CONSTRUCTION QUALITY ASSURANCE

FINAL REPORT

ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM

ON-SITE DISPOSAL FACILITY

United States Department of Energy
Fernald Environmental Management Project
Fernald, Ohio

prepared by

GEOSYNTEC CONSULTANTS

7400 Willey Road
Hamilton, Ohio 45103

under

Fluor Fernald, Inc.
Contract No. 95PS005028

REVISION 0
OCTOBER 2001
VOLUME V

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APPENDIX J

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ELECTRICAL EQUIPMENT SUBMITTALS AND TEST RESULTS

MANUFACTURER SUBMITTALS AND PRODUCT DATA

- Raceways
- Panels
- Poles and Pole Hardware
- Grounding
- Lighting
- Controls, Instrumentation, and Flow Meters

RACEWAYS

SUPPLIER DOC ... SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16110-001	REV: 0	DATE 19-Jun-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.

Ron Wood

SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Susan Schwab DATE: 6-19-2000

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	641-16110-001	0						X			Conduit, Raceway & Name Plates		X		16110	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
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Jim Jenkins	52-5				
Mike Godber	64				
Rob Kneip	52-5				
Scott Wheeler	52-5				
Kwasi Baw Twenebowah	38				

NO COMMENTS:

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: MW Griffin DATE 6/27/00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)

CFC - CERTIFIED FOR CONSTRUCTION

INF - INFORMATION/RECORD

DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)

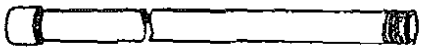
A - Conforms to Subcontract Requirements

B - Minor Comments - Incorporate and Resubmit

C - Revise and Resubmit (SEE COMMENTS)

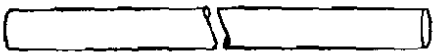
ORIGINAL

CONDUIT
Rigid Aluminum Conduit



Size	Dia., In.		Wall Thick.	Wt. Per
In.	External	Internal	In.	100'
½	0.840	.622	.109	27
¾	1.050	.824	.113	36
1	1.315	1.049	.133	53
1¼	1.660	1.380	.140	70
1½	1.900	1.610	.145	86
2	2.375	2.067	.154	116
2½	2.875	2.469	.203	183
3	3.500	3.068	.216	239
3½	4.000	3.548	.226	288
4	4.500	4.026	.237	340
5	5.563	5.047	.258	465
6	6.625	6.065	.280	612

CONDUIT
EMT Thinwall Conduit



Light weight galvanized electrical metallic tubing. Furnished in 10' lengths without couplings. UL approved.

Tubing—Dimensions and Weights

Size	Dia., In.		Wall Thick.	Wt. Per	Ft. Per
In.	External	Internal	In.	100'	Bdl.
½	0.706	0.622	0.042	30	100
¾	0.922	0.824	0.049	46	100
1	1.163	1.049	0.057	66	100
1¼	1.510	1.380	0.065	96	50
1½	1.740	1.610	0.065	112	50
2	2.197	2.067	0.065	142	30
2½*	2.875	2.731	0.072	230	...
3*	3.500	3.356	0.072	270	...
3½*	4.000	3.834	0.083	350	...
4*	4.500	4.334	0.083	400	...

*O.D. size same as corresponding sizes of Rigid Conduit. Applicable Tolerances—Length ±¼"—Outside Diameter: ±.005"

CONDUIT
Rigid Steel Conduit

Hot dipped galvanized or metallized. Furnished in 10' lengths with both ends threaded, with coupling screwed in one end.

Size	Dia., In.		Wall Thick.	Thrd. Per	Ft. Per	Wt. Per
In.	External	Internal	In.	In.	Bdl.	100'
½	0.840	.622	.109	14	100	79
¾	1.050	.824	.113	14	100	105
1	1.315	1.049	.133	11½	100	153
1¼	1.660	1.380	.140	11½	50	201
1½	1.900	1.610	.145	11½	50	246
2	2.375	2.067	.154	11½	50	334
2½	2.875	2.469	.203	8	10	527
3	3.500	3.068	.216	8	10	690
3½	4.000	3.548	.226	8	10	831
4	4.500	4.026	.237	8	10	992
5	5.563	5.047	.258	8	10	1334
6	6.625	6.065	.280	8	10	1770

CONDUIT
Intermediate Metal Conduit
Rigid—Type

Lightweight rigid-type steel conduit designed specifically to protect insulated electricity conductors and cables, eliminating need for heavier wall product.

Lighter in weight with larger interior diameter than galvanized rigid conduit. NEC recognized. UL labeled.

Large, smooth interior makes wire pulling easier. Can be installed anywhere rigid steel conduit would be used including hazardous locations.

Install above or below grade, in concrete or earth and use in high voltage installations (over 600V).

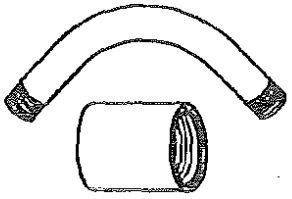
Interchangeable with threaded rigid conduit fittings.

A coupling is supplied with each 10' length.

Size	Dia., In.		Wall Thick.	Wt.* Per
In.	External	Internal	In.	100'
½	0.815	0.745	0.070	60
¾	1.029	0.954	0.075	82
1	1.290	1.205	0.085	116
1¼	1.638	1.553	0.085	150
1½	1.883	1.793	0.090	182
2	2.360	2.265	0.095	242
2½	2.857	2.727	0.130	401
3	3.476	3.346	0.130	493
3½	3.971	3.841	0.130	573
4	4.466	4.336	0.130	638

*Weight with coupling included.

CONDUIT
Rigid Aluminum Elbows & Couplings
Standard is 90°



Size	Wt. Lbs., Per 100	
In.	Elbows	Couplings
½	29	6.1
¾	43	9.1
1	71	12.5
1¼	110	16.9
1½	153	23.3
2	249	34.6
2½	437	68.3
3	767	91.4
3½	1036	108.0
4	1226	142.0
5	2490	241.9
6	3850	321.0

INFORMATION ONLY

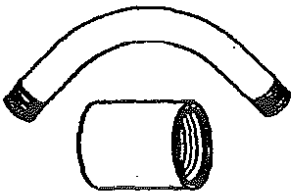
Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16110-001
Reviewed By: [illegible]
Date: 6/19/00

[A] - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 6/27/00

2½	575	1	575	1
3	840	1	840	1
3½	1080	1	1080	1
4	1440	1	1440	1

CONDUIT
Rigid Steel Elbows & Couplings
Standard is 90°



Size	Wt. Lbs., Per 100	
In.	Elbows	Couplings
½	80	13
¾	104	20
1	200	32
1¼	300	41
1½	420	56
2	680	78
2½	1250	184
3	1600	235
3½	2600	367
4	3300	300
5	6700	525
6	10000	850

Note: Special radii steel available.

CONDUIT
Conduit Nipples

Conduit Size In.	Nipple Lgth. In.	Ctn. Qty.	Std. Pkg.
½	1½ Close	100	500
½	1½ Short	50	200
½	2	50	200
½	3	25	100
½	4	25	100
½	5	25	100

CONDUIT FITTINGS

Sill Plates

Service Entrance Cables

278 With Duxseal .....ea. .....

CONDUIT FITTINGS

Metal Conduit Seals

Pennies

Size In.	Ctn.	Pkg.	Size In.	Ctn.	Pkg.
½	500	1000	2	50	100
¾	250	500	2½	50	100
1	125	250	3	10	50
1¼	125	250	3½	10	25
1½	50	100	4	5	25

CONDUIT FITTINGS

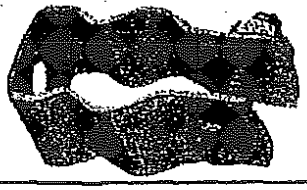
Knockout Snap-In Blanks

Size In.	Ctn.	Pkg.	Size In.	Ctn.	Pkg.
½	100	500	1¼	50	200
	100	500	1½	50	200
	50	200	2	25	100

CONDUIT FITTINGS

Pipe Hangers w/Bolts

Plated Steel

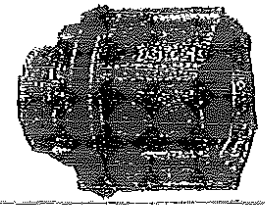


Size	Std. Pkg.	Size	Std. Pkg.	Size	Std. Pkg.
0	100	3	100	7	25
1	100	4	100	8	25
2	100	5	50	9	10
2½	100	6	50	...	...

CONDUIT FITTINGS

Conduit Hubs

Insulated Throat—Rainlight
Die-Cast for Rigid Conduit



Size In.	Unit Pkg.	Std. Pkg.	Size In.	Unit Pkg.	Std. Pkg.
½	10	10	2	2	2
¾	10	10	2½	1	1
1	10	10	3	1	1
1¼	5	5	3½	1	1
1½	2	2	4	1	1

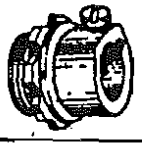
CONDUIT FITTINGS

Combination FLEX to Conduit Couplings

Size In.	Ctn.	Pkg.	Size In.	Ctn.	Pkg.
½	10	50	1¼	5	25
¾	10	50	1½	5	25
1	5	25	2	5	10

CONDUIT FITTINGS

Set Screw BX & FLEX Connectors



Flex In.	BX Size	Ctn.	Pkg.
⅜	14/2-10/2	50	500

CONDUIT FITTINGS

Two Screw BX & FLEX Connectors

Flex In.	BX Size	Ctn.	Pkg.
¾	14/2-10/2	100	500
½	10/3-8/3	25	100
¾	8/3-4/2	25	100

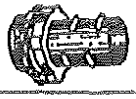
CONDUIT FITTINGS

Squeeze Type BX & FLEX Straight Connectors

Size In.	Ctn.	Pkg.	Size In.	Ctn.	Pkg.
¾	50	500	2	5	30
½	25	250	2½	5	5
¾	25	250	3	1	6
1	10	100	3½	1	6
1¼	5	50	4	1	6
1½	5	50	...	...	...

CONDUIT FITTINGS

Screw-In Type FLEX Connectors



Size In.	Ctn.	Pkg.	Size In.	Ctn.	Pkg.
¾	50	500	1¼	10	100
½	50	500	1½	10	60
¾	50	300	2	5	30
1	25	150	...	...	...

CONDUIT FITTINGS

90° Angle BX & FLEX Connectors

Clamp Type

Size In.	Ctn.	Pkg.	Size In.	Ctn.	Pkg.
⅜	50	500	2	1	10
½	25	250	2½	1	6
¾	15	150	3	1	1
1	10	50	3½	1	1
1¼	5	25	4	1	1
1½	1	10	...	...	...

CONDUIT FITTINGS

45° Angle BX & FLEX Connectors

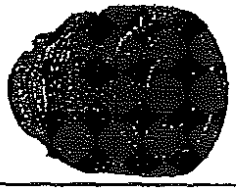
Clamp Type

⅜" 100/Pkg .....ea. .....
½" 100/Pkg .....ea. .....
¾" 50/Pkg .....ea. .....

CONDUIT FITTINGS

Liquid-Tight Straight Connectors

Die-Cast for Metallic & Non-Metallic Liquid-Tight Conduit

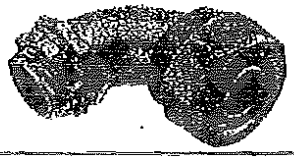


Size In.	KO Size In.	Unit Pkg.	Std. Pkg.	Size In.	KO Size In.	Unit Pkg.	Std. Pkg.
⅜	½	25	100	2	2	2	10
½	½	25	100	2½	2½	1	1
¾	¾	10	50	3	3	1	1
1	1	5	25	3½	3½	1	1
1¼	1¼	5	25	4	4	1	1
1½	1½	2	10	...	...	...	...

CONDUIT FITTINGS

Liquid-Tight 90° Angle Connectors

Die-Cast for Metallic & Non-Metallic Liquid-Tight Conduit



Size In.	KO Size In.	Unit Pkg.	Std. Pkg.	Size In.	KO Size In.	Unit Pkg.	Std. Pkg.
⅜	½	10	50	2	2	2	10
½	½	10	50	2½	2½	1	1
¾	¾	10	50	3	3	1	1
1	1	5	25	3½	3½	1	1
1¼	1¼	2	10	4	4	1	1
1½	1½	2	10	...	...	...	...

Condulet® Cast Device Boxes without Mounting Lugs

Crouse-Hinds®

Single Gang

Accessories Pg. 3F-21 to 27

Application:

Cast device boxes are installed to:
- accommodate wiring devices
- act as pull boxes for conductors in a condult system
- provide openings to make splices and taps in conductors
- provide access to conductors for maintenance and future system changes
- connect condult sections
- FSY boxes for mounting surface devices on floor or bench (used with single gang covers)

Features:

Available for surface mounting (with mounting lugs) or flush mounting (without mounting lugs) as listed
- Available as shallow (FS) or deep (FD) configuration. Use FD if device to be enclosed exceeds 1⅝" in depth
- Ample wiring room provided in either FS or FD configuration
- Wide selection of surface or flush covers available in three materials (sheet steel, *Feraloy*®, aluminum)
- Covers for flush mounting extend to conceal the rough plaster line
- Available in single gang and multi-gang configurations with hubs, and as blank bodies for brazed threaded hubs or tapping
- FS1019 device boxes have mounting feet for support independent of condult straps

Standard Materials:

- *Feraloy* iron alloy and copper-free aluminum. See "Shape Selector," page 3F-0, 1

Standard Finishes:

- *Feraloy* – zinc electroplate and aluminum acrylic paint[A]
- Aluminum – natural

Options:

- Finishes: *Corro-free*™ epoxy powder coat – information available on request

Size Ranges:

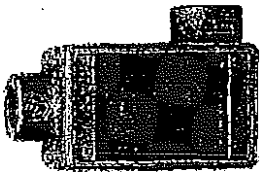
- Hubs – ½" to 1"

Compliances:

- UL Standard: 514
- ANSI Standard: C33.84
- Fed. Spec.: W-C-586

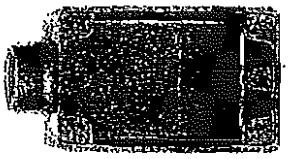
FS & FD Threaded Rigid

Size	Cat. #	Cat. #
½	FS1	FD1
¾	FS2	FD2
1	FS3*	FD3



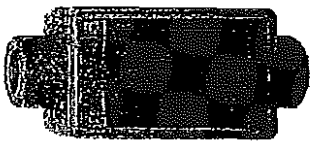
Threaded Rigid

Size	Cat. #	Cat. #
½	FSR1	FDR1
¾	FSR2	FDR2*



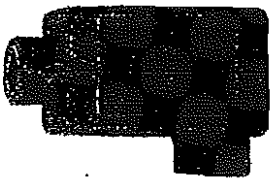
Die Cast Aluminum Threaded Rigid

Size	Cat. #	Cat. #
½	FS1-SA	FSC1-SA
¾	FS2-SA	FSC2-SA



Threaded Rigid

Size	Cat. #	Cat. #
½	FSC1*	FDC1*
¾	FSC2*	FDC2*
1	FSC3*	FDC3*

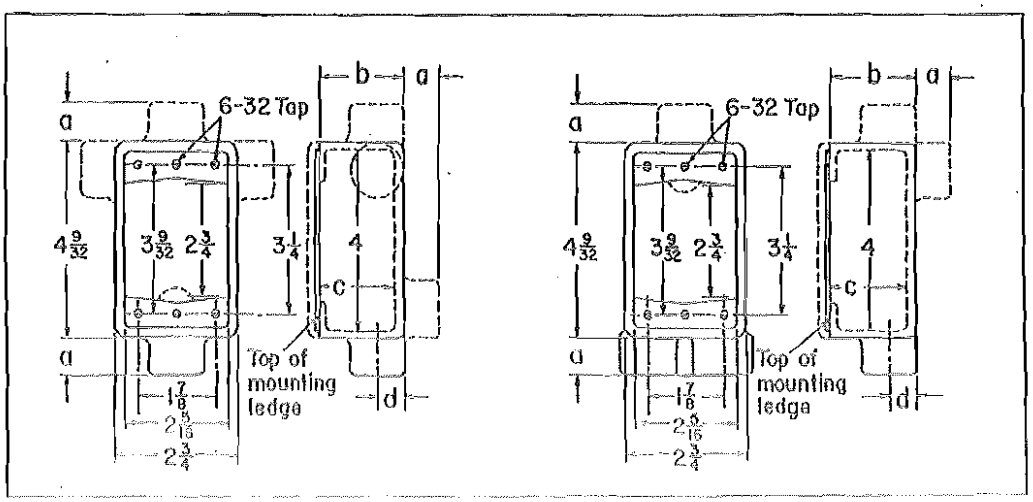


Threaded Rigid

Size	Cat. #	Cat. #
½	FSL1	FDL1
¾	FSL2	FDL2*

* Available in copper-free aluminum – add suffix SA to Cat. No.

Dimensions

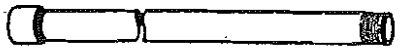


Size In.	Dia., In. Internal Min.	Dia., In. Internal Max.	Dia., In. External Min.	Dia., In. External Max.	Ft. Per Coil	Lbs. Per Coil
Type EF—Extra Flexible—JIC Approved Type HC—Extreme Temp −70°F to +220°F Type OR—Extra Oil-Resistant						
¾	.485	.505	.690	.710	250	55
½	.620	.640	.820	.840	200	60
¾	.815	.835	1.030	1.050	175	65
1	1.030	1.055	1.290	1.315	100	60
1¼	1.370	1.395	1.635	1.660	100	80
1½	1.575	1.600	1.865	1.900	50	60
2	2.020	2.045	2.340	2.375	50	80
2½	2.480	2.505	2.840	2.875	50	105
3	3.070	3.100	3.460	3.500	25	75
4	4.000	4.040	4.460	4.500	25	100
5	4.975	5.035	5.505	5.565	25	160
Type UA—UL Listed						
¾	.484	.504	.690	.710	200	60
½	.622	.642	.820	.840	200	75
¾	.820	.840	1.030	1.050	150	80
1	1.041	1.066	1.290	1.315	100	90
1¼	1.380	1.410	1.630	1.660	50	60
1½	1.575	1.600	1.865	1.900	50	65
2	2.020	2.045	2.340	2.375	50	85
2½	2.480	2.505	2.840	2.875	50	105
3	3.070	3.100	3.460	3.500	25	75

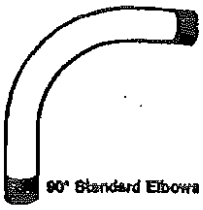
CONDUIT

Rigid Conduit, Elbows And Couplings

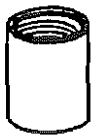
Plastic-Coated, Galvanized



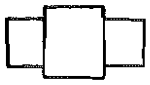
Conduit—40 and 20 Mil Coating



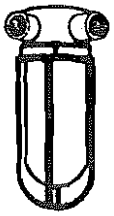
90° Standard Elbows



Coupling 20 Mil Only



Couplingw/Sleeve In 40 Mil Only



w/40MilCoating w/ 40 Mil Coating

Provides a smooth pin-hole free corrosion resistant protective coating. Improved overlapping sleeves provide more permanent fume-tight, moisture-proof joints. Unprecedented protection in corrosive environments. A specially formulated thermoplastic vinyl coating compound formulated for use in our coating process. Included among its physical characteristics are excellent impact resistance. It is tough, has a high tear strength, and exhibits good weather-ability. The operating temperature should be kept below 160°F to benefit from the maximum service life of the coating.

The galvanized conduit prior to coating conforms to Federal Specifications WW-C-581d, American Standard Rigid Steel Conduit Specification C80.1 1959, and UL Specifications.

The coating is applied on the galvanized surface which has been specially prepared to accept it. The adhesion of the coating to the conduit is such that the bond between the PVC and metal is greater than the tensile strength of the coating material. For the protection of complete electrical systems. Coating thicknesses of either 40 Mil or 20 Mil are now available. All items are also available in aluminum.

Dimensions and Weights

Nom Size In.	Wall Thick. In.	Outside Dia. In.	Conduit Wt. Per 100'	Elbow Wt. Per 100 Pcs.	Coupling Wt. Per 100 Pcs.
½	.149	.920	85	83	15
¾	.153	1.130	112	120	21
1	.173	1.395	164	208	36
1¼	.180	1.740	217	330	47
1½	.185	1.980	268	453	64
2	.194	2.455	358	690	85
2½	.243	2.955	546	1309	203
3	.256	3.580	708	1938	263
3½	.266	4.080	851	2875	380
4	.277	4.580	1009	3407	363
5	.298	5.643	1337	6788	550
6	.320	6.705	1939	12755	1200

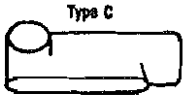
CONDUIT

Conduit Bodies

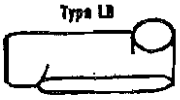
Plastic-Coated, Galvanized w/Covers and Stainless Screws

Type C

Type LB



Type LL

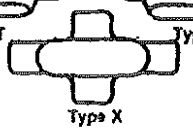


Type LR

Type	Size In.	Type	Size In.	Type	Size In.	Type	Size In.
C	½	LB	½	LL	½	LR	½
C	¾	LB	¾	LL	¾	LR	¾
C	1	LB	1	LL	1	LR	1
C	1¼	LB	1¼	LL	1¼	LR	1¼
C	1½	LB	1½	LL	1½	LR	1½
C	2	LB	2	LL	2	LR	2
C	2½	LB	2½	LL	2½	LR	2½
C	3	LB	3	LL	3	LR	3
C	3½	LB	3½	LL	3½	LR	3½
C	4	LB	4	LL	4	LR	4

Type T

Type TB



Type X

Type	Size In.	Type	Size In.	Type	Size In.
T	½	TB	½	X	½
T	¾	TB	¾	X	¾
T	1	TB	1	X	1
T	1¼	TB	1¼	X	1¼
T	1½	TB	1½	X	1½
T	2	TB	2	X	2
T	2½	...	...	...	...
T	3	...	...	...	...
T	3½	...	...	...	...
T	4	...	...	...	...

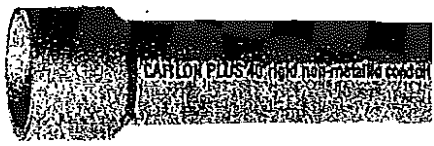
Extra Covers Only

Available in sizes ½", ¾", 1", 1¼", 1½", 2", 2½", 3", 3½", and 4".

Note: Additional fittings also available.

CARLON

PLUS 40® And PLUS 80® Rigid Non-Metallic Conduit



Heavy wall and extra-heavy wall rigid plasti (PVC) conduit, fittings and accessories designe for installation underground, in slab, encased c exposed.

Corrosion resistant, watertight joints, ligh weight, high-impact strength, and low installa tion costs. Supplied in standard 10' lengths, wit or without belled ends.

Encased in concrete or direct burial for unde ground applications; also for exposed or co cealed applications aboveground.

Sunlight resistant, rated for use with 90°C co ductors, reduced smoke and HCL emissions, s perior weathering characteristics. Specifica tions: UL listed, type 40 rated for 90°C cable.

Can be used in above ground or below grou applications subject to severe physical abus

Cat. No.	Size In.	Dia., In. External	Dia., In. Internal	Wall Thick. In.	Wt. Per 100'	P B
PLUS 40® Heavy Wall EPC						
49005	½	.840	.622	.109	17	1
49007	¾	1.050	.824	.113	23	1
49008	1	1.315	1.049	.133	34	1
49009	1¼	1.660	1.380	.140	46	
49010	1½	1.900	1.610	.145	55	
49011	2	2.375	2.067	.154	73	
49012	2½	2.875	2.469	.203	125	
49013	3	3.500	3.066	.216	164	
49014	3½	4.000	3.548	.226	198	
49015	4	4.500	4.026	.237	234	
49016	5	5.563	5.047	.258	318	
49017	6	6.625	6.065	.280	412	
PLUS 80® Extra Heavy Wall EPC-80						
49405	½	.840	.546	.147	22	1
49407	¾	1.050	.742	.154	29	
49408	1	1.315	.957	.179	43	
49409	1¼	1.660	1.278	.191	59	
49410	1½	1.900	1.500	.200	2	
49411	2	2.375	1.939	.218	99	
49412	2½	2.875	2.323	.276	152	
49413	3	3.500	2.900	.300	212	
49415	4	4.500	3.826	.337	310	
49416	5	5.563	4.813	.357	431	

CARLON

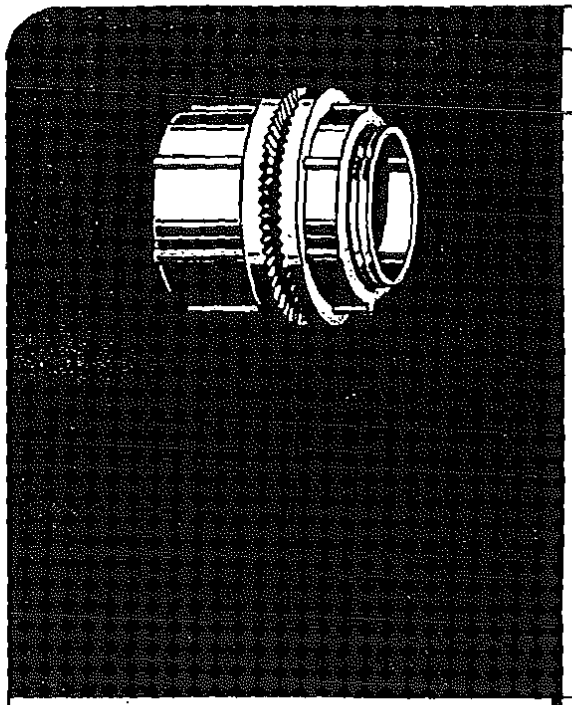
Non-Metallic Standard 90° Radius Elbows

Cat. No.	Size In.	Each	Cat. No.	Size In.	E
UA9AD	½	.....	UA9AJ	2	.
UA9AE	¾	.....	UA9AK	2½	.
UA9AF	1	.....	UA9AL*	3	.
UA9AG	1¼	.....	UA9AM*	3½	.
UA9AH	1½	.....	UA9AN	4	.

*Shipped in stackable dispenser crate.

THE Scru-Tite® HUB LINE

LISTED BY UNDERWRITERS LABORATORIES INC. (E27258)
LISTED BY CANADIAN STANDARDS ASSOCIATION
APPROVED FOR HAZARDOUS LOCATIONS CLASS II, DIVISION I, GROUPS E, F AND G.

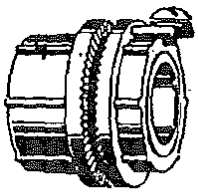


ZINC

NAED EDP Number	Cat. No.	Size	Quan. Per Box	Wt. Per Box Lbs.
10001	ST-02	¼	25	2
10002	ST-03	⅜	25	2½
10003	ST-1	½	25	5
10004	ST-2	¾	25	7½
10005	ST-3	1	25	10¼
10006	ST-4	1¼	10	5½
10007	ST-5	1½	10	7¼
10008	ST-6	2	10	9½
10009	ST-7	2½	5	9½
10010	ST-8	3	2	5
10011	ST-9	3½	2	6
10012	ST-10	4	2	7
10013	ST-11	5	1	6¼
10014	ST-12	6	1	7½

ALUMINUM

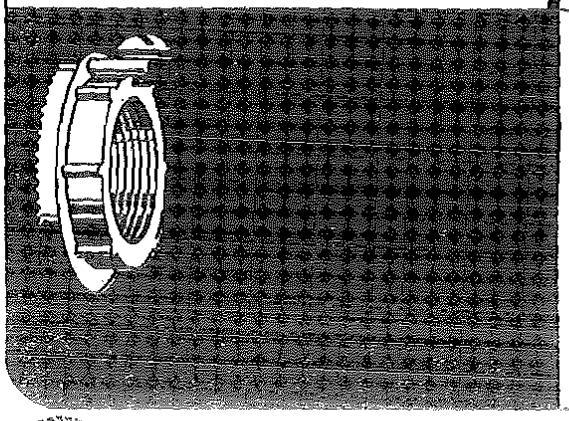
NAED EDP Number	Cat. No.	Size	Quan. Per Box	Wt. Per Box Lbs.
10015	STA-1	½	25	2¼
10016	STA-2	¾	25	3½
10017	STA-3	1	25	4¼
10018	STA-4	1¼	10	2½
10019	STA-5	1½	10	3¼
10020	STA-6	2	10	4½
10021	STA-7	2½	5	4¼
10022	STA-8	3	2	2¼
10023	STA-9	3½	2	2½
10024	STA-10	4	2	3
10025	STA-11	5	1	3
10026	STA-12	6	1	3¼



GROUND HUB Compact! Combines all of the features of the standard Scru-Tite® Hub with the grounding screw detail. Ideal for maintaining bonding or grounding continuity in the most difficult installations. LEXAN® insulated throat standard on sizes ½" through 4".

Max. Copper Grd. Wire Size

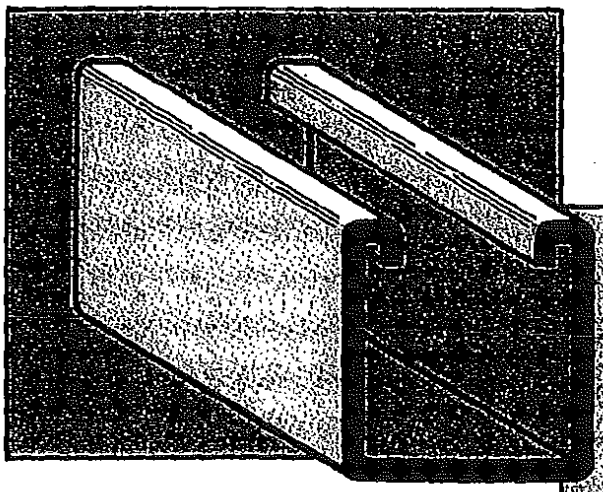
NAED EDP Number	Cat. No.	Size	Quan. Per Box	Wt. Per Box Lbs.	Max. Copper Grd. Wire Size
10093	STG-1	½	25	5	#10
10094	STG-2	¾	25	7½	#10
10095	STG-3	1	25	10¼	#10
10096	STG-4	1¼	10	5½	#10
10097	STG-5	1½	10	7¼	#8
10098	STG-6	2	10	9½	#8
10099	STG-7	2½	5	9½	#6
10100	STG-8	3	2	5¼	#6
10101	STG-9	3½	2	6	#6
10102	STG-10	4	2	7	#4
10103	STG-11	5	1	6¼	#2
10104	STG-12	6	1	7½	#1
10105	STAG-1	½	25	2½	
10106	STAG-2	¾	25	3½	
10107	STAG-3	1	25	4½	
10108	STAG-4	1¼	10	2½	
10109	STAG-5	1½	10	3¼	
10110	STAG-6	2	10	4½	
10111	STAG-7	2½	5	4½	
10112	STAG-8	3	2	2½	
10113	STAG-9	3½	2	2¾	
10114	STAG-10	4	2	3	
10115	STAG-11	5	1	2¾	
10116	STAG-12	6	1	3½	

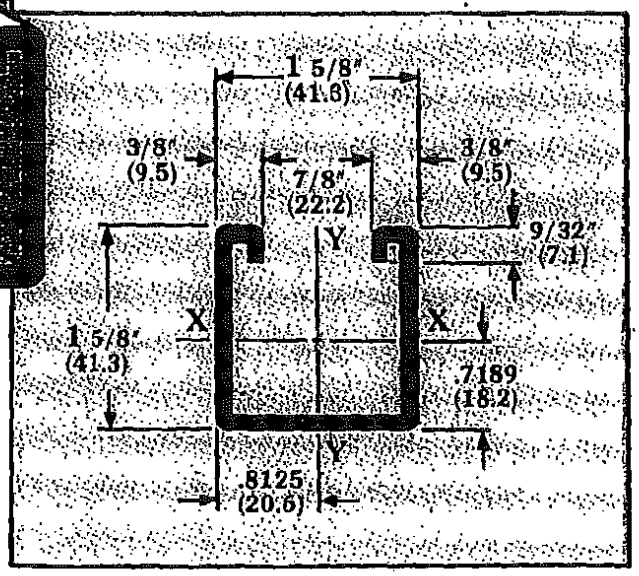


NAED EDP Number	Cat. No.	Size	Quan. Per Box	Wt. Per Box Lbs.	Max. Copper Grd. Wire Size
10137	STGN-1	½	25	1½	#10
10138	STGN-2	¾	25	2½	#10
10139	STGN-3	1	25	3¼	#10
10140	STGN-4	1¼	10	1½	#10
10141	STGN-5	1½	10	2¼	#8
10142	STGN-6	2	10	3	#8
10143	STGN-7	2½	5	2¼	#6
10144	STGN-8	3	2	1¼	#6
10145	STGN-9	3½	2	1¾	#6
10146	STGN-10	4	2	1¾	#4
10246	STGN-11	5	1	1½	#2
10247	STGN-12	6	1	1¾	#1
10147	STAGN-1	½	25	¾	
10148	STAGN-2	¾	25	1¼	
10149	STAGN-3	1	25	1½	
10150	STAGN-4	1¼	10	¾	
10151	STAGN-5	1½	10	1	
10152	STAGN-6	2	10	1¼	
10153	STAGN-7	2½	5	1	
10154	STAGN-8	3	2	[illegible]	
10155	STAGN-9	3½	2	[illegible]	
10156	STAGN-10	4	2	[illegible]	
10248	STAGN-11	5	1	[illegible]	
10249	STAGN-12	6	1	[illegible]	

AVAILABLE IN CORROSION-RESISTANT NICKEL-CHROME PLATE (ZINC ONLY) (MINIMUM QUANTITY 100 OR MORE) ADD SUFFIX CP TO CATALOG

B22 CHANNEL



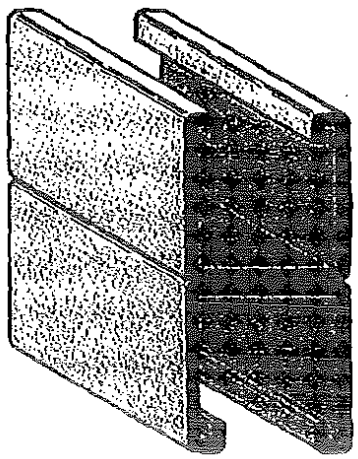


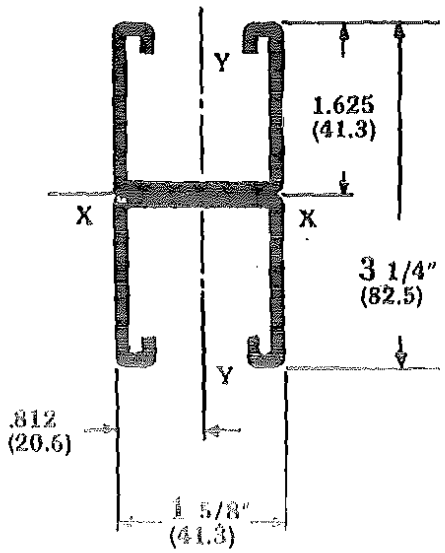
B22
WEIGHT: 1.90 Lbs./Ft. (2.83 kg/m)
THICKNESS: 12 Gauge (2.6 mm)
STANDARD LENGTHS: 10′ (3.05 m) & 20′ (6.09 m)
FINISHES: Plain, Dura-Green Epoxy and Pre-Galvanized

SECTION PROPERTIES

Channel	Weight lbs./ft.	Weight kg/m	Area of Section sq. in.	Area of Section cm²	X-X Axis: Moment of Inertia (I) in.⁴	X-X Axis: Moment of Inertia (I) cm⁴	X-X Axis: Section Modulus (S) in.³	X-X Axis: Section Modulus (S) cm³	X-X Axis: Radius of Gyration (R) in.	X-X Axis: Radius of Gyration (R) cm.	Y-Y Axis: Moment of Inertia (I) in.⁴	Y-Y Axis: Moment of Inertia (I) cm⁴	Y-Y Axis: Section Modulus (S) in.³	Y-Y Axis: Section Modulus (S) cm³	Y-Y Axis: Radius of Gyration (R) in.	Y-Y Axis: Radius of Gyration (R) cm.
B22	1.90	2.83	.559	3.61	.1850	7.70	.2042	3.34	.580	1.47	.2340	9.74	.2880	4.72	.653	1.
B22A	3.80	5.65	1.118	7.21	.9379	39.04	.5772	9.46	.924	2.34	.4681	19.48	.5761	9.44	.653	1.
B22X	6.70	9.97	1.950	12.58	4.1279	171.81	1.6935	27.75	1.450	3.68	1.1069	46.07	1.2064	19.77	.751	1.

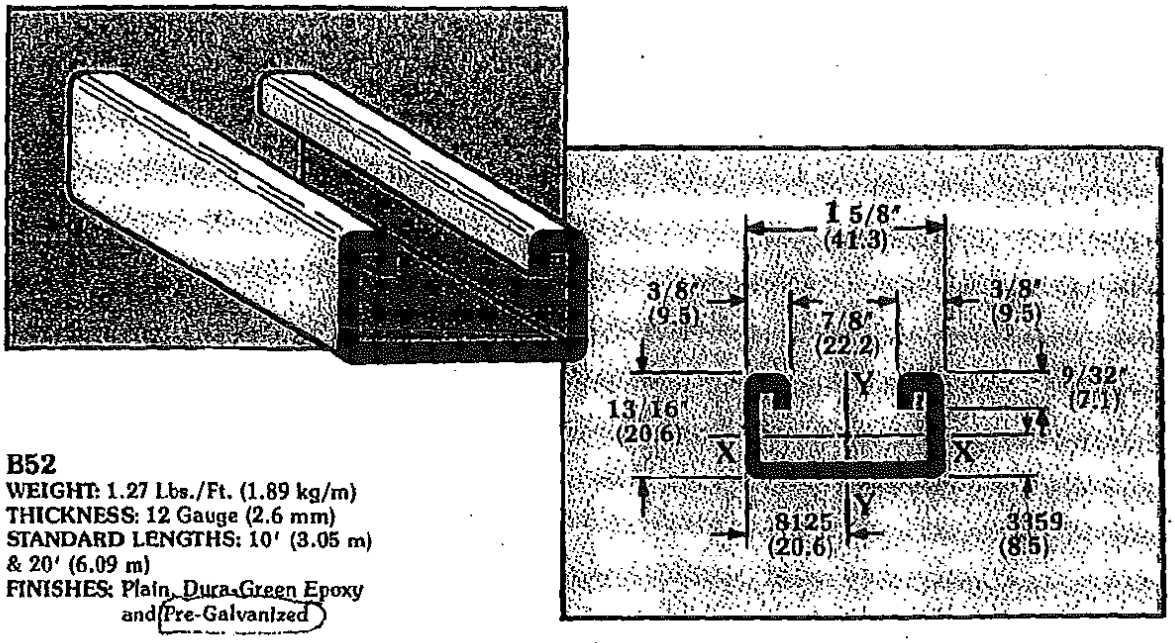
Calculations of section properties are based on metal thicknesses as determined by the AISI Cold-Formed Steel Design Manual.





B22A COMBINATION
Wt. 3.80 Lbs./Ft. (5.65 kg/m)

B52 CHANNEL & COMBINATIO

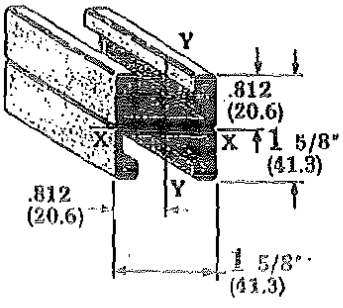


B52
WEIGHT: 1.27 Lbs./Ft. (1.89 kg/m)
THICKNESS: 12 Gauge (2.6 mm)
STANDARD LENGTHS: 10' (3.05 m) & 20' (6.09 m)
FINISHES: Plain, Dura-Green Epoxy and Pre-Galvanized

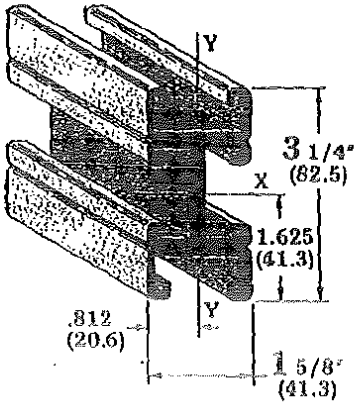
SECTION PROPERTIES

Channel	Weight lbs./ft.	Weight kg/m	Area of Section sq. in.	Area of Section cm²	X-X Axis Moment of Inertia (I) in.⁴	X-X Axis Moment of Inertia (I) cm⁴	X-X Axis Section Modulus (S) in.³	X-X Axis Section Modulus (S) cm³	X-X Axis Radius of Gyration (R) in.	X-X Axis Radius of Gyration (R) cm	Y-Y Axis Moment of Inertia (I) in.⁴	Y-Y Axis Moment of Inertia (I) cm⁴	Y-Y Axis Section Modulus (S) in.³	Y-Y Axis Section Modulus (S) cm³	Y-Y Axis Radius of Gyration (R) in.
B52	1.27	1.89	.374	2.41	.0308	1.28	.0647	1.06	.284	.72	.1375	5.72	.1692	2.77	.599
B52A	2.54	3.78	.747	4.82	.1481	6.16	.1823	2.99	.440	1.12	.2750	11.44	.3385	5.55	.599

Calculations of section properties are based on metal thicknesses as determined by the AISI Cold-Formed Steel Design Manual.



B52A
Wt. 2.54 Lbs./Ft. (3.78 kg/m)



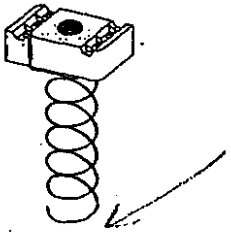
B52B4
Wt. 5.08 Lbs./Ft. (7.56 kg/m)

CHANNEL NUTS & HARDWARE

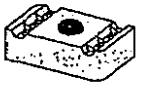
NUTS FOR B11, B12 CHANNELS

Part Number	Without Spring	Twirl Nut	Thread Size	Thickness		Weight Per 100 lbs	
N721	N221WO	TN221	#8-32	¼"	(6.3)	7.0	(3.17)
N722	N222WO	TN222	#10-24	¼"	(6.3)	7.0	(3.17)
N727	N227WO	TN227	#10-32	¼"	(6.3)	7.0	(3.17)
N724	N224WO	TN224	¼-20	¼"	(6.3)	6.7	(3.04)
N723	N223WO	TN223	5/16-18	¼"	(6.3)	6.7	(3.04)
N728	N228WO	TN228	⅜-16	⅜"	(9.5)	9.3	(4.22)
N726	N226WO	TN226	7/16-14	⅜"	(9.5)	8.8	(3.99)
N725	N225WO	TN225	½-13	½"	(12.7)	11.6	(5.26)
N755	N255WO	–	⅝-11	½"	(12.7)	16.4	(7.44)
N775	N275WO	–	¾-10	½"	(12.7)	14.5	(6.58)
N778	N278WO	–	⅞-9	½"	(12.7)	12.5	(5.67)

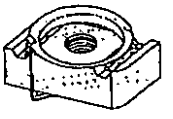
STANDARD FINISH: Electro-Plated



SPRING NUT



NUT WITHOUT SPRING



Patented

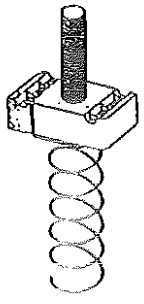
TWIRL-NUT ®

STUD NUTS FOR B11, B12 CHANNELS

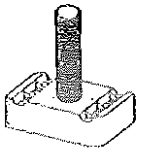
Part Number	Without Spring	Twirl Nut	Thread Size	Thickness		Stud Length		Weight Per 100 lbs	
SN724-¾	SN224-¾WO	STN224-¾	¼-20	¼"	(6.3)	¾	(19.0)	7.7	(3.49)
SN724-1	SN224-1WO	STN224-1				1	(25.4)	8.0	(3.63)
SN724-1¼	SN224-1¼WO	STN224-1¼				1¼	(31.7)	8.2	(3.72)
SN724-1½	SN224-1½WO	STN224-1½				1½	(38.1)	8.4	(3.81)
SN728-¾	SN228-¾WO	STN228-¾	⅜-16	⅜"	(9.5)	¾	(19.0)	12.0	(5.44)
SN728-1	SN228-1WO	STN228-1				1	(25.4)	12.6	(5.71)
SN728-1¼	SN228-1¼WO	STN228-1¼				1¼	(31.7)	13.2	(5.99)
SN728-1½	SN228-1½WO	STN228-1½				1½	(38.1)	13.8	(6.26)
SN725-¾	SN225-¾WO	STN225-¾	½-13	½"	(12.7)	¾	(19.0)	16.5	(7.48)
SN725-1	SN225-1WO	STN225-1				1	(25.4)	17.6	(7.98)
SN725-1¼	SN225-1¼WO	STN225-1¼				1¼	(31.7)	18.7	(8.48)
SN725-1½	SN225-1½WO	STN225-1½				1½	(38.1)	19.8	(8.98)

STANDARD FINISH: Electro-Plated

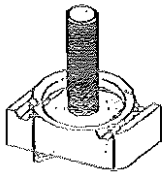
Other stud lengths available



STUD NUT WITH SPRING



STUD NUT WITHOUT SPRING



TWIRL STUD NUT

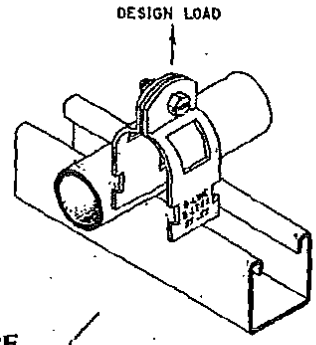
PIPE CLAMPS

Part No.	Nominal Size		Material Thickness		O.D. Size Range		Alternate For Clamp No.'s	Design Load Lbs.	KN	Wt./C Lbs.	Kg.
B2207	⅜"	(10)	16 Ga.	(1.5)	.557-.706	(14.2-17.9)	B2000, B2007, B2026	400	(1.78)	9	(4.1)
B2208	½"	(15)	16 Ga.	(1.5)	.701-.875	(17.8-22.2)	B2001, B2008, B2027, B2028	400	(1.78)	11	(5.0)
B2209	¾"	(20)	14 Ga.	(1.9)	.917-1.081	(23.2-27.4)	B2002, B2009, B2029	400	(1.78)	12	(5.4)
B2210	1"	(25)	14 Ga.	(1.9)	1.125-1.375	(28.6-34.9)	B2003, B2010, B2030, B2031, B2032	400	(1.78)	13	(5.9)
B2211	1¼"	(32)	14 Ga.	(1.9)	1.500-1.691	(38.1-42.9)	B2004, B2011, B2033, B2034	400	(1.78)	15	(6.8)
B2212	1½"	(40)	12 Ga.	(2.6)	1.735-1.931	(44.0-49.0)	B2005, B2012 B2035, B2036	600	(2.67)	23	(10.4)
B2213	2"	(50)	12 Ga.	(2.6)	2.192-2.400	(55.7-60.9)	B2006, B2013, B2039	600	(2.67)	26	(11.8)

PVC Coated (PVC), Dura-Copper Epoxy (DCU) or Pre-Assembled (PA) Pipe Clamps are available. To order, add suffix PVC, DCU or PA to the part number.

Includes Slotted Hex Head Machine Screw and Square Nut.

Patented



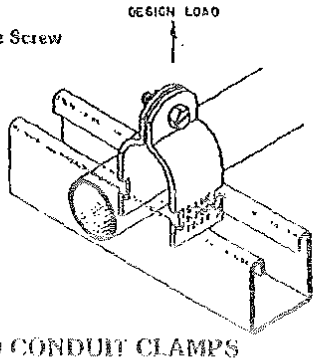
B2207 THRU B2213 MULTI-GRIP PIPE CLAMPS FOR THINWALL (EMT), I.M.C., RIGID CONDUIT OR PIPE

THINWALL CONDUIT (EMT) CLAMPS

Part No.	Conduit Size		Material Thickness		Design Load Lbs.	KN	Wt./C Lbs.	Kg.
B2000	¾"	(10)	16 Ga.	(1.5)	400	(1.78)	10	(4.5)
B2001	½"	(15)	16 Ga.	(1.5)	400	(1.78)	10	(4.5)
B2002	¾"	(20)	16 Ga.	(1.5)	400	(1.78)	11	(5.0)
B2003	1"	(25)	14 Ga.	(1.9)	600	(2.67)	16	(7.2)
B2004	1¼"	(32)	14 Ga.	(1.9)	600	(2.67)	19	(8.6)
B2005	1½"	(40)	12 Ga.	(2.6)	800	(3.56)	28	(12.7)
B2006	2"	(50)	12 Ga.	(2.6)	800	(3.56)	33	(14.9)

Includes Slotted Hex Head Machine Screw and Square Nut.

Hot-Dip Galvanized (HDG), PVC Coated (PVC) or Pre-Assembled (PA) Pipe Clamps are available. To order, add Suffix HDG, PVC or PA to the part number.



RIGID CONDUIT OR PIPE CLAMPS

Part No.	Conduit or Pipe Size		Material Thickness		Design Load Lbs.	KN	Wt./C Lbs.	Kg.
B2007	¾"	(10)	16 Ga.	(1.5)	400	(1.78)	10	(4.5)
B2008	½"	(15)	16 Ga.	(1.5)	400	(1.78)	11	(5.0)
B2009	¾"	(20)	14 Ga.	(1.9)	600	(2.67)	15	(6.8)
B2010	1"	(25)	14 Ga.	(1.9)	600	(2.67)	16	(7.2)
B2011	1¼"	(32)	14 Ga.	(1.9)	600	(2.67)	20	(9.1)
B2012	1½"	(40)	12 Ga.	(2.6)	800	(3.56)	30	(13.6)
B2013	2"	(50)	12 Ga.	(2.6)	800	(3.56)	34	(15.4)
B2014	2½"	(65)	12 Ga.	(2.6)	800	(3.56)	38	(17.2)
B2015	3"	(80)	12 Ga.	(2.6)	800	(3.56)	44	(19.9
B2016	3½"	(90)	11 Ga.	(3.0)	1000	(4.45)	61	(27.6
B2017	4"	(100)	11 Ga.	(3.0)	1000	(4.45)	66	(29.9
B2018	4½"	(115)	11 Ga.	(3.0)	1000	(4.45)	70	(31.7
B2019	5"	(125)	11 Ga.	(3.0)	1000	(4.45)	77	(34.9
B2020	6"	(150)	11 Ga.	(3.0)	1000	(4.45)	100	(45.3
B2021	7"	(175)	11 Ga.	(3.0)	1000	(4.45)	115	(52.1
B2022	8"	(200)	11 Ga.	(3.0)	1000	(4.45)	128	(58.(

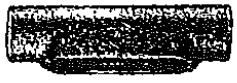
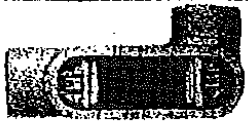
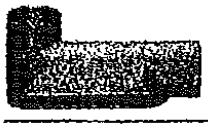
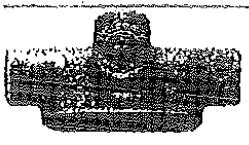
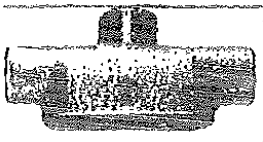
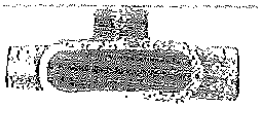
MATERIAL:
16 Ga. (1.5), 14 Ga. (2.6), and 12 Ga. (1.9) ASTM A570 Grade 33
11 Ga. (3.0) ASTM A607 Grade 50

Crouse-Hinds®

Condulet® Conduit Outlet Bodies

Dimensions Pgs. 1F-5 to 7

Threaded Rigid Bodies

Shape	Style	Hub Size ½	¾	1	1¼	1½	2	2½	3	3½	4
	**C**										
	Form 7	C17	C27	C37	C47	C57	C67	C77	C87		
	Form 8	C18	C28	C38	C448	C58	C68	C78	C88		
	Mark 9	C19	C29	C39	C49	C59	C69	C789	C889	C989	C1089
	E										
	Form 7	E17	E27	E37							
	**L**										
	Form 7	L17	L27	L37	L47	L57	L67				
		Double faced – may be used as LL or LR – has 2 openings, one of which is furnished with a blank sheet steel cover									
	**LB**										
	Form 7	LB17	LB27	LB37	LB47	LB57	LB67	LB777	LB87	LB97	LB107
	Form 8	LB18	LB28	LB38	LB448	LB58	LB68	LB78	LB888	LB98	LB108
	Mark 9	LB19	LB29	LB39	LB49	LB59	LB69	LB789	LB889	LB989	LB1089
	LL										
	Form 7	LL17	LL27	LL37	LL47	LL57	LL67	LL777	LL87	LL97	LL107
	Form 8	LL18	LL28	LL38	LL448	LL58	LL68	LL78	LL888		
	Mark 9	LL19	LL29	LL39	LL49	LL59	LL69	LL789	LL889	LL989	LL1089
	LR										
	Form 7	LR17	LR27	LR37	LR47	LR57	LR67	LR777	LR87	LR97	LR107
	Form 8	LR18	LR28	LR38	LR448	LR58	LR68	LR78	LR888		
	Mark 9	LR19	LR29	LR39	LR49	LR59	LR69	LR789	LR889	LR989	LR1089
	T‡										
	Form 7	T17	T27	T37	T47	T57	T67	T77	T87	T97	T107
	Form 8	T18	T28	T38	T448	T58	T68	T78	T88		
	Mark 9	T19	T29	T39	T49	T59	T69	T789	T889	T989	T1089
		‡ Certain Form 7 "T" shapes are available as follows: Form 7 Cat. # – T217 T317 T327; A&C Hub Size ¾ 1 1; B Hub Size ½ ½ ¾ (Cover or wiring devices same size as A&C hubs.)									
	**TA**										
	Form 7	TA17	TA27	TA37	TA47	TA57	TA67				
	**TB**										
	Form 7	TB17	TB27	TB37	TB47	TB57	TB67				
	Form 8	TB18	TB28	TB38	TB448	TB58	TB68				
	Mark 9	TB19	TB29	TB39	TB49						
	**X**										
	Form 7	X17	X27	X37	X47	X57	X67				
	Form 8	X18	X28	X38	X448	X58	X68				
	Mark 9	X19	X29	X39							

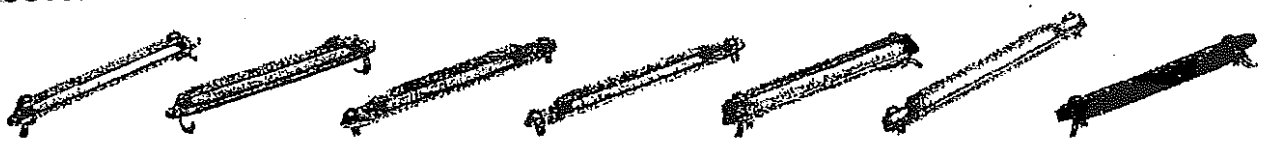
Conduit Outlet Bodies

Gaskets and Covers

Dimensions Pgs. 1F-5 to 7

Crouse-Hinds®

Blank Covers



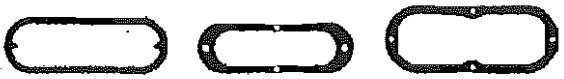
	Sheet Steel			Sheet Aluminum	*Feraloy*® Iron alloy		Composition
Size	Form 7 Wedgenut Cat. #	Form 7 Snaptight♦ Cat. #	Form 8 Cat. #	Mark 9 Cat. #	Form 7 Cat. #	Form 8 Cat. #	Form 7 Cat. #
½	170	170-SG	180	190	170F	180F	1770
¾	270	270-SG	280	290	270F	280F	2770
1	370	370-SG	380	390	370F	380F	3770
1¼	470	470-SG	480	490	470F	480F	4770
1½	570	570-SG	580	590	570F	580F	5770
2	670	670-SG	680	690	670F	680F	6770
2½	870		880	889	870F	880F	
3	870		880	889	870F	880F	
3½	970		980	989	970F	980F	
4	970		980	989	970F	980F	

♦ Form 7 Snaptight covers with integral sealing gasket are installed without the use of screws.

Solid Gaskets
Neoprene

Size	Form 7 Cat. #	Form 8* Cat. #	Mark 9† Cat. #
½	GASK571	GASK851N	GASK1941
¾	GASK572	GASK852N	GASK1942
1	GASK573	GASK853N	GASK1943
1¼	GASK574	GASK854N	GASK1944
1½	GASK575		GASK1945
2	GASK576		GASK1946
2½	GASK576		
3	GASK578		
3½	GASK579		
4	GASK579		

Open Gaskets
Neoprene



Size	Form 7 Cat. #	Form 8 Cat. #	Mark 9 Cat. #
½	GASK471		
¾	GASK472		
1	GASK473		
1¼	GASK474		
1½	GASK475	GASK805N	
2	GASK476	GASK806N	
2½	GASK478	GASK808N	GASK808N
3	GASK478	GASK808N	GASK808N
3½		GASK809N	GASK809N
4		GASK809N	GASK809N

* ½ – 1¼ use solid gaskets; 1½ – 4 use open gaskets.
† ½ – 2 use solid gaskets; 2½ – 4 use open gaskets.

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SECTION 1

RIGID NON-METALLIC CONDUIT

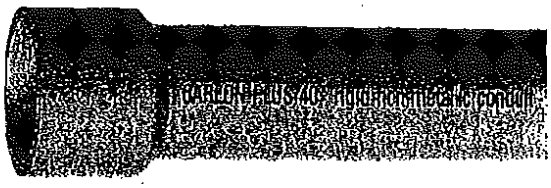
LISTED

Specifications and Data

CARLON PLUS 40® RIGID NON-METALLIC CONDUIT (Heavy Wall EPC)

For underground applications, encased in concrete or direct burial. Also for use in exposed or concealed applications above-ground.

- U.L. Listed
- Sunlight resistant
- Rated for use with 90°C conductors
- Reduced emissions of smoke and HCL
- Superior weathering characteristics



PLUS 40 Heavy Wall

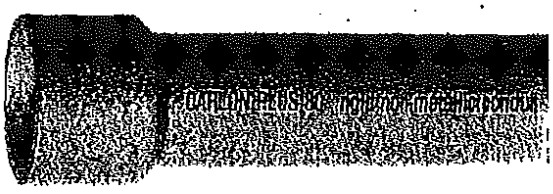
Nom. Size	Cat. No.	O.D.	I.D.	Wall	Wt. Per 100 Feet	Feet Per Bundle
½	49005	.840	.622	.109	17	100
¾	49007	1.050	.824	.113	23	100
1	49008	1.315	1.049	.133	34	100
1¼	49009	1.660	1.380	.140	46	50
1½	49010	1.900	1.610	.145	55	50
2	49011	2.375	2.067	.154	73	50
2½	49012	2.875	2.469	.203	125	10
3	49013	3.500	3.066	.216	164	10
3½	49014	4.000	3.548	.226	198	10
4	49015	4.500	4.026	.237	234	10
5	49016	5.563	5.047	.258	318	10
6	49017	6.625	6.065	.280	412	10

Rigid non-metallic conduit is normally supplied in standard 10′ lengths, with one belled end per length. For specific requirements, it may be produced in lengths shorter or longer than 10′, with or without belled ends.

CARLON PLUS 80® RIGID NON-METALLIC CONDUIT (Extra Heavy Wall EPC-80)

For use in above ground and below ground applications that are subject to severe physical abuse.

- U.L. Listed
- Sunlight resistant
- Rated for use with 90°C conductors



PLUS 80 Extra Heavy Wall

Nom. Size	Cat. No.	O.D.	I.D.	Wall	Wt. Per 100 Feet	Feet Per Bundle
½	49405	.840	.546	.147	22	100
¾	49407	1.050	.742	.154	29	100
1	49408	1.315	.957	.179	43	100
1¼	49409	1.660	1.278	.191	59	50
1½	49410	1.900	1.500	.200	72	50
2	49411	2.375	1.939	.218	99	10
2½	49412	2.875	2.323	.276	152	10
3	49413	3.500	2.900	.300	212	10
4	49415	4.500	3.826	.337	310	10
5	49416	5.563	4.813	.357	431	10

Rigid non-metallic conduit is normally supplied in standard 10′ lengths, with one belled end per length. For specific requirements, it may be produced in lengths shorter or longer than 10′, with or without belled ends.

SUPPORT OF CARLON RIGID NON-METALLIC CONDUIT IN ABOVEGROUND INSTALLATIONS

Distances between supports should be based on temperatures and the specific application. Because non-metallic conduit is lighter in weight, it does not require as strong a support system. The following chart illustrates the support requirements as outlined in the National Electric Code based on 50°C (122°F) air temperature and 90°C conductor temperature.

Conduit Size (in.)	Maximum Spacing Between Supports (feet)
½ - 1	3
1¼ - 2	5
2½ - 3	6
3½ - 5	7
6	8

Plastic conduit should always be installed away from steam lines, etc. Support straps should be tightened only enough to allow for lineal movement caused by expansion and contraction.

SECTION 5 FITTINGS DATA

UL LISTED NOTE: All fittings shown in this section are UL listed except where the symbol (►) appears.

Standard Radius Elbows

SCHEDULE 40 ELBOWS — STANDARD RADIUS

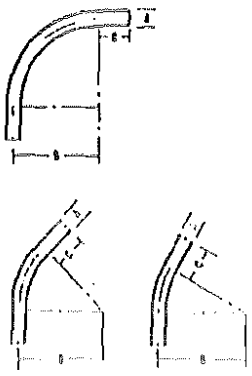
Item	Plain End Part No.	Belled End Part No.	Size	Plain End Pkg. Qty.	Belled End Pkg. Qty.
90° Elbow	UA9AD	—	½"	50	—
	UA9AE	—	¾"	25	—
	UA9AF	—	1"	25	—
	UA9AG	UA9AGB	1¼"	20	20
	UA9AH	UA9AHB	1½"	25	25
	UA9AJ	UA9AJB	2"	20	15
	UA9AK	UA9AKB	2½"	10	10
	UA9AL	UA9ALB	3"	30	25/5
	UA9AM	UA9AMB	3½"	25	20/5
	UA9AN	UA9ANB	4"	25	20/5
	UA9AP	UA9APB	5"	8	8/2
	UA9AR	UA9ARB	6"	8	8/2
45° Elbow	UA7AD	—	½"	50	—
	UA7AE	—	¾"	25	—
	UA7AF	—	1"	20	—
	UA7AG	UA7AGB	1¼"	20	20
	UA7AH	UA7AHB	1½"	20	20
	UA7AJ	UA7AJB	2"	20	20
	UA7AK	UA7AKB	2½"	20	20
	UA7AL	UA7ALB	3"	30	25/5
	UA7AM	UA7AMB	3½"	25	5
	UA7AN	UA7ANB	4"	25	20/5
	UA7AP	UA7APB	5"	8	3
	UA7AR	UA7ARB	6"	8	2
30° Elbow	UA6AD	—	½"	50	—
	UA6AE	—	¾"	25	—
	UA6AF	—	1"	25	—
	UA6AG	UA6AGB	1¼"	20	20
	UA6AH	UA6AHB	1½"	25	25
	UA6AJ	UA6AJB	2"	20	20
	UA6AK	UA6AKB	2½"	10	20
	UA6AL	UA6ALB	3"	30	5
	UA6AM	UA6AMB	3½"	25	5
	UA6AN	UA6ANB	4"	25	5
	UA6AP	UA6APB	5"	8	3
	UA6AR	UA6ARB	6"	8	2

*Belled end elbows available in 1¼" thru 6" only.

DIMENSIONS OF STANDARD RADIUS ELBOWS

Applicable to 90° - 45° - 30° Elbows

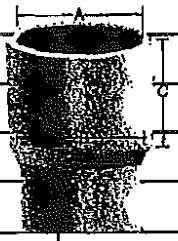
Size	A	B Min.	C Min.
½"	.840	4"	1½"
¾"	1.050	4½"	1½"
1"	1.315	5¾"	1⅞"
1¼"	1.660	7¼"	2"
1½"	1.900	8¼"	2"
2"	2.375	9½"	2"
2½"	2.875	10½"	3"
3"	3.500	13"	3⅛"
3½"	4.000	15"	3½"
4"	4.500	16"	3⅝"
5"	5.563	24"	3⅝"
6"	6.625	30"	3¾"



Schedule 40 Elbows — Standard Radius

Available in plain and integral belled end* for use with non-metallic solvent weld fittings. Special radius elbows available on request.

DIMENSIONS OF INTEGRAL BELLED END ELBOWS



Elbow Nominal Diameter (Inches)	"A" Range (Inches)	"B" Range (Inches)	"C" Range (Inches)
1¼	1.672 ± .012	1.655 ± .012	1.469 ± .531
1½	1.916 ± .012	1.894 ± .012	1.531 ± .469
2	2.393 ± .012	2.369 ± .012	1.562 ± .437
2½	2.890 ± .015	2.868 ± .015	2.234 ± .765
3	3.515 ± .015	3.492 ± .015	2.359 ± .765
3½	4.015 ± .050	3.992 ± .015	2.468 ± .781
4	4.515 ± .050	4.491 ± .015	2.562 ± .812
5	5.593 ± .050	5.553 ± .030	2.781 ± .844
6	6.658 ± .050	6.614 ± .030	2.937 ± .812

SCHEDULE 80 ELBOWS — STANDARD RADIUS

Available in plain end only for use with non-metallic solvent weld fittings. Special radius elbows available on request.

Item	Part No.	Size	Pkg. Qty.
90° Elbow	UB9AD	½"	50
	UB9AE	¾"	25
	UB9AF	1"	25
	UB9AG	1¼"	20
	UB9AH	1½"	25
	UB9AJ	2"	20
	UB9AK	2½"	5
	UB9AL	3"	5
	UB9AN	4"	5
	UB9AP	5"	1
45° Elbow	UB7AD	½"	50
	UB7AE	¾"	25
	UB7AF	1"	20
	UB7AG	1¼"	10
	UB7AH	1½"	20
	UB7AJ	2"	10
	UB7AK	2½"	5
	UB7AL	3"	5
	UB7AN	4"	5
	UB7AP	5"	1
30° Elbow	UB6AD	½"	50
	UB6AE	¾"	25
	UB6AF	1"	25
	UB6AG	1¼"	20
	UB6AH	1½"	25
	UB6AJ	2"	15
	UB6AK	2½"	5
	UB6AL	3"	5
	UB6AN	4"	5
	UB6AP	5"	1

FITTINGS DATA

UL LISTED NOTE: All fittings shown in this section are UL listed except where the symbol (►) appears.

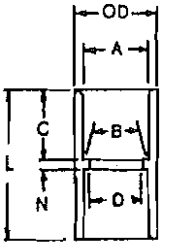
SECTION 5

Plus 40™ and Plus 80™ Fittings

All socket fittings should be attached using Carlon solvent cement. Using Carlon fittings with Carlon non-metallic conduit insures system integrity.

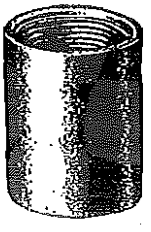
STANDARD COUPLINGS

Socket type for joining non-metallic conduit.

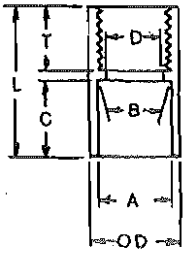


Part No.	Size	A	B	D	OD	C	N	L	Ctn. Qty.
E940D	½	.852	.836	.758	17/64	11/16	⅛	1½	150
E940E	¾	1.064	1.046	.948	15/16	¾	⅛	1⅝	100
E940F	1	1.330	1.310	1.210	1⅝	15/16	⅓	2	50
E940G	1¼	1.677	1.655	1.535	1 63/64	1	⅛	2⅛	30
E940H	1½	1.918	1.894	1.755	2 15/64	1⅛	⅛	2⅜	25
E940J	2	2.393	2.369	2.190	2 47/64	1 3/16	⅛	2½	30
E940K	2½	2.890	2.868	2.688	3 3/16	1⅝	¼	3 5/16	20
E940L	3	3.515	3.492	3.375	3 31/32	1¾	3/16	3 13/32	25
E940M	3½	4.015	3.992	3.780	4½	1⅞	¼	3⅝	20
E940N	4	4.515	4.491	4.265	5 3/32	2	¼	3¾	15
E940P	5	5.593	5.553	5.097	6¼	1 5/16	5/32	4 1/16	8
E940R	6	6.658	6.614	6.115	7½	2 3/16	1¼	4⅝	5

FEMALE ADAPTERS



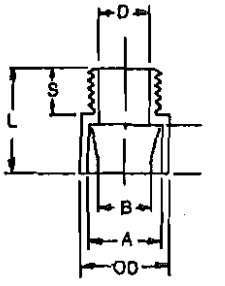
For adapting non-metallic conduits to threaded fittings, metallic systems. Female threads on one end, socket end on other.



