL
Carbon Tetrachloride	56-23-5	625	BDL
Vinyl Acetate	108-05-4	6250	BDL
Bromodichloromethane	75-27-4	625	BDL
1,2-Dichloropropane	78-87-5	625	BDL
2-Chloroethyl Vinyl Ether	110-75-8	1250	BDL
cis-1,3-Dichloropropene	10061-01-5	625	BDL
Trichloroethene	79-01-6	625	BDL
Dibromochloromethane	124-48-1	625	BDL
1,1,2-Trichloroethane	79-00-5	625	BDL
Benzene	71-43-2	625	BDL
trans-1,3-Dichloropropene	10061-02-6	625	BDL
Bromoform	75-25-2	625	BDL
4-Methyl-2-Pentanone	108-10-1	6250	BDL
2-Hexanone	591-78-6	6250	BDL
Tetrachloroethene	127-18-4	625	420 J
1,1,2,2-Tetrachloroethane	79-34-5	625	BDL
Toluene	108-88-3	625	2800
Chlorobenzene	108-90-7	625	BDL
Ethylbenzene	100-41-4	625	5200
Styrene	100-42-5	625	BDL
Xylenes (total)	1330-20-7	625	E
1,2-Dichlorobenzene	95-50-1	1250	BDL
1,3-Dichlorobenzene	541-73-1	1250	BDL

BDL = Below Sample Detection Limit

SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.E = analyte detected but quantitated amount exceeds linear range of instrument.

COMPANY NAME: WESTERN WATER CONSULTANTS

HYDROLOGIC PROJECT NUMBER: PR941692

HYDROLOGIC ID: 7236DL2

CLIENT ID: D-6

DATE SAMPLED: 10/11/94

DATE/TIME ANALYZED: 10/25/94 1851

EPA METHOD 8240

ANALYTE	CAS #	SDL (ug/Kg)	RESULTS (ug/Kg)
Chloromethane	74-87-3	5000	BDL
Bromomethane	74-83-9	5000	BDL
Vinyl Chloride	75-01-4	5000	BDL
Chloroethane	75-00-3	5000	BDL
Trichlorofluoromethane	75-69-4	2500	BDL
Methylene Chloride	75-09-2	2500	BDL
Acetone	67-64-1	50000	BDL
Carbon Disulfide	75-15-0	50000	BDL
1,1-Dichloroethene	75-35-4	2500	BDL
1,1-Dichloroethane	75-34-3	2500	BDL
Total-1,2-Dichloroethene	540-59-0	2500	BDL
Chloroform	67-66-3	2500	BDL
1,2-Dichloroethane	107-06-2	2500	BDL
2-Butanone	78-93-3	50000	BDL
1,1,1-Trichloroethane	75-55-6	2500	BDL
Carbon Tetrachloride	56-23-5	2500	BDL
Vinyl Acetate	108-05-4	25000	BDL
Bromodichloromethane	75-27-4	2500	BDL
1,2-Dichloropropane	78-87-5	2500	BDL
2-Chloroethyl Vinyl Ether	110-75-8	5000	BDL
cis-1,3-Dichloropropene	10061-01-5	2500	BDL
Trichloroethene	79-01-6	2500	BDL
Dibromochloromethane	124-48-1	2500	BDL
1,1,2-Trichloroethane	79-00-5	2500	BDL
Benzene	71-43-2	2500	BDL
trans-1,3-Dichloropropene	10061-02-6	2500	BDL
Bromoform	75-25-2	2500	BDL
4-Methyl-2-Pentanone	108-10-1	25000	BDL
2-Hexanone	591-78-6	25000	BDL
Tetrachloroethene	127-18-4	2500	BDL
1,1,2,2-Tetrachloroethane	79-34-5	2500	BDL
Toluene	108-88-3	2500	2400 J
Chlorobenzene	108-90-7	2500	BDL
Ethylbenzene	100-41-4	2500	4200
Styrene	100-42-5	2500	BDL
Xylenes (total)	1330-20-7	2500	70000
1,2-Dichlorobenzene	95-50-1	5000	BDL
1,3-Dichlorobenzene	541-73-1	5000	BDL

BDL = Below Sample Detection Limit  
 SDL = Sample Detection Limit

COMMENTS: J = Detected but below sample detection limit.



QC

DATA

PACKAGE

**VOLATILE ORGANICS - GC/MS**

**LAB CONTROL SAMPLE / LAB CONTROL SAMPLE DUPLICATE**

**CENREF PROJECT I.D.:** 941692

**CENREF LCS/LCSD I.D.:** VMSB9410191 / VMDB9410191

**ASSOCIATED CENREF SAMPLE I.D.:** N/A

**DATE ANALYZED:** 10/19/94

**MEDIUM SOIL**

**UNITS:       $\mu\text{g/Kg}$**

COMPOUND	CONC. ADDED	SAMP CONC	LCS CONC	% REC	LCSD CONC	% REC	RPD	QC LIMITS	
								RPD	% REC
1,1-DICHLOROETHENE	6250	0	4610	74	5210	83	11	22	59-172
TRICHLOROETHENE	6250	0	4810	77	5460	87	12	24	62-137
CHLOROBENZENE	6250	0	5300	85	5800	93	9	21	60-133
TOLUENE	6250	0	5130	82	5850	94	14	21	59-139
BENZENE	6250	0	4830	77	5980	96	22	21	66-142

**COMMENTS:** \_\_\_\_\_

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**VOLATILE ORGANICS - GC/MS - 8260**  
**SOIL SURROGATE RECOVERY**

CENREF PROJECT I.D.: 941692      CLIENT: Western Water Cons.

LEVEL: MEDIUM

SAMPLE	VOLATILE		
	DIBROMOFLUORO- METHANE	TOLUENE- D8	4-BROMOFLUORO- BENZENE
QC LIMITS	80-120	81-117	74-121
VMBB9410191	95	111	84
VMSB9410191	93	89	76
VMDB9410191	88	85	79
7113MS	93	89	105
7113MD	101	85	106
VMBB9410241	82	108	77
VMBB9410251	84	105	78
7228DL	95	112	83
7229DL	104	123*	134*
7229DL2	84	116	106
7230DL	89	125*	105
7230DL2	87	122*	112
7231DL	81	99	88

\* = VALUES OUTSIDE OF QC LIMITS

COMMENTS:

**VOLATILE ORGANICS - GC/MS - 8260  
SOIL SURROGATE RECOVERY**

**CENREF PROJECT I.D.: 941692**

**CLIENT: Western Water Cons.**

**LEVEL: MEDIUM**

SAMPLE	VOLATILE			
	DIBROMOFLUORO- METHANE	TOLUENE- D8	4-BROMOFLUORO- BENZENE	
QC LIMITS	80-120	81-117	74-121	
7231DL2	96	103	102	
7232DL	100	101	120	
7232DL2	69*	91	107	
7233DL	99	105	116	
7233DL2	90	95	107	
7234DL	94	95	124*	
7234DL2	79*	92	100	
7235DL	76*	81	90	
7235DL2	70*	65*	73*	
7236DL	98	95	101	
7236DL2	64*	67*	76	

\* = VALUES OUTSIDE OF QC LIMITS

COMMENTS:

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**VOLATILE ORGANICS - GC/MS - 8260**  
**SOIL SURROGATE RECOVERY**

CENREF PROJECT I.D.: 941692

CLIENT: Western Water Cons.

LEVEL: LOW

SAMPLE	VOLATILE		
	DIBROMOFLUORO-METHANE	TOLUENE-D8	4-BROMOFLUORO-BENZENE
QC LIMITS	80-120	81-117	74-121
VVBB9410211	94	95	90
VVSB9410211	101	111	105
VVDB9410211	108	89	93
7159MS	138*	136*	129*
7159MD	186*	120*	114
VVBB9410221	94	91	92
7228	100	101	149*
7229	99	97	164*
7230	94	110	208*
7231	104	117	181*
7232	104	109	246*
7233	83	99	161*
7234	112	105	220*

\* = VALUES OUTSIDE OF QC LIMITS

COMMENTS:

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**VOLATILE ORGANICS - GC/MS - 8260**  
**SOIL SURROGATE RECOVERY**

CENREF PROJECT I.D.: 941692

CLIENT: Western Water Cons.

LEVEL: LOW

SAMPLE	VOLATILE		
	DIBROMOFLUORO- METHANE	TOLUENE- D8	4-BROMOFLUORO- BENZENE
QC LIMITS	80-120	81-117	74-121
7235	102	102	194*
7236	102	114	207*

\* = VALUES OUTSIDE OF QC LIMITS

COMMENTS:

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**APPENDIX B**

**TECHNICAL SPECIFICATIONS**

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**DIVISION 1 - GENERAL REQUIREMENTS  
SECTION 01010 - SUMMARY OF WORK**

**PART 1 - GENERAL**

**1.01 PROJECT DESCRIPTION**

The following information, though not all-inclusive, is given to assist Contractors in their evaluation of the work required to meet the project objectives:

The project consists of expanding an existing soil vapor extraction (SVE) system. Three additional zones will be connected to the existing Wash Bay SVE system. The work includes vapor extraction wells, piping, manifolds, blower systems, air treatment systems, controls, electrical supply, and ancillary work.

**1.02 EMPLOYEE TRAINING**

- A. All employees expected to be on the project site shall attend a one hour safety training presented by the Owner. Location and time of the training shall be coordinated between the Contractor and Owner.

**1.03 PERMITS**

Contractor shall be responsible for obtaining all permits associated with the construction of the system. Owner will be responsible for any and all environmental permits needed.

**1.04 CONSTRUCTION STAKING**

- A. Prior to commencement of the work, the Contractor shall report to the Engineer any inconsistencies in the proposed lines, levels, grades, dimensions, or locations shown on the Drawings.

**1.05 SITE MAINTENANCE**

- A. At all times during the work, keep the premises clean and orderly, and upon completion of the work, repair all damages caused by equipment and leave the project free of rubbish or excess materials of any kind.
- B. Fueling and lubricating of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spills and evaporation. Lubricants to be discarded, and waste oil shall be disposed off-site in accordance with approved procedures meeting government regulations.

- C. The Contractor shall provide and maintain environmental protection during the life of the Contract. Environmental protection shall be provided to control pollution that develops during normal construction practices. The Contractor's operation shall comply with all government regulations pertaining to water, air, solid waste, and noise pollution.
- D. Wastes which are not contaminated shall be picked up and placed in containers which are to be emptied on a regular schedule. All handling and disposal shall be so conducted as to prevent contamination of the site and any other areas. Contractor shall transport and dispose of non-contaminated waste in a manner that complies with government requirements. The Contractor shall provide the Engineer a copy of permit or license which reflects government agency's approval and compliance with their solid waste disposal regulations. The permit or license and the location of the disposal area shall be provided prior to transporting any waste material.

#### **1.06 PROJECT COMPLETION AND CLEANUP**

Upon completion of the project, all areas used by the Contractor shall be properly cleared of all temporary structures, rubbish, and waste materials and properly graded to drain and blend in with the abutting property. All signs of temporary construction and activities incidental to construction of the required permanent work in place shall be obliterated.

#### **PART 2 - PRODUCTS**

Not used.

#### **PART 3 - EXECUTION**

Not used.

**END OF SECTION**

## SECTION 01039 - COORDINATION AND MEETINGS

### PART 1 - GENERAL

Contractor shall cooperate in the coordination of activities in a manner that will provide the least interference with operations at the facility.

#### 1.01 SHUTDOWN OF EXISTING OPERATIONS OR UTILITIES

- A. Tie-in to existing services or utilities or other work that requires the temporary shutdown of any existing operations or utilities shall be planned in detail with appropriate scheduling of the work and be coordinated with the Owner and the Engineer.
- B. All materials and equipment (including emergency equipment) necessary to expedite the tie-in shall be on hand prior to the shutdown of existing services or utilities.

#### 1.02 SCHEDULING

- A. Plan the work and carry it out with minimum interference to the operations at the facility. Prior to starting the work, confer with the Engineer and Owner's representative to develop an approved work schedule that will permit the existing facility to function as normally as practical.
- B. Access to the facilities for personnel and chemical deliveries shall be maintained at all times during construction.

#### 1.03 PRECONSTRUCTION CONFERENCE

The Contractor shall attend a conference that will be held after acceptance of bids to discuss the project and the Owner's safety requirements.

#### 1.04 PROJECT MEETINGS

Project meetings among the Contractor and Owner and/or Engineer will be conducted on a regular basis to discuss project progress.

### PART 2 - PRODUCTS

Not Used

**PART 3 - EXECUTION**

Not used.

**END OF SECTION**

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**Coordination and Meetings  
01039-2**

## SECTION 01160 - SITE CONDITIONS

### PART 1 - GENERAL

#### 1.01 SITE INVESTIGATIONS

- A. The Contractor shall inspect the site so that he has satisfied himself as to the nature and location of the work, the general and local conditions, particularly those bearing upon access to the site; handling, storage, and disposal of materials; availability of water, electricity and roads; uncertainties of weather, river stages, or similar physical conditions at the site; the conformation and conditions of the ground; the equipment and facilities needed prior to and during the execution of the work; and all other matters which can in any way affect the work or the cost thereof under this Contract.
- B. The Contractor further shall satisfy himself as to the character and quantity of surface and subsurface materials to be encountered from his inspection of the site and from reviewing any available records of exploratory work furnished by the Engineer or included in these Documents. Failure by the Contractor to acquaint himself with the physical conditions of the site and all the available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work.
- C. The Engineer and Owner assume no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the Engineer or Owner.

#### 1.02 INFORMATION ON EXISTING SITE CONDITIONS

Any information obtained by the Engineer regarding site conditions, subsurface information, groundwater elevations, existing construction of site facilities, and similar data will be available for inspection, as applicable, at the office of the Engineer upon request. Such information is offered as supplementary information only and is not a part of these contract documents. Neither the Engineer nor the Owner assumes any responsibility for the completeness or interpretation of such supplementary information.

#### 1.03 DIFFERING SUBSURFACE CONDITION

- A. In the event that the subsurface or latent physical conditions are found materially different from those indicated in these Documents, and differing materially from those ordinarily encountered and generally recognized as inherent in the character of work covered in these Contract Documents, the Contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing of such changed conditions.
- B. The Engineer will investigate such conditions promptly and following this investigation, the Contractor shall proceed with the work, unless otherwise instructed by the Engineer. If the Engineer finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for performing the work, the Engineer will recommend to the

Owner the amount of adjustment in cost and time he considers reasonable. The Owner will make the final decision on all Change Orders to the Contract regarding any adjustment in cost or time for completion.

## **PART 2 - PRODUCTS**

Not used.

## **PART 3 - EXECUTION**

### **3.01 UTILITIES**

Utilities such as sewer, water, electric lines, and gas lines encountered in the work shall be protected from injury and maintained in service until moved or replaced as required or abandoned. The Contractor shall remove such parts of abandoned lines as may be necessary for the proper construction and use of the new work. Utility connection extension and payment for same is the responsibility of the Contractor.

The Contractor shall be responsible for arranging utility locates prior to starting any construction activities.

### **3.02 OBSTRUCTIONS**

- A. Some obstructions may not be shown. Bidders are advised to carefully inspect the existing facilities before preparing their proposals. The removal and replacement of minor obstructions such as electrical conduits, air, water, and waste piping, and similar items shall be anticipated and accomplished, even though not shown or specifically mentioned.
- B. Major obstructions encountered that are not shown on the Drawings or could not have been foreseen by visual inspection of the site prior to bidding should immediately be brought to the attention of the Engineer. The Engineer will make a determination for proceeding with the work. If the Engineer finds that the obstruction adversely affects the Contractor's costs or schedule for completion, a proper adjustment to the Contract will be made in accordance with the General Conditions.

### **3.03 INTERFERING STRUCTURES**

Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground. An attempt has been made to show major structures on the Drawings. The completeness and accuracy cannot be guaranteed, and it is presented simply as a guide to avoid known possible difficulties.

### **3.04 FIELD RELOCATION**

During the progress of construction, it is expected that minor relocations of the work will be necessary. Such relocations shall be made only by direction of the Engineer. If existing structures are encountered

that prevent the construction, and that are not properly shown on the Drawings, notify the Engineer before continuing with the construction in order that the Engineer may make such field revision as necessary to avoid conflict with the existing structures. If the Contractor shall fail to so notify the Engineer when an existing structure is encountered, and shall proceed with the construction despite the interference, he shall do so at his own risk.

### **3.05 LAND MONUMENTS**

The Contractor shall notify the Engineer of any existing public and private land monuments encountered. Private monuments shall be preserved, or replaced by a licensed surveyor at the Contractor's expense. When government monuments are encountered, the Contractor shall notify the Engineer at least 2 weeks in advance of the proposed construction in order that the Engineer will have ample opportunity to notify the proper authority and reference these monuments for later replacement.

**END OF SECTION**

## SECTION 01300 - SUBMITTALS

### PART 1 - GENERAL

#### 1.01 SECTION INCLUDES

- A. Shop Drawing Submittals
- B. Operation and Maintenance Data

#### 1.02 SHOP DRAWING SUBMITTALS

- A. Transmit each submittal with Engineer accepted form.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- C. Identify project, Contractor, Subcontractor, or Supplier, pertinent drawing sheet and detail number(s); and specification section number as appropriate.
- D. Apply Contractor's stamp, signed or initialled, certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the contract documents.
- E. Submit number that Contractor requires, plus three copies to be retained by Engineer and Owner.
- F. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

#### 1.03 OPERATION AND MAINTENANCE DATA

- A. Provide operating and instruction manuals and warranty and service information from equipment manufacturers to Engineer and the Owner's on-site representative upon completion of the work.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls and communications.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routing procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Include manufacturer's printed operation and maintenance instructions.



- F. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- G. Manufacturer's operation and maintenance manuals shall be furnished for the following equipment, at a minimum:
1. Blowers and appurtenant equipment
  2. All control valves
  3. Heating and ventilating equipment
  4. Instrumentation and controls.

## **PART 2 - PRODUCTS**

Not used.

## **PART 3 - EXECUTION**

Not used.

