Department of Energy
Albuquerque Operations
Los Alamos Area Office
Los Alamos, New Mexico 87544

JUL 3 0 1987

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Michael Burkhart
Director, NMEID
Harold Runnels Building
Santa Fe, NM 87501

Dear Mr. Burkhart:

Pursuant to our March 12, 1987 letter to you, enclosed are results of soil sampling performed by the Los Alamos National Laboratory (the Laboratory) after a discharge from a surface impoundment in Technical Area (TA) 16. The discharge contained barium above the Extraction Procedure (EP) toxicity criteria of 100 mg/l. The Laboratory sampled downgradient from the discharge into the ephemeral channel to determine if barium levels indicating a Resource Conservation and Recovery Act (RCRA) hazardous waste (i.e., above 100 mg/l) were in the soil.

The analytical results indicate that measured levels (26.0 mg/l) somewhat above background (0.8 mg/l), although well below the EP toxic criteria (100.0 mg/l), exist within 3 feet of the discharge point. These levels quickly decrease to near background concentrations in samples taken 10 feet and 40 feet from the discharge (6.6 mg/l and 2.7 mg/l, respectively). Due to these low levels, we do not see the need for further evaluation related to this discharge.

Pursuant to our June 5, 1987 letter to you, enclosed are results of recent wastewater sampling for barium on other high explosive Outfalls, specifically, Outfalls 056 and 058. As stated in the June 5, 1987 letter, a composite sampling program was begun on other specific high explosive Outfalls, and as the data became available it would be transmitted to EPA and EID. Sampling from other high explosive Outfalls is continuing.

Our letter of March 12, 1987 stated we were planning to install a treatment system to ensure that future discharges of relatively elevated levels of barium would not occur. We proposed to install this treatment system and have it operational by September, 1987. We have since chosen to eliminate barium in our processes rather than treat barium as originally proposed. We anticipate elimination of barium in our processes to occur by September 1988.

We are currently developing a substitute composition to replace barium in our explosive manufacturing processes. Although this development is proceeding, our use of barium-containing compositions must continue in a very limited capacity until another composition can be proven effective. We are treating all barium-containing sludge and effluent in sumps prior to collection for disposal/burning at the pressure vessels. This treatment renders the barium insoluble prior to effluent discharge through permitted Outfall Number 055.

Generally, the treatment procedure for the sludge and effluent in the sumps is: 1) the sump that will receive barium-containing waste is emptied, 2) machining or cleaning waste effluent is discharged into the sump until an indicator light shows the discharge portion of the sump to be two-thirds full, 3) cleaning or machining operations then cease until the sump's contents have been treated and emptied, 4) prior to emptying, contents of the sump are sampled and the appropriate amount of chemicals (hydrochloric acid and sodium sulfate) to adequately fix the barium in a nonsoluble form is determined, 5) diluted hydrocholoric acid and sodium sulfate are then added to the sump, mixed, and allowed to settle, and 6) contents of the sump are removed by vacuum truck and drained through a cloth filter onto the pressure vessels for burning. This ensures that the eventual effluent from the pressure vessels into the surface impoundment does not contain elevated levels of barium.

We have expanded our Standard Operating Procedures (SOP) to include significant changes in process. These changes include reducing the amount of water associated with manufacturing barium-containing explosives and inert products and, consequently, reducing the amount dissolved in the washdown water; isolating activities that have potential to empty barium-containing wastewater into the collection sumps; and treating barium in the sumps prior to disposal. These SOPs have been included as enclosures.

Also in the March 12, 1987 letter, we committed to analyze influent entering the surface impoundment for a broad spectrum of other potential contaminants (specifically, volatiles, semi-volatiles and nitroaromatics). Results from these analyses are enclosed and indicate a need for treating organic constituents. We are changing our treatment system design to address removal of organics by filtering the effluent through an activated carbon adsorption tank. A copy of the treatment system design is enclosed.

This treatment system will be operational by mid-September, 1987. Once it is on-line, we will remove the remaining liquid from the surface impoundment. Before removal, the liquid will be sampled and analyzed for elevated levels of barium from discharges prior to our treatment in sumps. If only de minimus levels exist, we will discharge the fluid through the carbon treatment system to ensure removal of organic compounds. If higher

concentrations of barium are evident, we will pump the fluid into a stock tank for treatment similar to that performed in the sumps. The treated fluid will then be discharged through the cloth filter, pressure vessels, and carbon treatment system.

Eliminating barium from our manufacturing processes and removing organic compounds from our effluents are waste minimization steps in our continued efforts to maintain environmental compliance.

If this approach does not meet with your approval, please contact Mr. James Phoenix of my staff at 667-5288.

Sincerely,

Harold E. Valencia
Area Manager

7229A

Enclosure:
As stated 13 Atch

cc:
A. Tiedman, LANL, ADS, MS A120
J. Aragon, LANL, HSE-DO, MS K491
T. Gunderson (HSE8-87-730, 7-14), LANL, HSE-8, MS K490
A. Drypolcher, LANL, HSE-8, MS K490

XC: EID Surface Water
EPA (6H-HS)

SOIL SAMPLES TAKEN DOWNSTREAM FROM OUTFALL EPA05A055, TA-16-401,406 ON 11 Feb. 1987

SAMPLE #	LOCATION
87.02608	background taken between "pond" and outfall
87.02609	sample taken 3 feet downstream from outfall
87.02610	sample taken 10 feet downstream from outfall
87.02611	sample taken 40 feet downstream from outfall

1. All samples except #87.02608 were taken in the stream bed draining the outfall.
2. Each sample consisted of a 3.5" diamenter x 4" deep plug bagged separately and labeled in a ziplock plastic bag.
3. All samples were submitted to the Health and Environmental Chemistry Group (HSE-9) on 11 Feb. 1987 for Reactivity and EPtox(metals) analysis.

Atch 1

HSE-9 ANALYTICAL RESULTS

EPA 3-Mar-1987 FIT

SAMPLE NUMBER	REQ NUM	RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	DETECT
7.02608	05800	0.8000	0.5000	MG/L	3/03/87	
7.02609	05800	26.0000	2.6000	MG/L	3/03/87	
7.02610	05800	6.6000	0.7000	MG/L	3/03/87	
7.02611	05800	2.7000	0.5000	MG/L	3/03/87	
7.02612	05808	0.5000	0.5000	MG/L	3/03/87	

THESE DATA MEET ESTABLISHED HSE9 GROUP QUALITY ASSURANCE STANDARDS

GSH 3/2/87
SECTION LEADER

mag 3/3/87
QUALITY ASSURANCE OFFICER

HSE-9 ANALYTICAL RESULTS

REPORT 27-Feb-1987 RF

SAMPLE NUMBER	REQ NUM	RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
.02608	05800	0.0000	0.0000	SENS	2/27/87	NEG
.02609	05800	0.0000	0.0000	SENS	2/27/87	NEG
.02610	05800	0.0000	0.0000	SENS	2/27/87	NEG
.02611	05800	0.0000	0.0000	SENS	2/27/87	NEG

HSE9 DATA MEET ESTABLISHED HSE9 GROUP QUALITY ASSURANCE STANDARDS

3-3-87 DKuck
SECTION LEADER

QUALITY ASSURANCE OFFICER

HSE-9 ANALYTICAL RESULTS

AS 3-March-1987 ER

SAMPLE NUMBER	REQ NUM		RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
.02608	05800	<	0.0500	0.0500	MG/L	3/03/87	TA-16-401, 406 drainage
.02609	05800	<	0.0500	0.0500	MG/L	3/03/87	
.02610	05800	<	0.0500	0.0500	MG/L	3/03/87	
.02611	05800	<	0.0500	0.0500	MG/L	3/03/87	
.02612	05808	<	0.0500	0.0500	MG/L	3/03/87	— Cooling Tower

THESE DATA MEET ESTABLISHED HSE9 GROUP QUALITY ASSURANCE STANDARDS

GG 3/3/87
SECTION LEADER

mag 3/3/87
QUALITY ASSURANCE OFFICER

AS 3-MAR-1987 RR

SAMPLE NUMBER	REQ NUM		RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
7.02608	05800	<	0.0500	0.0500	MG/L	3/03/87	
7.02609	05800	<	0.0500	0.0500	MG/L	3/03/87	
7.02610	05800	<	0.0500	0.0500	MG/L	3/03/87	
7.02611	05800	<	0.0500	0.0500	MG/L	3/03/87	
7.02612	05808	<	0.0500	0.0500	MG/L	3/03/87	

THESE DATA MEET ESTABLISHED HSE9 GROUP QUALITY ASSURANCE STANDARDS

3/2/87
SECTION LEADER

mag 3/3/87
QUALITY ASSURANCE OFFICER

HSE-9 ANALYTICAL RESULT

CD 3-MAY-1987 F.F.

SAMPLE NUMBER	REQ NUM		RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
7.02608	05800	<	0.0100	0.0100	MG/L	3/03/87	
7.02609	05800	<	0.0100	0.0100	MG/L	3/03/87	
7.02610	05800	<	0.0100	0.0100	MG/L	3/03/87	
7.02611	05800	<	0.0100	0.0100	MG/L	3/03/87	
7.02612	05800	<	0.0100	0.0100	MG/L	3/03/87	

THESE DATA MEET ESTABLISHED HSE9 GROUP QUALITY ASSURANCE STANDARDS

EBG 3/2/87
SECTION LEADER

mag 3/3/87
QUALITY ASSURANCE OFFICER

HSE-9 ANALYTICAL RESULTS

CR 3-Mar-1987 LF

SAMPLE NUMBER	REQ NUM		RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
7.02608	05800	<	0.0500	0.0500	MG/L	3/03/87	
7.02609	05800	<	0.0500	0.0500	MG/L	3/03/87	
7.02610	05800	<	0.0500	0.0500	MG/L	3/03/87	
7.02611	05800		0.0700	0.0500	MG/L	3/03/87	
7.02612	05800		0.0800	0.0500	MG/L	3/03/87	

THESE DATA MEET ESTABLISHED HSE9 GROUP QUALITY ASSURANCE STANDARDS

CR 3/12/87
SECTION LEADER

mag 3/13/87
QUALITY ASSURANCE OFFICER

HSE-9 ANALYTICAL RESULTS

SE 3-MAR-1987 PA

SAMPLE NUMBER	REQ NUM		RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
7.02608	05800	<	0.0100	0.0100	MG/L	3/03/87	
7.02609	05800	<	0.0100	0.0100	MG/L	3/03/87	
7.02610	05800	<	0.0100	0.0100	MG/L	3/03/87	
7.02611	05800	<	0.0100	0.0100	MG/L	3/03/87	
7.02612	05800	<	0.0100	0.0100	MG/L	3/04/87	

THESE DATA MEET ESTABLISHED HSE9 GROUP QUALITY ASSURANCE STANDARDS

3/12/87
SECTION LEADER

mag 3/13/87
QUALITY ASSURANCE OFFICER

SAMPLE NUMBER	REQ NUM		RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
.02608	05800	<	0.0500	0.0500	MG/L	3/03/87	
.02609	05800	<	0.0500	0.0500	MG/L	3/03/87	
.02610	05800	<	0.0500	0.0500	MG/L	3/03/87	
.02611	05800	<	0.0500	0.0500	MG/L	3/03/87	
.02612	05800	<	0.0500	0.0500	MG/L	3/03/87	

HESE DATA MEET ESTABLISHED HSE9 GROUP QUALITY ASSURANCE STANDARDS

SEG 3/3/87
SECTION LEADER

mag 3/3/87
QUALITY ASSURANCE OFFICER

HSE SUMMARY REF

SAMPLE NUMBER	REQ NUM		RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
.02608	05800	<	0.0050	0.0050	MG/L	3/03/87	
.02609	05800	<	0.0050	0.0050	MG/L	3/03/87	
.02610	05800	<	0.0050	0.0050	MG/L	3/03/87	
.02611	05800	<	0.0050	0.0050	MG/L	3/03/87	
.02612	05808	<	0.0050	0.0050	MG/L	3/03/87	

HESE DATA MEET ESTABLISHED HSE9 GROUP QUALITY ASSURANCE STANDARDS

ESG 3/2/87
SECTION LEADER

mag 3/3/87
QUALITY ASSURANCE OFFICER

TA-16-401,406 Sampling results

Date sampled	Media	Depth (feet)	C.O.D.	Ba(TOTAL)	EP TOXIC Ba #	pH
08/14/85	liquid				36	
01/29/86	sludge					
01/29/86	liquid					
01/30/86	sludge				229.4	7
01/30/86	liquid				115.1	7.1
02/09/86	sludge					6.47
02/09/86	liquid			171		6.74
04/01/86	sludge			0.14		
05/20/86	liquid		290	22		7.07
07/07/86	liquid		190	15		
07/17/86	liquid		97			7.19
09/17/86	liquid		212	30		7.92
10/07/86	liquid		214	27		7.2
10/27/86	liquid		251	30		9.8
11/10/86	liquid	2.2	135	60		7.21
11/20/86	liquid	2.3	126	59		8

SUMMARY OF ANALYTICAL SOIL RESULTS DOWNSTREAM FROM TA 16 SURFACE IMPOUNDMENT

Extraction Procedure for Toxicity of Barium

Sample #	Location	Result(mg/l)
87.02608	background between "pond" & outfall	0.8
87.02609	3 ft downstream from outfall	26.0
87.02610	10 ft downstream from outfall	6.6
87.02611	40 ft downstream from outfall	2.7

Atch 2

SUMMARY OF LIQUID INFLUENT ANALYTICAL RESULTS FROM TA 16 SURFACE IMPOUNDMENT

Volatile Organics

Sample #	Compound	Concentration (ug/l)
87.02600	1,1,1 Trichloroethane	501.7
	Toluene	342.7
87.02601	1,1,1 Trichloroethane	654.3
	Toluene	452.8

Semi-volatiles and Nitroaromatics

Sample #	Compound	Concentration (ug/l) (approximate)
87.02604	TNT (2-methyl-1,3,5-trinitrobenzene)	1200
	2-chloroethanol phosphate	400
87.02605	TNT (2-methyl-1,3,5-trinitrobenzene)	1000
	2-chloroethanol phosphate	380

Daily Composite Samples
NPDES Outfall 056 (TA-16-260)

Date Sampled	Ba (mg/l)
05/26/87	360
05/27/87	120
05/28/87	100
05/29/87	47
06/01/87	13
06/03/87	400

Daily Composite Samples
NPDES Outfall 058 (TA-16-300 Line)

Date Sampled	Ba (mg/l)
05/18/87	71
05/19/87	76
05/20/87	64
05/21/87	64

HSE-9 Analytical Chemistry Request

Sample Sheet No.: 5385

Requestor: R. Bohn

Date Submitted: 01/27/87

ample No.	Contractor	Other ID No.	Analyses Desired
.97262	Rocky Mtn. Anal.	87.02606	Semi-Volatiles
.02604	Rocky Mtn. Anal.		Semi-Volatiles
.02605	Rocky Mtn. Anal.		Semi-Volatiles

tal Number of Samples: 3

Atch 3

Roy,

There were 18 compounds spiked into a QC sample send along with your two samples.