Part No.	Size	A	B	D	OD	C	T	L	Ctn. Qty.
E942D	½	.852	.836	.620	17/64	11/16	¾	1 9/16	150
E942E	¾	1.064	1.046	.822	1 5/16	1 3/16	¾	1⅝	100
E942F	1	1.330	1.310	1.046	1⅝	1 5/16	⅞	1 15/16	50
E942G	1¼	1.677	1.655	1.377	1 63/64	1	⅞	2	30
E942H	1½	1.918	1.894	1.607	2 5/32	1⅛	⅞	2 7/32	25
E942J	2	2.393	2.369	2.064	2 47/64	1 3/16	1	2 5/16	30
E942K	2½	2.890	2.868	2.450	3 11/32	1⅝	1⅛	2 15/16	20
E942L	3	3.515	3.492	3.000	3 31/32	1¾	1⅛	3 1/16	25
E942M	3½	4.015	3.992	3.500	4½	1⅞	1⅛	3¼	20
E942N	4	4.515	4.491	4.000	5 1/64	2	1⅛	3 11/64	15
E942P	5	5.593	5.553	5.047	6¼	1 15/16	1 1/16	3 5/16	8
E942R	6	6.658	6.614	6.055	7¼	2⅛	1 1/16	3⅜	5

TERMINAL ADAPTERS

For adapting non-metallic conduits to boxes, threaded fittings, metallic systems. Male threads on one end, socket end on other.



Part No.	Size	A	B	D	OD	C	S	L	Ctn. Qty.
E943D	½	.852	.836	.597	1⅛	⅝	9/16	1 5/16	150
E943E	¾	1.064	1.046	.800	1 11/32	¾	9/16	1⅜	125
E943F	1	1.330	1.310	1.018	1⅝	1	11/16	1 25/32	50
E943G	1¼	1.677	1.655	1.332	2 1/32	1	¾	1 15/16	50
E943H	1½	1.918	1.894	1.566	2 5/32	1 3/16	¾	2 1/16	25
E943J	2	2.393	2.369	2.000	2 21/32	1 3/16	¾	2⅛	50
E943K	2½	2.890	2.868	2.376	3 5/16	1¾	⅞	2⅞	25
E943L	3	3.515	3.492	2.954	4	1 15/16	⅞	3 1/16	45
E943M	3½	4.015	3.992	3.440	4½	2 7/16	1⅞	3 7/16	30
E943N	4	4.515	4.491	3.940	5 3/32	2⅜	⅞	3½	20
E943P	5	5.593	5.553	4.815	6¼	2⅓	1	3 15/16	5
E943R	6	6.658	6.614	5.860	7½	2⅜	1	3⅜	5

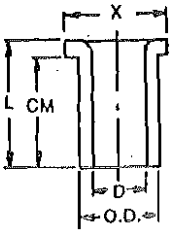
"O" RINGS

For a waterproof termination place a neoprene "O" ring over the threads of the terminal adapter. Use locknut or threaded bushing to secure.

Part No.	Size	Ctn. Qty.	Part No.	Size	Ctn. Qty.
E943DW	½	100	E943GW	1¼	50
E943EW	¾	125	E943HW	1½	50
E943FW	1	100	E943JW	2	25

ADAPTERS FOR NON-METALLIC ENCLOSURES

Adapts non-metallic conduit to all electrical enclosures by inserting adapter through knockout and cementing into Carlon couplings.



Part No.	Size	D	OD	X	CM	L	Ctn. Qty.
E996D	½	.662	.840	17/64	23/32	27/32	100
E996E	¾	.824	1.050	1 21/64	25/32	29/32	100
E996F	1	1.049	1.315	1⅝	61/64	3/32	100
E996G	1¼	1.380	1.660	1 31/32	1 1/16	1¼	50
E996H	1½	1.610	1.900	2 13/64	1 3/16	1⅜	50
E996J	2	2.067	2.375	2 29/32	1¼	1 7/16	25
E996K	2½	2.469	2.875	3 7/16	1⅞	1 15/16	10
E996L	3	3.068	3.500	4⅛	2	2 1/16	20
E996M	3½	3.548	4.000	4⅝	2⅛	2 3/16	10
E996N	4	4.026	4.500	5⅛	2½	2½	10

5" and 6" available on special request.

SUPPLIER DOCU SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16120-001	REV: 0	DATE 19-Jun-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.

Ron Wood

SIGNATURE: RWood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Erika Jarrett DATE: 6/20/00

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	641-16120-001	0						X			Conductors		X		16120	X		
											THHN/THWN-XHHW							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Jim Cherry	525				
Jim Jenkins	525				
Mike Godber	525				
Rob Kneip	525				
Scott Wheeler	525				
Kwasi Baw Tweneboah	164				

NO COMMENTS:

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: MWGriffin DATE 6/27/00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

ORIGINAL

SUBMITTAL TYPE: (BY SUPPLIER)

CFC - CERTIFIED FOR CONSTRUCTION

INF - INFORMATION/RECORD

DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)

A - Conforms to Subcontract Requirements

B - Minor Comments - Incorporate and Resubmit

C - Revise and Resubmit (SEE COMMENTS)

Wire & Cable

WIRE

Type THHN/THWN Building Wire

Copper Conductor—600 Volts

Small-diameter single conductor. Polyvinyl Chloride insulated wire with Nylon Jacket resists chemicals, gas, oils, and abrasions. Meets UL's VW-1 flame test and conforms to NEC® requirement that wires within 3" of fluorescent-lamp ballast be of 90°C type. UL listed.

Temperature: Maximum 90°C dry, 75°C wet.

Put-up: 500', 1000', and 2500' reels. Other put-ups also available.

Conductor			Size, In.			Weight
AWG	No.	Strand	Insul.	Jkt.	OD	Lbs./M'
14	1	Solid	.015	.004	.11	15
12	1	Solid	.015	.004	.12	23
10	1	Solid	.020	.004	.15	38
18†	1	16	.015	.004	.09	8
16†	1	19	.015	.004	.10	12
14	1	19	.015	.004	.11	16
12	1	19	.015	.004	.13	24
10	1	19	.020	.004	.17	39
8	1	19	.030	.005	.22	64
6	1	19	.030	.005	.26	96
4	1	19	.040	.006	.33	154
3	1	19	.040	.006	.35	191
2	1	19	.040	.006	.39	236
1	1	19	.050	.007	.45	302
1/0	1	19	.050	.007	.49	375
2/0	1	19	.050	.007	.53	465
3/0	1	19	.050	.007	.58	578
4/0	1	19	.050	.007	.64	719
250MCM	1	37	.060	.008	.71	858
300MCM	1	37	.060	.008	.77	1020
350MCM	1	37	.060	.008	.82	1182
400MCM	1	37	.060	.008	.86	1252
500MCM	1	37	.060	.008	.95	1662
600MCM	1	61	.070	.008	1.05	2028
750MCM	1	61	.070	.008	1.15	2513
1000MCM	1	61	.070	.008	1.29	3420

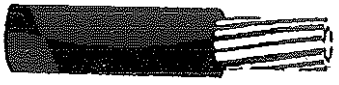
†Listed as TFFN 90°C, 105°C Appliance Wiring Material; MTW 90°C and 80°C when exposed to oil.

Note: For Stock Color availability, contact your representative.

WIRE

Type XHHW Building Wire

Copper Conductor—600 Volts



Used primarily in conduit, duct, or other recognized raceways for services, feeders, and branch circuit wiring. Soft annealed copper conductor with black crosslinked polyethylene insulation. Abrasion, high heat, and moisture resistant. May be used in wet or dry locations. UL listed.

Temperature: Maximum 90°C dry, 75°C wet.

Put-up: 500' and 1000' reels. Other put-ups also available.

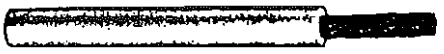
Conductor			Size, In.		Weight
AWG	No.	Strand	Insul.	OD	Lbs./M'
8	1	7	.045	.232	64
6	1	7	.045	.269	98
	1	7	.045	.315	149
	1	7	.045	.373	231
	1	19	.055	.432	291
1/0	1	19	.055	.472	363
2/0	1	19	.055	.516	452
3/0	1	19	.055	.566	564
4/0	1	19	.055	.622	706
250MCM	1	37	.065	.608	834
300MCM	1	37	.065	.741	994
350MCM	1	37	.065	.791	1154
400MCM	1	37	.065	.836	1313
500MCM	1	37	.065	.919	1631
600MCM	1	61	.080	1.026	1965
700MCM	1	61	.080	1.095	2281
750MCM	1	61	.080	1.128	2440
1000MCM	1	61	.080	1.277	3230

Note: For Stock Color availability, contact your representative.

WIRE

Type MTW/AWM Machine Tool/Appliance Wire

Copper Conductor—600 Volts



Multi-purpose wire that resists moisture and abrasion. Stranded copper conductor insulated with polyvinyl chloride (PVC) compound. Meets UL's VW-1 flame test.

For appliances, machine tools, and control panels. Soft-annealed stranded bare copper conductor. Meets UL's cold bend test at −30°C. UL and CSA listed.

Temperature: +105°C continuous in air for AWM use. 90°C for MTW use.

Put-up: 500' and 2500' reels. Other put-ups also available.

Conductor			Size, In.		
AWG	No.	Strand	Insul.	OD	Amps
18*	1	16 × 30	.030	.11	6
16*	1	26 × 30	.030	.12	8
14*	1	19 × .0147	.030	.14	15
12*	1	19 × .0185	.030	.16	20
10*	1	19 × .0234	.030	.18	30
8*	1	19 × .0295	.045	.24	50
14*	1	19 × .0147	.045	.17	15
12*	1	19 × .0185	.045	.19	20
10*	1	19 × .0234	.045	.22	30
8	1	19 × .0295	.060	.27	50
6*	1	19 × .0372	.060	.32	70
4*	1	19 × .0464	.060	.38	90
2	1	19 × .0591	.060	.42	120

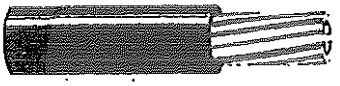
*Manufacturer stock item.

Note: For Stock Color availability, contact your representative.

CABLE

Type USE-RHH-RHW Service Cable

Copper Conductor—600 Volts
XLP Insulation—Black



Single conductor cross linked Polyethylene insulated wire suitable for operation at 90°C in dry locations and 75°C in wet or dry locations. May be installed in conduit, duct or other recognized raceway. Also approved for direct burial.

Size	No.	Insul. Thick.	OD	Net Wt. Lbs. M Ft.	
AWG	Strands	In.	In.	Copper	Alum
14†	1	.045	.16	21	...
12	1	.045	.18	30	18
10	1	.045	.20	43	23
8	1	.050	.26	67	39

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 6/27/00

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate Transmission System Project
STAVER # 7052

Submittal # 641-16120-001
Reviewed By: [illegible]
Date: 6/19/00

INFORMATION ONLY

SUPPLIER DOC ...T SUBMITTAL 16140-001 mwb

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: ~~16400-002~~	REV: 0	DATE: 14-Jun-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.

Ron Wood

SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Teresa Schwab DATE: 6-14-2000

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	641-~~16400-002~~	0						X			Switches & Receptacles		X		~~16400~~	X		
	16140-001														16140			
	mwb														mwb			

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Tatina Griffin	52-5				
Jim Cherry	52-5				
Jim Jenkins	52-5				
Tom Escue	52-0				
~~Bob Kneip~~	~~52-5~~	→ Jim Karl			
Scott Wheeler	52-5				
Kwasi Baw Twenebonah	38				

NC COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE 6/27/00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

ORIGINAL

SUBMITTAL TYPE: (BY SUPPLIER)

CFC - CERTIFIED FOR CONSTRUCTION

INF - INFORMATION/RECORD

DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)

A - Conforms to Subcontract Requirements

B - Minor Comments - Incorporate and Resubmit

C - Revise and Resubmit (SEE COMMENTS)

Straight Blade Devices

2 Pole, 3 Wire Grounding

15 and 20 Ampere, 125 Volts

Heavy Duty, Specification Grade, Duplex Receptacles

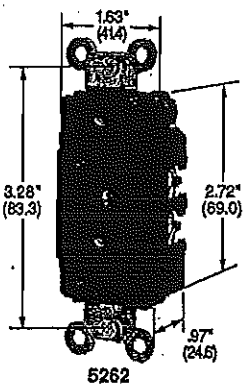
15A only

Heavy Duty, Specification Grade, Duplex Receptacles

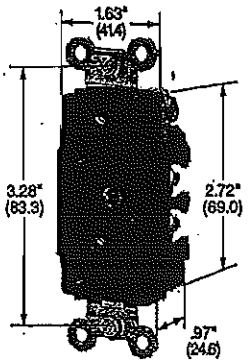
NEMA 5-15R 15A 125V UL CSA 0.5 HP

NEMA 5-20R 20A 125V UL Listed 1 HP

Description	Color	Catalog Numbers	
Flush, nylon face, back and side wired, slotted screws.	Brown	**5262**	**5362**
	Ivory	**5262I**	**5362I**
	Gray	5262GRY	5362GRY
	White	5262WHI	5362WHI
	Red	5262RDB	5362RDB
	Black	5262BLB	5362BLB
Flush, nylon face, back and side wired, Robertson/slotted screws.	Brown	**5262CN**	–
	Ivory	**5262ICN**	–
	Gray	5262GRYCN	–
	White	5262WHICN	–
	Red	5262RDBCN	–



5262



5362

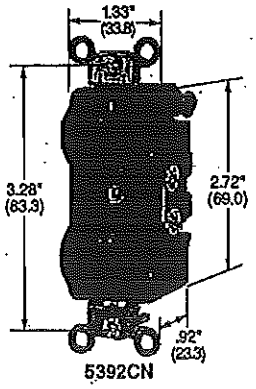
INFORMATION ONLY

Accepts 20A plug only.

Heavy Duty, Specification Grade, Duplex Receptacles– Robertson/slotted screws

5-20R Canadian 20A 125V UL CSA 1 HP

Description	Color	Catalog Numbers
Flush, nylon face, back and side wired.	Brown	**5392CN**
	Ivory	**5392ICN**
Isolated ground.	Orange	IG5392CN



5392CN

Notes: See Section G for full line of isolated ground devices.
Horsepower ratings listed above are AC only.
See page A-42 for accessories.
See page A-47 for technical information.

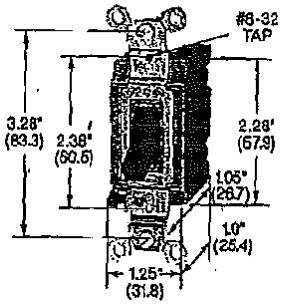
[ ]A - Conforms to the Subcontract Requirements
[ ]B - Minor Comment - Incorporate and Resubmit
[ ]C - Revise and Resubmit
Sig: MWS Date: 6/27/00

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052
Submittal # 641-~~11400-002~~ 16140-001 MWS
Reviewed By: [illegible]
Date: 6/14/00

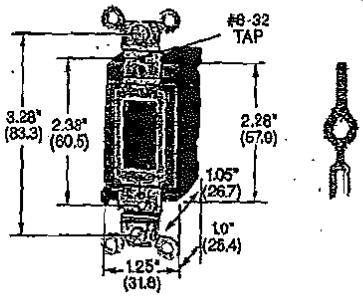
AC Switches

15, 20 and 30 Ampere, 120-277 Volt AC

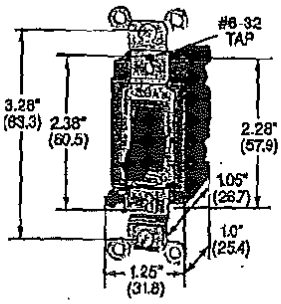
Industrial–Institutional, Heavy Duty Specification Grade
Toggle and Lock Type AC Switches with Ground Screw NEW



HBL1221



HBL1221L and Key



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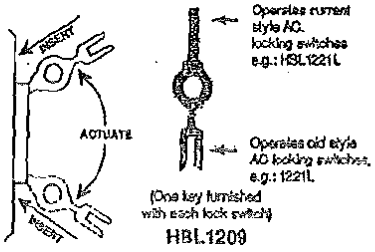
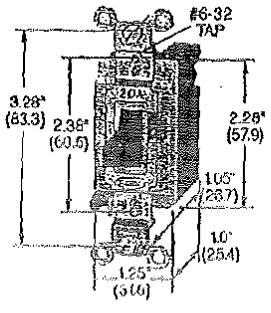


HBL1209



HBL1557

Specification Grade AC Switches, Back and Side Wired

15A, 120-277V AC

Description	Catalog Numbers Single Pole	Double Pole	Three Way	Four Way
Brown nylon toggle.	HBL1201	HBL1202	HBL1203	HBL1204
Ivory nylon toggle.	HBL1201I	HBL1202I	HBL1203I	HBL1204I
Gray nylon toggle.	HBL1201GY	–	HBL1203GY	HBL1204GY
White nylon toggle.	HBL1201W	–	–	–
Red nylon toggle.	HBL1201R	–	–	–
Lock type.	HBL1201L	HBL1202L	HBL1203L	HBL1204L
Key for lock switches.	HBL1209			

20A, 120-277V AC

Description	Catalog Numbers Single Pole	Double Pole	Three Way	Four Way
Brown nylon toggle.	HBL1221	HBL1222	HBL1223	HBL1224
Ivory nylon toggle.	HBL1221I	HBL1222I	HBL1223I	HBL1224I
Gray nylon toggle.	HBL1221GY	HBL1222GY	HBL1223GY	HBL1224GY
White nylon toggle.	HBL1221W	HBL1222W	HBL1223W	HBL1224W
Red nylon toggle.	HBL1221R	HBL1222R	HBL1223R	HBL1224R
Black nylon toggle.	HBL1221BK	HBL1222BK	HBL1223BK	HBL1224BK
Lock type.	HBL1221L	HBL1222L	HBL1223L	HBL1224L
Key for lock switches.	HBL1209			

30A, 120-277V AC

Description	Catalog Numbers Single Pole	Double Pole	Three Way
Brown nylon toggle.	HBL3031	HBL3032	HBL3033
Ivory nylon toggle.	HBL3031I	HBL3032I	HBL3033I

Momentary Contact, Specification Grade, Back and Side Wired
Three Position–Two Circuit Momentary Contact, Center Off

Description	Catalog Numbers 15A, 120-277V AC	20A, 120-277V AC
Brown nylon toggle.	HBL1556	HBL1557
Ivory nylon toggle.	HBL1556I	HBL1557I
Gray nylon toggle.	HBL1556GY	HBL1557GY
White nylon toggle.	–	HBL1557W
Lock type.	HBL1556L	HBL1557L
Key for lock switches.	HBL1209	

Notes: Keys are supplied with each lock switch. For extra keys order HBL1209.
For technical data see page C-21.
See Section D for wall plates. For accessories see pages C-18 to C-20.
See pages C-26 and C-27 for wiring diagrams.

HP Conversion Chart

	120V	240V
15A	1 HP	2HP
20A	1½ HP	2HP
30A	2HP	2HP

PANELS

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16160-001	REV: 1	DATE: 05-Sep-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.

Ron Wood

SIGNATURE: R Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Jluma Stewart DATE: 9-5-2000

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
9	641-16160-001	1						X			Panels		X		16160	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Nick Griffin	525				
Jim Cherry	525				
Jim Calvin	525				
Mike Stodber	64				
Rob Krip	525				
Scott Wheeler	525				
Kiyoi Bru Swenstad (Stoftec)	64				

NO COMMENTS

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

RECEIVED BY: Mus Gin DATE 9-18-00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)

CFC - CERTIFIED FOR CONSTRUCTION

INF - INFORMATION/RECORD

DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)

A - Conforms to Subcontract Requirements

B - Minor Comments - Incorporate and Resubmit

C - Revise and Resubmit (SEE COMMENTS)

APPROVAL DRAWINGS

FOR

LEACHATE PROJECT AT FERNALD

CONTRACTOR:

ECDC CONTROLLED
COPY NO.
76896

B & J ELECTRIC
6316 WIEHE
CINCINNATI, OHIO 45237

DISTRIBUTOR

SHARONVILLE/ REXAL
11361 MOSTELLER RD
CINCINNATI, OHIO 45242

PRESENTED BY

NICK SOLDANO
ACCOUNT MANAGER
SIEMENS ENERGY & AUTOMATION
4620 FOREST AVE
CINCINNATI, OHIO 45212
PH 513-841-3459 FAX 513-841-3416

[✓] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 9-18-00

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-116160-001
Reviewed By: R
Date: 9/5/00

Panel Type	: S3	Panel Marking	: 1 THRU 6 100A 1PH
System/Volt	: 1P,3W 120/240	Panel Quantity	: 6 Item # : 1
Panel IR	: 22K	Main Bus	: 100A AgCu Bus
Enclosure	: NEMA TYPE 3R	Mounting	: SURFACE
Cat. Number	: S3A30LH100ETS	Service Ent.	: YES
Date Entered	: AUG-29-2000	Lugs	: (1)-#14-1/0 AWG

BRANCHES

QTY	TRIP/POLE	BRANCH	IR
8	20/1	BLH	22 K
3	15/1	BLH	22 K
2	20/1	BLHF	22 K
2	30/2	BLH	22 K
13	PROV/1	BLH	

MODIFICATIONS

QTY	CODE	DEVICE	DESCRIPTION
1	BOX		CU Ground Bus
1	BOX		3R Encls
1	BOX		Must be S3 Panel

SECTION NO: 1

HEIGHT: 29.00
WIDTH: 20.00
DEPTH: 7.94

GUTTER SIZE
ENDS: 5.75
SIDES: 6.38

100 BLH Main Top

1	15/1 BLH		A	20/1 BLHF		2
3	15/1 BLH		B	20/1 BLHF		4
5	15/1 BLH		A	20/1 BLH		6
7	20/1 BLH		B	20/1 BLH		8
9	20/1 BLH		A	20/1 BLH		10
11	20/1 BLH		B	20/1 BLH		12
13	20/1 BLH		A	30/2 BLH		14
15	30/2 BLH		B			16
17			A	/1 BLH	PROV	18
19	/1 BLH	PROV	B	/1 BLH	PROV	20
21	/1 BLH	PROV	A	/1 BLH	PROV	22
23	/1 BLH	PROV	B	/1 BLH	PROV	24
25	/1 BLH	PROV	A	/1 BLH	PROV	26
27	/1 BLH	PROV	B	/1 BLH	PROV	28
29	/1 BLH	PROV	A	/1 BLH	PROV	30

JOB NAME : FERNALD LEACHATE	
P.O. :	CUST :
S.O. :	TITLE :
SIEMENS ENERGY & AUTOMATION, INC. ELECTRICAL APPARATUS DIV. V2.5.8	DRWG: SHEET 1 OF REV.

SUPPLIER DOC SUBMITTAL

DOE PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16160-001	REV: 0	DATE 27-Jun-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.

Ron Wood

SIGNATURE: R. Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Denise Wentz DATE: 6/28/00

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16160-001	0						X			Panels/ Disconnects		X		16160			

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Tim Cherry	52-5				
Jim Jenkins	52-5				
Mike Gocher	64				
Rob Kreyo	52-5				
B. Scott Wheeler	52-5				
Cwasi Bau Twenebocas	64				

COPY

RECEIVED JUN 29 2000

NO COMMENTS. COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

FWD TO PLANNER COMMENTS

RECEIVED BY: [signature] DATE 7/17/00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE. (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

ENTERED

APPROVAL DRAWINGS

FOR

LEACHATE PROJECT AT FERNALD

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16160-001
Reviewed By:
Date: 6/27/00

CONTRACTOR:

B & J ELECTRIC
6316 WIEHE
CINCINNATI, OHIO 45237

DISTRIBUTOR

SHARONVILLE/ REXAL
11361 MOSTELLER RD
CINCINNATI, OHIO 45242

PRESENTED BY

NICK SOLDANO
ACCOUNT MANAGER
SIEMENS ENERGY & AUTOMATION
4620 FOREST AVE
CINCINNATI, OHIO 45212
PH 513-841-3459 FAX 513-841-3416

Panel Type	: S3	Panel Marking	: 1 THRU 6 100A 1PH
System/Volt	: 1P,3W 120/240	Panel Quantity	: 6 Item # : 1
Panel IR	: 22K	Main Bus	: 100A Bare Cu Bus
Enclosure	: NEMA TYPE 3R	Mounting	: SURFACE
Cat. Number	: S3A30LH100FTS	Service Ent.	: YES
Date Entered	: JUN-23-2000	Lugs	: (1)-#14-1/0 AWG

BRANCHES

QTY	TRIP/POLE	BRANCH	IR
8	20/1	BLH	22 K
3	15/1	BLH	22 K
1	20/1	BLHF	22 K
2	30/2	BLH	22 K
14	PROV/1	BLH	

MODIFICATIONS

QTY	CODE	DEVICE	DESCRIPTION
1	BOX		CU Ground Bus
1	BOX		3R Encls
1	BOX		Must be S3 Panel

SECTION NO: 1

HEIGHT: 29.00
WIDTH: 20.00
DEPTH: 7.94

GUTTER SIZE
ENDS: 5.75
SIDES: 6.38

100 BLH Main Top

1	15/1 BLH		A	20/1 BLHF		2
3	15/1 BLH		B	20/1 BLH		4
5	15/1 BLH		A	20/1 BLH		6
7	20/1 BLH		B	20/1 BLH		8
9	20/1 BLH		A	20/1 BLH		10
11	20/1 BLH		B	20/1 BLH		12
13	30/2 BLH		A	30/2 BLH		14
15			B			16
17	/1 BLH	PROV	A	/1 BLH	PROV	18
19	/1 BLH	PROV	B	/1 BLH	PROV	20
21	/1 BLH	PROV	A	/1 BLH	PROV	22
23	/1 BLH	PROV	B	/1 BLH	PROV	24
25	/1 BLH	PROV	A	/1 BLH	PROV	26
27	/1 BLH	PROV	B	/1 BLH	PROV	28
29	/1 BLH	PROV	A	/1 BLH	PROV	30

JOB NAME : FERNALD LEACHATE	
P.O. :	CUST :
S.O. :	TITLE :
SIEMENS ENERGY & AUTOMATION, INC. ELECTRICAL APPARATUS DIV. V2.5.8	DRWG: SHEET 1 OF REV.

Panel Type	: S3	Panel Marking	: 7 60A MAIN 1 PH
System/Volt	: 1P,3W 120/240	Panel Quantity	: 1 Item # : 1
Panel IR	: 22K	Main Bus	: 100A Bare Cu Bus
Enclosure	: NEMA TYPE 3R	Mounting	: SURFACE
Cat. Number	: S3A30LH060FTS	Service Ent.	: YES
Date Entered	: JUN-23-2000	Lugs	: (1)-#14-1/0 AWG

BRANCHES

QTY	TRIP/POLE	BRANCH	IR
8	20/1	BLH	22 K
1	15/1	BLH	22 K
1	20/1	BLHF	22 K
2	30/2	BLH	22 K
16	PROV/1	BLH	

MODIFICATIONS

QTY	CODE	DEVICE	DESCRIPTION
1	BOX		CU Ground Bus
1	BOX		3R Encls
1	BOX		Must be S3 Panel

SECTION NO: 1

HEIGHT: 29.00
WIDTH: 20.00
DEPTH: 7.94

GUTTER SIZE
ENDS: 5.75
SIDES: 6.38

60 BLH Main Top

1	15/1 BLH		A	20/1 BLH		2
3	20/1 BLHF		B	20/1 BLH		4
5	20/1 BLH		A	20/1 BLH		6
7	20/1 BLH		B	20/1 BLH		8
9	20/1 BLH		A	30/2 BLH		10
11	20/1 BLH		B			12
13	30/2 BLH		A	/1 BLH	PROV	14
15			B	/1 BLH	PROV	16
17	/1 BLH	PROV	A	/1 BLH	PROV	18
19	/1 BLH	PROV	B	/1 BLH	PROV	20
21	/1 BLH	PROV	A	/1 BLH	PROV	22
23	/1 BLH	PROV	B	/1 BLH	PROV	24
25	/1 BLH	PROV	A	/1 BLH	PROV	26
27	/1 BLH	PROV	B	/1 BLH	PROV	28
29	/1 BLH	PROV	A	/1 BLH	PROV	30

JOB NAME : FERNALD LEACHATE	
P.O. :	CUST :
S.O. :	TITLE :
SIEMENS ENERGY & AUTOMATION, INC. ELECTRICAL APPARATUS DIV. V2.5.8	DRWG: SHEET 2 OF REV.

SIEMENS

Sentron™ Lighting and Power Distribution Panelboards
TYPES S3

600A Maximum Main Breaker / Main Lugs
600V AC, 250 DC Maximum,
1Ø3W, 3Ø3W, 3Ø4W

Specifications

A) General:
S3 panelboards comply with the following standards:
a) NEMA Standards PB-1
b) UL Standards
1) Enclosure — UL 50
2) Panelboards — UL 67
c) National Electric Code (NFPA 70)
d) Federal Specification W-P-115b

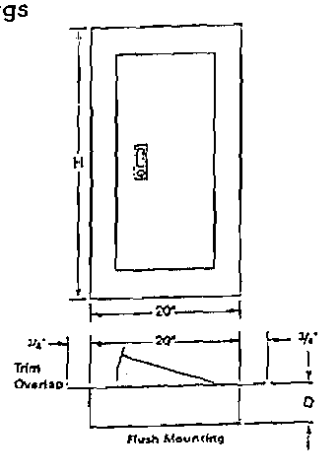
B) Main Lugs:
Suitable for copper or aluminum wire.

C) Main Breakers: ⑩
BL, BLH, HBL, BQD, ED4, ED6, HED4, HHED6, CED6, QJ2, QJH2, QJ2-H, FXD6, FD6 and HFD6 main breakers are mounted horizontally. CFD6, JXD2, JXD6, JD6, HJD6, CJD6, SJD6, SHJD6, SCJD6, LXD6, LD6, HLD6, CLD6, SLD6, SHLD6 and SCLD6 are mounted vertically. JD6, HJD6, HHJD6, CJD6, SJD6, SHJD6, SCJD6, LD6, HHLD6, HLD6, CLD6, SLD6, SHLD6 and SCLD6 must be mounted at top only.

D) Box:
Fabricated from galvanized or galvanealed steel. Removable end walls.

E) Bussing:
Bus bars and breaker branch bus is tin finished aluminum per UL 67 unless otherwise stated.

F) Front:
Fabricated from cold rolled steel and equipped with concealed hinges, flush lock and a holder for directory card. Trim screws are concealed behind a lockable door. Patented Feature! The trim screws do not enter the wire way to prevent conductor damage.

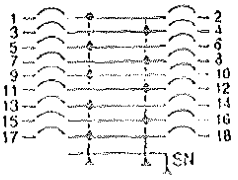


Box Depth(D)= 5.75" for 100A, 225A, 400A
Box Width(D)= 7.75" for 400A①, 600A②

Notes:

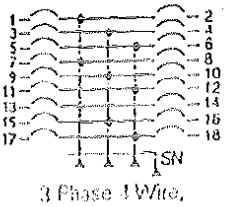
Typical Panelboard Wiring Diagrams

Main Breaker
Main Lugs



1 Phase 3 Wire

Main Breaker
Main Lugs



3 Phase 4 Wire,
3 Phase 3 Wire (No SN)

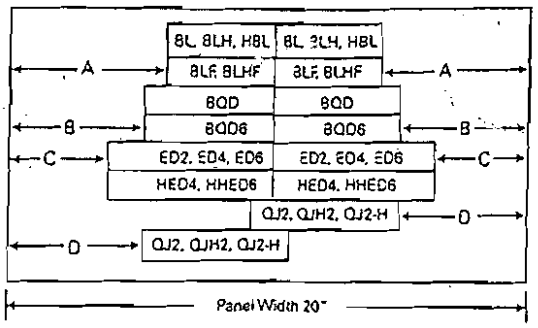
Main Breakers

Max. Amps.	Main Breaker Types	Max. No. of Poles④	(H) Ht. (In.)	Connectors Suitable for Cu or Al
100	BL, BLH, HBQ BQ, BQD⑨	18 30	32 29	(1) #12-1/0 AWG
125	ED4, ED6, HED4, HHED6	42	35	
	CED6	18 30 42	29 35 41	(1) #12-1/0 AWG
225	QJ2 QJH2 QJ2-H	18 30 42	29 35 41	(1) #1 AWG-300 kcmil
	FXD6 FD6 HFD6	18 30 42	32 38 44	(1) #6 AWG-300 kcmil
	CFD6	18 30 42	44 50 56	(1) #6 AWG-300 kcmil
400①	JXD6, JD6, HJD6, SJD6 SHJD6	18 30 42 54	47 53 59 65	(1) #3/0 AWG- 500 kcmil Cu or (2) #4/0 AWG- 500 kcmil Al
400①	CJD6 SCLD6	18 30 42 54	56 62 68 74	(1) #3/0 AWG- 500 kcmil Cu or (2) #4/0 AWG- 500 kcmil Al
600②	LXD6,LD6 HLD6, SLD6 SHLD6 SCLD6	18 30 42 54	50 56 62 68	(2) #3/0 AWG- 500 kcmil Cu or (2) #4/0 AWG- 500 kcmil Al
600②	CLD6 SCLD6	18 30 42 54	59 65 71 77	(2) #3/0 AWG- 500 kcmil Cu or (2) #4/0 AWG- 500 kcmil Al

Main Lug Panels

Max. Amps.	Max. No. of Poles④	Unit Space	(H) Ht. (In.)	Connectors Suitable for Cu or Al
100	18 30 42	9 15 21	23 29 35	(1) #12-1/0 AWG
225	18 30 42	9 15 21	26 32 38	(1) #6 AWG-300 kcmil
400①	18 30 42 54	9 15 21 27	32 38 44 50	(1) 250-500 kcmil or (2) #3/0 AWG- 250 kcmil
600②	18 30 42 54	9 15 21 27	38 44 50 56	(2) #3/0 AWG- 500 AWG

Branch Breaker Side



Side Gutter Wiring Space (Inches)

Reference Point	Panel Width 20"
A	5.75"
B	5.125"
C	4.0"
D③	5.0"

① A 7.75" deep box is required for 400 ampere panels when main bus is 750 amps/square inch aluminum or 1000 amps/square inch copper, or when JXD2, JXD6, JD6 or HJD6 breakers are used as succeed breakers.
② A 7.75" deep box is required
③ Single branch mounting construction

Branch Circuit Breakers ⑤ ⑩

Ampere Frame	Breaker Frame	No. of Poles	Ampere Rating	Height (Inches)	120V AC	120/240V AC	240V AC	Max. Interrupting Rating Symmetrical RMS Amperes					
								277V AC	480Y/277V AC	480V AC	600Y/347V AC	125V DC	250V DC
100	BL	1	15-60	1	—	10,000	—	—	—	—	—	—	—
		2	15-100	2	—	10,000	—	—	—	—	—	—	—
		2	15-100	2	—	—	10,000	—	—	—	—	—	—
		3	15-100	3	—	—	10,000	—	—	—	—	—	—
	BLH	1	15-60	1	—	22,000	—	—	—	—	—	—	—
		2	15-100	2	—	22,000	—	—	—	—	—	—	—
		3	15-100	3	—	—	22,000	—	—	—	—	—	—
	HBL	1	15-60	1	—	65,000	—	—	—	—	—	—	—
		2	15-100	2	—	65,000	—	—	—	—	—	—	—
		3	15-100	3	—	—	65,000	—	—	—	—	—	—
	BQD ⑨	1	15-100	1	65,000	—	—	14,000	—	—	—	—	—
		2	15-100	2	—	—	65,000	—	14,000	—	—	—	—
		3	15-100	3	—	—	65,000	—	14,000	—	—	—	—
	BQD6 ⑪	1	15-70	1	—	—	—	—	—	—	10,000	—	—
		2	15-70	2	—	—	—	—	—	—	10,000	—	—
		3	15-70	3	—	—	—	—	—	—	10,000	—	—
125	ED2	1	15-100	1	10,000	—	—	—	—	—	—	5,000	
		2	15-100	2	—	—	10,000	—	—	—	—	—	5,000
		3	15-100	3	—	—	10,000	—	—	—	—	—	—
	ED4	1	15-100	1	65,000	—	—	22,000	—	—	—	5,000	—
		2	15-125	2	—	—	65,000	—	—	18,000	—	—	30,000
		3	15-125	3	—	—	65,000	—	—	18,000	—	—	—
	ED6	2	15-125	2	—	—	65,000	—	—	25,000	18,000	—	30,000
		3	15-125	3	—	—	65,000	—	—	25,000	18,000	—	—
	HED4	1	15-30	1	100,000	—	—	65,000	—	—	—	30,000	—
			35-100		100,000	—	—	25,000	—	—	—	30,000	—
		2	15-100	2	—	—	100,000	—	—	42,000	—	—	30,000
			110-125		—	—	100,000	—	—	25,000	—	—	30,000
		3	15-100	3	—	—	100,000	—	—	42,000	—	—	—
			110-125		—	—	100,000	—	—	25,000	—	—	—
	HHED6	2	15-100	2	—	—	100,000	—	—	42,000	25,000	—	30,000
			110-125		—	—	100,000	—	—	42,000	25,000	—	30,000
		3	15-100	3	—	—	100,000	—	—	42,000	25,000	—	—
			110-125		—	—	100,000	—	—	42,000	25,000	—	—
225	QJ2	2	60-225	6⑥⑦	—	—	10,000	—	—	—	—	—	—
		3	60-225	6⑦⑧	—	—	10,000	—	—	—	—	—	—
	QJH2	2	60-225	6⑥⑦	—	—	22,000	—	—	—	—	—	—
		3	60-225	6⑦⑧	—	—	22,000	—	—	—	—	—	—
	QJ2-H	2	60-225	6⑥⑦	—	—	42,000	—	—	—	—	—	—

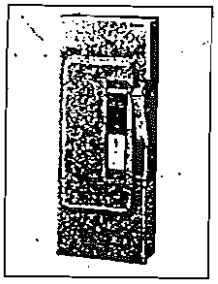
④ 1" per pole breakers double branch mounted
⑤ Branch breakers have non-interchangeable trip units
⑥ For additional 2-pole QJ breakers add 3" each
⑦ Combinations of 2-pole & 3-pole QJ breakers may require less space
⑧ For additional 3-pole QJ breakers add 6" each
⑨ Not for use on 480V delta systems
⑩ All main and branch devices are bolted to the bus bars
⑪ CSA listed only at 600Y/347V AC

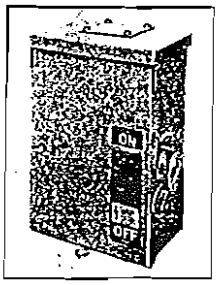
SAFETY SWITCHES

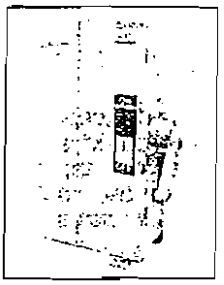
All heavy duty switches can handle 600v, but the system is 240v and requires 240v fuses. If we supply 600v rated equipment 240v fuses will not fit

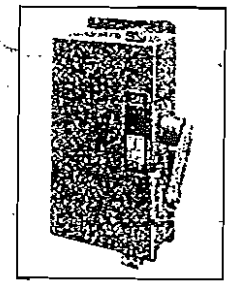
I-T-E® Enclosed Switches

Heavy Duty


Type 1


Type 3R


Type 4, 4X


Type 12

240 VOLT FUSIBLE

2-POLE, 2-FUSE AND SOLID NEUTRAL ① ⑧ — 240 VOLT AC/250 VOLT DC

System	Ampere Rating	INDOOR—Type 1 Catalog Number	List Price	Ship. Wgt. Std. Pkg.	OUTDOOR—Type 3R Catalog Number	List Price	Ship. Wgt. Std. Pkg.	Horsepower Ratings ⑦ 240 Volt AC 1 Phase, 2 Wire Std.	1 Phase, 2 Wire Max.	2 Phase, 4 Wire Std.	2 Phase, 4 Wire Max.	3 Phase, 3 Wire Std.	3 Phase, 3 Wire Max.	250 Volt DC 2 Wire Std.
	30	SN321	$ 128.	5	NRH321	$ 242.	8	1½	3	—	—	3	7½	5
	30	SN321R ②	143.	5	NRH321R ②	255.	8	1½	3	—	—	3	7½	5
	60	SN322	256.	14	NRH322	458.	12	3	10	—	—	7½	15	10
	100	SN323	391.	22	NRH323	587.	21	7½	15	—	—	15	30	20
	200	SN324	687.	47	NRH324	844.	48	15	—	—	—	25	60	40
	400	SN325	1583.	115	NRH325	2056.	130	—	—	—	—	50	125	50
	600	SN326	2839.	130	NRH326	3881.	145	—	—	—	—	75	200	—
	800 ③	SN327L ④	5325.	210	NRH327L ④	6158.	220	—	—	—	—	100	250	—
	1200 ③	SN328L ④	6570.	250	NRH328L ④	8826.	260	—	—	—	—	—	—	—

3-POLE, 3-FUSE AND SOLID NEUTRAL ⑧ — 240 VOLT AC

System	Ampere Rating	INDOOR—Type 1 Catalog Number	List Price	Ship. Wgt. Std. Pkg.	OUTDOOR—Type 3R Catalog Number	List Price	Ship. Wgt. Std. Pkg.	1 Phase, 2 Wire Std.	1 Phase, 2 Wire Max.	2 Phase, 4 Wire Std.	2 Phase, 4 Wire Max.	3 Phase, 3 Wire Std.	3 Phase, 3 Wire Max.	250 Volt DC 2 Wire Std.
	30	SN421	168.	5	NRH421	300.	8	1½	3	—	—	3	7½	—
	30	SN421R ②	186.	5	NRH421R ②	292.	8	1½	3	—	—	3	7½	—
	60	SN422	285.	14	NRH422	482.	12	3	10	—	—	7½	15	—
	100	SN423	452.	23	NRH423	687.	22	7½	15	—	—	15	30	—
	200	SN424	762.	49	NRH424	936.	51	15	—	—	—	25	60	—
	400	SN425	1997.	140	NRH425	2284.	145	—	—	—	—	50	125	—
	600	SN426	3453.	155	NRH426	4593.	160	—	—	—	—	75	200	—
	800 ③	SN427L ④	6460.	265	NRH427L ④	8636.	235	—	—	—	—	100	250	—
	1200 ③	SN428L ④	8393.	268	NRH428L ④	10450.	274	—	—	—	—	—	—	—

4-POLE, 4-FUSE — 240 VOLT AC

System	Ampere Rating	INDOOR—Type 1 Catalog Number	List Price	Ship. Wgt. Std. Pkg.	OUTDOOR—Type 3R Catalog Number	List Price	Ship. Wgt. Std. Pkg.	1 Phase, 2 Wire Std.	1 Phase, 2 Wire Max.	2 Phase, 4 Wire Std.	2 Phase, 4 Wire Max.	3 Phase, 3 Wire Std.	3 Phase, 3 Wire Max.	250 Volt DC 2 Wire Std.
	30	F421	444.	12				—	—	3	10	—	—	—
	60	F422	500.	12				—	—	7½	20	—	—	—
	100	F423	848.	22				—	—	15	30	—	—	—
	200	F424	1381.	54				—	—	30	50	—	—	—
	400	F425	2994.	159				—	—	50	—	—	—	—
	600	F426	4881.	203				—	—	—	—	—	—	—

System	Ampere Rating	Type 4, 4X ⑤ STAINLESS STEEL Catalog Number	List Price	Ship. Wgt. Std. Pkg.	Type 12 INDUSTRIAL Catalog Number	List Price	Ship. Wgt. Std. Pkg.	Horsepower Ratings ⑦ 240 Volt AC 1 Phase, 2 Wire Std.	1 Phase, 2 Wire Max.	3 Phase, 3 Wire Std.	3 Phase, 3 Wire Max.	250 Volt DC 2 Wire Std.

240 VOLT FUSIBLE

2-POLE, 2-FUSE ⑤ ① — 240 VOLT AC/250 VOLT DC

System	Ampere Rating	Type 4, 4X ⑤ STAINLESS STEEL Catalog Number	List Price	Ship. Wgt. Std. Pkg.	Type 12 INDUSTRIAL Catalog Number	List Price	Ship. Wgt. Std. Pkg.	1 Phase, 2 Wire Std.	1 Phase, 2 Wire Max.	3 Phase, 3 Wire Std.	3 Phase, 3 Wire Max.	250 Volt DC 2 Wire Std.
	30 60 100 200 400 600	For 2-pole, 2-fuse applications, use 3-pole, 3 fuse units 2 outside poles.			For 2-pole, 2-fuse applications, use 3-pole, 3 fuse units 2 outside poles.							

3-POLE, 3-FUSE ⑤ — 240 VOLT AC

System	Ampere Rating	Type 4, 4X ⑤ STAINLESS STEEL Catalog Number	List Price	Ship. Wgt. Std. Pkg.	Type 12 INDUSTRIAL Catalog Number	List Price	Ship. Wgt. Std. Pkg.	1 Phase, 2 Wire Std.	1 Phase, 2 Wire Max.	3 Phase, 3 Wire Std.	3 Phase, 3 Wire Max.	250 Volt DC 2 Wire Std.
	30	F321SS	$ 1181.	16	F321H	$ 408.	18	—	—	3	7½	5
	30	F321SSR ②	1192.	16	F321HR ②	400.	18	—	—	3	7½	5
	60	F322SS	1353.	18	F322H	460.	17	—	—	7½	15	10
	100	F323SS	2601.	32	F323H	714.	30	—	—	15	30	20
	200	F324SS	3653.	60	F324H	1132.	57	—	—	25	60	40
	400	F325SS	7155.	198	F325H	2522.	148	—	—	50	125	50
	600	F326SS	10227.	202	F326H	4317.	202	—	—	75	200	—
	800	F327SSL ⑥	16114.	800	F327HL ⑥	5943.	400	—	—	100	250	—

① Suitable for 3-pole motor applications.
② Class R-250 volt fuse adapter kit factory installed.
③ Supplied without knockouts—special drillings available when template is provided with order.
④ Arranged and UL listed for use with UL Class L fuses. Not UL listed for DC.
⑤ For applications requiring a solid neutral-order field addable groundable neutral kits from table in accessory section.
Service entrance label supplied with kit.
⑥ Not UL listed.
NOTE: For 3-pole, 3 fuse, no neutral Type F or 3R switch units, order 3-pole, 3 fuse with solid neutral switches.

⑦ Dual horsepower ratings: Std.—applies when NEC single element fuses are installed. Max.—applies when time delay fuses, suitable for starting characteristics of motor, are installed.
⑧ For service entrance application. Neutral installed.
⑨ Hub not supplied. See page 14.
See page 15 for T-fuse adapter kits.

POLES AND POLE HARDWARE

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16400-001	REV: 1	22-Feb-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Jarrett DATE: 2/22/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16400-001	1						X			Poles & Pole Hardware		X		16400		X	

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Tim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Rob Kneip	525				
Scott Wheeler	525				
Kwasi Bedu-Tweneboah	38				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

1- The 4 data sheets are OK.
~~See att~~ 2- Need data sheet on Helix screw anchor indicating pullout capacity for soil with blow count of 10
MW 3/05/01

RECEIVED BY: MW Gipp DATE 3/05/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

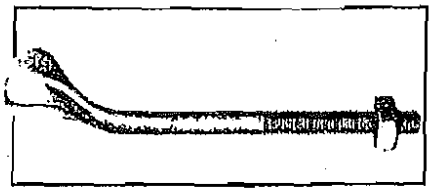
SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

YANYO Inc.

Angle Thimbleye Bolts

Angle Thimbleye Bolts are forged in a manner identical to straight bolts in all characteristics except that they are bent at a 45° angle at the thimbleye end.



5/8" Dia Minimum Tensile Strength 12,400 lbs.

Cat. No.	Bolt Length	Std. Pkg. Qty.	Ship Wt./100
414500	8"	50	130.0
414520	10"	50	144.0
414540	12"	50	160.0
414560	14"	25	184.0
414570	16"	25	204.0
414580	18"	25	198.0
414590	20"	25	210.0

3/4" Dia Minimum Tensile Strength 18,350 lbs.

Cat. No.	Bolt Length	Std. Pkg. Qty.	Shi Wt./1
414650	12"	25	162
414655	14"	25	260

[ ] A - Conforms to the Subcontract Requirements
[X] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 3/05/01

3/05/01

Hex-Head Bolts (Bronze, Aluminum, Stainless Steel and Galvanized)

Bolts within this category are available in assortments of sizes, including 3/8", 1/2" and 5/8"; maximum length is 3 inches. Also available, nuts & washers.

3/8" Dia

Cat. No.	Bolt Length	Std. Pkg. Qty.	Ship Wt./100
417009S	1"	50	1.0
417010	1-1/2"	50	1.0
417020	2-1/2"	50	1.0

INFORMATION ONLY

1/2" Dia

Cat. No.	Bolt Length	Std. Pkg. Qty.	Ship Wt./100
417040	3/4"	50	2.0
417050	1"	50	2.0
417055	1-1/2"	50	2.0
417060	1-3/4"	50	2.0
417065	2"	50	2.3

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate Transmission System Project
STAVER # 7052

Submittal # 641-16400-001
Reviewed By: [illegible]
Date: 8/22/01

[redacted]

CHANCE

BANDS, POLE, SECONDARY RACK

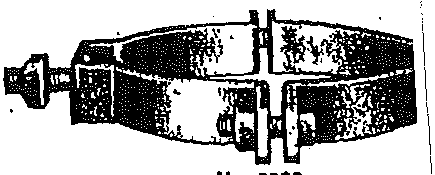
For attaching secondary racks to tubular metal poles. Bands are equipped with 5/8" x 2" carriage bolts for attaching the racks, and 1/2" x 1 5/8" oval-shoulder clamp bolts for tightening bands on pole. Hot dip galvanized 1/4" x 1 1/2" steel. Made in two styles, the single type for attaching one rack and the double type for two racks.

Single Type

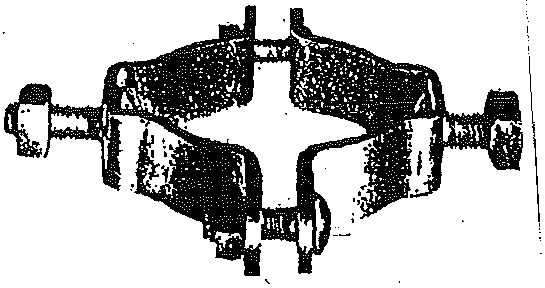
Cat. No.	Dim. in Inches: Nominal Pole Dia.	Dim. in Inches: Actual O.D.	Approx. Ship Wt. Lbs. Per 100 Pcs.
6364 1/2	4 1/2	5	304
6366	6	6 5/8	368
6367	7	7 5/8	406
6368	8	8 5/8	480

Double Type

Cat. No.	Dim. in Inches: Nominal Pole Dia.	Dim. in Inches: Actual O.D.	Approx. Ship Wt. Lbs. Per 100 Pcs.
6374 1/2	4 1/2	5	388
6376	6	6 5/8	380
6377	7	7 5/8	475
6378	8	8 5/8	524



No. 6366

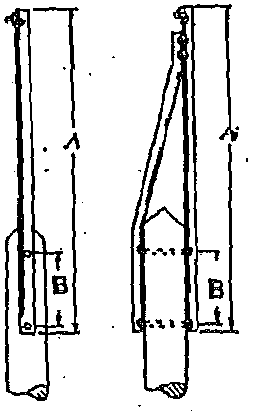


No. 6376

* BAYONETS, GROUND WIRE

For supporting overhead ground wire on wood or steel poles. Bayonets have an 11/16" hole and an 11/16" pole-mounting slot to allow for inaccuracy in boring holes. Holes at top of bayonet allow use of No. 5450 ground-wire clamps (Not included. See page 5-21). Bolts used to fasten corner bayonets together are included. Pole-mounting bolts and ground-wire clamps are not included. Hot dip galvanized.

Catalog No.	Dimensions in Inches: A	Dimensions in Inches: B	Dimensions in Inches: Angle Size	Approx. Ship Wt. Lbs. Per 100 Pieces
Straight Bayonets				
5436	36	10	2 x 2 x 1/4	957
5466	66	15	2 1/2 x 2 1/2 x 1/4	2200
5484	84	20	3 x 3 x 1/4	3430
Corner Bayonets				
* 5566	66	15	2 x 2 x 1/4	3509
5584	84	20	2 1/2 x 2 1/2 x 1/4	5740



No. 5436 No. 5566

BOLTS, CARRIAGE

Carriage Bolts have square nuts, finished points and rolled threads. Standard heads have square shoulders. Open-hearth steel. Hot dip galvanized.

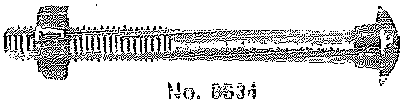
Cat. No.	Dim. in Inches: Bolt Length	Dim. in Inches: Thread Length	Approx. Ship Wt. Lbs. Per 100 Pcs.
5/8-Inch Diameter			
†*8634	4	1 3/4	15.6
†*8634 1/2	4 1/2	1 3/4	17
†*8636	6	1 3/4	17.6
†8638	6	1 3/4	21.6
8637	7	1 3/4	22

4,250 Pound Rated Tensile Strength

*N.E.M.A. Standard

Cat. No.	Dim. in Inches: Bolt Length	Dim. in Inches: Thread Length	Approx. Ship Wt. Lbs. Per 100 Pcs.
1/2-Inch Diameter			
†*8644 1/2	4 1/2	3	32
†*8646	6	3	31
†8646 1/2	6 1/2	3	37.5
†*8646	6	3	38
8647	7	4	44

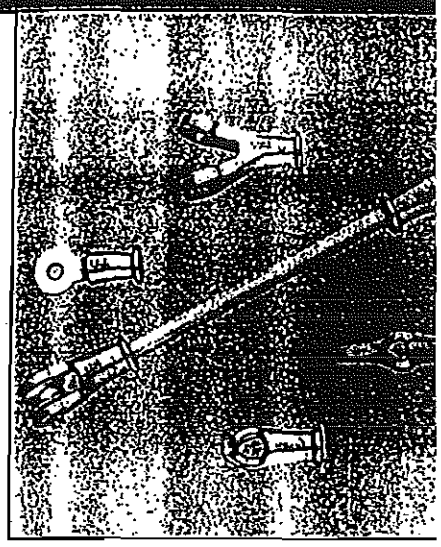
7,800 Pound Rated Tensile Strength



No. 8634

Fiberglass Pole Line Hardware

Guy Strain Insulator
21,000 lb. Ultimate Strength



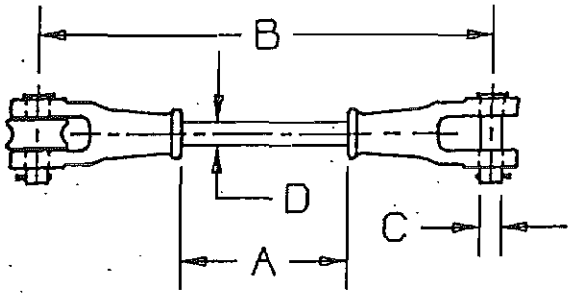


Fig. 1

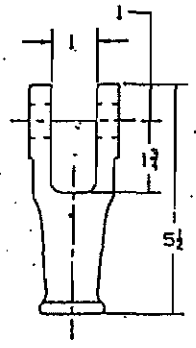


Fig. 2

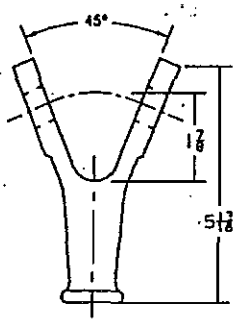


Fig. 3

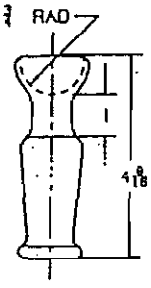


Fig. 4

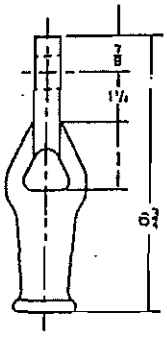


Fig. 5

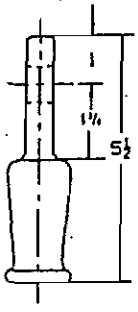


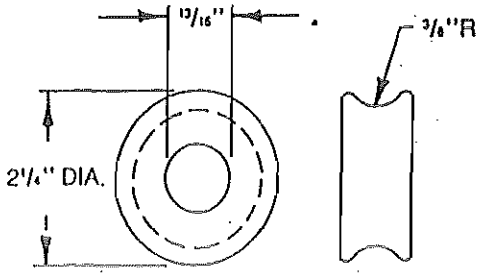
Fig. 6

Features:

- Rod—pultruded polyester with ultraviolet inhibitor.
- Coating—2 part aliphatic polyurethar enamel with exceptional ultraviolet resistance—smooth, tough finish and high tracking resistance.
- For added service life in exceptional corrosive environments, "No-Trac™" coating will equal the life of your structure.

DIMENSIONS (INCHES)						
CATALOG NO.	Fig.	A	B	C	D	WEIGHT/100 PCS.
210-12	1	12	23	3/4	13/16	597 lbs.
210-18	1	18	29	3/4	13/16	619
210-24	1	24	35	3/4	13/16	640
210-30	1	30	41	3/4	13/16	662
210-36	1	36	47	3/4	13/16	683
210-42	1	42	53	3/4	13/16	705
* 210-54	1	54	65	3/4	13/16	748
210-78	1	78	89	3/4	13/16	835

INTERCHANGEABLE END FITTINGS			
SUFFIX	FIGS.	FITTINGS	EXAMPLE
CY	2&3	Clevis - Y-Clevis	210-12CY
CM	2&4	Clevis - Thimble	210-12CM
CME	2&5	Clevis-Thimble-Eye	210-12CME
CE	2&6	Clevis - Eye	210-12CE
MM	4	Thimble - Thimble	210-12MM



ROLLER
P25

Notes:

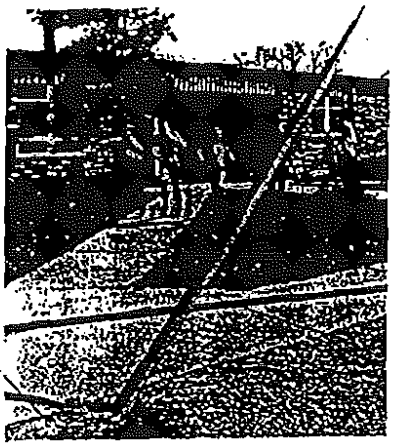
- All catalog numbers shown represent the Clevis-Clevis Strain Insulator with one roller. Add suffix "R" for an additional roller. Example: 210-12R.
- Add suffix "NT" for NO-TRAC™ coating. Example: 210-12NT.
- Most end fittings are interchangeable.
- Additional lengths are available upon request.
- REA Accepted.

Material Specifications:
Malleable Iron ASTM A-197-47
Hot-Dipped Galvanized ASTM A-153

HUBBELL POWER SYSTEMS CHANCE

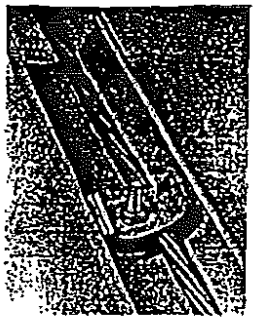
GUY MARKERS

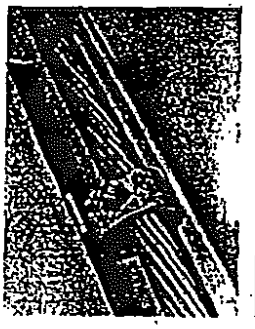
HALF-ROUND MARKERS



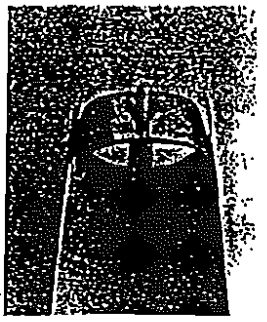
Made from an MPO formulation, markers come in orange, yellow and gray. They resist whitening and have high impact resistance. Markers don't become brittle when cold. They cover completely from the ground up. Markers attach to any 3/16" to 3/4" guy strands. Clamps are located at top, middle and lower end of marker.

Each PBG is furnished with a one-bolt hardware clamp at the lower end to fit all types of guy attachments and two one-bolt strand clamps at the middle that adapts to fit guy wires from 3/16" through 3/4".





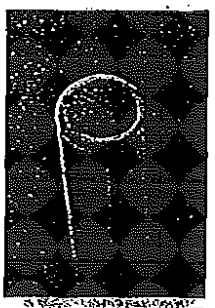
Convertible Strand Clamp



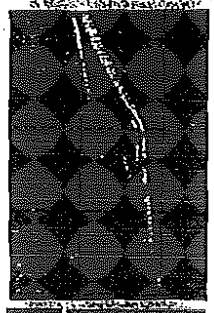
Hardware Clamp

Catalog Number			Dimensions		Strand Range	Std. Pkg	Wt. Per 100 Pcs.
Gray	Yellow	Orange	Length	Width			
84PBG-2	84PBG-2Y	84PBG-20RG	84"	2"	3/16" thru 3/4"	12	150
†96PBG-2	†96PBG-2Y	†96PBG-20RG	96"	2"	3/16" thru 3/4"	12	175
	84PBG-3Y		84"	3"	3/16" thru 3/4"	6	160
96PBG-3	96PBG-3Y	96PBG-30RG	96"	3"	3/16" thru 3/4"	6	216

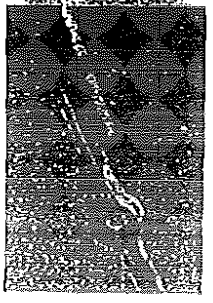
†RUS listed



Full Round Construction



Over the rod



Above the rod

ECONOMY FULL-ROUND MARKERS

Bright, high visibility markers neither bleach out to white nor crack from cold temperatures. Made of ultraviolet-stabilized high-density polyethylene, overlapping tube-like design offers full-length coverage.

Easy installation requires no tools. Replaceable standard tie strap allows the markers to be reused. Three holes permit the black self-locking nylon strap (furnished) to secure the lower end in a choice of two attachment methods — either above or over the anchor rod, illustrated below. This fastening design eliminates the cutaway section that would weaken its resistance to breaking.

The economy marker is available in high visibility 8' long, 1 1/8" O.D., bright yellow sections.

ORDERING INFORMATION

Catalog Number	Dimensions		Color	Per Carton	
	Length	Dia		Units	Weight per 100 pcs.
96FRPE	8 ft.	1 1/8"	Bright Yellow	25	96 lbs.

SUPPLIER DOCU . SUBMITTAL

OF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16400-001	REV: 0	DATE: 12-Jun-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: R Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Jarrett DATE: 6/13/00

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16400-001	0						X			Poles & Pole Hardware		X		16400	~~X~~ MB	X	

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	~~585~~				
Tim Cherry	525				
Jim Jenkins	525				
Tom Escue	520				
~~Rob Kreip~~ Jerl ✓	525				
Scott Wheeler	525				
Kwasi Bad Tweneboah	64				

~~NO COMMENTS:~~ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

~~Lag Screws — Dwg 6-3 calls for 5/8" MACHINE BOLTS~~
Straight Bayonet — Dwg E-3 calls for 66"
+ other comments attached

RECEIVED BY: MW Gill DATE 6/27/00
(SIGN/DATE AND RETURN 1 COPY TO ECDC, MS 52-7)

ORIGINAL

SUBMITTAL TYPE: (BY SUPPLIER)	SUBMITTAL ACTION CODE: (BY FDF)
CFC - CERTIFIED FOR CONSTRUCTION	A - Conforms to Subcontract Requirements
INF - INFORMATION/RECORD	B - Minor Comments - Incorporate and Resubmit
DRFT - DRAFT/PRELIMINARY	C - Revise and Resubmit (SEE COMMENTS)

Submittal 20111-641-16400-001

Fluor Fernald Comments:

[ ] A - Conforms to the Subcontract Requirements
[X] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig. MW Date 6/28/00

INFORMATION ONLY

Only resubmit items with comments:

1. Straight bayonet should be 66" (Dimension A).
2. Guy markers should be 2" x 96".
3. Angle eye fastener should be ¾".
4. Fiberglass Guy Strain Insulator not submitted.
5. Submit pullout capacity of Helix screw anchor for soil with blow count of 10.

SOUTHERN PINE

Consumer Information Sheet 40' Cl. II, 55' Cl. II & 60' Cl. II POLES ANSI 5.1 AWPA C4

PENTACHLOROPHENOL PRESSURE-TREATED WOOD

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641 16400-001
Reviewed By: RW
Date: 6/12/00
Sig: 6/27/00

[X] A - Conforms to the Subcontract Requirements
[X] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit

CONSUMER INFORMATION

This wood has been preserved by pressure-treatment with an EPA-registered pesticide containing pentachlorophenol to protect it from insect attack and decay. Wood treated with pentachlorophenol should be used only where such protection is important.

Pentachlorophenol penetrates deeply into and remains in the pressure-treated wood for a long time. Exposure to pentachlorophenol may present certain hazards. Therefore, the following precautions should be taken both when handling the treated wood and in determining where to use and dispose of the treated wood.

USE SITE PRECAUTIONS

Logs treated with pentachlorophenol should not be used for log homes.

Wood treated with pentachlorophenol should not be used where it will be in frequent or prolonged contact with bare skin (for example, chairs and other outdoor furniture), unless an effective sealer has been applied.

Pentachlorophenol-treated wood should not be used in residential, industrial, or commercial interiors except for laminated beams or building components which are in ground contact and are subject to decay or insect infestation and where two coats of an appropriate sealer are applied. Sealers may be applied at the installation site.

Wood treated with pentachlorophenol should not be used in the interiors of farm buildings where there may be direct contact with domestic animals or livestock which may crib (bite) or lick the wood.

In interiors of farm buildings where domestic animals or livestock are unlikely to crib (bite) or lick the wood, pentachlorophenol-treated wood may be used for building components which are in ground contact and are subject to decay or insect infestation and where two coats of an appropriate sealer are applied. Sealers may be applied at the installation site.

Do not use pentachlorophenol-treated wood for farrowing or brooding facilities.

Do not use treated wood under circumstances where the preservative may become a component of food or animal feed. Examples of such sites would be structures or containers for storing silage or food.

Do not use treated wood for cutting-boards or countertops.

Only treated wood that is visibly clean and free of surface residue should be used for patios, decks and walkways.

Do not use treated wood for construction of those portions of beehives which may come into contact with the honey.

Pentachlorophenol-treated wood should not be used where it may come into direct or indirect contact with public drinking water, except for uses involving incidental contact such as docks and bridges.

Do not use pentachlorophenol-treated wood where it may come into direct or indirect contact with drinking water for domestic animals or livestock, except for uses involving incidental contact such as docks and bridges.

HANDLING PRECAUTIONS

Dispose of treated wood by ordinary trash collection or burial. Treated wood should not be burned in open fires or in stoves, fireplaces, or residential boilers because toxic chemicals may be produced as part of the smoke and ashes. Treated wood from commercial or industrial use (e.g., construction sites) may be burned only in commercial or industrial incinerators or boilers rated at 20 million BTU/hour or greater heat input or its equivalent in accordance with state and Federal regulations.

Avoid frequent or prolonged inhalation of sawdust from treated wood. When sawing and machining treated wood, wear a dust mask. Whenever possible, these operations should be performed outdoors to avoid indoor accumulations of airborne sawdust from treated wood.

Avoid frequent or prolonged skin contact with pentachlorophenol-treated wood; when handling the treated wood, wear long-sleeved shirts and long pants and use gloves impervious to the chemicals (for example, gloves that are vinyl-coated).

When power-sawing and machining, wear goggles to protect eyes from flying particles.

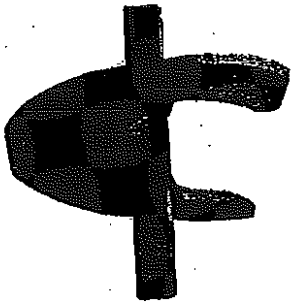
After working with the wood, and before eating, drinking, and use of tobacco products, wash exposed areas thoroughly.