**END OF SECTION**

## SECTION 01400 - SAFETY

### PART 1 - GENERAL

#### 1.01 CONSTRUCTION SAFETY PROGRAM

- A. The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The Contractor's safety program shall be in accordance with:
  - 1. All applicable requirements of the U.S. Environmental Protection Agency, the Occupational Safety and Health Administration, and all other federal, state, and local agencies with jurisdiction over safety issues at the site. (OSHA 29 CFR 1910.120).
  - 2. The Site Safety Plan developed for this project by the Engineer, as that plan is modified during the course of the project. Engineer will be responsible for keeping Contractor apprised of all modifications to the Site Safety Plan.
- B. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.
- C. The duty of the Owner and/or Engineer to conduct construction review of the Contractor's performance is not intended to include a review or acceptance of the adequacy of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.

#### 1.02 SAFETY EQUIPMENT

- A. The Contractor, as part of the Contractor's safety program, shall maintain at the Contractor's office or other well-known place at the job site, safety equipment applicable to the work as prescribed by the governing safety authorities, and all articles necessary for giving first-aid to the injured. Also, as part of the Contractor safety program, the Contractor shall establish the procedure for the immediate removal to a hospital or a doctor's care of any person who may be injured on the job site.
- B. During construction, the Contractor shall construct and at all times maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades, or steel plates, as applicable, at all openings, obstructions, or other hazards in streets, sidewalks, floors, roofs, and walkways. All such barriers shall have adequate warning lights as necessary, or required, for safety.

#### 1.03 COMPLETION OF THE WORK

The performance of all work and all completed construction, particularly with respect to ladders, platforms, structure openings, scaffolding, shoring, lagging, machinery guards, and the like, shall be in accordance with the applicable governing safety authorities.

#### 1.04 ACCIDENT REPORTS

- A. If death, serious injuries, or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Engineer and Owner. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the

performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses.

- B. If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

#### **1.05 FIRE PREVENTION AND PROTECTION**

- A. The Contractor shall perform all work in a fire-safe manner. The Contractor shall supply and maintain on the site, adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable federal, state, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NPFA No. 241) shall be followed.

### **PART 2 - PRODUCTS**

NOT USED

### **PART 3 - EXECUTION**

NOT USED

**END OF SECTION**

## **SECTION 01510 - TEMPORARY CONSTRUCTION UTILITIES AND FACILITIES**

### **PART 1 - GENERAL**

#### **1.01 SITE PREPARATION FOR CONTRACTOR OCCUPANCY**

- A. The Contractor shall provide all temporary facilities as required for performing the work.
- B. The area for Contractor's storage, staging, and parking is limited and shall be coordinated with the Owner and/or Engineer.
- C. The Contractor may construct a temporary security fence for the protection of materials, tools and equipment. Maintain fence during construction period. Upon completion of work, the security fence shall be removed from the site.
- D. The Contractor shall obtain the necessary permits for connection to necessary services provided by utility companies serving the project area.
- E. Set-up temporary construction facilities in a neat and orderly manner. Accomplish all required work in accordance with applicable portions of these specifications. Confine operations to work area shown.

#### **1.02 TEMPORARY WATER**

Potable water will be available to the Contractor locally. The water can be obtained from a water service line on Owner's property adjacent to the location of the work.

#### **1.03 - TEMPORARY ELECTRIC POWER**

Electric power will be available to the Contractor locally. The Contractor shall determine the type and amount available. Electricity can be obtained on Owner's property.

#### **1.04 SANITARY FACILITIES**

The Contractor shall provide sanitary facilities for the Contractor's employees and his subcontractors' employees. The facility shall conform to code requirements and be acceptable to the sanitary authorities. Contractor shall maintain the facility in a neat and orderly fashion.

#### **1.05 PRODUCT DELIVERY**

- A. Contractor shall schedule and perform construction operations to avoid blocking existing traffic patterns on Owner's property.

- B. Schedule delivery of products or equipment as required to allow timely installation and to avoid excessive on-site storage.
- C. Delivery of products or equipment to be in manufacturer's original unbroken cartons or other containers, clearly and fully marked and identified as to manufacturer, item, location where to install, and instructions for assembly, use and storage.
- D. The Contractor shall inspect all products or equipment delivered to the site prior to their unloading and shall reject all products or equipment that are damaged, used, or in any other way unsatisfactory for use on the project.

#### **1.06 STORAGE AND HANDLING**

- A. Store products or equipment off ground and protected from weather. Provide additional protection as required by manufacturer until the time that the item is to be installed. While storing, take care to avoid creating a humidity chamber by venting area.
- B. Store products or equipment in location to avoid physical damage to items while in storage, and to facilitate prompt inspection.
- C. Handle products or equipment in accord with manufacturer's recommendations and instructions.
- D. Delicate instruments and materials subject to vandalism or theft shall be placed under locked cover, and if necessary, provided with temporary control as recommended by manufacturer.

#### **PART 2 - PRODUCTS**

Not used.

#### **PART 3 - EXECUTION**

Not used.

**END OF SECTION**

**DIVISION 2 - SITE WORK**  
**SECTION 02230 - TRENCH EXCAVATION AND BACKFILL FOR**  
**PIPELINES AND APPURTENANT STRUCTURES**

**PART 1 - GENERAL**

**1.01 WORK INCLUDED**

This section covers excavation, trenching and backfilling for pipelines and appurtenances, complete. This item shall consist of all necessary clearing, grubbing and site preparation; removal of all material of whatever description that may be encountered; removal and disposal of debris; handling and storage of materials to be used for fill and backfill; all necessary bracing, shoring and protection; pumping and dewatering as necessary; all backfill, preparation of subgrades; and final grading, dressing and surface restoration cleanup of the site.

**PART 2 - PRODUCTS**

**2.01 PIPE BEDDING MATERIAL**

Bedding material around and to a minimum of six (6) inches over the pipe, or as shown on the drawings, shall consist of sand or fine gravel, free from clods or lumps of frozen or organic material. The material in this zone shall be free draining, non-plastic material. Where suitable material is available in the material excavated from the trench, the Contractor may procure the select material by screening, sifting or manually sorting the material removed from the trench.

**2.02 TRENCH BACKFILL**

Trench backfill is to be the same as for Pipe Bedding.

**PART 3 - EXECUTION**

**3.01 GENERAL**

- A. All excavation, trenching and shoring, and the like, under this contract shall be performed in a manner that meets with the OSHA Department of Labor, Safety and Health Regulations for Construction.
- B. The Contractor shall excavate as necessary at the locations shown on the drawings, staked in the field or otherwise specified for the installation of pipelines.
- C. The Contractor shall take precautions and protect all adjoining private and public property and facilities, including underground and overhead utilities, curbs, sidewalks, driveways, structures,

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02230-1

and fences. Any disturbed or damaged facilities will be suitably restored or replaced at no cost to the Owner.

- D. Crossings under sidewalks or curbs may be made by tunneling only if approved by Engineer. If the Contractor elects to remove a portion of the sidewalk or curb, he must use a concrete saw for making neat joints corresponding to existing joints, compact the backfill as specified, and pour a new concrete sidewalk or curb section.
- E. During excavation, materials suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. Excavated material shall be piled on one side of the trench only, to permit ready access to existing fire alarm boxes, fire hydrants, valves, manholes and other appurtenances. Surface drainage of adjoining areas shall be unobstructed.
- F. All excavated materials not required or unsuitable for backfill shall be removed from the site as directed by the Engineer. If any soil appears to be contaminated the Engineer will be notified immediately.
- G. Grading shall be done as may be necessary to prevent surface water from flowing into excavations, and any other water accumulating therein shall be promptly removed. Under no circumstances shall water be permitted to rise in unbackfilled trenches until after the pipe has been placed, tested and covered with backfill. Any pipe having its alignment or grade changes as a result of a flooded trench shall be relaid at no additional cost to the Owner.
- H. The bottom of the trenches shall be accurately graded to the line and grade or depth shown on the drawings. Bedding material shall provide uniform bearing and support for each section of the pipe at every point along its entire length. Bell holes and depressions for joints shall be dug after the trench bedding has been graded, and shall be only of such length, depth and width as required for properly making the particular type joint. Unauthorized overdepths shall be backfilled with bedding material at the Contractor's expense.
- I. There will be no differentiation between common and rock trench excavation, except when listed as separate items on the bid proposal or bid form. Excavation shall include the removal and subsequent handling of all earth, gravel, rock or other material encountered regardless of the type, character, composition or condition of the material.

### 3.02 STRIPPING

- A. When crossing existing or prospective cultivated areas, gravel streets or other developed surfaces, the Contractor shall strip the cover material to full depth at the existing surfacing. This surfacing shall be stockpiled and placed back over the trench after backfilling to the extent that it is acceptable and usable for that purpose. Topsoil shall be removed to full depth of the topsoil, or to a maximum depth of 12 inches, whichever is less.
- B. All established lawn areas cut by the trench or damaged during the course of the work shall be restored to a condition comparable to its surrounding area and to the complete satisfaction of the engineer.

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Trench Excavation and Backfill for  
Pipelines and Appurtenant  
Structures  
02230-2

### 3.03 TRENCH EXCAVATION

A. The sides of all trenches greater than five (5) feet in depth shall be sloped back to preclude collapse, in accordance with OSHA Regulations. In no case shall trench walls above the five foot level be sloped steeper than a one foot rise per one foot horizontal (1:1).

B. TRENCH DIMENSIONS. Trench dimensions shall be as specified below:

(1) Width. The width of the trench shall be such to provide adequate working room for men to install and join the pipe in the specified manner. Trench Excavation and Backfill, shall be adequate in width to allow proper compactive effort along both sides of the pipe.

(2) Depth of Trench. Trench depth shall be as required for the invert grade or pipe bury shown on the plans. Care shall be taken not to excavate below the required depth.

When soft or unstable material or rock is encountered at the subgrade which will not uniformly support the pipe, such material shall be excavated to an additional depth as directed by the Engineer and backfilled with Bedding Material.

C. EQUIPMENT. The use of trench digging machinery will be permitted except in places where its operation will cause damage to existing structures or features; in which case hand methods shall be employed.

Any equipment operating on tracts, which is to used on pavement, shall be equipped with suitable pads to prevent damage to the pavement. All pavement damaged during construction by the Contractor's equipment shall be restored to its original condition by the Contractor. No compensation will be allowed for pavement replacement other than as specified elsewhere.

D. DEWATERING. Where ground water is encountered in excavation, it shall be removed to avoid interfering with pipe laying and other construction operations. The cost of dewatering operations will not be paid for as a separate item, but shall be merged with and considered a part of the excavation cost.

E. SHORING, SHEETING AND BRACING. The Contractor shall do all shoring, bracing and tight sheeting required to prevent caving and to protect his workmen, in accordance with Occupational Safety and Health Regulation Requirements, and to protect adjacent property and structures. No extra payment shall be made for these items.

F. EXCAVATION FOR APPURTENANCES. Excavations for manholes, hydrants, structures and other appurtenances shall be sufficient to leave clearance adequate for proper compactive effort on all sides. The depth, provisions for removing water, and other applicable portions of these specifications shall apply to excavation for appurtenances.

### 3.09 TRENCH BACKFILL:

All trenches shall be backfilled immediately after grade, alignment and jointing of the pipe has been inspected and approved by the Engineer. Leakage tests, pressure tests or tests for alignment and grade



shall be performed after backfill. If any test fails, the Contractor shall be responsible for work required to correct the defects at no additional cost to the Owner.

- A. Bedding material under and around the pipe to six (6) inches above the top of the pipe shall be distributed by hand in maximum layers of six (6) inches and thoroughly compacted by tamping. Special care shall be taken to assure complete compaction under the haunches of the pipe. Backfill material shall be placed in the trench for its full width on each side simultaneously. Compaction of pipe bedding shall be in accordance with the pipe manufacturer's recommendations.

Water settling of this portion of the trench will not be allowed, and the addition of water shall be limited to that required for optimum moisture for maximum compaction of the material.

- B. Trench Backfill. Materials used for bedding and backfill shall be carefully deposited in layers suitable to the equipment used for compaction, wetted to optimum moisture content, and compacted to at least the density of the surrounding material.

The upper layer forming the subgrade for pavement which is to be replaced shall be compacted to a density of at least 90% of maximum Standard Proctor Density, as determined by AASHTO Designation T-180 Method A or C.

Compaction by flooding will only be permitted by approval of the Engineer. Wherever the trenches have not been properly filled, or if settlement occurs, they shall be re-opened to the depth required for proper compaction and refilled and recompacted.

For graveled streets the backfill shall be completed by blading the stripped gravel back over the trench.

- C. The Contractor may be required to mound excess earth over the top of the trench so that a depression will not be formed after the trench settles. In cultivated areas, the stripped topsoil shall be placed uniformly over the backfilled trench. The topsoil shall not be compacted but shall be graded to provide a smooth surface conforming to the adjoining ground surfaces.
- D. BACKFILLING FOR APPURTENANCES. Backfill around appurtenances shall be deposited in such a manner as not to disturb the appurtenance from its proper alignment, and compacted to the finished grade. Backfill material, compaction and backfill procedures shall conform to the requirements of the related Type A or Type B backfill as specified for trenches.
- E. BACKFILL ABOVE ORIGINAL GROUND FOR MINIMUM COVER REQUIREMENTS. Where shown on the plans, the Contractor shall provide embankment over the pipe above the original ground surface to a height which will satisfy the minimum depth of cover requirements. Such embankment shall be constructed to the cross section shown on the plans. No additional compensation will be paid for embankment unless shown as a specific item on the proposal.
- F. TESTING. Field density tests of the compacted fill will be run at all levels. These tests will be performed by the Engineer to insure that the specified density is being obtained.

### **3.05 CONTRACTOR'S SAFETY RESPONSIBILITIES**

The Contractor shall be responsible for enforcing safety and maintaining safe working conditions in all trenching, shoring, and blasting operations to conform to OSHA regulations.

The Contractor shall employ qualified, properly trained personnel to be design shoring, perform safety inspections of the trenches, and supervise the handling of explosives, and other operations involving safety procedures, as prescribed by OSHA.

### **3.06 TRAFFIC CONTROL AND WARNING DEVICES**

The Contractor shall construct the Project in such a manner as to minimize the interruption of the use of roads, highways or streets involved and shall provide for emergency runs and fire hydrant access at all times.

The Contractor is responsible for providing adequate barricades of high visibility design, flares, lanterns, signs, flagmen and pre-warning devices to alert the public, motorists and pedestrians of hazardous conditions in accordance with the latest issue of the Manual on Uniform Traffic Control Devices for Streets and Highways published by the Department of Transportation.

### **3.07 PROTECTION OF EXISTING PROPERTIES**

- A. Prior to beginning construction, the Contractor must give notice of intended excavation to public utilities with underground facilities located in the area of proposed excavation; and providing for exceptions.

Existing water mains and water services shall be protected at all times during construction operations.

- B. PRIVATE OWNED UTILITIES. Gas mains, underground electrical and telephone cables, telephone poles, light poles, etc., required to be moved to make way for new construction will be moved by others.

- C. EXPLORATORY EXCAVATION. Location of buried utilities that might interfere with alignment or grade shall be verified by exploratory excavation prior to construction. If any existing utility interferes with the work in either alignment or grade and has to be moved, such work shall be done by the Contractor and adjustment in payment will be made at a price agreed upon before the work is started.

- D. STRUCTURES. The Contractor shall exercise every precaution to prevent damage to existing buildings or structures in the vicinity of his work. In the event of such damages, he shall repair them to the satisfaction of the Owner of the damaged structure and at no cost to the Owner.

- E. OVERHEAD UTILITIES. The Contractor shall use extreme caution to avoid a conflict, contact or damage to overhead utilities, such as power lines, street lights, telephone lines, television lines, poles or other appurtenances during the course of construction of this Project.

- F. **PAVEMENT REMOVAL.** Where trench excavation or structure excavation requires the removal of curb and gutter, concrete sidewalks, or asphaltic or concrete pavement, the pavement or concrete shall be cut in a straight line parallel to the edge of the excavation by use of a spadebitted air hammer, concrete saw or similar approved equipment to obtain a straight, square clean break. Pavement cuts shall be two (2) feet wider than the actual trench opening and centered over such trench.
- G. **SURVEY MARKERS AND MONUMENTS.** The Contractor shall use every care and precaution to protect and not disturb any survey marker or monuments, such as those that might be located at lot or block corners, property pins, intersection of street monuments or addition line demarcation. Such protection shall include marking with flagged high lath and close supervision. No monuments shall be disturbed without prior approval of the Owner and Engineer. Any survey marker or monument that is disturbed or destroyed by the Contractor without approval during the construction of this Project shall be replaced at no cost to the Owner by a licensed land surveyor.

### 3.08 SURFACE RESTORATION

- A. **PERMANENT RESURFACING.** Unless otherwise specified on the plans, all surface improvements damaged or removed as a result of the Contractor's operations shall be reconstructed by the Contractor to the same dimensions, except for pavement thickness, and with the same type materials used in the original work. Trench resurfacing shall be one (1) inch greater in thickness than existing pavement.

Surfaces for trenches in gravel streets or alleys shall be restored to their original shape and the surfacing material shall be of equal quality and equal thickness to that of the original surface. Gravel surfacing material shall be approved by the Engineer. Care shall be taken to not contaminate existing gravel surfaces outside the trench area.

Subgrade for trench resurfacing shall be restored to that existing prior to the excavation and shall be placed in a manner that will permit the restoration of the surface to condition equivalent to that in which it was prior to excavation.

### 3.9 CLEANUP

As work progresses, that portion of the work completed shall be cleared of debris and brought to the finished grade. Upon completion of the work, the entire site shall be cleared of all debris and ground surfaces shall be finished to smooth, uniform slopes and shall present a neat and workmanlike appearance. All rocks brought to the ground surface by excavation or backfilling operations shall be removed.

END OF SECTION

## **SECTION 02610 - EXTRACTION WELLS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide extraction wells and accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation. The work shall include installation of twenty (20), 5-foot deep vapor extraction wells.
- B. Related work:
  - 1. Documents affecting work of this section include, but are not limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

#### **1.2 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- B. Comply with pertinent codes and regulations of government agencies having jurisdiction, and Federal Regulations for packages and storing of hazardous waste.