RMA found 12 of these 18 compounds, and of those 12 they reported analytical values that represent an average recovery of 66.7%.

Note, though that the ones they did not find were spiked at levels near their reported limits of detection.

QC data for SS# 5385

Amt. Found	Amt. Spiked	% Recovery
11	17	64.7
12	24	50.0
27	37	73.0
15	20	75.0
23	30	76.7
23	37	62.2
12	23	52.2
16	24	66.7
17	24	70.8
14	26	53.8
29	37	78.4
30	38	78.9
Average % Recovery		66.9

For 12 Samples with reported values.

Amt. Found	Amt. Spiked	% Recovery
ND	12	0
ND	12	0
ND	12	0
ND	12	0
ND	17	0
ND	12	0

Number of Compounds not detected 6

Analytical Report

Date: 02/20/87

:
R. Bohn
MS - K-490
Tel. (505)-665-0453

om:
Larry R. Field
HSE-9 / Contracting
MS - K484
Tel. (505)-667-5889

urce of Samples: ——> TA - 16, Discharge, Structures 401, 406

Sample Sheet # 5385

Sample No.	Other ID No.	Analysis Type	Cas. Number	Analytical Result		Units	Uncertainty +/-
					Amt. Spiked		
.97262	87.02606	4-Nitrophenol	100027	< 50		UG/L	5
QC Sample		4-Bromophenyl phenyl ether	101553	< 10		UG/L	1
		2,4-Dimethylphenol	105679	< 10		UG/L	1
		1,4-Dichlorobenzene	106467	< 10		UG/L	1
		bis(2-Chloroisopropylether	108601	< 10		UG/L	1
		Phenol	108952	< 10		UG/L	1
		bis(2-Chloroethyl)ether	111444	17	24	UG/L	1.7
		bis(2-Chloroethoxy)methane	111911	16	24	UG/L	1.6
		bis(2-Ethylhexyl)phthalate	117817	< 10		UG/L	1
		Di-n-octyl phthalate	117840	< 10	22	UG/L	1
		Hexachlorobenzene	118741	11	17	UG/L	1.1
		Anthracene	120127	< 10		UG/L	1
		1,2,4-Trichlorobenzene	120821	< 10	12	UG/L	1
		2,4-Dichlorophenol	120832	< 10		UG/L	1
		2,4-Dinitrotoluene	121142	29	37	UG/L	2.9
		1,2-Diphenylhydrazine *	122394	< 10		UG/L	1
		Pyrene	129000	23	30	UG/L	2.3
		Dimethyl phthalate	131113	< 10		UG/L	1
		Benzo(g,h,i)perylene	191242	< 5		UG/L	0.5
		Indeno(1,2,3-c,d)pyrene	193395	< 10		UG/L	1
		Benzo(b)fluoranthene	205992	< 10		UG/L	1
		Fluoranthene	206440	< 10		UG/L	1
		Benzo(k)fluoranthene	207089	12	23	UG/L	1.2
		Acenaphthylene	208968	< 10		UG/L	1
		Chrysene	218019	< 10		UG/L	1
		Benzo(a)pyrene	50328	< 10		UG/L	1
		2,4-Dinitrophenol	51285	< 50		UG/L	5
		4,6-Dinitro-2-methylphenol	534521	< 50		UG/L	5
		Dibenzo(a,h)anthracene	53703	< 10		UG/L	1
		1,3-Dichlorobenzene	541731	14	26	UG/L	1.4
		Benzo(a)anthracene	56553	23	37	UG/L	2.3
		4-Chloro-3-methylphenol	59507	< 10		UG/L	1

Sample No.	Other ID No.	Analysis Type	Cas. Number	Analytical Result	Units	Certainty +/-
		2,6-Dinitrotoluene	606202	30 38	UG/L	3
		N-Nitroso-dipropylamine	621647	< 10 17	UG/L	1
		N-Nitrosodimethylamine	62759	< 10	UG/L	1
		Hexachloroethane	67721	< 10	UG/L	1
		4-Chlorophenyl phenylether	7005723	< 10	UG/L	1
		1,2-Dichlorobenzene	75501	~~< 10~~ 12	UG/L	1
		Hexachlorocyclopentadiene	77474	< 10	UG/L	1
		Isophorone	78591	27 38	UG/L	2.7
		Acenaphthene	83329	< 10	UG/L	1
		Diethyl phthalate	84662	< 10 12	UG/L	1
		Di-n-butyl pthalate	84742	< 10 12	UG/L	1
		Phenanthrene	85018	15 20	UG/L	1.5
		Butyl benzyl phthalate	85687	< 10	UG/L	1
		N-Nitrosodiphenylamine *	86306	< 10	UG/L	1
		Fluorene	86737	< 10	UG/L	1
		Hexachlorobutadiene	87683	12 24	UG/L	1.2
		Pentachlorophenol	87865	< 50	UG/L	5
		2,4,6-Trichlorophenol	88062	< 10	UG/L	1
		2-Nitrophenol	88755	< 10	UG/L	1
		Naphthalene	91203	< 10	UG/L	1
		2-Chloronaphthalene	91587	< 10 12	UG/L	1
		3,3'-Dichlorobenzidine	91941	< 20	UG/L	2
		Benzidine	92875	< 20	UG/L	2
		2-Chlorophenol	95578	< 10	UG/L	1
		Nitrobenzene	98953	< 10	UG/L	1
.02604		4-Nitrophenol	100027	< 1000	UG/L	100
		4-Bromophenyl phenyl ether	101553	< 200	UG/L	20
		2,4-Dimethylphenol	105679	< 200	UG/L	20
		1,4-Dichlorobenzene	106467	< 200	UG/L	20
		bis(2-Chloroisopropylether	108601	< 200	UG/L	20
		Phenol	108952	< 200	UG/L	20
		bis(2-Chloroethyl)ether	111444	< 200	UG/L	20
		bis(2-Chloroethoxy)methane	111911	< 200	UG/L	20
		bis(2-Ethylhexyl)phthalate	117817	< 200	UG/L	20
		Di-n-octyl phthalate	117840	< 200	UG/L	20
		Hexachlorobenzene	118741	< 200	UG/L	20
		Anthracene	120127	< 200	UG/L	20
		1,2,4-Trichlorobenzene	120821	< 200	UG/L	20
		2,4-Dichlorophenol	120832	< 200	UG/L	20
		2,4-Dinitrotoluene	121142	< 200	UG/L	20
		1,2-Diphenylhydrazine *	122394	< 200	UG/L	20
		Pyrene	129000	< 200	UG/L	20
		Dimethyl phthalate	131113	< 200	UG/L	20
		Benzo(g,h,i)perylene	191242	< 100	UG/L	10
		Indeno(1,2,3-c,d)pyrene	193395	< 200	UG/L	20
		Benzo(b)fluoranthene	205992	< 200	UG/L	20
		Fluoranthene	206440	< 200	UG/L	20
		Benzo(k)fluoranthene	207089	< 200	UG/L	20
		Acenaphthylene	208968	< 200	UG/L	20
		Chrysene	218019	< 200	UG/L	20
		Benzo(a)pyrene	50328	< 200	UG/L	20
		2,4-Dinitrophenol	51285	< 1000	UG/L	100
		4,6-Dinitro-2-methylphenol	534521	< 1000	UG/L	100
		Dibenzo(a,h)anthracene	53703	< 200	UG/L	20
		1,3-Dichlorobenzene	541731	< 200	UG/L	20
		Benzo(a)anthracene	56553	< 200	UG/L	20
		4-Chloro-3-methylphenol	59507	< 200	UG/L	20
		2,6-Dinitrotoluene	606202	< 200	UG/L	20
		N-Nitroso-dipropylamine	621647	< 200	UG/L	20
		N-Nitrosodimethylamine	62759	< 200	UG/L	20

ample No.	Other ID No.	Analysis Type	CAS. Number	Analytical Result	Units	Uncertainty +/-
		Hexachloroethane	67721	< 200	UG/L	20
		4-Chlorophenyl phenylether	7005723	< 200	UG/L	20
		1,2-Dichlorobenzene	75501	< 200	UG/L	20
		Hexachlorocyclopentadiene	77474	< 200	UG/L	20
		Isophorone	78591	< 200	UG/L	20
		Acenaphthene	83329	< 200	UG/L	20
		Diethyl phthalate	84662	< 200	UG/L	20
		Di-n-butyl pthalate	84742	< 200	UG/L	20
		Phenanthrene	85018	< 200	UG/L	20
		Butyl benzyl phthalate	85687	< 200	UG/L	20
		N-Nitrosodiphenylamine *	86306	< 200	UG/L	20
		Fluorene	86737	< 200	UG/L	20
		Hexachlorobutadiene	87683	< 200	UG/L	20
		Pentachlorophenol	87865	< 1000	UG/L	100
		2,4,6-Trichlorophenol	88062	< 200	UG/L	20
		2-Nitrophenol	88755	< 200	UG/L	20
		Naphthalene	91203	< 200	UG/L	20
		2-Chloronaphthalene	91587	< 200	UG/L	20
		3,3'-Dichlorobenzidine	91941	< 400	UG/L	40
		Benzidine	92875	< 400	UG/L	40
		2-Chlorophenol	95578	< 200	UG/L	20
		Nitrobenzene	98953	< 200	UG/L	20
.02605		4-Nitrophenol	100027	< 1000	UG/L	100
		4-Bromophenyl phenyl ether	101553	< 200	UG/L	20
		2,4-Dimethylphenol	105679	< 200	UG/L	20
		1,4-Dichlorobenzene	106467	< 200	UG/L	20
		bis(2-Chloroisopropylether	108601	< 200	UG/L	20
		Phenol	108952	< 200	UG/L	20
		bis(2-Chloroethyl)ether	111444	< 200	UG/L	20
		bis(2-Chloroethoxy)methane	111911	< 200	UG/L	20
		bis(2-Ethylhexyl)phthalate	117817	< 200	UG/L	20
		Di-n-octyl phthalate	117840	< 200	UG/L	20
		Hexachlorobenzene	118741	< 200	UG/L	20
		Anthracene	120127	< 200	UG/L	20
		1,2,4-Trichlorobenzene	120821	< 200	UG/L	20
		2,4-Dichlorophenol	120832	< 200	UG/L	20
		2,4-Dinitrotoluene	121142	< 200	UG/L	20
		1,2-Diphenylhydrazine *	122394	< 200	UG/L	20
		Pyrene	129000	< 200	UG/L	20
		Dimethyl phthalate	131113	< 200	UG/L	20
		Benzo(g,h,i)perylene	191242	< 100	UG/L	10
		Indeno(1,2,3-c,d)pyrene	193395	< 200	UG/L	20
		Benzo(b)fluoranthene	205992	< 200	UG/L	20
		Fluoranthene	206440	< 200	UG/L	20
		Benzo(k)fluoranthene	207089	< 200	UG/L	20
		Acenaphthylene	208968	< 200	UG/L	20
		Chrysene	218019	< 200	UG/L	20
		Benzo(a)pyrene	50328	< 200	UG/L	20
		2,4-Dinitrophenol	51285	< 1000	UG/L	100
		4,6-Dinitro-2-methylphenol	534521	< 1000	UG/L	100
		Dibenzo(a,h)anthracene	53703	< 200	UG/L	20
		1,3-Dichlorobenzene	541731	< 200	UG/L	20
		Benzo(a)anthracene	56553	< 200	UG/L	20
		4-Chloro-3-methylphenol	59507	< 200	UG/L	20
		2,6-Dinitrotoluene	606202	< 200	UG/L	20
		N-Nitroso-dipropylamine	621647	< 200	UG/L	20
		N-Nitrosodimethylamine	62759	< 200	UG/L	20
		Hexachloroethane	67721	< 200	UG/L	20
		4-Chlorophenyl phenylether	7005723	< 200	UG/L	20
		1,2-Dichlorobenzene	75501	< 200	UG/L	20

NO.	NO.	Type	Number	Result	Units	+/-
		Hexachlorocyclopentadiene	77474	< 200	UG/L	20
		Isophorone	78591	< 200	UG/L	20
		Acenaphthene	83329	< 200	UG/L	20
		Diethyl phthalate	84662	< 200	UG/L	20
		Di-n-butyl pthalate	84742	< 200	UG/L	20
		Phenanthrene	85018	< 200	UG/L	20
		Butyl benzyl phthalate	85687	< 200	UG/L	20
		N-Nitrosodiphenylamine *	86306	< 200	UG/L	20
		Fluorene	86737	< 200	UG/L	20
		Hexachlorobutadiene	87683	< 200	UG/L	20
		Pentachlorophenol	87865	< 1000	UG/L	100
		2,4,6-Trichlorophenol	88062	< 200	UG/L	20
		2-Nitrophenol	88755	< 200	UG/L	20
		Naphthalene	91203	< 200	UG/L	20
		2-Chloronaphthalene	91587	< 200	UG/L	20
		3,3'-Dichlorobenzidine	91941	< 400	UG/L	40
		Benzidine	92875	< 400	UG/L	40
		2-Chlorophenol	95578	< 200	UG/L	20
		Nitrobenzene	98953	< 200	UG/L	20

Date: 2/20/87

proved, Contracting

mag Date: 2/20/87

Approved, Quality Control

Rocky Mountain Analytical Laboratory
4955 Yarrow Street, Arvada, CO 80002 (303) 421-6611

A DIVISION OF
ENSECO
INCORPORATED

February 10, 1987

Dr. Larry Field
University of California
Los Alamos National Laboratory
HSE-8, Mail Stop K490
Los Alamos, NM 87545

Dear Larry:

Enclosed please find the results for three water samples received in our laboratory on January 28, 1987. In addition to the priority pollutant semivolatiles reported in the accompanying report, the following approximate concentrations of tentatively identified compounds were also found:

62716-01	TNT, (2-methyl-1,3,5-trinitrobenzene) approx. 1200 ug/L 2-chloroethanol phosphate, approx. 400 ug/L
62716-02	TNT (2-Methyl-1,3,5-trinitrobenzene) approx. 1000 ug/L 2-chloroethanol phosphate, approx. 380 ug/L

As a result of the rather high levels of these two tentatively identified compounds, the detection limits reported for samples 1 and 2 are somewhat higher than normal.

Please note that the original request, both from yourself, as well as Suzanne Bell and Elizabeth Affeldt, requested priority pollutant semivolatiles. However, the sample tag note sent to us with the company chain of custody mentions HSL semivolatiles. As you can see, we reported the priority pollutant list.

Please feel free to contact me should any questions arise with regard to these data.