If oily preservatives or sawdust accumulate on clothes, launder before reuse. Wash work clothes separately from other household clothing.

Urethane, shellac, latex epoxy enamel and varnish are acceptable sealers for pentachlorophenol-treated wood.

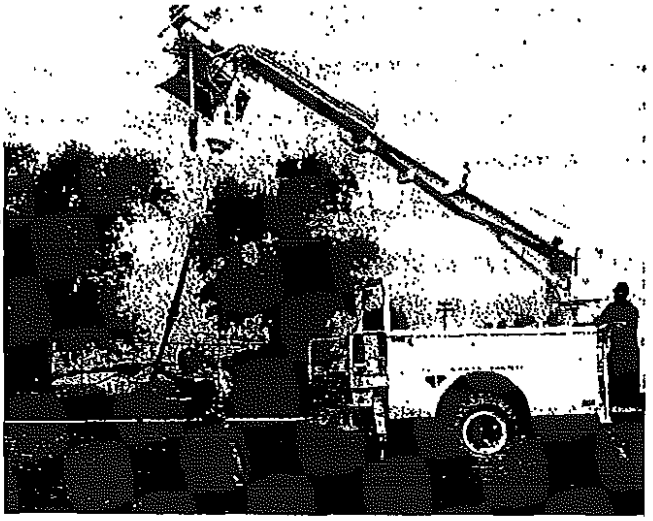
PISA® HELIX ASSEMBLIES

Code "CS" stamped into core identifies Standard-Strength Series. Code "CM" stamped into core identifies Mid-Strength Anchors.



PISA installation is about 10 minutes with two men.

Chance standard-strength 4,000 foot-pound anchors and mid-strength 6,000 foot pound-anchors have squared helices and curvilinear-leader designs to help reduce torque peaks and damage during installation. These anchors are painted orange and are available in single and twin helix designs. The same installing wrench installs both standard and mid-strength anchors as well as Square One® high-strength anchors. See catalog section 4A for installing wrench information.



ORDERING INFORMATION
STANDARD-STRENGTH SERIES

1⅜" CORE — 4000 Ft. Lbs. Typical Working Torque — Squared Helix — 3.0" Helix Pitch

SINGLE HELIX	CATALOG NUMBER									
	8" Dia.	Std. Pkg.	10" Dia.	Std. Pkg.	12" Dia.	Std. Pkg.	14" Dia.	Std. Pkg.	15" Dia.	Std. Pkg.
For ⅝" Dia. Rods	P024474	240/ Pallet	P024476	180/Pallet	P024462*	120/Pallet	NA	—	NA	—
For ¾" & 1" Dia. Rods	P024475	240/ Pallet	P024478	180/Pallet	P024481	120/Pallet	P024484*	60/Pallet	P024465	50/Pallet

TWIN HELIX	CATALOG NUMBER			
	8" Dia.	Std. Pkg.	10" Dia.	Std. Pkg.
For ¾" & 1" Dia. Rods	P012904	30/Pallet	P012905	30/Pallet

✳MID-STRENGTH SERIES

1⅜" CORE — 6000 Ft. Lbs. Typical Working Torque — Squared Helix — 3.0" Helix Pitch

SINGLE HELIX	CATALOG NUMBER									
	8" Dia.	Std. Pkg.	10" Dia.	Std. Pkg.	12" Dia.	Std. Pkg.	14" Dia.	Std. Pkg.	15" Dia.	Std. Pkg.
For ⅝" Dia. Rods	E102-1629	240/ Pallet	E102-1630	180/Pallet	E102-1631	120/Pallet	NA	—	NA	—
✳ For ¾" & 1" Dia. Rods	E102-1632	240/ Pallet	E102-1633	180/Pallet	E102-1634	120/Pallet	E102-1601	120/Pallet	E102-1602	60/Pallet

TWIN HELIX	CATALOG NUMBER					
	4" Dia.	Std. Pkg.	8" Dia.	Std. Pkg.	10" Dia.	Std. Pkg.
For ¾" & 1" Dia. Rods	E102-1635	30/Pallet	E102-1636	30/Pallet	E102-1637	30/Pallet

*REA Approved

See Pages 4-7 and 4-8 for ordering PISA anchor rods and eyenuts or catalog number combinations consisting of helix, rod and eyenuts.

POWER INSTALLED SCREW ANCHOR RODS

EYENUTS AND COUPLINGS

ORDERING INFORMATION

EYENUT	CATALOG NUMBER					
	Thimbleye Std.	Pkg./Pallet	Twineye	Std. Pkg./Pallet	Tripleye	Std. Pkg./Pallet
For ⅝" Dia. Rods	12587*	30/1560	12589	30/1170	12593	30/900
For ¾" & 1" Dia. Rods	6512*	30/1200	6562	30/1200	12585	30/1200

ROD	3½ FT. ROD		7 FT. ROD		Ultimate Strength
	Cat. No.	Std. Pkg./Pallet	Cat. No.	Std. Pkg./Pallet	
⅝" Dia.	12336P	5/60	12332P*	5/60	16,000 lbs.
¾" Dia.	12634P	5/60	12632P	5/60	23,000 lbs.
1" Dia.	12338P	5/60	12334P	5/60	36,000 lbs.

*REA Approved

PISA Rods with Corrosion Protection

Catalog Number	Description	Approx. Ship Wt., Ea.	Std. Pkg./ Pallet
C12334PC	7' x 1" rod, threaded	17	2/60

See page 4-5 for details. Corrosion-protected rod uses same protection as on the Square One rod.

COUPLING	Catalog Number	Std. Pkg./Pallet
For ⅝" Dia. Rods	12245P	60/2340
For ¾" & 1" Dia. Rods	12247P	60/2340
NOTE: Couplings are required only when it is necessary to add additional rods of 3½ ft. or 7 ft. to form an extension.		

Patent Numbers 3,148,150 and 3,525,225

EXTENSION RODS WITH INTEGRAL COUPLINGS

These extension rods eliminate the separate coupling previously required to add extra length to first-section rods on PISA and Square One anchors. External threads on top end and internal threads on coupling end are compatible with standard ¾" and 1"-diameter rods and corresponding eyenuts for PISA and Square One anchors. Both ¾"-and 1"-diameter extension rods with integral couplings have 1"-diameter threads. NOTE: Only ¾" and 1" extension rods may be used with Square One anchors. Chance recommends that diameter of extension rod match that of first-section rod for any anchor installation.

ORDERING INFORMATION

ROD	3½ ft. Rod		7 ft. Rod	
	Cat. No.	Std. Pkg./Pallet	Cat. No.	Std. Pkg./Pallet
¾" Dia.	12250	5/60	12254	5/60
1" Dia.	12251	5/60	12255	5/60
⅝" Dia.	12249	5/60	12253	5/60

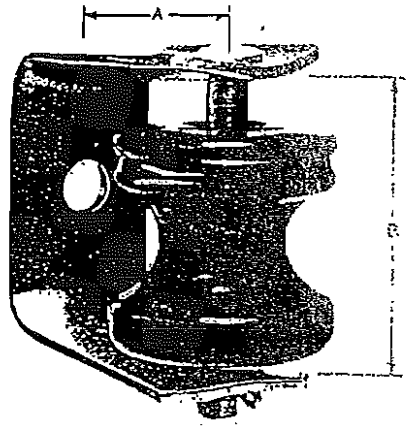
See next page for catalog number combinations consisting of helix, rod and eyenut.

Insulator Clevises and Related Items

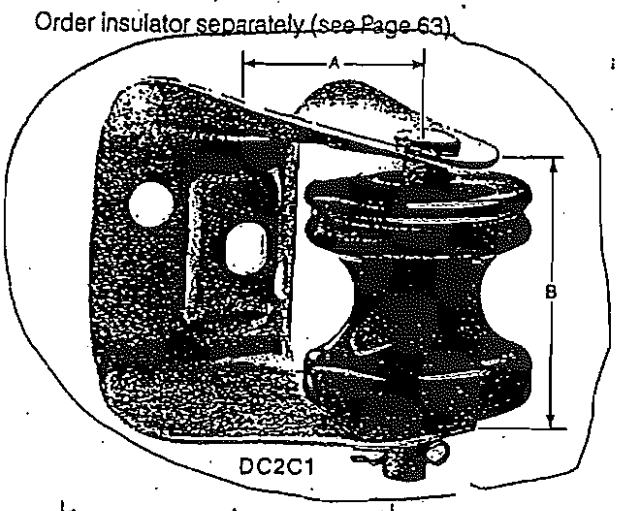
CLEVISES

Secondary/ Deadend

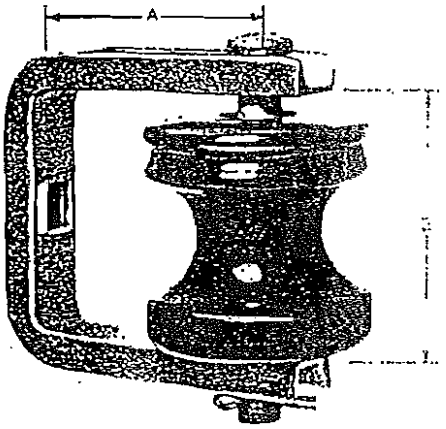
For secondary takeoffs or deadending at pole or crossarm.
A variety of styles and mounting holes is offered for end user preference.
Broad-base styles resist longitudinal loading.
Curved-back styles prevent twisting under heavy load.
Channel style offers high deadend strength.
Rounded edges prevent cable insulation damage.
Hot-dip galvanized steel for corrosion resistance.
Order insulator separately (see Page 63)



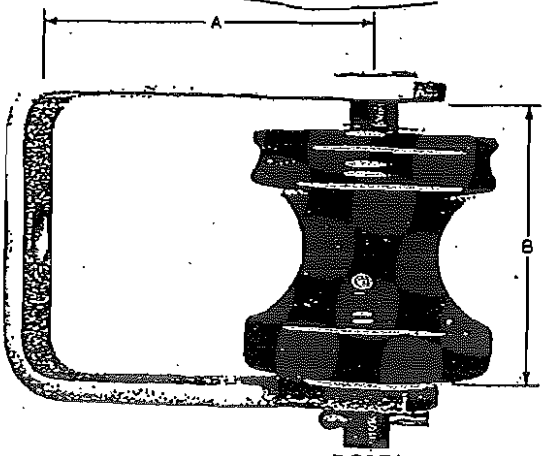
DC1C3



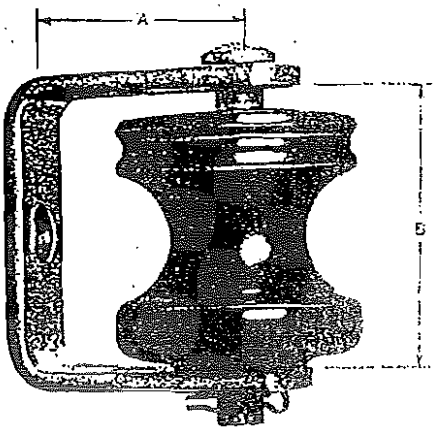
DC2C1



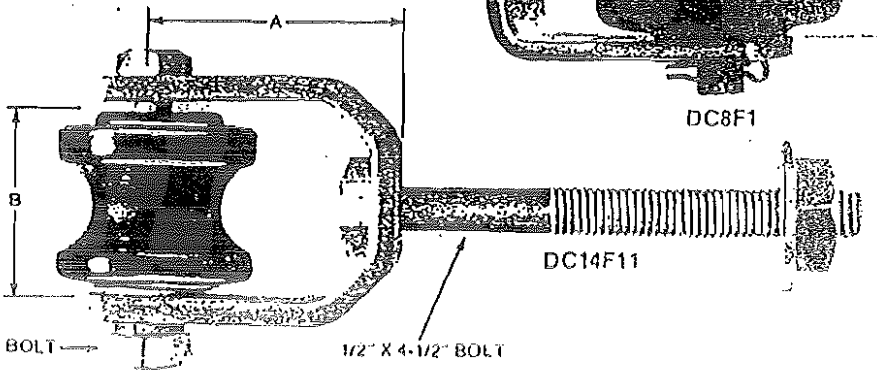
DC5C2



DC6F1



DC8F1



DC14F11

□ REA-approved.
ANSI/NEMA standard.
◊ AT&T specification.

Pistol Grip Deadends (Malleable)

Pistol Grip Deadends (Malleable and Bronze). Designed for dead ending steel static wires and copper or aluminum phase conductors.

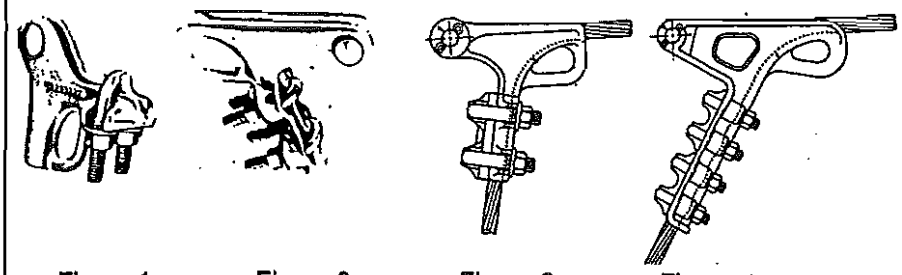


Figure 1 Figure 2 Figure 3 Figure 4

Cat. No.	Fig.	ACSR max.	ACSR min.	COPPER max.	COPPER min.	Size	Std. Pkg. Qty.	Ship Wt./100
201860	1	4/0	6	2/0	6	.16"-.56"	10	410.0
201880	2	2/0	6	4/0	6	.18"-.46"	25	190.0
201980	4	266.8	1/0	300	1/0	.37"-.63"	5	960.0
202020	4	—	—	650	2/0	.48"-.84"	10	1340.0

Straight Line Deadends (Aluminum)

Straight Line Deadends (Aluminum) are designed for distribution and light transmission construction with all aluminum, ACSR or aluminum alloy conductor. Holding ability is optimized by use of patented contour clamping feature.

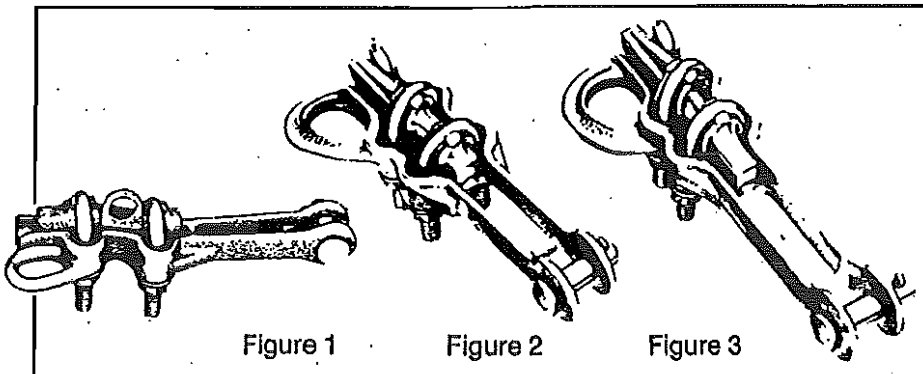


Figure 1 Figure 2 Figure 3

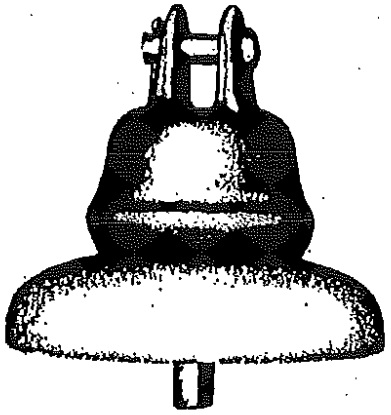
Cat. No.	Fig.	ACSR max.	ACSR min.	ALUM. max.	ALUM. min.	Size	Std. Pkg. Qty.	Ship Wt./100
202100	1	2/0	6	2/0	6	.18"-.46"	25	160.0
202150	2	2/0	6	3/0	6	.18"-.47"	50	110.0
202155	2	159	2	266.8	4	.30"-.60"	20	200.0
202250	3	397	4	400	4	.25"-.74"	5	240.0
202300	1	477	101.8	556.5	3/0	.46"-.86"	20	300.0
202350	2	556	2	556.4	1	.31"-.88"	20	220.0
202400	1	1113	556	1.272	600	.86"-1.30"	10	510.0
202450	1	1590	666	1800	750	.98"-1.55"	5	620.0

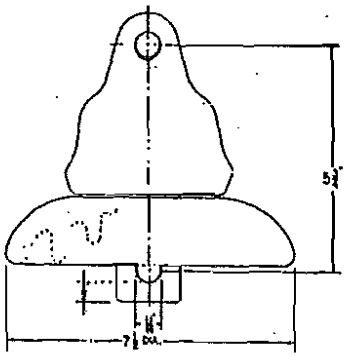
PORCELAIN PRODUCTS CO. | Talley™ Industries
PP™
225 N. Patterson Street
Carey, Ohio 43316
419/396-7621

[redacted]

SUSPENSION INSULATORS

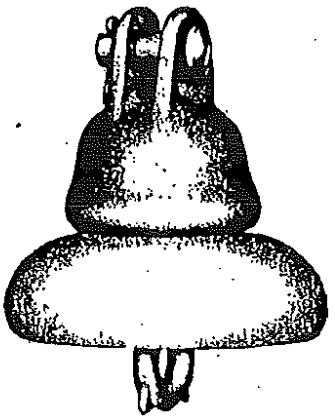
CLEVIS TYPE STEEL HARDWARE

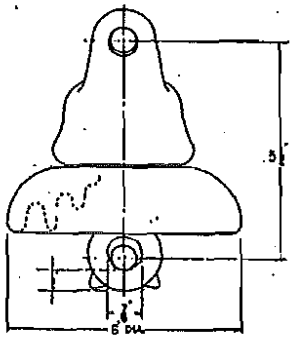




No. 87512

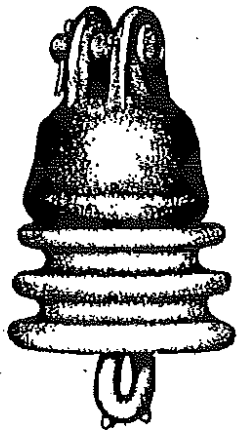
CLEVIS TYPE STEEL HARDWARE

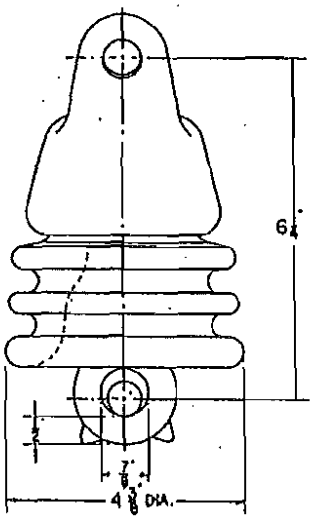




No. 86012

CLEVIS TYPE STEEL HARDWARE





No. 84300
Steel Hex Cotter Bolt Available

MECHANICAL & ELECTRICAL CHARACTERISTICS

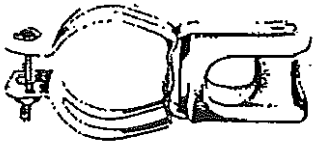
CATALOG NO.	87512	†86012	† 84300
ANSI CLASS	52-2	52-1	52-9
ANSI M & E Category	15,000 Pounds	10,000 Pounds	10,000 Pounds
Comb. M & E Strength	15,000 Pounds	10,000 Pounds	10,000 Pounds
Mechanical Impact Strength	50 In.-Lbs.	45 In.-Lbs.	45 In.-Lbs.
Routine Proof Test	7,500 Pounds	5,000 Pounds	5,000 Pounds
Time Load Test	10,000 Pounds	6,000 Pounds	6,000 Pounds
Low Frequency Flashover—Dry	65 KV	60 KV	60 KV.
Low Frequency Flashover—Wet	35 KV	30 KV	30 KV
Impulse Flashover—Positive	115 KV	100 KV	100 KV
Impulse Flashover—Negative	115 KV	100 KV	90 KV
Low Frequency Puncture Voltage	90 KV	80 KV	80 KV
Low Frequency Test Voltage Rms to Ground	7.5 KV	7.5 KV	7.5 KV
Maximum R.I.V. Microvolts at 1000 KC	50 MCV	50 MCV	50 MCV
Leakage Distance	8.25 Inches	7 Inches	6.75 Inches
Dry Arcing Distance	5.5 Inches	4.5 Inches	4 Inches
Maximum Net Weight	9.1 Pounds	5.5 Pounds	5.2 Pounds
Packed Weight Per Unit	10.1 Pounds	6.0 Pounds	5.8 Pounds
Standard Package Quantity	8	12	12

Standard Glaze "Skylite" ANSI 70 [illegible]

UTILITY
Page 16

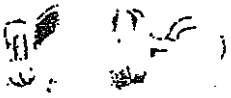
PIPE MOUNTING WIREHOLDERS & GUY STRAIN INSULATORS

PP



6316
6416

6419



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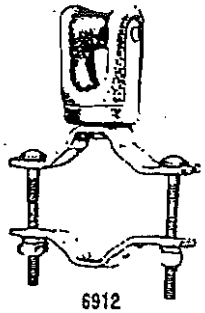

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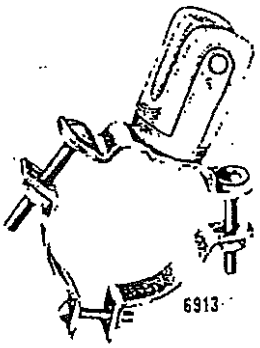


6913

Pipe Mounting Wireholders

Designed especially for service entrance masts. May be used in other applications requiring insulator attachment to pipe. All ferrous metal parts are hot dipped galvanized. Assembly of parts after galvanizing assures all surfaces are protected from rust and corrosion.

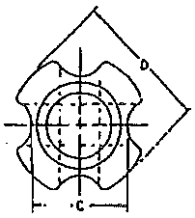
CAT. NO.	STYLE	PIPE SIZE	STD. PKG.	WT. PER 100
6319	1929	1 1/4" - 1 1/2"	50	94
6419	1929	2"	50	94
6316	1986	1 1/4" - 1 1/2"	50	94
6416	1986	2"	50	94
6516	1986	2 1/2"	50	100
6912	"Universal" Reinforced	1 1/4" - 1 1/2"	25	168
6913	"Universal" Reinforced	3" - 4"	10	175
6402	Triplex Hanger	2"	50	40

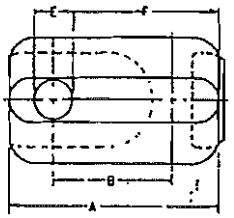
Standard insulator glaze "Skyline" ANSI-70, Munsell 5 BG 7.0/0.4. Brown or white glaze available on special order, add suffix "B" to catalog number for brown glaze or "W" for white glaze.

Cross Reference Guide

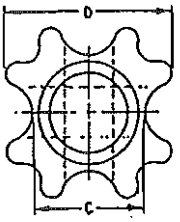
Porc. Prod.	Utilities Service	Chance	Hubbard	Joslyn	McGraw Edison	Oliver	Kerlick	Knox	Wagner
6316									W31
6416		3-11-66						5010	W32
6516								5081	W33
6912		P1225	67360	J0588	DW2C1	2529	K4563	5090	
6913		P1226			DW3C1	2523			

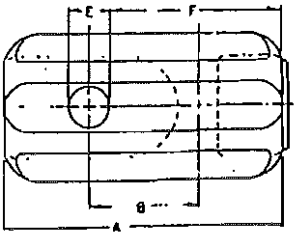
GUY STRAIN INSULATORS





Nos. 502-504-506





No. 708

CAT. NO.	ANSI CLASS	TENSILE STRENGTH POUNDS	LOW FREQUENCY FLASHOVER KV DRY	LOW FREQUENCY FLASHOVER KV WET	LEAKAGE DISTANCE INCHES	MAXIMUM CABLE DIAMETER INCHES	DIMENSIONS IN INCHES A	B	C	D	E	F	APPROX. NET WT. PER 100 PCS.	STANDARD PACKAGE QUANTITY
†502	54-1	10,000	25	12	1 5/8	3/8	3 1/2	1 3/4	1 3/4	2 1/2	5/8	2 5/16	112	50
†504	54-2	12,000	30	15	1 7/8	1/2	4 1/4	2 1/4	2 1/8	2 7/8	7/8	2 13/16	188	50
†506	54-3	20,000	35	18	2 1/4	5/8	5 1/2	3 1/8	2 3/8	3 3/8	1	3 13/16	296	25
*†708	54-4	20,000	40	23	3	5/8	6 3/4	2 5/8	2 3/8	3 1/2	1	4 1/2	475	16

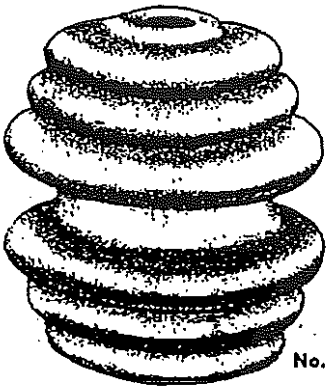
Standard Glaze "Skyline" ANSI-70, Munsell 5 BG 7.0/0.4
†REA Accepted

Cross Reference

ANSI CLASS NO.	PORCELAIN PRODUCTS	OHIO BRASS	JOSLYN (PIHCO)	A.B. CHANCE	ITE (VICTOR)	KNOX
54-1	502	31502	L502	C909-1041	502	502
54-2	504	31504	L504	C909-1042	504	504
54-3	506	31506	L506	C909-1043	506	506
54-4	708	31352	L539	C909-1044	556	708

PORCELAIN SPOOLS AND SECONDARY RACKS

WET PROCESS PORCELAIN



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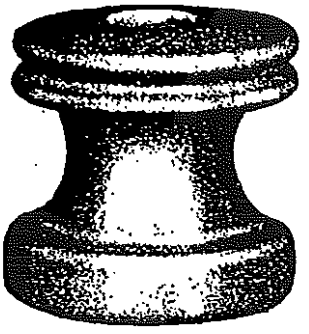

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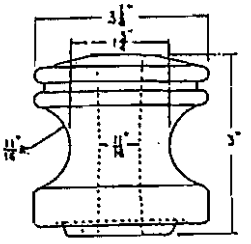

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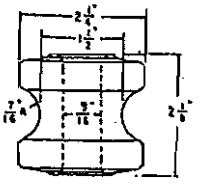

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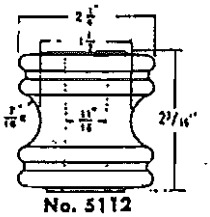

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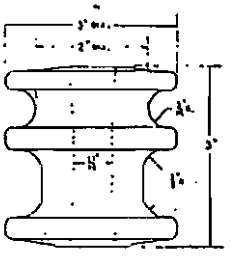

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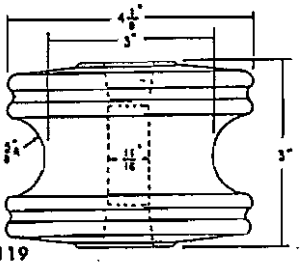

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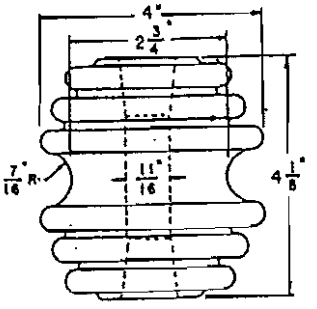

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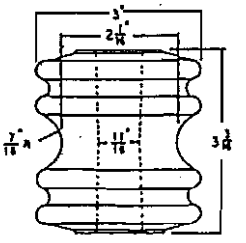


No. 5104

Mechanical and Electrical Characteristics

CATALOG NUMBER	ANSI CLASS	ULTIMATE STRENGTH LBS.	DRY	LOW-FREQUENCY FLASHOVER-KV WET		APPROXIMATE NET WEIGHT PER 100 PCS.	STANDARD PACKAGE QUANTITY
				VERT.	HORIZ.		
5101	53-2	3000	25	12	15	120	50
5102	—	3000	20	10	12	110	50
5104	53-3	4000	25	12	15	135	50
5107	—	1750	18	7	9	45	100
5112	53-1	2000	20	8	10	50	100
5116	53-5	6000	35	18	25	260	25
5119	53-4	4500	25	12	15	252	25

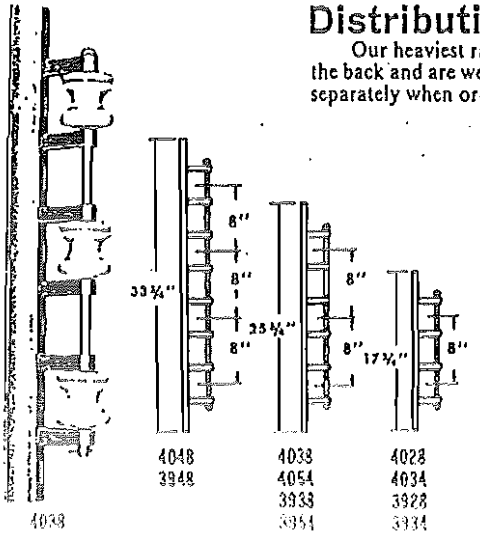
Spool Insulators Cross Reference

Standard Glaze "Skyline" ANSI-70, Munsell 5 BG 7.0/0.4

ANSI CLASS NO.	PORCELAIN PRODUCTS	OHIO BRASS	JOSLYN (PINCO)	A. B. CHANCE	ITE (VICTOR)	KNOX
53-1	5112	36139	J98	C909-1031	2011	303
53-2	5101	36361	J151	C909-1032	2012	310
53-3	5104		J97	C909-1033	2013	320
53-4	5119	38911	J0101	C909-1034	2026	306
53-5	5116	36140	J0613	C909-1035	2014	307
	5107		J150	C909-1931		300
	5102		J105	C909-1932		304

Distribution Racks

Our heaviest rack for toughest job. Made with 12 gage back and channel points. Points extend through the back and are welded to the channel sides for rigidity. Designed for #5101 3" Insulators which are packed separately when ordered with the racks.



Cat. No. Rack Only	Cat. No. With Ins.	Insulators	Spacing	Length	Std. Pkg.	Wt. Per 100
3928	4028	2	8"	17¾"	5	565— 805
3934	4034	3	4"	17¾"	5	565— 925
3938	4038	3	8"	25¾"	5	820—1180
3948	4048	4	8"	33¾"	5	1090—1570
3954	4054	5	4"	25¾"	5	820—1420

Cross Reference Guide

Porc. Prod.	Ohio Brass	Chance	Hubbard	Joslyn	McGraw Edison	Ohio	Kerlick	Knox	Westinghouse
3928	328	C207-0045	1274	J167	DR1W1	8328	K6728		SR-44
3934	334			J165	DR1W3	8334			SR-55
3938	338	C207-0047	1371	J168	DR1W3	8338	K6738	268	SR-66
3948	348	C207-0048	1478	J169	DR1W6	8348	K6748	269	SR-77
3954	354								SR-88

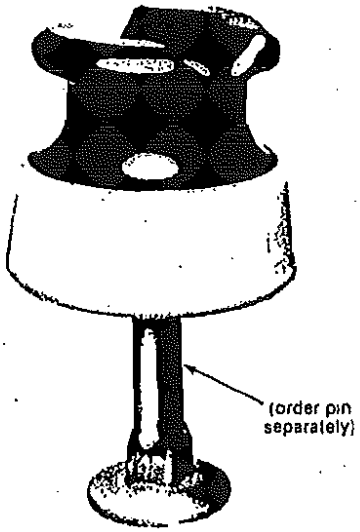
[redacted]

COOPER POWER SYSTEMS

Pin-Type Insulators and Insulator Pins—continued

PIN-TYPE INSULATORS

Hot-press formed.
High-strength, non-porous construction; glaze over porcelain improves strength and resists contamination accumulation.
Semi-conductive radio glaze on head and upper portions reduces radio and tv interference.
Deep petticoats assure high insulating characteristics.
Meets applicable portions of ANSI Standard C29.5; pin hole accepts ANSI-standard threaded pins; order separately (see Pages 66—72).



NP8D8

Catalog no. for standard pin-type insulator Catalog no. for high-strength pin-type insulator*	NP8D8□■ NP8D8S□	NP9D8□■ NP9D8S■	NP21D8□■ NP21D8S□	NP22D8■ NP22D8S■	NP23D8■ NP23D8S■
ANSI class	55-2	55-3	55-4	55-5	55-6
Typical application (kV)	7.2	13.2	13.2	13.2	19 9/34 5
Flashover voltage (kV)					
Critical impulse (1.2 x 50 μs wave)					
Positive	70	90	105	130	150
Negative	85	110	130	150	170
60 Hz					
Wet	25	30	35	45	50
Dry	45	55	65	80	100
Low-frequency puncture voltage (kV)	70	90	95	115	135
Radio influence voltage (RIV)					
Test voltage to ground (kV)	5	10	10	15	22
Max RIV at 1000 kHz = (μV)	50	50	50	100	100
Leakage distance (in.)	5	7	9	12	15
Dry arcing distance (in.)	3-3 8	4-1/2	5	6-1 4	8
Cantilever strength (lb)	2500	2500	3000	3000	3000
Pinhole diameter—threaded porcelain (in.)	1	1	1	1	1
Minimum pin height (in.)	4	5	5	6	7-1 2
Neck diameter (in.)	2-1/4	2-1/4	2-7/8	2-7 8	3-1 2
Groove height relationship (in.)	9/16—7/8	9/16—7/8	9/16—7/8	9/16—7 8	5 16—5 8
NEMA neck designation	C	C	F	F	J

*For information on pricing and availability, contact your McGraw-Edison sales representative

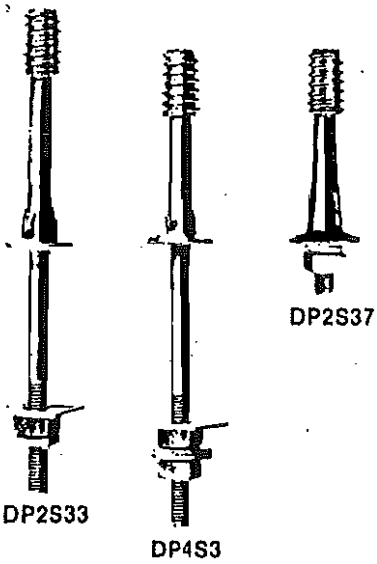
□ REA-approved

Pin-Type Insulators and Insulator Pins—continued

CROSSARM PINS

Low-Voltage

For supporting line wires, leads, and jumpers on poles and crossarms.
Manufactured of forged steel; hot-dip galvanized for corrosion resistance.
Broad base diameter distributes load without damaging wood crossarms.
Wrench-flat design aids installation.
1-in.-diameter ANSI/NEMA-standard lead threads.



Long Shank
For wood crossarms.

Catalog No.*	Shaft Height (in.)	Shank Dia (in.)	Shank Length (in.)	Min Thread Length (in.)	Base Dia (in.)	Hardware Included		
						Washer**	MF Locknut	Other
DP2S1□■	5	5/8	5-3/4	2-3/4	2	1	1	—
DP2S5■	5	5/8	6-1/2	3-1/4	2	1	1	—
DP2S9■	5	5/8	7-1/2	3-1/2	2	1	1	—
DP2S29■	6	5/8	5-3/4	2-3/4	2	1	1	—
DP2S33■	6	5/8	6-1/2	3	2	1	1	—
DP2S41	6	5/8	6-1/2	3	2	—	—	—
DP2S43	5	5/8	6	3	2	1	1	—
DP2S51	5	5/8	6-1/2	3-1/4	2	1 round	—	1 split lockwasher
DP2S52	6	5/8	7-1/2	3-5/8	2	1	1	—
DP2S53	6	5/8	6-1/2	3	2	1	1	1 spring washer
DP2S55	5	5/8	5-3/4	3-1/2	2	—	—	—
DP4S3	5	5/8	7-1/2	3-1/4	2	3***	—	1 additional square nut
DP4S4	6	5/8	7	3-1/2	2	2†	1	1 split lockwasher
DP8S2†	5	5/8	5-3/4	2-5/8	1-7/8	1 round	—	—
DP14S1	5	5/8	5-3/4	2-1/4	2-1/2	1	1	—
DP3S5	6	3/4	6-1/2	3	2	1††	1	—
DP3S7	6	3/4	6-1/2	3	2	1††	—	1 Palnut
DP3S13■	6	3/4	6-1/2	3-1/4	2-1/2	1††	1	—
DP3S18	6	3/4	9	3	2	1††	—	1 Palnut
DP3S21	6	3/4	6-1/2	3-1/4	2-1/2	1†	1	—
DP3S26	5	3/4	8	5	2-1/2	—	—	—
DP3S27	6	3/4	8	3-1/4	2-1/2	1††	1	—

* Catalog no. includes one regular square nut
** Washer is 2 in. square unless noted.
*** Two round washers and one square washer
† Washer is 3 in. square.
†† Washer is 2-1/4 in. square.

Short Shank
For steel crossarms.

Catalog No.*	Shaft Height (in.)	Shank Dia (in.)	Shank Length (in.)	Min Thread Length (in.)	Base Dia (in.)
DP2S37□■	5	5/8	1-1/2	1-1/4	2
DP2S38■	6	5/8	1-1/2	1-1/4	2
DP3S17■	6	3/4	1-3/4	1-1/2	2-1/2

* Catalog no. includes one split lockwasher and one regular square nut

□ REA-approved.
■ ANSI/NEMA standard.

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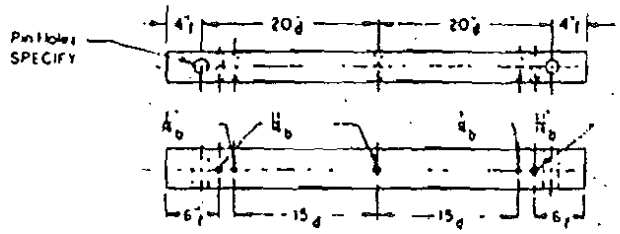
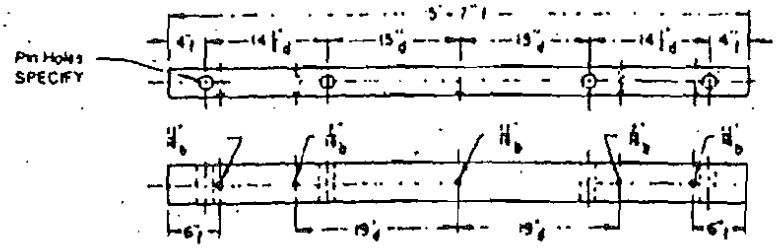
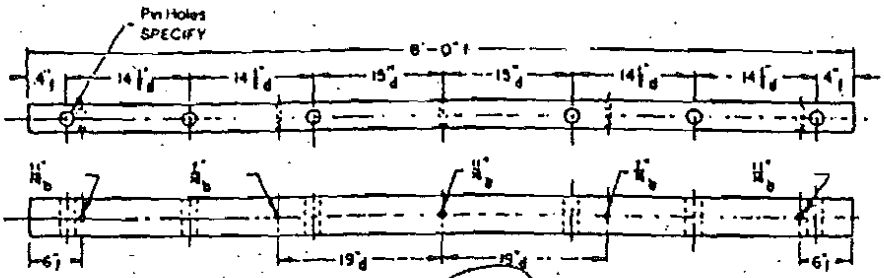


4' - 2 PIN ARM
CCC-300

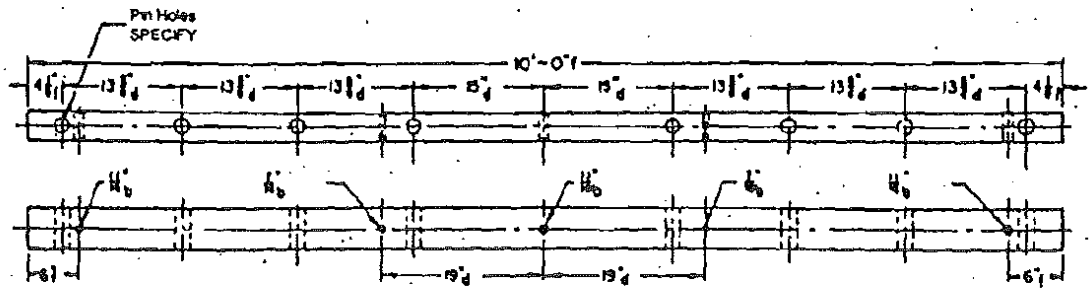


5'-7" - 4 PIN ARM
CCC-301



8'-6 PIN ARM
CCC-303

CROSSARM
PENTACHLOROPHENOL
SOUTHERN PINE



10' - 8 PIN ARM
CCC-305

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CROSSARM PENTACHLOROPHENOL SOUTHERN PINE

CATALOG NO.	LENGTH	NO. PINS	PIN SPACING END	PIN SPACING CENTER	PIN SPACING SIDES	PIN HOLE	MOUNTING BOLT	
CCC-101	4'	SPECIFY	SPECIFY	SPECIFY	SPECIFY	SPECIFY	11/16"	3 1/4" x 4 1/4" CABLE T.V.
CCC-102	4'	SPECIFY	SPECIFY	SPECIFY	SPECIFY	SPECIFY	11/16"	
CCC-103	6'	SPECIFY	SPECIFY	SPECIFY	SPECIFY	SPECIFY	11/16"	
CCC-104	8'	SPECIFY	SPECIFY	SPECIFY	SPECIFY	SPECIFY	11/16"	
CCC-201	6'	4	4"	30"	17"	9/16"	11/16"	3 1/4" x 4 1/4" RAILROAD
CCC-202	8'	6	4"	30"	14 1/2"	9/16"	11/16"	
CCC-203	10'	10	4"	33"	10"	9/16"	11/16"	
CCC-204	10'	10	4"	22"	11 1/4"	19/32"	11/16"	
CCC-301	5' 7"	4	4"	30"	14 1/2"	SPECIFY	11/16"	3 1/2" x 4 1/2" STANDARD
CCC-302	8'	4	4"	30"	29"	SPECIFY	11/16"	
CCC-303	8'	6	4"	30"	14 1/2"	SPECIFY	11/16"	
CCC-304	10'	6	4"	38"	18 1/2"	SPECIFY	11/16"	
CCC-401	4'	2	4"	40"		11/16"	11/16"	3 5/8" x 4 5/8" R.E.A.
CCC-402	5' 7"	4	4"	30"	14 1/2"	11/16"	11/16"	
CCC-403	8'	4	4"	30"	29"	11/16"	11/16"	
CCC-404	8'	6	4"	30"	14 1/2"	11/16"	11/16"	
CCC-405	10'	6	4"	38"	18 1/2"	11/16"	11/16"	
CCC-501	5' 7"	4	4"	30"	14 1/2"	SPECIFY	11/16"	3 3/4" x 4 3/4" DISTRIBUTION
CCC-502	6'	4	4"	30"	17"	SPECIFY	11/16"	
CCC-503	8'	4	4"	30"	29"	SPECIFY	11/16"	
CCC-504	8'	6	4"	30"	14 1/2"	SPECIFY	11/16"	
CCC-505	10'	6	4"	38"	18 1/2"	SPECIFY	11/16"	
CCC-506	10'	8	4"	31"	13 1/2"	SPECIFY	11/16"	
CCC-601	8'	SPECIFY	SPECIFY	SPECIFY	SPECIFY	SPECIFY		3 3/4" x 5 3/4" TRANSMISSION
CCC-602	10'	SPECIFY	SPECIFY	SPECIFY	SPECIFY	SPECIFY		

Lagscrews

Lagscrews of several types are available to suite specific applications. All are hot dipped galvanized for long service. Lagscrews have rolled threads and standard square heads. An upset shoulder is provided (same OD as thread) to permit a snug fit in hardware mounting holes.

Figure 1 illustrates Gimlet Point screws designed for wrench installation. Fetter Drive screws (Figure 2) may be wrenched or driven like a nail without loss of holding strength. Fetter Drive Drive Point screws (Figure 3) are particularly suited for hammer driving, employing a nail-like drive point ahead of the threaded portion. Twist Drive Drive Point screws (Figure 4) also are equipped with a nail-like point to provide speedier installation and starting ease.

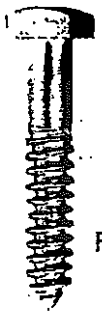

Figure 1

Figure 2

Figure 3

Figure 4

Cat. No.	Fig.	Size	Std. Pkg. Qty.	Ship Wt./100
402140	1	1/4"x1-1/2"	2000	2.2
402143	1	1/4"x2"	2000	2.7
402147	1	1/4"x2-1/2"	2000	3.2
402148	1	1/4"x3"	2000	7.6
402150	1	5/16"x2-1/2"	2000	5.9
402160	2	3/8"x2-1/2"	1000	8.5
402170	3	3/8"x3"	1000	9.9
402180	3	3/8"x4"	1000	12.8
402195	1	1/2"x3"	250	18.0
402213	1	1/2"x4"	250	25.0
402190	3	1/2"x3"	250	19.6
402200	3	1/2"x4"	250	24.0
402210	4	1/2"x4"	250	24.0
402215	3	1/2"x4-1/2"	250	26.0
402223	2	5/8"x4"	100	40.00
402230	2	5/8"x5"	100	44.0
402235	2	5/8"x6"	100	55.0

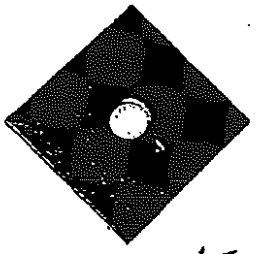

Figure 1

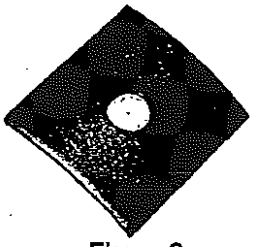

Figure 2

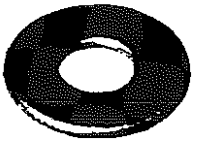

Figure 3

Figure 4

Curved washers, Round washers, Spring washers, and Square washers

Washers of several designs are stocked for your routine needs. Types available include the following:

Square washers (Figure 1) are hot dip galvanized; Curved washers (square) are shown in Figure 2 and also are galvanized; Figure 3 shows standard Round washers which are hot dip galvanized; Figure 4 illustrates Spring washers used to maintain units in tension when wood crossarm shrinkage occurs. Made of heat treated automotive spring steel, hot dip galvanized. Nut seats on flat surface when tightened.

Cat. No.	Fig.	Bolt Size	Hole Size	Diameter	Std. Pkg. Qty.	Ship Wt./100
404020	1	1/2"	9/16"	2"	500	15.0
404040	1	5/8"	11/16"	2"	500	13.8
404060	1	5/8"	11/16"	2-1/4"	250	26.0
404080	1	3/4"	13/16"	2-1/4"	250	25.2
404100	1	3/4"	13/16"	3"	100	60.0
404120	1	3/4"	13/16"	4"	100	90.0
404123	1	3/4"	13/16"	4"	50	120.0
404124	1	7/8"	15/16"	4"	50	120.0
404130	1	1"	1-1/8"	4"	25	230.0
404160	2	5/8"	11/16"	2-1/4"	250	26.0
404170	2	5/8"	11/16"	2-1/2"	250	36.0
404180	2	5/8"	11/16"	3"	100	67.0
404210	2	3/4"	13/16"	3"	100	62.0
404230	2	3/4"	13/16"	3-1/4"	100	78.0
404270	2	7/8"	15/16"	3-1/2"	50	125.0
404290	2	3/4"	13/16"	4"	50	90.0
404330	3	3/8"	7/16"	1"	5000	1.6
404340	3	3/8"	9/16"	1-1/4"	2500	2.8
404350	3	1/2"	9/16"	1-3/8"	2000	3.9
404370	3	5/8"	11/16"	1-3/4"	1000	8.4
404390	3	3/4"	13/16"	2"	500	11.8
404395	3	3/4"	13/16"	3-1/2"	100	70.0
404398	3	7/8"	15/16"	4"	100	90.0
404405	4	1/2"	9/16"	—	400	20.0
404410	4	5/8"	11/16"	—	100	90.0
404420	4	3/4"	13/16"	—	100	95.0

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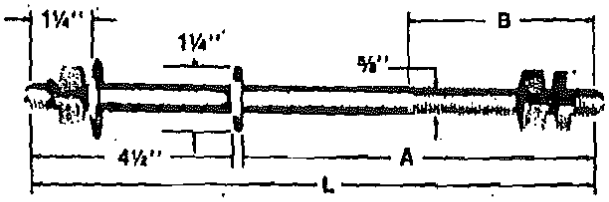
CHANCE

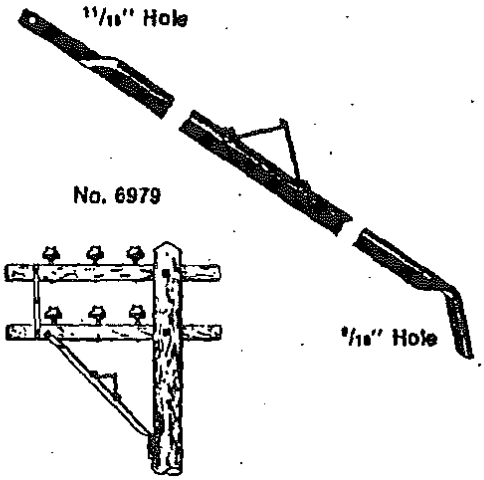
BOLTS, UPSET SINGLE



Used in rural secondary construction. Has ⅝" thread diameter. Spc insulator C909-1032 ANSI 53-2 (Section 11) can be used. Hot d galvanized.

Catalog No.	Dimensions in Inches			Approx. Wt. Lbs. Per 100 Pieces
	Shank Length			
	A	L	B	
†7741	8	12¾	4	138
†7741½	9	13¾	4	144
7742	10	14¾	4	170
7743	12	16¾	6	186
7744	14	18¾	6	196

12,400 Pound Rated Tensile Strength
†REA Accepted



BRACES, CROSSARM, ALLEY ARM

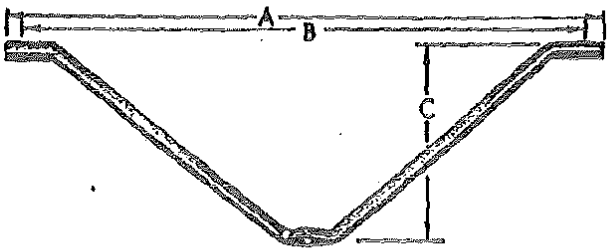
Used for side-arm construction. Furnished with lineman's steps. Hot dip galvanized.

Catalog No.	Length Feet	Angle Size Inches	Holes		Approx. Ship. Wt., Lbs. Per 100 Pcs.
			Arm Attach	Pole Attach	
*6979	5	1¾ x 1¾ x 3/16	9/16	9/16	1300
†6984	7	1¾ x 1¾ x 3/16	11/16	9/16	1788

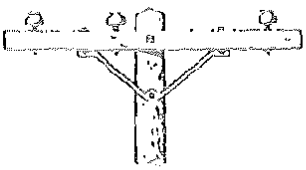
*N.E.M.A. Standard
†REA Accepted

*BRACES, CROSSARM, ANGLE

Furnished with 9/16" holes for crossarm mounting. 11/16" holes for pole mounting. The "-1" series has a 9/16" x 1" slot in place of the 9/16" diameter crossarm mounting holes. Hot dip galvanized.



No. 6940



Catalog No.	Dimensions in Inches				Approx. Ship. Wt. Lbs. Per 100 Pcs.
	Size of Angle	A	B	C	
*6940	1½ x 1½ x 3/16	45	42	12	820
*6941	1½ x 1½ x 3/16	51	48	18	980
†*6942	1½ x 1½ x 3/16	63	60	18	1100
†6948	1½ x 1½ x 3/16	51	48	14	920
†*6953	1¾ x 1¾ x 3/16	63	60	18	1340
†6955	1¾ x 1¾ x 3/16	75	72	18	1600
6940-1	1¾ x 1¾ x 3/16	45	42	12	820
6942-1	1¾ x 1¾ x 3/16	63	60	18	1120

*N.E.M.A. Standard
†REA Accepted

[redacted]

GROUND RODS & ACCESSORIES

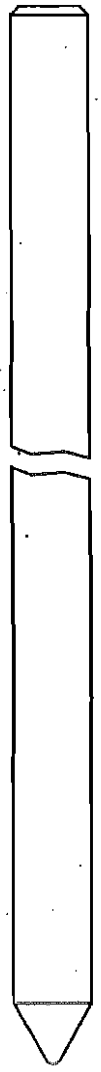
TYPE 61

COPPERBONDED POINTED GROUND RODS

- Perfectly bonded rods last longer, drive easier and will not crack.
- Stop corrosion, while providing the lowest possible resistance to ground.
- Copper exteriors, molecularly bonded to nickel-sealed high-strength steel cores, exceed the requirements of ANSI/UL 467-1984 (ANSI C33.8-1972) and CSA.
- Identification: Company name, length, diameter, catalog number, UL logo and control number are roll-stamped within 12" of chamfered end on each rod for easy inspection after installation.
- Copper Jacket: standard copper plating thickness exceeds UL and ANSI specs. of .010".
- The rods exceed a tensile strength of 75,000 pounds per square inch and straightness tolerance of .010" per linear foot.

Catalog Number	Nominal Diameter X Length	Standard Bundle	Master Bundle	Weight per 100
613852*	3/8" x 5'	20	100	160
613862	3/8" x 6'	20	100	198
613882	3/8" x 8'	20	100	236
611255*	1/2" x 5'	10	100	296
611265	1/2" x 6'	10	100	310
611285*	1/2" x 8'	10	100	444
611380*	1/2" x 8'	10	100	553
611200	1/2" x 10'	10	100	605
611300	1/2" x 10'	10	100	690
615830	5/8" x 3'	--	50	253
615840	5/8" x 4'	10	100	338
615850	5/8" x 5'	10	100	422
615860*	5/8" x 6'	10	100	509
615880*	5/8" x 8'	10	100	680
615883***	5/8" x 8'	10	100	680
615800*	5/8" x 10'	10	100	844
615803***	5/8" x 10'	10	100	844
615812	5/8" x 12'	10	100	1018
615815	5/8" x 15'	10	100	1266
613460	3/4" x 6'	5	50	744
613480*	3/4" x 8'	5	50	1004
* 613400*	3/4" x 10'	5	50	1240
613412	3/4" x 12'	5	50	1488
613415	3/4" x 15'	5	50	1860
614400	1" x 10'	3	25	1266

*Standard Inventory Items.
**13 mil minimum REA Listed rods.



ERITECH, INC.
P.O. Box 487 • Aberdeen, NC 28315
Phone: (910) 944-3355
Toll Free: (800) 438-8150

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BANDS, POLE, SECONDARY RACK

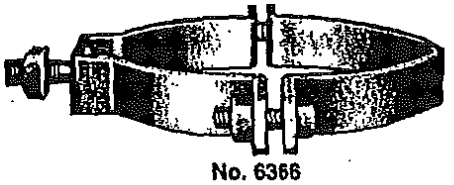
For attaching secondary racks to tubular metal poles. Bands are equipped with 5/8" x 2" carriage bolts for attaching the racks, and 1/2" x 1 5/8" oval-shoulder clamp bolts for tightening bands on pole. Hot dip galvanized 1/4" x 1 1/2" steel. Made in two styles, the single type for attaching one rack and the double type for two racks.

Single Type

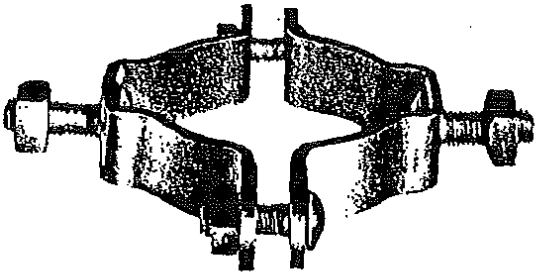
Cat. No.	Dim. in Inches: Nominal Pole Dia.	Dim. in Inches: Actual O.D.	Approx. Ship Wt. Lbs. Per 100 Pcs.
6364 1/2	4 1/2	5	304
6366	6	6 5/8	368
6367	7	7 5/8	406
6368	8	8 5/8	480

Double Type

Cat. No.	Dim. in Inches: Nominal Pole Dia.	Dim. in Inches: Actual O.D.	Approx. Ship Wt. Lbs. Per 100 Pcs.
6374 1/2	4 1/2	5	388
6376	6	6 5/8	380
6377	7	7 5/8	475
6378	8	8 5/8	524



No. 6366

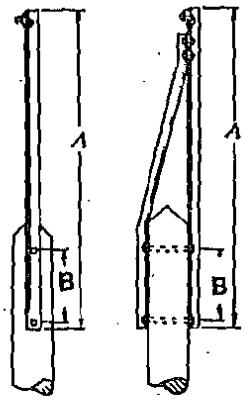


No. 6376

* BAYONETS, GROUND WIRE

For supporting overhead ground wire on wood or steel poles. Bayonets have an 11/16" hole and an 11/16" pole-mounting slot to allow for inaccuracy in boring holes. Holes at top of bayonet allow use of No. 5450 ground-wire clamps (Not included. See page 5-21). Bolts used to fasten corner bayonets together are included. Pole-mounting bolts and ground-wire clamps are not included. Hot dip galvanized.

Catalog No.	Dimensions in Inches: A	Dimensions in Inches: B	Dimensions in Inches: Angle Size	Approx. Ship Wt. Lbs. Per 100 Pieces
Straight Bayonets				
* 5436	36	10	2 x 2 x 1/4	957
→ 5466	66	15	2 1/2 x 2 1/2 x 1/4	2200
5484	84	20	3 x 3 x 1/4	3430
Corner Bayonets				
* 5566	66	15	2 x 2 x 1/4	3509
5584	84	20	2 1/2 x 2 1/2 x 1/4	5740



No. 5436 No. 5566

BOLTS, CARRIAGE

Carriage Bolts have square nuts, finished points and rolled threads. Standard heads have square shoulders. Open-hearth steel. Hot dip galvanized.

Cat. No.	Dim. in Inches: Bolt Length	Dim. in Inches: Thread Length	Approx. Ship Wt. Lbs. Per 100 Pcs.
5/8-Inch Diameter			
†*8634	4	1 3/4	15.6
†*8634 1/2	4 1/2	1 3/4	17
†*8635	5	1 3/4	17.6
†8636	6	1 3/4	21.6
8637	7	1 3/4	22

4,250 Pound Rated Tensile Strength

*N.E.M.A. Standard

†REA Accepted

Cat. No.	Dim. in Inches: Bolt Length	Dim. in Inches: Thread Length	Approx. Ship Wt. Lbs. Per 100 Pcs.
1/2-Inch Diameter			
†*8644 1/2	4 1/2	3	32
†*8645	5	3	31
†8645 1/2	5 1/2	3	37.5
†*8646	6	3	38
8647	7	4	44

7,800 Pound Rated Tensile Strength

No. 8634

ACSR-581 [redacted]

Code Word	Size (AWG or KCM)	Stranding (Al/Stl)	Diameter (Inches) Individual Wires Al	Individual Wires Stl	Steel Core	Complete Cable	Weight Per 1000 Feet (Lbs.) Al	Stl	Total	Content (%) Al	Stl	Rated Strength (Lbs.)	Resistance OHMS/1000 Feet DC @ 20°C	AC @ 75°C	Ampacity[1] (Amps)
Turkey	6	6/1	.0661	.0661	.0661	.198	24.5	11.6	36.1	67.90	32.10	1,190	.641	.806	105
Swan	4	6/1	.0834	.0834	.0834	.250	39.0	18.4	57.4	67.90	32.10	1,860	.403	.515	140
Swanate	4	7/1	.0772	.1029	.1029	.257	39.0	28.0	67.0	58.13	41.87	2,360	.399	.519	140
Sparrow	* 2	6/1	.1052	.1052	.1052	.316	62.0	29.3	91.3	67.90	32.10	2,850	.254	.332	184
Sparate	2	7/1	.0974	.1299	.1299	.325	62.0	44.7	106.7	58.13	41.87	3,460	.251	.338	184
Robin	1	6/1	.1181	.1182	.1182	.355	78.2	37.0	115.2	67.90	32.10	3,550	.201	.268	212
Raven	1/0	6/1	.1327	.1327	.1327	.398	98.6	46.6	145.2	67.90	32.10	4,380	.159	.217	242
Quail	2/0	6/1	.1489	.1489	.1489	.447	124.3	58.8	183.1	67.90	32.10	5,310	.126	.176	276
Pigeon	3/0	6/1	.1672	.1672	.1672	.502	156.8	74.1	230.9	67.90	32.10	6,620	.100	.144	315
Penguin	4/0	6/1	.1878	.1878	.1878	.563	197.7	93.4	291.1	67.90	32.10	8,350	.0795	.119	357
Waxwing	266.8	18/1	.1217	.1217	.1217	.609	250.4	39.3	290	86.45	13.55	6,880	.0643	.0787	449
Partridge	266.8	26/7	.1013	.0788	.2364	.642	251.7	115.6	367	68.53	31.47	11,300	.0637	.0779	475
Ostrich	300.0	26/7	.1074	.0835	.2505	.680	283.0	129.9	413	68.53	31.47	12,700	.0567	.0693	492
[redacted]	336.4	18/1	.1367	.1367	.1367	.684	315.8	49.5	365	86.45	13.55	8,680	.0510	.0625	519
Linnet	336.4	26/7	.1137	.0884	.2652	.720	317.3	145.7	463	68.53	31.47	14,100	.0505	.0618	529
Oriole	336.4	30/7	.1059	.1059	.3177	.741	318.1	209.0	527	60.35	39.65	17,300	.0502	.0613	535
Chickadee	397.5	18/1	.1486	.1486	.1486	.743	372.5	58.5	431	86.45	13.55	9,940	.0432	.0529	576
Brant	397.5	24/7	.1287	.0858	.2574	.772	374.9	137.1	512	73.23	26.77	14,600	.0430	.0526	584
Ibis	397.5	26/7	.1236	.0961	.2883	.783	375.0	172.2	547	68.53	31.47	16,300	.0428	.0523	587
Lark	397.5	30/7	.1151	.1151	.3453	.806	375.9	246.9	623	60.35	39.65	20,300	.0425	.0519	594
Pelican	477.0	18/1	.1628	.1628	.1628	.814	447.8	70.2	518	86.45	13.55	11,800	.0360	.0442	646
Flicker	477.0	24/7	.1410	.0940	.2820	.846	450.0	164.5	615	73.23	26.77	17,200	.0358	.0439	655
Hawk	477.0	26/7	.1354	.1053	.3159	.858	450.0	206.8	657	68.53	31.47	19,500	.0356	.0436	659
Hen	477.0	30/7	.1261	.1261	.3783	.883	451.0	296.3	747	60.35	39.65	23,800	.0354	.0433	666
Osprey	556.5	18/1	.1758	.1758	.1758	.879	522	82	604	86.45	13.55	13,700	.0308	.0379	711
Parakeet	556.5	24/7	.1523	.1015	.3045	.914	525	192	717	73.23	26.77	19,800	.0307	.0376	721
Dove	556.5	26/7	.1463	.1138	.3414	.927	525	241	766	68.53	31.47	22,600	.0306	.0375	726
Eagle	556.5	30/7	.1362	.1362	.4086	.953	526	346	872	60.35	39.65	27,800	.0303	.0372	734
Peacock	605.0	24/7	.1588	.1059	.3177	.953	571	208	779	73.23	26.77	21,600	.0282	.0346	760
Squab	605.0	26/7	.1525	.1186	.3558	.966	571	262	833	68.53	31.47	24,300	.0281	.0345	765
Wood Duck	605.0	30/7	.1420	.1420	.4260	.994	572	376	948	60.35	39.65	28,900	.0279	.0342	774
Teal	605.0	30/19	.1420	.0852	.4260	.994	572	367	939	60.89	39.11	30,000	.0279	.0342	773
Kingbird	636.0	18/1	.1880	.1880	.1880	.940	597	94	691	86.45	13.55	15,700	.0270	.0332	773
Swift	636.0	36/1	.1329	.1329	.1329	.930	597	47	644	92.80	7.20	13,690	.0271	.0334	789
Rook	636.0	24/7	.1628	.1086	.3255	.978	600	219	819	73.23	26.77	22,000	.0268	.0330	784
Grosbeak	636.0	26/7	.1564	.1216	.3648	.990	600	275	875	68.53	31.47	25,200	.0267	.0328	789
Scoter	636.0	30/7	.1456	.1456	.4368	1.019	601	395	996	60.35	39.65	30,400	.0266	.0325	798
Egret	636.0	30/19	.1456	.0874	.4370	1.019	601	387	988	60.89	39.11	31,500	.0266	.0326	798
Flamingo	666.6	24/7	.1667	.1111	.3333	1.000	629	230	859	73.23	26.77	23,700	.0256	.0315	807
Gannet	666.6	26/7	.1601	.1245	.3735	1.014	628	289	917	68.53	31.47	26,400	.0255	.0313	812
Stilt	715.5	24/7	.1727	.1151	.3453	1.036	675	247	922	73.23	26.77	25,500	.0239	.0294	844
Starling	715.5	26/7	.1659	.1290	.3870	1.051	675	310	985	68.53	31.47	28,400	.0238	.0292	849
Redwing	715.5	30/19	.1544	.0926	.4630	1.081	676	435	1111	60.89	39.11	34,600	.0236	.0290	859
Coot	795.0	36/1	.1486	.1486	.1486	1.040	747	58	805	92.80	7.20	16,710	.0217	.0268	884
Cuckoo	795.0	24/7	.1820	.1213	.3639	1.092	749	274	1024	73.23	26.77	27,900	.0215	.0265	901
Drake	795.0	26/7	.1749	.1360	.4080	1.108	750	344	1094	68.53	31.47	31,500	.0214	.0263	907
Tern	795.0	45/7	.1329	.0886	.2658	1.063	750	146	896	83.69	16.31	22,100	.0216	.0269	887
Condor	795.0	54/7	.1213	.1213	.3639	1.092	750	274	1024	73.25	26.75	26,200	.0215	.0272	889
Mallard	795.0	30/19	.1628	.0977	.4885	1.140	752	483	1235	60.89	39.11	38,400	.0213	.0261	918
Ruddy	900.0	45/7	.1414	.0943	.2829	1.131	849	166	1015	83.69	16.31	24,400	.0191	.0239	958
Canary	900.0	54/7	.1291	.1291	.3873	1.162	849	310	1159	73.25	26.75	31,900	.0190	.0241	961
Rail	954.0	45/7	.1458	.0971	.2913	1.166	900	175	1075	83.69	16.31	25,900	.0180	.0225	993
Cardinal	954.0	54/7	.1329	.1329	.3987	1.196	900	329	1229	73.25	26.75	33,800	.0179	.0228	996
Ortolan	1033.5	45/7	.1515	.1010	.3030	1.212	975	190	1165	83.69	16.31	27,700	.0167	.0209	1043
Curlew	1033.5	54/7	.1383	.1383	.4149	1.246	975	356	1331	73.25	26.75	36,600	.0165	.0211	1047

CSR

ATTN: MARK

COOPER POWER SYSTEMS

quipment Mounts—continued

QUIPMENT CLUSTER-MOUNTING BRACKETS

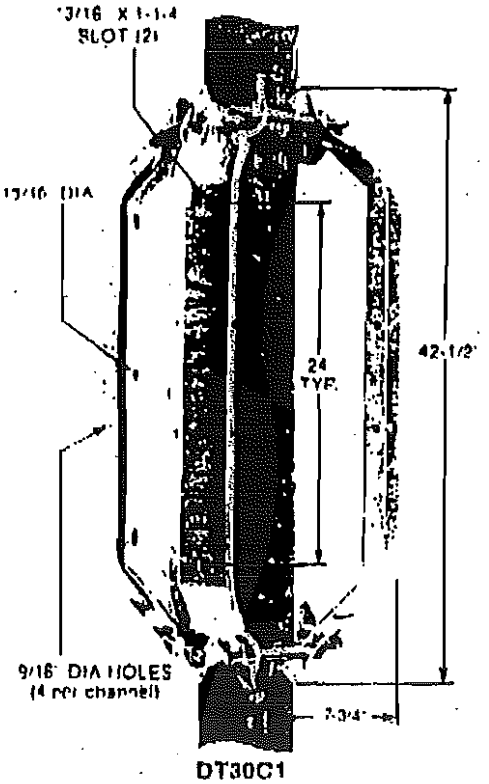
A simplified, labor-saving approach to mounting three transformers rated 3—333 kVA
One-piece, high-strength vertical channels provide 6 in. of pole clearance.
Channel mounting holes are spaced on 12-in centers
Full-threaded bolt tension members provide adjustment to accommodate a wide range of pole diameters
Pole mounting hardware included
Hot-dip galvanized steel for corrosion resistance

DT30C Series
Maximum capacity per position is 3600 lb; maximum total capacity is 10800 lb.
Spacing between top and bottom holes is 24 in
Horizontal adapter plates required for 250—333-kVA transformers (see page 121).