40 CFR 262, Subpart C, Pre-Transport Requirements  
49 CFR 178.80, Transport Requirements

### **PART 2 - PRODUCTS**

#### **2.1 EXTRACTION WELLS**

- A. Well Casing - 2-inch diameter blank, Schedule 80, flush threaded PVC well casing. The top of each casing shall be provided with a tee to connect to the header piping with an air tight removable cap.
- B. Well Screen - 2-inch diameter, Schedule 80, flush threaded PVC well screen with 0.05-inch factory slots. Each well screen shall be provided with a threaded PVC cap at the bottom.
- C. Filter Pack - 6-9 mesh clean, washed silica sand
- D. Bentonite Seal - Bentonite chips or pellets
- E. Concrete Surface Seal - 6-inch - 12-inch concrete seal of portland cement mix or neat cement grout

- F. **Protective Well Cover** - 12-inch diameter, water tight, cast iron monitoring well cover with 12-inch galvanized steel skirts, wells (SVE-1, 2, 6, 11, 12, 16, 17, 18). Universal Model #65 or approved equal.

## **PART 3 - EXECUTION**

### **3.1 SURFACE CONDITIONS**

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

### **3.2 INSTALLATION**

- A. **Borehole** - The borehole shall be a minimum of 12-inches in diameter and drilled by an auger or approved method.

Provide a minimum separation of 1-foot between the bottom of the borehole and the ground-water surface. Upon withdrawal of the auger, the borehole sidewalls shall be raked to remove all smearing of the subsurface created by the drilled. Approximately 1/4-inch of material shall be scraped from the borehole sidewall. The raked material shall be allowed to fall to the bottom of the borehole.

The raked material shall be tamped in the bottom of the borehole to assist in provided a seal between the borehole and the ground-water table.

- B. **Soil Cuttings** - The soil cuttings generated during borehole installation shall be considered a Federally regulated hazardous waste and shall be handled in accordance with EPA Regulations.

1. **Soil Cuttings Handling** - All cuttings generated during borehole installation shall be handled and containerized as Federally regulated F-lsited hazardous waste. Soil has been documented to contain only residual product contamination by chlorinated hydrocarbons, therefore the need for respiratory protection is not anticipated. All handling and packaging work shall be performed in accordance with 40 CFR 262, Subpart C, Pre-Transport Requirements.

Soil cuttings from borehole installation shall be containerized as soon as is practicable after drilling. Temporary storage or staging areas must be covered with an impermeable liner before the cuttings are placed there. At a minimum, all cuttings shall be containerized at the end of each working day. Containers shall be provided by the OWNER and shall be HDPE, removable head drums constructed and tested in accordance with US Department of Transportation regulation 49 CFR 178.80, or approved equal.

The CONTRACTOR shall place the soil in the containers, seal the container, properly label the container with the date of filling and the waste identification number (to be provided by the ENGINEER), place the containers on pallets in an approved on-site

location specified by the Dowell Schlumberger site manager and band the containers. The pallets shall be provided by the OWNER. The OWNER shall be responsible for coordinating and accomplishing disposal.

- C. **Extraction Well** - Each borehole shall be completed as an extraction well by installation of 2-inch diameter Schedule 80 PVC well screen, well casing, filter pack, bentonite seal, and concrete seal. The surface completion shall be either above-grade or below-grade depending on well location.

**END OF SECTION**

**DIVISION 6 - WOOD & PLASTIC**  
**SECTION 06111 - LIGHT WOODEN STRUCTURES**

**PART 1 - GENERAL**

**1.01 WORK INCLUDED**

- A. Provide all labor and construction materials to construct light duty wooden structures. Work includes rough carpentry framing, sheathing walls and roofs, insulation, interior sheathing, finish carpentry, and ancillary work as necessary. Dimensions and materials are as shown on the drawings.

**1.02 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

**PART 2 - PRODUCTS**

**2.01 GRADE STAMPS**

- A. Identify framing lumber by the grade stamp of the West Coast Lumber Inspection Bureau, or such other grade stamp as is approved in advance by the Engineer.
- B. Identify plywood as to species, grade, and glue type by the stamp of the American Plywood Association.
- C. Identify other materials of this Section by the appropriate stamp of the agency approved in advance by the Engineer.

**2.02 ROUGH CARPENTRY**

Provide materials in the quantities needed for the Work shown on the Drawings, and meeting or exceeding the following standards of quality:

- A. Horizontal framing members: Douglas Fir-Hemlock, Construction grade.
- B. Vertical framing members: Douglas Fir-Hemlock, Standard grade.
- C. Plywood:
  - 1. Sheathing Roof: Structural II, C-C, exterior; or standard sheathing with exterior glue.

- 2. Soffit: 3/8" thick AC, exterior, Group 2.
- D. 1. Nails:
  - (1) Use common except as otherwise noted.
  - (2) Comply with Fed Spec FF-N-1.
  - (3) Use galvanized at exterior locations.
- 2. Joist Hangers: Simpson, Teco, or equal as approved by the Engineer.
- E. Interior Sheathing - 1/2" Wafer Board
- F. Exterior Sheathing - T-111

## 2.03 FINISH CARPENTRY

- A. Provide materials in the needed for the Work as shown on the Drawings, and meeting or exceeding the following standards of quality:
  - 1. Wood base: Pine, streamline 9/16" x 2 1/4".
  - 2. Casing: Pine, streamline 9/16" x 2 1/4".
- B. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

## 2.04 INSULATION

- A. Provide the following building insulations where shown on the Drawings or otherwise needed to achieve the degree of insulation required under pertinent regulations of governmental agencies having jurisdiction.
  - 1. Wall insulation: 3-1/2" thick Kraft-faced glass fiber batts with an insulation-only value of R-11.
  - 2. Ceiling insulation: 6" thick Kraft-faced glass fiber batts with an insulation-only value of R-19.

## 2.05 DELIVERY, STORAGE AND HANDLING

- A. Protection:
  - 1. Deliver the materials to the job site and store, in a safe area, out of the way of traffic, and shored up off the ground surface.
  - 2. Identify framing lumber as to grades, and store each grade separately from other grades.



3. Protect metals with adequate waterproof outer wrapping.
4. Use extreme care in off loading of lumber to prevent damage, splitting, and breaking of materials.

### **PART 3 - EXECUTION**

#### **3.01 SURFACE CONDITIONS**

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

#### **3.02 FRAMING**

- A. Produce joints which are tight, true, and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.
- B. Selection of lumber pieces:
  1. Carefully select the members.
  2. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing, and will allow making of proper connections.
  3. Cut out and discard defects which render a piece unable to serve its intended function.
  4. Lumber may be rejected by the Engineer, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.
- C. Do not shim any framing component.
- D. In addition to framing operations normal to the fabrication and erection indicated on the Drawings, install wood blocking and backing required for the work of other trades.
- E. Set horizontal and sloped members with crown up.
- F. Do not notch, cut, or bore members for pipes, ducts, or conduits, or for other reasons except as shown on the Drawings or as specifically approved in advance by the Engineer.
- G. Bearing Surfaces
  1. Make bearings full unless otherwise indicated on the Drawings.

2. Finish bearing surfaces on which structural members are to rest so as to give sure and even support.
3. Where framing members slope, cut or notch the ends as required to give uniform bearing.

H. Alignment

On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8" from the plane of surfaces of adjacent furring and framing members.

### 3.03 BLOCKING AND BRIDGING

- A. Install blocking as required to support items of finish and to cut off concealed draft openings, both vertical and horizontal, between ceiling and floor areas.
- B. Bridging:
  1. Install wood cross bridging (not less than 2" x 3" nominal), metal cross bridging of equal strength, or solid blocking between joists where the span exceeds 8' - 0".
  2. Provide maximum distance of 8' - 0" between a line of bridging and a bearing.
  3. Cross bridging may be omitted for roof and ceiling joists where the omission is permitted by code, except where otherwise indicated on the Drawings.
  4. Install solid blocking between joists at points of support and wherever sheathing is discontinuous. Blocking may be omitted where joists are supported on metal hangers.

### 3.04 FASTENING

- A. Nailing:
  1. Use only common wire nails or spikes of the dimension shown on the Nailing Schedule, except where otherwise specifically noted on the Drawings.
  2. For conditions not covered in the Nailing Schedule provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike, provided, however, that 16d nails may be used to connect two pieces of 2" (nominal) thickness.
  3. Nail without splitting wood,
  4. Prebore as required.
  5. Remove split members and replace with members complying with the specified requirements.

**B. Bolting:**

1. Drill holes 1/16" larger in diameter than the bolts being used.
2. Drill straight and true from one side only.
3. Do not bear bolt heads on wood, but use washers under head and nut where both bear on wood, and use washers under all nuts.

**C. Screws:**

1. For lag screws and wood screws, prebore holes same diameter as root of threads, enlarging holes to shank diameter for length of shank.

**3.05 INSTALLATION OF PLYWOOD ROOF SHEATHING**

**A. Placement:**

1. Place plywood with face grain perpendicular to supports and continuously over at least two supports, except where otherwise shown on the Drawings.
2. Center joints accurately over supports, unless otherwise shown on the Drawings.

**B. Protect plywood from moisture by use of waterproof coverings until the plywood in turn has been covered with the next succeeding component or finish.**

**3.06 FINISH CARPENTRY**

**A. Produce joints which are true, tight, and well nailed with all members assembled in accordance with the Drawings.**

**B. Jointing:**

1. Make joints to conceal shrinkage; miter exterior joints; cope interior joints; miter or scarf end-to-end joints.
2. Install trim in pieces as long as possible, jointing only where solid support is obtained.

**C. Fastening:**

1. Install items straight, true, level, plumb, and firmly anchored in place.
2. Where blocking or backing is required, coordinate as necessary with other trades to ensure placement of required backing and blocking in a timely manner.
3. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood,

4. Nail exterior trim with galvanized nails, making joints to exclude water.
5. On exposed work, set nails for putty.
6. Screw, do not drive, wood screws; except that screws may be started by driving and then screwed home.

### 3.07 INSULATION

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Remove, or protect against, projections in construction framing which may damage or prevent proper insulation.
- C. Install the work of this Section in strict accordance with the original design, requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Engineer, anchoring all components firmly into position.

END OF SECTION

**DIVISION 9 - FINISHES**  
**SECTION 09900 - PAINTING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Paint and finish exposed surfaces using the combination of materials listed on Painting Schedule in Part 3 of this Section, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
  - 2. Priming or priming and finishing of certain surfaces may be specified to be factory-performed or installer-performed under pertinent other Sections.
- C. Work not included:
  - 1. Unless otherwise indicated, painting is not required on surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces, and duct shafts.
  - 2. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require painting under this Section except as may be so specified.
  - 3. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sensing devices; and motor shafts, unless otherwise indicated.
  - 4. Do not paint over required labels or equipment identification, performance rating, name, or nomenclature plates.
  - 5. Do not paint concrete.
- D. Definitions:
  - 1. "Paint", as used herein, means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats.

**1.2 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the

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necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Paint coordination:

1. Provide finish coats which are compatible with the prime coats actually used.

### 1.3 SITE CONDITIONS

A. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45°F, unless otherwise permitted by the manufacturers' printed instructions as approved by the Engineer.

B. Weather conditions:

1. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces, unless otherwise permitted by the manufacturers' printed instructions.
2. Applications may be continued during inclement weather only within the temperature limits specified by the paint manufacturer as being suitable for use during application and drying periods.

### 1.4 MAINTENANCE

A. Upon completion of the work of this Section, deliver to the Owner an extra stock equaling 10% of each color, type, and gloss of paint used in the Work, tightly sealing each container, and clearly labeling with contents and location where used.

## PART 2 - PRODUCTS

### 2.1 PAINT MATERIALS

A. Acceptable materials: Provide paint of a reputable manufacturer as approved by Engineer.

### 2.2 APPLICATION EQUIPMENT

A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint.

B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied, and that integrity of the finish will not be jeopardized by use of the proposed equipment.

## 2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

### 3.2 MATERIALS PREPARATION

- A. General:
  - 1. Mix and prepare paint materials in strict accordance with the manufacturers' recommendations.
  - 2. When materials are not in use, store in tightly covered containers.
  - 3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.

### 3.3 SURFACE PREPARATION

- A. General:
  - 1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturers' recommendations.
- B. Preparation of wood surfaces:
  - 1. Clean wood surfaces until free from dirt, oil, and other foreign substances.
  - 2. Smooth finished wood surfaces exposed to view, using the proper sandpaper. Where so required, use varying degrees of coarseness in sandpaper to produce a uniformly smooth and unmarred wood surface.
  - 3. Unless specifically approved by the Engineer, do not proceed with painting of wood surfaces until the moisture content of the wood is 12% or less.
- C. Preparation of metal surfaces:
  - 1. Thoroughly clean surfaces until free from dirt, oil, and grease.

### 3.4 PAINT APPLICATION

#### A. General:

1. Touchup shop-applied prime coats which have been damaged, and touchup bare areas prior to start of finish coats application.
2. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.

#### B. Drying:

1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.

### 3.5 PAINTING SCHEDULE

#### A. Provide the following paint finishes.

#### B. Exterior metal, Doors:

1. First coat: Oil base
2. Second coat: Oil base

#### C. Exterior wood:

1. First coat: Primer
2. Second coat: Exterior Latex
2. Third coat: Exterior Latex

#### D. Exterior Siding:

1. First coat: Exterior Latex
2. Second coat: Exterior Latex

#### E. Interior flat wall paint ("F"):

1. On Waferboard Sheathing:
  - a. First coat: Primer
  - b. Second coat: Latex, interior
  - c. Third coat: Latex, interior

END OF SECTION



## **SECTION 15060 - PLANT PIPING - GENERAL**

### **PART 1 - GENERAL**

#### **1.1 WORK INCLUDED**

- A. This section covers the work necessary to furnish and install, complete, the plant piping specified herein, and as further specified in the Detail Piping Specifications hereinafter.

#### **1.2 GENERAL**

- A. Like items of material provided hereunder shall be the end products of one manufacturer.

#### **1.3 SUBMITTALS DURING CONSTRUCTION**

- A. Shop Drawings:

- 1. A specific selection of pipe material and joint type for each pipeline where alternative materials and joints are specified for selection by the Contractor.

#### **1.4 STANDARDS, SPECIFICATIONS, AND CODES**

- A. All systems shall conform to Uniform Plumbing Code, Uniform Mechanical Code, all applicable NFPA Codes and local codes as approved by the Owner for the project site.
- B. The Owner will obtain any variances imposed by site constraints.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. The general materials to be used for the piping systems are shown on the Drawings. Specific material requirements are contained in the Detail Piping Specifications.

#### **2.2 PIPING SUPPORT SYSTEMS**

- A. General:

- 1. Piping shall be supported, in general, as described hereinafter.
  - 2. The Contractor shall select and design all piping support systems within the specified spans and component requirements. Structural design and selection of support system

components shall withstand the dead loads imposed by the weight of the pipes. Commercial pipe supports and hangers shall have a minimum safety factor of 5.

3. No attempt has been made to show required pipe supports in all locations, either on the Drawings or in the details. The absence of pipe supports and details on any drawings shall not relieve the Contractor of the responsibility for providing them throughout the plant.
4. All support anchoring devices, including anchor bolts, inserts and other devices used to anchor the support onto a concrete base, roof, wall or structural steel works, shall be of the proper size, strength and spacing to withstand the shear and pullout loads imposed by loading and spacing on each particular support.
5. Where piping connects to equipment it shall be supported by a pipe support and not by the equipment.

**B. Building Piping:**

1. Horizontal black steel piping shall be supported with adjustable swivel-ring, split-ring type hangers. Grinnell, Figure 97 or equal.
2. No metal portion of a hanger, support, or brace shall contact pipe directly.
3. No pipe shall be supported from the pipe above it.
4. Horizontal piping hanger support rods shall attach to steel beams with concentric loading I-beam clamps; to concrete with inserts, brackets or flanges fastened with concrete anchors.
5. Vertical piping hangers and supports shall be channel and pipe straps manufactured by Unistrut, Kin-Line, or equal.
6. Unless noted otherwise on the Drawings, horizontal pipe support or hanger spacing and rod sizing for natural gas pipe shall be as follows:

<u>Pipe Size</u>	<u>Maximum Support &amp; Hanger Span</u>	<u>Minimum Rod Size Single Rod Hangers</u>
1/2" & Smaller	6'	1/4"
3/4" thru 1"	8'	1/4"
1-1/4" & Larger	10'	3/8"

7. The load rating for universal concrete inserts shall not be less than that of the hanger rods they support.
8. Vertical sway bracing shall be provided where shown, or on 10-foot maximum centers.
9. All piping shall be supported in a manner which will prevent undue strain on any valve, fitting, or piece of equipment. In addition, pipe supports shall be provided at changes

in direction or elevation, adjacent to flexible couplings, and where otherwise shown. Pipe supports and hangers shall not be installed in equipment access areas.

## **2.3 SLAB, FLOOR, WALL, AND ROOF PENETRATIONS AND CLOSURES**

### **A. Pipe Sleeves:**

1. Piping passing through concrete or masonry shall be installed through hot-dip galvanized, Schedule 40 steel pipe sleeves where shown on the Drawings. Holes drilled with a suitable rotary drill will be considered in lieu of sleeves in existing walls.

## **PART 3 - EXECUTION**

### **3.1 PIPE PREPARATION AND HANDLING**

- A. Each pipe and fitting shall be carefully inspected before the exposed pipe or fitting is installed. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.
- B. Use proper implements, tools, and facilities for the safe and proper protection of the pipe. Carefully handle pipe in such a manner as to avoid any physical damage to the pipe.

### **3.2 INSTALLATION OF EXPOSED PIPING**

- A. Unless shown otherwise, piping shall be parallel to building lines. Hangers on adjacent piping shall be aligned where possible on common size ranges.
- B. Lateral supports for seismic loads shall be provided at all changes in direction.
- C. All pipe flanges shall be set level, plumb, and aligned. All flanged fittings shall be true and perpendicular to the axis of the pipe. All boltholes in flanges shall straddle vertical centerline of pipes.
- D. Unions shall be installed where required for piping or equipment installation, even though they are not shown on the Drawings.
- E. Piping shall be installed without springing or forcing the pipe in a manner which would set up stresses in the pipe, valves, or connected equipment.