Best Regards,

Owen Callaway

Owen Callaway
Technical Director

JOC/MPP/bjb
Enclosures

RMAL # 62716

Reviewed by:

Michael P. Phillips

Michael P. Phillips
Director
Mass Spectrometry

SAMPLE DESCRIPTION INFORMATION

for

Los Alamos National Laboratory

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
62716-01	87.02604	Water	01/26/87	01/28/87
62716-02	87.02605	Water	01/26/87	01/28/87
62716-03	87.02606	Water	—	01/28/87

February 10, 1987

ANALYTICAL RESULTS

For

Los Alamos National Laboratory

PRIORITY POLLUTANT SEMIVOLATILES, METHOD 625

Parameter	Units	62716-01		62716-02		62716-03		
Acenaphthene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Acenaphthylene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Anthracene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Benzidine	ug/L	ND	(400)	ND	(400)	ND	(20)	
Benzo(a)anthracene	ug/L	ND	(200)	ND	(200)	23	(10)	37
Benzo(a)pyrene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Benzo(b)fluoranthene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Benzo(g,h,i)perylene	ug/L	ND	(100)	ND	(100)	ND	(5)	
Benzo(k)fluoranthene	ug/L	ND	(200)	ND	(200)	12	(10)	23
bis(2-Chloroethoxy)methane	ug/L	ND	(200)	ND	(200)	16	(10)	24
bis(2-Chloroethyl)ether	ug/L	ND	(200)	ND	(200)	17	(10)	24
bis(2-Chloroisopropyl)ether	ug/L	ND	(200)	ND	(200)	ND	(10)	
bis(2-Ethylhexyl)phthalate	ug/L	ND	(200)	ND	(200)	ND	(10)	
4-Bromophenyl phenyl ether	ug/L	ND	(200)	ND	(200)	ND	(10)	
Butyl benzyl phthalate	ug/L	ND	(200)	ND	(200)	ND	(10)	
2-Chloronaphthalene	ug/L	ND	(200)	ND	(200)	ND	(10)	12
4-Chlorophenyl phenyl ether	ug/L	ND	(200)	ND	(200)	ND	(10)	
Chrysene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Dibenzo(a,h)anthracene	ug/L	ND	(200)	ND	(200)	ND	(10)	
1,2-Dichlorobenzene	ug/L	ND	(200)	ND	(200)	ND	(10)	12
1,3-Dichlorobenzene	ug/L	ND	(200)	ND	(200)	14	(10)	26
1,4-Dichlorobenzene	ug/L	ND	(200)	ND	(200)	ND	(10)	
3,3'-Dichlorobenzidine	ug/L	ND	(400)	ND	(400)	ND	(20)	
Diethyl phthalate	ug/L	ND	(200)	ND	(200)	ND	(10)	12
Dimethyl phthalate	ug/L	ND	(200)	ND	(200)	ND	(10)	
Di-n-butyl phthalate	ug/L	ND	(200)	ND	(200)	ND	(10)	12
2,4-Dinitrotoluene	ug/L	ND	(200)	ND	(200)	29	(10)	37
2,6-Dinitrotoluene	ug/L	ND	(200)	ND	(200)	30	(10)	38
Di-n-octyl phthalate	ug/L	ND	(200)	ND	(200)	ND	(10)	22
1,2-Diphenylhydrazine*	ug/L	ND	(200)	ND	(200)	ND	(10)	

ND = Not Detected. Detection limits in parentheses. * = Analyzed as azobenzene.

ANALYTICAL RESULTS

For

Los Alamos National Laboratory

PRIORITY POLLUTANT SEMIVOLATILES, METHOS 625 (CONT.)

Parameter	Units	62716-01		62716-02		62716-03		
Fluoranthene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Fluorene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Hexachlorobenzene	ug/L	ND	(200)	ND	(200)	11	(10)	17
Hexachlorobutadiene	ug/L	ND	(200)	ND	(200)	12	(10)	24
Hexachlorocyclopentadiene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Hexachloroethane	ug/L	ND	(200)	ND	(200)	ND	(10)	
Indeno(1,2,3-c,d)pyrene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Isophorone	ug/L	ND	(200)	ND	(200)	27	(10)	38
Naphthalene	ug/L	ND	(200)	ND	(200)	ND	(10)	
Nitrobenzene	ug/L	ND	(200)	ND	(200)	ND	(10)	
N-Nitrosodimethylamine	ug/L	ND	(200)	ND	(200)	ND	(10)	
N-Nitroso-dipropylamine	ug/L	ND	(200)	ND	(200)	ND	(10)	17
N-Nitrosodiphenylamine*	ug/L	ND	(200)	ND	(200)	ND	(10)	
Phenanthrene	ug/L	ND	(200)	ND	(200)	15	(10)	20
Pyrene	ug/L	ND	(200)	ND	(200)	23	(10)	30
1,2,4-Trichlorobenzene	ug/L	ND	(200)	ND	(200)	ND	(10)	12
2-Chlorophenol	ug/L	ND	(200)	ND	(200)	ND	(10)	
2,4-Dichlorophenol	ug/L	ND	(200)	ND	(200)	ND	(10)	
2,4-Dimethylphenol	ug/L	ND	(200)	ND	(200)	ND	(10)	
4,6-Dinitro-2-methylphenol	ug/L	ND	(1000)	ND	(1000)	ND	(50)	
2,4-Dinitrophenol	ug/L	ND	(1000)	ND	(1000)	ND	(50)	
2-Nitrophenol	ug/L	ND	(200)	ND	(200)	ND	(10)	
4-Nitrophenol	ug/L	ND	(1000)	ND	(1000)	ND	(50)	
4-Chloro-3-methylphenol	ug/L	ND	(200)	ND	(200)	ND	(10)	
Pentachlorophenol	ug/L	ND	(1000)	ND	(1000)	ND	(50)	
Phenol	ug/L	ND	(200)	ND	(200)	ND	(10)	
2,4,6-Trichlorophenol	ug/L	ND	(200)	ND	(200)	ND	(10)	
SS Nitrobenzene-D5	%	54	(-)	46	(-)	83	(-)	
SS 2-Fluorobiphenyl	%	60	(-)	50	(-)	81	(-)	
SS Terphenyl-D14	%	22	(-)	15	(-)	95	(-)	
SS Phenol-D5	%	11	(-)	11	(-)	47	(-)	
SS 2-Fluorophenol	%	19	(-)	14	(-)	47	(-)	
SS 2,4,6-Tribromophenol	%	32	(-)	23	(-)	61	(-)	

ND = Not Detected. Detection limits in parentheses. SS = Surrogate Spikes. * = Analyzed as diphenylamine

ANALYSIS DATA SHEET # 5589

Post Sampling Conference Completed With _____ and Samples Submitted On _____ Time _____

Due _____ Project # _____ Estimate of Time Involved _____ Actual Time 3 days

Analytical Results and Remarks Recovery of surrogate spikes: 108.2% (σ = 3.7) on 87.02600 and 106.5% (σ = 4.6) on 87.02601. Analyzed by PTGCMS. 5ml each. Total of 5 runs per sample

QC Cross Reference: Notebook R6981 p7

If Chain of Custody, Seal(s) Intact: Yes ___ No X Seal(s) Broken By: _____ Date _____

Printed Data Output Attached: Yes ___ No ___ Other Sheets Attached: Yes ___ No ___ (DE=Date Extracted, DA=Date Analyzed)

Sample Number	DE/DA	Compound	CAS #	Analytical Result (Units)	Analytical Uncertainty	MDL	Comments
87.02600		111 Trichloroethane	71556	504.7 ug/L	79.2		
		Toluene	108883	342.7	52.4		
87.02601		111 Trichloroethane	71556	654.3	64.2		
		Toluene	108883	452.8	43.6		
0.97246		CHCl3	67663	63.9 ppb (ug/L)	6.4 ppb		Added / % Rec
		CCl4	56235	63.9	6.4		82.8 / 77
		BrCM	75274	63.0	6.3		106.4 / 60
0.97247		111 TCE	71556	48.7	4.9		76.8 / 82
0		CDBM	124481	71.8	7.2		67.9 / 72
		Ethylbenzene	100414	38.7	3.9		85.05 / 84
							54.9 / 70

Approved By: Analyst _____ Notebook R698 Page 23 Date 2-3-87 QC Coordinator mag 2/3/87

Section Leader _____ Date 2-3-87 Computer Entry _____ Date ! ! !

0112S (002S)

A1.1.4

REQUESTOR DATA SHEET # 5589

Log Book_____ Page_____

Sampled by Roy Bohn/Ralph Ward Collection Date 1/26/87 Time 1400 Weather clear Witness_____

Presampling Conference Completed With S. Bell On 1/26/87 Send Report To R. Bohn MS K-490

Phone 5-0452 Source of Sample: TA-16 - 401, 406 Reason for Sampling_____

Group HSE-8 Site 16 Building 401, 406 Room No. OUTSIDE

Priority Assigned: 1. Emergency; 2. Recognized Danger; 3. Imminent Deadline; 4. Special Survey; 5. Routine;

(Circle One) Priority Approval:_____ (1. GL or DGL; 2. or 3. AGL; 4. or 5. SL)

Method of Analysis Complies With:_____

Background Information Useful to Analyst (Contamination Levels, Hazards, Etc.)_____

Chain of Custody: Yes_____(See Attached Form) No_____ Other Information_____

All Samples Submitted to HSE-9 Must Be Screened For Radioactivity. Samples Containing Greater Than 20 dpm Total Alpha or 100 dpm Combined Gamma/Beta Contamination Cannot Be Handled At TA-59.

Sample Number	Other I.D.	Sampling Location	Analysis Requested	Sampling Method	Sample Type	Preservative Utilized	Radioactivity Scan (dpm) Alpha	Radioactivity Scan (dpm) Beta/Gamma	Remarks
~~86~~									
87,02600	#1	16-401,406	Volatiles	grab	liquid	none	NA	NA	
87,02601	#2	16-401,406	"	grab	liquid	none	↓	↓	
0.97246	}	Quality Control		(Blind)					
0.97247	}								

Sampling Method: 24FC=24 Hour Flow-Weighted Composite; 24TC=24 Hour Time-Weighted Composite; G=Grab; B=Ball; D=Drill; C=Core; P=Pump; O=Other (Please Specify)

Sample Type: E=Effluent; SL=Sludge: SO=Soil; SC-Soil Core; WW-Well Water; SW=Surface Water; O=Other

Preservative: F=Filtered; NF=Non-Filtered; NA=Non Acidified; A-H_2SO_4(2 ml/l); A-HNO_3(5 ml/l); A-HNO_3(5 ml/l); A H_3PO_4 & $CuSO_4$; A-Other; I=Iced; P-NaOH.

Semivolatiles + Plutonium

TA 16

COPY

Delta H Engineering, Ltd.

ΔH ENGINEERING

1900 CHAMISA POST OFFICE BOX 2023 SANTA FE, NEW MEXICO 87504-2023 (505) 983-2594

June 30, 1987

Mr. Jim White
Regulatory Compliance, HSE-8
Los Alamos National Laboratory
P.O. Box 1663
Los Alamos, NM 87545

Re: TA-16 Outfall 055 Treatment, Revised Plan
Subcontract 9-XS5-V3017-1

Dear Mr. White:

Attached are two copies of the revised treatment system for TA-16 wastewater treatment at outfall 055. This revision is based upon the elimination of barium from the wastewater through process changes.

Although this report is by no means complete and does not provide detailed engineering for fabrication of the unit, it may be used directly by Delta H engineers and fabricators to construct a system if so desired. We estimate from 6 to 8 weeks will be required for this effort, although equipment has been specified for delivery within 2 weeks and if everything goes as it should this could be shortened.

It was necessary to provide the level of definition included in this report as it has forced us to recognize details which were heretofore assumed in informal discussions but had to be addressed eventually.

Please do not hesitate to let me know if you have any questions.

Sincerely,

Lauren Ames

cy:
A. Drypolcher
C. Nylander
A. Barr
L. Parkinson
G. Daly (w/o attach.)

Atch 5

Table of Contents

OUTFALL 055 (TA-16) TREATMENT

-- REVISED PROCESS AND IMPLEMENTATION PLAN --

prepared for:
THE LOS ALAMOS NATIONAL LABORATORY
LOS ALAMOS, NEW MEXICO

June, 1987

under contract:
9-XS5-V3017-1

Delta H Engineering, Ltd.
P. O. Box 2023
Santa Fe, NM 87504
505-983-2594

contact: Lauren Ames

EXECUTIVE SUMMARY

The batch effluent from TA-16 filters 401 and 406 has, on occasion, failed to meet the requirements of the NPDES permit. This has been due to high levels of barium and chemical oxygen demand (COD). High explosive formulations using barium are being phased out so that barium contaminants in the effluent will not present a long term problem. A treatment process addressing COD abatement of the wastewater going to the outfall is presented.

The self-contained treatment module is designed for unattended operation for extended periods of time. Periodic sampling, and biannual carbon changes are the only scheduled maintenance requirements.

This submittal is intended to provide the basis for Delta H Engineering, Ltd. to contract for fabrication of a prototype treatment unit to be installed at a specified location at TA-16.

LIST OF FIGURES

OUTFALL 055 (TA-16) TREATMENT

— REVISED PROCESS AND IMPLEMENTATION PLAN —

1 INTRODUCTION

Since publication of the title 1 design for this process [1], there has been a change in the composition of high explosive formulations at TA-16. Barium, a RCRA toxic material, has been eliminated and will no longer be found in HE wastes. Consequently, wastewater processing is greatly simplified, needing only capability to reduce chemical oxygen demand (COD) to below the 150/250 mg/L permit level.

To expedite the fabrication and delivery of a COD reduction system, Delta H Engineering has been asked to redesign the process and to follow its fabrication and assist in its installation and startup. This report provides the criteria for redesign and fabrication.

---

1. Outfall 055 (TA-16) Treatment - Conceptual Design, Delta H Engineering, April 1987.

2 TREATMENT UNIT MODIFICATIONS

All equipment associated with barium removal and disposal has been eliminated from the process. Coal-based activated carbon remains the material of choice for COD removal. It has the characteristic of loading a broader spectrum of organic compounds than does activated carbon derived from plant sources, such as coconut or walnut shells. This broad spectrum capture comes at the price of higher loading capacity available with other carbons. The organic concentration in the outfall is low enough such that the recommended canisters may be left in place for at least two years, with the lead canister then disposed of by burning at an adjacent burn pad site and the lag canister put into the lead position. New carbon would be added to the lag position.

Four Westates 110-gallon carbon canisters are specified in a series-parallel configuration. This arrangement is required to accommodate the flow and to provide more than the minimum residence time for thorough COD removal. A timed recycle of the flow through the carbon is provided to prevent initially high COD values from the unit as a new batch of wastewater is passed through it. This revision to the previous treatment process insures against reequlibriation or desorption of the previously

adsorbed organics to the stagnant wastewater in the canisters between batches. Flow indicators and proportional flow hand valves are provided to observe and balance the flow through each portion of the parallel circuit.

A 750-gallon receiver in the treatment unit collects gravity-flow from the pressure filters and discharges, via a submursible pump, through the carbon to the canyon outfall. The first five minutes of flow is recycled back to the receiver to sweep the desorbed organic from the second cartridge. A timer-operated solenoid valve directs the flow forward through the carbon after the recycle period.