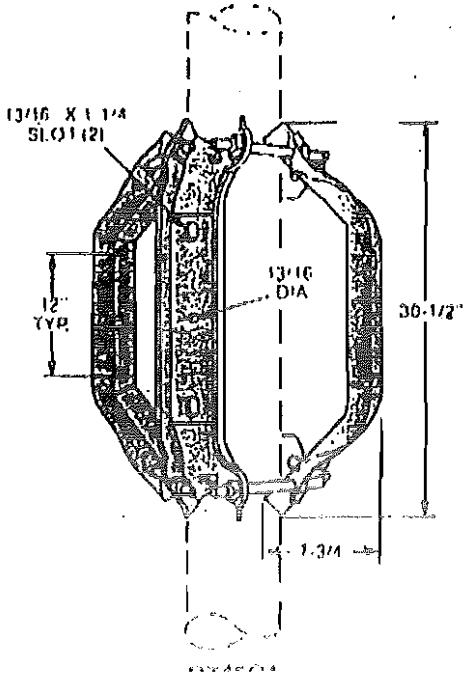
Catalog No.	kVA Range	NEMA Lug Spacing (in.)	Max Capacity per Position (lb)	Total Max Capacity (lb)
DT30C1*	3–333*	12 and 24	3600	10,800
DT46C1	3–50	12	2000	6,000

*Horizontal adapter plates required for transformers with NEMA "C" Lugs

DT46C1
Accommodates transformers ranging from 3—50 kVA
Maximum capacity per position is 1200 lb maximum total capacity is 3600 lb
Fits 7—12-in. pole diameters
Lug spacing is 12 in



DT30C1



Guy Fittings—continued

EYE FASTENERS CONTINUED

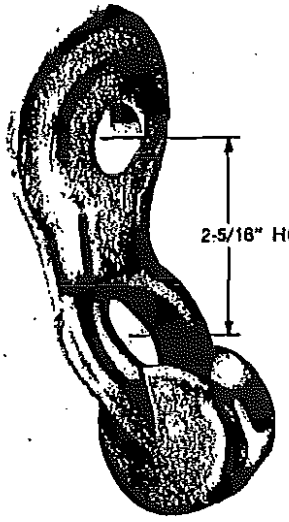
Bolt Eyes (Eyelets) CONTINUED

Single-Strand—Angle Guying

DG11E Series

Forged steel, hot-dip galvanized for corrosion resistance.

Catalog No.	Accommodates Bolt Diameter (in.)	Maximum Strand Size (in.)	Angle
DG11E1□	5/8	1/2	40°
DG11E2	3/4	1/2	40°



DG11E Series

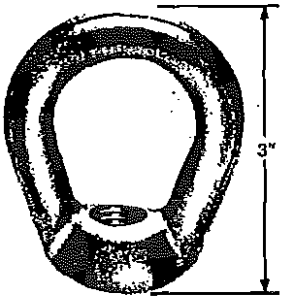
Eyenuts

For attaching guy strands and deadends to poles. Used with double-arming bolts to connect suspension insulators to crossarms.
Tapped for use with industry-standard bolts; strength rating of eyenut is equal to that of bolt.
Order bolts separately (see Page 39).
Forged steel, hot-dip galvanized for corrosion resistance.

Standard

DG2E Series

Catalog No.	Accommodates Bolt Diameter (in.)
DG2E1	3/8
DG2E2	1/2
✳DG2E3□■	5/8
DG2E4	3/4

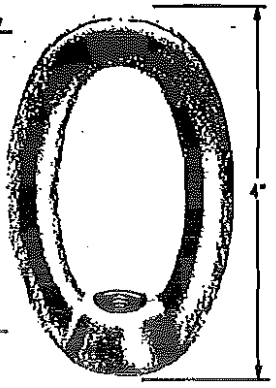


DG2E Series

Extension

DG3E Series

Catalog No.	Accommodates Bolt Diameter (in.)
DG3E1	5/8
DG3E3	3/4



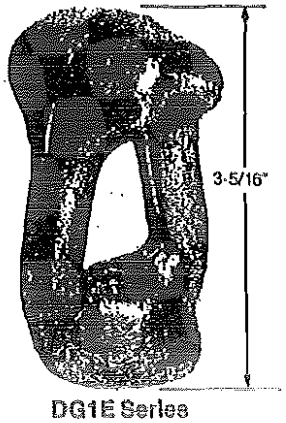
DG3E Series

Single-Strand

DG1E Series

Maximum strand diameter is 1/2 in.

Catalog No.	Accommodates Bolt Diameter (in.)
DG1E1□■	5/8
DG1E2■◊	3/4

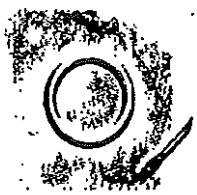


DG1E Series

□ REA-approved.
■ ANSI/NEMA standard.
◊ AT&T specification.

Pole Butt * Grounding Plates

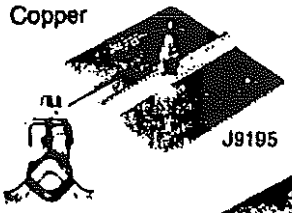
Hot Dip Galvanized



J055W

J055

Copper



J9195

J9196

The embossed ring on both sides of Joslyn Pole Butt Grounding Plates assures permanent, positive contact with the earth.

The J055W has 8-feet of No. 6 AWG insulated copper lead for connecting a copper or aluminum ground wire above grade. A specially designed stainless steel compression connector isolates the plate from the lead to prevent galvanic and electrolytic corrosion.

The J055 features a galvanized steel parallel groove clamp for galvanized iron ground wire.

Copper Pole Butt Grounding Plates provide an inexpensive method of maintaining a low resistance neutral for multigrounded neutral construction. Plates are made of heavy gauge copper and include nail holes.

Stock No.	Plate Size Inches	Approx. Shp. Wt. Lbs. per 100 pcs.	Std. Pkg. Qty.
Hot Dip Galvanized			
J055W (E)	16 Ga. x 7-1/2 x 7-1/2	212	35
J055 (E)	16 Ga. x 7-1/2 x 7-1/2	145	35

(E) REA Electrical Approved, Item dh

For Prices See "HJ" Sheet

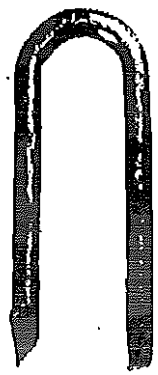
Stock No.	Plate Size Inches	Connector Type	Wt. per 100 pcs.	Std. Pkg.
Copper				
J9195	7 x 7-1/2	Eyebolt & Base Casting	62	50
J9196 (E)	7 x 7-1/2	Set Screw Terminal Lug	52	50

(E) REA Electrical Approved, Item dh

For Prices See "C" Sheet

Staples *

Coppercoated
Hot Dip Galvanized
Electro-Galvanized
Mill Galvanized
Alumoweld®
(EEI Specification TDJ-14)



Cut Point

Joslyn coppercoated, hot dip galvanized, electro-galvanized, mill galvanized and Alumoweld staples are used to secure ground wire and ground wire molding to wood poles.

FOR GROUND WIRE

Stock No.	Finish	Dimensions (in.) Length x Inside Width x Wire Dia.	Approx. Weight per 100 Staples (Lbs.)	Pcs. per 50 Lb. Std. Carton
Cut Point				
J6651	Coppercoated	1-3/8 x 1/2 x .162	1.6	3,100
* J6652 (E)	Coppercoated	1-1/2 x 3/8 x .162	1.8	2,900
J6653	Coppercoated	2 x 1/4 x .162	2.2	2,200
J6654	Coppercoated	1-1/4 x 3/16 x .114	.8	6,700
J6655	Coppercoated	2 x 1/2 x .162	2.3	2,200
J1672G (E)	Hot Dip Galv.	1-1/2 x 1/4 x .148	1.4	3,650
J7495	Electro-Galv.	1-1/2 x 3/16 x .148	1.4	3,600
J7496	Electro-Galv.	1-3/4 x 3/8 x .148	1.6	3,100
J7497	Electro-Galv.	2 x 1/2 x .162	2.2	2,300
J7498	Electro-Galv.	2-1/4 x 7/8 x 3/16	4.2	1,200
J1672	Mill Galv.	1-1/2 x 1/4 x .148	1.4	3,650
J1673	Mill Galv.	1-3/4 x 1/4 x .148	2.0	2,500

(E) REA Electrical Approved, Item al
For Prices See "E" Sheet

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CABLE

Type SEU Service Entrance Cable

Copper and Aluminum Conductor
600 Volts to Ground

Two Type XHHW conductors insulated with cross linked Polyethylene are laid parallel with a bare concentric neutral over them and gray PVC overall jacket. One cable for entire service between line or entrance cap to meter, switch or range receptacle. Approved by UL for use without conduit.

Conductors Insul. Size AWG	Power No. Strands	Neutral Size AWG	Insul. Thick. In.	Jacket Thick. In.	OD In.	Net Wt. Lbs. M Ft.
Copper Conductors						
10	1	10	.030	030	.28 × .44	136
8	7	8	.045	.030	37 × 62	220
8	7	8	.045	030	.41 × .69	290
6	7	6	.045	.030	.42 × .70	325
4	7	4	045	.030	.49 × .82	485
3	7	3	.045	.030	.53 × .86	595
2	7	2	.045	030	57 × 96	740
Compact Aluminum Conductors						
8	1	8	.045	.030	.39 × .62	98
6	7	6	.045	.030	.43 × .70	135
4	7	6	.045	.030	.48 × .78	176
4	7	4	.045	030	48 × 78	190
2	7	4	045	030	52 × .89	252
2	7	2	045	039	55 × .91	274
1	19	1	.055	.030	.61 × .02	343
1/0	19	2	.055	045	64 × 1.08	379
1/0	19	1/0	055	045	67 × 1 11	416
2/0	19	1	.055	045	69 × 1 17	457
2/0	19	2/0	.055	.045	.72 × 1.28	505
4/0	19	2/0	.055	045	82 × 1.40	682
4/0	19	4/0	056	045	86 × 1 44	755

Packaging. Sizes 12 thru 8 AWG, 250' coil, 6 AWG, 200' coil; 4 thru 3 AWG, 150' coil, 2 AWG, 100' coil, 1 AWG and larger, cutting lengths as desired

WIRE

Bare Copper Wire

Conforms to American Society for Testing And Materials Specification.

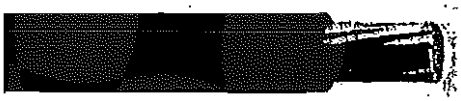
Size AWG	Solid Dia. In.	Class B Stranding No. Strands	Dia. In.
14	0641	7	073
12	0808	7	092
10	.1019	7	116
9	1144	7	130
8	1285	7	146
6	1620	7	184
4	2043	7	232
2	2576	7	292
1	2893	19	332
1/0	3249	19	373
2/0	3648	19	419
3/0	4096	19	470
4/0	4600	19	526
250MCM		37	575
300MCM		37	630
350MCM		37	681
400MCM		37	728
500MCM		37	.813
600MCM		61	.893
750MCM		61	998
1000MCM		61	1 152

Note: Available in Hard Drawn, Medium Hard Drawn and Annealed (Soft Drawn)
Lengths as desired.
Distribution packages of Soft Drawn sizes 14 thru 4 AWG available on 25-lb spools

WIRE

Type XHHW Building Wire

Aluminum Conductor—600 Volts



Used primarily in conduit, duct, or other recognized raceways for services, feeders, and branch circuit wiring. Compact stranded aluminum alloy single conductor with black crosslinked polyethylene insulation. Abrasion, high heat, and moisture resistant May be used in wet or dry locations. UL listed.

Temperature: Maximum 90°C dry, 75°C wet.

Put-up: 500' and 1000' reels. Other put-ups also available.

Conductor AWG	No.	Strand	Size, In. Insul.	OD	Weight Lbs./M'
8	1	7	045	224	28
6	1	7	045	260	40
4	1	7	045	305	58
2	1	7	045	.360	86
1	1	19	055	415	109
1/0	1	19	055	450	133
2/0	1	19	055	490	162
3/0	1	19	055	540	199
4/0	1	19	055	590	245
250MCM	1	37	065	660	294
300MCM	1	37	065	715	347
350MCM	1	37	065	760	398
400MCM	1	37	065	800	450
500MCM	1	37	065	880	552
600MCM	1	61	080	980	672
700MCM	1	61	080	1 050	774
750MCM	1	61	080	1 090	825
1000MCM	1	61	080	1 230	1077

Note: For Stock Color availability contact your representative

WIRE

Type RHH/RHW/USE Building Wire

Aluminum Conductor—600 Volts

Compact stranded aluminum conductors with black interlinked polyethylene insulation for abrasion, moisture, heat, and sunlight resistant.

May also be used as underground service entrance cable, for direct burial, at conductor temperatures not to exceed 75°C When used as RHW, conductor temperatures shall not exceed 75°C in wet or dry locations When used as RHH, conductor temperatures shall not exceed 90°C in dry locations UL listed

Temperature. Maximum 90°C dry, 75°C wet

Put-up 500' and 1000' reels Other put-ups also available

Conductor AWG	No.	Strand	Size, In. Insul.	OD	Weight Lbs./M'
8	1	7	.060	.254	36
6	1	7	.060	.290	49
4	1	7	.060	.334	65
2	1	7	.060	.390	94
1	1	19	.080	.468	126
1/0	1	19	.080	.506	150
2/0	1	19	.080	.547	181
3/0	1	19	.080	.596	220
4/0	1	19	.080	.649	268
250MCM	1	37	.095	.726	325
300MCM	1	37	.095	.777	379
350MCM	1	37	.095	.824	433
400MCM	1	37	.095	.868	487
500MCM	1	37	.095	.940	591
700MCM	1	61	.110	1.110	821
750MCM	1	61	.110	1.140	873
1000MCM	1	61	.110	1.285	1132

Note: For Stock Color availability, contact your representative.

CABLE

Aluminum Type Use—RHW-RHH Cross-Linked Polyethylene Cable

600 Volt
For Aerial and Direct Burial Conduit and Underground Duct
Wet or Dry Locations - 75°C
Dry Locations - 90°C

Size AWG	Strands	O.D. In.	Lbs. M ft.
6	7	.31	50
4	7	.36	66
2	7	.42	94
1	19	.49	128
1/0	19	.53	152
2/0	19	.57	184
3/0	19	.62	223
4/0	19	.68	269
250MCM	37	.77	343
300MCM	37	.82	382
350MCM	37	.87	437
400MCM	37	.92	488
500MCM	37	1.01	593
600MCM	61	1.11	723
700MCM	61	1.18	830
750MCM	61	1.22	880
1000MCM	61	1.37	1176

CABLE

Aluminum Type SE, Style U—600V Entrance Cable

Plastic Jacket

Construction. Aluminum conductors. Heat and moisture-resistant. Each conductor wrapped in color-coded tape. Uninsulated neutral concentrically laid around insulated conductors. 70°-90°C

Ins Cond	Bare Cond.	Lbs. 1000'	Std. Pkg. Ft.
Coils			
2 #8	1 #8	179	250
2 #6	1 #6	198	250
2 #4	1 #6	266	200
2 #4	1 #4	285	200
2 #2	1 #4	355	200
2 #2	1 #2	379	200

Fasteners – continued

BOLTS CONTINUED

Machine
CONTINUED

5/8-In. Diameter
DF3B Series*

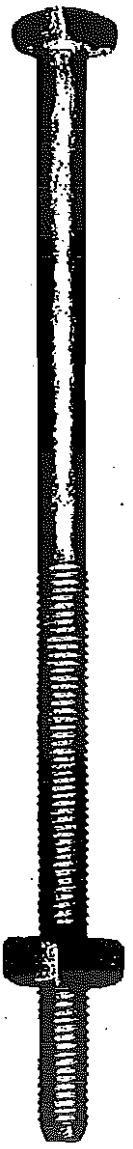
Catalog No.	Bolt Length (In.)	Min Thread Length (In.)
DF3B150	1-1/2	1-1/2
DF3B175	1-3/4	1-1/2
DF3B2	2	1-1/2
DF3B250	2-1/2	1-1/2
DF3B3	3	1-1/2
DF3B350	3-1/2	1-3/4
DF3B4	4	3
DF3B5	5	3
DF3B6□■	6	3
DF3B7□	7	4
* DF3B8□■	8	4
DF3B9□	9	4
* DF3B10□■	10	6
* DF3B12□■	12	6
* DF3B14□■	14	6
* DF3B16□■	16	6
DF3B18□■	18	6
DF3B20□■	20	6
DF3B22□	22	6
DF3B24□	24	6
DF3B26	26	6
DF3B28	28	6
DF3B30	30	6

*Cone points on bolts 8 in. and longer ease nut starting; bolts shorter than 8 in. have blunt ends.

3/4-In. Diameter
DF4B Series*

Catalog No.	Bolt Length (In.)	Min Thread Length (In.)
DF4B2	2	1-3/4
DF4B250	2-1/2	2-1/8
DF4B3	3	1-3/4
DF4B350	3-1/2	1-3/4
DF4B6□	6	3
DF4B7□	7	4
DF4B8□■	8	4
DF4B10□■	10	4
DF4B12□■	12	6
DF4B14□■	14	6
DF4B16□■	16	6
DF4B18□■	18	6
DF4B20□	20	6
DF4B22□	22	6
DF4B24□	24	6
DF4B26□	26	6
DF4B28	28	6

*Cone points on bolts 8 in. and longer ease nut starting. Bolts shorter than 8 in. have blunt ends.



DF3B Series

7/8-In. Diameter
DF5B Series*

Catalog No.	Bolt Length (In.)	Min Thread Length (In.)
DF5B12□■	12	6
DF5B14□■	14	6
DF5B16□■	16	6
DF5B18□■	18	6
DF5B20□	20	6
DF5B22□	22	6
DF5B24□	24	6

*All lengths have blunt ends

□ REA-approved.
■ ANSI/NEMA standard.
◇ AT&T specification.

NATIONAL STRAND PRODUCTS, INC.

				Minimum Breaking Strength In Pounds					Minimum Weight of Coating OZ/SQ.FT		
Strand Diameter: Inches	Coated Wire Diameter: Inches	Wires Per Strand	Weight/1000 Ft. Pounds	Common Grade	Siemens-Martin Grade	High Strength Grade	Extra High Strength Grade	Utilities Grade	Class A	Class B	Class C
3/16"	.062	7	73	1150	1900	2850	3990		.5	1.0	1.5
3/16"	.065	7	80					2400	.5	1.0	1.5
1/4"	.080	7	121	1900	3150	4750	6650		.6	1.2	1.8
5/16"	.104	7	205	3200	5350	8000	11200		.8	1.6	2.4
5/16"	.109	7	225					6000	.8	1.6	2.4
* 3/8"	.120	7	273	4250	6950	10800	15400	11500	.85	1.7	2.55
7/16"	.145	7	399	5700	9350	14500	20800	18000	.9	1.8	2.7
* 1/2"	.165	7	517	7400	12100	18800	26900	25000	.9	1.8	2.7
9/16"	.188	7	671	9600	15700	24500	35000		1.0	2.0	3.0
5/8"	.207	[redacted]	813	11600	19100	29600	42400		1.0	2.0	3.0
3/4"	.150	19	1155	16000	26200	40800	58300		.9	1.8	2.7
7/8"	.177	19	1581	21900	35900	55800	79700		.9	1.8	2.7
1"	.200	19	2073	28700	47000	73200	104500		1.0	2.0	3.0
5/16"	.145	3	171	SPECIAL "BB" GRADE 3490# MIN. BREAKING STRENGTH							2.70

CHANCE

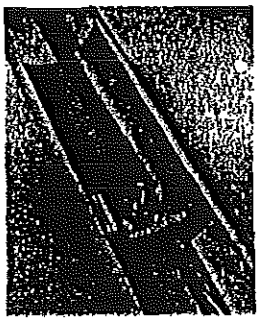
[redacted]

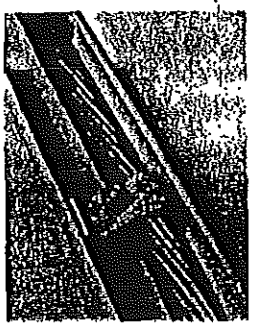
GUY MARKERS

HALF-ROUND MARKERS

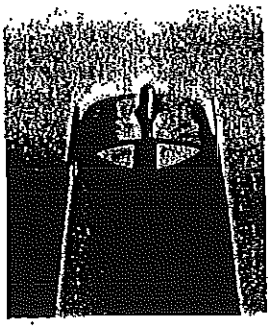
Chance plastic markers offer better color retention and higher impact resistance than PVC and ABS plastic markers. Made from an MPO formulation, markers come in orange, yellow and gray. They resist whitening and have high impact resistance. Markers don't become brittle when cold. They cover completely from the ground up. Markers attach to any 3/16 to 3/4-inch guy strands. Clamps are located at top, middle and lower end of marker.

Each PBG is furnished with a one-bolt hardware clamp at the lower end to fit all types of guy attachments and two one-bolt strand clamps at the middle that adapts to fit guy wires from 3/16" through 3/4".





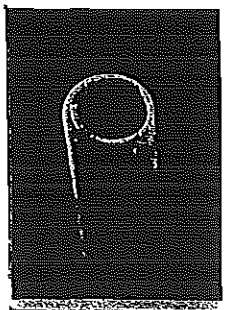
Convertible Strand Clamp



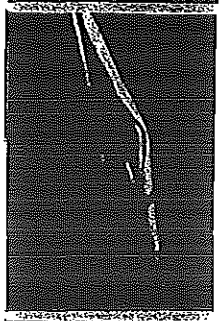
Hardware Clamp

Catalog Number			Dimensions		Strand Range	Std. Pkg.	Wt. Per 100 Pcs.
Gray	Yellow	Orange	Length	Width			
84 PBG-2	84 PBG-2Y	84 PBG-20RG	84"	2"	3/16" thru 3/4"	12	150
†96 PBG-2	†96 PBG-2Y	†96 PBG-20RG	96"	2"	3/16" thru 3/4"	12	175
	84 PBG-3Y		84"	3"	3/16" thru 3/4"	6	160
96 PBG-3	96 PBG-3Y	96 PBG-30RG	96"	3"	3/16" thru 3/4"	6	216

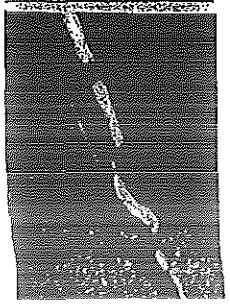
†REA Accepted



Full Round Construction



Over the rod



Above the rod

ECONOMY FULL-ROUND MARKERS

Bright, high visibility markers neither bleach out to white nor crack from cold temperatures. Made of ultraviolet-stabilized high-density polyethylene, overlapping tube-like design offers full-length coverage and is the most vandal-resistant marker on the market.

Easy installation requires no tools. Replaceable standard tie strap allows the markers to be reused. Three holes permit the black self-locking nylon strap (furnished) to secure the lower end in a choice of two attachment methods. Either above or over the anchor rod, illustrated below. This fastening design eliminates the cutaway section that would weaken its resistance to breaking.

The economy marker is available in high visibility 8 ft. long, 1 1/8" O.D., bright yellow sections.

ORDERING INFORMATION

Catalog Number	Dimensions			Per Carton	Weight per
96 FRPE	8 ft.	1 1/8"	Bright Yellow	25	96 lbs

Guy Fittings—continued

EYE FASTENERS [redacted]

Single-Strand Eyebolts

Forged steel eyebolt for attaching guy strands to poles and crossarms, deadending, and down-guying.
Eye contour prevents bending of guy strand.
Cone points ease nut starting.
Hot-dip galvanized for corrosion resistance.

Straight
DG1F Series*

Catalog No.	Diameter (in.)	Length (in.)	Minimum Thread Length (in.)
DG1F8□	5/8	8	4
DG1F10□■	5/8	10	4
DG1F12□■	5/8	12	6
DG1F14■	5/8	14	6
DG1F16	5/8	16	6
DG1F18	5/8	18	6

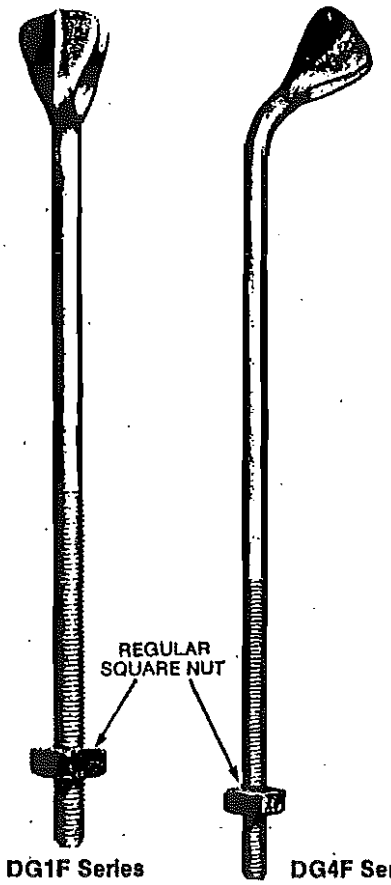
*Includes regular square nut.

Need 3/4"

Angle
DG4F Series*

Catalog No.	Diameter (in.)	Length (in.)	Minimum Thread Length (in.)
DG4F8□■	5/8	8	4
DG4F10□■	5/8	10	4
DG4F12□■	5/8	12	6
DG4F14■	5/8	14	6
DG4F16	5/8	16	6

*Includes regular square nut.



DG1F Series DG4F Series

Bolt Eyes (Eyelets)

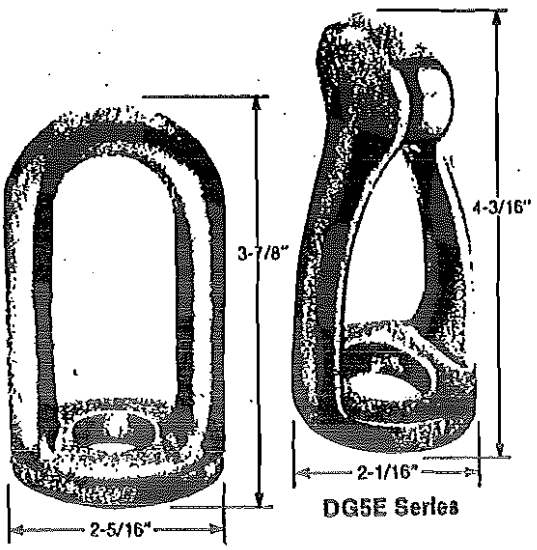
Used for guying, deadending, or fastening suspension insulators to crossarms.
Order bolts separately (see Section 4).
Ductile iron, hot-dip galvanized for corrosion resistance.

Standard—Straight Guying
DG6E Series

Catalog No.	Mounting Slot Size (in.)	Accommodates Bolt Diameter (in.)
DG6E1□■	1 X 11/16	5/8
DG6E3■	1-1/8 X 13/16	3/4

Single-Strand—Straight Guying
DG5E Series
Maximum strand diameter is 1/2 in.

Catalog No.	Mounting Slot Size (in.)	Accommodates Bolt Diameter (in.)
DG5E1	1 X 11/16	5/8
DG5E2	1-1/8 X 13/16	3/4



DG6E Series DG5E Series

□ REA-approved.
■ ANSI/NEMA standard.

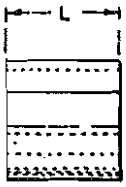
[redacted]

TYPE YC-U

✳ UNIVERSAL CRIMPIT

LINE TAP COMBINATIONS OF COPPER, ALUMINUM, ACSR, 6201, 5005 & COMPRESSED AND COMPACT CONDUCTORS

Figure "6" -shaped, wide range-taking aluminum compression tap connector for smaller primary service taps and secondary service drops. Minimizes galvanic corrosion of conductors. Connector can be gripped in tool and slipped over line for easy installation. Installed with aluminum CRIMPIT dies. Pre-filled with PENETROX joint compound and Stripsealed.



CATALOG NUMBER	RUN		TAP		L	DIE INDEX	TOOLS, DIE SET CATALOG NO.,& NUMBER OF CRIMPS	
	ALUM.,& COPPER	ACSR, 6201, &5055	ACSR, 6201, &5005	ALUM.,&COPPER			Y35, Y750, Y45†, Y46‡	
YC4U1	4 Sol.-4 Str.	4	6 Sol. - 1 Str.	6 - 2	1-7/8	D*	U-D	2
YC1U1 ✳	2 Str.-1 Str.	✳ 2						
[illegible]8U26	1/0 Str.-4/0 Str.	1/0-4/0	6 Sol. - 2/0 Str.	6 - 1/0	2-1/8	H	U-H	2
[illegible]426U	300-400	266.8(6-7)-336.4 (30-7)				R	U-R	2

* Die Index "D" is not Die Index "D3" (Cabelok & Universal CRIMPIT Die).
† U Die with adapter PT-6515.
‡ U Die with adapter P-UADP.

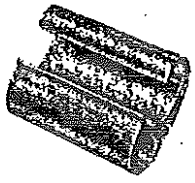
E-23

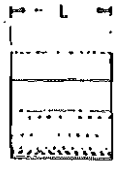
TYPE YPC-A-U, YPC-R-U

✳ CRIMPIT

STREET LIGHTING TAP FOR COMBINATIONS OF COPPER, ALUMINUM, ACSR, COMPRESSED AND COMPACT CONDUCTORS

Compact compression connector designed to tap small lighting wires from secondaries. Figure "6" -shape separates run and tap, and minimizes galvanic corrosion. Connector can be gripped in tool and slipped over line for easier installation. Pre-filled with PENETROX joint compound and Stripsealed.





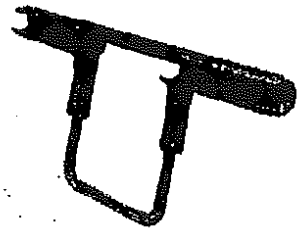
CATALOG NUMBER	RUN				TAP	L	DIE INDEX	TOOLS, DIE SET CATALOG NO., & NUMBER OF CRIMPS				OUR840
	ACSR	COMPRESSED ACSR	ALUM. & COPPER	COMPRESSED ALUMINUM	ALUM. & COPPER			MD6		Y35, Y750, Y45†, Y46‡		
[illegible]2A6U	6 - 4	6 - 2	4 - 2 Sol. 6 - 2 Str.	4 - 2	14 Sol. - 8 Str.	5/8	BG or 5/8	BG W-BG	2 1*	U-BG	1*	XBG
[illegible]6U	2 - 3/0	1 - 3/0	1 - 3/0 Str.	1/0 - 3/0		3/4	0	W-O	2	U-O	1	W-O

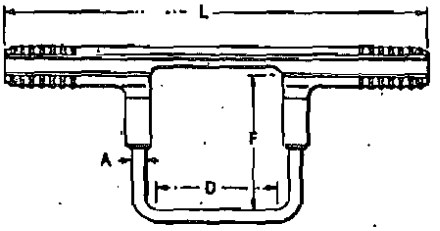
* Multiple crimp die set, makes more than one crimp per tool compression. Figure indicates number of compressions.
† U Die with adapter PT-6515.
‡ U Die with adapter P-UADP.

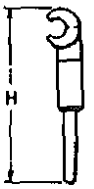
TYPE YCB-R

STIRRUP HOT-LINE CLAMP ADAPTERS FOR ALUMINUM, ACSR, 6201, 5005, COMPRESSED AND COMPACT CONDUCTORS

Permanent compression hot-line clamp adapter with aluminum run and copper bail. Accommodates any standard copper hot-line clamp on bail elements. Permits hot-line tapping without arcing or chafing damage to aluminum conductor. Installed with standard tools and dies.







CATALOG NUMBER	ALUMINUM	ACSR, 6201, 5005	A	H	L	D	F	DIE INDEX	TOOLS, DIE SET CATALOG NO., & CRIMPS PER END: MD6		Y35, Y75, Y45†, Y46‡	
YCB2R*	2 Str.-6 Sol.	2-4	2 Sol.	3-3/4	9	2-1/2	2-1/2	BG	BG W-BG	6 2*	U-BG	2*
YCB25R	1/0 (7, 19)	1/0-80 (8-1)		5	9-3/4			C	W-C	4	U-C	2*
YCB26R	2/0 (7, 19)	2/0	1/0 Sol.		11-1/8	3-1/2	3-1/2	L	W-L	4	U-L	2
YCB27R	3/0 (7,19)	3/0										
YCB28R	4/0 (7,19)	4/0										
[redacted]	350 (19,37) 336.4 (19, 37)	[redacted]		5-3/8	12-3/4			M	—		U-M	3
YCB33R	400 (19. 37) 397.5 (19.37)	336.4 (26-7), (30-7) 397.5 (18-1)										
YCB35R	500 (37, 61) 477 (19, 37)	397.5 (26-7) (30-7)										
YCB361R	477 (19, 37)	477 (18-1)		5-1/4	13-1/4			317			U317	3

* Multiple crimp die set, makes more than one crimp per tool compression. Figure indicates number of compressions.
† U Die with adapter PT-6515
‡ U Die with adapter P-UADP.

SECTION C

[redacted]

HOT LINE AND STIRRUP CONNECTORS

ALUMINUM ENERGIZED LINE CLAMP TYPES AH/AC

ALUMINUM
AH/AC

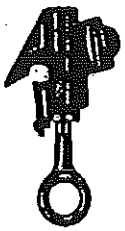


FIGURE 1

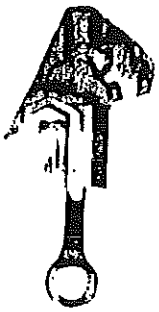


FIGURE 2

For aluminum, ACSR, and armor rod covered aluminum or ACSR conductor.

For installation on energized conductor.

Material: Body and Keeper-AH/AC—Aluminum alloy
Eyebolt—Bronze—tin plated
Eyestem—Bronze alloy, Forged—AH-00, AH-4 & AC 500
Eyestem—Bronze alloy, Cast—AH-7
Spring (on eyestem)—Stainless Steel

Note: For connectors with sealant in main jaw and plastic bag, add suffix "-XB" to catalog number.

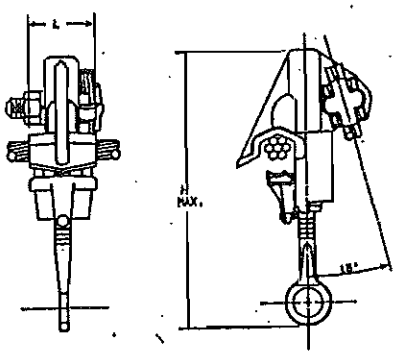


FIGURE 3

CATALOG NUMBER	FIG. NO.	CONDUCTOR RANGE (AWG or MCM) MAIN AAC	MAIN AAC WITH A/R	MAIN ACSR	MAIN ACSR WITH A/R	TAP AAC/CU	TAP ACSR	DIMENSIONS INCHES (MM) L	DIMENSIONS INCHES (MM) H	APPROX. WT. EACH LBS. (KG.)
AH-00	1	#8 Sol.—2/0 Str.	#6—#4 Str.	#8—2/0	#6—#5	#8 Sol.—2/0 Str.	#8—1/0	1-9/32 (39.67)	4-7/8 (123.82)	.48 (12.19)
* AH-00-GP	1	.128"—.477"				.128"—.419"				
AH-4	2	#8 Sol.—600 MCM	#6 Str.—3/0 Str.	#8—556.65 (18/1)	#6—3/0	#8 Sol.—266.8 Str.	#6—4/0	1-3/4 (44.45)	7-3/8 (187.3)	.76 (.34)
* AH-4-GP	2	.157"—.905"				.157"—.593"				
AH-7	3	4/0 Str.—800 MCM	#4 Str.—4/0	3/0 (6/1) 636 (30/19)	#4—266.8	#4 Sol.—350 MCM	#6—266.8	1-13/16 (46.0)	7-5/16 (185.8)	.98 (.45)
AH-7-GP	3	.502"—1.031"				.198"—.703"				
AC-500	2	#6 Sol.—600 MCM	#6—3/0	#8—556.5 18/1	#6—3/0	#6 Sol.—266.8 Str.	#6—4/0	1-3/4 (44.4)	7-3/8 (187.3)	.76 (.34)
AC-500-GP	2	.157"—.905"				.157"—.593"				

[redacted]

HELICAL
BIG GRIPS

SECTION IV
GUYING

[redacted]

GALVANIZED STEEL BIG GRIP

"C" GRADE GALVANIZED STEEL HELI BIG GRIP							
Catalog Number	Per Carton		Applied Length	Color Code	Rated Strength	Galvanized Steel Strand	
	Units	Wt./Lbs.				Size	Type
HBG 312 1/2	20	62	49	Blue	20,000	1/2"	7W-19W
HBG 313 9/16	15	67	55	Yellow	35,000	9/16"	7W-19W
HBG 314 5/8	10	53	60	Black	44,000	5/8"	7W-19W

ALL BIG GRIPS ARE TWISTED LOOP DESIGN. LEFT HAND LAY. DIMENSIONS ARE IN INCHES. WEIGHTS ARE IN POUNDS.

ALUMINUM COVERED STEEL BIG GRIP

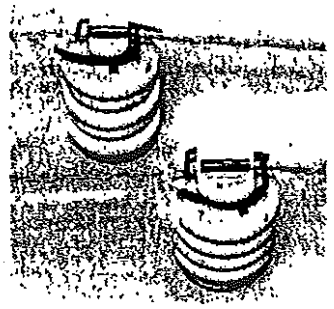
ALUMIWELD HELI BIG GRIP DEADENDS								
Catalog Number	Per Carton		Applied Length	Color Code	Rated Strength	Aluminum Covered Steel Strand		
	Units	Wt./Lbs.						
HBG 530-7 #6	25	54	42	Blue	22,750		1/2"	7 #6
HBG 531-25M	25	54	47	Red	25,000	25M		19 #10
HBG 532-7 #6 19 #9	15	51	53	Yellow	27,030 34,250			7 #6 19 #9

ALL BIG GRIPS ARE TWISTED LOOP DESIGN. LEFT HAND LAY. DIMENSIONS ARE IN INCHES. WEIGHTS ARE IN POUNDS.

HUBBELL® CHANCE®

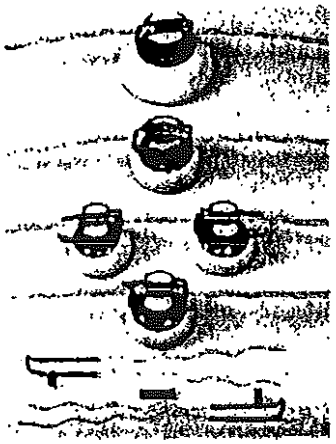
SUPER TOP-TIE® Line Ties

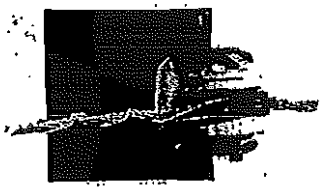
• for Pin, Post and Spool Insulators

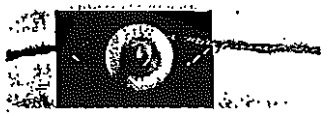


Made of aluminum-clad steel compatible with aluminum, aluminum-alloy and ACSR conductors in the top grooves of vertical-mounted *ANSI Class C, F, J and many non-standard pin and post insulators (single-or double-support) or on *ANSI 53-2 spool insulators (horizontal or vertical).

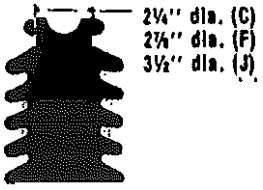
High-density polyethylene hooks provide the wide application range and ensure proper installation. If used over armor rods (not required), select tie size based on total conductor/armor diameter. Semiconductive-rubber pad and high-density-polyethylene on loops protect against abrasion of insulator, conductor and tie. Fit is resilient and provides superior performance under galloping and aeolian vibration. Install by hand or with hot-line tools.



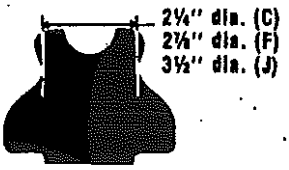




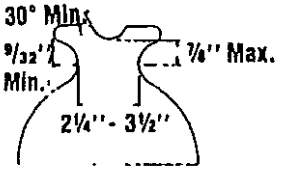
Manufactured and/or for use under U.S. Patent 4,015,073.



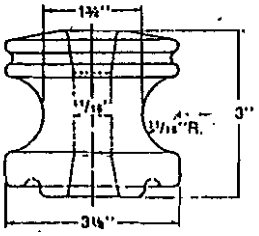
POST INSULATOR



PIN INSULATOR



NON-STANDARD INSULATOR



ANSI 53-2 SPOOL

Super Top-Tie STT-10 — STT-130 also fit many foreign or reclaimed pin and post insulators with neck sizes 2¼" - 3½". *Super Top-Tie STT-140 applies only on ANSI F & J pin and post insulators (no spools), also fits many foreign or reclaimed pins and posts with neck sizes 2⅞" - 3½". **Consult Chance Co. for use on pins and posts outside these dimensions.**

ORDERING INFORMATION

Catalog Number	Aluminum-Type Conductors, Typical Sizes				Color Code	Std. Pkg.	Wt. Per 100, Lb.
	AAC (All-Aluminum)	AAAC (Alum.-Alloy)	ACSR	Diameter Range			
STT-10	#6, 7W	#6, 7W	#6, 6/1	.184-.220" (4.67-5.59 mm)	None	50	28
STT-20	#4, 7W	#4, 7W	#4, 6/1	.221-.257" (5.61-6.53 mm)	Orange	50	28
STT-30	#3, 7W	#3, 7W	#3, 6/1	.258-.289" (6.55-7.34 mm)	Purple	50	28
* STT-40	#2, 7W	#2, 7W	#2, 6/1	.290-.325" (7.37-8.26 mm)	Red	50	28
STT-50	#1, 7W	#1, 7W	#1, 6/1	.326-.360" (8.28-9.14 mm)	Gray	50	28
STT-60	1/0, 7W	1/0, 7W	1/0, 6/1	.361-.409" (9.17-10.39 mm)	Yellow	50	32
STT-70	2/0, 7W	2/0, 7W	2/0, 6/1	.410-.460" (10.41-11.68 mm)	Blue	50	32
STT-80	3/0, 7W	3/0, 7W	3/0, 6/1	.461-.516" (11.71-13.11 mm)	Black	50	32
STT-90	4/0, 7W	4/0, 7W	4/0, 6/1	.517-.584" (13.13-14.83 mm)	Pink	50	32
STT-100	266.8, 19W	266.8, 19W	266.8, 18/1	.585-.664" (14.86-16.87 mm)	Green	50	32
STT-110	336.4, 19W	336.4, 19W	336.4, 18/1	.665-.755" (16.89-19.18 mm)	Brown	50	40
STT-120	477, 19W	477, 19W	477, 18/1	.756-.859" (19.20-21.82 mm)	Violet	50	40
STT-130	636, 37W	556.5, 19W	556.5, 18/1	.860-.977" (21.84-24.82 mm)	Gold	50	40
*STT-140	795, 37W	795, 37W	795, 36/1	.978-1.108" (24.84-28.14 mm)	None	50	40

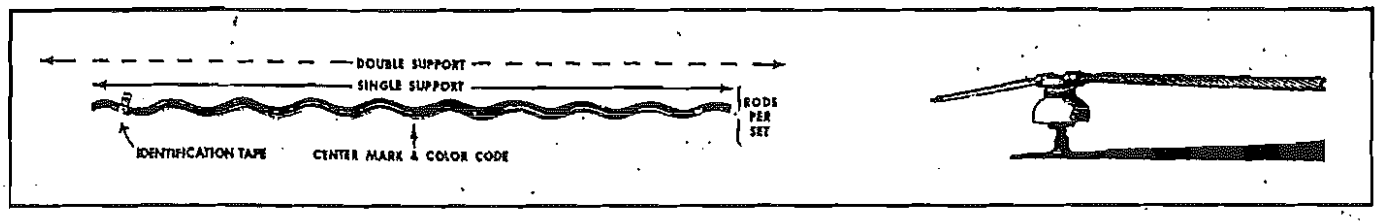
LEFT-HAND LAY STANDARD

- Applied Length: 29" - 46" (Depends on insulator make and conductor size).
- Strength: Exceeds Rule 251E.2(A) of National Electrical Safety Code.
- REA accepted.
- To obtain outside diameters of conductors not shown, but which fall within the diameter range, consult Conductor Chart page 15-30.

YANYO Inc.

Armor Rods

Armor Rods are designed to protect against bending, compression, abrasion and arc-over. Recommended for clamp-type supports and hand-tied spans of 300 feet or more.



Cat. No.	Dia. Range min.	max.	Conductor Size	Length	Rod Dia.	Color Code	Std. Pkg. Qty.
550300	.244"	.259"	4	40" Single	.146"	Orange	50
550306	.244"	.259"	4	52" Dbl.	.146"	Orange	50
550310	.290"	.308"	2	42" Single	.146"	Purple	50
* 550320	.309"	.326"	2	44" Single	.136"	Red	50
550324	.309"	.326"	2	56" Dbl.	.136"	Red	50
550350	.390"	.413"	1/0	52" Single	.167"	Yellow	50
550351	.390"	.413"	1/0	64" Dbl.	.167"	Yellow	50
550360	.437"	.463"	2/0	54" Single	.167"	Blue	50
550361	.437"	.463"	2/0	66" Dbl.	.167"	Blue	50
550370	.491"	.521"	3/0	68" Dbl.	.167"	Orange	25
550380	.522"	.551"	4/0	58" Single	.167"	Black	25
550381	.522"	.551"	4/0	70" Dbl.	.167"	Black	25
550390	.552"	.585"	4/0	60" Single	.182"	Red	25
550391	.552"	.585"	4/0	72" Dbl.	.182"	Red	25
550410	.631"	.655"	266.8	66" Single	.182"	Yellow	25
550411	.631"	.655"	266.8	76" Dbl.	.182"	Yellow	25
550420	.656"	.679"	336.4	66" Single	.182"	Brown	18
550425	.656"	.679"	336.4	78" Dbl.	.182"	Brown	18
550440	.704"	.740"	336.4	72" Single	.204"	Green	18
550445	.704"	.740"	336.4	84" Dbl.	.204	Green	18

Larger sizes available upon request.

Fasteners – continued

BOLTS CONTINUED

Double-Arming

Rolled threads assure uniformity and strength.
Cone points ease nut starting.
Hot-dip galvanized steel for corrosion resistance.

5/8-In. Diameter

Length* (in.)	No. of Regular Square Nuts Supplied			
	4	3	2	None
8	DF2D8	—	DF8D8	—
10	DF2D10	—	DF8D10	DF17D10
12	DF2D12□■	—	DF8D12	DF17D12
14	DF2D14□■	DF12D14	DF8D14	DF17D14
16	DF2D16□■	DF12D16	DF8D16	DF17D16
18	DF2D18□■	DF12D18	DF8D18	DF17D18
20	DF2D20□■	DF12D20	—	DF17D20
22	DF2D22□■	DF12D22	—	DF17D22
24	DF2D24□■	DF12D24	—	DF17D24
26	DF2D26	DF12D26	—	DF17D26
28	DF2D28	DF12D28	—	—
30	DF2D30	DF12D30	—	DF17D30
32	DF2D32	DF12D32	—	—
34	DF2D34	—	—	—
36	DF2D36	—	—	—

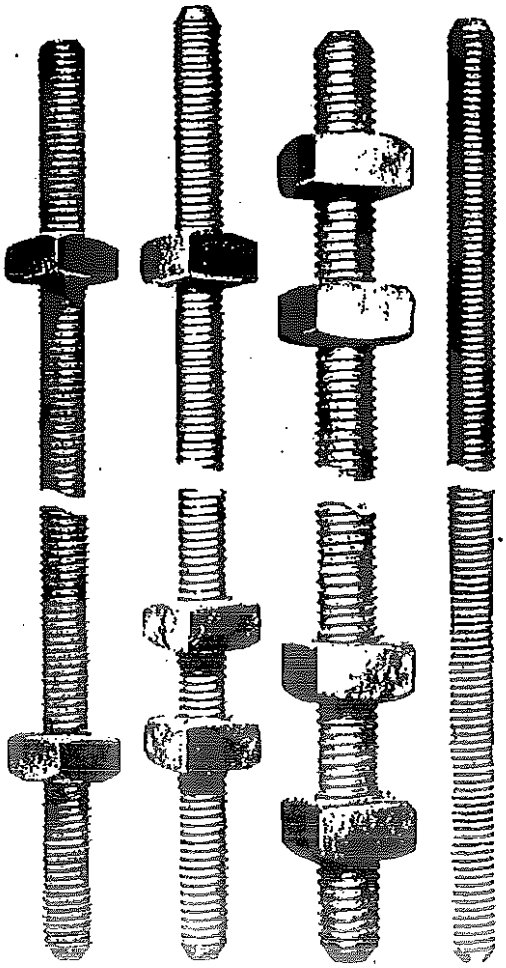
*Length does not include points.

3/4-In. Diameter

DF3D Series
Includes four regular square nuts.

Catalog No.	Length* (in.)
DF3D12■	12
DF3D14■	14
DF3D16■	16
DF3D18■	18
DF3D20□■	20
DF3D22□■	22
DF3D24□■	24
DF3D26	26
DF3D28	28
DF3D30	30
DF3D32	32
DF3D34	34
DF3D36	36

*Length does not include points



DF8D Series | DF12D Series | DF2D and DF3D Series | DF17D Series

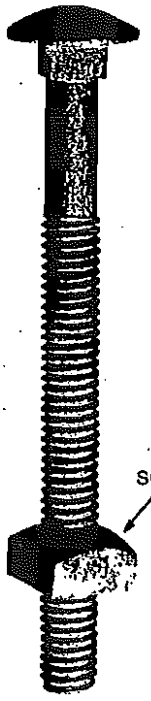
□ REA-approved.
■ ANSI/NEMA standard

Fasteners

BOLTS

Carriage

For attaching hardware to crossarms.
Standard carriage-bolt head with square shoulders.
Rolled threads assure uniformity and strength.
Hot-dip galvanized steel for corrosion resistance.



DF1C, DF2C and DF3C Series

3/8-In. Diameter

DF1C Series*

Catalog No.	Length (in.)	Min Thread Length (in.)
DF1C4□■	4	3
DF1C450□■	4-1/2	3
DF1C5□■	5	3
DF1C550	5-1/2	3
DF1C6□■	6	3
DF1C8	8	4

*Includes one regular sq. nut.

1/2-In. Diameter

DF2C Series*

Catalog No.	Length (in.)	Min Thread Length (in.)
DF2C450□■	4-1/2	3
DF2C5□■	5	3
DF2C550	5-1/2	3
DF2C6□■	6	3
DF2C7	7	3
DF2C8	8	3

*Includes one regular square nut.

5/8-In. Diameter

DF3C Series*

Catalog No.	Length (in.)	Min Thread Length (in.)
DF3C6	6	3
DF3C7	7	3

*Includes one regular square nut.

□ REA approved.
■ ANSI/NEMA standard.

SUPPLIER DO[illegible]NT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16400-002	REV: 0	DATE 15-Jun-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: R Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Denise Wentz DATE: 6/15/00

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
3	641-16400-002	0						X			Pole Mounted Xfmer & Cutouts		X		16400	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
~~Mike Griffin~~	~~52-5~~				
Tim Cherry	52-5				
Jim Jenkins	52-5				
Mike Godner	64				
~~Bob Knerp~~ Jim KERL	52-5				
B. Scott Wheeler	52-5				
Kwasi Bau Twenebogh	64				

NC COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

Perform testing prior to installation and submit results

RECEIVED BY: [signature] DATE 6/28/00
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

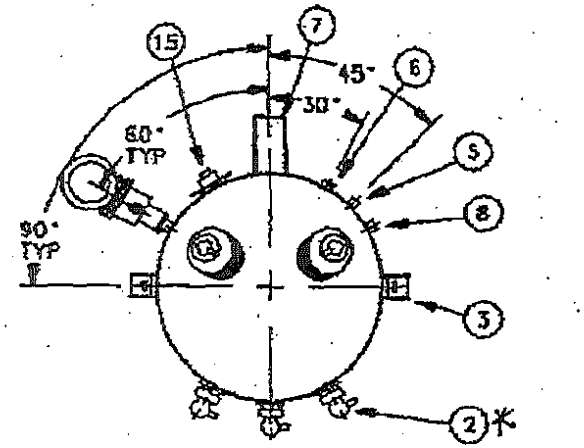
SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

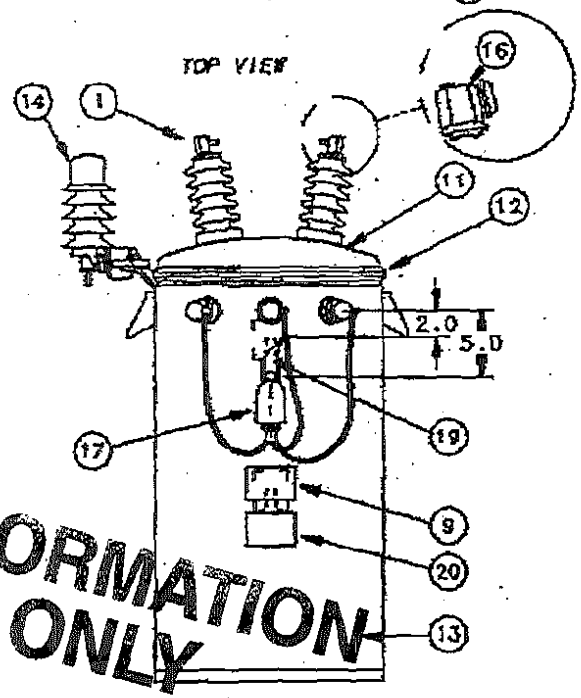
37.5KVA & 1VA POLEMOUNT TRANSFORMERS

PRIMARY VOLTAGE 13.2KV DELTA SECONDARY VOLTAGES: 120/240V & 277V

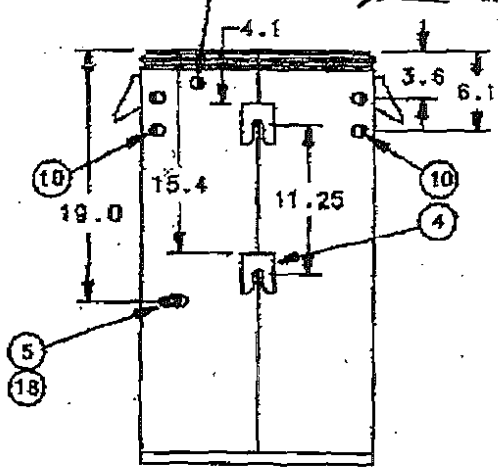
STANDARD FEATURES		
IT	DESCRIPTION	QTY
1	HV BUSHING, PORCELAIN, KV RATING AND EYEBOLT PER ANSI STANDARD	2
2	LV BUSHING, 1.2 KV, EYEBOLT TERMINAL PER ANSI STANDARD.	3
3	LIFTING LUG	2
4	NAMEPLATE, LASER SCRIBED, ANODIZED ALUMINUM, MOUNTED ON LOWER SUPPORT LUG	1
5	TANK GROUND PROVISION, .50"-13 UNC MILD STEEL	1
6	PRESSURE RELIEF VALVE MECH 1776K, .25" NPT	1
7	"A" TYPE SUPPORT LUG	2
8	COVER GROUND STRAP 28GA X .875 SS WITH .50"-13 UNC BOLT	1
9	KVA DECAL, 2.5" BLACK ON CLEAR	1
10	ARRESTER MOUNTING BOSS .50"-13 UNC MILD STEEL	4
11	MILD STEEL COVER, 8.3 KV WITHSTAND	1
12	MILD STEEL COVER BAND W/ .375"-16 UNC STAINLESS STEEL BOLT AND SILICON BRONZE NUT. W/ STAINLESS STEEL COVER BOLT RETENTION.	1
13	MILD STEEL TANK, FINISH COLOR GRAY MUNSEL 5.0 BG 7.0/0.4	1
IT	STANDARD OPTIONS	
14	POLYMER HV ARRESTER, HEAVY DUTY VARIGAP, KV RATING PER ANSI STANDARD	
15	EXTERNALLY OPERATED TAP CHANGER, OR DUAL VOLTAGE SWITCH	
16	BIRDGUARD WITH HANDWHEEL	
17	LV ARRESTER, STORM TRAPPER	
18	TANK GROUND CONNECTOR, No.6 SOLID TO No.1 STRD	
19	LV GROUND STRAP, .020" THICK X 1.0" WIDE SOFT COPPER	
20	NON-PCB DECAL, WHITE LETTERING ON A BLUE BACKGROUND	



TOP VIEW



FRONT VIEW



REAR VIEW

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16400-002
Reviewed By:
Date: 6/15/00

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit

Sig: Date: 6/28/00

REVISIONS

INFORMATION ONLY

*The 277V will have 2 Bushings.
The middle one will Not Be THERE.

1 PH DOUBLE BUSHING, SINGLE HANGER, [redacted]
POLEMOUNTED CONVENTIONAL TRANSFORMER
CLASS OA, OIL FLUID FILLED, 60HZ, 65°C TEMP. RISE

TRANSFORMER PRODUCTS
WAUKESHA, WI

DRAWN DOM	CHK/DR	SHEET 59
9-13-99		

PR11297A04

CHANCE Type C LOADBREAK Cutout with Arc Chute Interrrupers

Specifications and Ordering Information

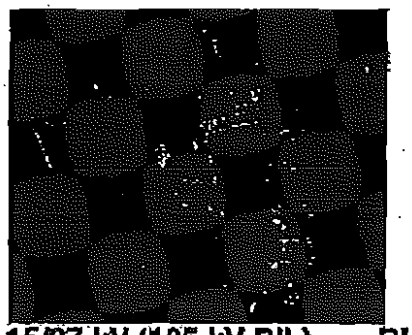
All Type C Cutouts meet or exceed ANSI/NEMA specifications.

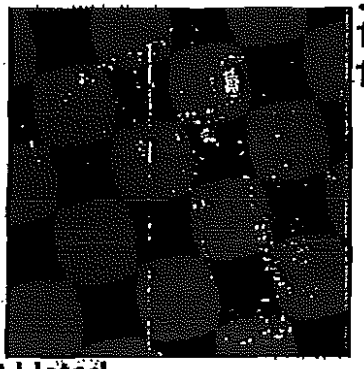
See page 10A-17 for Catalog Number System.

15 kV (110 kV BIL) — RUS Listed

*Catalog Number	Maximum Design Voltage	Nominal System Voltage	Continuous & Loadbreak Current (Amps)	Number of Operations	Interrupt Capacity (Asym Amps)	Leakage to Ground, Metal to Metal		Weight (lb./kg.)	Replacement Fusetube Cap	Arc Shortening Rod
C730-112PB	15 kV	Thru 14.4 kV	100	200	10,000	8.7"	220 mm	22.5 / 10.2	P700-1535	No
C730-114PB	15 kV	Thru 14.4 kV	100	200	16,000	8.7"	220 mm	22.7 / 10.3	E700-1767	Yes
C730-143PB	15 kV	Thru 14.4 kV	200	200	12,000	8.7"	220 mm	23.3 / 10.6	E700-2146	Yes
C730-133PB	15 kV	Thru 14.4 kV	300	50	12,000**	8.7"	220 mm	22.8 / 10.4	P700-1535	N/A

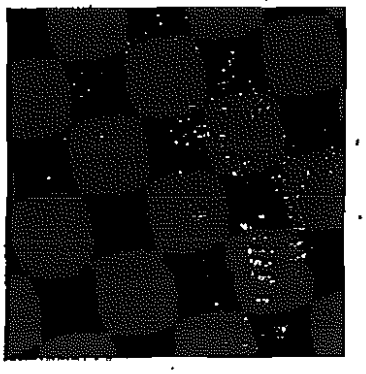
▼15 kV, 110 kV BIL





◄15/27 kV, 125 kV BIL

20/34.5 kV, 150 kV BIL►



15/27 kV (125 kV BIL) — RUS Listed

C730-211PB	15/27 kV	No Restrictions thru 14.4 kV; †20.8 thru 24.9 kV	100	200	8,000	12.6"	320 mm	25.1 / 11.4	P700-1535	No
C730-213PB	15/27 kV		100	200	12,000	12.6"	320 mm	25.3 / 11.5	E700-1768	Yes
C730-242PB	15/27 kV		200	200	10,000	12.6"	320 mm	26.0 / 11.8	E700-2479	Yes
C730-233PB	15/27 kV		300	50	12,000**	12.6"	320 mm	25.5 / 11.6	P700-1535	N/A

20/34.5 kV (150 kV BIL) — RUS Listed

C730-311PB	20/34.5 kV	No Restrictions thru 14.4 kV; †20.8 thru 34.5 kV	100	100	8,000	17.3"	440 mm	30.9 / 14.0	P700-1535	No
C730-313PB	20/34.5 kV		100	100	12,000	17.3"	440 mm	31.1 / 14.1	E700-1768	Yes

*Suffix: P = Parallel-groove clamps [No. 6 solid through 4/0 ACSR (13.3mm² - 160.6mm²) or 250 kcmil stranded (167.5mm²)]
B = NEMA Heavy Duty "B" bracket with 1½" captive bolt

Terminal variations:

P = Parallel-groove clamps [No. 6 solid through 4/0 ACSR (13.3mm² - 160.6mm²) or 250 kcmil stranded (167.5mm²)]
E = Small eyebolt [No. 8 solid through 2/0 stranded (7.7 - 90mm²)]
Change "P" to "E;" e.g., C730-112EB
L = Large eyebolt [No. 6 solid through 4/0 stranded (13.3 - 160.6mm²) or 250 kcmil stranded (167.5mm²)]
Change "P" to "L;" e.g., C730-112LB

Bracket variations:

B = NEMA Heavy Duty "B" bracket with 1½" captive bolt
X = Extended bracket (horizontal section 2⅝" longer than NEMA Type B bracket)
Change "B" to "X;" e.g., C730-112PX
D = Pole mounting bracket *Change "B" to "D;" e.g., C730-112PD*
(Blank) = Without crossarm bracket *Drop "B" from Catalog No.; e.g., C730-112P*

Extra corrosion resistance:

Not Available

**Momentary rating — Solid blade

†For application on single-phase to neutral circuits with phase-to-ground voltages not exceeding the value to the *left* of the slant; and for application on three-phase solidly-grounded-wye systems with solidly-grounded loads with line-to-line voltages not exceeding the value to the *right* of the slant.

Type K fuse links

Application

The fast characteristics of Type K fuse links were established by ANSI/NEMA to provide fuse links that would meet existing coordination schemes.

Chance Type fuse links are designed to carry 150% of their rated current without damage to the fuse link itself or the cutout in which it is installed. This capacity is for special loading situations, such as, short-time overloads, and cold load pick-up.

Materials used

The fusible section of the 1 through 3 ampere Type K links consist of a stainless-steel fuse strain wire; the 6 through 10 ampere, stainless-steel strain wire and a copper-alloy fuse wire; 12 through 100 amperes, a stainless steel strain wire and a silver-copper fuse wire; 140 and 200 ampere, a silver-copper fuse wire large enough to serve as both strain and fuse wire.

Buttonheads and lengths

Conforming to all applicable ANSI/NEMA specifications, Chance Type K links are available with a removable or solid buttonhead.

Note: Catalog Numbers shown are 23" overall length; also available in 26" length.
For 26": *Solid head K or T links, change the last two digits from 23 to 26.
†Removable head K or T links, drop the last two digits.

Amps	Catalog Number *Solid head	Catalog Number †Removable head
1	M1K23	M1KA23
2	M2K23	M2KA23
3	M3K23	M3KA23
6	M6K23	M6KA23
8	M8K23	M8KA23
10	M10K23	M10KA23
12	M12K23	M12KA23
15	M15K23	M15KA23
20	M20K23	M20KA23
25	M25K23	M25KA23
30	M30K23	M30KA23
40	M40K23	M40KA23
50	M50K23	M50KA23
65	M65K23	M65KA23
80	M80K23	M80KA23
100	M100K23	M100KA23
140	M140K23	M140KA23
200	M200K23	M200KA23

Twin Pigtail Type K and T fuse links

The twin pigtail fuse link is convenient to work with and easier to install in the cutout than conventional single pigtail fuse links. The pigtails attach under the clamp with one on each side of the attachment stud.

*†Catalog Numbers shown are 23" in overall length; for 26", see Note above.

Twin Pigtail fuse links

Type	Amps	*Solid head	†Removable head
K	200	M200K23T	M200KA23T
T	200	M200T23T	M200TA23T

Type T fuse links

Application

Chance Type T fuse links provide slower time-current characteristics than the Type K links. Type T links coordinate particularly well with automatic oil-circuit reclosers.

Chance Type T links are designed to carry 150% of their rated current without damage to the fuse link itself or the cutout in which it is installed. This capacity is for special loading situations, such as, short-time overloads, and cold-load pick-up.

Fuse elements

1 through 3 ampere Type T fuse links employ a fusing section consisting of a stainless-steel wire serving as both strain and fuse wire; 6 through 100 ampere, a stainless-steel strain wire and a pure-tin fuse wire in parallel. 140 and 200 ampere T links have a copper element mechanically crimped at one end, soldered at the other end. On overloads or low faults, the solder becomes a fluid and the link separates; on higher fault currents, the link separates when the copper wire melts.

Buttonheads and lengths

Chance Type T fuse links meet all applicable ANSI/NEMA specifications. They are available with a removable or solid buttonhead.

*†Catalog Numbers shown are 23" in overall length; for 26", see Note above.

Amps	Catalog Number *Solid head	Catalog Number †Removable head
1	M1T23	M1TA23
2	M2T23	M2TA23
3	M3T23	M3TA23
6	M6T23	M6TA23
8	M8T23	M8TA23
10	M10T23	M10TA23
12	M12T23	M12TA23
15	M15T23	M15TA23
20	M20T23	M20TA23
25	M25T23	M25TA23
30	M30T23	M30TA23
40	M40T23	M40TA23
50	M50T23	M50TA23
65	M65T23	M65TA23
80	M80T23	M80TA23
100	M100T23	M100TA23
140	M140T23	M140TA23
200	M200T23	M200TA23

Type MS fuse links (Equivalent to Kearney Type KS)

Application data

Chance Type MS fuse links have very slow time-current characteristics. In applications where ANSI/NEMA Type T fuse link characteristics are too-fast, the slower characteristics of Type MS can often be utilized.

Fuse-section operation

The fuse element of Chance Type MS fuse links is composed of two copper or copper-alloy wires joined by a solder junction. During heavy overloads or low fault currents, the heat generated by the two wires melts the solder, causing fuse operation. Operation under medium or heavy fault current occurs as one of the two wires melt.