### **3.3 TESTING**

- A. General: Conduct pressure and leakage tests on all newly installed pipelines. Furnish all necessary equipment and material and make all connections to the pipe, as required. The Architect or Owner will monitor the tests. The test pressure for all piping shall be 25 psi.

1. Exposed Natural Gas Piping: Conduct the tests on exposed piping after the piping has been completely installed, including all supports, hangers, and anchors.
2. The test pressure shall be continuously maintained for a minimum of 30 minutes and for such additional time as may be necessary to conduct soap test and examinations for leakage. Soap test and examination for leakage shall be made at all joints and connections. The piping system, or valve shall show no visual evidence of weeping or leaking. Any visible leakage shall be corrected at the Contractor's sole expense.

### 3.4 CLEANING

- A. Care shall be exercised during fabrication to prevent the accumulation of weld rod, weld spatter, pipe cuttings and filings, gravel, cleaning rags, etc. within piping sections. All piping shall be examined to assure removal of these and other foreign objects prior to assembly. Shop cleaning may employ any conventional commercial cleaning method if it does not corrode, deform, swell, or otherwise alter the physical properties of the material being cleaned.

END OF SECTION

# **SECTION 15061 - DETAIL PIPING SPECIFICATION POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS**

## **PART 1 - GENERAL**

### **1.1 WORK INCLUDED**

- A. This section covers the work necessary to furnish and install, complete, the polyvinyl chloride pipe and fittings specified herein, and as specified further in Section PLANT PIPING - GENERAL.

### **1.2 GENERAL**

- A. See Section PLANT PIPING - GENERAL, for additional requirements. All piping system components shall be the products of one manufacturer.

## **PART 2 - PRODUCTS**

### **2.1 PIPE**

- A. PVC, Schedule 40, conforming to ASTM D1784 and ASTM D1785.
- B. PVC, Schedule 80, conforming to ASTM D1784 and ASTM D1785.

### **2.2 NIPPLES**

- A. Same as pipe.

### **2.3 JOINTS**

- A. Socket-weld, except where connecting to unions, valves, and equipment with threaded connections that may require future disassembly.

### **2.4 FITTINGS**

- A. Schedule 40 fittings shall conform to ASTM D2466 for socket type fittings.
- B. Schedule 80, fittings shall conform to the requirements of ASTM D2467 for socket type and ASTM D2464 for threaded type.

## **2.5 VALVES**

### **A. PVC Ball Valves**

1. Valves shall have PVC body, ball, and stem with replaceable TFE seats and Viton o-ring stem seals.
2. Valves shall be double-union with socket ends.
3. Valves shall be Harrington Plastics, Chemtrol, Hayward, or equal.

### **B. PVC Globe Valves**

1. Valves shall have PVC body, disk, and stem with replaceable EPDM seals.
2. Valves shall be double-union with socket ends.
3. Valves shall be Harrington Plastics, Chemtrol, Hayward, or equal.

## **2.6 FLANGES**

- A. One piece, molded hub type flat faced flanges, 125-pound standard, as specified under FITTINGS hereinbefore.

## **2.7 GASKETS**

- A. Full-faced, 1/8-inch thick, fabricated from ethylene propylene rubber (EPR).
- B. When mating flange has raised face, use flat ring gasket and provide filler gasket between OD of raised face and flange OD to protect PVC flange from bolting moment.

## **2.8 BOLTING**

- A. Type 316 stainless steel, ASTM A193, Grade B8M hex head bolts and ASTM A194, Grade 8M hex head nuts.
1. Bolts shall be fabricated in accordance with ANSI B18.2 and provided with washers of the same material as the bolts.

## **2.9 SOLVENT CEMENT**

- A. All socket connections shall be joined with PVC solvent cement conforming to ASTM D2564. Manufacture and viscosity shall be as recommended by the pipe and fitting manufacturer to assure compatibility.

## **2.10 THREAD LUBRICANT**

- A. Teflon tape.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. All rigid PVC pipe shall be cut, made up, and installed in accordance with the pipe manufacturer's recommendations. Offset shall be as recommended by the manufacturer for the maximum temperature variation between time of solvent welding and during operation.
- B. Only strap wrenches shall be used for tightening threaded plastic joints, and care shall be taken not to overtighten these fittings. Pipe shall not be installed when the temperature is below 40 degrees F, nor above 90 degrees F when exposed to direct sunlight. Ends to be joined shall be shielded from direct sunlight prior to and during the installation operation.
- C. Provide adequate ventilation when working with pipe joint solvent cement.

### **3.2 TESTING**

- A. All lines shall be hydrostatically tested as specified in Section PLANT PIPING - GENERAL.

### **3.3 SUPPORTS AND HANGERS**

- A. In accordance with the manufacturer's recommendations.

**END OF SECTION**

## **SECTION 15801 - SOIL VAPOR EXTRACTION MECHANICAL EQUIPMENT**

### **PART I - GENERAL**

#### **1.1 SUMMARY**

- A. Provide blower and appurtenances necessary to extract and treat soil vapor. The equipment shall include a regenerative blower with explosion proof motor, 10-micron inline air filter, centrifugal moisture separator, fittings, gauges, valves, and vertical exhaust stack with an inline muffler.
- B. Related work:
  - 1. Documents affecting work of this section include, but are not limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

#### **1.2 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- B. Comply with pertinent codes and regulations of governmental agencies having jurisdiction.

### **PART 2 - PRODUCTS**

#### **2.1 EQUIPMENT**

- A. Blower - EG & G Rotron regenerative blower, Model DR505, with explosion proof motor, as supplied by Fluid Technology, Inc. 1315 Nelson, Unit H, Lakewood, Colorado 80215, 303/233-7400, or approved equal. The blower shall be capable of providing 40-inches of water in vacuum without exceeding 90 percent of its rated maximum continuous service rating vacuum and provide a minimum of 100 scfm at or about 40 inches of water. The motor shall be explosion proof (NEMA Class 7), three phase, 230-volt.
- B. Control Panel - See Drawings and Section 16005.
- C. Inline Muffler - EG & G Rotron Dual Connection Inline Air Filter, 500184, or approved equal. The muffler shall connect inline to the blower exhaust.
- D. Inline Particulate Air Filter - EG & G Rotron Inline Particulate Air Filter, 515255, or approved equal. The filter shall be equipped with a dual connection and removable and replaceable filter element capable of filtering particles to 10 microns. One filter element shall be provided with the filter unit.

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Soil Vapor Extraction  
Mechanical Equipment  
15801-1



- E. **Air Filter Elements** - Two (2) spare EG & G Rotron Air Elements, 516435 compatible with air filter unit, or approved equal.
- F. **Moisture Separator** - EG & G Rotron Centrifugal Moisture Separator, Model MS200D, with secured base, or approved equal. The separator shall provide high efficiency cyclonic separation and be sized appropriately for the blower. The separator shall be supplied with a vacuum relief valve, manual drain and protection to prevent water from flowing into the blower should the vessel become full. The base shall not obstruct the manual drain on the separator.
- G. **Vacuum Gauges** - 0-60" of water vacuum gauges. Approved by the Engineer.
- H. **Louvered Vent** - Ruskin Model, manually operated 24" x 24" louvered vent, or approved equal.
- I. **Roof Ventilator** - Roof ventilating system approved by the Engineer.
- J. **Carbon Tanks** - Tigg Corporation, NITOX N100 granular activated carbon air pollution control absorbers or approved equal. The tanks shall be of 55 gallon drum size with 2" NPT inlet and outlet and contain at least 170# of virgin activated carbon.

## **PART 3 - EXECUTION**

### **3.1 SURFACE CONDITIONS**

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- B. Make necessary measurements in the field to ensure precise fit of items in accordance with the Drawings.

### **3.2 SUPPORTS**

The equipment shall be supported and secured to the interior of the shed. Provide rigid supports inline air filter and the blower exhaust stack. The pipe exiting the shed shall be supported to the wall and provided with a weather tight seal. The horizontal section of the pipe run from the blower to the inline air filter shall be supported from the floor of the shed. The blower itself shall be secured to the shed floor or provided with a secure base. All support systems shall be approved by the Engineer.

### **3.3 MANUALS**

The Contractor shall provide two (2) copies of all manufacturer's operation and maintenance manuals for all the equipment to the Engineer prior to completion of the project.

**END OF SECTION**

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**DIVISION 16 - ELECTRICAL  
SECTION 16005 - ELECTRICAL**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. This section covers the work necessary for the construction of the electrical system shown on the accompanying Drawings. The work included under this section includes providing all materials and labor to install all electrical work as indicated and as specified.

**1.2 PROJECT DESCRIPTION**

- A. The work in general shall consist of, but is not limited to, providing the following:
1. Electrical service as required by the electric utility.
  2. Panelboard, conduit, and wiring for all equipment shown.
  3. Lighting fixtures, lamps.

**1.3 CODES AND PERMITS**

- A. All work shall be performed in strict accordance with the current edition of the Local Laws and Ordinances or the National Electrical Code (NEC), where applicable. Conflicts, if any, that may exist will be resolved at the discretion of the Owner.
- B. Wherever the requirements of the Specifications or Drawings exceed those of these codes, the requirements of the Specifications or Drawings shall govern. Code compliance is mandatory. Nothing in these Contract Documents shall be construed as permitting work not in accordance with these laws and codes.
- C. Obtain all permits and pay all fees required by any governmental agency having jurisdiction over this work. Upon completion of work, provide signed permits indicating that the work is acceptable to the regulatory authorities having jurisdiction.

**1.4 INTENT OF DRAWINGS**

- A. The electrical drawings show only general locations of equipment, devices, and raceways, unless specifically dimensioned. The Contractor shall be responsible for the proper routing of raceways, final sizing of conductors, and location of equipment and connections.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. Use of quality materials is of essence on this project.
- B. Unless otherwise indicated, provide all first quality, new materials and equipment, free from any defects, in first-class condition, and suitable for the space provided. Provide materials and equipment listed by Underwriter's Laboratory or other qualified electrical testing laboratory wherever standards have been established by that agency.
- C. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.

### **2.2 STANDARD PRODUCTS**

- A. Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturer's latest standard design that conforms to these Specifications.

### **2.3 ALTITUDE**

- A. For altitudes above 3,300 feet above sea level, provide materials and equipment suitable for installation and operation under rated conditions.

### **2.4 HAZARDOUS AREAS**

- A. Provide materials and equipment acceptable to the regulatory authority having jurisdiction for Class 1, Division 1, Group D hazardous areas of the NEC.

### **2.5 SERVICE ENTRANCE (NOT USED)**

### **2.6 MOTOR CONTROLLERS**

- A. Provide motor rated switches designed specifically for breaking loads of the size indicated or greater, meeting NEMA ICS 2 of the horsepower rating, voltage, number of phases, and enclosure shown and with thermal overload protection, and pushbutton or toggle switch operation. Provide for locking in the OFF position. Provide running overcurrent protection. Minimum rating of motor rating switches shall be 20 amperes.
- B. Provide full voltage magnetic starters with the rating and enclosure shown meeting NEMA ICS 2, Class A, or I.G.C. as indicated on the drawings.

- C. Supply individual control power transformers where indicated. The transformers shall have sufficient capacity to serve the connected load and limit voltage regulation to 10 percent during contactor pickup. Fuse one side of the secondary winding and ground the other side. Provide primary, current limiting fuses where fuses shown on Drawings, or where required by applicable codes and standards.
- D. Fusible and Nonfused switches, individual, 0 to 600 volt. Provide switches that can be locked in the OFF position. Interlock enclosure and switches to prevent opening the cover with the switch in the On position. Provide switches which are quick-make, quick-break, motor rated, load-break, heavy-duty (HD) type having external marking clearly indicating ON and OFF positions. Furnish switches meeting the requirements of NEMA KS 1. Provide switches suitable for use with 76 degrees C wire at full NEC Degrees C ampacity. Fusible types shall accept Class R fuses.
- E. Provide each motor with a suitable controller and devices that will function as specified for the respective motors and meeting NEMA ICS 2 or I.G.C., the NEC, and Underwriter's Laboratory.
- F. Provide each motor controller with thermal overload protection in all ungrounded phases. Use protection consisting of thermal overload relays meeting NEMA ICS 2 or I.G.C. as indicated on the drawings which are sensitive to motor current and mounted within the motor controller. Use overload protection devices of the inverse-time-limit type. Provide controller-mounted overload relays of the manual-reset type with externally operated reset button. Select and install overload relay heaters after the actual nameplate full-load current rating of the motor has been determined.
- G. Combination motor starters shall be mounted in NEMA 4 enclosures.

## 2.7 LIGHTING AND POWER DISTRIBUTION PANELBOARDS

- A. General: Provide circuit breaker panelboards meeting standards established by Underwriter's Laboratory or other qualified electrical testing laboratory and the NEC. Provide panels Underwriter's Laboratory or other qualified electrical testing laboratory labeled for service entrance use. Provide panelboards and circuit breakers suitable for use with 75 degrees C wire at full NEC 75 degrees C. ampacity. Panelboards shall be NEMA 3R weatherproof enclosure.
- B. Circuit Breakers:
  - 1. Furnish indicating type molded circuit breakers providing ON/OFF and TRIPPED positions of the operating handle. Furnish thermal magnetic, quick-make, quick-break circuit breakers which are noninterchangeable in accordance with the NEC. Do not use tandem or dual circuit breakers in normal single-pole spaces. Do not use single-pole circuit breakers with handle ties where multiple circuit breakers are indicated. Utilize multipole circuit breakers designed so that an overload on one pole automatically causes all poles to open. Install bolt-on circuit breakers in all panelboards.
- C. Acceptable Manufacturers: General Electric or Equal.

## 2.8 DRY TYPE SMALL POWER TRANSFORMERS (0- TO 600- VOLT PRIMARY)

- A. Provide self-cooled, two-winding, dry type transformers of the ratings indicated and built in

accordance with the latest IEEE, ANSI, and NEMA standards. Utilize units with manufacturer's standard insulation class and standard temperature rise. For ratings 3 to 25 kVA single-phase and 3 to 15 kVA 3-phase, provide units with core and coils completely enclosed in nonventilated, NEMA 3R weatherproof enclosure, utilize inclosed in a nonventilated, NEMA 3R weatherproof enclosure. Utilize encapsulated windings on single-phase units 0 to 25 KV. On all transformers 3kVA and larger, provide units with at least four, 2-1/2 percent, full capacity voltage taps; two above and two below normal voltage rating.

- B. Supply units where sound levels determined by tests in accordance with NEMA and ANSI standards do not exceed 45 decibels for 10 to 50 kVA.

## 2.9 SAFETY SWITCHES

- A. All safety switches, furnished and installed under this section of the Specifications shall be heavy-duty class. Enclosures for indoor nonhazardous areas shall be NEMA 1.

## 2.10 CONDUITS

- A. Metallic Conduit: For non-hazardous interior locations use rigid galvanized steel (RGC), intermediate metal conduit (IMC) or electrical metallic tubing (EMT). Only RGS or IMC are acceptable for hazardous locations.
- B. PVC Conduit: Use rigid PVC conduit, schedule 40, Underwriter's Laboratory or other qualified electrical testing laboratory.

## 2.11 CONDUCTORS

- A. All conductors shall be annealed copper. All conductors shall be stranded.
1. Insulation: In raceway system use Type THHN/THWN thermoplastic jacketed insulated wire.
  2. Sizes: No wire smaller than size No. 12 AWG shall be installed for lighting or other power circuits unless otherwise noted.
  3. Wire Color Identification
    - A. 120/240V 4 wire system:

One hot leg:	Black
Second hot leg:	Red
High Leg:	Orange
Neutral:	White

B. 480Y/277 Volt 3-phase, 4-wire system:

Phase A	Brown
Phase B	Orange
Phase C	Yellow
Neutral	White, Black Tracer or Grey

C. Equipment grounding, all systems: Green

4. Fixture Connection: Circuit wiring connections to fixture wire shall be made with pressure type solderless connectors. Buchanan, Scotchlock, Wing Nut, or approved equal, complete with insulator and security ring.

2.12 LIGHTING FIXTURES

- A. Provide fixtures as shown on the Drawings, with propped hangers, pendants, canopies, lamps, etc. necessary for complete installation. Use only Underwriters Laboratory or other qualified electrical testing laboratory listed luminaries.

2.13 SWITCHES

- A. Provide Underwriter's Laboratory or other qualified electrical testing laboratory listed, specification grade, totally enclosed, ac type, quiet tumbler switches meeting heavy-duty performance standards. Use switches suitable for Class 1, Division 1, Group D hazardous areas where the area is so classified.

2.14 BOXES

- A. Provide boxes not less than 2 inches deep, unless shallower boxes are required by structural conditions. Do not use box extensions to provide wiring space required by the NEC. For hollow masonry construction, provide boxes of sufficient depth so that conduit knockouts or hubs are in masonry void space.
- B. For hazardous areas, use boxes and cover plates applicable for the location and hazardous atmosphere present.

2.15 COVER PLATES

- A. Provide plates fitting closely and tightly to the box on which they are to be installed. On surface-mounted boxes, provide plates which do not extend beyond the sides of the box unless the plates do not have sharp corners or edges.

## **2.16 BACKFILL MATERIAL FOR CONDUIT ZONE**

- A. The conduit zone shall include full trench width from a point 3 inches below the bottom of the conduit to a point 3 inches above the top of the conduit.
- B. Backfill material for the conduit zone shall be natural material from the trench excavation, structural excavation, or site grading, with a maximum particle size of 1/4-inch and free from organic matter, roots, construction debris and excessive fines. Tamp and compact the conduit zone material to 90 percent relative compaction.

## **2.17 BACKFILL MATERIAL ABOVE CONDUIT ZONE OR ABOVE DUCT BANKS**

- A. Provide backfill material as approved by Owner for above the conduit zone of direct burial conduit.