Figure 1 is a revised piping and instrument drawing (P&ID).

3 DESIGN CRITERIA

The following criteria guide the process configuration and equipment sizing:

Inflow COD	>150 mg/L
Outflow COD	< 20 mg/L
Flow Cycles per Day	2
Flow per Cycle	750 gal
Maximum Flow Rate	25 gpm

The criteria guiding the civil engineering due to site conditions and layout of the treatment unit are found in the notes to Figure 2.

4 TREATMENT UNIT INSTALLATION

It is assumed that Delta H Engineering will supervise the fabrication of the treatment unit and will be available to assist in its installation if required. The following information is therefore brief, and provided with this understanding.

4.1 Site Preparation

After surveying the site with HSE-8 and WX-4 supervision, it was determined that processing would be most economically accomplished using electric power to provide necessary pressure and flow for the treatment unit rather than relying upon gravity. Flow into the unit, however, continues to be by gravity. The unit has been located such that a tenth of an inch per foot drop in grade is available. The data in Figure 2 show the location and grade of the installation and the feed piping changes required.

The unit is housed in an electrically heated, thermostatically controlled, insulated structure, designed to maintain an interior temperature of 38 degrees during wintertime months. The structure sits on four piers, connected by 2 - 2 x 8 beams on each side, as shown in Figure 3. An 8-foot stock tank below grade and under the unit, receives wastewater flow by gravity. A flat,

compacted site may be prepared by a bulldozer or front-end loader.

Approximately 300 feet of power line is required to provide electrical service to the site. Since all service specified for the unit is single phase 110/220 volt, a transformer will be required. The electrical load is less than 5 kVA at full demand. Disconnects and circuit breakers required to meet code are provided as part of the treatment unit. The transformer should be furnished by LANL facilities engineering and specified per their standards.

4.2 Treatment Unit Construction Detail

Two by four framing is used throughout. A gambrel roof allows 8-feet, 3-inches of head room at the center of the structure. The building is painted and shingled with composition lock-tab shingles, and looks much like a garden shed for tool storage.

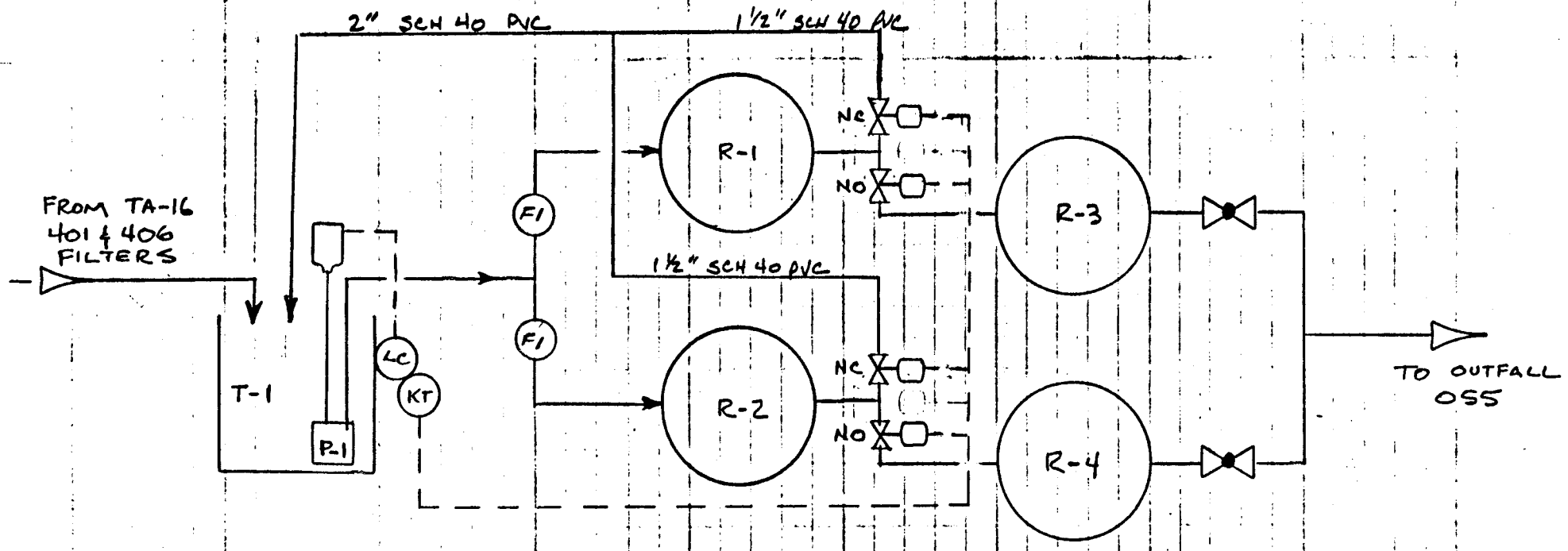
Double doors provide access to the carbon canisters and allow sunlight into the structure, when open, for infrequent operation or maintenance calls. Three inches of fiberglass insulation in the walls, doors, and against the roof decking, provide for minimum heat loss. An electric baseboard heater operates with a direct-mounted thermostat for control.

PVC piping is used throughout. A detailed piping layout is not provided as plans for this will be developed with the

fabricator. Figure 4 provides the specification for the collection tank, Figure 5 is the specification for the plastic pump and Figure 6, the specification for the level control. In the interest of expediting construction, all equipment is available off-the-shelf.

4.3 Construction Expediting

Because compliance with NPDES must be quickly achieved, Delta H Engineering will locate an outside fabricator and contract for the construction of this unit. This procedure will allow maximum flexibility for such a straight forward process unit by reducing the amount of detailed engineering required and by allowing for close coordination between Delta H engineers and the fabricator. The unit will be delivered and invoiced to LANL when it is complete. Delta H will obtain cost effective quotations and will provide a price and delivery time to LANL ten days after approval of this revised plan.



T-1

WASTEWATER
RECEIVER
500 GAL

FIBERGLASS

P-1

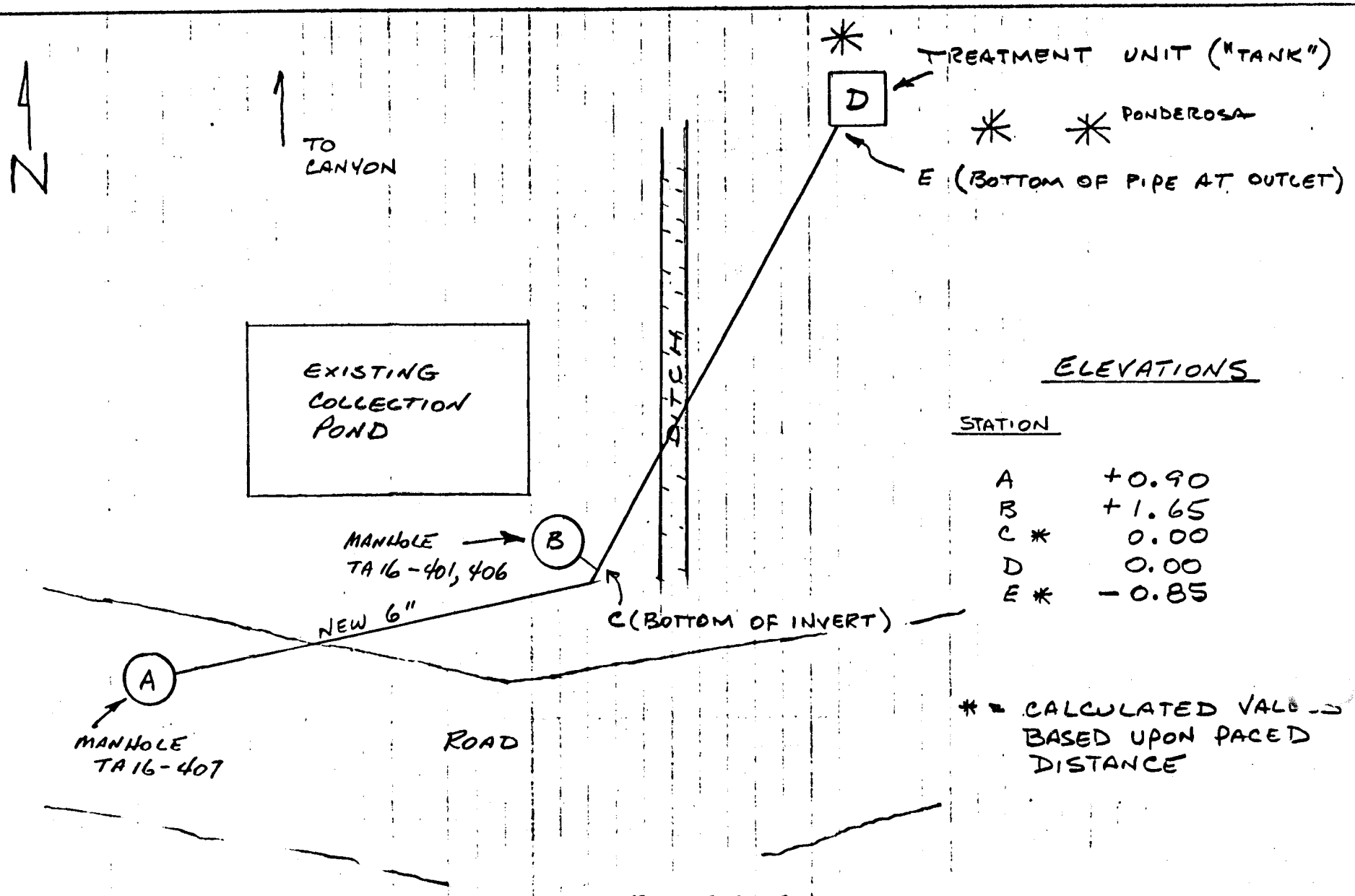
WASTEWATER
SUMP PUMP
40 GPM
15 PSI
PLASTIC

R-1 to R-4

CARBON COLUMNS
110 GAL EA.
COAL BASE ACTIVE
CARBON
WESTATES
ASC-110
CO-401

FIGURE 1

PIPING AND INSTRUMENT DRAWING



ELEVATIONS

STATION	
A	+0.90
B	+1.65
C *	0.00
D	0.00
E *	-0.85

* = CALCULATED VALUES BASED UPON PACED DISTANCE

FIGURE 2
SITE PLAN

NOTES TO FIGURE 2

1. APPROXIMATE DISTANCES (PACED)

STATION A TO STATION B	65 FEET
STATION B TO STATION D	85 FEET
LENGTH OF NEW POWER LINE STRUCTURE TA16-402 TO STATION D	300 FEET

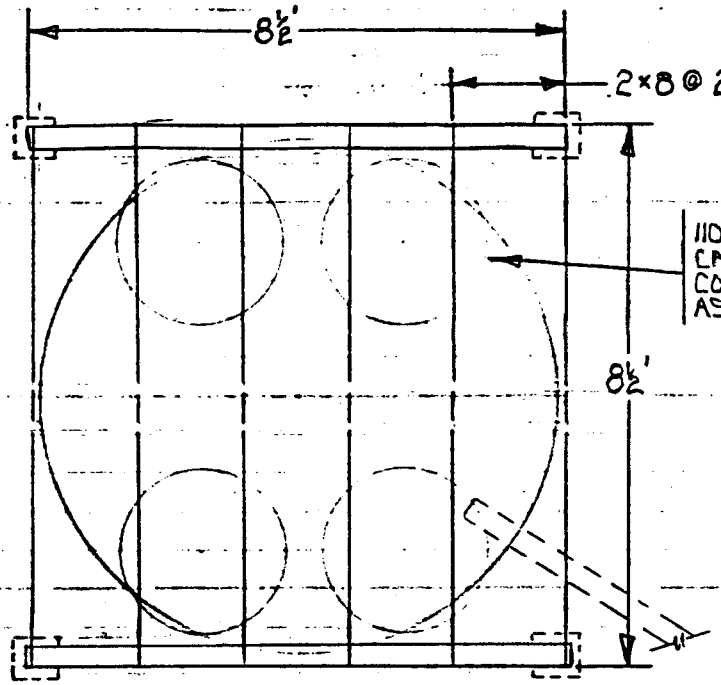
2. NEW 6" STEEL DRAIN LINE TO BE RUN FROM STATION A TO STATION D WITH CONNECTION TO STATION B. SLOPE OF PIPE TO BE 1 FT PER 100 LINEAL FEET OF PIPE.

3. OUTLET OF NEW DRAIN LINE WILL BE 0.85 FEET BELOW GRADE AT TREATMENT UNIT SITE. THIS DRAIN WILL DISCHARGE INTO A 8 FT DIA x 2 FT HIGH COLLECTION RECEIVER INSTALLED BELOW GRADE UNDER THE TREATMENT UNIT.

4. 220v/110v SINGLE PHASE 5 KVA SERVICE REQUIRED TO TREATMENT UNIT FROM VICINITY OF STRUCTURE TA16-402.