Buttonhead and lengths

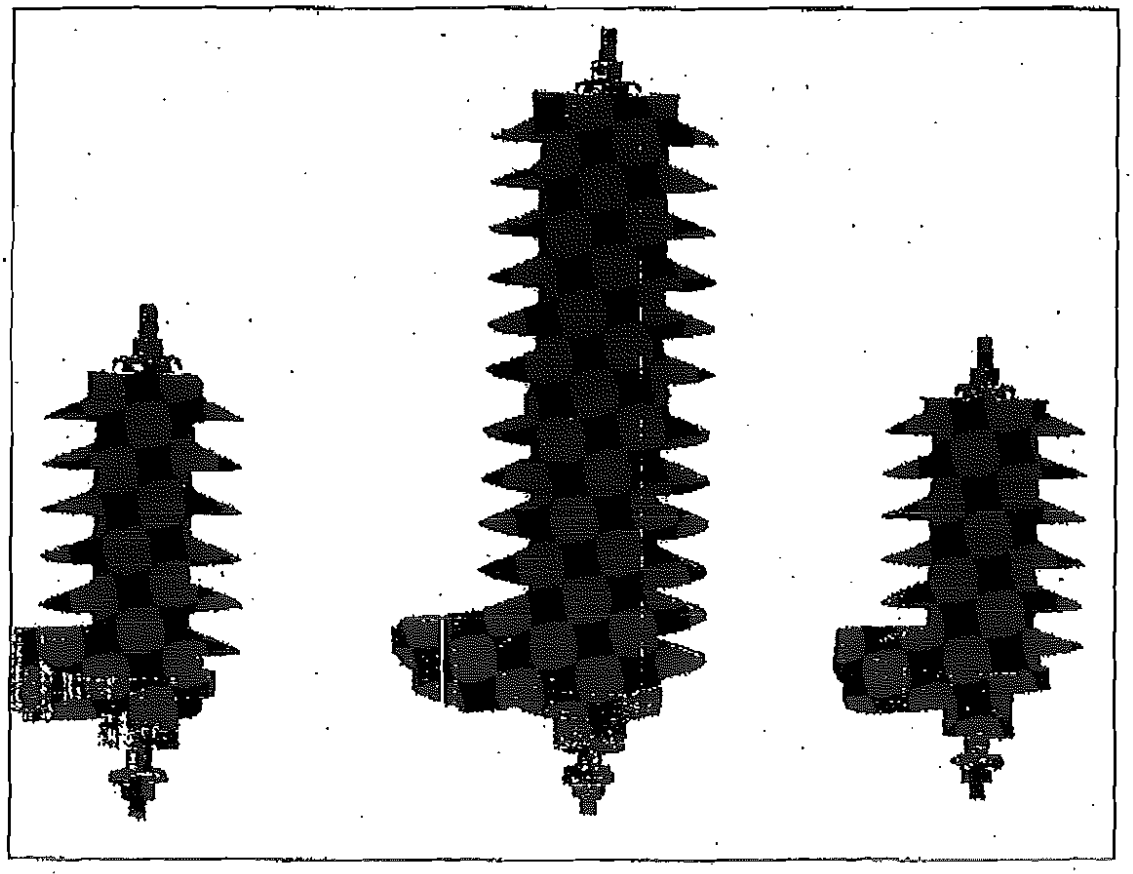
The Type MS link is available with only a removable buttonhead.

†Note: Catalog Numbers shown are 23" overall length; also available in 26" length.

Amps	†Catalog Number Removable head
3	M3MSA23
5	M5MSA23
7	M7MSA23
10	M10MSA23
15	M15MSA23
20	M20MSA23
25	M25MSA23
30	M30MSA23
40	M40MSA23
50	M50MSA23
65	M65MSA23
80	M80MSA23
100	M100MSA23
125	M125MSA23
150	M150MSA23
200	M200MSA23

DynaVar®

Distribution Class (PDV) and Riser Pole (PVR) Surge Arresters



ISO 9001-94
Cert. No. 002196
Ohio Brass Co.
Wadsworth, OH USA

ANSI/IEEE C62.11 TESTED
IEC 99-4 TESTED

DynaVar® PDV-100 and PDV-65 Distribution Class Surge Arresters and PVR Riser Pole Type

Metal-oxide type surge arresters have been acknowledged as a major improvement in surge protection over conventional silicon-carbide designs. Ohio Brass has manufactured both station class and intermediate class metal-oxide surge arresters since 1981.

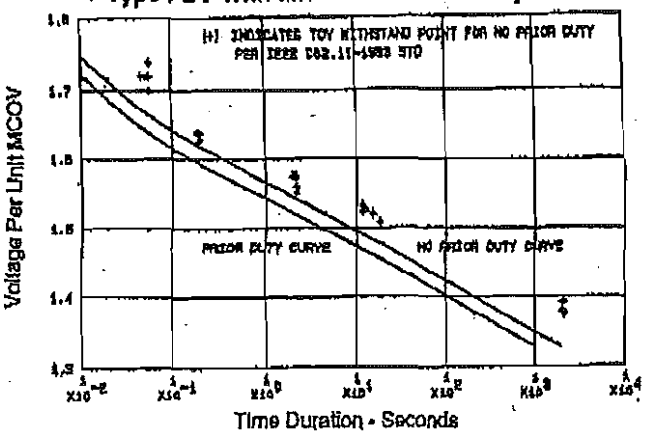
NORMALLY RECOMMENDED DYNAVAR PDV/PVR MCOV FOR VARIOUS SYSTEM VOLTAGES

System L-L Voltage kV		Arrester MCOV-kV	
Nominal	Maximum	Effectively Grounded Neutral Circuits	Impedance Grounded and Ungrounded Circuits
2.4	2.54	—	2.55
4.16	4.4	2.55	5.1
4.8	5.08	—	5.1
6.9	7.26	—	7.65
12.0	12.7	7.65	12.7
12.47	13.2	7.65	—
13.2	13.97	8.4	—
13.8	14.52	8.4	15.3
20.78	22.0	12.7	22.0
22.86	24.2	15.3	22.0
23.0	24.34	—	22.0
24.94	26.4	15.3	—
34.5	36.5	22.0	—

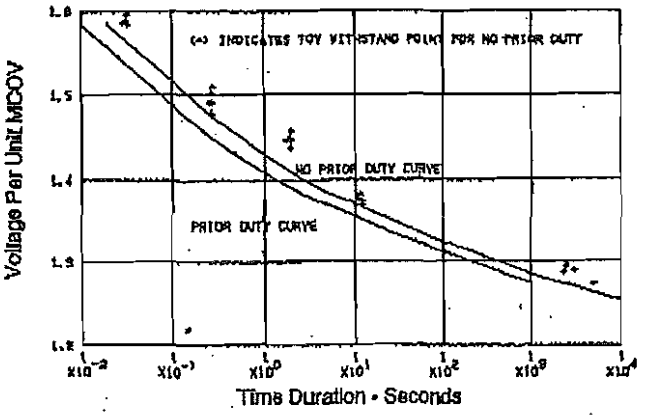
Selection of arrester size is based upon the maximum continuous operating voltage (MCOV) that is applied across the arrester in service (line-to-ground). For arresters on effectively grounded systems, this is normally the maximum line-to-ground voltage – e.g., 7.65 kV on a 12.47 kV multi-grounded system. For ungrounded or impedance-grounded systems, the MCOV should be at least 90 percent of maximum phase-to-phase voltage. Smaller arresters than shown may be used, contact your Ohio Brass representative for details.

For convenience, the catalog data shown on page 12 includes the traditional duty-cycle voltage rating associated with the MCOV of each arrester.

60 Hz Temporary Overvoltage Capability Type PDV With and Without Prior Duty

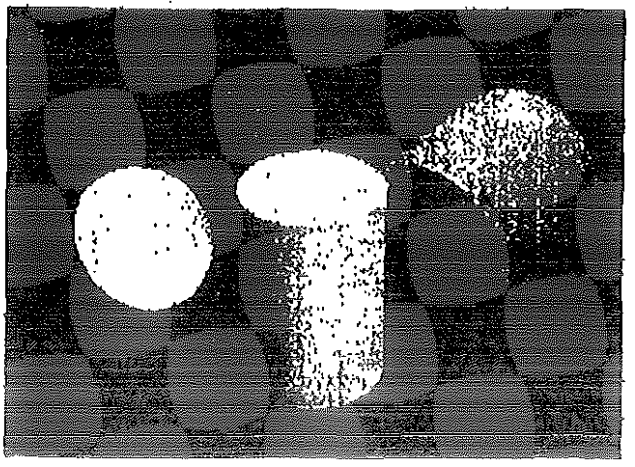


60 Hz Temporary Overvoltage Capability Type PVR With and Without Prior Duty

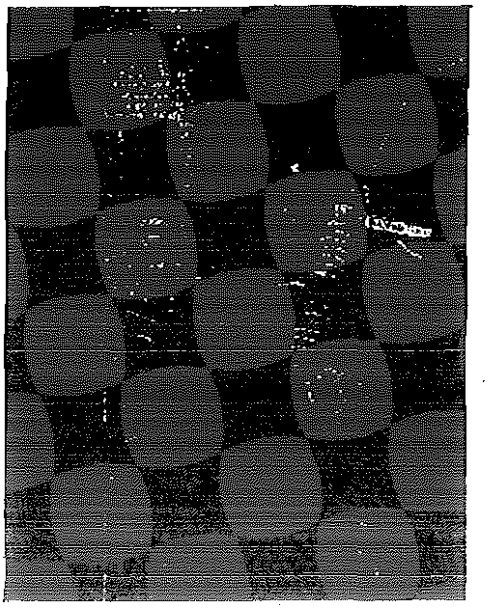


DynaVar PDV/PVR arresters are gapless and all the system line-to-ground voltage appears on the metal-oxide valve elements. The blocks can withstand significant overvoltage for a limited time, depending on the magnitude of any immediately preceding surge duty. They can withstand 1.1 percent of MCOV for periods of 2000 hours, up to five percent of the life of the arrester.

PVR arresters can withstand about 3.4 KJ/KV of MCOV within one minute. DynaVar PDV-100 arresters can absorb up to 2.2 kJ per kV of MCOV within one minute. DynaVar PDV-65 arresters can absorb up to 1.4 kJ per kV of MCOV within one minute. This maximum energy rating may be repeated many times provided there is a sufficient cooling time to keep arrester temperature at reasonable levels.



DynaVar PDV-65 and PDV-100 metal-oxide varistors.



DynaVar PDV-100 arrester being installed.

OHIO BRASS

Heavy Duty
PDV-100 Electrical Characteristics

Rated Voltage kV	MCOV kV	Unit Catalog Number	0.5 µsec 10kA Maximum IR-kV	500 A Switching Surge Maximum IR-kV	8/20 Maximum Discharge Voltage - kV					
					1.5 kA	3 kA	5 kA	10 kA	20 kA	40 kA
3	2.55	217602	12.5	8.0	9.5	10.0	10.5	11.0	13.0	15.3
6	5.1	217605	25.0	16.0	19.0	20.0	21.0	22.0	26.0	30.5
9	7.65	217608	34.0	22.5	24.5	26.0	27.5	30.0	35.0	41.0
10	8.4	217609	36.5	23.5	26.0	28.0	29.5	32.0	37.5	43.5
12	10.2	213610	43.5	28.2	38.0	32.9	34.5	38.5	43.8	51.5
15	12.7	213613	54.2	35.0	38.4	41.0	43.4	48.0	54.6	64.2
18	15.3	213615	65.0	42.1	46.0	49.1	52.0	57.5	65.4	76.9
21	17.0	213617	69.5	44.9	49.2	52.5	55.7	61.5	69.9	82.2
24	19.5	213620	87.0	56.4	61.6	65.8	69.6	77.0	87.6	103.0
27	22.0	213622	97.7	63.2	69.2	73.9	78.2	86.5	98.4	115.7
30	24.4	213624	108.4	70.0	76.8	82.0	86.8	96.0	109.2	128.4
36	29.0	213629	130.0	84.2	92.0	98.2	104.0	115.0	130.8	153.8

Normal Duty
PDV-65 Electrical Characteristics

Rated Voltage kV	MCOV kV	Unit Catalog Number	0.5 µsec 5kA Maximum IR-kV	500 A Switching Surge Maximum IR-kV	8/20 Maximum Discharge Voltage - kV					
					1.5 kA	3 kA	5 kA	10 kA	20 kA	40 kA
3	2.55	217253	12.5	8.5	9.8	10.3	11.0	12.3	14.3	18.5
6	5.1	217255	25.0	17.0	19.5	20.5	22.0	24.5	28.5	37.0
9	7.65	217258	33.5	23.0	26.0	28.0	30.0	33.0	39.0	50.5
10	8.4	217259	36.0	24.0	27.0	29.5	31.5	36.0	41.5	53.0
12	10.2	217260	50.0	34.0	39.0	41.0	44.0	49.0	57.0	74.0
15	12.7	217263	58.5	40.0	45.5	48.5	52.0	57.5	67.5	87.5
18	15.3	217265	67.0	46.0	52.0	56.0	60.0	68.0	78.0	101.0
21	17.0	217267	73.0	49.0	55.0	60.0	64.0	73.0	84.0	107.0
24	19.5	217270	92.0	63.0	71.5	76.5	82.0	90.5	106.5	138.0
27	22.0	217272	100.5	69.0	78.0	84.0	90.0	99.0	117.0	151.5
30	24.4	217274	108.0	72.0	81.0	88.5	94.5	108.0	124.5	159.0
36	29.0	217279	134.0	92.0	104.0	112.0	120.0	132.0	156.0	202.0

Riser-Pole
PVR Electrical Characteristics

Duty Cycle Voltage Rating kV	MCOV kV	Catalog Number	0.5 µsec 10kA Maximum IR-kV	500 A Switching Surge Maximum IR-kV	8/20 Maximum Discharge Voltage - kV					
					1.5 kA	3 kA	5 kA	10 kA	20 kA	40 kA
3	2.55	218603	8.7	5.8	6.5	7.0	7.4	8.1	9.0	10.6
6	5.1	218605	17.4	11.7	13.0	14.0	14.7	16.2	18.1	21.1
9	7.65	218608	25.7	17.5	19.3	21.0	21.9	24.0	27.0	31.6
10	8.4	218609	28.5	19.2	21.2	23.0	24.0	26.5	29.8	34.8
12	10.2	218610	34.8	23.3	25.9	28.0	29.4	32.3	36.2	42.2
15	12.7	218613	43.1	29.1	32.3	35.0	36.6	40.2	45.1	52.7
18	15.3	218615	51.4	34.9	38.6	41.9	43.8	48.0	54.0	63.2
21	17	218617	57.6	38.7	42.8	46.4	48.6	53.6	60.2	70.5
24	19.5	218620	68.8	46.6	51.6	55.9	58.5	64.2	72.1	84.3
27	22	218622	77.1	52.4	57.9	62.9	65.7	72.0	81.0	94.8
30	24.4	218624	85.5	57.6	63.5	69.0	72.0	79.5	89.4	104.4
36	29	218629	102.8	69.8	77.2	83.8	87.6	95.0	108.0	126.6

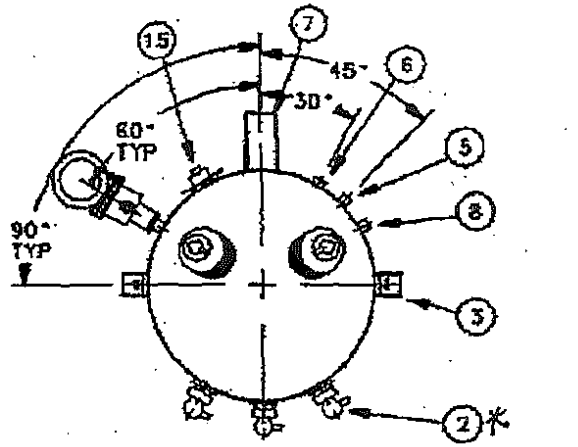
06/12/2000 08:50 4405191715 NATIONAL POWERX PAGE 02/07

PRIMARY VOLTAGE 13.2KV DELTA SECONDARY VOLTAGES: 120/240V & 277V

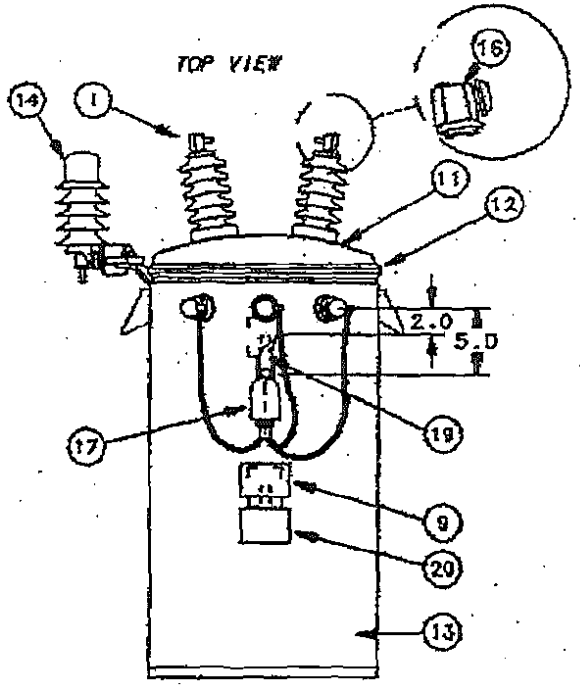
STANDARD FEATURES

IT	DESCRIPTION	QTY
1	HV BUSHING, PORCELAIN, KV RATING AND EYEBOLT PER ANSI STANDARD	2
2	LV BUSHING, 1.2 KV, EYEBOLT TERMINAL PER ANSI STANDARD.	3
3	LIFTING LUG	2
4	NAMEPLATE, LASER SCRIBED, ANODIZED ALUMINUM, MOUNTED ON LOWER SUPPORT LUG	1
5	TANK GROUND PROVISION, .50"-13 UNC MILD STEEL	1
6	PRESSURE RELIEF VALVE DEFA 1778K, .25" NPT	1
7	"A" TYPE SUPPORT LUG	2
8	COVER GROUND STRAP 22GA X .875 SS WITH .50"-13 UNC BOLT	1
9	KVA DECAL, 2.5" BLACK ON CLEAR	1
10	ARRESTER MOUNTING BOSS .50"-13 UNC MILD STEEL	4
11	MILD STEEL COVER, 8.3 KV WITHSTAND	1
12	MILD STEEL COVER BAND W/ .375"-16 UNC STAINLESS STEEL BOLT AND SILICON BRONZE NUT. W/ STAINLESS STEEL COVER BOLT RETENTION.	1
13	MILD STEEL TANK, FINISH COLOR GRAY MUNSEL 5.0 BG 7.0/0.4	1

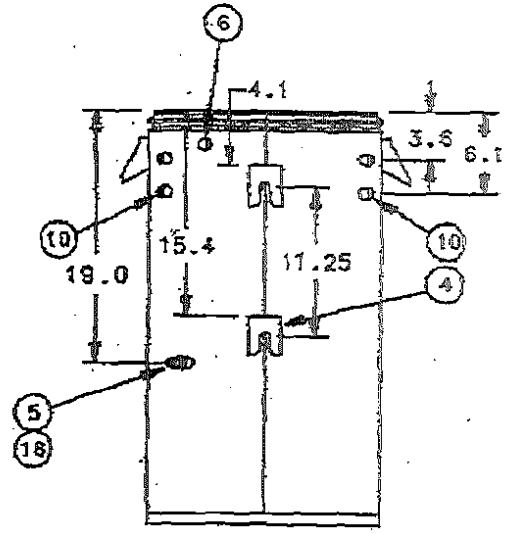
IT	STANDARD OPTIONS
14	POLYMER HV ARRESTER, HEAVY DUTY VARIGAP, KV RATING PER ANSI STANDARD
15	EXTERNALLY OPERATED TAP CHANGER, OR DUAL VOLTAGE SWITCH
16	BIRDGUARD WITH HANDWHEEL
17	LV ARRESTER, STORM TRAPPER
18	TANK GROUND CONNECTOR, No.6 SOLID TO No.1 STRD
19	LV GROUND STRAP, .020" THICK X 1.0" WIDE SOFT COPPER
20	NON-PCB DECAL, WHITE LETTERING ON A BLUE BACKGROUND



TOP VIEW



FRONT VIEW



REAR VIEW

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-_____
Reviewed By:_____
Date:_____

REVISIONS

* The 277volt will have 2 Bushings.
The middle one will NOT BE THERE.

1 PH DOUBLE BUSHING, SINGLE HANGER, [redacted]
POLEMOUNTED CONVENTIONAL TRANSFORMER
CLASS OA, OIL FLUID FILLED, 60HZ, 65°C TEMP. RISE

TRANSFORMER PRODUCTS
WAUKESHA, WI

DRW	DDM	CHK/DSN	PRIMARY DWG NO. 59
9-13-99			

PR11297A04

SUPPLIER DO[illegible]T SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16400-003	REV: 0	DATE 21-Jun-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.

Ron Wood

SIGNATURE: RWood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Gina Jarrett DATE: 6/21/00

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
3	641-16400-003	0						X			Service Drop		X		16400-003	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Tim Cherry	525				
Tim Jenkins	525				
Mike Godber	164				
Bob Kreip	525				
Scott Wheeler	525				
Kwasi Bau Twenebeah	164				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: MW Gipson DATE 6/28/00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

ORIGINAL

SUBMITTAL TYPE: (BY SUPPLIER)

CFC - CERTIFIED FOR CONSTRUCTION

INF - INFORMATION/RECORD

DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)

A - Conforms to Subcontract Requirements

B - Minor Comments - Incorporate and Resubmit

C - Revise and Resubmit (SEE COMMENTS)

Triplex Service Drop – Aluminum Conductor

Code Name	Phase Conductors			Bare Neutral			Weight Per 1000ft. (lbs)		Ampacity (amps)	
	Size AWG or MCM	Stranding	Insul. Thick. (mls)	Size (AWG)	*Stranding	Rated Strength (Lbs)	XLP	Poly	XLP	Poly
AAC NEUTRAL-MESSENGER										
Haiotis	6	Solid	45	6	7	563	102.5	98.8	85	70
Patella	6	7/w	45	6	7	563	109.1	101.6	85	70
Fusus	4	Solid	45	4	7	881	151.9	147.6	115	90
Oyster	4	7/w	45	4	7	881	161.8	151.7	115	90
Clam	2	7/w	45	2	7	1,350	243.2	229.2	150	120
Murex	1/0	7/w	60	1/0	7	1,990	395.1	369.4	205	150
Purpura	1/0	19/w	60	1/0	7	1,990	386.1	369.4	205	160
Nassa	2/0	7/w	60	2/0	7	2,510	485.8	455.3	235	185
Melita	3/0	19/w	60	3/0	19	3,310	585.2	562.9	275	215
Portunus	4/0	19/w	60	4/0	19	4,020	723.9	697.3	315	245
Nannynose	336.4	19/w	80	336.4	19	6,146	1160.4	1118.0	420	325
WITH FULL SIZE ACSR MESSENGER										
Paludina	6	solid	45	6	6/1	1,190	114	113	85	70
Voluta	6	7/w	45	6	6/1	1,190	120	113	85	70
Whelk	4	solid	45	4	6/1	1,860	169	165	115	90
Periwinkle	4	7/w	45	4	6/1	1,860	176	172	115	90
Conch	2	7/w	45	2	6/1	2,850	267	261	150	120
Neritina	1/0	7/w	60	1/0	6/1	4,380	430	419	205	160
Cerna	1/0	19/w	60	1/0	6/1	4,380	426	416	205	160
Runcina	2/0	7/w	60	2/0	6/1	5,310	430	519	235	185
Triton	2/0	19/w	60	2/0	6/1	5,310	526	514	235	185
Cherrystone	3/0	7/w	60	3/0	6/1	6,620	656	643	250	200
Mursia	3/0	19/w	60	3/0	6/1	6,620	750	638	275	215
Razor	4/0	7/w	60	4/0	6/1	8,350	814	799	315	245
Zuzara	4/0	19/w	60	4/0	6/1	8,350	805	792	315	295
Limpet	336.4	19/w	80	336.4	18/1	8680	1209	1187	420	325

Code Name	Phase Conductors			Bare Neutral			Weight Per 1000ft. (lbs)		Ampacity (amps)	
	Size AWG or MCM	Stranding	Insul. Thick. (mls)	Size (AWG)	Stranding	Rated Strength (Lbs)	XLP	Polyeth	XLP	Poly
WITH ACSR REDUCED SIZE MESSENGER										
Scallop	4	solid	45	6	6/1	1,190	148	144	115	90
Strombus	4	7/w	45	6	6/1	1,190	158	148	115	90
Cockle	2	7/w	45	4	6/1	1,860	233	227	150	120
Janthina	1/0	7/w	60	2	6/1	2,850	376	365	205	160
Ranella	1/0	19/w	60	2	6/1	2,850	372	362	205	160
Cavolinia	2/0	7/w	60	1	6/1	3,550	462	451	235	185
Clio	2/0	19/w	60	1	6/1	3,550	458	446	235	185
Sanddollar	3/0	7/w	60	1/0	6/1	4,380	570	557	275	215
Aega	3/0	19/w	60	1/0	6/1	4,380	565	552	275	215
Cuttlefish	4/0	7/w	60	2/0	6/1	5,310	706	691	315	245
Cerapus	4/0	19/w	60	2/0	6/1	5,310	699	684	315	245
Cowry	336.4	19/w	80	4/0	6/1	8350	1135	1093	420	385

* NOTE: See left page A-9 for details.

INFORMATION ONLY

☒ A - Conforms to the Subcontract Requirements
☐ B - Minor Comment - Incorporate and Resubmit
☐ C - Revise and Resubmit
Date: 6/28/00

Fluor Contract FSC-641
USDF Enhanced Permanent Leach.
Transmission System Project
STAVER # 7052

Submittal # 641-16400-003
Reviewed By: EJ
Date: 6/21/00

KWI
KING WIRE INC.
CORPORATE HEADQUARTERS
NUMBER ONE CABLE PLACE, NORTH CHICAGO, ILLINOIS 60064
TOLL FREE (800) 453-KING(5464) TEL: (847) 688-1100 FAX: (847) 688-0244

NEW YORK (800) 221-0144 | DALLAS (800) 527-5207 | PHOENIX (800) 528-0449 | CLEVELAND (800) 242-2727 | FT. LAUDERDALE (800) 327-3737 | PITTSBURGH (800) 737-0790

Quadruplex Service Drop - Aluminum Conductor

Code Name	Phase Conductor			Bare Neutral Messenger			Weight Per 1000 ft (lbs)		Rating (Amps)	
	Size AWG	Strand	Insulation Thickness (mls)	Size AWG	Strand	Breaking Strength (lbs)	XLP	POLY	XLP	POLY
AAC NEUTRAL-MESSENGER										
Clydesdale	4	Solid	45	4	7	881	208	201.8	100	80
Pinto	4	7/w	45	4	7	881	223	207.9	100	80
Mustang	2	7/w	45	2	7	1,350	333	312.6	135	105
Criollo	1/0	19/w	60	1/0	7	1,990	529	504.5	180	140
Percheron	2/0	19/w	60	2/0	7	2,510	649	620.5	205	160
Hanoverian	3/0	19/w	60	3/0	19	3,310	799	765.6	235	185
Oldenburg	4/0	19/w	60	4/0	19	4,020	986	946.7	275	210
Lippizaner	336.4	19/w	80	336.4	19	6,146	1,546	1,519.2	370	280
***ACSR NEUTRAL-MESSENGER**										
Morochuca	6	Solid	45	6	6/1	1,190	152	147.4	75	60
Chola	6	7/w	45	6	6/1	1,190	162	151.7	75	60
Morgan	4	Solid	45	4	6/1	1,860	226	220	100	80
Hackney	4	7/w	45	4	6/1	1,860	241	226.1	100	80
Palomino	2	7/w	45	2	6/1	2,850	362	342.6	135	105
Costena	1/0	19/w	60	1/0	6/1	4,380	575	550.6	180	140
Grullo	2/0	19/w	60	2/0	6/1	5,310	707	678.7	205	160
Suffolk	3/0	19/w	60	3/0	6/1	6,620	872	838.9	235	185
Appaloosa	4/0	19/w	60	4/0	6/1	8,350	1079	1039.2	275	210
Bronco	336.4	19/w	80	336.4	18/1	8,580	1613	1568.2	370	280
Gelding	336.4	19/w	80	4/0	6/1	8,350	1448	1494.3	370	280

Code Name	Phase Conductor			Bare Neutral Messenger			Weight Per 1000 ft (lbs)		Rating (Amps)	
	Size AWG	Strand	Insulation Thickness (mls)	Size AWG	Strand	Breaking Strength (lbs)	XLP	POLY	XLP	POLY
6201 ALLOY NEUTRAL-MESSENGER										
Bay	6	Solid	45	6	7	1,110	145	140.0	75	60
French Coach	6	7/w	45	6	7	1,110	155	144.3	75	60
German Coach	4	Solid	45	4	7	1,760	214	208.3	100	80
Arabian	4	7/w	45	4	7	1,760	229	214.4	100	80
Belgian	2	7/w	45	2	7	2,800	344	323.1	135	105
Shetland	1/0	19/w	60	1/0	7	4,460	546	521.1	180	140
Thoroughbred	2/0	19/w	60	2/0	7	5,390	670	641.5	205	160
Trotter	3/0	19/w	60	3/0	7	6,790	825	791.8	235	185
Walking	4/0	19/w	60	4/0	7	8,560	1019	979.7	275	210

* NOTE: See left page for details.

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NEW YORK (800) 221-9144 | DALLAS (800) 527-5207 | PHOENIX (800) 528-0449 | CLEVELAND (800) 242-2727 | FT. LAUDERDALE (800) 327-3737 | PITTSBURGH (800) 737-0790

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16400-004	REV: 0	10-Nov-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: R. Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Teresa Schwab DATE: 11-13-2000

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16400-004	0						X			Pole Mounted X' fmer Tests		X		16400	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Tim Cherry	52-5				
Jim Jenkins	52-5				
Mike Godber	64				
Rob Kneip	52-5				
B. Scott Wheeler	52-5				
Grepsyntec (Kwasi)	38				

NO COMMENTS:

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: M W Gill DATE 11-30-00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

ORIGINAL

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

11/10/2000 07:03 3517101
11/09/2000 10:32 4485191715
B&J ELECTRICAL CO
NATIONAL POWERX
PAGE 02/03
PAGE 02
LEIDY ENGINEERING SALES 330 497 0918 P.6

COOPER Power Systems

Transformer Products

Electrical Test Report

Customer Name: NATIONAL POWER X
Customer PO: 1013281
Catalog #: ECPS437152V37C0
Primary Voltage: 13200/22860Y
Secondary Voltage: 277
Taps: 106.00/102.50/100.00/97.50/95.00
Class: OA

Note: No Load Loss data corrected to: 85.0 °C
Load Loss data corrected to : 85.0 °C
No Load Loss data reported at : 100 %

CPS Sales Order #: 185899
Customer Req #:
Type: POLE
Customer Material #:
Nameplate KVA: 37.5
Phase: 1
Cycles: 60 Hz
Rise: 85
Insulating Fluid: MINERAL OIL

Serial Number	Sequence Number	Test Date	No Load Loss	Load Loss	Total Loss	%IEX	%Z	%X	%R	%Reg @0.8	%Reg @1.0
CP0002145910	--	10/11/2000	113	529	642	0.54	2.57	2.15	1.41	2.42	1.43
CP0002145911		10/11/2000	111	535	646	0.52	2.58	2.15	1.43	2.44	1.45
Quantity: 2		Averages:	112	532	644						

All transformers manufactured using insulating fluid containing less than 1 PPM PCB. ASTM D4059 Test Certification available. All of the transformers listed have received and passed the following tests: Continuity, Ratio, Leak, Polarity and Phase-Relationship, Routine Impulse, Induced Voltage, and Applied Voltage in accordance with ANSI standards C57.12.00, Latest Edition.

Certified by: Terri Marks

Ship Date: 10/13/2000
Invoice: 90373699

ECDC CONTROLLED COPY NO. 76666

[ ]A - Conforms to the Subcontract Requirements
[ ]B - Minor Comment - Incorporate and Resubmit
[ ]C - Revise and Resubmit
Sig: MW Date: 11-30-00

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-116400-004
Reviewed By: Dal
Date: 11/10/00

COOPER Power Systems

Transformer Products

Electrical Test Report

Customer Name: NATIONAL POWER X
Customer PO: 1013281
Catalog #: ECPS437132Y37C0
Primary Voltage: 13200/22860Y
Secondary Voltage: 277
Taps: 105.00/102.50/100.00/97.50/95.00
Class: OA

Note: No Load Loss data corrected to: 85.0 °C
Load Loss data corrected to : 85.0 °C
No Load Loss data reported at : 100 %

CPS Sales Order #: 185699
Customer Req #:
Type: POLE
Customer Material #:
Nameplate KVA: 37.5
Phase: 1
Cycles: 60 Hz
Rise: 55
Insulating Fluid: MINERAL OIL

Serial Number	Sequence Number	Test Date	No Load Loss	Load Loss	Total Loss	%IEX	%IZ	%X	%R	%Reg @0.8	%Reg @1.0
CP0002146012		10/16/2000	112	532	644	0.55	2.59	2.17	1.42	2.44	1.44
Quantity: 1		Averages:	112	532	644						

All transformers manufactured using insulating fluid containing less than 1 PPM PCB. ASTM D4059 Test Certification available. All of the transformers listed have received and passed the following tests: Continuity, Ratio, Leak, Polarity and Phase-Relationship, Routine Impulse, Induced Voltage, and Applied Voltage in accordance with ANSI standards C57.12.00, Latest Edition.

Certified by: Terri Marks

Ship Date: 10/17/2000
Invoice: 90374713

Transformer Produ

Page

PEER Power Systems

Electrical Test Report

omer Name: NATIONAL POWER X
ustomer PO. 1013281
Catalog #: EZAA411132Y25C9
ary Voltage: 13200/22860Y
ary Voltage: 120/240
Taps: 105 00/102.50/100 00/97 50/95 00
Class: OA

No Load Loss data corrected to: 20 0 °C
Load Loss data corrected to : 85.0 °C
No Load Loss data reported at . 100 %

CPS Sales Order #: 0000135699
Customer Req #:
Type: POLE
Customer Material #:
Nameplate KVA: 25.0
Phase: 1
Cycles: 60 Hz
Rise: 65
Insulating Fluid: MINERAL OIL

Serial Number	Sequence Number	Test Date	No Load Loss	Load Loss	Total Loss	%IEX	%IZ	%IX	%IR	%Reg @ 0.8	%Reg @ 1.0
CP000214389		09/28/2000	86	487	573	0.70	3.00	2 28	1 95	2.93	1.88
CP000214389		09/28/2000	85	475	560	0.70	2 98	2.30	1.90	2.90	1.93
CP000214390		09/28/2000	83	481	564	0.61	2.89	2.28	1.93	2.91	1 95
CP000214390		09/28/2000	85	481	566	0.69	2 99	2 29	1 92	2.91	1.85
CP000214390		09/28/2000	85	486	571	0.71	3.00	2 28	1.95	2.93	1 88
CP000214390		09/28/2000	84	476	560	0.72	2.97	2.27	1 91	2.89	1 84
CP000214390		09/28/2000	84	484	568	0.69	2.99	2 28	1.94	2.92	1.97
Quantity: 7		Averages:	84	481	566						

All transformers manufactured using insulating fluid containing less than 1 PPM PCB. ASTM D4059 Test Certification available. All of the transformers listed have received and passed the following tests: Continuity, Ratio, Leak, Polarity and Phase-Relationship, Routine Impulse, Induced Voltage, and Applied Voltage in accordance with ANSI standards C57.12.00, Latest Edition.

Certified by: Terri Marks

Ship Date: 10/05/2000
Invoice: 90369846

Transformer Products

IPER Power Systems

Electrical Test Report

stomer Name: NATIONAL POWER X
Customer PO: 1013281
Catalog #: ECPS437132Y25C0
mary Voltage: 13200/22860Y
ndary Voltage: 277
Taps: 105.00/102.50/100.00/97.50/95.00
Class: OA

: No Load Loss data corrected to: 20.0 °C
Load Loss data corrected to : 85.0 °C
No Load Loss data reported at : 100 %

CPS Sales Order # 0000185[illegible]
Customer Req #.
Type: POLE
Customer Material #.
Nameplate KVA: 25.0
Phase: 1
Cycles: 60 Hz
Rise: 65
Insulating Fluid: MINERAL OIL

Serial Number	Sequence Number	Test Date	No Load Loss	Load Loss	Total Loss	%IEX	%IZ	%IX	%IR	%Reg @ 0.8	%Reg @ 1.0
CP0002143742		10/02/2000	90	501	591	0.71	3.07	2.32	2.01	3.00	2.04
CP0002143743		10/02/2000	88	494	582	0.65	3.06	2.33	1.98	2.98	2.01
CP0002143744		10/02/2000	85	503	588	0.58	3.10	2.36	2.01	3.03	2.04
Quantity: 3		Averages:	87	499	587						

All transformers manufactured using insulating fluid containing less than 1 PPM PCB. ASTM D4059 Test Certification available. All of the transformers listed have received and passed the following tests: Continuity, Ratio, Leak, Polarity and Phase-Relationship, Routine Impulse, Induced Voltage, and Applied Voltage in accordance with ANSI standards C57.12.00, Latest Edition.

Certified by: Terri Marks

Ship Date: 10/05/2000
Invoice: 90369846

B&J ELECTRICAL CO., INC.

6316 WIEHE ROAD
CINCINNATI, OHIO 45237
(513) 351-7100

Job Number: EPLTS
Job Name: EDE 20111 STAVER 7052

Date: 11-6-00
Supervisor: [illegible] 76683

INSULATION RESISTANCE TEST FOR FEEDER CABLES

SERIAL # KVA 13.2 KV 480 V

TEST DATA	WIRE GAGE	~~EQUIPMENT FROM:~~	~~EQUIPMENT TO:~~	~~CONTINUITY ALL WIRES~~	PHASE A TO GROUND	PHASE B TO GROUND	~~PHASE C TO GROUND~~	~~PHASE A TO GROUND~~	PHASE A TO GROUND	PHASE B TO GROUND	NEUTRAL TO GROUND, ~~PHASE C~~
transformer		EP000	145912	37.5 KVA	∞	∞			∞	∞	
↓		CP0002	145911	37.5 KVA	∞	∞			∞	∞	
↓		CP0002	145910	37.5 KVA	∞	∞			∞	∞	

TEST EQUIPMENT ID #: 8BU0150RA DATE CALIBRATED 10-19-00
INSPECTED BY SUPERVISOR [illegible] DATE 11-6-00
INSPECTED BY QA [illegible] DATE 11-6-00
ACCEPTED BY QA [illegible] DATE 11/6/00

B&J ELECTRICAL CO., INC.

6316 WIEHE ROAD
CINCINNATI, OHIO 45237
(513) 351-7100

Job Number: EPL TS
Job Name: 30111/7052 STAVER FDE

Date: 11-6-00
Supervisor: N. Wickwire
76603

INSULATION RESISTANCE TEST FOR FEEDER CABLES

SERIAL # KVA 13.2 KV 480 V

TEST DATA	WIRE GAGE	~~EQUIPMENT FROM~~	~~EQUIPMENT TO~~	~~CONFIGURATION AMPERES~~	PHASE A TO GROUND	PHASE B TO GROUND	~~PHASE C TO GROUND~~	~~PHASE A TO B~~	PHASE A TO ~~B~~ GROUND	PHASE B TO ~~C~~ GROUND	NEUTRAL TO GROUND/ ~~PHASE C~~
Transformer		CT0002	143904	25 KVA	∞	∞			∞	∞	∞
		CT0002	143903	25 KVA	∞	∞			∞	∞	∞
		CT0002	143902	25 KVA	∞	∞			∞	∞	∞
		CT0002	143901	25 KVA	∞	∞			∞	∞	∞
		CT0002	143900	25 KVA	∞	∞			∞	∞	∞
		CT0002	143899	25 KVA	∞	∞			∞	∞	∞
		CT0002	143898	25 KVA	∞	∞			∞	∞	∞
		CT0002	143744	25 KVA	∞	∞			∞	∞	
		CT0002	143743	25 KVA	∞	∞			∞	∞	
		CT0002	143742	25 KVA	∞	∞			∞	∞	

TEST EQUIPMENT ID #: 83V01502A DATE CALIBRATED 10-19-00
INSPECTED BY SUPERVISOR N. Wickwire DATE 11-6-00
INSPECTED BY QA [illegible] DATE 11-6-00
ACCEPTED BY QA [illegible] DATE 11/6/00

GROUNDING

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16450-001	REV: 0	DATE: 09-Jun-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: R Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Jarrett DATE: 6/12/00

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	641-16450-001A	0						X			Grounding&Bonding		X		16450	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
~~Mike Griffin~~	525				
Tim Cherry ✓	525				
Jim Jenkins ✓	525				
Tom Escue ✓	520				
~~Bob Krip~~ Jkerl ✓	525				
Scott Wheeler	525				
Kansi Bau Twenebooh ✓	654				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: MW Sipe DATE 6/28/00
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

[redacted]

GROUND RODS & ACCESSORIES

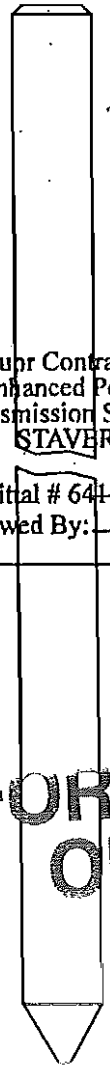
TYPE 61

COPPERBONDED POINTED GROUND RODS

- Perfectly bonded rods last longer, drive easier and will not crack.
- Stop corrosion, while providing the lowest possible resistance to ground.
- Copper exteriors, molecularly bonded to nickel-sealed high-strength steel cores, exceed the requirements of ANSI/UL 467-1984 (ANSI C33.8-1972) and CSA.
- Identification: Company name, length, diameter, catalog number, UL logo and control number are roll-stamped within 12" of chamfered end on each rod for easy inspection after installation.
- Copper Jacket: standard copper plating thickness exceeds UL and ANSI specs. of .010".
- The rods exceed a tensile strength of 75,000 pounds per square inch and straightness tolerance of .010" per linear foot.

Catalog Number	Nominal Diameter X Length	Standard Bundle	Master Bundle	Weight per 100
613852*	3/8" x 5'	20	100	160
613862	3/8" x 6'	20	100	198
613882	3/8" x 8'	20	100	236
611255*	1/2" x 5'	10	100	296
611265	1/2" x 6'	10	100	310
611285*	1/2" x 8'	10	100	444
611380*	1/2" x 8'	10	100	553
611200	1/2" x 10'	10	100	605
611300	1/2" x 10'	10	100	690
615830	5/8" x 3'	--	50	253
615840	5/8" x 4'	10	100	338
615850	5/8" x 5'	10	100	422
615860*	5/8" x 6'	10	100	509
615880*	5/8" x 8'	10	100	680
615883**	5/8" x 8'	10	100	680
615800*	5/8" x 10'	10	100	844
615803**	5/8" x 10'	10	100	844
615812	5/8" x 12'	10	100	1018
615815	5/8" x 15'	10	100	1266
613460	3/4" x 6'	5	50	744
613480*	3/4" x 8'	5	50	1004
* 613400*	3/4" x 10'	5	50	1240
613412	3/4" x 12'	5	50	1488
613415	3/4" x 15'	5	50	1860
614400	1" x 10'	3	25	1266

*Standard Inventory Items.
**13 mil minimum REA Listed rods.



[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 6/28/00
DW 6/28/00

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16450-001
Reviewed By: [illegible]
Date: 6/09/00

INFORMATION ONLY

ERITECH® INC
P.O. Box 487 • Aberdeen, NC 28315
Phone: (910) 944-3355

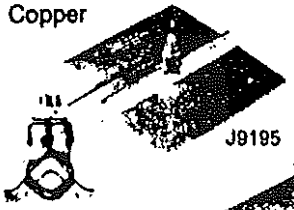
Pole Butt * Grounding Plates

Hot Dip Galvanized

J055W

J055

Copper



J9195

J9196

The embossed ring on both sides of Joslyn Pole Butt Grounding Plates assures permanent, positive contact with the earth.

The J055W has 8-feet of No. 6 AWG insulated copper lead for connecting a copper or aluminum ground wire above grade. A specially designed stainless steel compression connector isolates the plate from the lead to prevent galvanic and electrolytic corrosion.

The J055 features a galvanized steel parallel groove clamp for galvanized iron ground wire.

Copper Pole Butt Grounding Plates provide an inexpensive method of maintaining a low resistance neutral for multigrounded neutral construction. Plates are made of heavy gauge copper and include nail holes.

Stock No.	Plate Size Inches	Approx. Shp. Wt. Lbs. per 100 pcs.	Std. Pkg. Qty.
Hot Dip Galvanized			
J055W (E)	16 Ga. x 7-1/2 x 7-1/2	212	35
J055 (E)	16 Ga. x 7-1/2 x 7-1/2	145	35

(E) REA Electrical Approved, item dh

For Prices See "HJ" Sheet

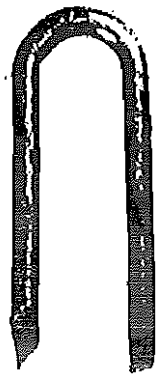
Stock No.	Plate Size Inches	Connector Type	Wt. per 100 pcs.	Std. Pkg.
Copper				
J9195	7 x 7-1/2	Eyebolt & Base Casting	62	50
J9196 (E)	7 x 7-1/2	Set Screw Terminal Lug	52	50

(E) REA Electrical Approved, item dh

For Prices See "C" Sheet

Staples *

Coppercoated
Hot Dip Galvanized
Electro-Galvanized
Mill Galvanized
Alumoweld®
(EEI Specification TDJ-14)



Cut Point

Joslyn coppercoated, hot dip galvanized, electro-galvanized, mill galvanized and Alumoweld staples are used to secure ground wire and ground wire molding to wood poles.

FOR GROUND WIRE

Stock No.	Finish	Dimensions (in.) Length x Inside Width x Wire Dia.	Approx. Weight per 100 Staples (Lbs.)	Pcs. per 50 Lb. Std. Carton
Cut Point				
J6651	Coppercoated	1-3/8 x 1/2 x .162	1.6	3,100
* J6652 (E)	Coppercoated	1-1/2 x 3/8 x .162	1.8	2,900
J6653	Coppercoated	2 x 1/4 x .162	2.2	2,200
J6654	Coppercoated	1-1/4 x 3/16 x .114	.8	6,700
J6655	Coppercoated	2 x 1/2 x .162	2.3	2,200
J1672G (E)	Hot Dip Galv.	1-1/2 x 1/4 x .148	1.4	3,650
J7495	Electro-Galv.	1-1/2 x 3/16 x .148	1.4	3,600
J7496	Electro-Galv.	1-3/4 x 3/8 x .148	1.6	3,100
J7497	Electro-Galv.	2 x 1/2 x .162	2.2	2,300
J7498	Electro-Galv.	2-1/4 x 7/8 x 3/16	4.2	1,200
J1672	Mill Galv.	1-1/2 x 1/4 x .148	1.4	3,650
J1673	Mill Galv.	1-3/4 x 1/4 x .148	2.0	2,500

(E) REA Electrical Approved, Item ai
For Prices See "E" Sheet

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CABLE

Type SEU Service Entrance Cable

Copper and Aluminum Conductor
600 Volts to Ground

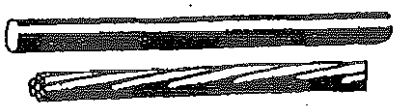
Two Type XHHW conductors insulated with cross linked Polyethylene are laid parallel with a bare concentric neutral over them and gray PVC overall jacket. One cable for entire service between line or entrance cap to meter, switch or range receptacle. Approved by UL for use without conduit.

Conductors Insul. Size AWG	Power No. Strands	Neutral Size AWG	Insul. Thick. In.	Jacket Thick. In.	OD In.	Net Wt. Lbs. M Ft.
Copper Conductors						
10	1	10	.030	030	.28 × .44	136
8	7	8	.045	030	37 × 62	220
8	7	8	045	030	41 × .69	200
6	7	6	045	030	.42 × .70	325
4	7	4	045	.030	.49 × 82	485
3	7	3	.045	.030	.53 × .88	595
2	7	2	.045	030	57 × 98	740
Compact Aluminum Conductors						
8	1	8	.045	.030	.39 × .62	98
6	7	6	.045	.030	.43 × .70	135
4	7	6	.045	030	48 × 78	176
4	7	4	045	030	48 × 78	190
2	7	4	045	030	.52 × 89	252
2	7	2	045	030	55 × 91	274
1	19	1	.055	.030	.61 × .02	343
1/0	19	2	.055	045	64 × 1.08	379
1/0	19	1/0	055	045	67 × 1 11	416
2/0	19	1	055	045	69 × 1 17	457
2/0	19	2/0	055	.045	72 × 1 28	505
4/0	19	2/0	055	045	82 × 1.40	682
4/0	19	4/0	055	045	86 × 1 44	755

Packaging. Sizes 12 thru 8 AWG, 250' coil, 6 AWG, 200' coil; 4 thru 3 AWG, 150' coil, 2 AWG, 100' coil, 1 AWG and larger, cutting lengths as desired

WIRE

Bare Copper Wire



Conforms to American Society for Testing And Materials Specification.

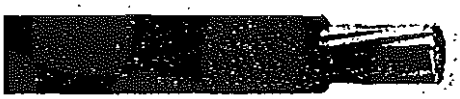
Size AWG	Solid Dia. In.	Class B Stranding No. Strands	Dia. In.
14	0641	7	073
12	0808	7	092
10	1019	7	116
9	1144	7	130
8	1285	7	146
6	1620	7	184
4	2043	7	232
2	2576	7	292
1	2893	19	332
1/0	3249	19	373
2/0	3648	19	419
3/0	4096	19	470
4/0	4600	19	528
250MCM		37	575
300MCM		37	630
350MCM		37	681
400MCM		37	728
500MCM		37	813
600MCM		61	893
750MCM		61	998
1000MCM		61	1 152

Note: Available in Hard Drawn, Medium Hard Drawn and Annealed (Soft Drawn)
Lengths as desired
Distribution packages of Soft Drawn sizes 14 thru 4 AWG available on 25 lb spools

WIRE

Type XHHW Building Wire

Aluminum Conductor—600 Volts



Used primarily in conduit, duct, or other recognized raceways for services, feeders, and branch circuit wiring. Compact stranded aluminum alloy single conductor with black crosslinked polyethylene insulation Abrasion, high heat, and moisture resistant May be used in wet or dry locations UL listed.

Temperature: Maximum 90°C dry, 75°C wet

Put-up: 500' and 1000' reels. Other put-ups also available.

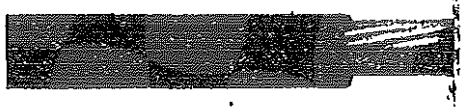
Conductor AWG	No.	Strand	Size, In. Insul.	OD	Weight Lbs./M'
8	1	7	045	224	28
6	1	7	045	260	40
4	1	7	045	305	58
2	1	7	045	360	86
1	1	19	055	415	109
1/0	1	19	055	450	133
2/0	1	19	055	490	162
3/0	1	19	055	540	199
4/0	1	19	055	590	245
250MCM	1	37	065	660	294
300MCM	1	37	065	715	347
350MCM	1	37	065	760	398
400MCM	1	37	065	800	450
500MCM	1	37	065	880	552
600MCM	1	61	080	980	672
700MCM	1	61	080	1 050	774
750MCM	1	61	080	1 090	825
1000MCM	1	61	080	1 230	1077

Note: For Stock Color availability contact your representative

WIRE

Type RHH/RHW/USE Building Wire

Aluminum Conductor—600 Volts



Compact stranded aluminum conductors with black interlinked polyethylene insulation is abrasion, moisture, heat, and sunlight resistant.

May also be used as underground service entrance cable, for direct burial, at conductor temperatures not to exceed 75°C When used as RHW, conductor temperatures shall not exceed 75°C in wet or dry locations When used as RHH, conductor temperatures shall not exceed 90°C in dry locations UL listed

Temperature Maximum 90°C dry, 75°C wet

Put-up 500' and 1000' reels Other put-ups also available

Conductor AWG	No.	Strand	Size, In. Insul.	OD	Weight Lbs./M'
8	1	7	.060	.254	36
6	1	7	.060	.290	49
4	1	7	.060	.334	65
2	1	7	.060	.390	94
1	1	19	.080	.468	125
1/0	1	19	.080	.506	150
2/0	1	19	.080	.547	181
3/0	1	19	.080	.596	220
4/0	1	19	.080	.649	268
250MCM	1	37	.095	.726	325
300MCM	1	37	.095	.777	379
350MCM	1	37	.095	.824	433
400MCM	1	37	.095	.868	487
500MCM	1	37	.095	.940	591
700MCM	1	61	.110	1.110	821
750MCM	1	61	.110	1.140	873
1000MCM	1	61	.110	1.285	1132

Note: For Stock Color availability, contact your representative

CABLE

Aluminum Type Use—RHW-RHH Cross-Linked Polyethylene Cable

600 Volt
For Aerial and Direct Burial Conduit and Underground Duct
Wet or Dry Locations - 75°C
Dry Locations - 90°C

Size AWG	Strands	O.D. In.	Lbs. M ft.
6	7	.31	50
4	7	.36	66
2	7	.42	94
1	19	.49	128
1/0	19	.53	152
2/0	19	.57	184
3/0	19	.62	223
4/0	19	.68	269
250MCM	37	77	343
300MCM	37	.82	382
350MCM	37	.87	437
400MCM	37	.92	488
500MCM	37	1.01	593
600MCM	61	1.11	723
700MCM	61	1 18	830
750MCM	61	1.22	880
1000MCM	61	1.37	1178

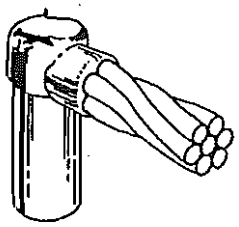
CABLE

Aluminum Type SE, Style U—600V Entrance Cable

Plastic Jacket

Construction. Aluminum conductors. Heat and moisture-resistant. Each conductor wrapped in color-coded tape. Uninsulated neutral concentrically laid around insulated conductors. 70°-90°C

Ins Cond	Bare Cond.	Lbs. 1000'	Std. Pkg. Ft.
Coils			
2 #8	1 #8	179	250
2 #6	1 #6	198	250
2 #4	1 #6	268	200
2 #4	1 #4	285	200
2 #2	1 #4	355	200
2 #2	1 #2	379	200



CABLE TO GROUND ROD
TYPE GR

TYPE GR (Cable tap to top of ground rod) CONNECTIONS—*Continued*

Concentric Strand Copper Cable

Rod Size	Cable Size	Mold Part Number Column 4	Mold Part Number Column 5	Mold Price	Weld Metal
3/4"	#4	GRC-181L	GRC-331L	C	#90
	2	GRC-181V	GRC-331V	C	90
	1	GRC-181Y	GRC-331Y	C	90
	1/0	GRC-182C	GRC-332C	C	90
	2/0	GRC-182G	GRC-332G	C	90
	3/0	GRC-182L	GRC-332L	C	90
	4/0	GRC-182Q	GRC-332Q	C	90
	250	GRC-182V	GRC-332V	C	90
	300	GRC-183A	GRC-333A	C	115
	350	GRC-183D	GRC-333D	C	115
	500	GRC-183Q	GRC-333Q	C	150
	750	GRC-184L	GRC-334L	C	250
1"	4	GRC-221L	GRC-371L	C	150
	2	GRC-221V	GRC-371V	C	150
	1	GRC-221Y	GRC-371Y	C	150
	1/0	GRC-222C	GRC-372C	C	150
	2/0	GRC-222G	GRC-372G	C	150
	3/0	GRC-222L	GRC-372L	C	150
	4/0	GRC-222Q	GRC-372Q	C	150
	250	GRC-222V	GRC-372V	C	150
	300	GRC-223A	GRC-373A	C	200
	350	GRC-223D	GRC-373D	C	200
	500	GRC-223Q	GRC-373Q	C	200
	750	GRC-224L	GRC-374L	C	250
	1000	GRD-224Y	GRD-374Y	D	2-150

3/4" and 1" NOMINAL SIZE GROUND RODS USE . . .

COLUMN 4

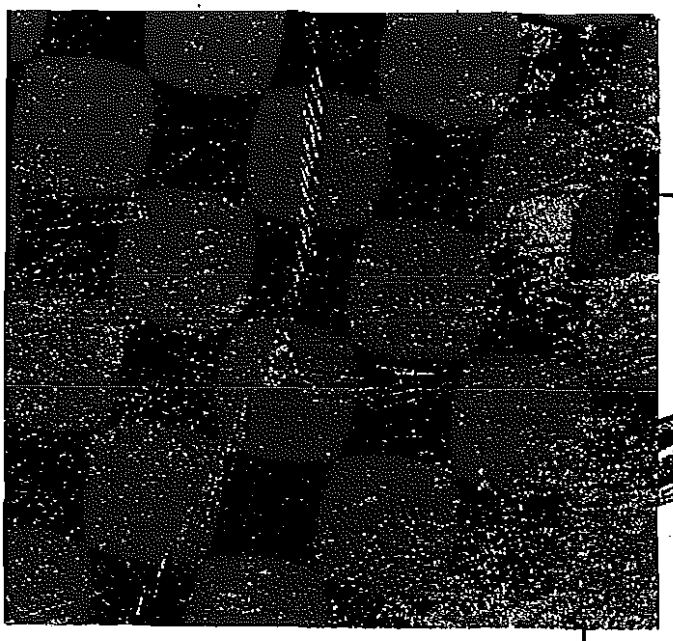
Copper clad sectional (threaded) or plain rods,

COLUMN 5

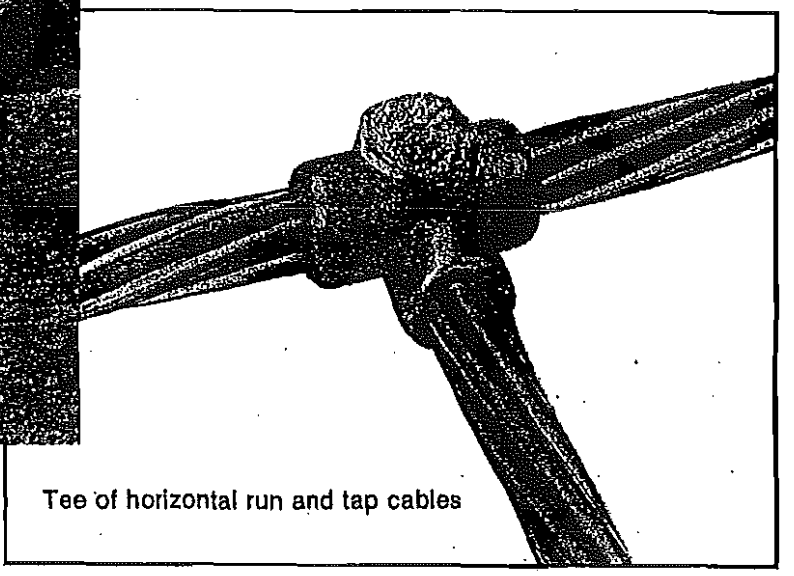
Steel rods (full size).*

*Stainless, stainless clad, galvanized, etc.

CABLE TO CABLE
TYPE TA



CADWELD Tee connections of Horizontal cables . . . for most conductors including copper, Copperweld and steel.



Tee of horizontal run and tap cables

For small taps (#6 or 5 power type) See page 6-12 this Commander

Concentric Strand Copper Cable

CABLE SIZE Run	CABLE SIZE Tap	Mold Part No.	Mold Price	Weld Metal
#4	#4	TAC-1L1L	C	#32
3	3	TAC-1Q1Q	C	32
2	2	TAC-1V1V	C	45
	4	TAC-1V1L	C	45
1	1	TAC-1Y1Y	C	45
	2	TAC-1Y1V	C	45
	4	TAC-1Y1L	C	45
1/0	1/0	TAC-2C2C	C	90
	1	TAC-2C1Y	C	45
	2	TAC-2C1V	C	45
	4	TAC-2C1L	C	45
2/0	2/0	TAC-2G2G	C	90
	1/0	TAC-2G2C	C	90
	1	TAC-2G1Y	C	45
	2	TAC-2G1V	C	45
	4	TAC-2G1L	C	45
3/0	3/0	TAC-2L2L	C	115
	2/0	TAC-2L2G	C	90
	1/0	TAC-2L2C	C	90
	1	TAC-2L1Y	C	45
	2	TAC-2L1V	C	45
	4	TAC-2L1L	C	45

CABLE SIZE Run	CABLE SIZE Tap	Mold Part No.	Mold Price	Weld Metal
4/0	4/0	TAC-2Q2Q	C	#150
	3/0	TAC-2Q2L	C	115
	2/0	TAC-2Q2G	C	90
	1/0	TAC-2Q2C	C	90
	1	TAC-2Q1Y	C	90
	2	TAC-2Q1V	C	90
	4	TAC-2Q1L	C	90
250	250	TAC-2V2V	C	150
	4/0	TAC-2V2Q	C	150
	3/0	TAC-2V2L	C	150
	2/0	TAC-2V2G	C	90
	1/0	TAC-2V2C	C	90
	1	TAC-2V1Y	C	90
	2	TAC-2V1V	C	90
	4	TAC-2V1L	C	90
300	300	TAC-3A3A	C	200
	250	TAC-3A2V	C	150
	4/0	TAC-3A2Q	C	150
	3/0	TAC-3A2L	C	150
	2/0	TAC-3A2G	C	90
	1/0	TAC-3A2C	C	90
	1	TAC-3A1Y	C	90
	2	TAC-3A1V	C	90
	4	TAC-3A1L	C	90

LIGHTING

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16500-001	REV: 1	22-Feb-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: RWood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Sarrett DATE: 2/22/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16500-001	1						X			Lighting Product Data		X		16500	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Jim Cherry	525				
Jim Jenkins	525				
Mike Goettler	61				
Rob Kneip	52-5				
Scott Wheeler	525				
Kwasi Badu-Tweneboah	38				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE 3/05/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

RICHARDS ELECTRIC SUPPLY CO.

PHONE: 513-242-8800
FAX: 513-242-6270

LIGHTING SUBMITTALS
For:

FERNALD-LEACHATE
S/C 641

Prepared For:

B&J ELECTRIC

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: MW Biff Date: 3/05/01

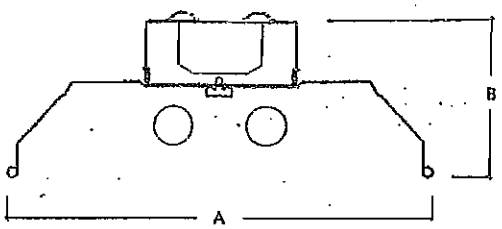
Submitted By:
Richards Electric Supply
4620 Reading Road, Cincinnati OH. 45229
(513)242-8800

INFORMATION ONLY

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16800-001
Reviewed By: [illegible]
Date: 2/22/01

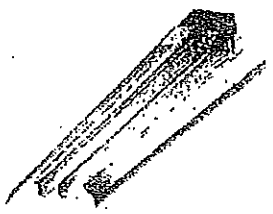
DIMENSIONS



NOMINAL LENGTH	A	B
4', 8'	12" (305mm)	4 5/8" (117mm)

DESCRIPTION

The IA Series is an energy efficient family of light duty industrials that features premium performance and durability. The series incorporates sturdy embossed reflectors that precisely direct and effectively control light. The IA Series can be installed using various mounting methods and numerous options and accessories are available. The series is available with both Apertured (IA) and Closed Top (IC) reflector combinations. The IA Series can be utilized in simple task and area lighting and industrial applications.



IA, ICSERIE

4' or 8' Industri
2 Lam

INDUSTRI

ORDERING INFORMATION

IA - 232 - 120V - LEOC8

SAMPLE NUMBER: IA-232-120V-EB81-U

- **Tandem** 8T=8' Length
- **Series** (A=Apertured Reflector; IC=Closed Top Reflector; ICW=Extra Wide Channel Reference STW Series With Symmetric Reflector)
- **Silver Reflector** SS=Silver-Lining Reflector
- **Number of Lamps** 2 Lamps (Not Included)
- **Wattage (Length)** 40=40W (48") 32=32W T8 (48") 48=40W (48") SL 48=60W (48") HO 96=110W (96") HO 96T8=59W (96") SL 96T8HO=85W T8 (96") HO
- HO=High Output (800 MA)
- **Voltage** [2] 120=120V 277=277V 347=347V
- **Ballast Type** [2] LE3= Energy Saving Ballast® LEOC8= Energy Saving Ballast (T-8 Lamp Only) EB__= Generic Electronic Ballast; No. of Ballasts 1 or 2; Lamp Size 2=T12 8=T8 (For Specific Electronic Ballast Specify Brand and Catalog Number)
- **Options** (See Options and Accessories Page)

- Equipped with energy Saving ballasts/complies with federal energy efficiency standards
- Die formed channels
- Heavy gauge apertured, (IA) or closed top, (IC) reflector
- Baked white enamel finis
- Pressure lock lampholder (RS), spring loaded lampholders (SL, HO)
- Wire guards available for special application
- Apertured reflector (IA) standard with 8% uplight
- Also available in tandem lengths
- Luminaire Efficacy Rating LER=F-84 Catalog Number: IA-296T8
- U.L. Listed, CSA Certified and IBEW Labeled

PRODUCT INFORMATION

Catalog Number	Lamp Type	Nominal Size	Shipping Wt.
IA-232	2F32	4'	13 lbs. (6.9kg)
8TIA-232	4F32	8'	26 lbs. (11.7kg)
IA-248 [1]	2F48	4'	16 lbs. (7.2kg)
IA-296T8	2F96T8	8'	30 lbs. (13.5kg)
IA-248HO [1]	2F48HO	4'	18 lbs. (8.1kg)
IA-296T8HO	2F96T8HO	8'	35 lbs. (15.8kg)

NOTES: [1] Standard ballast (Non-LE3). [2] Products also available in non-US voltages and frequencies for international markets. [3] For 12' and 16' fixtures use Master Satellite options. [4] For complete product data, reference the Fluorescent Specification Binder. [5] Specifications & dimensions subject to change without notice. [6] Consult your Cooper Lighting Representative for availability and ordering information.

SUPPLIER DOC SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16500-001	REV: 0	DATE: 18-Jul-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.

Ron Wood

SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Jeanna Lewis DATE: 7/18/2000

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16500-001	0						X			Lighting Product Data		X		16500		X	

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Giffin	525				
Jim Cherry	525				
Jim Jenkins	525				
Mike Hodber	64				
Bob Krip	525				
Scott Wheeler	525				
Lucci Bau Quinebah	64				

RECEIVED AUG 03 2000

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

attached

RECEIVED BY: MW DATE 8/3/00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

RICHARDS ELECTRIC SUPPLY CO.

PHONE: 513-242-8800
FAX: 513-242-6270

LIGHTING SUBMITTALS
For:

FERNALD-LEACHATE
S/C 641

Prepared For:

B&J ELECTRIC

INFORMATION ONLY

Submitted By:
Richards Electric Supply
4620 Reading Road, Cincinnati OH. 45229
(513)242-8800

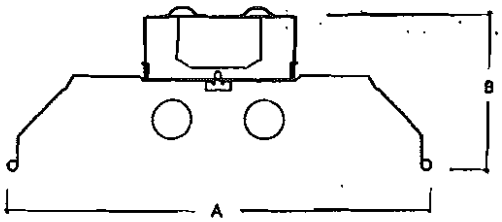
[ ] A - Conforms to the Subcontract Requirements
[✓] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: MWB Date: 8/03/00

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641- 116500-001
Reviewed By: RJ
Date: 7/18/00

METALUX

DIMENSIONS



NOMINAL LENGTH	A	B
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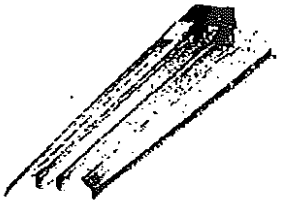
The IA Series is an energy efficient family of light duty industrials that features premium performance and durability. The series incorporates sturdy embossed reflectors that precisely direct and effectively control light. The IA Series can be installed using various mounting methods and numerous options and accessories are available. The series is available with both Apertured (IA) and Closed Top (IC) reflector combinations. The IA Series can be utilized in simple task and area lighting and industrial applications.