## **2.18 NON-CLASSIFIED LOCATION ENCLOSURES**

- A. Type 3R Enclosures: Type 3R enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against rain and sleet.

## **2.19 CLASSIFIED LOCATION ENCLOSURES**

- A. Type 7 Enclosures, Type 7 enclosures are for indoor use in locations classified as Class 1, Groups A, B, C, or D as defined in the NEC.

# **PART 3 - EXECUTION**

## **3.1 GENERAL**

- A. Craftmanship is of essence in the work of this project.
- B. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work which has a neat and finished appearance.
- C. Coordinate electrical work with Owner and work of other trades to avoid conflict, errors, delays, and unnecessary interference with operation of the plant during construction.
- D. Check the approximate locations of light fixtures, equipment, and other electrical system components shown on Drawing for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, consult the Owner. The Owner's decision shall govern. Make Modifications and changes required.

### **3.2 PROTECTION DURING CONSTRUCTION**

- A. Throughout this Contract, provide protection for materials and equipment against loss or damage in accordance with provisions elsewhere in these Contract Documents. Protect everything from the effects of weather. Prior to installation, store items in clean, dry, indoor locations. Store in clean, dry, indoor, heated locations items subject to corrosion under damp conditions, and items containing electrical insulation, such as conductors, motors, and controls.
- B. Following installation, protect materials and equipment from corrosion, physical damage, and the effects of moisture on insulation. Cap conduit runs during construction with manufactured seals. Keep openings in boxes or equipment closed during construction.

### **3.3 MATERIAL AND EQUIPMENT INSTALLATION**

- A. Follow manufacturer's installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between manufacturer's instructions, codes and regulations, and these Contract Documents, follow Owners decision. Keep copy of manufacturer's installation instructions on the jobsite available for review at all times.

### **3.4 CUTTING AND PATCHING**

- A. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval of the Owner. Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Following such work, restore surfaces neatly to original condition. Use skilled craftsmen of the trades involved.

### **3.5 CLEANING AND TOUCHUP PAINTING**

- A. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps, and debris from premises and from interior and exterior of all devices and equipment. Touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish.

### **3.6 HAZARDOUS AREAS**

- A. Install all materials and equipment in hazardous areas in a manner acceptable to the regulatory authority having jurisdiction for the class, division, and group of hazardous area indicated.



### 3.7 CONDUIT

- A. Use and install conduit in accordance with the following table:

AREA	CONDUIT
Interior (Non-hazardous)	RGS, IMC, EMT
Direct Buried	PVC
Hazardous Locations	RGS, IMC

- B. Conduits must be kept within the furring lines of building unless specifically noted to be exposed.
- C. Provide all necessary sleeves and chases required where conduits pass through floors or walls, seal all openings and finish to match adjacent surfaces.
- D. Conduits entering cabinets, pull boxes or outlet boxes shall be secured with double galvanized locknuts, one on inside and outside of box, and bushings.
- E. Conduit shall be sized in accordance with the NEC and shall be of such size and so installed that conductors may be drawn in without injury or excessive strain.
- F. Installation of Conduit Below Slab on Grade or Direct Buried: All electrical wiring shall be protected by a conduit system. No conduit system shall be installed horizontally within concrete slab on grade. For slab on grade construction, horizontal runs of rigid PVC or rigid steel shall be installed below the floor slab. Conduit passing vertically through slab on grade shall be rigid steel. Rigid steel conduits installed below slab on grade or direct buried shall be field wrapped with 0.010-inch thick pipe wrapping plastic tape applied with a 50 percent overlay, or shall have a factory-applied plastic resin, epoxy, or coal-tar coating system. Zinc coating may be omitted from rigid steel conduit. All joints shall be wrapped or coated.
- G. Exposed Raceways: Exposed raceways shall be installed parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings.
- H. Changes in Direction of Runs: Changes in direction of runs shall be made with symmetrical bends or cast metal fittings. Field made bends and offsets shall be made with an approved hickey or conduit bending machine. Crushed or deformed raceways shall not be installed. Trapped raceways in damp and wet locations shall be avoided where possible. Care shall be taken to prevent the lodgment of plaster, dirt, or trash in raceways, boxes, fittings, and equipment during the course of construction. Clogged raceways shall be entirely freed of obstructions or shall be replaced.
- I. Supports: Raceways shall be securely and rigidly fastened in place at intervals of not more than 10 feet with approved pipe straps, wall brackets, conduit clamps, conduit hangers, threaded C-clamps with retainers, or ceiling trapeze.

### **3.8 GROUNDING**

- A. All panelboard cabinets, equipment and enclosures, and the complete conduit system shall be grounded securely in accordance with pertinent sections of Article 250 of NEC. All electrically operated equipment shall be bonded to the grounding conduit system. Grounding shall include the grounding conductors shown on Drawings and additional grounding as required above.

### **3.9 OUTLET AND JUNCTION BOXES**

- A. Provide a box suitable for the conditions encountered at each outlet in the wiring or raceway system and sized in accordance with the NEC.
- B. Install boxes in a secure, substantial manner, supported independently of conduit attachment to the structure. Boxes embedded in concrete or masonry need not be additionally supported. Use galvanized mounting hardware in industrial areas.
- C. Install boxes for conduits below grade flush with finished grade. Boxes in paved areas, roadways, or walkways shall be boxes and covers suitable for the weights to which they may be subjected.

### **3.10 WIRING**

- A. No wire shall be drawn into conduit until conduit system is complete. Lubricant shall be approved by wire manufacturer.

### **3.11 CIRCUITS**

- A. Combining circuits in single conduit is permitted with proper identification and wire size increase required by NEC.

### **3.12 LIGHTING FIXTURES**

- A. Furnish and install all lighting fixtures, complete with lamps and accessories, as indicated. Electrical Contractor shall verify ceiling construction, recessed depth, mounting hardware, etc., prior to ordering fixture.

### **3.13 TOUCH UP**

- A. After the equipment is installed, touch up any scratches, marks, etc., incurred during shipment or installation of equipment.

**END OF SECTION**

**APPENDIX C**

**AIR QUALITY CORRESPONDENCE**

# WESTERN WATER CONSULTANTS, INC.

Engineering • Hydrology • Hydrogeology • Waste Management • Construction Administration

611 SKYLINE ROAD, P.O. BOX 4128 • LARAMIE, WYOMING 82071 • (307) 742-0031 • FAX (307) 721-2913

July 8, 1991

Mr. Bobby Myers  
Air Quality Bureau  
New Mexico Environment Department  
P.O. Box 26110  
Harold Runnels Building  
Santa Fe, NM 87502

Re: Notification of intent to conduct two pilot SVE tests at the Dowell Schlumberger facility in Artesia, New Mexico, WWC JN 0125.

Dear Mr. Myers,

As per our telephone conversation of June 28, 1991, I am providing you with information about the emissions predicted to be generated from two soil vapor extraction (SVE) pilot tests Western Water Consultants (WWC) will be conducting at the Dowell Schlumberger Inc. (DSI) facility in Artesia, New Mexico. The results of our emissions calculations indicate that WWC does not need a permit to conduct these tests since the SVE emissions will be less than 10 lbs/hr and less than 10 tons/yr.

WWC plans to perform the SVE pilot tests during the week of July 22 - 26, 1991. These pilot tests will be conducted at two separate locations at the DSI facility: around the truck wash facility, and near the acid dock sump. Ethylbenzene, toluene, xylenes, and tetrachloroethylene (PCE) were present in soil samples from the vicinity of the truck wash facility. Ethylbenzene and xylenes were detected in soil near the acid dock sump. Concentrations of soil contaminants are presented in the accompanying table. For calculation purposes, the soil vapor was assumed to be saturated with xylenes, the chemical present in the greatest concentration in both areas. The ratio of partial pressure to vapor pressure for the other chemicals present was assumed to be proportional to the ratio of their soil concentrations with respect to the soil concentration of xylenes.

The soils underlying the DSI Artesia facility are typically fine-grained: gypsiferous silts, clayey silts, and discontinuous clays. Previous SVE tests performed by WWC in similar fine-grained material produced flow rates of 1 to 10 cfm. A maximum flow rate of 20 cfm (cubic feet per minute) was used in the calculations, representing a generous upper limit for possible emissions from the Artesia SVE tests. The SVE tests will be producing emissions for approximately 2 hours per test.

#### OTHER LOCATIONS

1949 SUGARLAND DRIVE, SUITE 134  
SHERIDAN, WYOMING 82801  
(307) 672-0761  
FAX (307) 674-4265

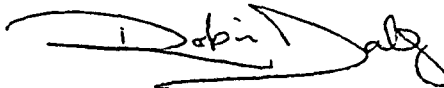
701 ANTLER DRIVE, SUITE 233  
CASPER, WY 82601  
(307) 473-2707  
FAX (307) 237-0828

Mr. Bobby Myers  
Air Quality Bureau  
New Mexico Environment Department  
Page 2  
July 1, 1991

The calculated emissions for a flow rate of 20 cfm are: 5.22 lb/hr for the test at the truck wash facility, and 3.74 lb/hr at the acid dock. The total calculated emissions for the two tests are 17.94 lbs. The conservative scenario represented by these calculations indicates that actual emissions from these two SVE pilot tests will not exceed the 10 lbs/hour and 10 tons/yr permitting limit.

WWC would appreciate receiving written confirmation from you that you have received our notification, and that no permit or more formal notification is required. If you have questions or comments, please feel free to call me at (307) 742-0031. Thanks for your help.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Robin Daley', with a stylized flourish extending from the end.

Robin Daley  
Geologist

RD:lab  
cc: John Miller, DSI  
W. J. Witt, Dow Chemical  
File 0125-E  
Revised 7/8/91

# ESTIMATION OF MAXIMUM EMISSIONS OF ORGANIC COMPOUNDS FROM TWO SOIL VAPOR EXTRACTION TESTS AT THE DOWELL SCHLUMBERGER FACILITY, ARTESIA, NEW MEXICO

## I. BASIS FOR CALCULATIONS:

FLOW RATE: 20.0 ACFM  
TEST DURATION: 2.0 HOURS  
SOIL TEMPERATURE: 70.0 degrees F. = 21.11 degrees C. = 294.21 degrees K.

### VAPOR PRESSURE OF CONTAMINANTS AT SOIL TEMPERATURE, mm Hg:

ETHYLBENZENE	8.00
TOLUENE	24.05
XYLENE (para)	7.38
PCE	15.85

### CONTAMINANT CONCENTRATIONS AT TRUCK WASH FACILITY, mg/Kg:

	MINIMUM	MAXIMUM
ETHYLBENZENE	5	25
TOLUENE	7	19
XYLENE	42	270
PCE	0.44	1.30

### CONTAMINANT CONCENTRATIONS AT ACID DOCK SUMP, mg/Kg:

ETHYLBENZENE	46
XYLENE	290

II. ASSUME THAT SOIL VAPOR WILL BE SATURATED WITH XYLENE, AND THAT THE RATIO OF PARTIAL PRESSURE TO VAPOR PRESSURE FOR OTHER CONTAMINANTS WILL BE PROPORTIONAL TO THE RATIO OF THEIR CONCENTRATION IN THE SOIL WITH RESPECT TO THE SOIL CONCENTRATION OF XYLENE.

### PARTIAL PRESSURE IN EXHAUST SOIL VAPOR AT TRUCK WASH FACILITY, mm Hg

ETHYLBENZENE	0.95
TOLUENE	4.01
XYLENE	7.38
PCE	0.17

### PARTIAL PRESSURE IN EXHAUST SOIL VAPOR AT ACID DOCK SUMP, mm Hg

ETHYLBENZENE	1.27
XYLENE	7.38

III. GAS CONSTANT R =

999 (mm Hg)(CF)/(lb-mol)(degrees K.)

CONCENTRATION = P/RT

CONCENTRATIONS IN EXHAUST SOIL VAPOR AT TRUCK WASH FACILITY

ETHYLBENZENE	3.24E-06 lb-mol/CF =	0.00034 lb/CF
TOLUENE	1.36E-05 lb-mol/CF =	0.00125 lb/CF
XYLENE	2.51E-05 lb-mol/CF =	0.00266 lb/CF
PCE	5.65E-07 lb-mol/CF =	0.00009 lb/CF
TOTAL		0.00435 lb/CF

CONCENTRATIONS IN EXHAUST SOIL VAPOR AT ACID DOCK SUMP

ETHYLBENZENE	4.32E-06 lb-mol/CF =	0.00046 lb/CF
XYLENE	2.51E-05 lb-mol/CF =	0.00266 lb/CF
TOTAL		0.00312 lb/CF

IV. TOTAL SOIL VAPOR EMITTED DURING 2-HOUR TEST =

2400.0 CF

TOTAL CONTAMINANTS IN EXHAUST SOIL VAPOR AT TRUCK WASH FACILITY

ETHYLBENZENE	0.82 lb
TOLUENE	3.01 lb
XYLENE	6.39 lb
PCE	0.23 lb
TOTAL	10.45 lb

HOURLY EMISSIONS 5.22 lb/hour

TOTAL CONTAMINANTS IN EXHAUST SOIL VAPOR AT ACID DOCK SUMP

ETHYLBENZENE	1.10 lb
XYLENE	6.39 lb
TOTAL	7.49 lb

HOURLY EMISSIONS 3.74 lb/hour



BRUCE KING  
GOVERNOR

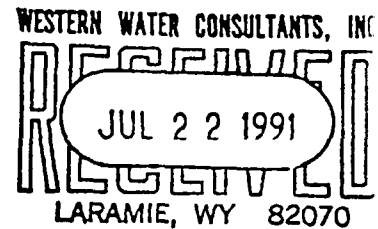
State of New Mexico  
ENVIRONMENT DEPARTMENT  
Harold Runnels Building  
1190 St. Francis Drive, P.O. Box 26110  
Santa Fe, New Mexico 87502  
(505) 827-2850

JUDITH M. ESPINOSA  
SECRETARY

RON CURRY  
DEPUTY SECRETARY

July 16, 1991

Ms. Robin Daley  
Western Water Consultants, Inc.  
P.O. Box 4128  
Laramie, WY 82071



Dear Ms. Daley,

The Bureau has received your July 8, 1991 letter notifying us of the planned SVE tests in Artesia, NM. Based on the information supplied in the letter and estimating techniques in EPA's UST Cleanup publication, the Bureau agrees with your conclusion that the predicted emissions from these tests will fall below the requirements of AQCR 703.1, Notice of Intent. Therefore, no further Air Quality Bureau related action is required by WWC for the project as outlined.

For your information, I have enclosed a copy of AQCR 702. Please note Part III of this regulation - Permits for Toxic Air Pollutant Emissions. The anticipated pollutants from the proposed tests are found in this part of the regulation. However, based on your figures, they are not to be emitted in quantities exceeding those in the regulation, and therefore do not require a permit. However, you may wish to review this portion of the regulation for any future work as well.

Thank you for informing the Bureau of your plans.  
Sincerely,

Robert L. Myers II  
Environmental Engineer, New Source Review Unit  
Technical Analysis and Permits Section  
Air Quality Bureau