FIGURE 3

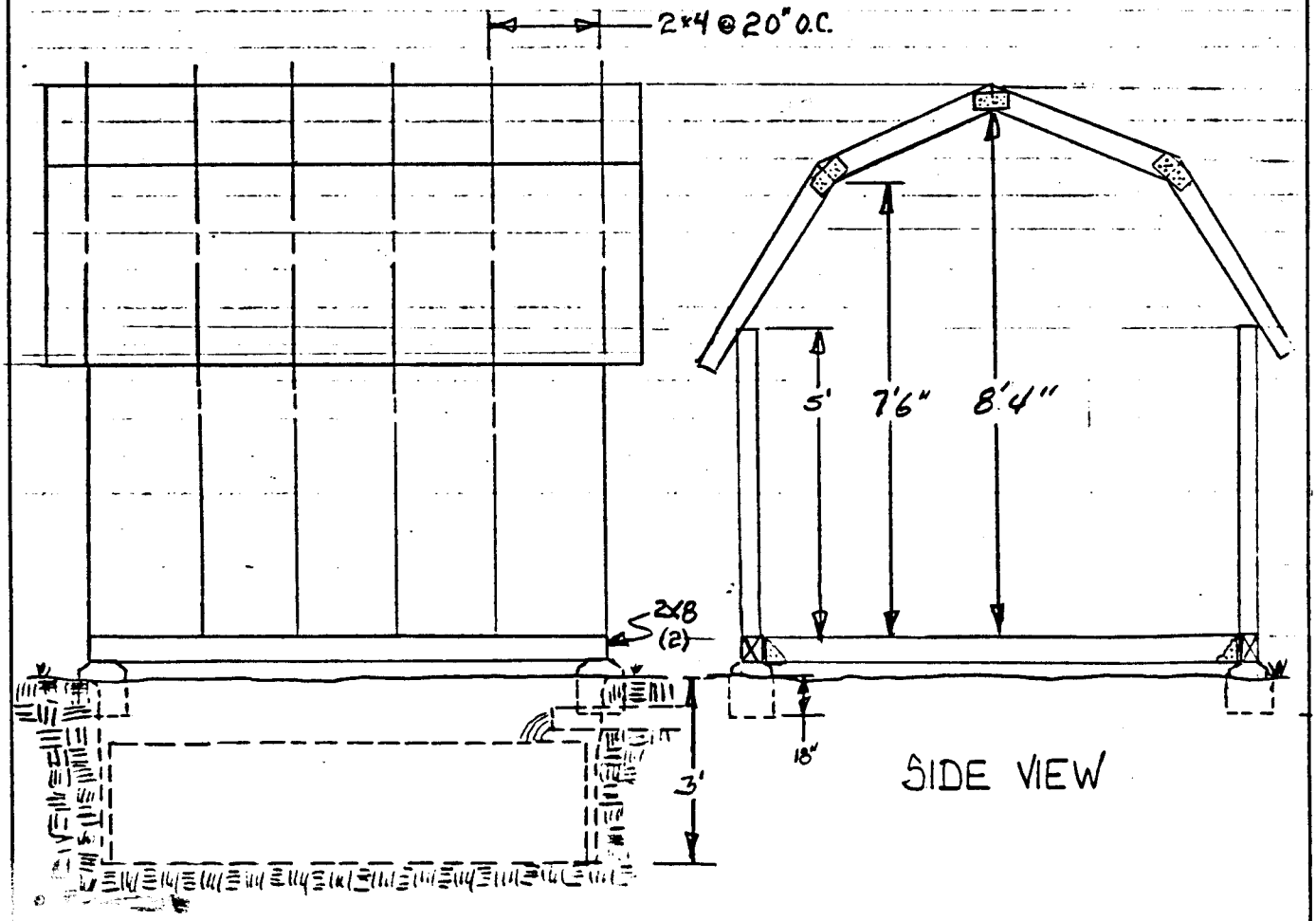
EQUIPMENT LAYOUT & BUILDING PLAN



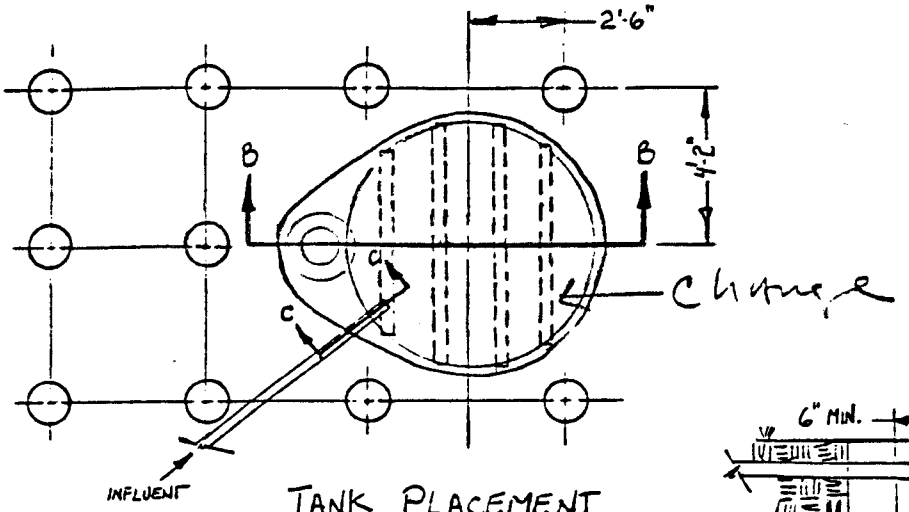
TOP VIEW
(FOUNDATION ONLY)

NOTES

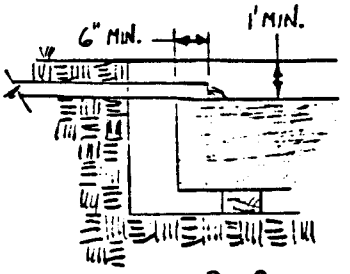
1) 6'-6" HIGH DOUBLE DOORS
2) SIDING - 1" CAR SIDING
3) FLOORING - 2×8 FIR (¼ GAP)
4) ROOFING - LOCK-TAB SHINGLES
5) INSULATION - 3 IN. FIBERGLASS



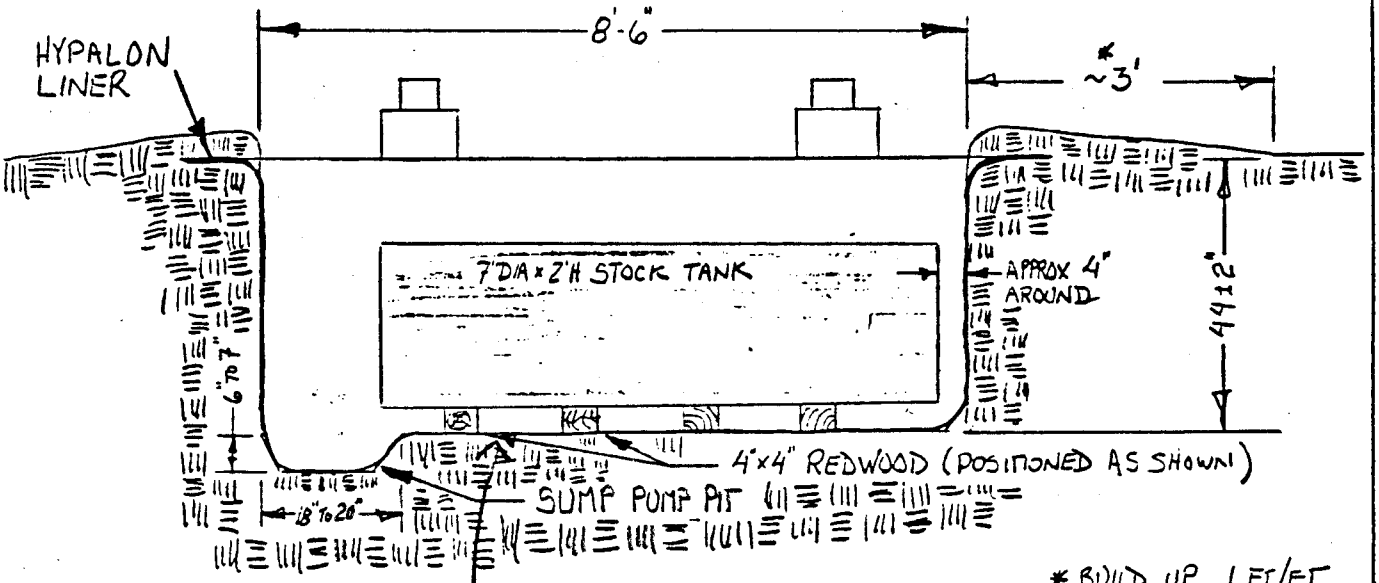
SIDE VIEW



TANK PLACEMENT
PLAN VIEW



C-C



SECTION B-B

* BUILD UP .1 FT/FT AROUND HOLE CIRCUMFERENCE RAIN DRAINAGE

Treated Westcoast Fir

NOT TO SCALE

TANK CONTAINMENT PLAN

EQUIPMENT DESIGN DRAWING	ΔH Delta H Engineering, Ltd.	
	700 GALLON STOCK TANK	Date 6-29-87 Rev.

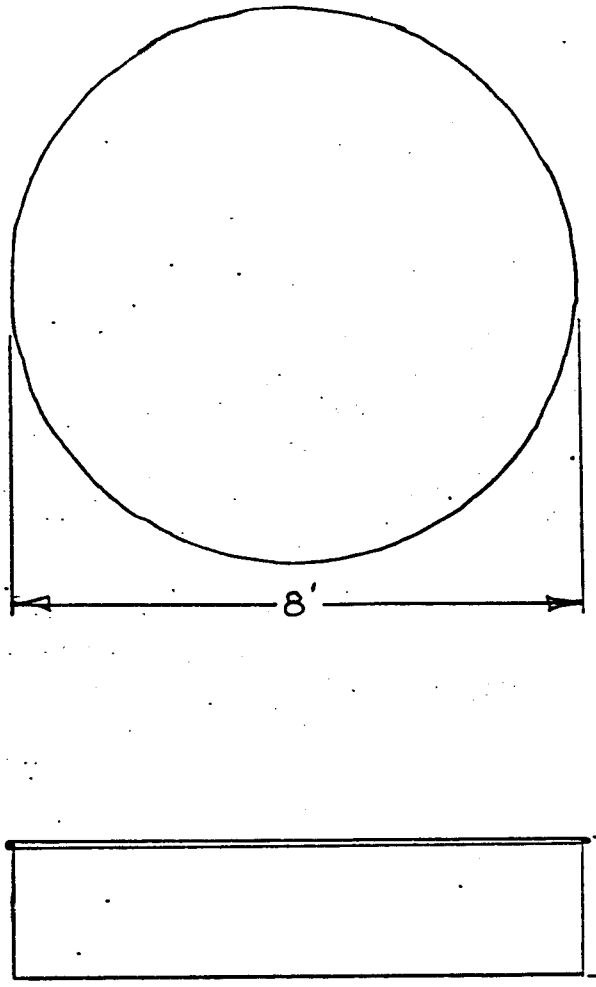
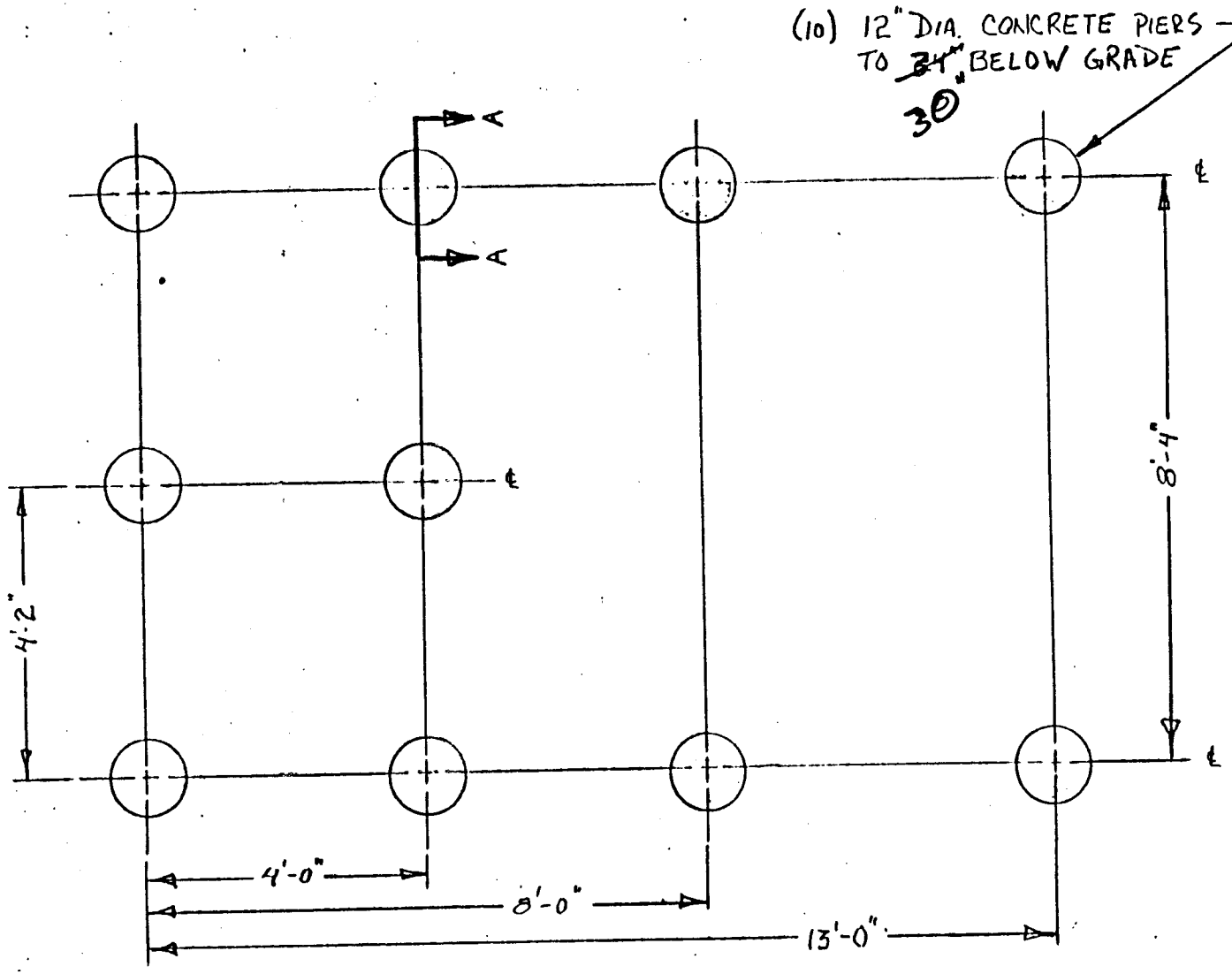
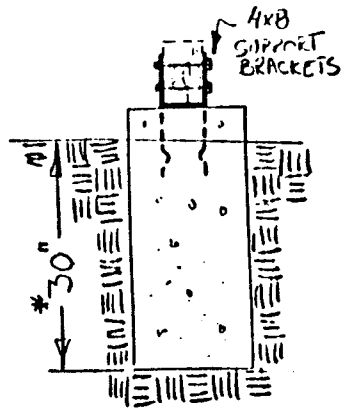


FIGURE 4





A-A

NOTE:
CONCRETE PIERS TO BE FORMED USING TUBEFORM, EXTENDING 6" ABOVE GRADE AT HIGHEST ELEV. POUR WITH 3,000 PSI CONCRETE.

* PIER DEPTH MAY CONTINGENT UPON TEST HOLE ANALYSIS.

NOT TO SCALE

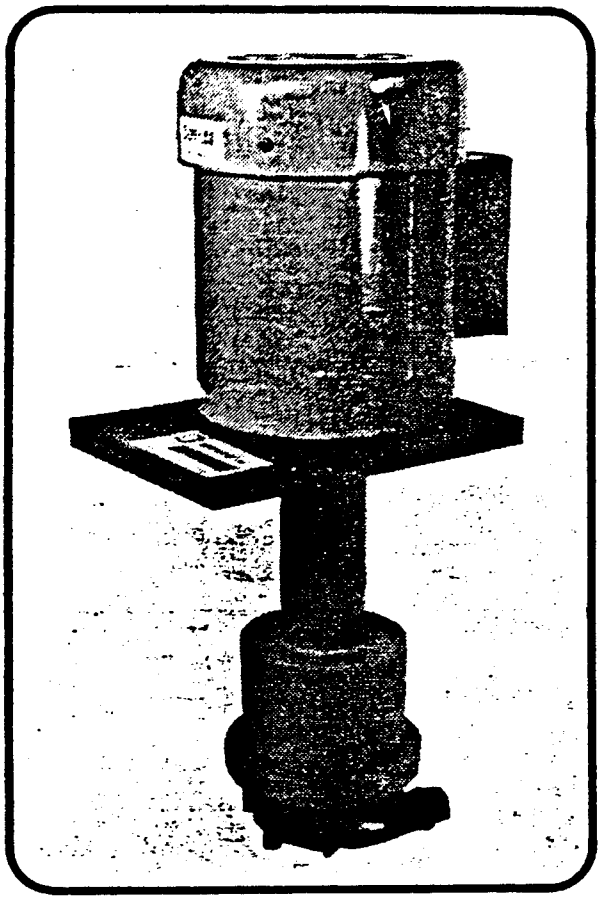
TA-16 OUTFALL TREATMENT PLANT

FOUNDATION PLAN

BULLETIN
P-304J
JULY 1985

SERFILCO PLASTIC SUMP PUMP

SERIES 'EC' — *high efficiency for low energy usage*



. . . . for pumping, filtering, mixing, transferring, spraying, recirculating of . . . .