IA, ICSERIES

4' or 8' Industrial
2 Lamp

INDUSTRIAL

- Equipped with energy Saving ballasts/complies with federal energy efficiency standards
- Die formed channels
- Heavy gauge apertured, (IA) or closed top, (IC) reflector
- Baked white enamel finish
- Pressure lock lampholders (RS), spring loaded lampholders (SL, HO)
- Wire guards available for special application
- Apertured reflector (IA) standard with 8% uplight
- Also available in tandem 8' lengths
- Luminaire Efficacy Rating LER=FI-84 Catalog Number: IA-296T8
- U.L. Listed, CSA Certified and IBEW Labeled

MB 8/3/00

IA LEOC8

ORDERING INFORMATION

~~IC~~ - 232 - 120V - E~~B~~81

SAMPLE NUMBER: IA-232-120V-EB81-U

- Tandem 8T=8' Length
- Series
  - IA=Apertured Reflector
  - IC=Closed Top Reflector
  - ICW=Extra Wide Channel Reference STW Series With Symmetric Reflector
- Silver Reflector SS=Silver-Lining Reflector
- Number of Lamps 2 Lamps (Not Included)
- Wattage (Length)
  - 40=40W (48")
  - 32=32W T8 (48")
  - 48=40W (48") SL
  - 48=60W (48") HO
  - 96=110W (96") HO
  - 96T8=59W (96") SL
  - 96T8HO=85W T8 (96") HO
- HO=High Output (800 MA)
- Voltage [2]
  - 120=120V
  - 277=277V
  - 347=347V
- Ballast Type [2]
  - LE3= Energy Saving Ballast®
  - LEOC8= Energy Saving Ballast (T-8 Lamp Only)
  - EB__= Generic Electronic Ballast
    - No. of Ballasts 1 or 2
    - Lamp Size 2=T12 8=T8
  - (For Specific Electronic Ballast Specify Brand and Catalog Number)
- Options (See Options and Accessories Page)

Confirm (Submit) mean lumens (should be 2650) MB 8/3/00

PRODUCT INFORMATION

Catalog Number	Lamp Type	Nominal Size	Shipping Wt.
IA-232	2F32	4'	13 lbs. (5.9kg)
8TIA-232	4F32	8'	26 lbs. (11.7kg)
IA-248 [1]	2F48	4'	16 lbs. (7.2kg)
IA-296T8	2F96T8	8'	30 lbs. (13.6kg)
IA-248HO [1] [3]	2F48HO	4'	18 lbs. (8.1kg)
IA-296T8HO [3] [4]	2F96T8HO	8'	35 lbs. (15.8kg)

NOTES: [1] Standard [illegible] [2] [illegible] [3] [illegible] [4] For 1F and 1F Apertured use Master Catalog options. [5] For complete product data, please [illegible] [6] [illegible] Consult your Cooper [illegible]

Thermoplastic LED — Pathfinder® P2000 Series

- Durable thermoplastic design
- Non-yellowing
- Fire resistant
- Textured white finish
- Snap together design for easy installation
- Universal chevrons, 100 ft. visibility
- Universal mount design
- Battery powered and AC; 120/277/347 volt input, combo; 120/277 volt input
- Reverse polarity protected
- Low voltage disconnect (combo)
- AC lockout (combo)
- Long life LED AC indicator (battery and combination units)
- Long life maintenance free, NiCd battery
- Combination units include two high performance rectangular lamp heads
- All required lamps included
- AC Battery - 2 watts / Combo, 4.5 watts
- Five year full warranty, additional three prorated years on battery
- Meets New UL standard requirements
- Battery packs - two hour rating/damp location listed - Combo (90 minute rating)

AC only or Battery Unit

ENERGY STAR COMPLIANT

NRTL/C
Meets New UL Standard

Combination Unit

QUICK SHIP UNITS

PRA	PGA	PRB-ADA	PGB-ADA
PRB	PGB	PRC-ADA	PGC-ADA
PRC	PGC		

Sample Catalog Number

CATALOG LOGIC

P	R	B	ADA
series	letter color	operation	option

SERIES	
P	Pathfinder Next Generation Plastic LED exit

LETTER COLOR	
R	Red LED
G	Green LED

OPERATION	
A	AC only
B	Battery pack
C	Combo unit

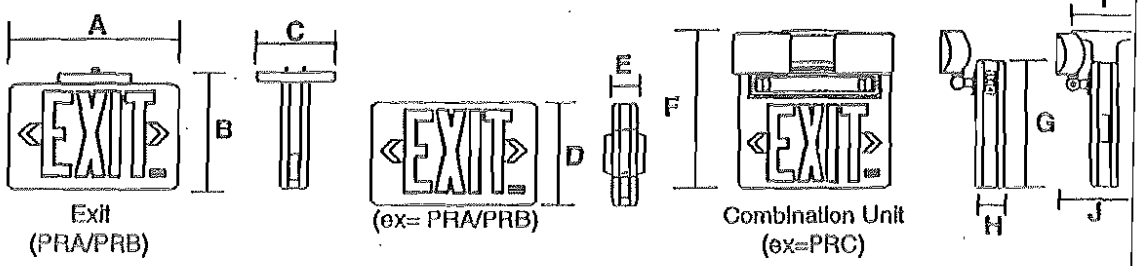
OPTION	
ADA	FAI (24V DC), beeper, flash

ACCESSORIES - Must be ordered separately

Catalog Number	Description
PP6	Pendant kit (white, 6")
PP12	Pendant kit (white, 12")
SW	Special Wording (consult factory)
WG-E	Wireguard - end mount (AC Battery)
WG-W	Wireguard - wall mount (AC Battery
WG-C	Wireguard - ceiling mount (AC Battery)
WG-L	Wireguard - wall mount (combo) PRC or PGC
WG-S	Wall mount battery PRB or PGB

PLASTIC LED EXIT POWER CHARACTERISTICS

	AC			AC/DC			Combo (NiCd)	
	120	277	347	120	277	347	120	277
WATTAGE	2.2	1.7	1.8	1.8	1.6	2.2	4.5	4.1
CURRENT	.06	.05	.06	.06	.05	.08	.25	.22
POWER FACTOR	0.102	0.125	0.249	0.241	0.12	0.101	0.151	0.068



Exit (PRA/PRB)

(ex= PRA/PRB)

Combination Unit (ex=PRC)

A	B	C	D	E	F	G	H	I	J
12.25"	8.0"	5.25"	7.5"	1.75"	15.25"	10.25"	2.0"	5.25"	7.0"
311 mm	203 mm	133 mm	190 mm	44 mm	387 mm	260 mm	51 mm	133 mm	178 mm

Perimalux® NRG® — 300 Series

New 50W Metal Halide

The Perimalux is a compact, lightweight wall lighter for mounting heights of 8-12 feet. It's designed for maximum spacing and uniformity between luminaires. Spacing to mounting height ratio ranges from 6 to 1 on HPS through 4 to 1 on 28w fluorescent. Bronze polycarbonate construction makes this an excellent choice for lighting exterior and interior architectural and security lighting applications for commercial buildings, shopping centers, schools, and apartment complexes.

NRTL/C

Housing
One piece, injection molded, bronze polycarbonate housing provides a permanent color with a textured finish.

Reflector
Internal reflector features a white Lektrocote® finish for excellent reflectivity and uniformity.

Refractor
UV stabilized prismatic polycarbonate refractor provides low brightness and high spacing to mounting height ratios. This unique design punches the light side-to-side while bending the light 15° below horizontal for reduced glare.

Lamp Included
HPS — B17 clear medium base 50 and 70 watt.

MH — NRG 350 (AC version) B17 coated medium base 50 watt. NRG 305 (DC version) ED17 coated medium base 48 watt (venture).

Fluorescent — 28 watt ww, 1600 lumen, Philips 15mm, 2 pin (-20°F starting). 42 watt, 3500K, 3200 lumen, 4 pin electronic (0°F starting)

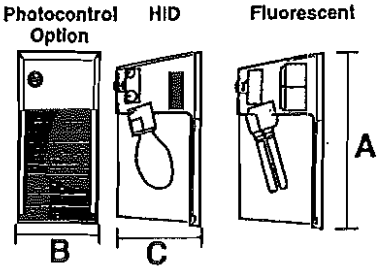
Vandal Resistant Set Screw
Retains the refractor and protects the lamp due to recessed location.

Additional Features
- All weather gasketing
- Easy to install over a standard 4" rough in junction box
- UL listed, CSA certified for indoor/outdoor locations
- Optional photocontrol version for dusk to dawn capability
- NRG-B3 feed thru conduit box allows placement in locations with no wiring box
- Max ambient 25° C

ORDERING INFORMATION

Catalog Number[1]	Wattage	Voltage	Ballast	Start Temp.	Weight lbs.	Weight kg
HIGH PRESSURE SODIUM						
NRG-301[2]	50	120	Reactor	-40°F	4.0	1.8
NRG-307[2]	70	120	Reactor	-40°F	4.0	1.8
METAL HALIDE						
NRG-305[2]	50	120	Reactor HPF	-20°F	5.0	2.2
NRG-305[2]	50	120	Low Loss NPF	-20°F	5.0	2.2
FLUORESCENT						
NRG-308- 4W [2]	28	120	Auto-Lag	-20°F	3.6	1.6
NRG-304	42	120	Electronic	0°F	5.0	2.2
NRG-304-277	42	277	Electronic	0°F	5.0	2.2

1. Lamp included.
2. Not available in 277V.

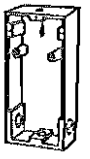


NRG 300 Series

A	B	C
10-5/8"	5"	5-1/4"
270 mm	127 mm	133 mm

ACCESSORY - Must be ordered separately

Catalog Number	Description	Weight lbs.	Weight kg
NRG-B3	Cast aluminum surface mounting box with four 1/2" tapped hubs and three plugs. Bronze Lektrocote finish. (not UL or CSA)	2.5	1.1



NRG-B3

OPTION - Order with fixture by adding appropriate suffix

Suffix	Description
-PC	Button type photocontrol, 120V (on 28W order as NRG-308-4-PCW)

CONTROLS, INSTRUMENTATION, AND FLOW METERS

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-001	REV: 00	13-Sep-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Pinny Dragoo DATE: 9-13-2000

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	641-16900-001E	0						X			Control Panel		X		16900		X	

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Jim Chreey	52-5				
Jim Jenkins	52-5				
Mike Godber	64				
Rob Knein	52-5				
R. Scott Wheeler	52-5				
Kwasi Bau Yeyenbeah (GeoSyntec)	38				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

See attached

RECEIVED BY: MW Griffin DATE 9-21-00
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
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C - Revise and Resubmit (SEE COMMENTS)

ENTERED

DIGITAL

NATIONWIDE CONTROL SERVICES, INC. (NCSI)

INSTRUMENT ENGINEERING
&
SYSTEMS INTEGRATION

CINCINNATI, OHIO
800-252-6760

FLUOR FERNALD, INC.

ENHANCED PERMANENT LEACHATE
TRANSMISSION CONTROL PANELS

SUBMITTAL

ECDC CONTROLLED COPY NO. 76896

SEPTEMBER 11, 2000

[ ] A - Conforms to the Subcontract Requirements
[X] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: MWB Date: 9-21-00

1. See notes on panel labels
2. DCN 20111-25 has been initiated, which adds to control wiring

Incorporate & Resubmit when DCN is approved & issued for contract.
MWB

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16900-001E
Reviewed By: Rad
Date: 9/13/00

CONTRACTOR: Staver Group, Inc.

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SECTION I

HARDWARE

* **Wiegmann**
  * NEMA 12 Continuous Hinge

* **Eaton**
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  * Pushbuttons and Indicating Lights - Indicating Light Components
  * I.E.C. Section Terminal Blocks - Single Level Feed Through
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* **IDEC**
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* **Apollo**
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SECTION II

DRAWINGS

* GQ1030-07-01
  FEMP EPLTS Valve House Control Panel
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* GQ1030-07-02
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  Electrical Schematic

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* GQ1030-07-04
  FEMP EPLTS Control Valve House Control Panel
  Electrical Schematic

12 CONTINUOUS HINGE

Construction

- Fabricated from 14 gauge steel.
- Continuously welded seams ground smooth, less knockouts or holes.
- Closed cell neoprene gasket, attached with oil-resistant adhesive.
- External mounting feet.
- Weldnuts are provided for mounting optional panels securely on models 6 x 4 and larger.
- External screw clamps are quick and easy to operate.
- Standard continuous hinge.
- Grounding kit provided.
- Optional panels and terminal kits must be ordered separately.

Finish

ANSI-61 gray polyester powder inside and out over phosphatized surfaces. Optional sub panels are painted white polyester powder.

Listings

- UL 50 Listed, Types 12 & 13 (6 X 6 X 4 & above)
- UL 508 Listed, Types 12 & 13 (6 X 4 X 4 & smaller)
- CSA Certified, Types 12 & 13
- Meets NEMA/EEMAC Type 12 & 13 requirements
- JIC EL-1-71

UL Files E23553, E64791

CSA File LL66078

Accessories — Pages 252-275

Application Designed for use as instrument housings, electrical control enclosures, terminal wiring boxes or electrical junction boxes. Provides protection from dirt, dust, oil and water.

Catalog Number	Box Ga.	Enclosure Size HxWxD	*Panel Number	Panel Size A x B	Mounting C x E	Overall L x M	F	G	I	J	K	N	O	P	Q
B040403CH	14	4.00x4.00x3.00 (102x102x76)	NA	NA	4.75x2.00 (121x51)	5.50x5.00 (140x127)	2.53 (76)	4.31 (109)	3.00 (76)	NA	1.38 (35)	1.78 (45)	2.53 (64)	0.63 (16)	4.31 (110)
B040404CH	14	4.00x4.00x4.00 (102x102x102)	NA	NA	4.75x2.00 (121x51)	5.50x5.00 (140x127)	3.53 (101)	4.31 (109)	3.00 (76)	NA	1.38 (35)	2.78 (71)	3.53 (90)	0.63 (16)	4.31 (110)
B060403CH	14	6.00x4.00x3.00 (152x102x76)	P0604	4.88x2.88 (124x73)	6.75x2.00 (171x51)	7.50x5.00 (191x127)	2.53 (76)	4.31 (109)	3.00 (76)	0.56 (14)	2.38 (60)	1.78 (45)	2.53 (64)	0.63 (16)	6.31 (160)
B060404CH	14	6.00x4.00x4.00 (152x102x102)	P0604	4.88x2.88 (124x73)	6.75x2.00 (171x51)	7.50x5.00 (191x127)	3.53 (101)	4.31 (109)	3.00 (76)	0.56 (14)	2.38 (60)	2.78 (71)	3.53 (90)	0.63 (16)	6.31 (160)
B060604CH	14	6.00x6.00x4.00 (152x152x102)	P0606	4.88x4.88 (124x124)	6.75x4.00 (171x102)	7.50x7.00 (191x178)	3.53 (101)	6.31 (160)	5.00 (127)	0.56 (14)	2.38 (60)	2.78 (71)	3.53 (90)	0.63 (16)	6.31 (160)
B080603CH	14	8.00x6.00x3.50 (203x152x89)	P0806	6.88x4.88 (175x124)	8.75x4.00 (222x102)	9.50x7.00 (241x178)	3.03 (88)	6.31 (160)	5.00 (127)	0.56 (14)	1.00 (25)	2.28 (58)	3.03 (77)	0.63 (16)	8.31 (211)
B080606CH	14	8.00x6.00x6.00 (203x152x152)	P0806	6.88x4.88 (175x124)	8.75x4.00 (222x102)	9.50x7.00 (241x178)	5.53 (152)	6.31 (160)	5.00 (127)	0.56 (14)	1.00 (25)	4.78 (121)	5.53 (141)	0.63 (16)	8.31 (211)
B080804CH	14	8.00x8.00x4.00 (203x203x102)	P0808	6.88x6.88 (175x175)	8.75x6.00 (222x152)	9.50x9.00 (241x229)	3.53 (101)	8.31 (211)	7.00 (178)	0.56 (14)	1.00 (25)	2.78 (71)	3.53 (90)	0.63 (16)	8.31 (211)
B100804CH	14	10.00x8.00x4.00 (254x203x102)	P1008	8.88x6.88 (226x175)	10.75x6.00 (273x152)	11.50x9.00 (292x229)	3.53 (101)	8.31 (211)	7.00 (178)	0.56 (14)	1.00 (25)	2.78 (71)	3.53 (90)	0.63 (16)	10.31 (262)
B100806CH	14	10.00x8.00x6.00 (254x203x152)	P1008	8.88x6.88 (226x175)	10.75x6.00 (273x152)	11.50x9.00 (292x229)	5.53 (152)	8.31 (211)	7.00 (178)	0.56 (14)	1.00 (25)	4.78 (121)	5.53 (141)	0.63 (16)	10.31 (262)
B101006CH	14	10.00x10.00x6.00 (254x254x152)	P1010	8.88x8.88 (225x225)	10.75x8.00 (273x203)	11.50x11.00 (292x279)	5.53 (152)	10.31 (262)	9.00 (229)	0.56 (14)	1.00 (25)	4.78 (121)	5.53 (141)	0.63 (16)	12.31 (313)
B120604CH	14	12.00x6.00x4.00 (305x152x102)	P1206	10.88x4.88 (276x124)	12.75x4.00 (324x102)	13.50x7.00 (343x178)	3.53 (101)	6.31 (160)	5.00 (127)	0.56 (14)	1.00 (25)	2.78 (71)	3.53 (90)	0.63 (16)	12.31 (313)
B121005CH	14	12.00x10.00x5.00 (305x254x127)	P1210	10.88x8.88 (276x226)	12.75x8.00 (324x203)	13.50x11.00 (343x279)	4.53 (127)	10.31 (262)	9.00 (229)	0.56 (14)	1.00 (25)	3.78 (96)	4.53 (115)	0.63 (16)	12.31 (313)
B121008CH	14	12.00x10.00x8.00 (305x254x203)	P1210	10.88x8.88 (276x226)	12.75x8.00 (324x203)	13.50x11.00 (343x279)	7.53 (203)	10.31 (262)	9.00 (229)	0.56 (14)	1.00 (25)	6.78 (172)	7.53 (191)	0.63 (16)	12.31 (313)
B121206CH	14	12.00x12.00x6.00 (305x305x152)	P1212	10.88x10.88 (276x276)	12.75x10.00 (324x254)	13.50x13.00 (343x330)	5.53 (152)	12.31 (313)	11.00 (279)	0.56 (14)	1.00 (25)	4.78 (121)	5.53 (141)	0.63 (16)	14.31 (364)
B140806CH	14	14.00x8.00x6.00 (356x203x152)	P1408	12.88x6.88 (327x175)	14.75x6.00 (375x152)	15.50x9.00 (394x229)	5.53 (152)	8.31 (211)	7.00 (178)	0.56 (14)	1.00 (25)	4.78 (121)	5.53 (141)	0.63 (16)	14.31 (364)
B141206CH	14	14.00x12.00x6.00 (356x305x152)	P1412	12.88x10.88 (327x276)	14.75x10.00 (375x254)	15.50x13.00 (394x330)	5.53 (152)	12.31 (313)	11.00 (279)	0.56 (14)	1.00 (25)	4.78 (121)	5.53 (141)	0.63 (16)	14.31 (364)
B141208CH	14	14.00x12.00x8.00 (356x305x203)	P1412	12.88x10.88 (327x276)	14.75x10.00 (375x254)	15.50x13.00 (394x330)	7.53 (203)	12.31 (313)	11.00 (279)	0.56 (14)	1.00 (25)	6.78 (172)	7.53 (191)	0.63 (16)	14.31 (364)
B161006CH	14	16.00x10.00x6.00 (406x254x152)	P1610	14.88x8.88 (378x226)	16.75x8.00 (425x203)	17.50x11.00 (445x279)	5.53 (152)	10.31 (262)	9.00 (229)	0.56 (14)	1.00 (25)	4.78 (121)	5.53 (141)	0.63 (16)	16.31 (414)
B161406CH	14	16.00x14.00x6.00 (406x356x152)	P1614	14.88x12.88 (378x327)	16.75x12.00 (425x305)	17.50x15.00 (445x381)	5.53 (152)	14.31 (363)	13.00 (330)	0.56 (14)	1.00 (25)	4.78 (121)	5.53 (141)	0.63 (16)	16.31 (414)
B161408CH	14	16.00x14.00x8.00 (406x356x203)	P1614	14.88x12.88 (378x327)	16.75x12.00 (425x305)	17.50x15.00 (445x381)	7.53 (203)	14.31 (363)	13.00 (330)	0.56 (14)	1.00 (25)	6.78 (172)	7.53 (191)	0.63 (16)	16.31 (414)
B161410CH	14	16.00x14.00x10.00 (406x356x254)	P1614	14.88x12.88 (378x327)	16.75x12.00 (425x305)	17.50x15.00 (445x381)	9.53 (254)	14.31 (363)	13.00 (330)	0.56 (14)	1.00 (25)	8.78 (223)	9.53 (242)	0.63 (16)	16.31 (414)

*Panels must be ordered separately.

WIEGMANN

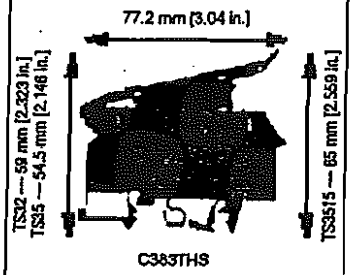
I.E.C. SECTIONAL TERMINAL BLOCKS
DIN Rail Mounted
Fuse Blocks

WHEN ORDERING SPECIFY

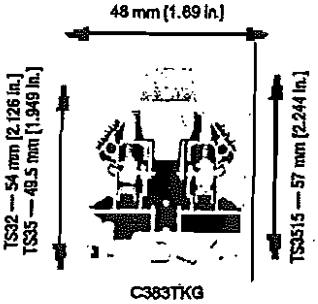
- Catalog Number

Maximum Wire Size AWG	12 AWG	10 AWG	6 AWG
UL Ratings	600V 22-12 AWG 10A	300V 22-10 AWG 10A	600V 22-6 AWG 15A
CSA Ratings	600V 22-10 AWG 10A	250V 20-10 AWG 6.3A	600V 16-6 AWG 15A
Block Width	Block Width 10 mm	Block Width 6 mm	Block Width 12 mm
Wire Stripping Length	Wire Strip Length 8 mm	Wire Strip Length 9 mm	Wire Strip Length 9 mm

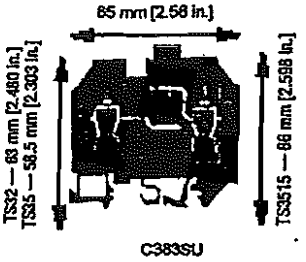
- 1/4" x 1-1/4" fuse
  C383TH except THS5
  C383SU, SUL, SUG
- 5 mm x 20 mm fuse
  C383THS5
  C383TKG
  C383SU5



C383THS



C383TKG



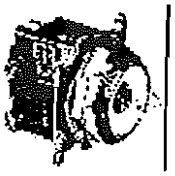
C383SU

Description	Catalog Number	Price Per Unit	Standard Pack	Catalog Number	Price Per Unit	Standard Pack	Catalog Number	Price Per Unit	Standard Pack
Fuse block	C383THS	$ 10.11	50	C383TKG	$ 2.06	100	C383SU	$ 8.06	50
Fuse holder for insertion in block	[illegible]	---	---	1KGST	4.28	100	[illegible]	---	---
Diode holder for insertion in block	[illegible]	---	---	1KGD	5.00	10	[illegible]	---	---
Fuse block w/ LED 12-24 volt ac/dc	C383THLZ	15.69	50	[illegible]	---	---	[illegible]	---	---
Fuse block w/ LED 24-60 volt ac/dc	[illegible]	15.69	50	C383TKGS1L ①	13.45	100	C383SUL ①	12.37	50
Fuse block w/ neon lamp 110-250V ac/dc	[illegible]	16.50	50	1KGS1G ②	13.04	100	C383SUG ②	12.80	50
Fuse block for 5 x 20 mm fuses	C383THS5 ③	10.11	50	[illegible]	---	---	C383SU5	8.06	100
ACCESSORIES									
DIN rail:									
35 mm x 7.5 mm x 2M (slotted)	C383TS35	14.26	20	C383TS35	14.26	20	C383TS35	14.26	20
35 mm x 7.5 mm x 2M (solid)	TS35S	11.73	20	TS35S	11.73	20	TS35S	11.73	20
35 mm x 15 mm x 2M (solid)	TS3515	20.10	10	TS3515	20.10	10	TS3515	20.10	10
32 mm x 2M	TS32	15.69	10	TS32	15.69	10	TS32	15.69	10
End stop 35 mm DIN rail	C383ES35	0.57	100	C383ES35	0.57	100	C383ES35	0.57	100
32 mm DIN rail	ES32	0.57	100	ES32	0.57	100	ES32	0.57	100
End plate	[illegible]	---	---	C383AP4TK	0.55	10	C383AP1SU	0.59	10
Partition plate	[illegible]	---	---	TW4TK	0.58	10	[illegible]	---	---
Test plug	See page J-28	---	---	See page J-28	---	---	See page J-28	---	---
Marking options	See page J-28	---	---	See page J-28	---	---	See page J-28	---	---

① Rated 24 volts.
② Rated 220 volts.
③ Incandescent blub 28V 20 mA.
④ Neon lamp 100-150V 0.6 mA.
⑤ Rated 6.3 amperes.

PUSHBUTTONS AND INDICATING LIGHTS
30.5 mm Heavy Duty Oiltight
Indicating Light Components

ORDERING EXAMPLE



Standard Transformer Type
Cat. No. 10250T181N

Lens
10250TC1N

Legend Plate
10250TS81
(Pages M-76 - M-77)

For complete 10250T operators using single composite catalog number (Example: 10250T181-NC1NS81), See Page M-59.

BASIC UNIT — UL (NEMA) Type 4, 4X, 13 Vertical or Horizontal Mounting

Standard Transformer Type
Cat. No.
10250T181N

PresTest Transformer Type —
Cat. No.
10250T221N

Type	Lamp No.	Volts	STANDARD UNIT Cat. No.	STANDARD UNIT Price	PRES-TEST Cat. No.	PRES-TEST Price	MASTER TEST Cat. No.	MASTER TEST Price
Transformer Type 50 or 60 Hertz ac only	6 Volt #755 Lamp ❶	120 ❸ 208-240 277 380 480 600	10250T181N 102N 103N 111 113N	$60.00	10250T221N 222N 223N 231N 232N 241N	$78.00	10250T171N ❷	$90.00
Full Voltage For use w/LED Bayonet Base Type Lamp	None ❹	❸	197N	46.50	---	---	---	---
Full Voltage Type ac or dc (Direct Connected)	#755 #756 #757 #1828 #1835	6 12-14 24 32 48	203N 204N 206N 207N 208N	48.00	220N 223N 226N 227N 228N	66.00	---	---
Resistor ac or dc	120MB 120MB	120 240	107N	48.00	210N	66.00	---	---
Neon Type ❺ ac or dc (Resistant to Shock & Vibration)	NE51H-R-22 NE51H-R-68	120 ac, dc 240 ac, dc	261N 271N	48.00	---	---	---	---
Solid-State Type 120V ac only 50 or 60 Hz	120MB	120	---	---	---	---	191N	78.00

❶ For flashing lamp, add letter "F" to listed catalog number and add $6.00 to price. Example: 10250T181NF, Price $ 66.00.
❷ For Master Test (dual input) or Flasher add-on modules, see Page M-80. Modules can only be used with 24 or 120V ac/dc standard indicating lights.
❸ Relay test circuit.
❹ These units do not include lamp. Order LED lamp separately from Page M-80.
❺ For best illumination use amber, yellow or clear lens.
❻ Additional voltages available, contact your nearest Eaton Corp. Cutler-Hammer Distributor or call our Customer Service Center 1-800-833-3927.

ACCESSORIES

	Description	Catalog Number	Price
	❼ Transparent Boot for PresTest Indicating lights — Temperature to -38°F (-39°C)	10250T125	$ 18.00

❼ Not suitable for single contact block depth cast enclosure. Cover is too thick.

LENS

Plastic

Glass

Color	FOR STANDARD AND MASTER TEST INDICATING LIGHTS — Plastic Cat. No.	Plastic Price	Glass Cat. No.	Glass Price
Red	10250TC1N	$ 4.20	10250TC7N	$ 7.50
Green	C2N		C8N	
Amber	C19N		C9N	
Yellow	C3N			
Blue	C4N		C10N	
Clear	C5N		C11N	
White	C6N		C12N	

Plastic

Glass

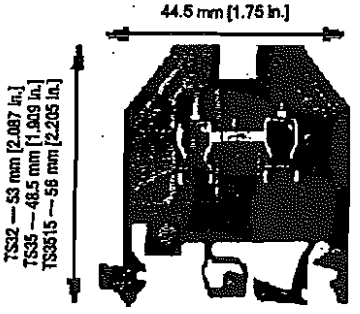
Color	FOR PRES-TEST INDICATING LIGHTS — Plastic Cat. No.	Plastic Price	Glass Cat. No.	Glass Price
Red	10250TC1N	$ 4.20	10250TC7N	$ 7.50
Green	C2N		C8N	
Amber	C19N		C9N	
Yellow	C3N			
Blue	C4N		C10N	
Clear	C5N		C11N	
White	C6N		C12N	

WHEN ORDERING SPECIFY

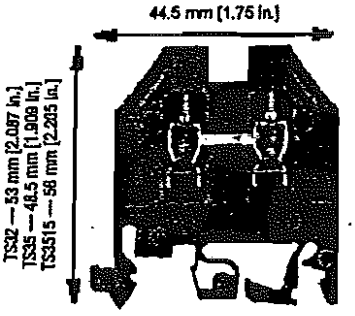
- Catalog Number

Maximum Wire Size AWG	12 AWG	10 AWG
UL Ratings	600V 22-12 AWG 20A	600V 22-10 AWG 30A
CSA Ratings	600V 24-12 AWG 25A	600V 20-10 AWG 40A
Block Width	Block Width 5 mm	Block Width 6 mm
Wire Stripping Length	Wire Strip Length 9 mm	Wire Strip Length 9 mm

- Low profile
- Wire range size 24 AWG to 3/0 AWG
- Current ratings up to 175A
- Universal mounting for 32 mm or 35 mm DIN rail



C383RK25



C383RK254

Description	Catalog Number	Price Per Unit	Standard Pack	Catalog Number	Price Per Unit	Standard Pack
Terminal block	[illegible]	$ 1.18	100	[illegible]	$ 1.22	100
				[illegible] White	1.22	100
				[illegible] Red	1.22	100
				[illegible] Blue	1.22	100
				[illegible] Yellow	1.22	100
				[illegible] Black	1.22	100
				[illegible] Green	1.22	100
ACCESSORIES						
DIN rail: 35 mm x 7.5 mm x 2M (slotted)	[illegible]	14.26	20	[illegible]	14.26	20
35 mm x 7.5 mm x 2M (solid)	[illegible]	11.73	20	[illegible]	11.73	20
35 mm x 15 mm x 2M (solid)	[illegible]	20.10	10	[illegible]	20.10	10
32 mm x 2M	[illegible]	15.69	10	[illegible]	15.69	10
End stop35 mm DIN rail	[illegible]	0.57	100	[illegible]	0.57	100
32 mm DIN rail	[illegible]	0.57	100	[illegible]	0.57	100
End plate	[illegible]	0.40	10	[illegible]	0.40	10
Partition plate	[illegible]	0.54	10	[illegible]	0.54	10
Cross connector assembly						
2 terminals	[illegible]	0.82	10	[illegible]	0.82	10
3 terminals	[illegible]	1.19	10	[illegible]	1.19	10
4 terminals	[illegible]	1.56	10	[illegible]	1.56	10
Bar for custom lengths	[illegible] (10 terminals)	39.91	10	[illegible] (10 terminals)	33.47	10
Insulated jumper comb						
2 terminals		---	---	[illegible]	1.16	100
Up to 12 terminals (Page J-26)		---	---	[illegible]	4.06	100
Switchable connecting link	[illegible]	1.17	50	[illegible]	1.17	50
Stud bolt for test plug	[illegible]	0.27	50	[illegible]	0.15	50
Test plug	[illegible]	3.60	50	[illegible]	3.60	50
Dead front cover	[illegible]	0.27	100	[illegible]	0.27	100
Snap-in partition	[illegible]	0.31	10	[illegible]	0.31	10
Snap-in cover w/warning symbol	[illegible]	0.71	10	[illegible]	0.71	10
Rapid mounting tool	[illegible]	N/C ❶	1	[illegible]	N/C ❶	1
Marking options	[illegible]	---	---	[illegible]	---	---

❶ Available at no charge.

PUSHBUTTONS AND INDICATING LIGHTS
30.5 mm Heavy Duty Oiltight
Assembled Devices

PUSHBUTTON OPERATORS, ASSEMBLED W/CONTACT BLOCKS — UL (NEMA) TYPE 4, 4X,13

Type	Color	Contact Block Configuration									
		NO		NC		NO - NC		NO - NO		NC - NC	
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
Flush Button	Black Red Green Yellow	10250 T23B T23R T23G T23Y	$ 25.20	10250 T11-51 T12-51 T13-51 T14-51	$ 25.20	10250 T30B T30R T30G T30Y	$ 34.20	10250 T11-2 T12-2 T13-2 T14-2	$ 34.20	10250 T11-3 T12-3 T13-3 T14-3	$ 34.20
Extended Button	Black Red Green Yellow	T25B T12-53 T25G T25Y	25.20	T11-51 T25R T13-51 T14-51	25.20	T31B T31R T31G T31Y	34.20	T11-2 T12-2 T13-2 T14-2	34.20	T11-3 T12-3 T13-3 T14-3	34.20
Mushroom Head	Black Red Green Yellow	T26B T12-53 T26G T26Y	43.20	T11-51 T26R T13-51 T14-51	43.20	T32B T32R T32G T32Y	52.20	T11-2 T12-2 T13-2 T14-2	52.20	T11-3 T12-3 T13-3 T14-3	52.20
Jumbo Mushroom Head	Black Red Green Yellow	T27B T12-53 T27G T27Y	49.20	T11-51 T27R T13-51 T14-51	49.20	T33B T33R T33G T33Y	58.20	T11-2 T12-2 T13-2 T14-2	58.20	T11-3 T12-3 T13-3 T14-3	58.20
	Red — Engraved "Emergency Stop"	T721-53	54.00	T29	54.00	T23	63.00	T721-2	63.00	T721-3	63.00

SELECTOR SWITCH OPERATORS, ASSEMBLED — UL (NEMA) TYPE 4, 4X, 13

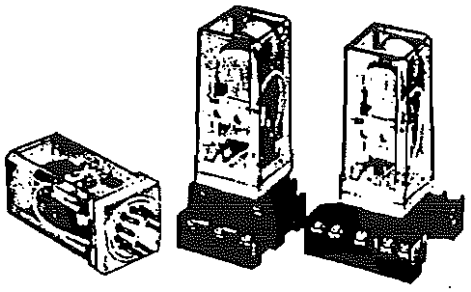
	Description			Selector Switch				Illuminated Selector Switch			
	Number of Positions	No. of Contact Blocks	Circuit	Knob		Lever		Knob		Lever	
				Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2 Position Maintained Switch	2	1	X 0 0 X	10250 T20K ❶	$ 40.20	10250 T20L ❶	$ 40.20	10250 ED1117-K ❶	$ 88.20	10250 ED1117-L ❶	$ 88.20
	3	1	X 0 0 0 0 X	T21K ❶	40.20	T21L ❶	40.20	ED1117-K ❶	88.20	ED1117-L ❶	88.20
3 Position Maintained Switch	3	2	X 0 0 0 X 0 0 0 X	T22K ❶	58.20	T22L ❶	58.20	ED1117-K ❶	106.20	ED1117-L ❶	106.20
	4	2	X 0 0 0 0 X 0 0 0 0 X 0 0 0 0 X	T46K ❶	58.20	T46L ❶	58.20	ED1117-K ❶	106.20	ED1117-L ❶	106.20

❶ Add Code Letter from Color Selection Table below. Example: 10250T20KB

COLOR SELECTION TABLE

Color	Code Letter		Color	Code Letter		Color	Code Letter	
	Non-Illuminated	Illuminated		Non-Illuminated	Illuminated		Non-Illuminated	Illuminated
Black Red Green	B R G	B R G	White Blue	W U	W U	Orange Amber Clear	O A C	O A C

Magnetic Latching Relays
10A Contact Rating
2 Form C Contacts



Features

- Standard octal base (11-pin) termination
- Operates by pulse input and maintains condition even during power failure
- High vibration and shock resistance
- Excellent self-holding performance
- Optional manual check button for circuit testing
- DIN rail, surface, and panel mount sockets available for a wide range of mounting applications
- UL recognized and CSA certified

UL Recognized File No. E67770

CSA Certified File No.LR35144

RR2KP Series Part List

Termination	Contact Configuration	Basic Part No.	
		Standard	W/Check Button
P: 11-Pin	DPDT	RR2KP-U	RR2KP-UC

Contact Ratings

Voltage	Resistive			Inductive		
	Nom.	UL	CSA	Nom.	UL	CSA
30V DC	10A	10A	10A	7.5A	7A	7.5A
100V DC	0.5A	—	—	0.3A	—	0.5A
120V AC	10A	10A	10A	7.5A	7.5A	7.5A
240V AC	7.5A	10A	10A	5A	7A	7A

Note: Inductive load cos ø = 0.3, L/R = 7msec.

Note: UL/CSA motor load rating 1/4 HP @ 120V AC and 1/3HP @ 240V AC.

Sockets

Relay	Sockets			Spring (Optional)
	Din Rail Mount		Panel	
	Snap	Fingersafe		
RR2KP	SR3P-05 SR3P-06	SR3P-05C	SR3P-51	SR3P-06F3 SR3P-51F3

Note: See section F for details on sockets. All DIN rail mount sockets shown above can be mounted using DIN Rail BNDN-1000.

Note: See page D2-17 for dimensions. See page D2-13 for electrical life curves and internal circuit drawings.

Ordering Information

Ordering standard voltages results in quickest delivery. Allow extra delivery time for non-standard voltages.

Basic Part No.		Coil Voltage:
RR2KP-U	—	AC120V

Coil Ratings

Rated Voltage		Rated Current ±15% @20°C		Coil Resistance ±10% @20°C
		60Hz	50Hz	
AC	6V	429mA	467mA	3.5Ω
	12V	184mA	200mA	23.8Ω
	24V	92mA	100mA	95Ω
	120V	22mA	24mA	2200Ω
	240V	10.6mA	11.5mA	9190Ω
DC	6V	240mA		25Ω
	12V	120mA		100Ω
	24V	60mA		400Ω
	48V	30mA		1600Ω
	110V	13.8mA		7960Ω

Operational Characteristics

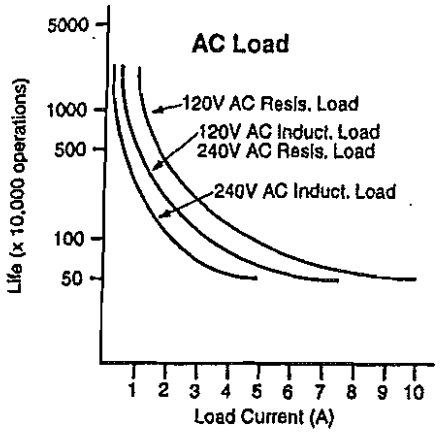
Maximum continuous applied voltage (AC/DC) @ 20°C	110% of rated voltage without overheating
Set & Reset Voltage @ 20°C	80% of rated voltage

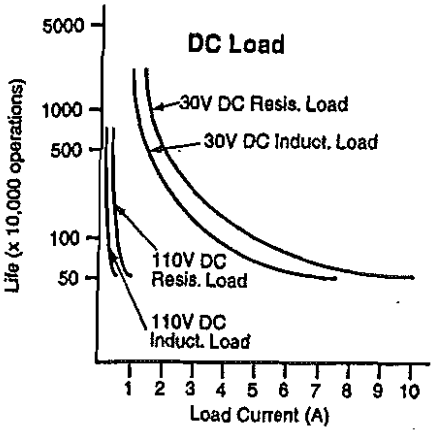
Specifications

Contact Material	Silver (Ag)
Contact Resistance	30mΩ maximum (initial value)
Min. Applicable Load	5V DC, 100mA
Operating Time	25ms maximum
Power Consumption	AC: Approx.2.4VA (50Hz), 2.2VA (60Hz) DC: Approx.1.5W
Insulation Resistance	100MΩ minimum (w/500V DC megger)
Dielectric Strength	Betw. live and dead parts: 1500V AC, 1 min Betw. contact ckt. and op. coil: 1500V AC, 1 min Betw. contact circuits: 1500V AC, 1 min (1000V betw. NO-NC contacts)
Frequency Response	1800 operations/hr
Temperature Rise	Coil: 85°C max. Contact: 65°C max.
Vibration Resistance	0 to 6G (55Hz maximum)
Shock Resistance	100N (approx. 10G)
Life Expectancy	Electrical: Over 500,000 op. (120V, 10A) Mechanical: Over 5,000,000 operations
Operating Temperature	-30°C to +70°C
Weight	170g (approx.)

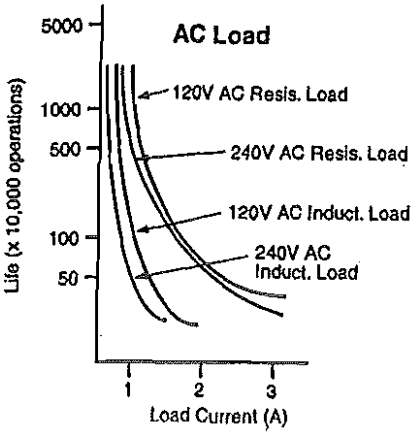
Electrical Life Curves

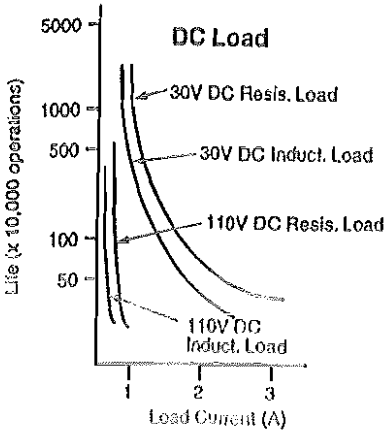
RR2KP Series





RY2KS Series



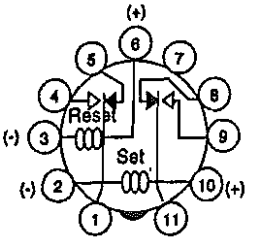


Instructions

- Set/Reset coils should not be energized at same time.
- Do not use relay in environments where magnetic particles are present in significant quantities, or near external magnetic fields such as high current circuits.
- Avoid using in circuits where large power surges occur.
- Maintain minimum 0.234" (6mm) clearance between relays.
- Observe polarity of DC types.

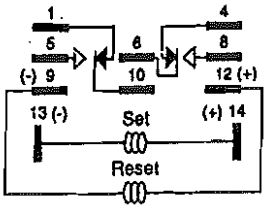
Internal Circuits

RR2KP Series



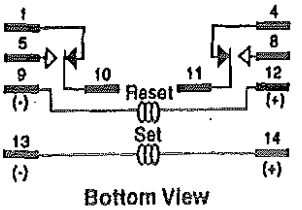
Bottom View

RH2L Series



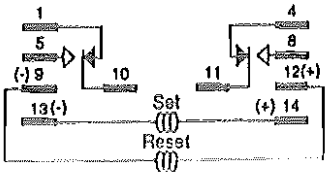
Bottom View

RY2KS Series



Bottom View

RY2L Series



Bottom View

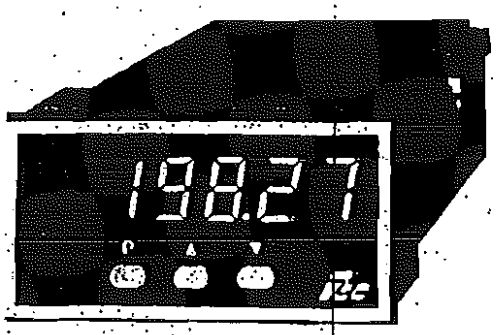
Note: All relays shown in reset (or unlatched) position.

Attn: Jim

NORTHWEST CONTROLS
10004 INTERNATIONAL BLVD.
CINCINNATI, OHIO 45246
513-860-1222

MODEL IMP - APOLLO 4½-DIGIT DC INTELLIGENT METER FOR PROCESS INPUTS

- *40,000 COUNT MEASUREMENT RESOLUTION (Can be scaled to ±99,999 display)*
- *ACCEPTS STANDARD PROCESS SIGNAL CURRENTS (4 to 20 & 10 to 50 mA DC; Automatic Ranging)*
- *EASY, ONE-PASS SCALING*
- *STATE-OF-THE-ART DIGITAL ELECTRONICS FOR GREATER ACCURACY AND RELIABILITY*
- *FULL 6-DIGIT, HIGH VISIBILITY, 0.56" (14.2 mm) HIGH RED LED DISPLAY*
- *PROGRAMMABLE FRONT PANEL LOCK-OUT MENU*
- *TRANSDUCER EXCITATION SUPPLY (Optional)*
- *INTEGRATOR (Totalizer) AND LINEARIZER (Optional)*
- *PEAK/VALLEY MEMORY AND TARE (Re-zero) FUNCTION (Optional)*
- *DUAL ALARM RELAY OUTPUTS (Optional)*
- *BI-DIRECTIONAL SERIAL COMMUNICATIONS (Optional)*



- *4 to 20 mA or 0 to 10 VDC ANALOG OUTPUT (Optional)*
- *NEMA 4/IP65 SEALED METAL FRONT BEZEL*

D

DESCRIPTION

The Apollo Intelligent Process Meter accepts standard process signals and precisely scales them into engineering units. One model covers any current range within 0 to 50 mA. A full 6-digit display accommodates nearly any engineering units and holds large totalization values. State-of-the-art digital circuitry virtually eliminates errors due to drift. A full complement of option packages are available to fulfill many process applications.

The indicator features a choice of two different scaling procedures which greatly simplifies initial set-up. English Style display prompts and front panel buttons aid the operator through set-up and operation. A front panel lock-out menu protects set-up data and operation modes from unauthorized personnel. Programmable digital filtering enhances the stability of the reading. Programmable remote input *"E1-CON"* pin can be utilized to control a variety of functions, such as totalizing, alarm control, display hold or tare operations. All set-up data is stored in E^2PROM, which will hold data for a minimum of 10 years without power.

An optional integrator *(totalizer)*/linearizer can be used to totalize or integrate signals up to a maximum display value of 999,999. It features independent scaling and a low signal cut-out to suit a variety of signal integration applications. Programmable remote input *"E2-CON"* pin is included with this option, and can control a variety of functions, such as totalizing, alarm control, display hold or tare operations, simultaneously with *"E1-CON"* pin. Additionally, nine slopes and offsets can easily be programmed with this option to linearize transducers with non-linear outputs, such as square law devices. Peak/valley *(max/min)* reading memory, display hold and a signal re-zeroing *(tare)* function are included with this option and they are easily recalled and controlled by either the front panel or a remote input. All readings are retained at power-down.

Optional dual relays with parallel solid state outputs are fully programmable to operate in a wide variety of modes to suit many control or alarm applications.

Optional 20 mA loop, bi-directional serial communications provides computer and printer interfacing to extend the capabilities of the indicator. More than one unit can be connected in the loop with other RLC products which have serial communications capabilities.

An optional 4 to 20 mA or 0 to 10 VDC re-transmitted analog output can be scaled by the user to interface with a host of recorders, indicators and controllers. The indicator has several built-in diagnostic functions to alert operators of any malfunction. Extensive testing of noise interference mechanisms and full burn-in makes the indicator extremely reliable in industrial environments. The die-cast front bezel meets NEMA 4/IP65 requirements for washdown applications. Plug-in style terminal blocks simplify installation wiring and change-outs.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

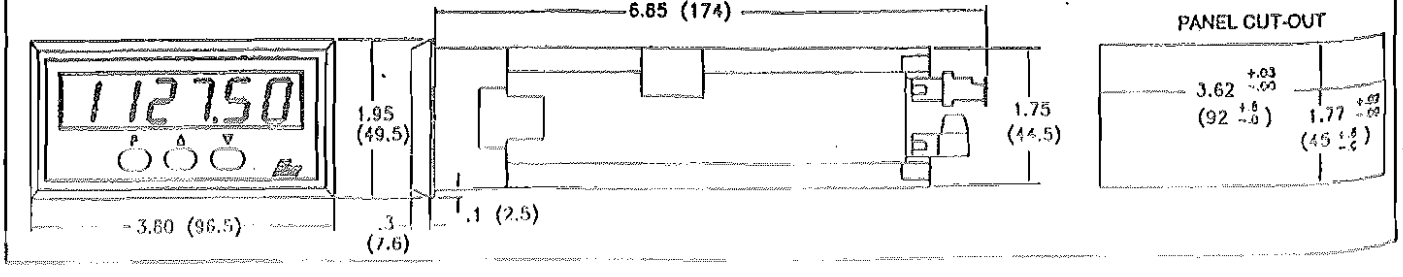
Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

SPECIFICATIONS

1. **DISPLAY:** 6-digit, 0.56" *(14.2 mm)* High LED, minus sign displayed for negative values. "Flashing" display for totalizer overflow. "....." displayed for input display out of range. *"OLOLOL"* displayed for input display overload and *"ULULUL"* for underload *(negative overload)*.
2. **POWER REQUIREMENTS:**
   A.C. Power: Switch Selectable 115/230 VAC, ±10%, 50/60 Hz, 14 VA
   D.C. Power: 10 to 30 VDC, 9 watts max., isolated to 300 Vp.
3. **CONTROLS:** Three front panel push buttons for modifying alarm values and indicator set-up. Two external inputs for disabling the front panel and controlling programmable functions.

DIMENSIONS "In inches (mm)"

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.1" (53.3) H x 5.5" (140) W.



4. SIGNAL INPUT RANGE: 0 to 50 mA DC *(4 to 20 mA, 10 to 50 mA)*
5. INPUT IMPEDANCE: 10 Ω, 0.2 VDC @ 20 mA
   Max. Input Current: 200 mA DC (continuous)
6. ACCURACY AND RESOLUTION:
   Resolution: 1/40,000
   Accuracy: ±(0.02% of full scale + 1 digit)
7. PROGRAMMABLE DISPLAY READING RANGE: -99999 to +999999
8. READING RATE: 2.5 readings/second
9. RESPONSE TIME: 2 seconds to settle for step input *(increases with programmable digital filtering)*
10. NORMAL MODE REJECTION: 40 dB at 50/60 Hz *(may be improved by programmable digital filtering)*
11. COMMON MODE REJECTION: 120 dB, DC to 50/60 Hz
12. TOTALIZER/LINEARIZER: Front panel button for input/total display select. External totalizer reset/enable. Programmable time-base, scale factor (0.001-100,000) and low-end cut-out. 9-segment multiple slope scaling for non-linear inputs. Response Time = 0.2 sec max.
13. E1-CON & E2-CON: External remote inputs that allow activation of various functions *(reset total, peak indicator mode, alarm control, etc.)*
    V_{IL} = 0.8 V_{MAX}; V_{IH} = 2.0 V_{MIN}; Response Time = 0.2 sec max.
14. ENVIRONMENTAL CONDITIONS:
    Operating Temperature Range: 0° to 50°C
    Storage Temperature Range: -40° to 80°C
    Span Temperature Coeff.: 100 ppm/°C max; 40 ppm/°C typ.
    Zero Temperature Coeff.: 1 μV/°C
    Operating and Storage Humidity: 85% max. relative humidity (non-condensing) from 0 to 50°C.
    Altitude: Up to 2000 meters.
15. EXCITATION (Optional): Regulated 18 VDC @ 60 mA max.
16. SERIAL COMMUNICATIONS (Optional):
    Type: Bi-directional 20 mA current loop, 20 mA source provided on transmit loop. *(Powers up to 7 units in a loop with internal current source.)*
    Baud Rate: programmable 300 to 2400
    Maximum address: 99 *(Actual number in a single loop is limited by serial hardware specifications.)*
    Data Format: 10 bit frame, Odd parity *(one start bit, 7 data bit, one odd parity bit, and one stop bit.)*
    Serial Hardware Specifications:
    SO - Output Transistor Rating: V_{MAX} = 30 VDC,
    V_{SAT} = 1 V_{MAX} at 20 mA.
    Note: This will allow up to 28 units max. in each loop.
    SI - Input Diode Rating: VF = 1.25 V_{TYP}; 1.5 V_{MAX}
    Note: The compliance voltage rating of the source must be greater than the sum of the voltage drops around the loop. (Typically a 30 VDC powered source would be capable of operating between 18 and 22 units in a loop.)
17. ALARMS (Optional):
    Solid State: Two, isolated, sinking open collector NPN transistors acting in parallel with relays.
    I_{MAX}: 100 mA. V_{SAT} = 1 V @ 100 mA. V_{MAX} = 30 VDC.
    Relays:
    Type: Form C (2)
    Max. Rating: 5 Amps @ 120/240 VAC or 28 VDC *(resistive load)*, 1/8 hp @ 120 VAC *(inductive load)*.
    Relay Life Expectancy: 100,000 cycles at max. rating. *(As load level decreases, life expectancy increases.)*
18. ANALOG OUTPUT (Optional):
    4 to 20 mA: Digital scaling and offsetting within a 4 to 20 mA range
    Accuracy: 0.1% of full scale
    Resolution: 12 bits
    Compliance Voltage: 10 VDC *(500 Ω max. loop impedance)*
    0 to 10 VDC: Digital scaling and offsetting within a 0 to 10 VDC range
    Accuracy: ±(0.1% of reading +35 mV)
    Resolution: 12 bits
    Min. Load Resistance: 10 KΩ (1 mA max.)
19. PEAK/VALLEY/TARE (Optional):
    Peak and Valley recording. Signal re-zero *(tare)*.
20. CERTIFICATIONS AND COMPLIANCES:
    EMC EMISSIONS:
    Meets EN 50081-2: Industrial Environment.
    CISPR 11 Radiated and conducted emissions
    EMC IMMUNITY:
    Meets EN 50082-2: Industrial Environment.
    ENV 50140 - Radio-frequency radiated electromagnetic field [1]
    ENV 50141 - Radio-frequency conducted electromagnetic field [2]
    EN 61000-4-2 - Electrostatic discharge (ESD)[3]
    EN 61000-4-4 - Electrical fast transient/burst (EFT)

Notes:

1. *Unit mounted in a metal panel connected to earth ground (protective earth) with rear cover providing at least 10 dB of shielding effectiveness.*
   a. *When units are mounted in a metal panel without a rear cover, the process signal can vary as much as 2% from the stated accuracy*
   b. *The analog output option can vary as much as 16% from the stated accuracy specification.*
2. *One ferrite suppression core (Steward #28-B2025-0A0) placed on the 20 mA serial communications cable at the unit for EMI frequencies above 40 MHz.*
3. *Metal bezel of unit connected with ground lead from rear bezel screw to metal mounting panel.*

Refer to the EMC Compliance Installation section of the manual for additional information.

21. CONSTRUCTION: Die-cast metal front bezel that meets NEMA 4/IP65 requirements for indoor use when properly installed. Installation Category II, Pollution Degree 2. Case body is black, high impact plastic (panel gasket and mounting clips included).
22. CONNECTION: Removable terminal blocks
23. WEIGHT: 1.2 lbs (0.54 Kg)

EXCITATION OPTION

The excitation option provides a regulated excitation voltage *(18 VDC, 60 mA)* that can be used to power the transducer.

TOTALIZER/LINEARIZER/PEAK/VALLEY/TARE/ E2-CON OPTION

The major feature of this option is its integrator/totalizer *(accumulator)*. The integrator simply totals *(adds)* input readings along with a programmable time base and scaling coefficient. The integrator/totalizer may be reset via a remote input *(E2-CON)*, by the front panel or through the serial communications loop. Alarms may be programmed to trigger from totalizer values, for example to signal total flow thresholds for batching operations. A programmable low signal level disable feature completes the integrator/totalizer features. At loss of power to the indicator, the contents of the totalizer are saved.

The linearizer feature is a series of programmable scaling points that are used to construct linear segments to linearize the input signal. The most common application would be to interface with square law devices *(generally, flow transducers)*. A maximum of nine segments are available and using nine segments for a square law device would reduce linearity errors to 0.35%.

The other features of this option are peak and valley detection and a re-zero *(tare)* function. The indicator will record the lowest reading *(valley)* and the highest reading *(peak)*, automatically, for later recall. This information is valuable when monitoring the limits of the process over any length of time which can span over shifts, days, etc. *(These values are stored at power-down)*. A remote input *(E1-CON or E2-CON pin)* can be programmed to reset or engage the unit into a peak reading indicator. Additionally, the peak and valley can be viewed and reset from the front panel, if so programmed, and viewed and reset through the serial communication option.

The re-zero *(tare)* function can also be controlled via a remote input or by the front panel. This feature can quickly compensate for small shifts or drifts in the input signal or can re-zero every operation, such as batching.

ISOLATED ALARM OPTION

The alarm option consists of an additional printed circuit board with 9 connections. Six of these are for the two Form-C relays and the other three are for the two open collector transistors, which act in parallel with the relays. The two alarms are completely independent with programmable values, hysteresis *(deadband)*, high or low acting, auto or manual reset, triggering from input or total and they can be made to track each other, if desirable. If the alarms are programmed to latch *(manual reset)*, then they can be reset either by the front panel or a remote input. The alarms can be made to trigger from either the integrator/totalizer or the input display, to actuate external alarms, control valves, etc.

Alarm #1 can be programmed to track Alarm #2 by enabling alarm tracking. This is useful in alarm set-ups where a pre-warning control activates before a second alarm shuts off the process. Changing the shut-off trip value *(alarm #2)* automatically changes the pre-warn value *(alarm #1)* an equal amount. Alarm and hysteresis values can be modified through the optional serial communications to provide automatic control.

ISOLATED SERIAL COMMUNICATIONS OPTION

The serial communication option is a half-duplex, two-way 20 mA loop that can connect to a variety of printers, computers, terminals and controllers to suit many data-polling or automatic operation applications. The indicator responds to a host of commands, including change alarm value, reset totalizer and transmit input signal. Two loops are required for all hook-ups; a transmit *(outgoing data)* loop and a receive *(in-coming data)* loop. Since the indicator monitors the receive loop for a busy signal *(current interrupted)* while transmitting, the receive loop must be connected even if the indicator is transmitting only, such as to a printer. A built-in 20 mA source is provided in the transmit loop. Additionally, multiple units and other Red Lion Controls instruments can be serially addressed, with a maximum address capability of 99 units. *(Note: There are serial hardware limitations which restrict this to a lower number of units per serial loop.)*

PROGRAMMABLE FUNCTIONS

Programming of the IMP is divided into modular steps. Each module is a short sequence of data entries. The front panel buttons *"UP"* and *"DOWN"*, *(shown as "arrows" on the front panel)* are used to change the data and set-ups, while the *"P"* button is used to *save* or *enter* the data. After pressing *"P"* which gains entry into the programming mode, the programming modules are identified by the message *"Pro"* and a number in the display. *"UP"* and *"DOWN"* are used to select the desired programming module and *"P"* is used to enter it. All of the subsequent programming steps follow the same procedure. The rear terminal labeled *"PGM. DIS."* must be ungrounded to gain access to programming. The following table lists the programming steps.

"Pro 0" - RETURN TO MEASUREMENT MODE

"Pro 1" - SCALE UNIT BY APPLYING SIGNAL

- "dECPNt" - Enter decimal point for scaled display
- "round" - Enter rounding factor and trailing zeros for scaled display
- "SCALE" - *
- "dSP 1" - Enter display reading for scaling point #1
- "INP 1" - Apply signal level for scaling point #1
- "dSP 2" - Enter display reading for scaling point #2
- "INP 2" - Apply signal level for scaling point #2
- "SEGt" - *

"Pro 2" - SCALE UNIT BY KEY-IN SIGNAL LEVEL

- "dECPNt" - Enter decimal point for scaled display
- "round" - Enter rounding factor and trailing zeros for scaled display
- "SCALE" - *
- "dSP 1" - Enter display reading for scaling point #1
- "INP 1" - Enter signal level for scaling point #1
- "dSP 2" - Enter display reading for scaling point #2
- "INP 2" - Enter signal level for scaling point #2
- "SEGt" - *

"Pro 3" - PROGRAM FUNCTIONS ACCESSIBLE WITH FRONT PANEL LOCKOUT ENGAGED

- "dSP AL" - Enable display alarms
- "ENt AL" - Enable enter alarms †
- "dSPHYS" - Enable display hysteresis
- "ENtHYS" - Enable enter hysteresis †
- "rSt AL" - Enable reset latched alarms
- "dSPbUF" - Enable display of peak/valley readings
- "rStbUF" - Enable reset of peak/valley readings †
- "SELdSP" - Enable switching display between input and total
- "rSttOt" - Enable reset total
- "tArE" - Enable re-zero *(tare)* of input signal

"Pro 4" - PROGRAM DIGITAL FILTERING AND REMOTE INPUT FUNCTION

- "FILtEr" - Enter level of digital filtering
  - "0" - no digital filtering
  - "1" - normal filtering
  - "2" - increased filtering
  - "3" - maximum filtering
- "E1-CON" - Enter function of remote input
  - "0" - re-zero input
  - "1" - reset total
  - "2" - reset and gate totalizer
  - "3" - gate totalizer
  - "4" - display hold
  - "5" - reset peak/valley
  - "6" - reset peak and start peak indication
  - "7" - reset valley and start valley indication
  - "8" - reset latched alarms
  - "9" - reset all alarms
  - "10" - toggle display between input and total
  - "11" - re-zero input and totalize the tared values
  - "12" - display hold with tare
  - "13" - instrument reading synchronization
  - "14" - print request
- "E2-CON" - Same function as "E1-CON"

"Pro 5" - PROGRAM TOTALIZER

- "dECPNt" - Enter decimal point for totalization
- "tbASE" - Enter time base
  - "0" - second
  - "1" - minute
  - "2" - hour
- "SCLFAC" - Enter multiplying scale factor
- "Lo-cut" - Enter low-signal cut out

"Pro 6" - PROGRAM ALARMS

- "trAc" - Enable alarm value tracking
- "dISP" - Enable display alarm annunciators
- "LAtC-1" - Enable alarm #1 latching
- "ASN-1" - Enter alarm #1 trigger source *(input or total)*
- "AL-1" - Enter alarm #1 value
- "HYS-1" - Enter hysteresis value for alarm #1
- "Act-1" - Enter alarm #1 action *(high or low)*
- "LAtC-2" - Enable alarm #2 latching
- "ASN-2" - Enter alarm #2 trigger source *(input or total)*
- "AL-2" - Enter alarm #2 value
- "HYS-2" - Enter hysteresis value for alarm #2
- "Act-2" - Enter alarm #2 action *(high or low)*

"Pro 7" - PROGRAM SERIAL COMMUNICATIONS

- "bAud" - Enter baud rate
- "AddrES" - Enter loop address number *(0-99)*
- "Print" - Enter print function, or "P" command function through Serial Option
  - "0" - input
  - "1" - input, peak/valley, and tare
  - "2" - input and alarms
  - "3" - input, peak/valley, alarms, hysteresis, and tare
  - "4" - total
  - "5" - input, total
  - "6" - input, total, peak/valley, and tare
  - "7" - total and alarms
  - "8" - input, total and alarms
  - "9" - input, total, peak/valley, alarms
- "FULL" - Enable full or abbreviated transmission

"Pro 8" - PROGRAM RE-TRANSMITTED ANALOG OUTPUT

- "ASIN" - Select source of analog output *(input or total)*
- "AN-Lo" - Enter 4 mA or 0 VDC display value
- "AN-HI" - Enter 20 mA or 10 VDC display value

"Pro 9" - SERVICE OPERATIONS (Protected by access code)

** - Entire sequence for this modular step is not shown (see manual for further details).*

† - This sequence may be subject to being locked-out due to other programmed sequences.

ISOLATED RE-TRANSMITTED ANALOG OUTPUT OPTION

4 to 20 mA

The re-transmitted analog output option transmits a digitally programmable 4 to 20 mA current to drive chart recorders, remote indicators and controllers. The compliance is 10 VDC. Non-standard current ranges within the 4 to 20 mA range can be supported by calculating the slope and intercept of the display/output and calculating the required display values at 4 and 20 mA.

0 to 10 VDC

The re-transmitted analog output option transmits a digitally programmable 0 to 10 VDC output signal to drive chart recorders, remote indicators and controllers. Non-standard current ranges within the 0 to 10 VDC range can be supported by calculating the slope and intercept of the display/output and calculating the required display values to 0 VDC and 10 VDC.

TOTALIZER EXAMPLE

A milk producer requires that the flow rate of a pump be monitored in 10ths of gallons per minute. Also, a running total of the number of gallons that has been pumped is needed for accounting/storage purposes. The IMP meets all of these needs. A flow sensor with a 4-20 mA output that corresponds to 0 to 175 gallons per minute is used. The input is scaled to read in tenths of gallons per minute and the totalizer will display gallons. The following programming steps are performed.

BASIC SCALING

"Pro 2"....."dECPNt"	-	0.0
"round"	-	0.1
"dSP 1"	-	0.0
"INP 1"	-	4.000
"dSP 2"	-	175.0
"INP 2"	-	20.000

TOTALIZER SET-UP

With an average input of 175.0 gallons, the totalizer is to display in gallons per minute. The following formula applies:

$$S.F. = \frac{D.T.}{P.D.} \times \left[\frac{T.B.}{Time}\right]^{*} \times \frac{D.T.D.P.}{I.D.D.P.}$$

S.F. = Programmable Scale Factor
D.T. = Desired Total Value For A Fixed Time Duration
T.B. = Programmable Time Base

T.B. =	If Program Select Number Chosen Is:		Enter In Formula
	"0" for sec.	=	"1"
	"1" for min.	=	"60"
	"2" for hr.	=	"3600"

I.D. = Input Display Value
Time = Actual Time Period In Seconds

D.T.D.P. =	Desired Total Decimal Point	Enter In Formula
	0	1
	0.0	10
	0.00	100
	0.000	1000
	0.0000	10000

I.D.D.P. =	Input Display Decimal Point	Enter In Formula
	0	1
	0.0	10
	0.00	100
	0.000	1000
	0.0000	10000

$$S.F. = \frac{175}{175.0} \times \left[\frac{60^{**}}{60}\right]^{*} \times \frac{1}{10}$$

$$S.F. = 1 \times 1 \times 0.1$$

$$S.F. = 0.1$$

"Pro 5"....."dECPNt"	-	0
"tbASE"	-	1
"SCLFAC"	-	0.100
"Lo-cut"	-	0.00

* *This value is normally 1, but can be used as a coarse scale factor of 60 or 3600.*

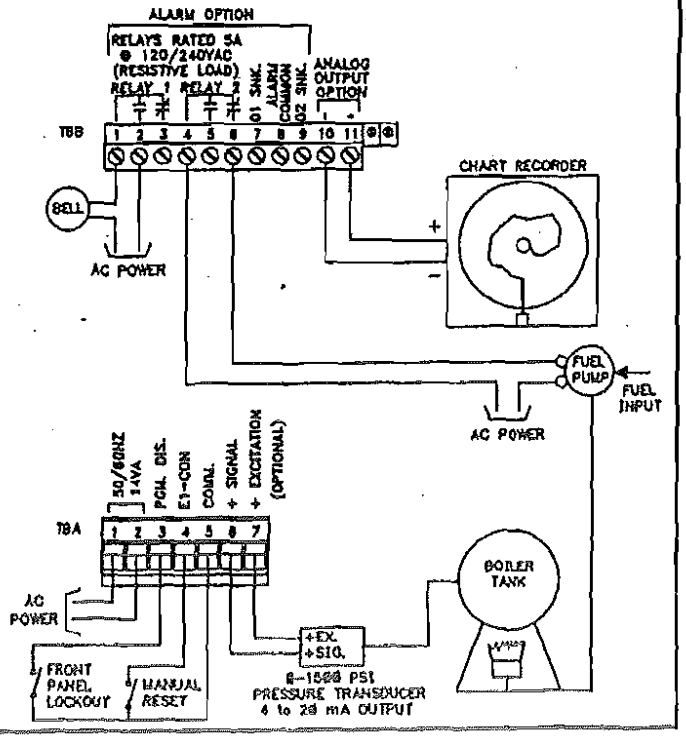
** *Since the time period is in minutes, the selected T.B. is 60 (program select value = 1) which equals time base in minutes (60 sec.).*

The totalizer will accumulate up to 99999.9 gallons.

PRESSURE MONITORING EXAMPLE

An IMP indicator is installed as a monitoring device for pressure levels within an industrial boiler. A pressure transducer with a range of 0-1500 PSI and a corresponding 4-20 mA output is selected. The maximum allowable pressure of the boiler is 1200 PSI, and at which time a pressure relief valve will operate (this makes the system inherently safe). In addition, when the relief valve trips, fuel delivery to the boiler must be stopped. The relay option of the indicator is employed to turn off the fuel at 1200 PSI. To provide for fail safe operation, operator intervention is required to reset the latched relay in order to re-start the boiler. The indicator's other output is used to signal operators with a warning bell when high pressures exist *(1100 PSI)*, so that they may take action to prevent boiler shut-down. The alarm/set point values are made to track, so changing the cut-off alarm changes the other an equal amount. Additionally, the indicator is programmed to provide a display alarm in both cases. Key switches are installed in the panel to lock-out the front panel from operators and to provide the means to reset the latched relay to re-start the boiler. The linearizer/totalizer option is specified to integrate the average boiler pressure over discrete time periods *(i.e. overnight, during peak use, start-up, etc)*. Peak pressures are automatically stored with this option. Programming module #5 *(Pro 5)* is used to set up the integrator. The re-transmitted analog output is also specified to drive a chart recorder with 4-20 mA for a hard copy of pressure profiles for later evaluation.