RLM/rlm

enclosure

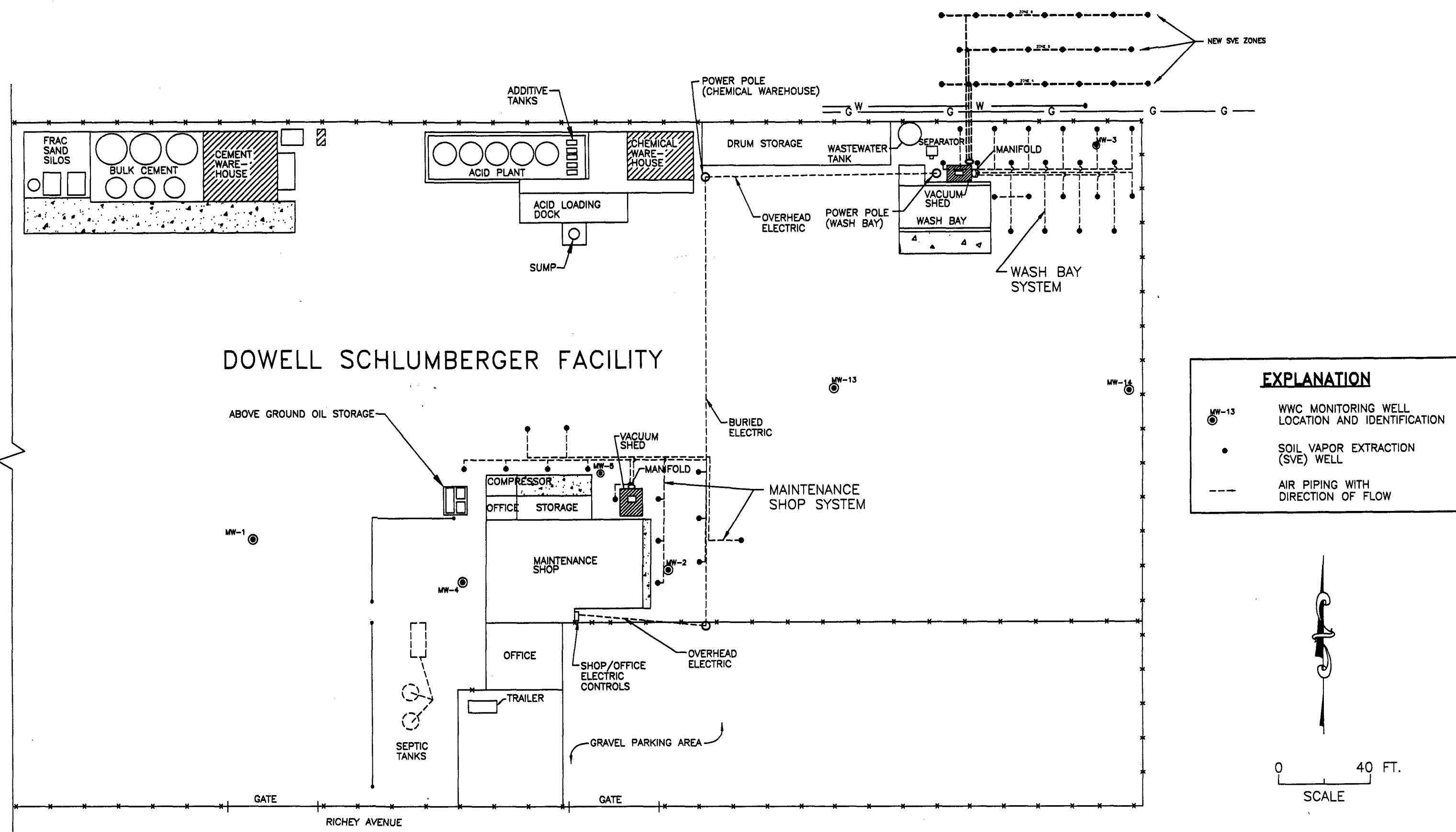


# SOIL VAPOR EXTRACTION SYSTEM

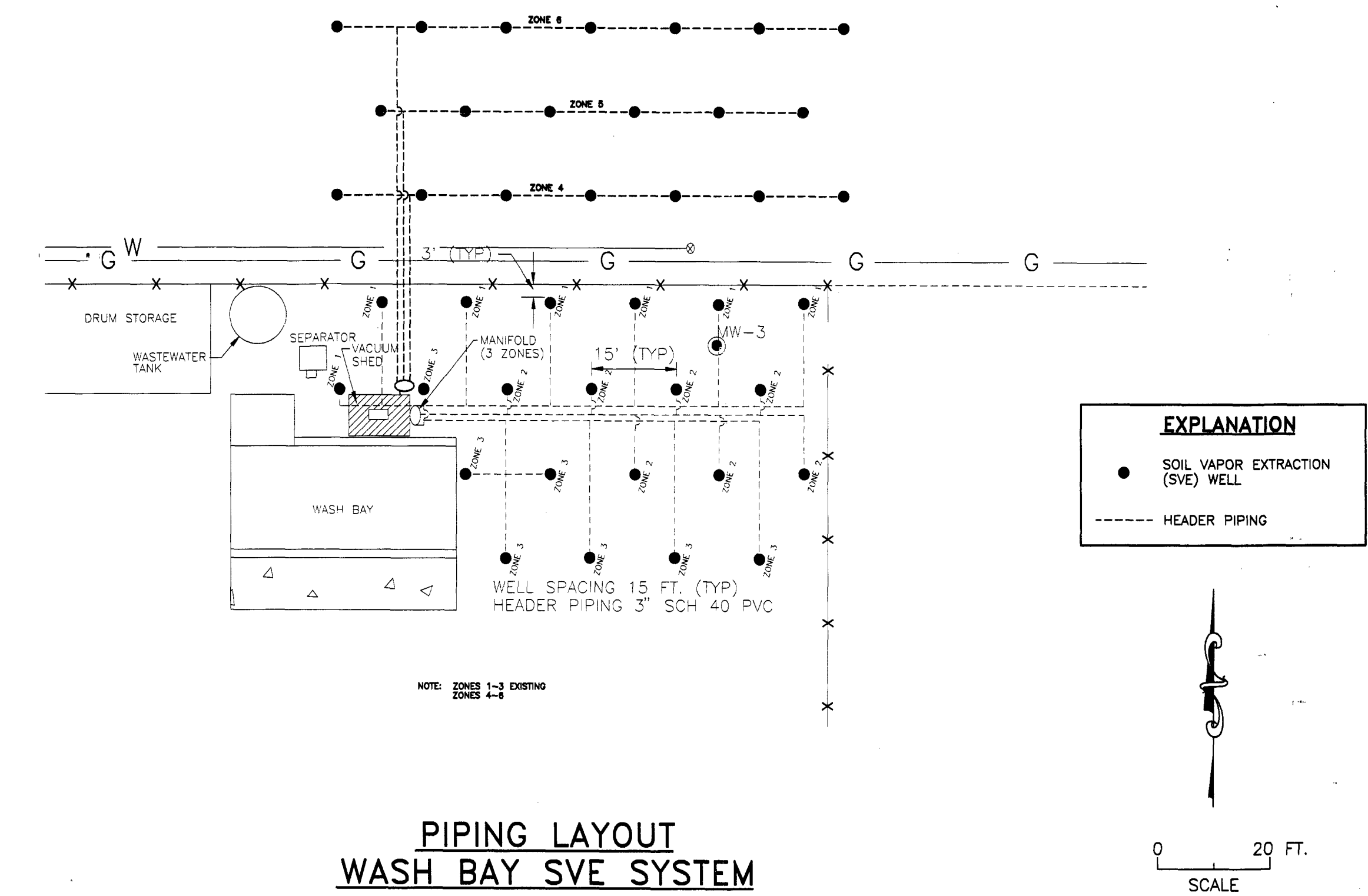
EXPANSION OF WASH BAY SVE SYSTEM  
DOWELL SCHLUMBERGER INCORPORATED  
ARTESIA, NEW MEXICO

## PLAN INDEX

TITLE	DRAWING NO.
SITE PLAN	1 OF 5
SITE WORK DETAILS	2 OF 5
VACUUM SHED DETAILS	3 OF 5
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ELECTRICAL	5 OF 5

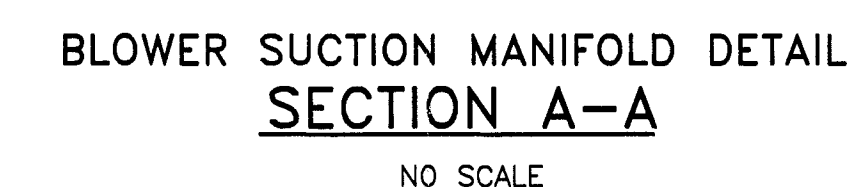
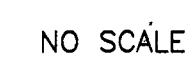
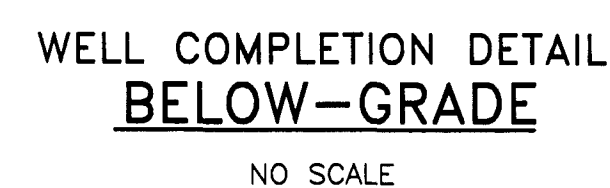


SITE PLAN

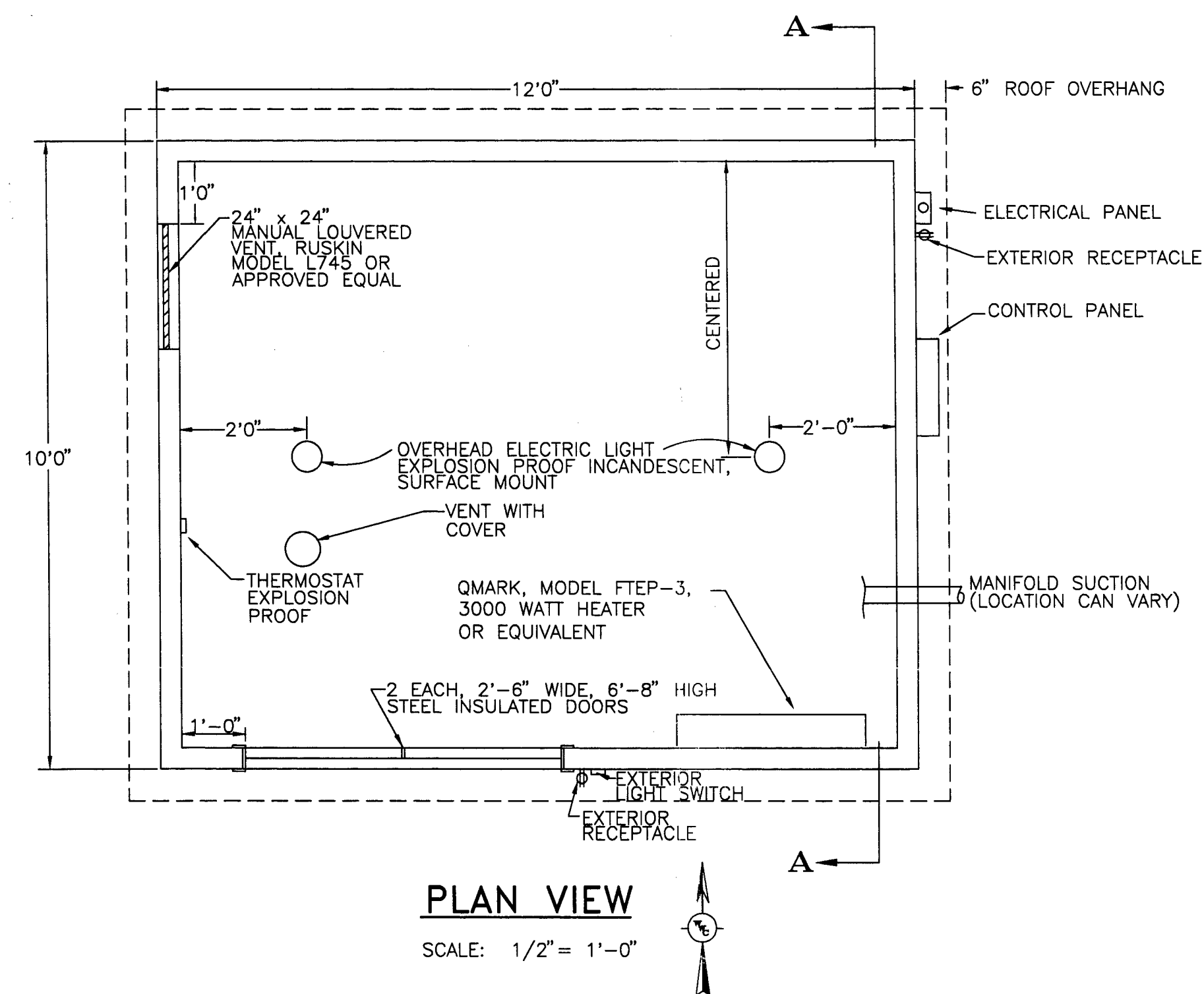


PIPING LAYOUT  
WASH BAY SVE SYSTEM

SITE PLAN		DOWELL SCHLUMBERGER INCORPORATED ARTESIA, NEW MEXICO	
DESIGNED BY: SDH	DATE: 8/93	DESIGNED BY: SDH	DATE: 1/93
DRAWN BY: SDH	DATE: 9/93	DRAWN BY: SDH	DATE: 1/93
CHECKED BY: SDH (AS BUILT)	DATE: 3/94	CHECKED BY: SDH (EXPANSION)	DATE: 11/94
611 SKYLINE ROAD LARAMIE, WY. 82070 (307)742-0031 FAX (307)721-2913		701 ANTLER DR., SUITE 233 CASPER, WY. 82601 (307)473-2107 FAX (307)237-0828	
1949 SUGARLAND DR., SUITE 134 SHERIDAN, WY. 82801 (307)672-0761 FAX (307)674-4265		JOB NO: 0125 DEPARTMENT: LW SHEET NO: 1 OF 5	

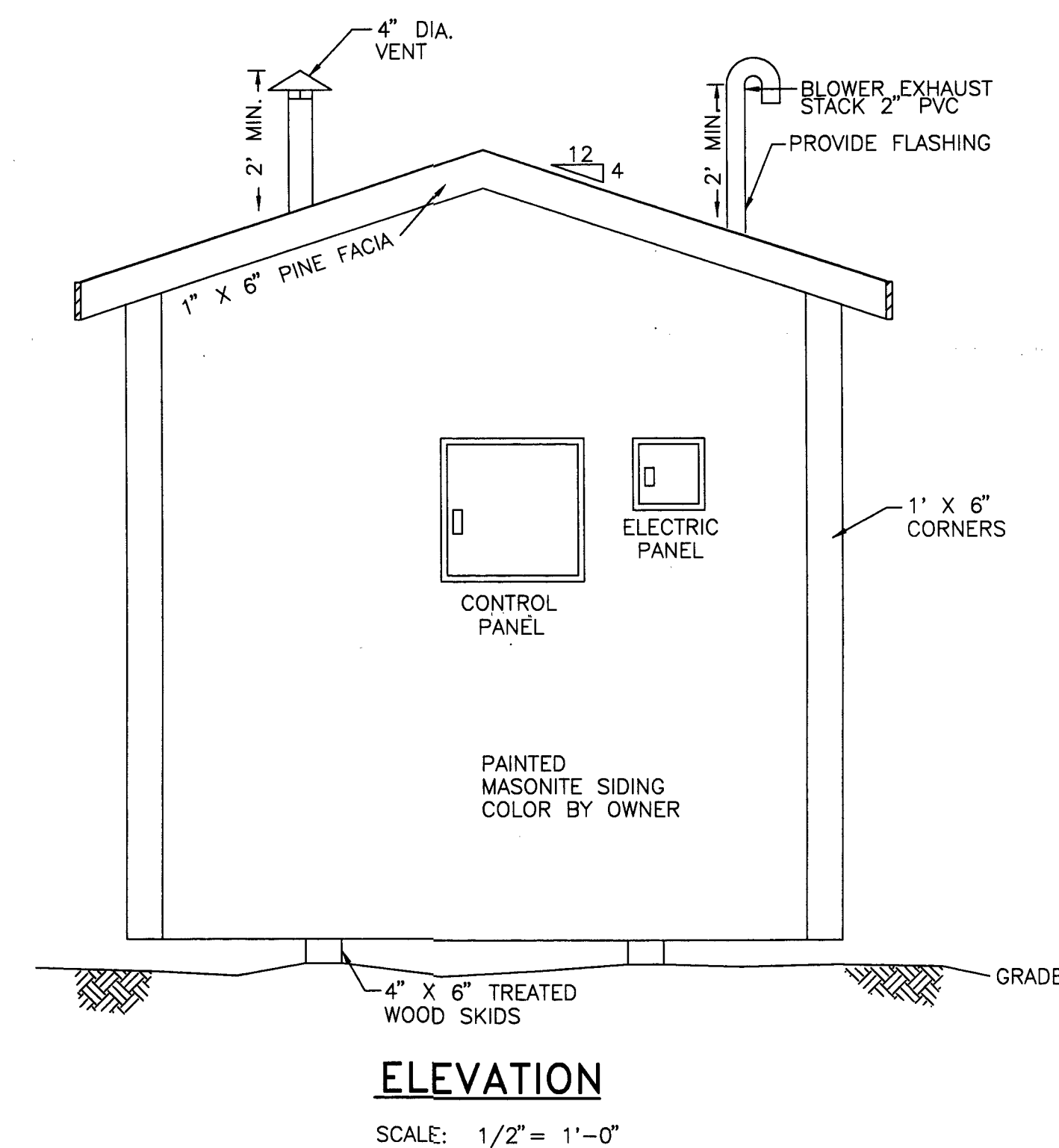
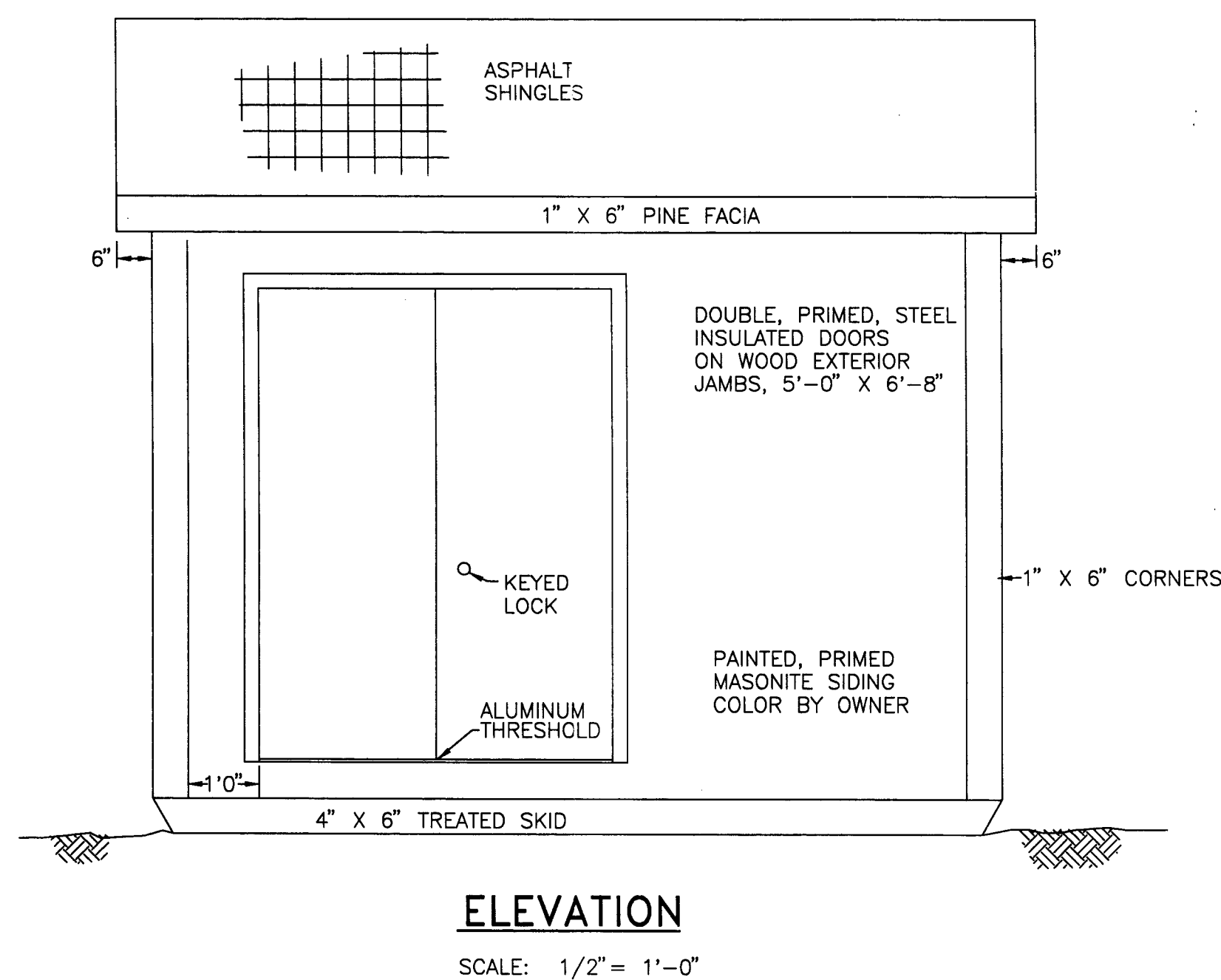
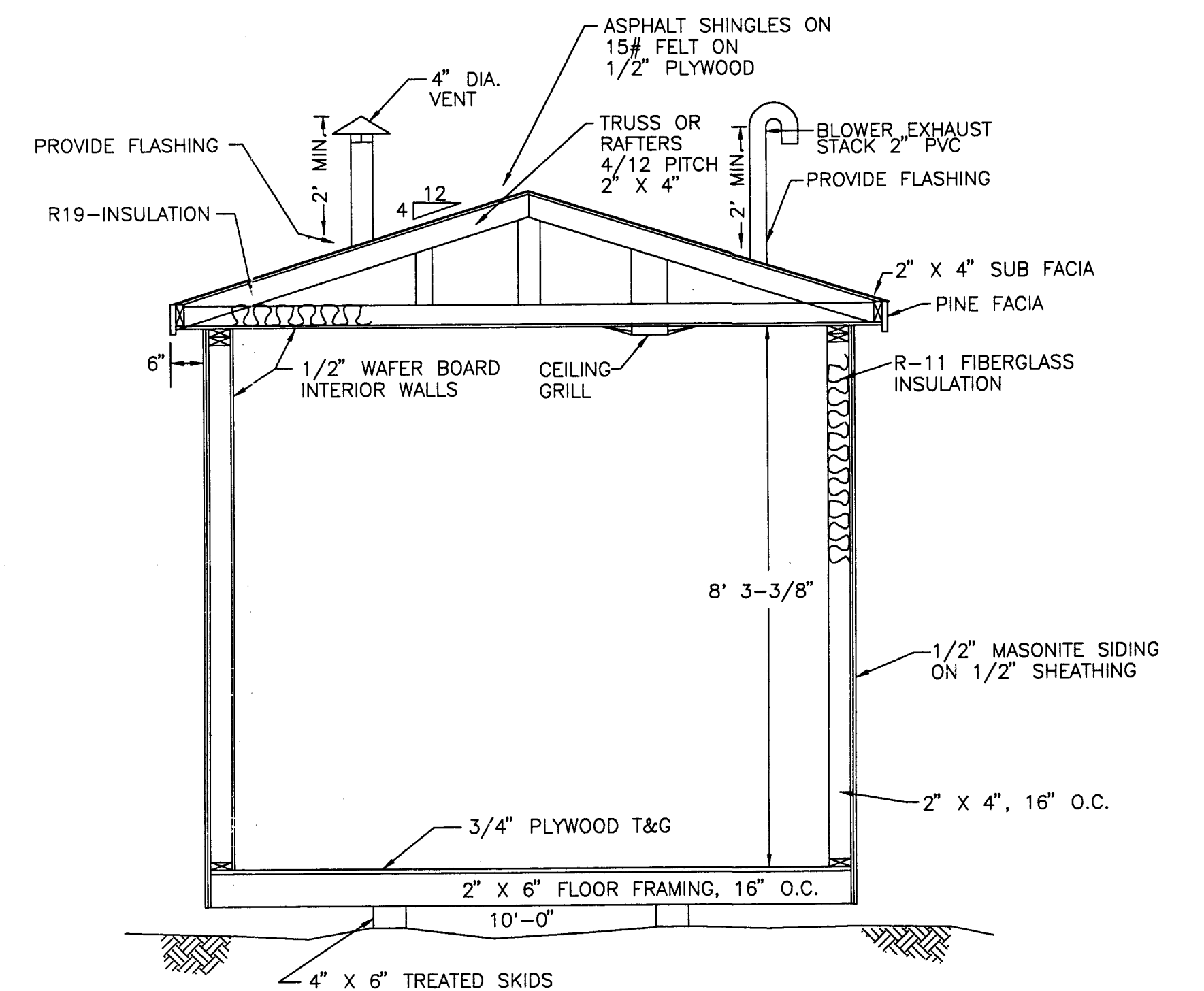