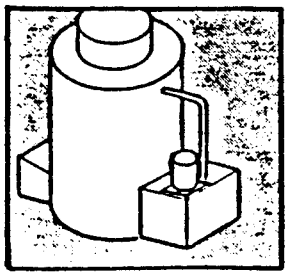
- **WASTES • ACIDS • PLATING**
- **CHEMICALS • FUME SCRUBBER**
- **PHOTOGRAPHIC SOLUTIONS**
- **ETCHING SOLUTIONS**
- **CLEANING SOLUTIONS**

- NON-METALLIC SOLUTION CONTACT
- MOLDED CHLORINATED POLYVINYL CHLORIDE & KYNAR® & ALL KYNAR
- NO BEARINGS, CANTILEVER SHAFT
- HIGHER EFFICIENCY — LESS HORSEPOWER REQUIRED
- BUILT-IN AUTOMATIC LEVEL CONTROL
- TO 80 GPM OR 47 FT. TDH (250LPM OR 10 M)
- SEAL-LESS, DRY OPERATION WILL NOT DAMAGE PUMP
- INTANK OR OUT-OF-TANK
- HIGH TEMPERATURE OPERATION TO 210°F (99° C)
- CHEMICAL DUTY MOTOR
- ALL KYNAR COMPONENTS ARE 100% PURE NATURAL COLOR PVDF

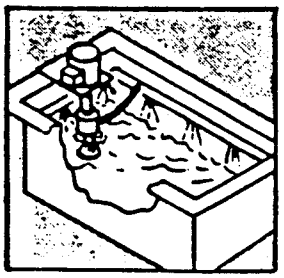
The Series 'EC' Sump Pump features a cantilevered stainless steel shaft sleeved in CPVC or Kynar which eliminates bearings and seals, resulting in a pump that can run dry without damage. Compound impeller prevents liquid from rising in column, even at maximum TDH, while semi-enclosed bottom impeller provides efficient flow performance at low horsepower.

Unique characteristic of all Series 'EC' pumps is their ability to perform on continuous duty as an automatic level control when optional suction extension pipe is installed. With motor energized, pump will self-prime when liquid is at level of impeller. Solution level will then be pumped down to end of suction extension, pump will lose prime, then automatically re-prime when liquid again reaches impeller.

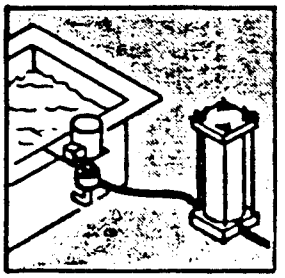
Pump casing may be rotated for choice of discharge direction and flexibility of installation. Discharge pipe assembly, suction extension and suction strainer are available options.



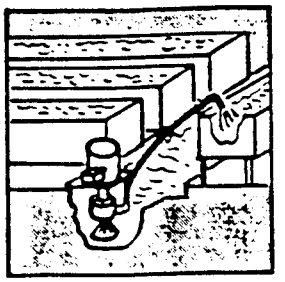
FUME SCRUBBER



SPRAY PUMPING & PHOTOGRAPHIC



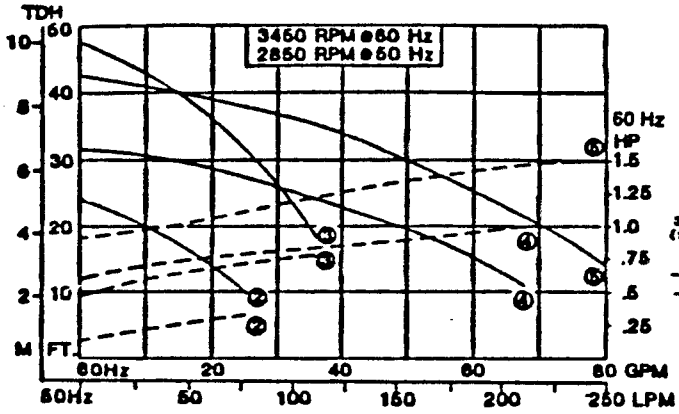
OUT-OF-TANK & PUMPING FILTRATION



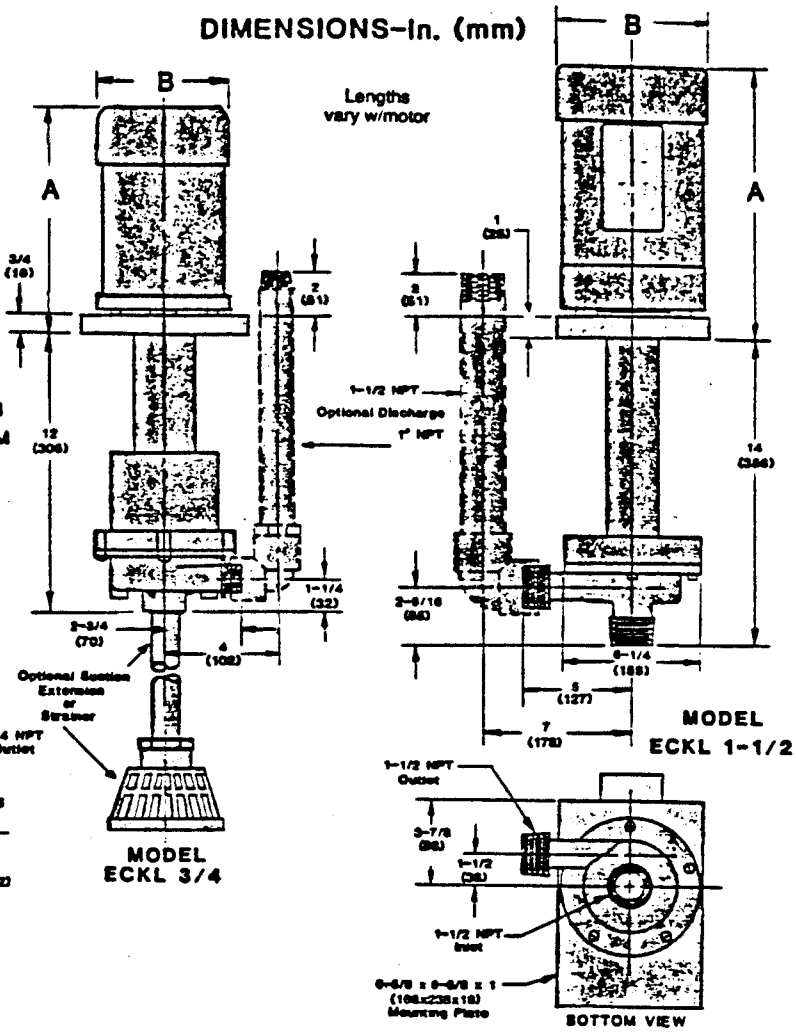
WASTE TREATMENT & POLLUTION CONTROL

SPECIFICATIONS

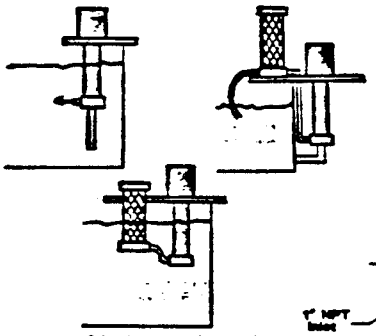
Standard CPVC models constructed of C with CPVC sleeved stainless steel shaft, r casing, CPVC casing bolts and ethylene propylene 'O' ring. Impeller is semi-enclosed for high efficiency and s compound design. Complete assembly provides non-metallic solution contact. Mounting plate is PVC with pump mounted off-center to allow clearance when mounting to tank flange. Standard Kynar models are 100% Kynar constructed with Kynar mounting plate. Pump casing may be rotated for selection of discharge direction. Chemical duty motors are single or three phase,3450 RPM @ 60 Hz,2850 RPM @ 50 Hz, TEFC painted two-part epoxy enamel. 60 Hz single phase motors include 8 ft. line cord and 3-prong plug,50 Hz include 2.4M line cord.Consult factory for custom mounting plates, explosion-proof or air motors for hazardous environments.



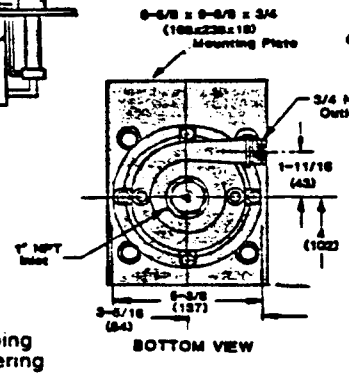
DIMENSIONS–In. (mm)



INTANK OR OUT-OF-TANK



- Mixing or Agitating
- Transfer Pumping
- Recirculatory Pumping for Spraying or Filtering



CPVC/KYNAR MODEL NO.	PRICE CODE NO.	100% KYNAR MODEL NO.	PRICE CODE NO.	MOTOR, TEFC 3450 RPM or 2850 RPM	H.P.	SHIPPING WEIGHT Lbs.	SHIPPING WEIGHT Kg	DIMENSIONS A In.	DIMENSIONS A mm.	DIMENSIONS B In.	DIMENSIONS B mm.
ECKL3/4-2SC-C.3	45-0201	EKL3/4-2SC-C.3	45-0401	115-230/1/50-60	1/3	30	13.6	9	228	6	152
ECKL3/4-2SC-D.3	45-0202	EKL3/4-2SC-D.3	45-0402	230-380-460/3/50-60							
ECKL3/4-3SC-C.75	45-0203	EKL3/4-3SC-C.75	45-0403	115-230/1/50-60	3/4	35	15.9	10-3/16	259	6-5/8	168
ECKL3/4-3SC-D.75	45-0204	EKL3/4-3SC-D.75	45-0404	230-380-460/3/50-60							
ECKL1½-4SC-C1.0	45-0210	EKL1½-4SC-C1.0	45-0410	115-230/1/50-60	1	35	15.9				
ECKL1½4SC-D1.0	45-0211	EKL1½-4SC-D1.0	45-0411	230-380-460/3/50-60				11-3/16	284	7-1/4	184
ECKL1½-5SC-C1.5	45-0212	EKL1½-5SC-C1.5	45-0412	115-230/1/50-60	1-1/2	40	18.1				
ECKL1½-5SC-D1.5	45-0213	EKL1½5SC-D1.5	45-0413	230-380-460/3/50-60							

OPTIONAL

ADD SUFFIX TO MODEL	MATERIAL	PRICE CODE NO.	MATERIAL	PRICE CODE NO.
Viton 'O' ring change L to V in Model No. and Add Suffix A to PCN.				
Suction strainer 1" NPT -ST	Polypro	45-0207	-	-
1½"NPT -ST	"	45-0214	-	-
Discharge pipe assembly 1" NPT -DPA	CPVC	45-0209	Kynar	45-0220
1½"NPT -DPA	"	45-0215	"	45-0221
Suction Extension 1" NPT 18"(457)lg. -SX	"	45-0208	"	45-0222
1½"NPT 18"(457)lg. -SX	"	45-0216	"	45-0223

Motor Starters and Level Controls — See Product Catalog

F.O.B. Glenview, Illinois

SERFILCO, LTD.
1234 Depot Street
Glenview, IL 60025
U.S.A.
312/998-9300
800-323-5431
Telex: 289557 SERFC UR

ΔH
Delta H Engineering, I

LEVEL SWITCHES
FLOAT-DISPLACER

DATA SHEET
SPEC
PROJECT
ACCOUNT
DATE 6-29-87
BY

CLIENT LANL
PROJECT OUTFALL 055 (TA-16) TREATMENT
LOCATION TA-16
REVISIONS 1 BY 2 BY 3 BY 4 BY
MANUFACTURER SOURCE: QUOTE OF

FORM NO. N-728 12/77
BASED ON ISA S20

GENERAL	1	TAG NUMBER										
	2	SERVICE										
	3	ACCOUNT NO.										
	4	LINE NO./VESSEL NO.										
	5	FLOW SHEET										
BODY	6	TYPE										
	7	MATERIAL										
	8	MFR RATING: PRESS / TEMP										
	9	TOP CONN LOCATION										
	10	BTM CONN LOCATION										
	11	CONN SIZE & TYPE										
	12	COOLING FIN										
	13	GAUGE GLASS CONN										
	14	GAUGE GLASS										
	15											
FLOAT DISPL	16	TYPE										
	17	SIZE / MATERIAL										
	18	ROD: LENGTH / MATERIAL										
	19											
SWITCH	20	ENCLOSURE										
	21	QUANTITY / FORM										
	22	RATING: VOLTS / HZ OR DC	115V	60 Hz.								
	23	AMPS										
	24	ACTION	OPEN CLOSE	ON LEVEL	INCR DECR	OPEN CLOSE	ON LEVEL	INCR DECR	OPEN CLOSE	ON LEVEL	INCR DECR	
	25											
PNEU PILOT	26	ACTION ON LEVEL INC										
	27	OPER MEDIUM / PRESS										
	28											
FLUID DATA	29	FLUID	WATER W/HE									
	30	OPER: PRESS. PSIG / TEMP °F										
	31	MAX: PRESS. PSIG / TEMP °F										
	32	SP GR @ 60°F / @ O.T. - UPPER										
	33	SP GR @ 60°F / @ O.T. - LOWER										
	34	LEVEL REQ'D FOR ACTUATION	ONE FOOT									
	35	ACTUATES	3" TO 12"									
	36	% SOLIDS										
	37	CORROSIVE DUE TO										
	38	MODEL NUMBER										

OPERATING DIFFERENTIAL - 3" TO 12"

FIGURE C.0

A WORD ABOUT VARIABLE AREA FLOWMETERS

Variable area flowmeters can provide reliable backup to more expensive and complicated electronic flow measuring devices. These flowmeters are designed according to simple physical laws. Generally, the media enters the bottom or lower end of a precision tapered metering tube and forces a float (or plummet) to rise in direct correlation to flow rate. The float must rise until the annular area between the float and the wall of the tube is such that the pressure through this construction is sufficient to support the float. The flow rate is indicated by the height of the float at equilibrium in the tube. Scales printed on the outside of the tube provide the reading. Due to the variable area, design pressures that drop through these instruments are constant over the full range of flow. Additionally no straight runs of pipe are required at either end of these flowmeters.