Scaling of the indicator is done by programming module #1 *(Pro 1)*. For dSP 1, 0 PSI is keyed-in. For INP 1, the transmitter is powered and connected to the indicator and the boiler is at 0 PSI. The indicator then measures the output from the transmitter. For dSP 2, 1000 PSI is keyed-in. Prior to INP 2, the boiler is fired and brought to 1000 PSI as checked by a reference pressure gage. Once stabilized, the indicator is allowed to measure the output of the transducer for INP 2. Since there are no span/zero interactions, scaling is complete.



ORDERING INFORMATION

MODEL NO	DESCRIPTION	+18 VDC EXCITATION	TOTALIZER/ LINEARIZER/ PEAK/VALLEY TARE/ESCON	DUAL ALARMS	SERIAL OUTPUT	ANALOG OUTPUT	PART NUMBERS FOR AVAILABLE SUPPLY VOLTAGES	
							*10 to 30 VDC	115/230 VAC
IMP	Intelligent Process Meter with 0-50 mA DC Signal Input (4-20 mA DC 10-50 mA DC)	NO	NO	NO	NO	NO	IMP20030	IMP20060
		YES	NO	NO	NO	NO	IMP20130	IMP20160
		YES	NO	YES	NO	NO	IMP20132	IMP20162
		YES	YES	NO	NO	NO	IMP23130	IMP23160
		YES	YES	NO	YES	NO	IMP23131	IMP23161
		YES	YES	YES	NO	NO	IMP23132	IMP23162
		YES	YES	NO	NO	4 to 20 mA	IMP23133	IMP23163
		YES	YES	YES	YES	4 to 20 mA	IMP23137	IMP23167
		YES	YES	YES	YES	0 to 10 VDC	IMP23139	IMP23169

For more information on Pricing, Enclosures & Panel Mount Kits refer to the RLC Catalog or contact your local RLC distributor.

*Note: The 10 to 30 VDC Versions of the IMP have not yet been specified for EMC.

D

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-001	REV: 4	DATE: 07-Dec-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
David R. Opalka
SIGNATURE: David R. Opalka

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Denise Wentz DATE: 12/07/00

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	641-16900-001F	1						X			Annunciator product data		X		16900	X		
											(additional information)							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Tim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Rob Knepp	525				
B. Scott Wheeler	525				
Kwasi Bau Tweneboah	38				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: MW Griffin DATE 12-14-00
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

ENTERED

AMETEK®
DIXON DIVISION
PANALARM BUSINESS UNIT | 1725 Western Drive | West Chicago, IL 60185 | U.S.A.
Phone: (630) 621-3103| Fax: (630)621-3152

PANALARM®

Fax Transmittal

Date: 12-6-00 Page: 1 of 1 page(s)

To: Dave OPALKA

Company: Staver Group

Destination Fax: 513-648-4187

From: TOM RYAN

Subject: Job # 7052, P.O.# 7052-12

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16900-001F
Reviewed By: DTO
Date: 12/7/00

DAVID,

We have received your official release to fabricate the Model 910 you have purchased. The description on your P.O. # 7052-12 is a good description of what you will get. The model number 910AC120KC120E1 can be broken down like this: (910) 1ea-10 point LED annunciator; (AC120)-refers to the input power required to run the unit; (KC120)-refers to the input voltage needed to make the points go into alarm, from the field.; E1 refers to sealed relay that is standard on all units. Your SW101's will have a nameplate above each pushbutton describing its function, that is "Ack"; "TEST"; "RESET" and "Flash Reset". The NT2-120A HORN will be mounted on side of enclosure and not on the door.

PLEASE NOTIFY PANALARM BUSINESS UNIT IF TRANSMISSION IS ILLEGIBLE

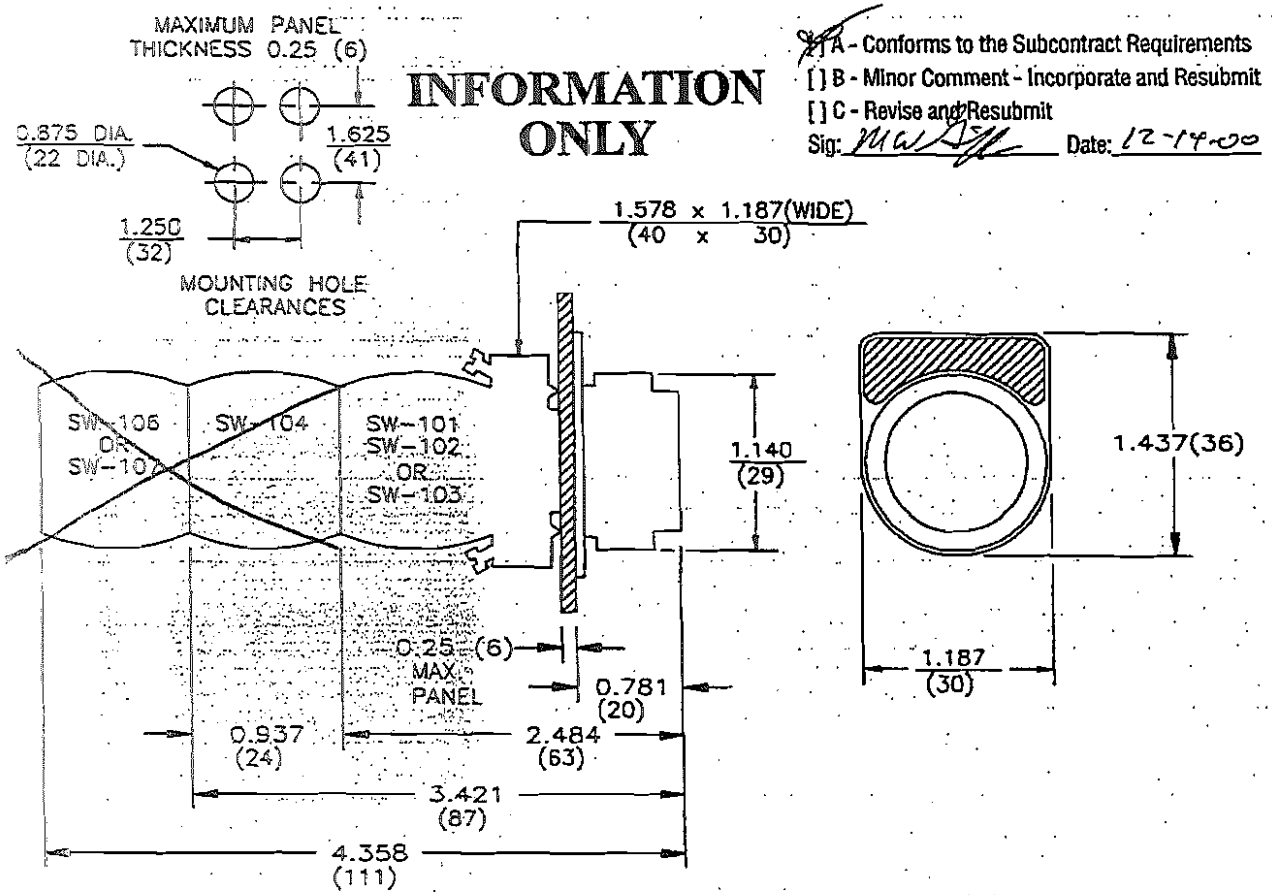
Regards,
Tom Ryan

To: Dave OPALKA
513-648-4187

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: MW Date: 12-14-00

ELECTRICAL CHARACTERISTICS				
VOLTAGE	120V	240V	480V	600V
AC-60 Hz MAKE	60A	30A	15A	12A
P.F. 0.35 BREAK	6A	3A	1.5A	1.2A
DC	1.1A	0.55A	0.3A	0.2A



PARENT ITEM NUMBER
SWITCH, OIL AND WATER TIGHT — SW 10 !

TYPE
10 = PUSHBUTTON, MOMENTARY

CONTACT BLOCK CONFIGURATION
1 = (1)N.O.
~~2 = (1)N.O.,(1)N.C.~~
~~3 = (1)N.C.~~
~~4 = (2)N.O.,(2)N.C.~~
~~5 = (3)N.O.,(3)N.C.~~
~~7 = (3)N.O.~~

ESCUTCHEON MARKING
(OMIT FIELD FOR NO ESCUTCHEON)
A = "ACK"
T = "TEST"
R = "RESET"
~~B = (ENGRAVE PER SALES ORDER COMMENTS)~~
~~FT = "FIRST RESET"~~
FR = "FLASH RESET"

COMPLIES WITH NEMA 1,2,3,4,4B,5,12 & 13 STANDARDS

U.L. FILE #E39281

CSA GUIDE #148-N13-1U, CLASS 3211

REV	ECN NO.	BY	APPD	DATE	MATERIAL:	
08	10452	SM	SP	07/17/90	FINISH:	
09	11543-01A	SK	AHD	04/27/95	USED ON/REF. DWG	DESCRIPTION
10	11789	EM	JT	02/05/97	SW*	DRAWING LIST
11	11872	SK		/ /	57800-33-1	ASSEMBLY, FINAL

TOL. UNLESS SPECIFIED
INCHES
.X = .015
.XX = .010
.XXX = .005
MILLIMETERS
X.0 = 1.0
0.X = 0.4
0.XX = 0.1
ANGLES ±0°30'
SCALE NONE | INCH (MM)

57100-SW10_-1-11-01.dwg ©1979

AMETEK

PANALARM 1725 WESTERN DRIVE, WEST CHICAGO, IL, 60185, U.S.A.
PHONE: 1-630-231-5900 FAX: 1-630-231-4502

DWN BY JN/SM
APPD/DATE RDM 12/04/79
THIRD ANGLE PROJECTION

DIMENSIONAL OUTLINE, PUSHBUTTON SWITCH, PANEL MOUNT, MODEL SW10*, OILTIGHT AND WATERTIGHT

SHEET 1 OF 1 | DWG. NO. 57100-SW10*-1 | -8-

SUPPLIER DO. /ENT SUBMITTAL

FDF PRO. NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-001	REV: 3/1	DATE: 22-Nov-

FROM: The STAVER GROUP, Inc.

David R. Opalka

SIGNATURE:

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Denise Wentz DATE: 11/27/00

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16900-001F	0						X			Annunciator Product data + wiring diagrams		X		16900		X	

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Tim Cherry	525				
Jim Jenkins	525				
Mike Godber	L64				
Rob Kneip	525				
B. Scott Wheeler	525				
Kuiasi Bau Tuineboah	38				

RECEIVED DEC 13 2000

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

attached

RECEIVED BY: DATE 12-05-00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit

Griffin, Michael

From: Kerl, James
ent: Friday, December 01, 2000 3:12 PM
o: Griffin, Michael; Jenkins, James; Frazier, Willie; Blankenship, Shelby; Hooks, Annette; Kerl, James
Subject: SUBMITTALS PER RES 4046

COMMENTS FOR SUBMITTAL 641-16900-001F

THESE SHEETS ARE THE GENERAL DETAIL SHEETS FOR THE PANELARM AND DO NOT SPECIFY WE ARE GETTING THE OPTIONS REQUESTED. THESE ARE LIST BELOW.

-120 INPUT CARD
-4 EXTERNAL PUSH BUTTONS, FACTORY WIRED AND LABELED AS THE SMALL BUTTONS ON THE UNIT:
- -ACK.
- -FL. RST.
- -RESET
- -TEST

-THE ANN. NAMEPLATE AS DETAILED ON PAGE 3 OF 21 IN DCN 20111-25

-THE OPTIONAL OUTDOOR HORN, FACTORY WIRED.

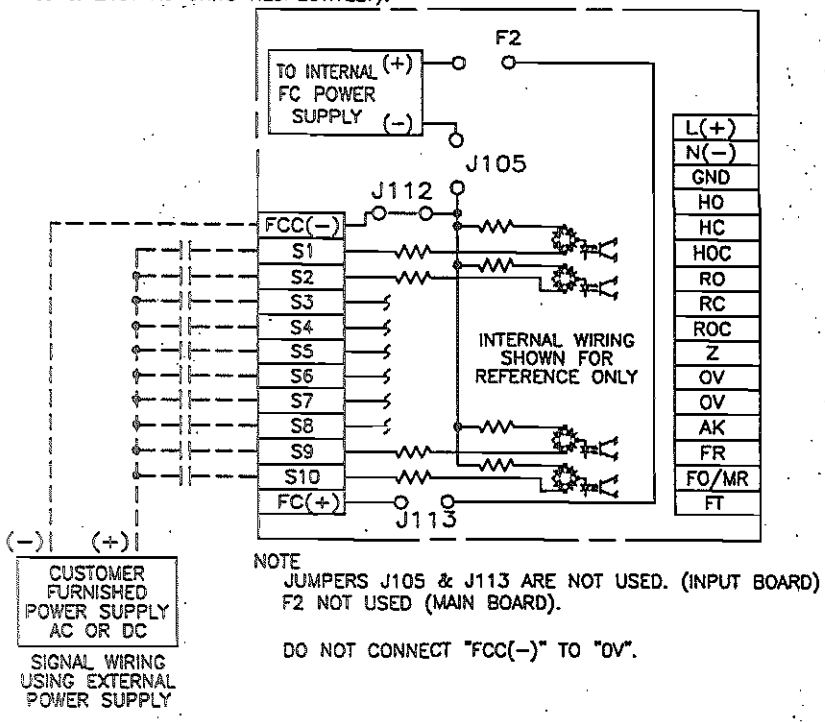
JAMES E. KERL
c: HARD COPY TO THE RES 4046 FOLDER.

USDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16900-001F
Reviewed By: DRO
Date: 11/22/00

INFORMATION ONLY

NOTES:
1) "B" VERSION CARD WILL DE-ENERGIZED AT A HIGHER VOLTAGE THAN STANDARD "KC" UNIT TO COMPENSATE FOR THE UNDESIRABLE EFFECT OF RESIDUAL VOLTAGE CAUSED BY DISTRIBUTED CAPACITANCE ALONG FIELD CONTACT WIRING (APPROX. 90V AC AND 180V AC FOR 120 & 240V AC UNITS RESPECTIVELY).

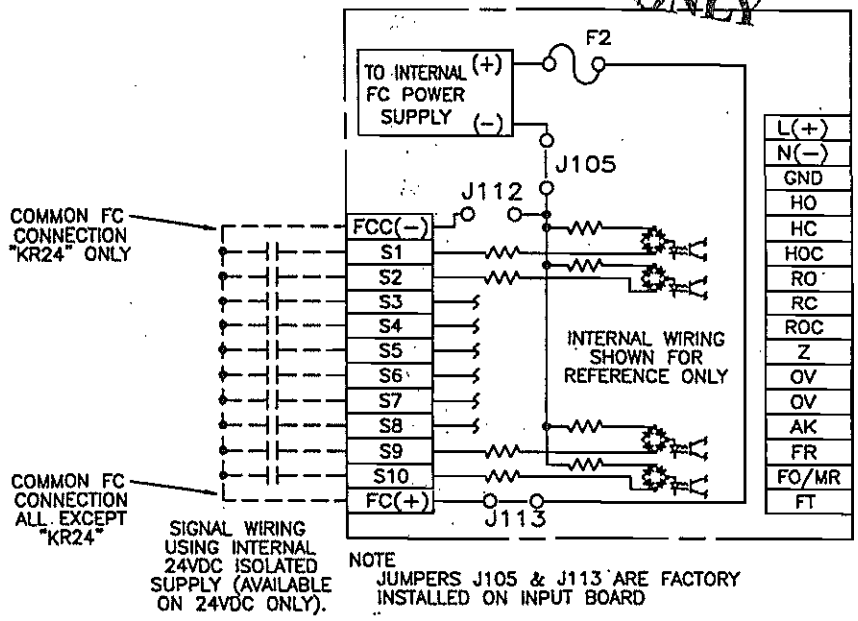


NOTE
JUMPERS J105 & J113 ARE NOT USED. (INPUT BOARD)
F2 NOT USED (MAIN BOARD).

DO NOT CONNECT "FCC(-)" TO "0V".

TYPE "KC12","KC24","KC48","KC120","KC125","KC240" & "KCB240" (OPTICALLY COUPLED)

WIRING DIAGRAM WITH CUSTOMER SUPPLIED
"FC" VOLTAGE, 12VAC/DC, 24VAC/DC, 48VAC/DC, 120VAC, 125VDC, 240VAC, 250VDC



NOTE
JUMPERS J105 & J113 ARE FACTORY INSTALLED ON INPUT BOARD

TYPE "K24" & "KR24" INPUT (OPTICALLY COUPLED)

WIRING DIAGRAM WITH INTERNALLY SUPPLIED
"FC" VOLTAGE (24V DC)

NOTE: DASHED LINES INDICATE CUSTOMER FIELD WIRING

REV	ECN NO.	BY	APPD	DATE	MATERIAL: **********	
00	7032-04	RSP	RS	07/08/83	FINISH: **********	
01	7032-12	WW	RAS	10/04/83	USED ON/REF. DWG	DESCRIPTION
02	8883-11	WW	RCV	10/25/83	910450-SEQ-1	SEQUENCE CHARTS
03	7032-23	WW	JWK	03/22/84	910450-TERM-1	TERMINAL ARRANGEMENT
04	7100-28	JJ	PG	01/28/87	910*	DRAWING LIST
05	7100-35	LJ	PG	04/14/87		
06	10915	SK	CNL	03/30/92		
07	11672	SK	.	/ /	910450-K_-1-07-01.dwg	©1983

TOL UNLESS SPECIFIED
INCHES
.X = .015
.XX = .010
.XXX = .005
MILLIMETERS
X.0 = 1.0
0.X = 0.4
0.XX = 0.1
ANGLES ±0°30'
SCALE NONE
INCH (MM)

AMETEK

PANALARM 1725 WESTERN DRIVE, WEST CHICAGO, IL., 60185, U.S.A.
PHONE: 1-630-231-5900 FAX: 1-630-231-4502

DWN. BY RSP / SK
APPD/DATE RS 07/08/83
THIRD ANGLE PROJECTION

CUSTOMER WIRING DIAGRAM,
"KC","K" & "KR"
INPUTS (OPTICALLY COUPLED)
FOR MODEL 910 ANNUNCIATOR SYSTEM

SHEET 1 OF 1 | DWG. NO. 910450-K*-1 | -B-

[ ] A - Conforms to the Subcontract Requirements
[X] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [signature] Date: 12-05-00

OPERATIONAL SEQUENCE 'AF & AFNL'

INPUT STATUS	VISUAL	AUDIBLE
ALARM OR TES.	FLASHING	ON
ACKNOWLEDGE	STEADY-ON	OFF
RETURN TO NORMAL	OFF	OFF

OPERATIONAL SEQUENCE 'FR'

INPUT STATUS	VISUAL	AUDIBLE
ALARM OR TEST	FLASHING	ON
ACKNOWLEDGE	FLASHING	OFF
FLASH RESET	STEADY-ON	OFF
RETURN TO NORMAL	OFF	OFF

OPERATIONAL SEQUENCE 'AM'

INPUT STATUS	VISUAL	AUDIBLE
ALARM OR TEST	FLASHING	ON
ACKNOWLEDGE	STEADY-ON	OFF
RETURN TO NORMAL	STEADY-ON	OFF
RESET	OFF	OFF

OPERATIONAL SEQUENCE 'FRM'

INPUT STATUS	VISUAL	AUDIBLE
ALARM OR TEST	FLASHING	ON
ACKNOWLEDGE	FLASHING	OFF
FLASH RESET	STEADY-ON	OFF
RETURN TO NORMAL	STEADY-ON	OFF
RESET	OFF	OFF

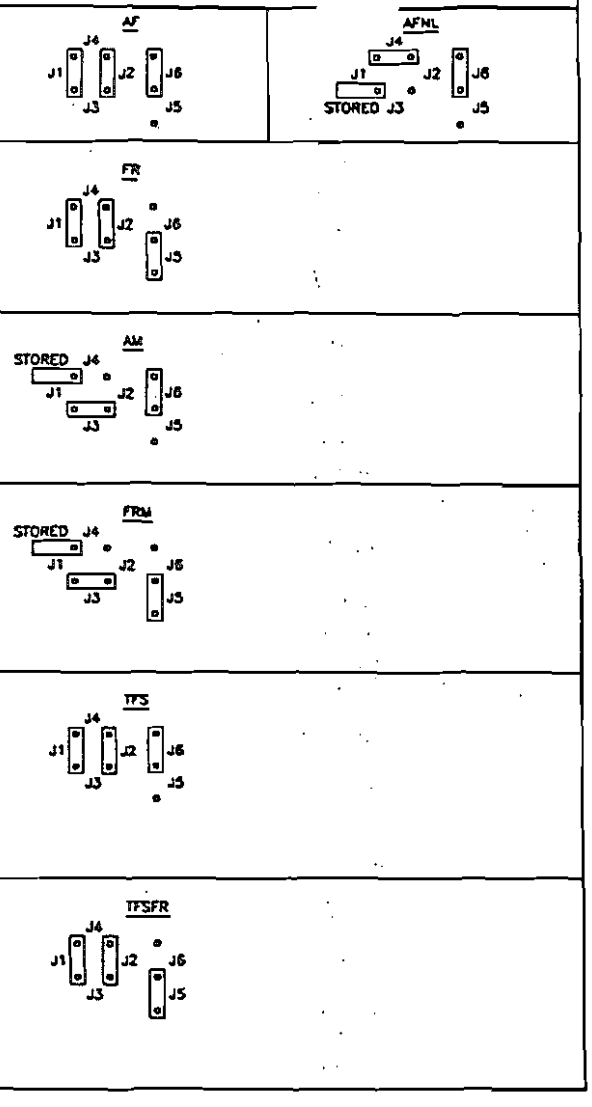
OPERATIONAL SEQUENCE 'TFS' (3)

INPUT STATUS	FIRST VISUAL	SUBSEQUENT VISUAL	AUDIBLE
1st ALARM OR TEST	INTERM. FAST FL.		ON
SUBSEQUENT ALARM		FAST FLASH	ON
ACKNOWLEDGE	SLOW FLASH	STEADY-ON	OFF
FIRST RESET	STEADY-ON	STEADY-ON	OFF
RETURN TO NORMAL	OFF	OFF	OFF

OPERATIONAL SEQUENCE 'TFSFR' (3)

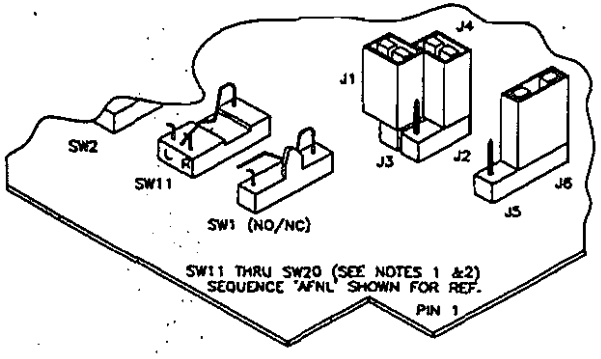
INPUT STATUS	FIRST VISUAL	SUBSEQUENT VISUAL	AUDIBLE
1st ALARM OR TEST	INTERM. FAST FL.		ON
SUBSEQUENT ALARM		FAST FLASH	ON
ACKNOWLEDGE	INTERM. FAST FL.	FAST FLASH	OFF
FLASH RESET	SLOW FLASH	STEADY-ON	OFF
FIRST RESET	STEADY-ON	STEADY-ON	OFF
RETURN TO NORMAL	OFF	OFF	OFF

JUMPER DETAIL J1 THRU J6



SEQUENCE JUMPER CONFIGURATIONS

	SEQUENCE	ISA TYPE	SW11 THRU SW20 LEFT	SW11 THRU SW20 RIGHT
	AF	A		X
(6)	AFNL	A4		X
	FR	A-1-2		X
	AM	M		X
	FRM	M-1-2		X
	TFS	F3A-3	X	
	TFSFR	F3A-3-1	X	



NOTES:

1. FOR FIRST-OUT SEQUENCE TFS OR TFSR, PLACE SWITCHS SW11-20 IN "LEFT" POSITION. FOR ALL OTHER SEQUENCES PLACE SW11-20 IN "RIGHT" POSITION.
2. NORMALLY, ALL 10 SWITCHES (SW11-20) MUST BE IN SAME POSITION HOWEVER, AF MAY BE MIXED WITH WITH TFS OR FR MAY BE MIXED WITH TFSFR BY FIRST PROGRAMMING JUMPERS FOR AF OR FR, THEN SELECTING FIRST OUT GROUP BY PLACING ANY OF SWITCHES 11 THROUGH 20 IN THE LEFT POSITION.
3. REFERENCE DRAWING 910450-TERM-1 FOR FIRST OUT GROUPING BETWEEN CABINETS.
4. IF A NEW ALARM OCCURS WHILE IN TEST SEQUENCE POINT WILL REVERT TO ALARM STATUS AFTER ACKNOWLEDGE, (OR FLASHER RESET WHEN USED).
5. POINT WILL INDICATE ALARM WHEN TEST PUSHBUTTON IS OPERATED IF THE VISUAL INDICATOR IS OFF OR STEADY-ON.
6. IF POINT IS SET FOR NON-LOCK-IN MODE POINT WILL GO FROM ALARM STATUS TO NORMAL STATUS IF INPUT REVERTS TO NORMAL CONDITION PRIOR TO ACKNOWLEDGE.
7. TEST SIMILAR TO MOMENTARY ALARM.

REV	ECN NO.	BY	APPD	DATE	MATERIAL:	
00	7032-04	WW	RS	07/08/83	FINISH:	
01	8683-11	WW	RCV	10/25/83	USED ON/REF. DWG	DESCRIPTION
02	7032-62	JJ	RCV	07/09/88		
03	11872	SK	.	/ /		

910450-SEQ-1-03-01.dwg © 1983

TOL. UNLESS SPECIFIED
INCHES .X = .015 .XX = .010 .XXX = .005
MILLIMETERS X.0 = 1.0 0.X = 0.4 0.XX = 0.1
ANGLES ±0°30'
SCALE NONE | INCH (MM)

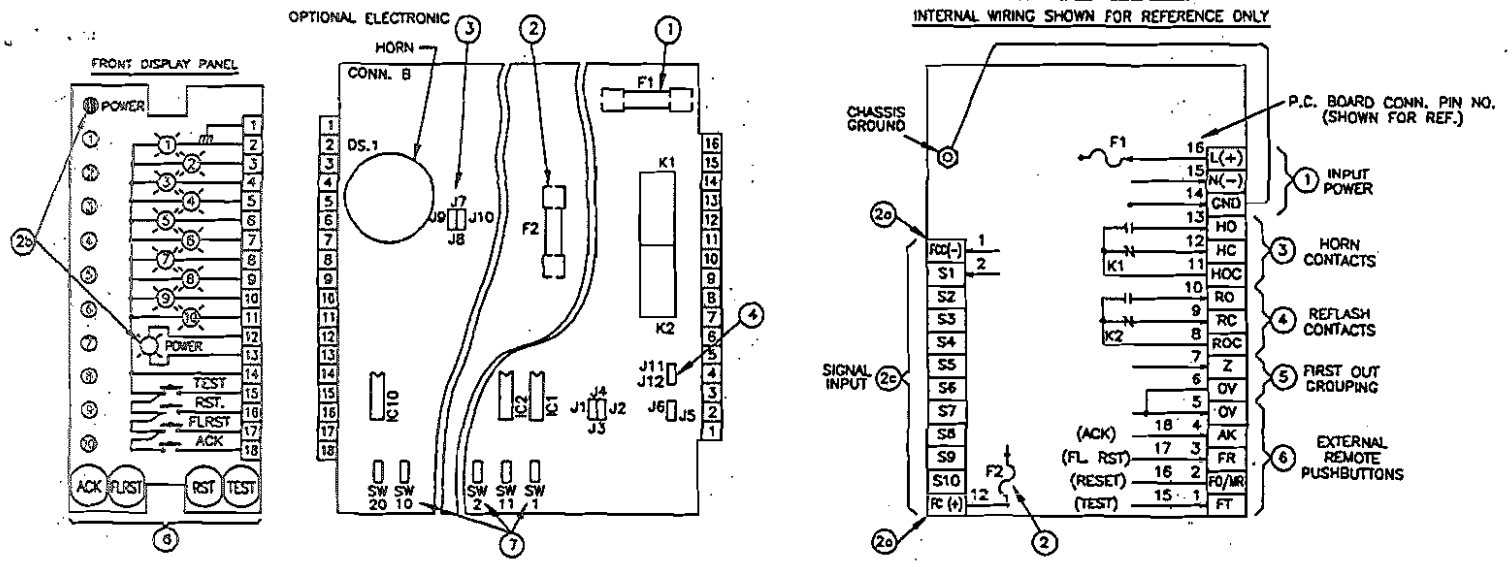
AMETEK

PANALARM 1725 WESTERN DRIVE, WEST CHICAGO, IL. 60185, U.S.A. PHONE: 1-630-231-5900 FAX: 1-630-231-4502

DRAWN BY WW / SK
APPROVED RS 07/08/83
THIRD ANGLE PROJECTION

WIRING DIAGRAM, MODEL 910,
ANNUNCIATOR SEQUENCE DIAGRAM CHARTS

SHEET 1 OF 1 | DWG. NO. 910450-SEQ-1 | -C-



NOTES:
1. DASHED LINES INDICATE CUSTOMER FIELD WIRING.
2. DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AERA IS KNOWN TO BE NON-HAZARDOUS.
3. WIRING METHODS SHALL COMPLY WITH CLASS 1, DIV. 2 LOCATIONS REQUIREMENTS.
4. SUITABLE IN CLASS 1 DIVISION 2 APPLICATIONS.

WARNING:
EXPOSURE TO SOME CHEMICALS MAY DEGRADE THE SEALING PROPERTIES. RELAYS SHOULD BE INSPECTED PERIODICALLY FOR SIGNS OF ATTACK. (CRAZING, SWELLING OR DEFORMATION). REPLACE P.C. BOARD IF DEGRADATION IS OBSERVED.

RELAY CONTACT RATINGS
STANDARD (SEALED)
5A @ 250VAC OR 28VDC RESISTIVE
500MA @ 120VAC OR 28VDC LAMP LOAD
500MA @ 125VDC RESISTIVE
125MA @ 125VDC LAMP LOAD

(1) INPUT POWER	INTERNAL	FUSE RATING CHART	
INPUT VOLTAGES	FUSE	RATING	P/N
24VDC	F1	1/2A 250V	110738
120VAC	F1	2/10A 250V S.B.	110696
230VAC	F1	1/16A 250V S.B.	110695
24VDC ISOLATED	F1	1/2A 250V S.B.	110739
48VDC ISOLATED	F1	1/4A 250V S.B.	110752
110/-230VAC ISOLATED	F1	2/10A 250V S.B.	110698

(2) SIGNAL CONTACT	INTERNAL	FUSE RATING CHART	
INPUT VOLTAGES	FUSE	RATING	P/N
ALL	F2	1/16A AGC 3AG	110797

(2) FC (+) SUPPLY IS FUSED INTERNALLY AS SHOWN IN CHART. FUSE IS NOT IN CIRCUIT IF CUSTOMER PROVIDES FC POWER SUPPLY.

(2c) FCC(+) AND FCC(-) ARE OUTPUTS FOR INTERNALLY SUPPLIED FC VOLTAGE, BUT MAY BE INPUTS FOR MODELS WHERE CUSTOMERS PROVIDES FC POWER SUPPLY. REFER TO DRAWING #910450-T*-1 AND 910450-K*-1 FOR WIRING INFORMATION.

(2b) POWER L.E.D. (GREEN) MONITORS INTERNAL LOGIC SUPPLY VOLTAGE.

(2c) FOR SIGNAL INPUT WIRING REFER TO DRAWING #910450-T*-1 ("T" TYPE SWITCH CONTACT) & DRAWING #910450-K*-1 (OPTICAL COUPLED "K" OPTION)

(3) HORN CONTACTS ARE SHOWN WITH RELAY IN DEENERGIZED STATE

J9 J10 — J7 J8 — FACTORY INSTALLED

FOR NORMALLY ENERGIZED RELAY REMOVE J7 & J8 AND INSTALL J9 & J10.

(4) REFLASH CONTACTS ARE SHOWN WITH RELAY IN DEENERGIZED STATE

J11 J12 (J11 FACTORY INSTALLED)

FOR NORMALLY ENERGIZED RELAY REMOVE J11 & INSTALL J12.

J11 J12 (J12 INSTALLED)

REFLASH RELAY WILL NOT OPERATE ON "TEST" IF ALL POINTS ARE NORMAL. IF ANY POINT IS IN ALARM PRIOR TO TEST REFLASH WILL MOMENTARILY OPERATE ON TEST.

RELAY OPERATES ON FIRST ALARM AND MOMENTARILY (100Ms) CHANGES STATE FOR SUBSEQUENT ALARMS AFTER ACK.

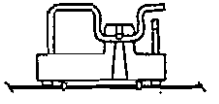
(5) FIRST OUT GROUPING
WHEN IT IS DESIRED TO CONNECT "TFS" POINTS ON SEVERAL MODEL 910 ANNUNCIATORS, AS A SINGLE FIRST OUT GROUP, CONNECT THE "OV" AND "Z" TERMINALS BETWEEN CABINETS. MAXIMUM (10) CABINETS (100 POINTS) MAY BE GROUPED FOR FIRST OUT INDICATION.

(6) EXTERNAL PUSHBUTTONS
FOR REMOTE LOCATIONS CAN BE WIRED AS SHOWN IN ADDITION TO THE INTEGRAL PUSHBUTTONS.

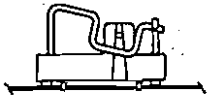
OV — ACK
AK — FL. RST.
FR — RESET
FO/MR — FUNCTIONAL TEST
FT

(7) NO/NC SELECTION
SW1 THRU SW10 ARE USD TO SELECT (NO) OR (NC) OPERATION.

FOR NORMALLY OPEN SIGNAL CONTACT, SWITCH IS OPEN.



FOR NORMALLY CLOSED SIGNAL CONTACT, SWITCH IS CLOSED.



REV	ECN NO.	BY	APPD	DATE	MATERIAL:	
07	7032-69	JT	DHB	06/29/88	FINISH:	
08	11435	SK	PG	04/19/94	USED ON/REF. DWG	DESCRIPTION
09	11466-04	JTM	CNL	08/29/95	910*	DRAWING LIST
10	11466-048	AD	JM	10/13/95	910100-1	OUTLINE DRAWING
11	7700-50	EM	JT	05/06/97	910800-1	FINAL ASSEMBLY DWG.
12	11872	SK	-	/ /	910450-SEQ-1	SEQUENCE DIAGRAM CHARTS
					910450-TERM-1-12-01.dwg	© 1983

TOL. UNLESS SPECIFIED
INCHES .X = .015 .XX = .010 .XXX = .005
MILLIMETERS X.0 = 1.0 0.X = 0.4 0.XX = 0.1
ANGLES ±0°30'
SCALE NONE INCH (MM)

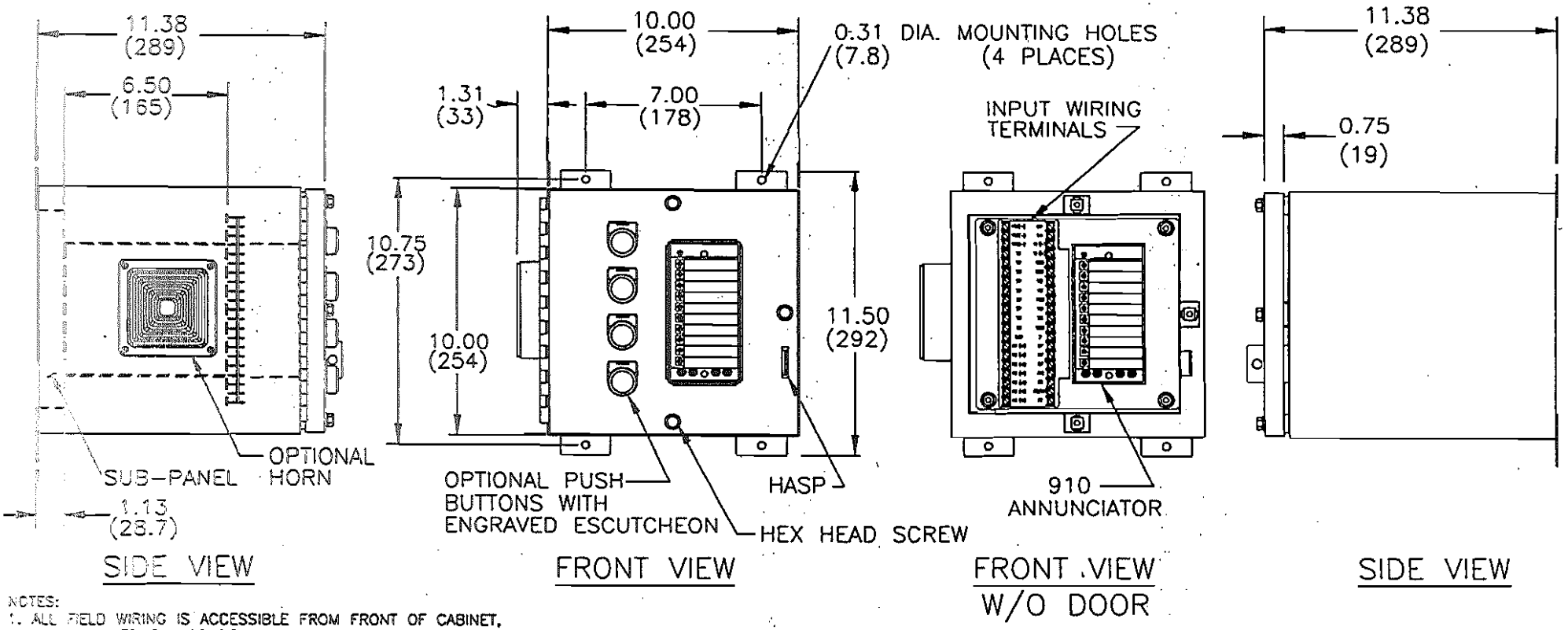
AMETEK

PANALARM 1725 WESTERN DRIVE, WEST CHICAGO, IL. 60185, U.S.A. PHONE: 1-630-231-5900 FAX: 1-630-231-4502

DRAWN BY RSP / SK
APPD/DATE RS 07/08/83
THIRD ANGLE PROJECTION

TERMINAL ARRANGEMENT AND INPUT – OUTPUT FUNCTIONS MODEL 910 ANNUNCIATOR

SHEET 1 OF 1 | DWG. NO. 910450-TERM-1 | -C-



NOTES:
1. ALL FIELD WIRING IS ACCESSIBLE FROM FRONT OF CABINET, AFTER HINGED ENCLOSURE DOOR IS OPENED.
2. IF SPECIFIED, PUSHBUTTON(S) WILL BE MOUNTED IN ENCLOSURE DOOR AS SHOWN. REFER TO GENERAL WIRING DIAGRAM FOR THE NUMBER OF PUSHBUTTONS REQUIRED.
3. ALSO MEETS NEMA 4.
4. NEMA 4 ENCLOSURE, MODEL 910SM4, MADE FROM 0.059 NOMINAL (#16 GA) CRS WITH POWER COATED GREY FINISH PER PANALARM DRAWING No. ENG-151-11. NEMA 4X ENCLOSURE, MODEL 910SM4X, MADE FROM 0.059 NOMINAL (#16 GA) STAINLESS STEEL, FINISH: NONE.

REV	ECN NO.	BY	APPD	DATE	MATERIAL: SEE NOTE 4	
00	9056-01	MR	SC	08/24/84	FINISH: SEE NOTE 4	
01	7032-53	SC	RCV	05/23/85	USED ON/REF. DWG	DESCRIPTION
02	11087	SM	JT	08/08/92	910*	DRAWING LIST
03	11960	SK	.	/ /		

910100-SM4-1-03-01.dwg ©1984

TOL. UNLESS SPECIFIED
INCHES
.X = .015
.XX = .010
.XXX = .005
MILLIMETERS
X.0 = 1.0
0.X = 0.4
0.XX = 0.1
ANGLES ±0° 30'
SCALE 0.25:1
INCH (MM)

AMETEK

PANALARM 1725 WESTERN DRIVE, WEST CHICAGO, IL., 60185, U.S.A.
PHONE: 1-800-213-9568 FAX: 1-630-231-4502

DRAWN BY MR / SK
APPD/DATE SC 08/24/84
THIRD ANGLE PROJECTION

DIMENSIONAL OUTLINE, MODEL 910,
SURFACE MOUNT ENCLOSURE
DESIGNED TO MEET NEMA 4 & 4X

SHEET 1 OF 1 | DWG. NO. 910100-SM4-1 | -B-

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC -	SUBMITTAL NO: 16900-001	REV: 5	DATE: 02-Jan-01	PAGE 1 OF 1

FROM: STAVER GROUP, Inc.
David R. Opalka
SIGNATURE:

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Denise Wentz DATE: 01/03/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION A	B	C
8	641-16900-001G	05						X			Kobold Float Switch		X		16900	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Tina Cherry	52-5				
Jim Jenkins	52-5				
Mike Godber	64				
Rob Knapp	52-5				
B. Scott Wheeler	52-5				
Kurosi Bau Tweneboah	38				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

For LSHH-110 (Permanent Lift Station), a 10' cable is required
See attached sketch MWG

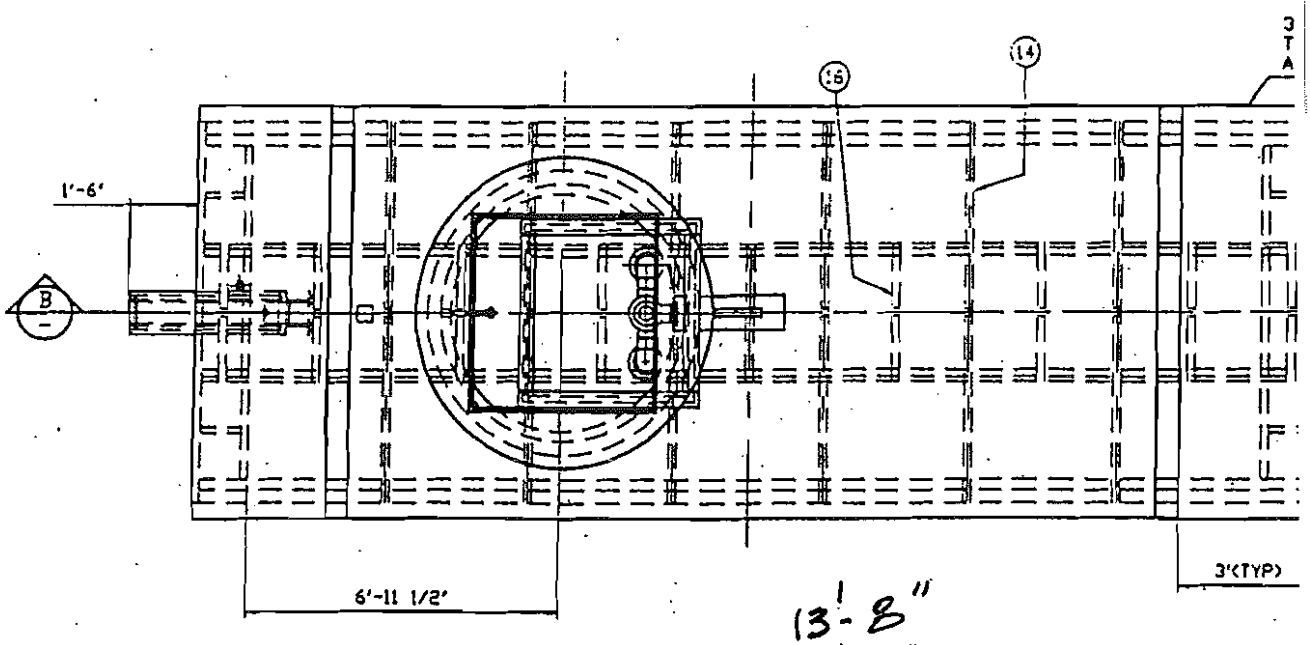
RECEIVED BY: MWG DATE 1/08/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

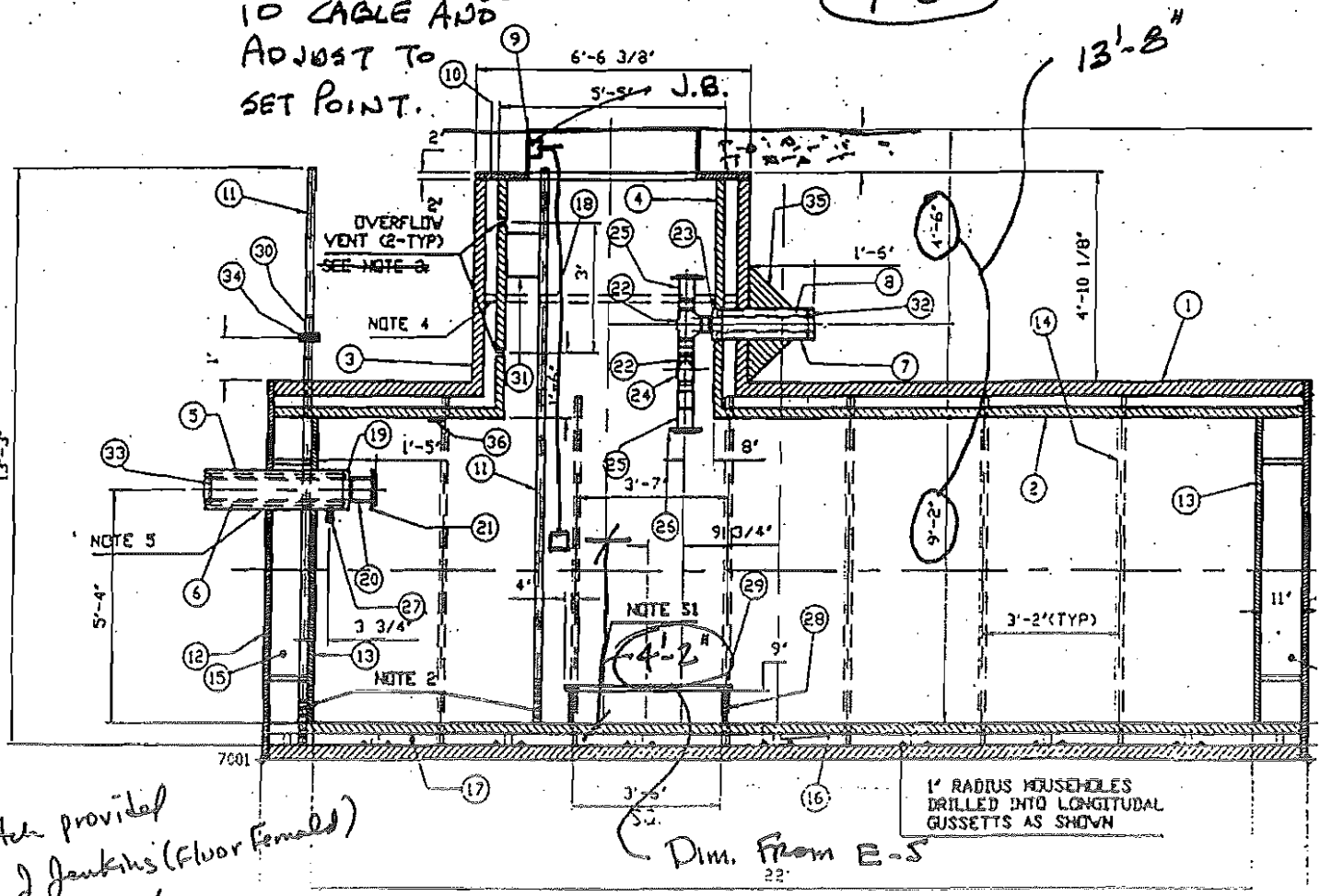
ORIGINAL

DRAWING NUMBER



13'-8"
4'-2"
9'-6"

For LSHH-110 suggest 10' CABLE AND ADJUST TO SET POINT.



Sketch provided by J Jenkins (Floor Female)
MWB
1/08/01

SECTION 3

NATIONWIDE CONTROL SERVICES, INC. (NCSI)

INSTRUMENT ENGINEERING & SYSTEMS INTEGRATION

CINCINNATI, OHIO
800-252-6760

FLUOR FERNALD

LEACHATE

SUBMITTAL

DECEMBER, 2000

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16900-001G
Reviewed By: DMO
Date: 01/2/01

[✓] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: MWB Date: 1/08/01

INFORMATION ONLY

Please note: for ordering information, please request a catalog.
Return to flow products
Return to KOBOLD On Line Catalog Index

NS - FLOAT SWITCHES FOR LIQUIDS

Kobold Series NSM, NSP, NSE, and NST float switches enable liquid to be monitored easily. Filling levels may also be controlled by installing at least two floats, one as a minimum, the other as a maximum limit switch.

The switches can be installed wherever magnetic liquid level switches are unsuitable due to the risk of the float jamming with dirt particles or the formations of deposits.

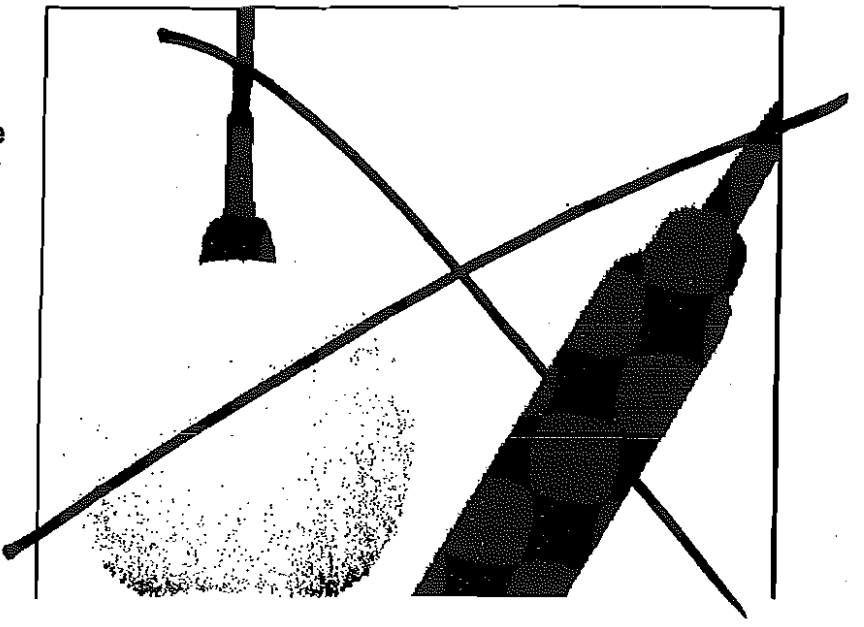
Even extremely aggressive, hot, dirty, or pulp-like media may be monitored with these float switches(depending on the shape and material of the float).

Description

The float consists of a hollow cylinder or sphere with an integral mercury or microswitch. The switch supplied is a SPDT contact, to be connected as normally

open (N/O) or normally closed (N/C) contact.

The contact operates when the level rises above or falls below the horizontal float position. The switching point is fixed by installing the switch horizontally at the required position or by clamping the cable to the tank or vessel.



Summary of Models

Type NSM:

Material: Polypropylene
Contact: Mercury switch
Maximum Temperature: 140°F
Maximum Pressure: 15 PSIG

Type NST:

Material: Teflon®
Contact: Mercury Switch
Maximum Switch: 320°F
Maximum Pressure: 15 PSIG

Contact Rating

Micro switch:
250 V, 4 A max.
Mercury switch:
220, A, 4 A max.

Type NSP:

Material: Polyethylene
Contact: Mercury Switch
Maximum Temperature: 190°F
Maximum Pressure: 30 PSIG

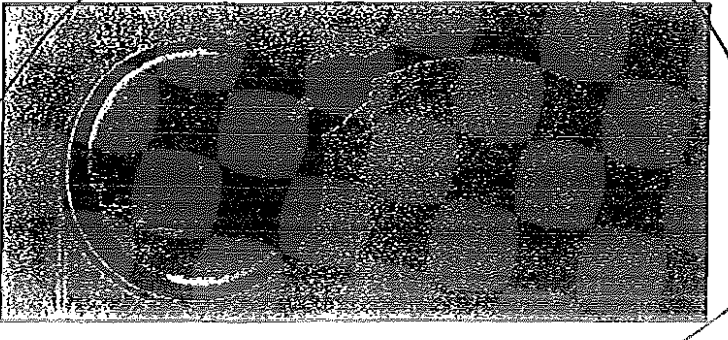
Type NSE:

Material: 316 Ti SS
Contact: Mercury Switch
Maximum Switch: 320°F
Maximum Pressure: 220 PSIG

NSM-5...: Polypropylene

Reasonably priced float switch for liquids such as oils, solvents, weak acids, and alkalis.

Installation:	From above in open container
Material:	
Float:	Polypropylene
Cable Gland:	Polyamide
Cable:	6 ft. Neoprene



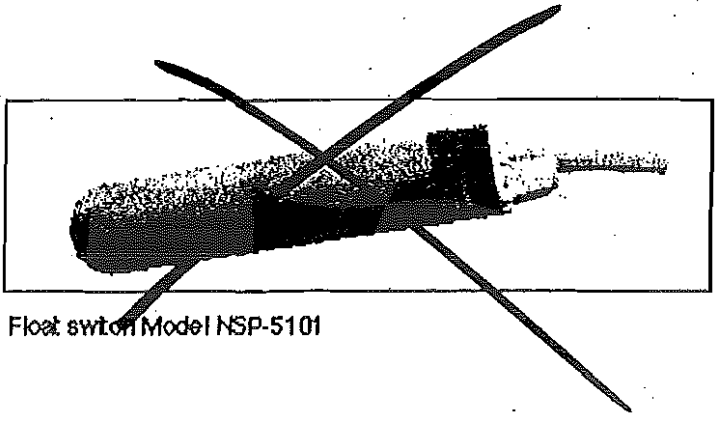
Float switch Model NSM-5101

Max. Pressure:	15 PSIG
Max. Temperature:	140°F
Switch:	SPDT Microswitch
Max. Density:	0.6 g/ml

NSP-5...: Polyethylene

For all types of liquids. E.g.:dirty water, oil, weak acids, and alkalis.

Installation:	From above in open container or through tank side
Material:	
Float:	Polyethylene
Cable:	6 ft. PVC
Optional Cables:	Silicon, Oilflex, Teflon® on request
Max. Pressure:	
NSP-5101:	15 PSIG
NSP-5201:	30 PSIG
Max. Temperature:	140°F, 190°F Silicon and Teflon Cable
Switch:	SPDT Mercury Switch
Float Density:	
NSP-5101:	0.9 g/ml
NSP-5201:	0.8 g/ml



Float switch Model NSP-5101

Order Number	Float Material	Switch Function	Contact Rating
NS[redacted]-5101	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

ES 1/26/01

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-001	REV: ~~10~~ 6	DATE: 26-Jan-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
David R. Opalka
SIGNATURE: David R. Opalka

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Jarrett DATE: 1/26/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	641-16900-001H	0						X			Instrumentation O&M manuals		X		16900		~~X~~	X
	641-16900-001J	0						X			(GLI, Troll 4000, Contec 202D		X			X		
	641-16900-001K	0						X			Metron Farnier Flowmeters,		X			X		
	641-16900-001L	0						X			Apollo Intelligent Meters, & Kobald		X			X		
	641-16900-001M	0						X			Float Switch) X		X			X		
	641-16900-001N	0						X					X			X		

MB 2/5/01

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Tim Cherry	525				
Jim Jenkins	525				
Mike Godber	41				
Rob Kneip	525				
Scott Wheeler	525				
Ge Kwasi Bredu Tweneboah	38				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

Kobold literature is not O+M information

RECEIVED BY: MGI Bill DATE 1/31/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

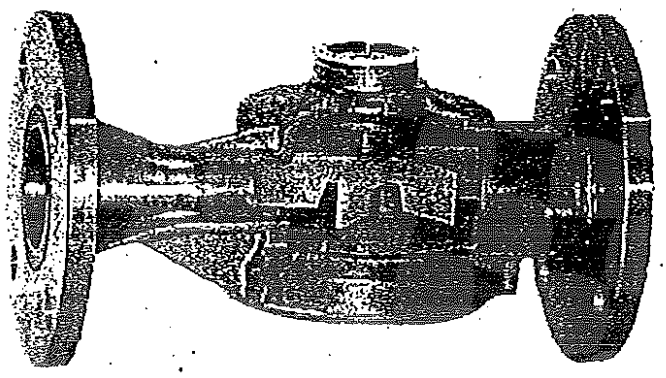
ORIGINAL

641-16900-001J PROD #7284_Vol 5

OPERATIONS & MAINTENANCE-*FREE* MANUAL

SPECTRUM
WATER METERS
MODELS 175, 260 & 440

[✓] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: MW Griffin Date: 2/05/01



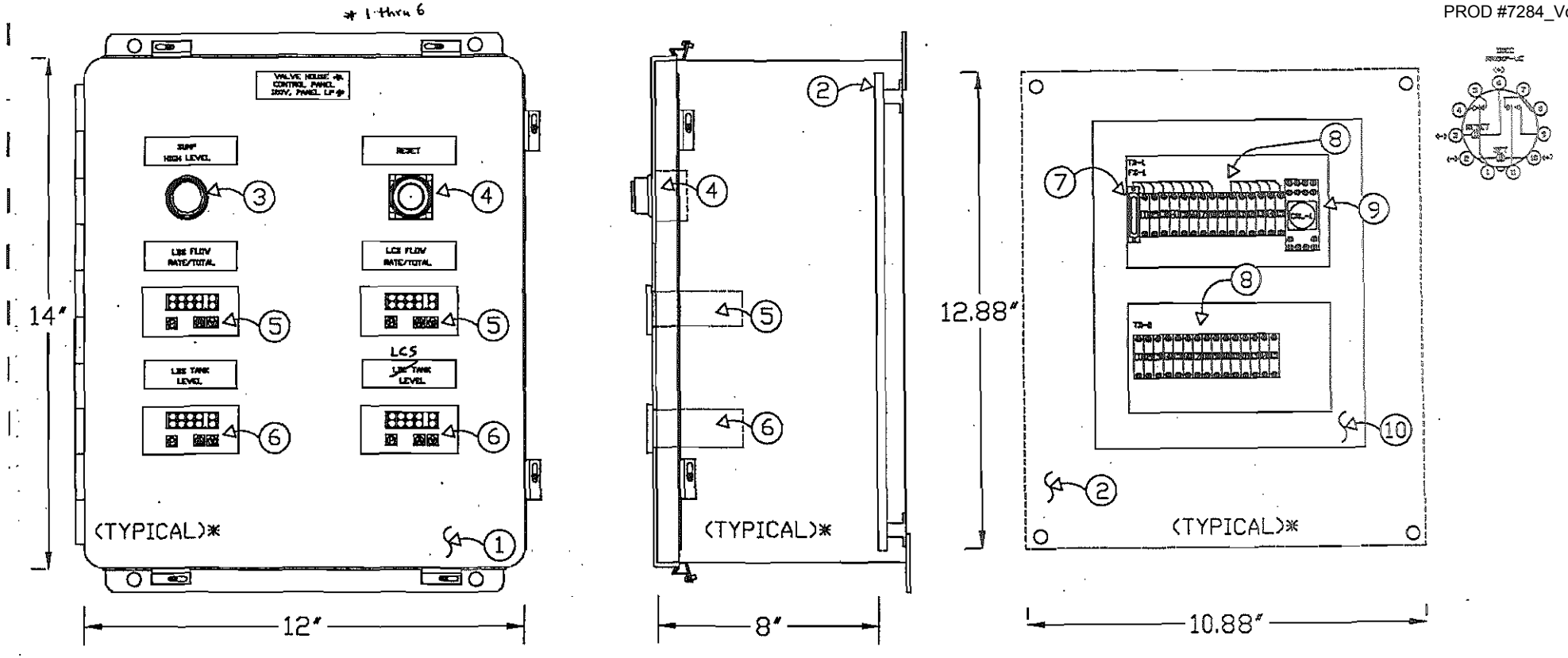
INFORMATION ONLY

Submittal 20111-641-16900-001, Rev. 6

[✓] A – Conforms to the Subcontract Requirements
[ ] B – Minor Comment – Incorporate and Resubmit
[ ] C – Revise and Resubmit

Sign: MW Griffin Date: 1/31/01

Note: Original document retained by Project Engineer
To support Operations and Maintenance



BILL OF MATERIALS				
ITEM	QTY.	DESCRIPTION	MANUFACTURER	MODEL NO.
1	1	NEMA 12 CONTINUOUS HINGE ENCLOSURE	WIEGMANN	B141208CH
2	1	PANEL	WIEGMANN	P1412
3	1	PUSH TO TEST PILOT LIGHT	CUTLER/HAMMER	10250T75R
4	1	PUSH BUTTON	CUTLER/HAMMER	10250T2411-2
5	2	FLOW INDICATOR/~~CONTROLLER~~ TOTALIZER	APOLLO	IMP23160
6	2	LEVEL INDICATOR	APOLLO	IMP20162
7	1	FUSE TERMINAL BLOCK FINGER SAFE	CUTLER/HAMMER	C383TKGSTG
8	20	TERMINAL BLOCKS	CUTLER/HAMMER	C383RK610
9	1	LATCHING CONTROL RELAY	IDEC	RR2KP-UC-AC120V
10	6'	WIRE DUCT	PANDUIT	TYPE-F

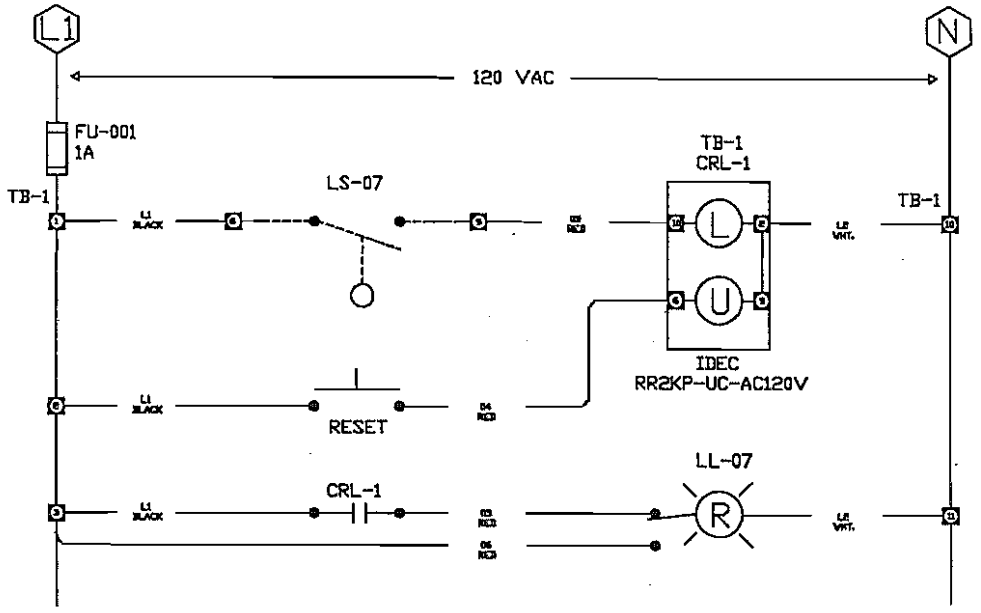
NOTES:
1. TYPICAL OF THE REQUIRED SIX CONTROL PANELS COMPLETE.
2. NOT TO SCALE

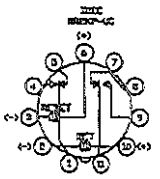
Nationwide Control Services Inc.
Instrument Engineering & Technical Assistance
1-800-252-6760

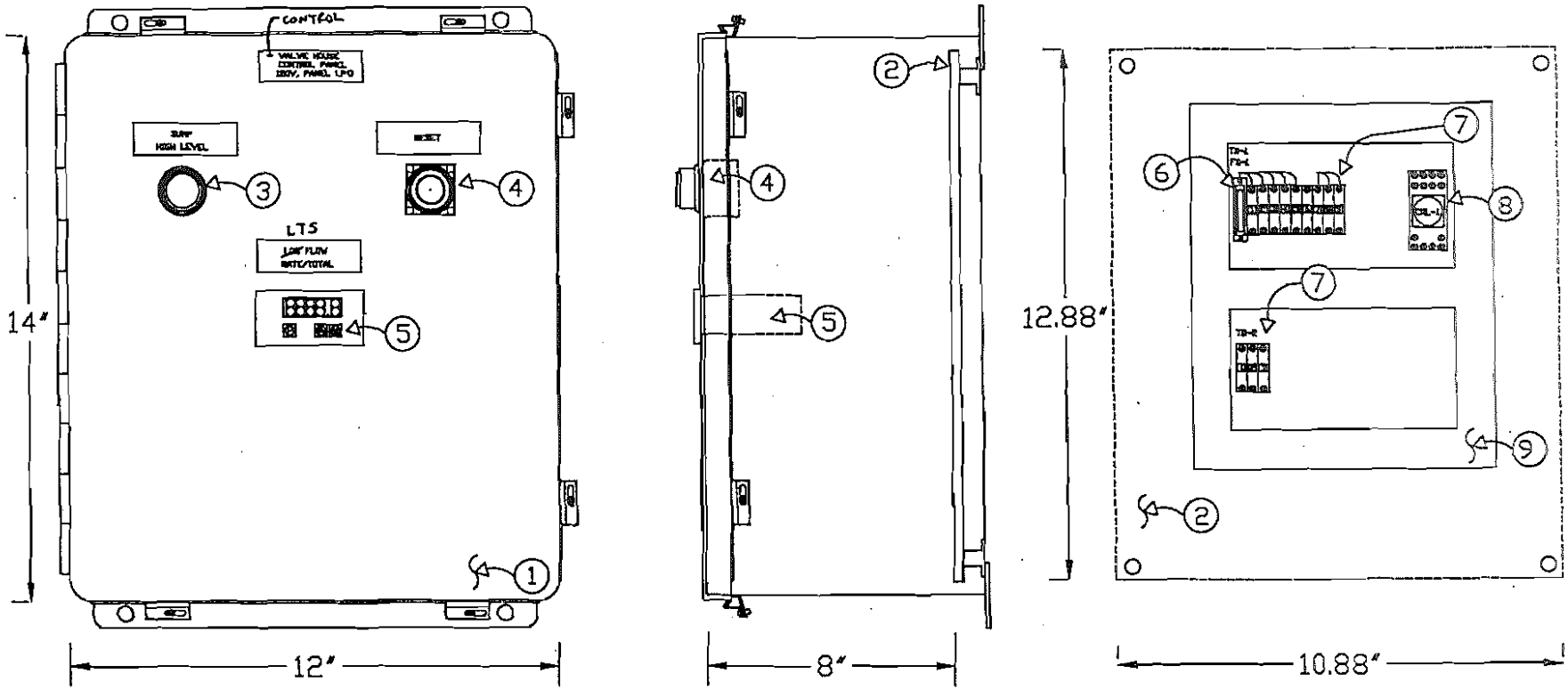
DRAWN: JIM TONS
CHECKED: JIM TONS
APPROVED: MAXWELL

DRAWING TITLE
FEMP EPLTS
VALVE HOUSE CONTROL PANEL
COMPONENT LAYOUT
AND BILL OF MATERIALS

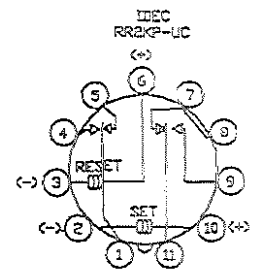
SHEET 01 OF 04
DRAWING GO1030-07-01
DATE 09/13/00


L1
N
120 VAC
FU-001
1A
TB-1
LS-07
TB-1
CRL-1
L
U
IDEC
RR2KP-UC-AC120V
TB-1
RESET
CRL-1
LL-07
R





BILL OF MATERIALS				
ITEM	QTY	DESCRIPTION	MANUFACTURER	MODEL NO.
1	1	NEMA 12 CONTINUOUS HINGE ENCLOSURE	WIEGMANN	B141208CH
2	1	PANEL	WIEGMANN	P1412
3	1	PUSH TO TEST PILOT LIGHT	CUTLER/HAMMER	10250T75R
4	1	PUSH BUTTON	CUTLER/HAMMER	10250T2411-2
5	2	FLOW INDICATOR/~~CONTROLLER~~ TOTALIZER	APOLLO	IMP23160
6	1	FUSE TERMINAL BLOCK FINGER SAFE	CUTLER/HAMMER	C383TKGSTG
7	20	TERMINAL BLOCKS	CUTLER/HAMMER	C383RK610
8	1	LATCHING CONTROL RELAY	IDEC	RR2KP-UC-AC120V
9	6'	WIRE DUCT	PANDUIT	TYPE-F



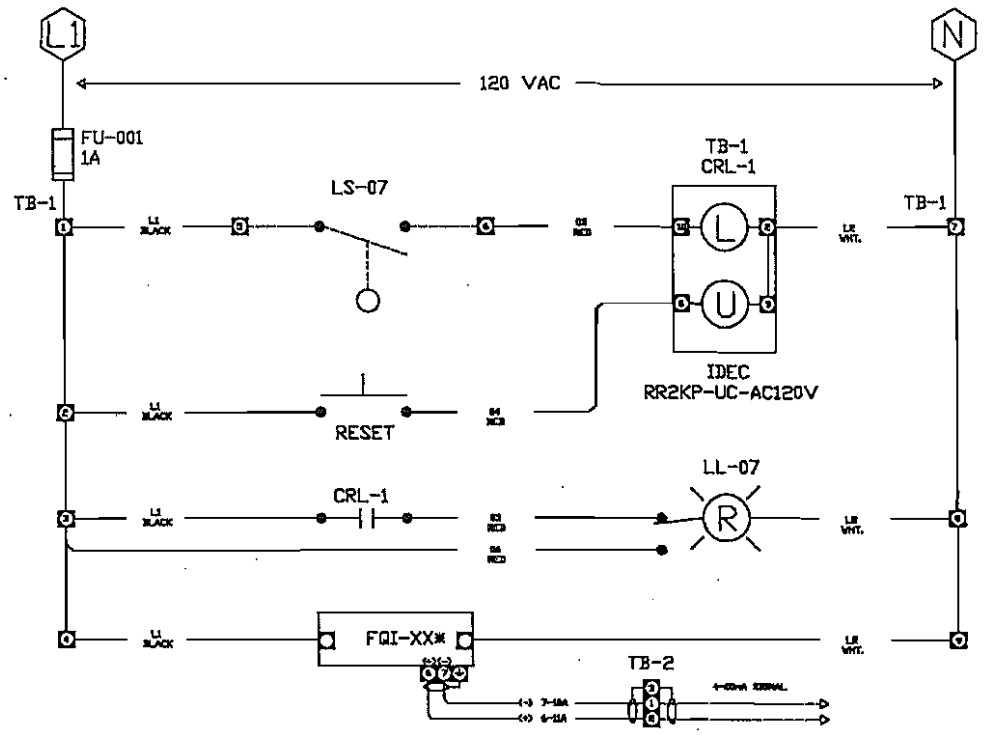
NOTES:

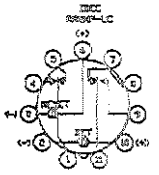
Nationwide Control Services Inc.
Instrument Engineering & Technical Assistance
1-800-252-6760

DESIGN	JIM TONS						
DRAWN	JIM TONS						
CHECKED	MAXWELL	REV. NO.	REVISION DATE	REVISION	BY	APPD	
APPROVED	MAXWELL						

DRAWING TITLE
FEMP EPLTS
CONTROL VALVE HOUSE CONTROL PANEL
COMPONENT LAYOUT
AND BILL OF MATERIALS

SHEET 03 OF 04
DRAWING 501030-07-03
DATE 09/13/00
PROJECT 00-091300





Nationwide Control Services Inc.
Instrument Engineering & Technical Assistance
1-800-252-6760

DESIGN	JIM TONS				
DRAWN	JIM TONS				
CHECKED	MAXWELL				
APPROVED	MAXWELL	NO.	DATE	REVISION	BY APPD

DRAWING TITLE
FEMP EPLTS
CONTROL VALVE HOUSE CONTROL PANEL
ELECTRICAL SCHEMATIC

SHEET 04 OF 04
DRAWING 001030-07-04
DATE 09/13/00
PROJECT 00-001300

SUPPLIER DOC[illegible]NT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-001	REV: 0	DATE: 02-Aug-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
David R. Opalka
SIGNATURE: David R. Opalka

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Denise Wentz DATE: 8/3/00

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16900-001A	0						X			Contrec Rate Totaliser 202D		X		16900	X		
8	641-16900-001B	0						X			Metron-Farnier Spectrum Meters		X		16900	X		
8	641-16900-001C	0						X			GLI Model 690L Level Transmitter		X		16900	X		
8	641-16900-001D	0						X			Troll Level Recorder System		X		16900	X		

REVIEW DISTRIBUTION

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Kwasi Bau Twenoboah	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

See attached

RECEIVED BY: Mike Griffin DATE 8/10/00
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resub
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

ENTERED

Datasheet

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16900-001A
Reviewed By: DRO
Date: 8/10/00

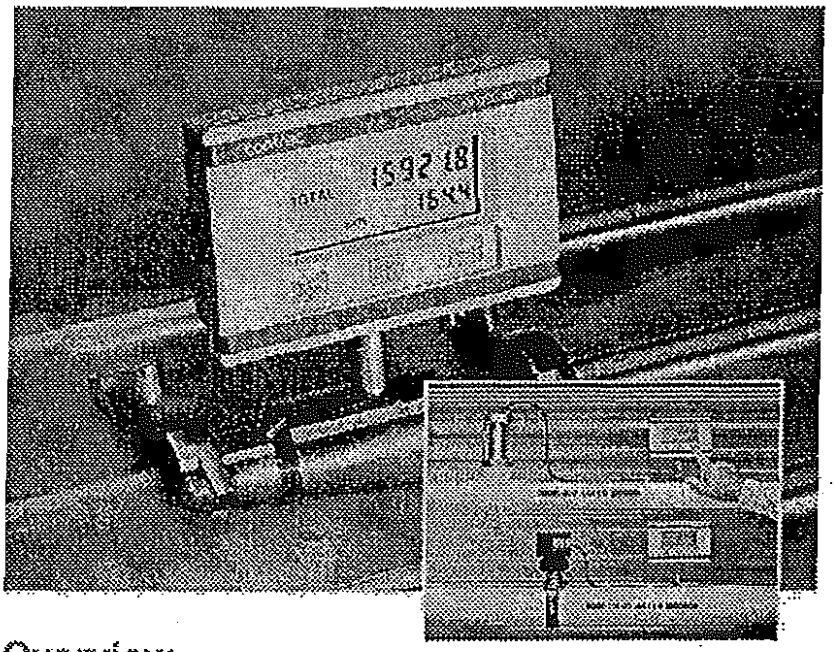
contrec

Field Mounting Rate Totaliser

Model 202D

Features

- CENELEC, CSA_{USC} approved
- Displays Rate, Total and Accumulated Total
- Battery, Loop or DC powered
- Intrinsically safe version - 202DI
- Watertight to IP67 (Nema 4X)
- Wall, pipe, panel or flowmeter mounting
- Fully programmable
- 4-20mA output
- High & low alarms
- CE compliant



Overview

The 202D Field Mounting Rate Totaliser requires no external power and is designed to operate with turbine, positive displacement and paddlewheel flowmeters in applications such as irrigation systems and pipelines, and as a replacement for mechanical registers.