## 2 OF 5



**NOTES:**

- 1) ELECTRICAL CONTROL PANELS SHALL BE MOUNTED ON OUTSIDE OF SHED. WHICH WALL THEY ARE MOUNTED ON CAN VARY TO BEST FIT THE SITE.
- 2) ALL WIRING WITHIN THE BUILDING SHALL BE CLASS 1, DIVISION 1, GROUP D. WIRING OUTSIDE THE BUILDING IS NON-CLASSIFIED.
- 3) TREATED WOOD SHALL BE PRESSURE TREATED WITH CCA.



**VACUUM SHED DETAILS**

DOWELL SCHLUMBERGER INCORPORATED  
ARTESIA, NEW MEXICO

**western**  
**water**  
**consultants, inc.**

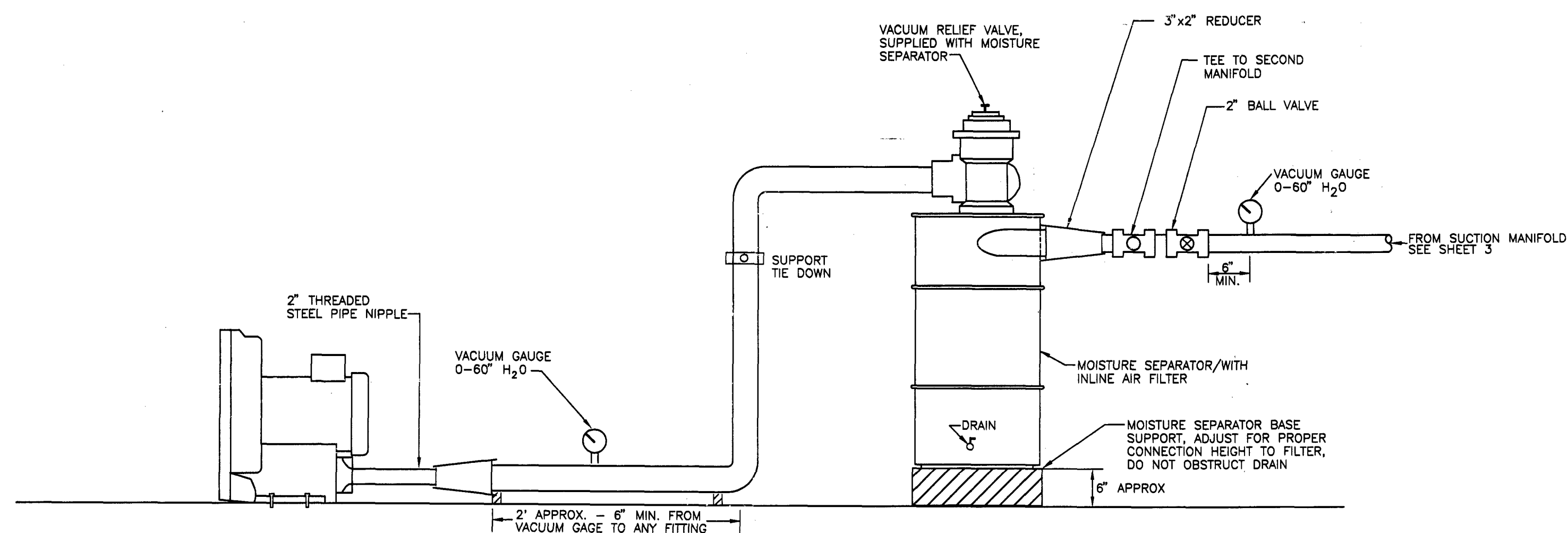
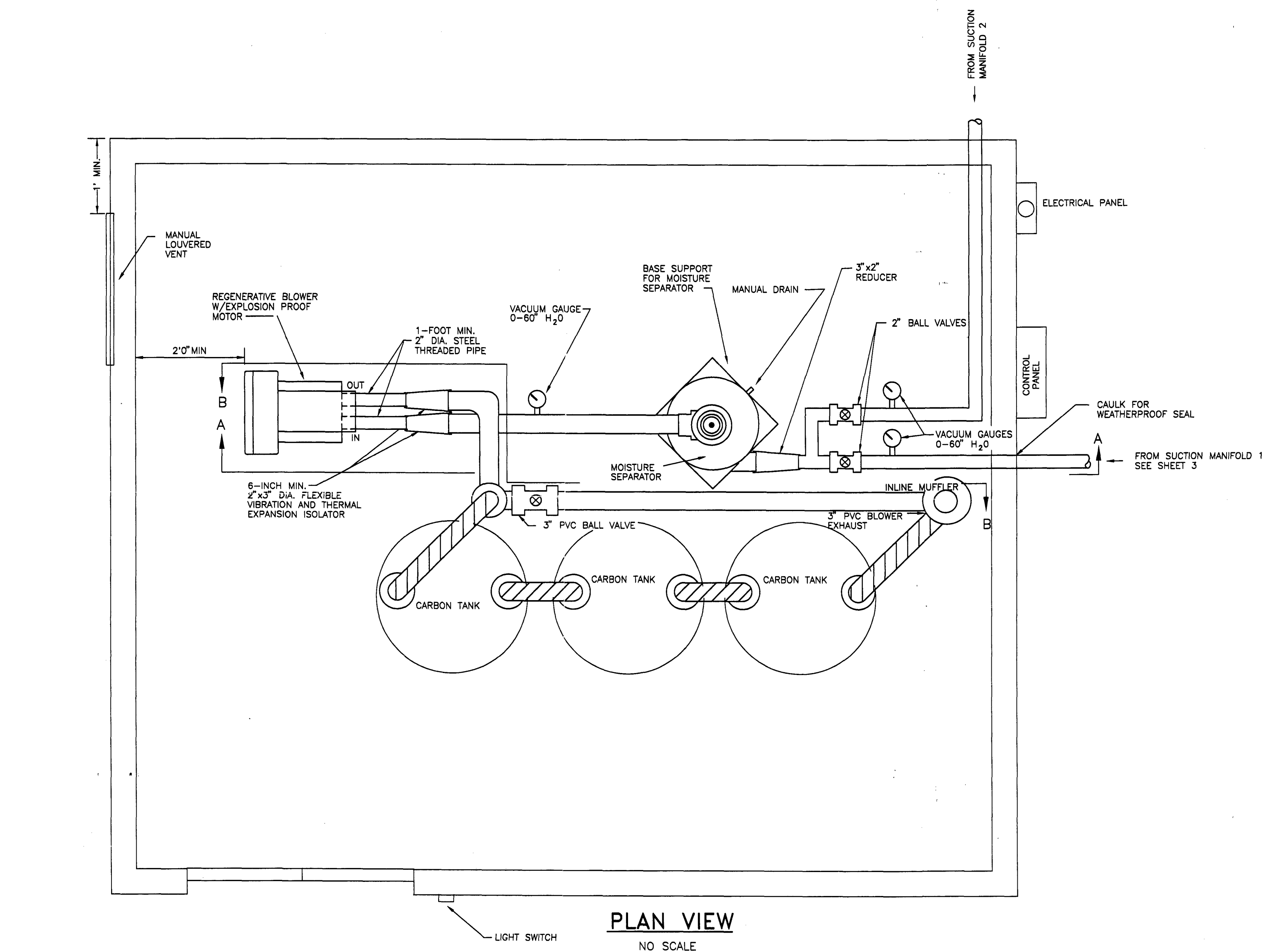
611 SKYLINE ROAD  
URAMIE, WY. 82070  
(307)742-0031  
FAX (307)721-2913

701 ANTLER DR., SUITE 233  
CASPER, WY. 82601  
(307)473-2707  
FAX (307)237-0828

1848 SUGARLAND DR., SUITE 134  
SHERIDAN, WY. 82801  
(307)672-0761  
FAX (307)674-4265

REVISED BY:	DATE:
SDH	6/93
SDH	9/93
SDH (AS BUILT)	3/94
SDH (EXPANSION)	11/94

DESIGNED BY:	DATE:
DRAWN BY:	DATE:
SDH	1/93
CHECKED BY:	DATE:
JOB NO:	0125
DEPARTMENT:	LW
SHEET NO:	3 OF 5



## MECHANICAL EQUIPMENT

## QUANTITY

## PART SPECIFICATION

BLOWER	1 EACH	EG & G ROTRON REGENERATIVE BLOWER, MODEL DR707, WITH EXPLOSION PROOF MOTOR (NEMA CLASS 7), 230/3/60.
CARBON TANKS	3 EACH	CAMERON - YAKIMA
INLINE MUFFLER	1 EACH	EG & G ROTRON DUAL CONNECTION INLINE MUFFLER, PART NUMBER 511569
INLINE PARTICULATE FILTER	1 EACH	H2 OIL RECOVERY SYSTEMS
REPLACEABLE AIR FILTER ELEMENTS	2 EACH	H2 OIL RECOVERY SYSTEMS
MOISTURE SEPARATOR	1 EACH	H2 OIL RECOVERY SYSTEMS
0-60" H <sub>2</sub> O VACUUM GAUGE	3 EACH	EG & G ROTRON OR EQUAL

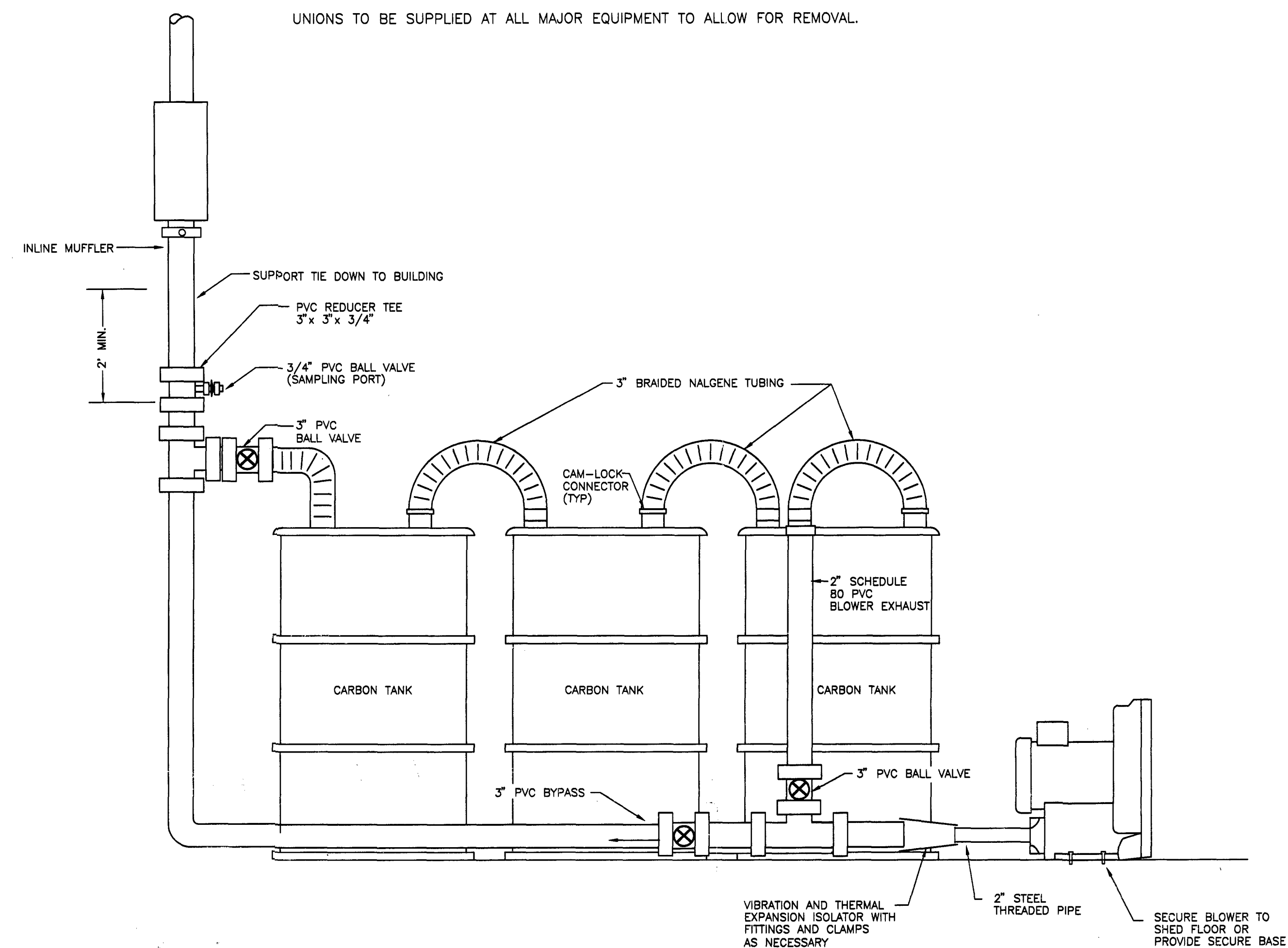
FITTINGS SUCH AS TEES, ADAPTORS AND ELBOWS NECESSARY TO CONSTRUCT THE EQUIPMENT IN THE CONFIGURATION SHOWN SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. NOT ALL FITTINGS NECESSARY TO PROPERLY CONSTRUCT THE SYSTEM ARE SPECIFICALLY IDENTIFIED ON THE CONSTRUCTION DRAWINGS.

ANY EQUIPMENT MAY BE SUBSTITUTED WITH EQUIVALENT EQUIPMENT IF APPROVED BY ENGINEER IN ACCORDANCE WITH THE PROCEDURE ESTABLISHED IN THE SPECIFICATIONS. ADDITIONAL PERFORMANCE REQUIREMENTS ARE CONTAINED IN THE SPECIFICATIONS.

PROVIDE 2\"/>

EQUIPMENT CAN BE LAYED OUT MIRROR IMAGE IF NECESSARY.

UNIONS TO BE SUPPLIED AT ALL MAJOR EQUIPMENT TO ALLOW FOR REMOVAL.