For greatest accuracy, variable area flowmeters should be calibrated to the media which they are to handle. They are normally affected by viscosities, specific gravities and temperature.

POSACON SERIES VARIABLE AREA FLOWMETERS

TYPES 805, 807, 815 AND 817
FLOW RATES FROM .08 TO 50 GPM

Our Posacon Series variable area flowmeters are truly unique in design as they will accept an unsurpassed variety of accessories providing optimum service and reliability. These all plastic flowmeters feature molded dovetails on the metering tube, for the mounting of limit switches and continuous read-out signaling devices or adjustable flow indicators.

STANDARD FEATURES

- Polysulfone metering tube for temperatures to 212°F
- PVC, socket type, union connections (140°F max)
- Polypropylene or stainless "floats" (magnetic float required with accessories)
- EPDM O-ring seals for maximum versatility
- Maximum pressure rating of 150 psig @ 72°F
- Adjustable flow indicator lets you quickly check flow range at a distance.
- No ribs or guides to wear or cause float to stick
- Designed to tolerate particle contamination in the fluid
- Standard scales in GPM & LMP

OPTION:

- Special scales to match fluids specific gravity
- Calibration for liquids or gases 1/h, m³/h, %
- Flanged, sanitary connections, or thread union connections
- PVDF or malleable iron connectors
- Viton O-rings

Accessories shown on page 359.

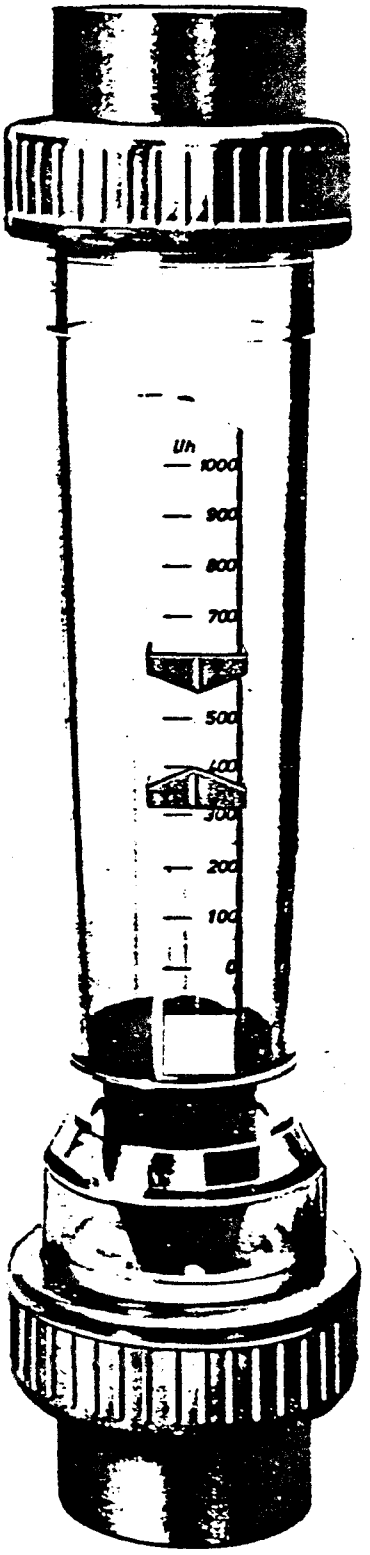


FIGURE 7

POSACON SER .S VARIABLE AREA FL WMETERS

SPECIFICATIONS FOR TYPE 805 & 815 FLOWMETER WITH POLYPROPYLENE FLOATS

PIPE SIZE (IN.)	SCALE RANGE MEDIA/GPM	TYPE 805 WITH POLYPROPYLENE FLOAT	PRICE EACH ($)	TYPE 815 WITH POLYPROPYLENE FLOAT AND MAGNET	PRICE EACH ($)
	WATER				
1	.08-.7	805-001-512214-01	116.00	815-001-512214-01	161.00
1	.1-1.1	805-001-512214-02	116.00	815-001-512214-02	161.00
1	.2-1.8	805-001-512214-03	116.00	815-001-512214-03	161.00
1	.3-3.0	805-001-512214-04	116.00	815-001-512214-04	161.00
1¼	.4-4.6	805-114-512214-05	157.00	815-114-512214-05	235.00
1¼	.75-7.5	805-114-512214-06	157.00	815-114-512214-06	235.00
2	1.0-12.0	805-002-512214-07	253.00	815-002-512214-07	401.00
2	2.0-18.0	805-002-512214-08	253.00	815-002-512214-08	401.00
2	3.0-28.0	805-002-512214-09	253.00	815-002-512214-09	401.00
2½	6.0-50.0	805-212-512214-10	447.00	815-212-512214-10	663.00
	Na OH 50%				
1	.01-.6	805-001-512214-04 Na OH	116.00	—	
	HCL 30-33%				
1	.06-.58	805-001-512214-01 HCL	116.00	815-001-512214-01 HCL	161.00
1	.075-.95	805-001-512214-02 HCL	116.00	815-001-512214-02 HCL	161.00
1	.1-1.6	805-001-512214-03 HCL	116.00	815-001-512214-03 HCL	161.00
1	.2-2.5	805-001-512214-04 HCL	116.00	815-001-512214-04 HCL	161.00

SPECIFICATIONS FOR TYPE 807 & 817 FLOWMETERS WITH STAINLESS STEEL FLOATS

PIPE SIZE (IN.)	SCALE RANGE MEDIA/GPM	TYPE 807 WITH STAINLESS STEEL FLOAT	PRICE EACH ($)	TYPE 817 WITH STAINLESS STEEL FLOAT AND MAGNET	PRICE EACH ($)
	WATER				
1	.1-1.1	807-001-512214-01	116.00	817-001-512214-01	161.00
1	.2-1.8	807-001-512214-02	116.00	817-001-512214-02	161.00
1	.3-3.0	807-001-512214-03	116.00	817-001-512214-03	161.00
1	.4-4.6	807-001-512214-04	116.00	817-001-512214-04	161.00
1¼	.75-7.5	807-114-512214-05	157.00	817-114-512214-05	235.00
1¼	1-12	807-114-512214-06	157.00	817-114-512214-06	235.00
2	2-18	807-002-512214-07	253.00	817-002-512214-07	401.00
2	3-28	807-002-512214-08	253.00	817-002-512214-08	401.00
2	4-46	807-002-512214-09	253.00	817-002-512214-09	401.00
2½	10-80	807-212-512214-10	447.00	817-212-512214-10	663.00
	Na OH 50%				
1¼	.025-2.5	807-114-512214-05 Na OH	157.00	—	

NOTE: All scales are based on a process fluid temperature of 68°. Other materials of construction are available on request.

EQUIPMENT SPECIFICATION SHEET	ΔH Delta H Engineering, Ltd.	...-16 WASTEWATER TREATMENT UNIT
	Figure 8: Carbon Beds (R1, R2, R3, R4)	Date 4-6-87 Rev. 6-29-87

Type: Activated Carbon, Type CO-401

Manufacturer: Westates Carbon Co., Inc. 213-737-2631

Particle size: 8 x 30 mesh

Apparent density: 30 lb/cf

Iodine Number: 900

Weight, carbon: 400 lbs each bed

Housing diam., in.: 30

Housing height, in.: 41

Housing mrtl: Epoxy coated steel

Internal distributors: 1½" SCH 40 PVC

Connections: 1½" NPTF, top; 3/4" NPTF, side drain

Model No.: ASC-110

GENERAL SERVICE
2 Way Solenoid Valves

Normally Closed and Normally Open Operation
Brass, Stainless Steel and Nylon Bodies • ¼" to 3" N.P.T.

ASCO Red-Hat
BULLETINS
8210, 8211

General Description

These valves provide long trouble-free life on general service applications. A broad selection of body materials and operating pressures is available.

Applications

These dependable 2 way valves are used in:

- pumps
- spraying
- cooling
- air dryers
- pollution controls
- laundry equipment
- irrigation
- compressors
- dishwashers
- water treatment

Special valves available for: • dry air-gas • continuous cycling • exceptionally long life • heavy-duty operation • clickless and quiet (no AC hum) operation. Refer to Long Life Construction.

Specifications

Operation: Two types available:

(a) Normally Closed — valves closed when de-energized, open when energized.

(b) Normally Open — valves closed when energized, open when de-energized.

Valve Parts in Contact with Fluid:

Body — Brass, Stainless Steel (Series 300), Nylon or Bronze, as listed.

Seals and Discs — Buna "N," Teflon* or Ethylene Propylene, as listed.

Disc Holder — Nylon, as listed.

Core Tube — 305 s.s.

Core and Plugnut — 430F s.s.

Springs — 302 s.s.

Shading Coil — Copper (brass and nylon body); Silver (stainless steel body).

Solenoid Enclosures: Two types available:

(a) Type 1 — General Purpose.

(b) Types 4 and 7 (C and D) — Combination Watertight and Explosion-Proof. Also meets Types 3 and 9 (E, F and G). Refer to Engineering Section for definitions and details. Consult your local ASCO office for Types 3S and 4X.

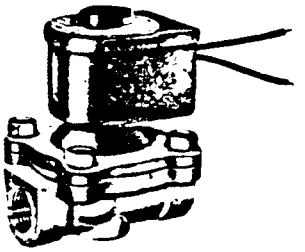
Electrical: Standard Voltages:

24, 120, 240, 480 volts, AC, 60 Hz (or 110, 220 volts, AC, 50 Hz).

6, 12, 24, 120, 240 volts, DC.

Other voltages available when required.

*DuPont Co. trademark.



Coil: Continuous Duty Molded Class A, B, F and H, as listed.

Temperature:

Fluid: To 210°F., as listed.

Ambient: Nominal Range, 32°F. to 77°F. (104°F. occasionally — refer to Engineering Section.)

Installation:

Dimensions: Refer to Dimensions Tables for envelope size and mounting.

Attitude: Valves may be mounted in any position except as noted in Dimensions Table.

Approvals: UL listed and CSA certified, as indicated. Refer to Engineering Section for details and coding explanation.

SPECIFICATIONS

Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Operating Pressure Differential (psi) Minimum	Maximum: Air-Inert Gas AC	Air-Inert Gas DC	Water AC	Water DC	Light Oil @ 300 SSU AC	Light Oil @ 300 SSU DC	Maximum Fluid Temp. °F. AC	Maximum Fluid Temp. °F. DC	Type 1 General Purpose Solenoid Enclosure: Catalog Number	Constr. Ref. No. ②	UL Listing	Types 4 and 7 (C and D) Watertight and Explosion-Proof Solenoid Enclosure: Catalog Number	UL Listing	Watt Rating/Class of Coil Insulation AC	Watt Rating/Class of Coil Insulation DC
NORMALLY CLOSED OPERATION, Forged Brass Body, Buna "N" or Teflon③ Seating for General Service																		
¼	5/16	1.2	5	125	—	120	—	—	—	180	—	8210B20	3D	•	—	—	6.5/B	—
⅜	¼	1.2	5	125	—	125	—	—	—	180	—	8210B21	3D	•	—	—	6.5/B	—
	⅜	1.5	①	125	40	125	40	—	—	180	150	8210C73④	1P	•	8211C73④	•	6/A	11.2/A
	⅜	3	0	100	40	100	40	—	—	180	150	8210C93	5D	○	8211C93	○	11/A	11.2/A
	⅜	3	5	200	125	135	100	135	100	180	150	8210D1	6D	○	8211D1	○	6/A	11.2/A
	⅜	3	5	300	—	300	—	300	—	175	—	8210C6	5D	○	8211C6	○	16.7/F	—
½	7/16	2.2	①	125	40	125	40	—	—	180	150	8210A15	2P	•	8211A15	•	6/A	11.2/A
	½	4	5	200	125	135	100	135	100	180	150	8210D2	6D	○	8211D2	○	6/A	11.2/A
	½	4	0	100	40	100	40	—	—	180	150	8210C94	5D	○	8211C94	○	11/A	11.2/A
	½	4	5	300	—	300	—	300	—	175	—	8210C7	5D	○	8211C7	○	16.7/F	—
¾	¾	5	0	100	40	100	40	—	—	180	150	8210D95	8D	○	8211D95	○	11/A	11.2/A
	¾	5	5	125	100	125	90	125	75	180	150	8210D9	9D	○	8211D9	○	6/A	11.2/A
	¾	6	0	350	200	300	180	200	180	200	77	8210B26④	10P	⑤	8211B26④	⑤	15.4/A	30.6/H
	¾	6.5	5	250	125	150	125	100	125	180	150	8210D3	11D	○	8211D3	○	6/A	11.2/A
1	1	13	5	125	125	125	125	100	125	180	150	8210D4	12D	○	8211D4	○	6/A	11.2/A
	1	13.5	10	300	225	300	200	300	200	200	180	8210B78④	13P	⑤	8211B78④	⑤	16.7/F	16.8/A
	1	13.5	0	300	—	225	—	115	—	200	—	8210B27	14P	•	8211B27	•	20/F	—
	1	13	0	125	100	125	100	125	80	180	77	8210B54	31D	⑤	8211B54	⑤	15.4/A	30.6/H
1¼	1⅛	15	5	125	125	125	125	100	125	180	150	8210D8	16D	○	8211D8	○	6/A	11.2/A
	1⅛	15	10	300	225	300	200	300	200	200	180	8210B80④	17P	—	8211B80④	—	16.7/F	16.8/A
	1⅛	15	0	125	100	125	100	125	80	180	77	8210B55	32D	⑤	8211B55	⑤	15.4/A	30.6/H
1½	1¼	22.5	5	125	125	125	125	100	125	180	150	8210D22	18D	○	8211D22	○	6/A	11.2/A
	1¼	22.5	10	300	225	300	200	300	200	200	180	8210B82④	19P	—	8211B82④	—	16.7/F	16.8/A
	1¼	22.5	0	125	100	125	100	125	80	180	77	8210B56	33D	⑤	8211B56	⑤	15.4/A	30.6/H
2	1¾	43	5	125	50	125	50	90	50	180	150	8210100	20P	—	8211100	—	6/A	11.2/A
2½	1¾	45	5	125	50	125	50	90	50	180	150	8210101	21P	—	8211101	—	6/A	11.2/A
3	3	101	10	250	—	250	—	250	—	200	—	8210B51④	22P	—	8211B51④⑤	—	28/H	—

FIGURE 9

SPECIFICATIONS (continued)

Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Operating Pressur Differential (psi) Minimum	Maximum: Air-Inert Gas AC	Maximum: Air-Inert Gas DC	Maximum: Water AC	Maximum: Water DC	Maximum: Light Oil @ 300 SSU AC	Maximum: Light Oil @ 300 SSU DC	Maximum Fluid Temp. °F. AC	Maximum Fluid Temp. °F. DC	Type 1 General Purpose Solenoid Enclosure: Catalog Number	Constr. Ref. No. ①	UL Listing	Types 4 and 7 (C and D) Watertight and Explosion-Proof Solenoid Enclosure: Catalog Number	UL Listing	Watt Rating/ Class of Coil Insulation: AC	Watt Rating/ Class of Coil Insulation: DC
NORMALLY OPEN OPERATION, ① Forged Brass Body, Buna "N" Seating for General Service																		
3/8	5/8	3	0	125	125	125	125	125	80	180	150	8210C33	23D	•	8211C33	•	10.5/A	11.2/A
1/2	5/8	4	0	125	125	125	125	125	80	180	150	8210C34	23D	•	8211C34	•	10.5/A	11.2/A
3/4	3/4	5.5	0	125	125	125	125	125	80	180	150	8210C35	25D	•	8211C35	•	10.5/A	11.2/A
	3/4	6.6	5	250	250	200	200	200	200	180	180	8210C13	24D	•	8211C13	•	15.4/A	16.8/A
1	1	13	0	125	—	125	—	125	—	180	—	8210B57	34D	•	—	—	20/F	—
	1	13	5	125	125	125	125	125	125	180	180	8210D14	26D	⑤	8211D14	—	15.4/A	16.8/A
1 1/4	1 1/8	15	0	125	—	125	—	125	—	180	—	8210B58	35D	•	—	—	20/F	—
	1 1/8	15	5	125	125	125	125	125	125	180	180	8210D18	28D	—	8211D18	—	15.4/A	16.8/A
1 1/2	1 1/4	22.5	0	125	—	125	—	125	—	180	—	8210B59	36D	•	—	—	20/F	—
	1 1/4	22.5	5	125	125	125	125	125	125	180	180	8210D32	29D	—	8211D32	—	15.4/A	16.8/A
2	1 3/4	43	5	125	125	125	125	125	125	180	150	8210103	30P	—	8211103	—	15.4/A	16.8/A
2 1/2	1 3/4	45	5	125	125	125	125	125	125	180	150	8210104	27P	—	8211104	—	15.4/A	16.8/A
NORMALLY CLOSED OPERATION, Forged Brass Body, Ethylene Propylene Diaphragm for Hot Water Service																		
3/8	5/8	3	5	—	—	125	100	—	—	210	150	8210D1HW	6D	⑤	8211D1HW	—	6/A	11.2/F
	5/8	3	④	—	—	100	40	—	—	210	150	8210C93HW	5D	⑤	8211C93HW	⑤	11/A	11.2/F
1/2	5/8	4	5	—	—	125	100	—	—	210	150	8210D2HW	6D	⑤	8211D2HW	—	6/A	11.2/F
	5/8	4	④	—	—	100	40	—	—	210	150	8210C94HW	5D	⑤	8211C94HW	⑤	11/A	11.2/F
3/4	3/4	5	5	—	—	125	100	—	—	210	150	8210D9HW	9D	⑤	8211D9HW	—	6/A	11.2/F
	3/4	5	④	—	—	100	40	—	—	210	150	8210D95HW	8D	⑤	8211D95HW	⑤	11/A	11.2/F
NORMALLY CLOSED OPERATION, Nylon Body, Buna "N" Diaphragm for General Service																		
3/8" O.D. Compression	5/16	1.2	5	125	—	125	—	—	—	130	—	8210B10	4D	•	—	—	6.5/B	—
NORMALLY CLOSED OPERATION, Stainless Steel Body, Buna "N" Diaphragm for Corrosive Liquids and Gases																		
3/8	3/8	1.5	①	125	40	125	40	—	—	180	150	8210A36⑥	1P	•	8211A36⑥	•	6/A	11.2/A
1/2	7/16	2.2	①	125	40	125	40	—	—	180	150	8210A37⑥	2P	•	8211A37⑥	•	6/A	11.2/A
	5/8	4	0	125	40	125	40	125	—	175	150	8210C87	7D	•	8211C87	•	16.7/F	11.2/A
3/4	5/8	4.5	0	125	40	125	40	125	—	175	150	8210C88	7D	•	8211C88	•	16.7/F	11.2/A
1	1	11.2	0	125	100	125	100	125	80	180	77	8210D89	15D	⑤	8211D89	⑤	15.4/A	30.6/H
NORMALLY OPEN OPERATION, Stainless Steel Body, Buna "N" Diaphragm for Corrosive Liquids and Gases																		
1/2	5/8	3	0	125	125	125	125	100	80	180	150	8210B30	37D	•	8211B30	—	10.5/A	11.2/A
3/4	5/8	3	0	125	125	125	125	100	80	180	150	8210B38	38D	•	8211B38	—	10.5/A	11.2/A

Notes: ① 5 psi on air and inert gas; 1 psi on water.
② Letter "D" denotes diaphragm construction; "P" denotes piston construction.
③ Main valve has bronze body.
④ "0" psi on AC construction, 1/4 psi on DC.
⑤ UL listed as General Purpose Valve on AC voltage only.
⑥ Valve includes Ryton (Phillips Petroleum trademark) piston.
⑦ Valve includes nylon disc holder, except 8210B57, 8210B58, 8210B59.
⑧ Valves provided with Teflon main seat.
⑨ Suitable for Types 4 and 7 (C and D) only and has a temperature range code T2B.

ELECTRICAL INFORMATION

Standard Coil and Class of Insulation	Watt Rating and Power Consumption: DC Watts	AC: Watts	AC: VA Holding	AC: VA Inrush	Spare Coil Part No.: AC	Spare Coil Part No.: DC
A	11.2	6	15.6	34	96-619	27-463
F	11.2	—	—	—	—	66-611
A	16.8	10.5 & 11	23	55	27-462	96-671
H	30.6	—	—	—	—	74-073
A	—	15.4	23.6	70	96-817	—
F	—	16.7	35	78	64-982	—
F	—	20	43	240	99-257	—
H	—	28	57	250	222-345	—
B	—	6.5	9.2	17.3	204-945	—

OPTIONAL FEATURES

Many optional electrical and construction features are available, refer to Optional Feature Section

ORDERING INFORMATION

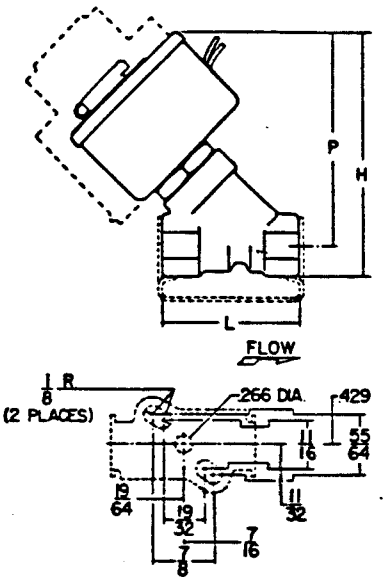
IMPORTANT: We must have CATALOG NUMBER, VOLTAGE and HERTZ, operating pressure and fluid handled. Use strainers with solenoid valves.

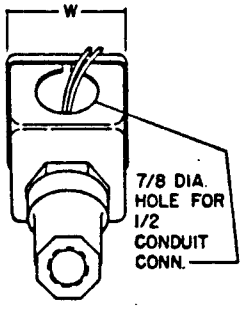
ASCO. Automatic Switch Co. 50-56 Hanover Road, Florham Park, New Jersey 07932, Tel. (201) 966-2000

Printed in U.S.A.

DIMENSIONS (in inches)

(Watertight and Explosion-Proof Solenoid Enclosure sho· ·otted-in. Details available on request.)



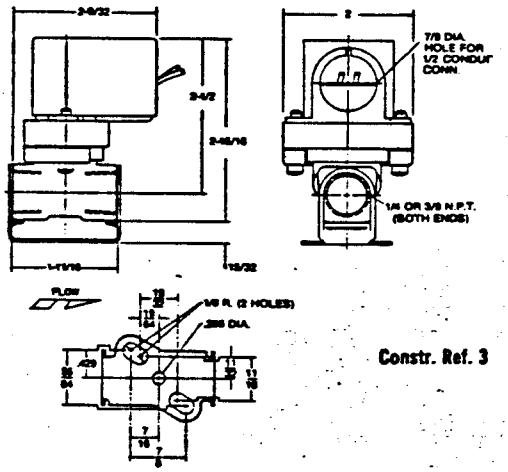


Mounting Bracket Available — refer to Price Schedule.

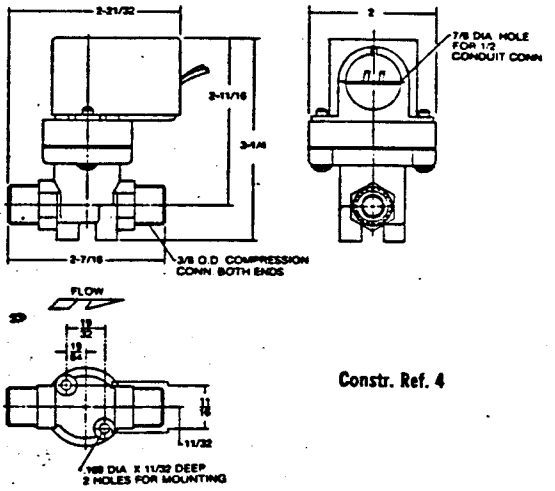
Constr. Refs. 1 and 2

Constr. Ref.	H	L	P	W
1*	$3^{15}/_{16}$	$1^{29}/_{32}$	$3^{1}/_{2}$	$1^{13}/_{16}$
2*	$3^{29}/_{32}$	$2^{9}/_{32}$	$3^{3}/_{4}$	$1^{21}/_{32}$

*DC dimensions slightly larger.

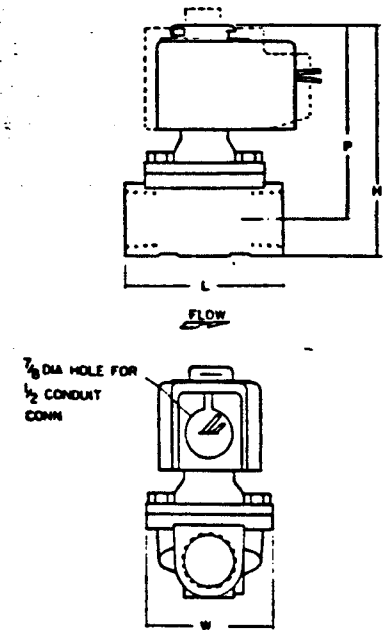


Constr. Ref. 3



Constr. Ref. 4

Constr. Refs. 5 to 38



Constr. Ref.	H	L	P	W	Constr. Ref.	H	L	P	W
5	$3^{29}/_{32}$	$2^{1}/_{4}$	$3^{11}/_{32}$	$2^{5}/_{16}$	22#	$1^{37}/_{8}$	$10^{1}/_{2}$	$10^{5}/_{32}$	$8^{15}/_{16}$
6*	$3^{13}/_{32}$	$2^{3}/_{4}$	$2^{27}/_{32}$	$2^{5}/_{16}$	23	$4^{13}/_{32}$	$2^{3}/_{4}$	$3^{27}/_{32}$	$2^{9}/_{32}$
7	$4^{7}/_{32}$	$2^{13}/_{16}$	$3^{1}/_{2}$	$2^{13}/_{32}$	24	$5^{1}/_{16}$	$3^{25}/_{32}$	$4^{7}/_{16}$	$2^{3}/_{4}$
8	$4^{5}/_{32}$	$2^{13}/_{16}$	$3^{1}/_{2}$	$2^{5}/_{16}$	25	$4^{5}/_{8}$	$2^{13}/_{16}$	4	$2^{9}/_{32}$
9*	$3^{5}/_{8}$	$2^{13}/_{16}$	3	$2^{5}/_{16}$	26	$6^{17}/_{32}$	$3^{3}/_{4}$	$4^{29}/_{32}$	$2^{15}/_{16}$
10*#	$5^{1}/_{4}$	$2^{13}/_{16}$	$4^{19}/_{32}$	$2^{5}/_{16}$	27	$8^{7}/_{32}$	$5^{1}/_{2}$	$5^{15}/_{32}$	$5^{3}/_{16}$
11*	$4^{5}/_{32}$	$3^{25}/_{32}$	$3^{17}/_{32}$	$2^{3}/_{4}$	28	$6^{17}/_{32}$	$3^{21}/_{32}$	$4^{29}/_{32}$	$3^{3}/_{8}$
12*	$5^{3}/_{8}$	$3^{3}/_{4}$	4	$2^{65}/_{16}$	29	$7^{1}/_{32}$	$4^{3}/_{8}$	$5^{1}/_{16}$	$3^{3}/_{4}$
13*	$5^{7}/_{8}$	$3^{3}/_{4}$	$4^{1}/_{4}$	$4^{1}/_{4}$	30	$8^{7}/_{32}$	$5^{1}/_{16}$	$5^{15}/_{32}$	$4^{11}/_{16}$
14#	$6^{17}/_{32}$	$3^{15}/_{16}$	$5^{23}/_{32}$	$3^{1}/_{4}$	31*	$5^{1}/_{4}$	$3^{3}/_{4}$	$4^{7}/_{16}$	$3^{1}/_{4}$
15*	$6^{3}/_{32}$	$3^{3}/_{4}$	$5^{7}/_{32}$	$3^{27}/_{32}$	32*	$5^{11}/_{16}$	$3^{21}/_{32}$	$4^{11}/_{16}$	$3^{1}/_{4}$
16*	$5^{3}/_{8}$	$3^{21}/_{32}$	4	$3^{3}/_{8}$	33*	$6^{1}/_{16}$	$4^{3}/_{8}$	$4^{15}/_{16}$	$3^{29}/_{32}$
17*	$5^{7}/_{8}$	$3^{21}/_{32}$	$4^{1}/_{4}$	$4^{11}/_{16}$	34#	$6^{29}/_{32}$	$3^{3}/_{4}$	$6^{3}/_{32}$	$3^{1}/_{4}$
18*	$6^{1}/_{8}$	$4^{3}/_{8}$	$4^{5}/_{32}$	$3^{3}/_{4}$	35#	$7^{11}/_{32}$	$3^{21}/_{32}$	$6^{11}/_{32}$	$3^{1}/_{4}$
19*	$6^{3}/_{8}$	$4^{3}/_{8}$	$4^{13}/_{32}$	$5^{19}/_{32}$	36#	$7^{21}/_{32}$	$4^{3}/_{8}$	$6^{9}/_{16}$	$3^{29}/_{32}$
20*	$7^{5}/_{16}$	$5^{1}/_{16}$	$4^{9}/_{16}$	$4^{11}/_{16}$	37	$4^{11}/_{16}$	$2^{13}/_{16}$	$3^{31}/_{32}$	$2^{13}/_{32}$
21*	$7^{5}/_{16}$	$5^{1}/_{2}$	$4^{9}/_{16}$	$5^{3}/_{16}$	38	$4^{11}/_{16}$	$2^{13}/_{16}$	$3^{31}/_{32}$	$2^{13}/_{32}$

*DC dimensions slightly larger.

. All valves mountable in any position without affecting operation, except construction noted # which must be mounted with solenoid vertical and upright.