## MECHANICAL DETAILS

DOWELL SCHLUMBERGER INCORPORATED  
ARTESIA, NEW MEXICO

REVISED BY: DATE:  
SDH 6/93  
SDH (AS BUILTS) 3/94  
SDH (EXPANSION) 11/94

**Western  
water  
Consultants, Inc.**

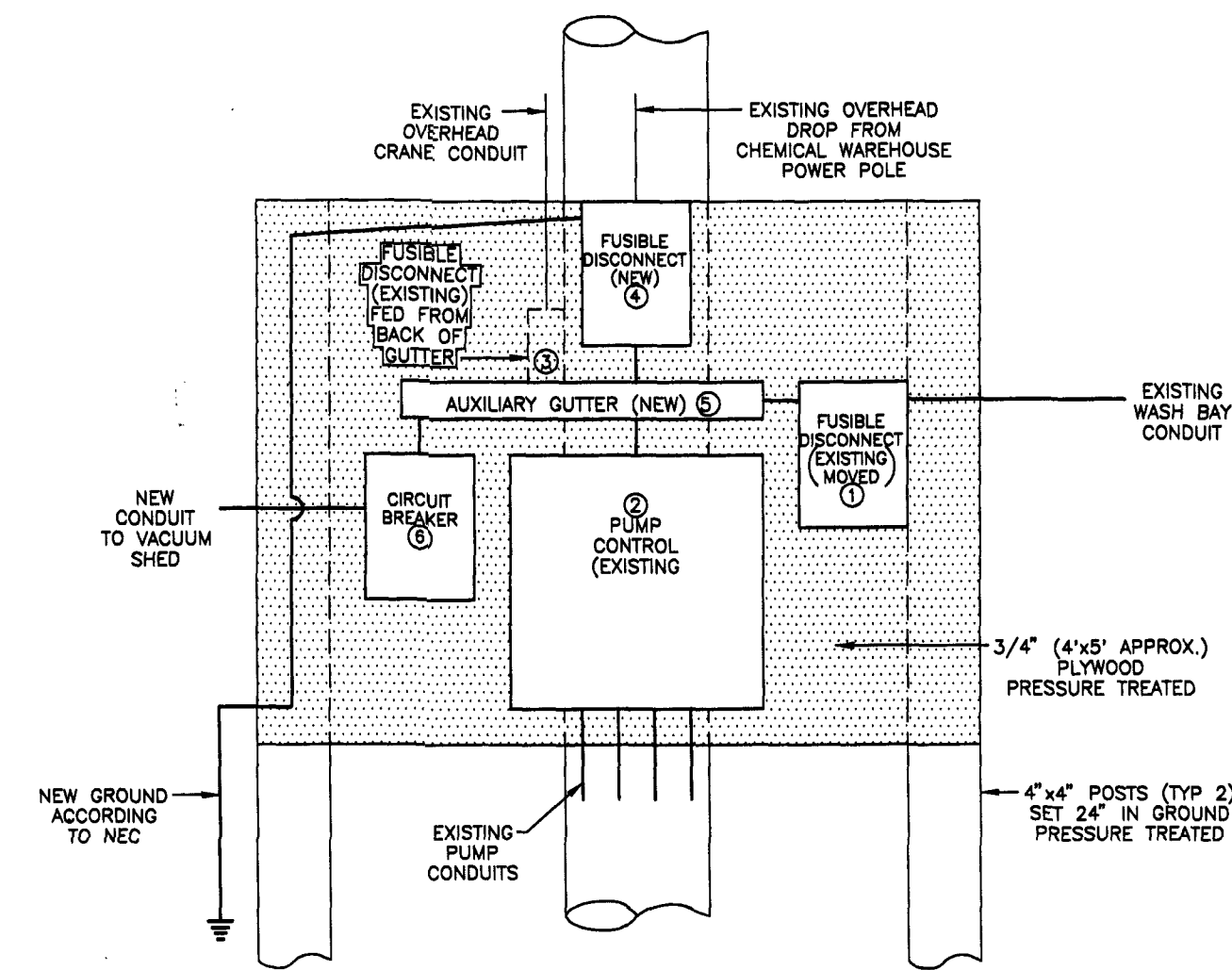
611 SKYLINE ROAD  
LARAMIE, WY. 82070  
(307)742-0031  
FAX (307)721-2913

701 ANTLER DR., SUITE 233  
CASPER, WY. 82601  
(307)473-2707  
FAX (307)237-0828

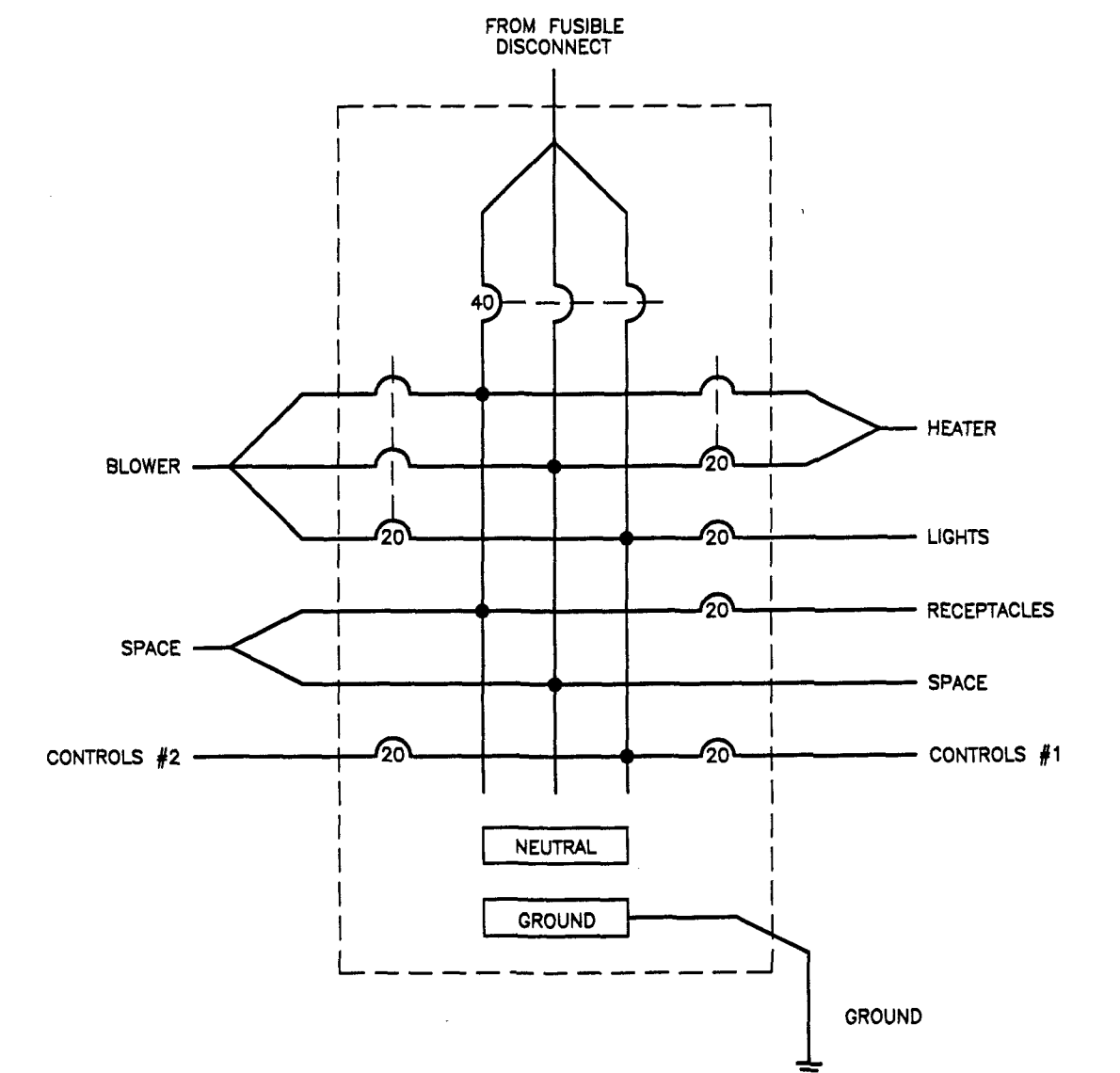
1949 SUGARLAND DR., SUITE 134  
SHERIDAN, WY. 82801  
(307)672-0761  
FAX (307)674-4285

DESIGNED BY: DATE:  
DRAWN BY: DATE:  
CHECKED BY: DATE:  
JOB NO:  
0125  
DEPARTMENT:  
LW  
SHEET NO:  
4 OF 5

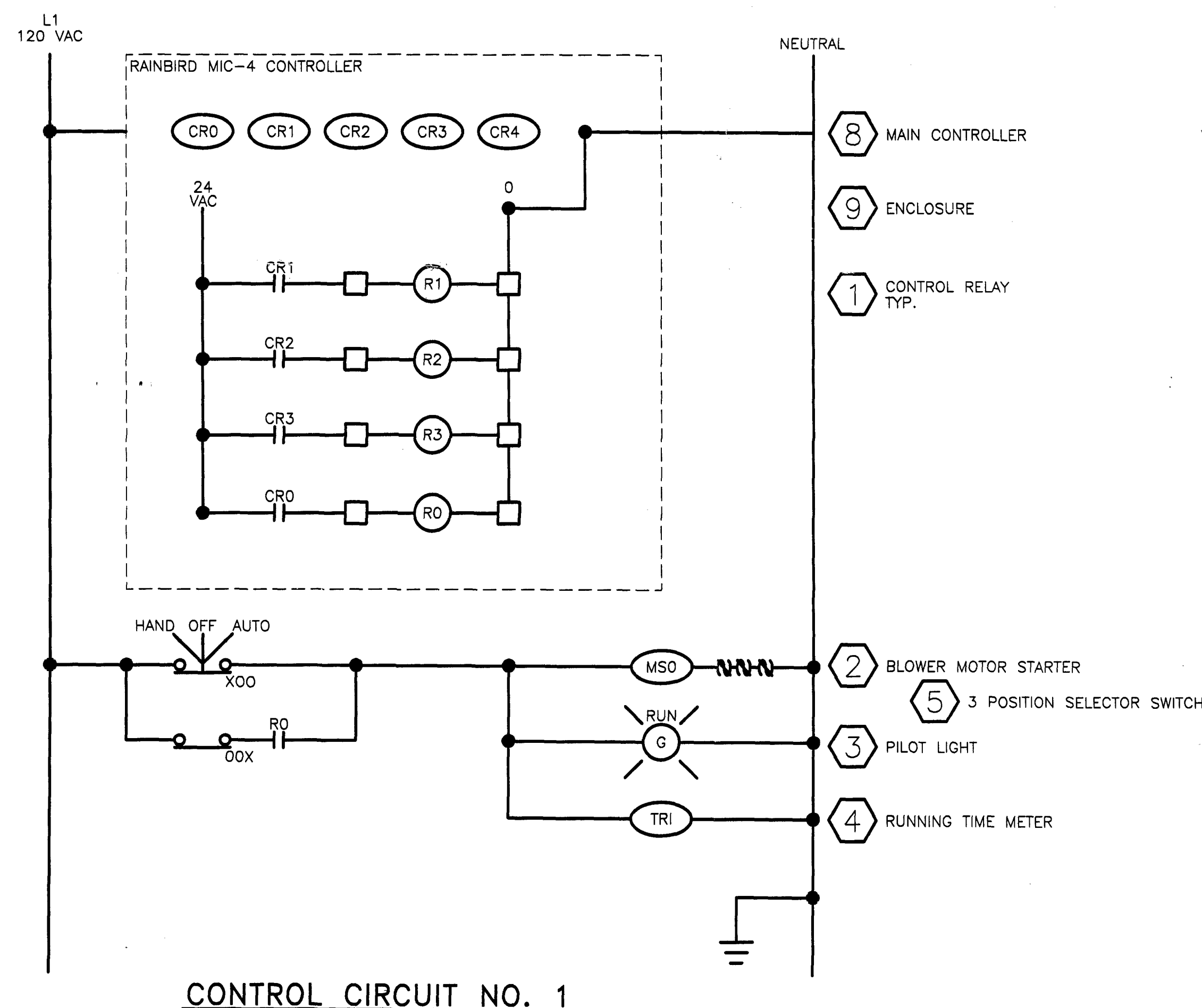




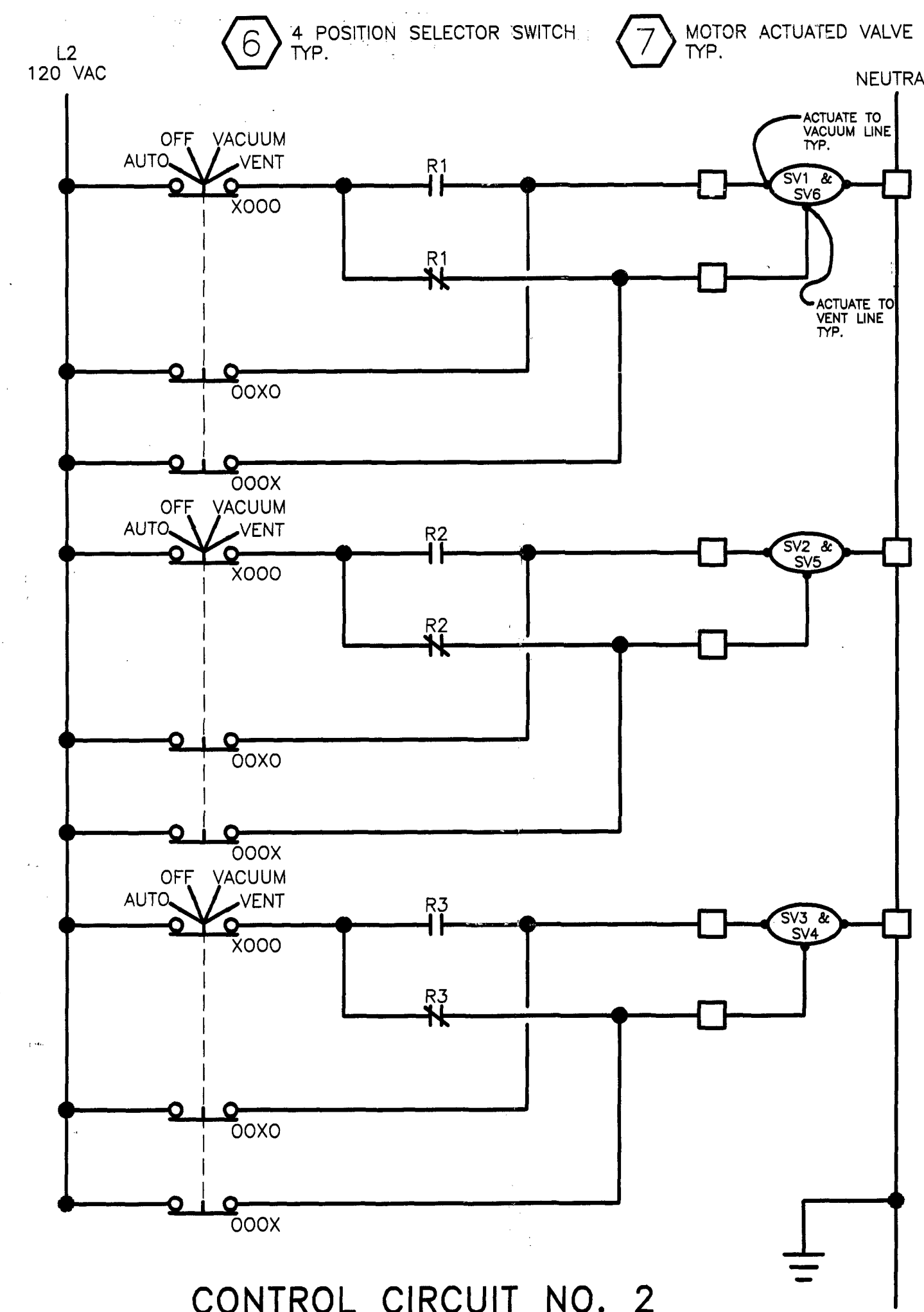
MODIFIED WASH BAY POWER POLE



PANEL  
100A, 240/120V, 3Ø, 4W  
MAIN BREAKER  
12 SPACES MINIMUM  
ONE LINE DIAGRAM



CONTROL CIRCUIT NO. 1



CONTROL CIRCUIT NO. 2

NOTE: ZONES 1 & 6, 2 & 5, 3 & 4, ARE OPERATED SIMULTANEOUSLY.

MARK	MANUF.	PART NO.
1	SQUARE D	CLASS 8501, TYPE KU-12, W/ TYPE NR-82 SOCKETS
2	SQUARE D	CLASS 8502, TYPE PES.10E W/ CLASS 9065 TYPE PE 11.5 BIMETALLIC OVERLOAD RELAY
3	SQUARE D	CLASS 9001, TYPE KP-1G31 W/ TYPE KN-724SP LEGEND PLATE
4	CRAMER	635 K, TO 99999.9 HOURS
5	SQUARE D	CLASS 9001, TYPE KS-43BH13 W/ TYPE KN-760SP LEGEND PLATE
6	SQUARE D	CLASS 9001, TYPE KS-88BH2 W/ TYPE KN-799SP LEGEND PLATE
7	HARRINGTON PLASTICS	EA 0200180H
8	RAINBIRD	MIC-4
9	GE, SQUARE D	NEMA 3R; SIZED TO HOLD ALL DEVICES ① THRU ⑥ ABOVE; PILOT DEVICES ③ THRU ⑥ TO BE MOUNTED ON FRONT, HINGED, LOCABLE COVER.

## ELECTRICAL

DOWELL SCHLUMBERGER INCORPORATED  
ARTESIA, NEW MEXICO

**Western Water Consultants, Inc.**

811 SKYLINE ROAD  
LARAMIE, WY. 82070  
(307)742-0031  
FAX (307)721-2913

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FAX (307)237-0828

1848 SUGARLAND DR., SUITE 134  
SHERIDAN, WY. 82801  
(307)672-0781  
FAX (307)674-4265

REVISED BY: SDH	DATE: 8/93	DESIGNED BY:	DATE:
SDH (AS BUILTS)	3/94	DRAWN BY: SDH	DATE: 1/93
SDH (EXPANSION)	11/94	CHECKED BY:	DATE:
		JOB NO: 0125	
		DEPARTMENT: LW	
		SHEET NO:	5 OF 5