Battery, Loop or DC powered

The standard 202D is powered by long-life lithium batteries. Alternatively, the 202D can be loop powered via an optional 4-20mA output, or powered from a 9-28 Volts DC supply.

For installation in hazardous areas a certified intrinsically safe version is available. The intrinsic safety approvals cover a wide range of inputs and both the 4-20mA output and relay outputs.

Watertight field mounting enclosure

The 202D Rate Totaliser is housed in a rugged yet attractive IP67 (Nema 4X) rated polycarbonate enclosure which is completely watertight.

This enables the instrument to be mounted directly on the flowmeter, panel mounted or wall mounted using a special universal bracket. A 2" pipe mounting bracket is also available.

Fully user programmable

K-factor, decimal point positions, filter constants and time base are fully user programmable.

Rate and Totals can also be displayed in different engineering units such as gallons per minute and barrels.

INFORMATION ONLY

[ ] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit

Sig: [illegible] Date: 8/10/00

Need Model 202D-441

CE Ex SP

ACCURACY PERFORMANCE

contrec

Field Mounting Rate Totaliser

Model 202D

Frequency to Current conversion

The 202D loop powered Rate Totaliser makes an excellent **Frequency to Current** Converter particularly for low frequency inputs from positive displacement or turbine flowmeters.

Because the 202D calculates the flow rate by measuring the time interval between input pulses, it is able to provide a very stable and accurate 4-20mA output for low frequency inputs.

Time interval measurement also means that the 202D will have a fast response to changes in flow rate, although the response can also be limited, where necessary, via the digital filtering.

Digital filtering enhances rate accuracy

Frequency fluctuations caused by pulsating flow through a flowmeter, often makes the rate impossible to read with any precision.

The 202D has a digital filter which averages out these fluctuations and enables the rate to be read to a four digit accuracy.

The degree of filtering is fully programmable and, therefore, highly accurate and stable readings can be obtained without excessive lag. For versions with 4-20mA output, the current output is also filtered.

Versions Available

Battery powered

The battery version of the 202D is designed for operation where external power sources are not available. It derives its power from two lithium battery packs which provide sufficient power for up to 5 years.

Low battery power condition is signalled to the operator by a message on the LCD and battery replacement is easily carried out in the field even in hazardous areas.

4-20mA Output Loop powered

The 4-20mA output version draws its operating power from the 4-20mA loop and uses lithium batteries for back-up if the 4-20mA loop is interrupted.

The instrument provides a 2-wire re-transmission of the flow rate. Both the 4mA and 20mA points are fully programmable so that the output can span across the entire range or, alternatively, across a small section of the operating range.

DC powered

The DC powered version will operate from an external power source between 9 and 28 Volts and draws no more than 4mA. This enables the 202D to be powered from AC mains adaptors and eliminates the need to run mains voltages in the field.

Lithium batteries provide back-up if the DC power is interrupted.

Solid State Relay Outputs

Both the 4-20mA output version and the DC powered version are provided with two solid state relay outputs. The solid state relays provide high and low flow rate alarms or, alternatively, a pulse output and a low flow rate alarm. The outputs can sink up to 200mA and can be used to power external relays, audible alarms or counters. The outputs are internally protected against voltage spikes caused by relays and coils.

Both outputs are separately isolated via opto isolators.

The switching points can be programmed during the set-up mode. If programmed for a pulse output, the pulse can be selected as either unscaled (raw pulse input) or scaled. The maximum pulse frequency is 500mSec with a pulse width which is automatically set as:

1mSec	if output > 50Hz
10mSec	if output = 5...50Hz
100mSec	if output < 5Hz

Specifications

General

Display - Total	7 digit 10mm (0.4") high LCD (continuously powered). Note: The Resettable Total is resettable from the front panel and the Accumulated Total is displayed when the ACCUM TOT key is pressed.
Display - Rate	4 digit 8.5mm (0.33") high LCD (continuously powered).
K-factor Range	The pulses per unit of measure (eg. pulses/gallon) is programmable in the range 0.000001 to 999,999.
Decimal Points	*Fully programmable for Rate and Total.*
Time Base	Rates can be displayed in units per second, minute, hour or day.
Frequency Range	0.01Hz to 10kHz.
Signal Type	Switch settable for sine wave (15mV P-P minimum), open collector, reed switch or pulse.
Interference	CE compliance.

Physical

Operating Temperature
-20 to 60°C.

Enclosure

Dimensions:	98mm (3.9") high x 152mm (6.0") wide x 43mm (1.7") deep.
Protection:	IP67 (Nema 4X) watertight.
Cable Entry:	By cable glands.
Materials:	Polycarbonate and ABS.

Mounting Options

Wall:	Wall mount bracket with cable glands.
Pipe:	A galvanised metal bracket enables the 202D to be attached to a 2" vertical or horizontal pipe.
Panel:	Two mounting brackets are provided and terminals are accessible on the rear of the enclosure. Note that the panel mount version is not watertight.
Turbine Meter:	Bottom and rear mounting stems are available for mounting the 202D directly on turbine flowmeters which have a 1" NPT or BSP boss.

Battery Powered Version

Battery Type	2 x Lithium battery packs.
Battery Life	5 years.

Loop Powered 4-20mA Output Version

Scale	The 4mA and 20mA points are programmable.

Resolution & Linearity
0.05% of span.

Accuracy	0.05% of span at 25°C.
Update Time	0.5s.
Connection	2 wire.

Voltage Across Output
28V dc maximum.

Voltage Drop	9V maximum.
Memory Backup	Lithium battery.

DC Powered / Alarm or Pulse Output Version

Outputs	2 x solid state relay outputs suitable for driving DC solenoids or external relays. The outputs provide fully programmable high & low flow alarms or a pulse output & low alarm.
Pulse Output	Scaled or unscaled pulse output, 500Hz maximum. Pulse width depends on output frequency and varies from 100mSec to 1mSec.
Switching Power	200mA, 30V dc maximum.
Saturation Voltage	0.8V dc across outputs when in the "on" state.
Isolation	Both outputs are separately isolated.
DC Power Input	9-28V @ 4mA maximum.
Memory Backup	Lithium battery.

Hazardous Area Approval (Model 202Di)

Type of Approval

CENELEC	EEx ia IIB T4.
CSA_{IS}	Class 1, Groups C and D.
SAA	Ex ia IIB T6.

Maximum Ambient
60°C.

Maximum Input Parameters
(For certified IS coil or other certified IS sensors which produce a pulse output.)

Uo = 10.0V	Li = 0mH
Io = 9.0mA	Ui = 24V
C(ext) = 60μF	Ii = 20mA
L(ext) = 1.5H	Pi = 320mW
	Ci = 0.002μF

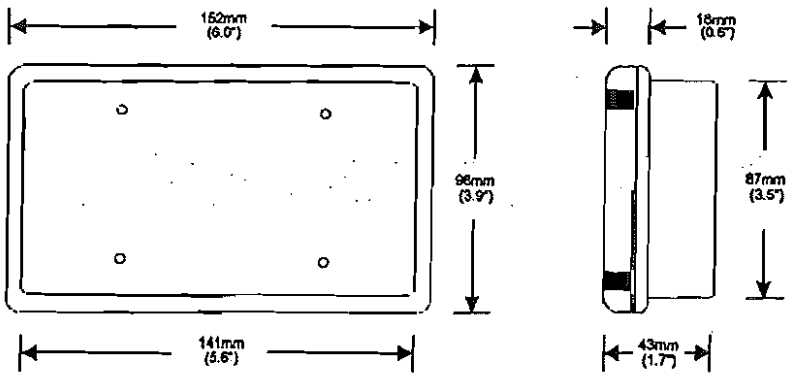
Note: Devices such as reed switches, which can be classed as "Simple Apparatus" as defined in the Cenelec standard EN50020, can be connected to the Model 202D without additional certification.

Maximum Output Parameters

4-20mA or Relays	Ui = 28V
	Ii = 93mA
	Pi = 653mW

Important: Specifications are subject to change without notice.

Dimension Drawings



REAR VIEW SIDE VIEW

Terminal Descriptions

No.	Terminals Common All Models
7	Signal Input (-)
8	Signal Input (+)

No.	4-20mA Output Versions
1	4-20mA (-)
2	4-20mA (+)
3	Low Alarm (-)
4	Low Alarm (+)
5	High Alarm (-) or Pulse (-)
6	High Alarm (+) or Pulse (+)

No.	DC Power Versions
1	DC Power 0V
2	DC Power +9 to 28V dc

Ordering Information

When specifying please indicate model(s) required using the following method.

202D . 2 0
202Di . 4 3L

Model

Standard
Rate Totaliser - 202D

Intrinsically Safe
Rate Totaliser - 202Di

Type of Power
0 - Battery powered
3L - DC powered with alarm/pulse outputs and battery back-up
4L - Loop powered with 4-20mA output, alarm pulse output and battery back-up

Type of Mounting
0 - No cable entry holes
1 - Panel mount
2 - Wall mount with cable glands
4 - Turbine flowmeter mount
6 - 2" galvanised pipe bracket

contrec

Distributed by:

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Email: sales@contrec.co.uk

Website: www.contrec.com.au

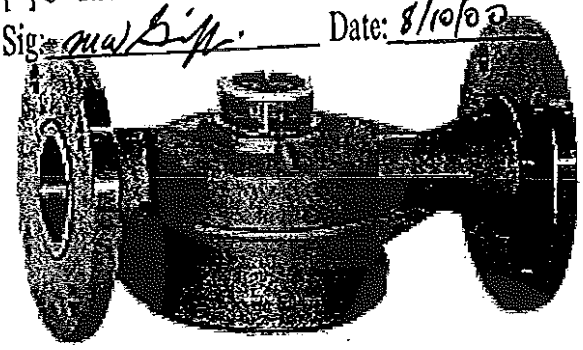
General Specifications

Metron-Farnier Spectrum Series

Spectrum 175-440 3"- 6"

[✓] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 8/10/00

The Spectrum Single-Jet Meter is the widest range, single measuring element meter available to U.S. utilities. It is designed to replace maintenance intensive compound type and limited range turbine type meters, for commercial services. The combination of design simplicity, superior grade materials, and high quality manufacturing standards allows for years of virtually new meter performance with no maintenance.



Spectrum features include:

- High accuracy
- Wide range – 1000:1 turndown
- Superior low flow registration
- No maintenance
- Excellent performance in adverse conditions
- Unaffected by sand or small debris in line
- No straight pipe requirements upstream or downstream of meter
- No strainer requirement
- 5 Year flange to flange warranty
- Compatible with virtually all AMR systems

INFORMATION ONLY

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachi
Transmission System Project
STAVER # 7052

Submittal # 641-16900-001F
Reviewed By: DTO
8/10/00

PHYSICAL SPECIFICATIONS

Materials

Body – Cast Silicon Bronze
Impeller – Polypropylene
Register – Direct transmission brass gearing immersed in an oil bath. The gearing consists of electrochemically polished Clockwork Brass.
Impeller Bearing – Fiber Reinforced Nylon
Impeller Pivots – 440C Stainless Steel – H.T.700 Vickers
Dimensions – See Table 2.
Weight – See Table 2.

FUNCTIONAL SPECIFICATIONS

Fluids measured –Potable cold water (hot water optional)
Flow Range – See Table 1.
Accuracy – ± 2% See Figure 1.
Pressure Loss – See Figure 1.
Repeatability – 0.5 % of full scale
Maximum operating Pressure – 230 PSI
Maximum Operating Temperature –
140° F (60°C)
(194° F (90° C) optional)
End Connections – 3", 4" or 6" Round Flanges
Registration – See Figure 5.
99,999,999 Gallons
10 Gallon dial revolution
9,999,999 Cubic Feet
1 Cubic Ft. dial revolution
Warranty – 5 Yr. – Flange to Flange
15 Yr. Register

OPERATION

Incoming water rotates a suspended impeller that is directly linked to the register. A low friction pivot bearing supports the impeller at low flow rates while a thrust bearing provides the support at high flow rates. This patented "dual bearing" design provides unparalleled accuracy and durability at both high and low flows. The register is hermetically sealed from the measuring chamber through a hydraulic watertight joint. The vacuum sealed, oil filled register cannot fog after installation in a pressurized service.

Accuracy Testing

For optimal performance during meter accuracy tests observe the following.

1. Register is level to the horizontal
2. Upstream pipe should be the same diameter as the meter flange
3. Upstream valve should be fully opened during test
4. No leaks are present between the Spectrum and downstream volumetric tank or reference meter

Tamper-Proof Features

A factory installed tamper detection seal prevents unauthorized access to the meter and register.

INSTALLATION

The Spectrum meter should be stored as shipped with register face down until installation. To maintain accuracy, the meter is to be installed horizontally (±10°) in the direction of water flow, with the register face up. In most applications, no straight pipe length, upstream or downstream is necessary. Under normal usage conditions the Spectrum is not affected by sand or suspended particles and does not require a strainer.

Automatic Meter Reading

All Spectrum meters can be field retrofitted or factory installed with a Universal Automatic Meter Reading Device. The system utilizes an optoelectric interrogator attached to the register face. The digital output is conditioned and amplified for transmission up to 1000 ft. and is compatible with virtually all touchpad, phone, and radio systems.

OPTIONS

The Spectrum meter is manufactured with varying End Connection options (Table. 2.). The Spectrum 260 is available with 3" 4-Bolt or 4" 8-Bolt round flanges. The Spectrum 440 is available with 4" 8-Bolt or 6" 8-Bolt round flanges. This enables water usage levels to be matched with the proper meter size without additional plumbing or cone reducers.

VH CVH

Table 1. Flow Specification 3"-6"

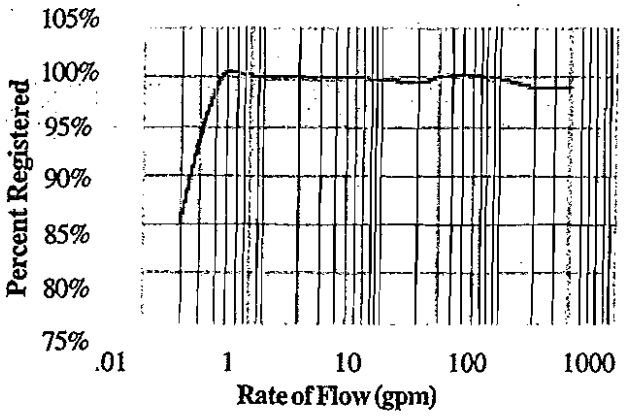
	Model	Minimum Test Flow (95%-102%)	Normal Low Flow (98%-102%)	Nominal Flow	Maximum Continuous Flow	Peak Test Flow	Head Loss at Nominal Flow Figure 1.
	Spectrum 175	1/3 gpm	1/2 gpm	175 gpm	245 gpm	350 gpm	7.25 psi
VH →	Spectrum 260	1/2 gpm	3/4 gpm	260 gpm	365 gpm	520 gpm	7.25 psi
CVH →	Spectrum 440	1 gpm	1.25 gpm	440 gpm	630 gpm	880 gpm	7.25 psi

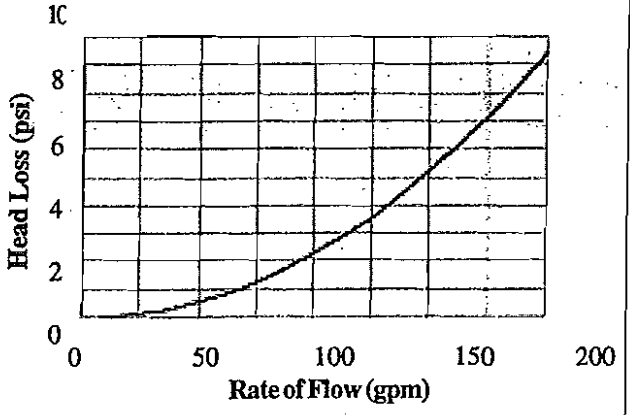
Figure 1.

Accuracy Curves

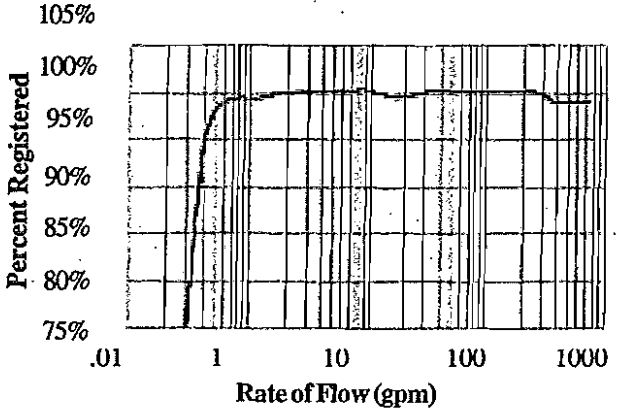
Pressure Loss Curves

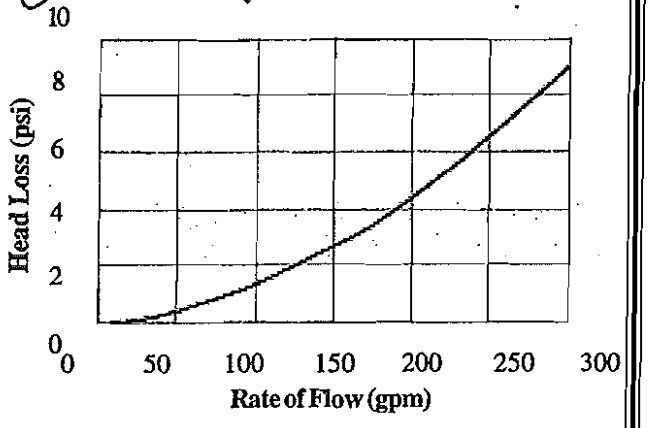
Spectrum 175 3"



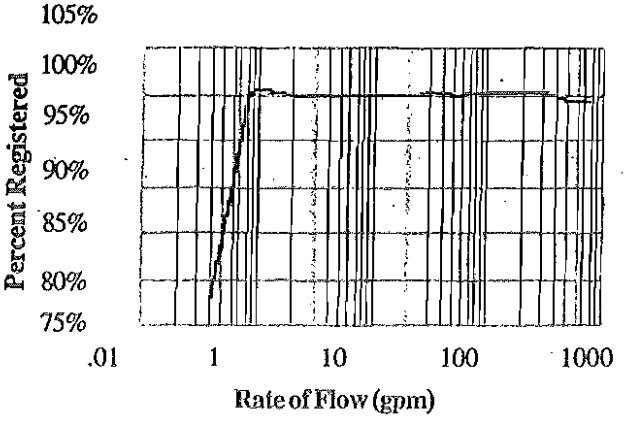


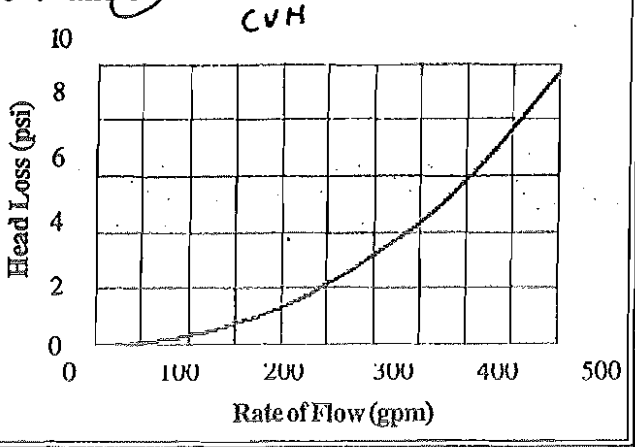
Spectrum 260 3" and 4" (VH 1-6)





Spectrum 440 4" and 6" CVH





Spectrum Models: 175, 260, 440

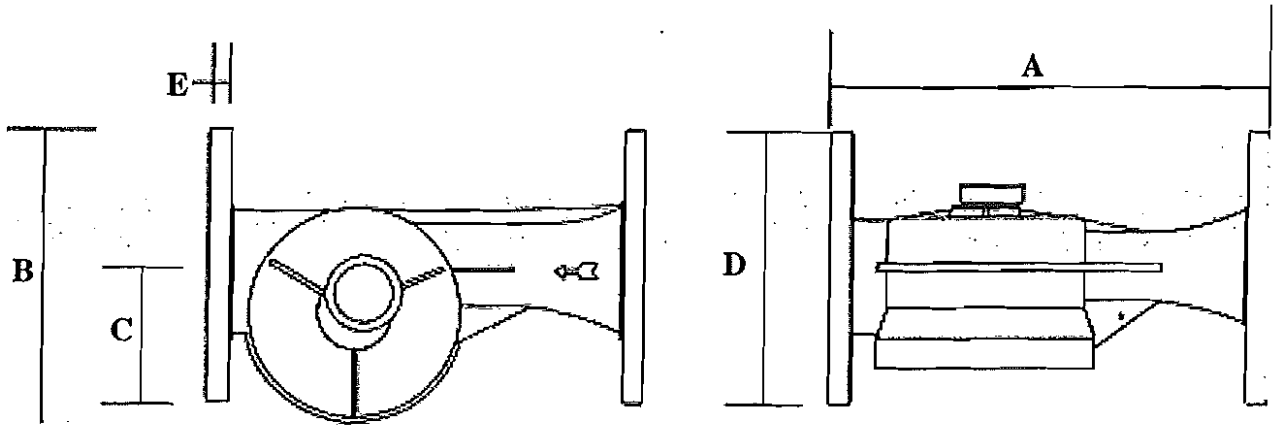


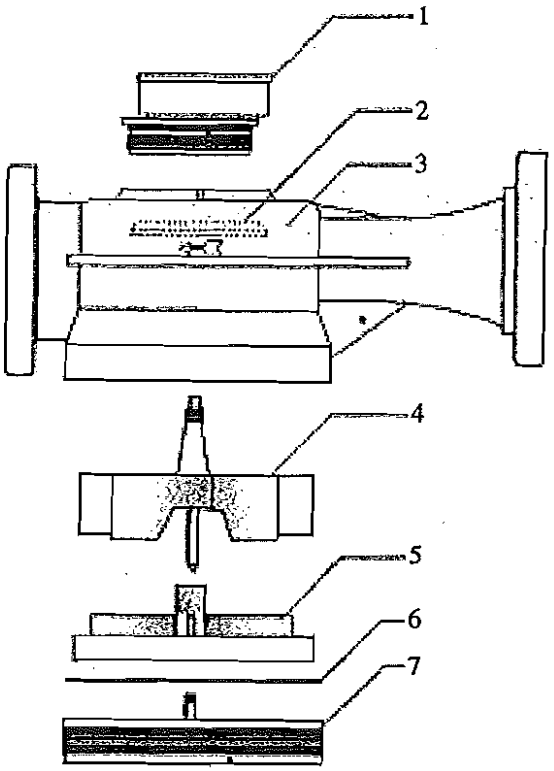
Table 2. Dimensions and Configurations

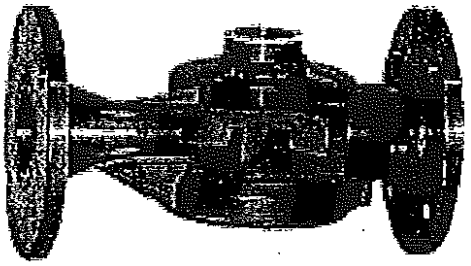
Meter Type Pipe Size	Length * A	Width B	Center Line C	Height D	Flange E	No. Bolts	Net Weight
Spectrum 175 -3"	11 3/4" (298mm)	8 1/8" (206mm)	3 3/4" (95mm)	7 1/2" (190mm)	5/8" (15mm)	4	27lb (12.3kg)
VH 1-6 → Spectrum 260 -3"	13 3/4" (349mm)	10 1/8" (257mm)	3 3/4" (95mm)	7 1/2" (190mm)	5/8" (15mm)	4	38lb (17.3kg)
Spectrum 260 -4"	13 3/4" (349mm)	10 7/8" (276mm)	4 1/2" (114mm)	9" (229mm)	3/4" (19mm)	8	48lb (21.8kg)
Spectrum 440 -4"	17 3/4" (450mm)	11 1/2" (292mm)	4 1/2" (114mm)	9" (229mm)	3/4" (19mm)	8	72lb (32.7kg)
CVH → Spectrum 440 -6"	17 3/4" (450mm)	12 1/2" (317mm)	5 1/2" (139mm)	11" (279mm)	7/8" (22mm)	8	92lb (41.8kg)

* When replacing compound meters, spools with testports are available to accommodate varying lay lengths. When replacing turbine meters, no service modifications are needed when using Spectrum 175 3", Spectrum 260 4", and Spectrum 440 6".

Compound Meter Size	Lay Length Type "A"	Lay Length Type "B"	Spectrum Lay Length	Spool Length		Assembled Lay Length	
				Type "A"	Type "B"	Type "A"	Type "B"
3"	17"	24"	113/4"	3" x 5"	3" x 12"	17"	24"
4"	20"	29"	13 3/4"	4" x 6"	4" x 15"	20"	29"
6"	24"	36 1/2"	17 3/4"	6" x 6"	6" x 18"	24"	36 1/2"

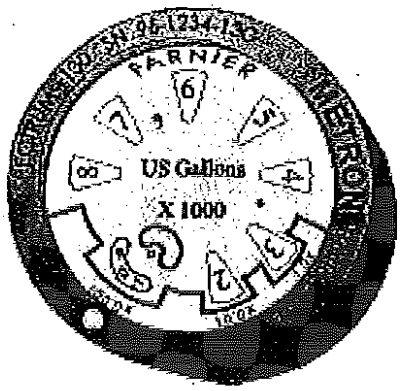
Figure 4. Metron Spectrum Parts List Models 175, 260, and 440





1	Register Assembly
2	Register Mounting Rings
3	Meter Body
4	Impeller
5	Lifting Vane
6	O Ring
7	Bottom Plate

Figure 5. Reading the Metron Spectrum

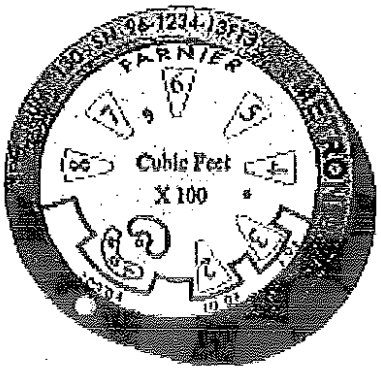


SPECTRUM 175 - 440 GALLONS

This meter has measured exactly 87,654,321 Gallons of water.
The meter read taken (in billing units of 1000 Gallons) is 87,654
The digit "4" is equal to four billing units.

SPECTRUM 175 - 440 CUBIC FEET

This meter has measured exactly 8,765,432.1 Cubic Feet of water.
The meter read taken (in billing units of 100 Cubic Feet) is 87,654
The digit "4" is equal to four billing units.



Ordering Instructions

1. Select one code from each category to fill in complete model number.
2. Add additional equipment (electronics, spools, strainers, or any custom order) as separate items on the order.

Example Order: Spectrum 175 - 3"- GAL; AMR - MP; ST - 03; SP - 3x5x1 1/2 - FC

Ordering Codes for Spectrum Series

Meter					Options and Accessories		
Quantity	Model	Flow Range	Size	Units	AMR	Strainer	Spool
	175	1/3 - 350	3"	Gal or FT3		ST-	SP-
	260	1/2 - 520	4"	Gal or FT3		ST-	SP-
	260	1/2 - 520	4"	Gal or FT3		ST-	SP-
	440	1 - 880	6"	Gal or FT3		ST-	SP-
	440	1 - 880	6"	Gal or FT3		ST-	SP-
Example Order: 175 3" Gal, FM, ST - 03, SP - 3x5x1 1/2 1/2 FC							

Options and Accessories - Spools, Strainers, AMRs

Electronics

Name	Description	Ordering Code
Metron-Farnier	FET Module	FM
Prolink	Pit-mount Wall-mount LCD	PPM PWM PLC
Hexagram	Pit-mount short Pit-mount tall Wall-mount	HPS HPT HWM
Example: AMR - MP		

Strainers

Strainer	Description	Ordering Code
Flange Size	3" Bronze 4" Bronze 6" Bronze	03 04 06
Example: ST - 03		

Spools

Spool	Description	Ordering Code
Flange Size	3" flange 4" flange 6" flange	3 4 6
Pipe Length	5" (3" flange) 6" (3", 4", 6" flange) 10" (4" flange) 12" (3" flange) 15" (4" flange) 18.5" (6" flange)	5 6 10 12 15 18.5
Test Port	none 1 1/2" 2" (not available on 5" LL)	NT 1 1/2 2
Coating	Fusion Epoxy Standard Shop Coat	FC SC
Example: SP - 3 X 5 X 1 1/2 - FC		

Specifications are subject to change without notice.

Fluor Contract FSC-641
USDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

GLI International

Technology For Solutions

Submittal # 641-16900-001 C
Reviewed By: DPO
Date: 7/10/00

Data Sheet 690L/998
Supersedes 690L/997

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Sig: mw/Sp. Date: 8/10/00

Model 690L Level Transmitter

(Non-indicating with 4-20 mA Output)

Ensure compatibility with plastic tank nozzle

Model 690L in Standard Aluminum Explosionproof Enclosure
(shown with cover removed)

Hazardous Area Certification*

Factory Mutual System Approved

Class I, Div. 1, Groups A, B, C and D
Class II, Div. 1, Groups E, F and G

INFORMATION ONLY

Class I, Div. 1, Groups B, C and D
Class II, Div. 1, Groups E, F, and G

Class I, Div. 2, Groups A, B, C and D
Class II, Div. 2, Groups E, F and G

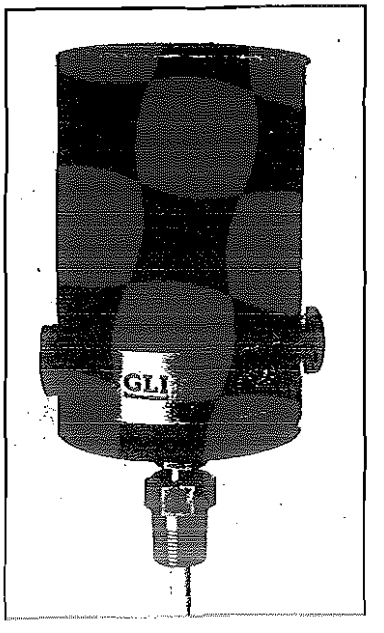
*Hazardous area certification is available only when the transmitter is housed in the standard aluminum explosionproof enclosure.

■ **Anti-Coat Circuitry.**
The Model 690L transmitter uses anti-coat circuitry to eliminate false level readings caused by material coatings or buildup on the level probe.

■ **EMI/RFI Static Protection.**
The standard aluminum explosionproof enclosure provides protection from radiated EMI/RFI emissions.

■ **Isolated 4-20 mA Output.**
The transmitter output features adjustable damping for turbulent applications, and field selectable direct or reverse acting operation.

■ **Remote-mount Capability.**
Optional remote mount accessories allow the transmitter to be installed up to 150 feet from the level probe.



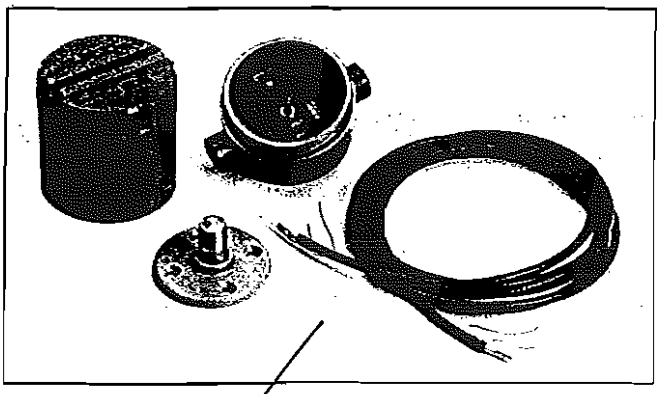
Model 690L in Optional PVC Enclosure (integrally-mounted)

Ordering Information (continued)

Remote Mount Accessories (order separately):

- 1000G3071 Threaded Adapter
- 1000G3072 Explosionproof Junction Box (with jack and terminals)
- 1000G3073 Triaxial Interconnect Cable▲ (up to 160°F)
- 1000G3074 Triaxial Interconnect Cable▲ (up to 392°F)

▲ Cable is appropriately terminated at each end. Specify length up to 150 feet.



Remote Mount Accessories

(foreground - threaded adapter and triaxial interconnect cable; background - explosionproof junction box with cover removed)

Signal Transmission Cables

- 1W0980 -- For use with AC line-powered Model 690L transmitters. Specify required length in whole feet.
- 1W0979 -- For use with DC-powered Model 690L transmitters. Specify required length in whole feet.

FM and CSA Certification Usage Guide

MODEL 690L TRANSMITTER		GLI LEVEL PROBES		
Enclosure Type	Power Requirements	Models 4000L, 4100L, 4200L, and 4500L	Model 4300L	
			Insulated	Bare
Aluminum Explosionproof	115 VAC, 230 VAC, or 24 VDC	Class I and II, Div. 1 (see Note 1)	Class I and II, Div. 1 (see Notes 1 and 2)	Safe area use only
PVC	115 VAC, 230 VAC, or 24 VDC	Div. 2 areas (see Note 3)	Div. 2 areas (see Note 3)	

NOTES:
1. The FM certification option includes all groups. The CSA certification option excludes Group A.
2. Optional certification for using this equipment combination in Div. 1 areas is only available by CSA.
3. Optional certification for using a Model 690L in a PVC enclosure and any GLI level probe in Div. 2 areas is only available by CSA.

Engineering Specification

1. The transmitter shall be non-indicating.
2. Line voltage shall be 115 volts, 50/60 Hz., 230 volts, 50/60 Hz., or 24 VDC requiring 18-35 VDC power.
3. The transmitter shall employ "anti-coat" circuitry to significantly reduce error effects of conductive buildup on the surface of the level probe.
4. The transmitter shall have an isolated 4-20 mA output, and adjustable output damping for turbulent material levels. The output shall be field-selectable for direct or reverse acting operation.
5. The transmitter enclosure shall be the standard aluminum explosionproof enclosure, or the optional PVC NEMA 4X enclosure for corrosive environment duty.
6. The transmitter shall have non-interacting zero and span adjustments.
7. The transmitter shall be GLI International, Inc. Model 690L-series.

GLI International

Technology For Solutions

Data Sheet 4500L/598
Supersedes 4500L/1196

Concentric Shield Level Sensing Elements

■ Concentric Metal Shield.
The concentric metal shield provides a linear ground reference for applications in which non-conductive liquids are contained in irregularly-shaped vessels or non-conductive vessels. The close proximity of the concentric shield to the sensing electrode enables this probe to produce a high capacitance change with level variation.

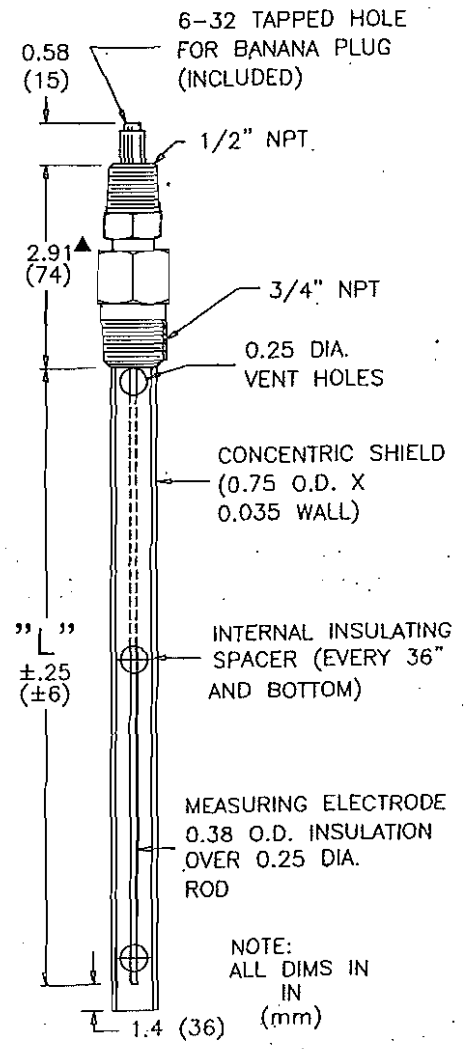
■ Convenient Out-of-vessel Calibration.
Calibration can be performed before installing the concentric shield probe into the vessel. Simply immerse the probe into a sample of the liquid to be measured and calibrate. It is not necessary to recalibration after installing the probe into the vessel.

■ Extruded Insulation.
The extruded insulation on the sensing electrode ensures a snug fit, minimizing air encapsulation and variation in generated capacitance.

■ Chemically-resistant Wetted Materials.
Wetted parts of 316 stainless steel and TFE Teflon® are standard materials of construction. Other materials are available.

■ Safe, Captive Sensing Element.
The sensing element is held captive in the entrance gland to prevent it from becoming a projectile when used in a pressurized vessel.

■ Flange Mounting and Cooling Gland Options.
To accommodate your installation requirements, these level probes may be ordered with a flange, and a gland welded to the flange for cooling.



▲Probes with agency certification option have longer glands (2.91 inches increases to 3.6 inches).

Specifications

Wetted Materials ..... 316 SS and TFE Teflon®, PVDF (Kynar®) or polyethylene — other materials available

Max. Temperature ..... TFE Teflon®: 450°F
PVDF (Kynar®): 250°F
Polyethylene: 160°F

Max. Pressure ..... TFE Teflon®: 1000 psig at 150°F, derated to 0 psig @ 350°F
PVDF (Kynar®): 1000 psig @ 100°F, derated to 0 psig @ 250°F

Max. Pressure (Cont.) .... Polyethylene: 1000 psig @ 80°F, derated to 0 psig @ 140°F

Gland Capacitance ..... 25 pF (for TFE Teflon®)

Max. Standard Length ..... 19.5 feet

Electrode Diameter ..... Concentric Shield: 3/4 in. O.D.
Electrode: 3/8 in. O.D.

LEVEL

Simco Controls FC performance Performance

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641- 16900-001D
Reviewed By: NRO
Date: 7/10/00

11236 Williamson Road
Cincinnati, OH 45241
Phone: (513) 489-8805
Fax: (513) 489-1642

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ON-SITE DISPOSAL FACILITY ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM

SUBMITTAL DATA for LEVEL RECORDER

CONTRACTOR: THE STAVER GROUP
1271 EAST 2ND STREET
FRANKLIN, OH 45005
PH: 513-743-7995

ENGINEER: GeoSyntec CONSULTANTS
1100 Lake Hearn, NE, Ste.200
ATLANTA, GA 30342

PROJECT: FLUOR FERNALD
NO. 20111

MANUFACTURER: IN-SITU, INC.

TAG (S): LR:102,202,~~203~~,~~204~~,~~205~~,~~206~~ 302,402,502,602
LR:105,205,305,405,505,605

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Ensure 2" well dirk is compatible with plastic tank nozzle [illegible]

BILL OF MATERIALS

QTY. 12	**TROLL 4000. Includes Temperature Sensor, 15 PSI rating Sensor, Alkaline Battery, RS232 Communications, Quick Disconnect cable Connector, Operator's Manual, Win-Situ Software and User's Guide.**
QTY. 12	**TROLL Cable RS232 Polyurethane, Incudes Quick as Mentioned Above, Dust Cap, and Service Grip.**
QTY. 1	**RS232 Communication Kit/Power Cable, Power Supply Transformer, And 9M-25F Pin Adapter**
QTY. 1	**2" Well Dock w/Hanging Clip**

In-Situ Inc.

TROLL 4000

Superior pressure and temperature monitoring with reliable and economical data logging

Now you can...

- Record up to 100,000 data points with internal data logger
- Compensate for barometric fluctuations and temperature
- Protect against vandalism–everything submerged in well
- Swap cables for custom applications
- Download data without stopping a test or removing unit
- Quickly prepare custom graphs or export your data
- Monitor up to 5 years with our long-life battery options
- Network up to 32 units and communicate via telemetry

Introducing the TROLL 4000. With nearly 3000 units in the field the TROLL 4000 sets the standard for precision water level and temperature monitoring! Everything you need in one fully submersible unit, including sensors, data logger, memory and power!

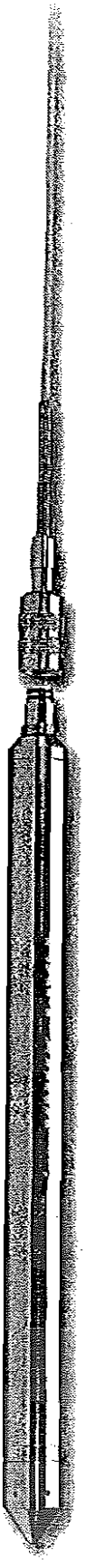
The TROLL 4000 allows water professionals to track minute water level and temperature changes with unprecedented accuracy and reliability. Pressure readings are fully compensated for barometric fluctuations and changes in temperature. And there's plenty of non-volatile memory–enough for over 100,000 data points.

With the TROLL's all-in-one design, the entire unit can be safely locked in a well protecting it from vandalism. With our long-lasting user-replaceable batteries, reliable long-term monitoring is finally possible.

Need to log precise water and temperature data? Try a TROLL!

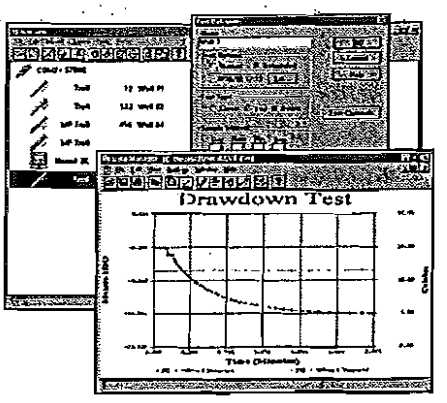
Use it for...

Long-term monitoring	Waste disposal sites
Ground & surface water	Remediation sites
Aquifer testing	Industrial & municipal
Tidal studies	Estuaries & wetlands



With Win-Situ software, test setup and data presentation are easier than ever!

Quickly set up tests, then download your data and graph the results all while the TROLL continues to run!



Fully submersible vented Quick-Connect cables

Internal memory, power and data logging

Highly accurate pressure and temperature sensors

The ultimate tool for water monitoring. Call us today to learn how this powerful water monitoring tool can work for you.

1-800-446-7488 or visit us on the internet at www.in-situ.com!

32-BIT SOFTWARE

NEW! Win-Situ 2000 is here!

Win-Situ 2000

USE IT FOR:

Easy to use Windows-based Win-Situ 2000 software is your key to harnessing the power of In-Situ instruments.

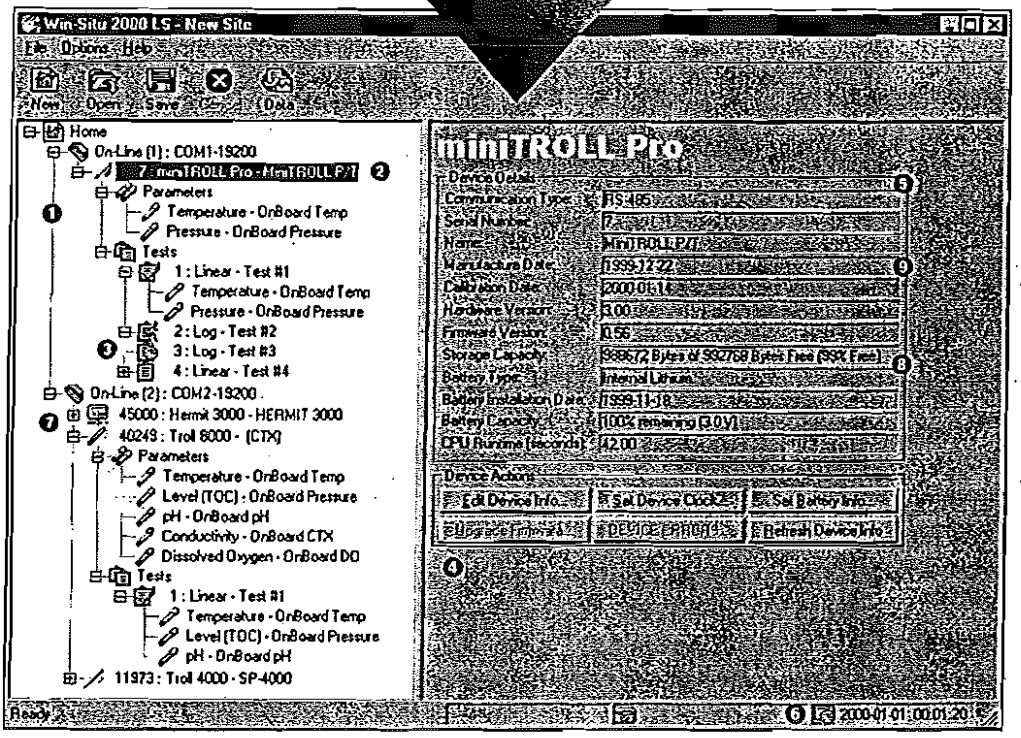
Powerful NEW user interface for In-Situ's New miniTROLL logger/probe
*included **FREE** with purchase of the miniTROLL*

Check it out!

❶ Intuitive tree structure organizes instruments, parameters and tests. Selecting an instrument in the tree displays its parameters and tests.

❷ Unique names identify each site and instrument in a network.

❸ Easy-to-read icons indicate the status of a test—completed, running, scheduled, or manual-start.



❹ Perform actions on each device with a 'click' of a button.

❺ Context-sensitive screen displays only the information that you need. Selecting an item on the left displays its options on the right.

❻ A clock displays the time of the instrument for easy synchronization with a PC.

❼ Full support for the Multi-Parameter TROLL 8000, TROLL 4000 and HERMIT 3000 is available with Win-Situ 2000 LS.

❽ Convenient readouts display remaining battery life and memory.

❾ Win-Situ displays manufacturing and calibration dates as well as the versions of hardware and firmware for easy reference.

Unleash the Power!

TOTALLY NEW 32-BIT WIN-SITU 2000 VERSION 3 SOFTWARE

See it on the Web at www.in-situ.com!

Win-Situ 2000 is a totally new, innovative approach to instrument control and data management for In-Situ instruments. Based on the Windows 32-bit architecture and an open systems strategy, Win-Situ 2000 is faster and easier-to-use than ever before!

It's loaded with the features that you need to manage your monitoring site and data. Features like networking, batch downloads, and easy readouts for remaining battery life and memory. Customize each parameter and set the display units.

With Win-Situ 2000 each device can have up to 16 tests defined for immediate or scheduled starts. Intuitive Wizards guide you through each operation including test setup and calibration. Test options include linear, logarithmic, linear average or event sampling modes.* Everything is organized within an easy-to-read tree list structure.

Win-Situ 2000's Data Manager produces report, graphs and can also transfer your data to Microsoft Excel with a 'click' of a button. With Win-Situ 2000, you will spend less time learning your instruments and more time getting the data you need.

800.446.7488 • 307.742.8213 On the web at www.in-situ.com

In-Situ Inc.

EJ 1/26/01

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-001	REV: ~~10~~ 6	DATE: 26-Jan-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
David R. Opalka
SIGNATURE: David R. Opalka

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6	641-16900-001H	0						X			Instrumentation O&M manuals		X		16900		X	X
	641-16900-001J	0						X			(GLI, Troll 4000, Contec 202D		X			X		
	641-16900-001K	0						X			Metron Farnier Flowmeters,		X			X		
	641-16900-001L	0						X			Apollo Intelligent Meters, & Kobald		X			X		
	641-16900-001M	0						X			Float Switch) X		X			X		
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ORIGINAL

641-16900-001J PROD #7284_Vol 5

OPERATIONS & MAINTENANCE-*FREE* MANUAL

SPECTRUM WATER METERS
MODELS 175, 260 & 440

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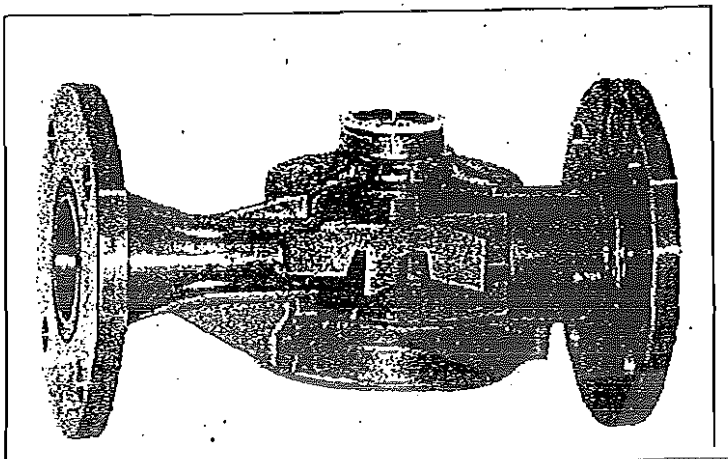

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In-Situ Inc.
Helping monitor the earth's resources

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TROLL
Model SP4000
Operator's Manual

April 1999

INFORMATION ONLY

641-16900-001 PROJ 67284 Vol 5

GLI International

Operating Instruction Manual

Manual No. 690L
Revision 6-693

MODEL 690L
CONTINUOUS LEVEL MEASUREMENT TRANSMITTERS WITH 4-20 mA OUTPUT

(Blind and Indicating Styles

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GLI International, Inc.
9020 West Dean Road
P.O. Box 23056
Milwaukee, WI 53224 USA
office: [414] 355-3601
fax: [414] 355-8346
e-mail: info@gliinc.com

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641-16900-001M

Operation Manual

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ACCURACY • QUALITY • PERFORMANCE

Equipment apparatus for potentially explosive atmospheres
EN 50014 - 1992

641-16900-001A2 TROD#7284_Vol 5

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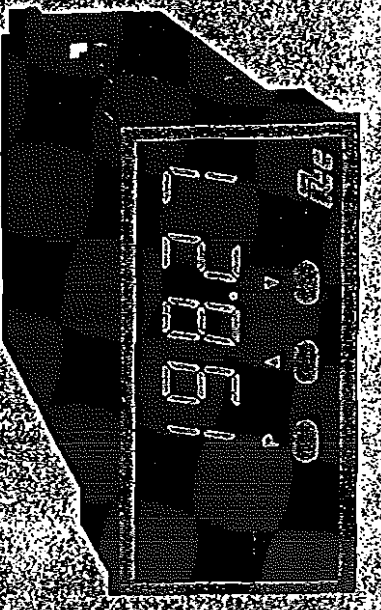

MODEL IMP INSTRUCTION MANUAL

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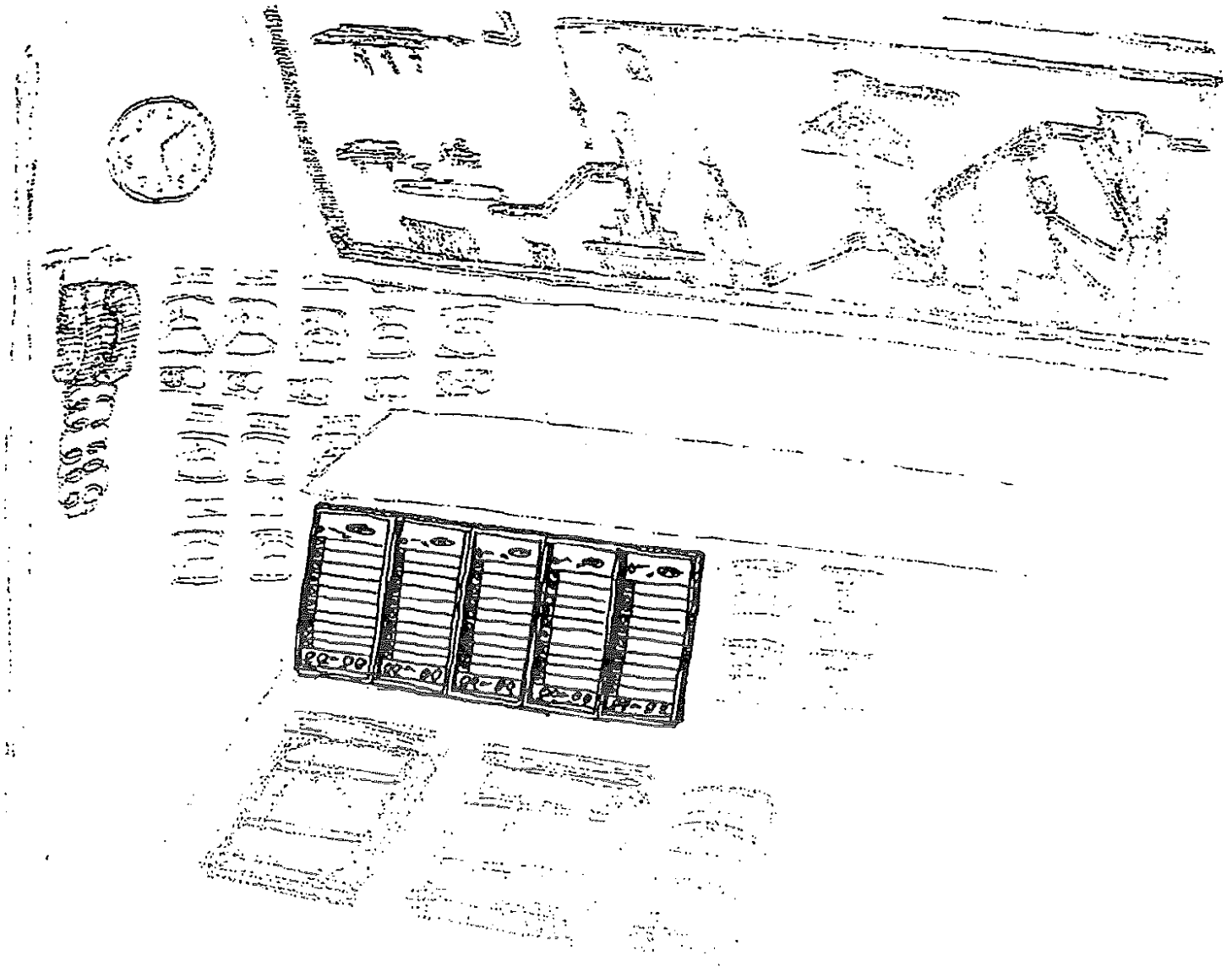
PANALARM®

INSTRUCTION AND OPERATING MANUAL

MODEL

910 Annunciator



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2	9377	9-4-86			
3	9797	9-6-88			
4	11436	3-29-94			
5	11685	9-30-95			
6	7700-50	2-28-97			

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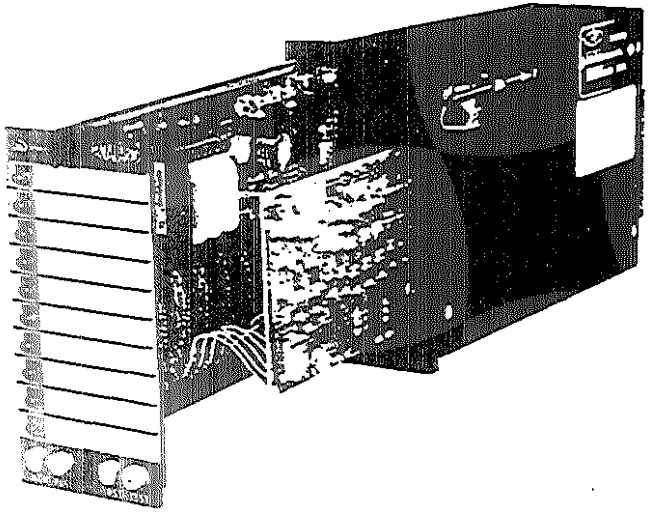
T 1

TURES DESCRIPTION

Description

The Model 910 annunciator is a self-contained unit comprising ten independent I²L logic micro chip circuits on a single printed wiring board. Standard features include integral LED indication, common control pushbuttons, AC or DC power supply, output reflash relay, external audible relay, NO/NC field contacts, seven field programmable operational sequences and packaging per DIN 43700 standard. Included as optional features are integral audible signal device, wiring box terminal enclosure, switch contact inputs or optically coupled inputs (AC or DC) and weatherproof surface mounted cabinet and watertight doors designed to meet Nema 4 and 12 environments.



ront panel includes a power-on LED, a LED for each point adjacent to each of n nameplate windows, and four pushbuttons (ACK, FLRST, RST, and TEST). s a dual-purpose pushbutton serving as manual reset for sequences AM and and as first-out reset for sequences TFS and TFSFR. (See Part 3).

1.2 Standard Model Number Explanation [4] [1]

910 _ _ _ _ _ _ _ _

MODEL 910

POWER INPUT VOLTAGE
- AC120 = 120VAC (24VFC)
- AC230 = 230VAC (24VFC)
- DC24 = 24VDC CONVERTER ISOLATED (24VFC)
- DC48 = 48VDC CONVERTER ISOLATED (24 OR 48VFC)
- DC9 = 100-280VDC CONVERTER ISOLATED (24 OR 125VFC)
- DCF12 = 12VDC NON-ISOLATED FILTER ONLY (12VDC)
- DCF24 = 24VDC NON-ISOLATED FILTER ONLY (24VFC)

SIGNAL INPUT TYPE & VOLTAGE

INTERNALLY SUPPLIED FC VOLTAGE
- T12 = SWITCH CONTACT, 12VDC (AVAILABLE WITH DCF12 FILTERS ONLY)
- T24 = SWITCH CONTACT, 24VDC (AVAILABLE W/ALL POWER SUPPLIES)
- T48 = SWITCH CONTACT, 48VDC (AVAILABLE W/DC48 CONVERTER ONLY)
- T125 = SWITCH CONTACT, 125VDC (AVAILABLE W/DC125 CONVERTER ONLY)
- K24 = OPTICALLY COUPLED, 24VDC (AVAILABLE W/ALL POWER SUPPLIES)

CUSTOMER SUPPLIED FC VOLTAGE
- TC24 = SWITCH CONTACT, 24VDC
- TC48 = SWITCH CONTACT, 48VDC
- TC125 = SWITCH CONTACT, 125VDC
- KC12 = OPTICALLY COUPLED, 12VAC/VDC
- KC24 = OPTICALLY COUPLED, 24VAC/VDC
- KC48 = OPTICALLY COUPLED, 48VAC/VDC
- KC120 = OPTICALLY COUPLED, 120VAC
- KC125 = OPTICALLY COUPLED, 125VDC
- KC240 = OPTICALLY COUPLED, 240VAC
- KC250 = OPTICALLY COUPLED, 250VDC

SERIES CONTACT MONITORING
- KM120 = TWO ISOLATED TERMS. PER CIRCUIT (120VAC/VDC)
- KM240 = TWO ISOLATED TERMS. PER CIRCUIT (240VAC/VDC)

NO INTEGRAL PUSH BUTTONS
- NP1 = FLUSH MOUNT
- NP2 = WALL MOUNT

WALL MOUNT ANNUNCIATOR
- WM1 = INPUTS T, K, TC & KC
- WM2 = INPUT KM

SURFACE MT. CABINET OPTION WILL ALL PUSHBUTTON CAPABILITIES (DOOR MTD) DESIGNED TO MEET NEMA 4
- SM4 = NEMA 4 (ALSO MEETS NEMA 12)
- SM4X = SM4 WITH CORROSION RESISTANT CABINET
- SM4P20 = NEMA 4 HOUSING (2) 10 POINT ANNUNCIATORS (20 POINTS)

WIRING BOX OPTION
- WB1 = TERMINAL ENCLOSURE [2] [3]

INTEGRAL HORN OPTION
- H1 = INDICATES HORN [2]

SEALED RELAY OPTION
- E1 = SEALED RELAY

INPUT TIME DELAY OPTION
- NO DESIGNATION = STD. 20ms
- D1 = 50ms
- D2 = 100ms

1.2.1

910D _ _

MODEL 910 WATERTIGHT DOOR

WATERTIGHT DOOR OPTION
- H1 = WATERTIGHT DOOR W/ LOCKING T-HANDLE (NEMA 12)
- T1 = WATERTIGHT DOOR W/ 1/4-20 BOLTS (NEMA4)
- T2 = WATERTIGHT DOOR W/ 1/4-20 BOLTS (NEMA 4X STAINLESS STEEL)

FIELD DRAWINGS

910100-1	DIMENSIONAL OUTLINE, MODEL 910" FLUSH MOUNT CABINET & OPTION "WB1" WIRING BOX
910100-SM4-1	DIMENSIONAL OUTLINE, SURFACE MOUNT ENCLOSURE (NEMA 4 & 12)
910100-SM4P20-1C	DIMENSIONAL OUTLINE, SURFACE MOUNTED ENCLOSURE WITH TWO MODEL 910 ANNUNCIATORS
910100-WM1-1	DIMENSIONAL OUTLINE, WALL MOUNT CABINET
910115-DH/DT-1	DIMENSIONAL OUTLINE, FLUSH MOUNT CABINET WITH WATERTIGHT DOOR
910450-TERM-1	TERMINAL ARRANGEMENT & INPUT-OUTPUT FUNCTIONS
910450-TERM-2	TERMINAL ARRANGEMENT & WIRING FOR 910SM" SURFACE MOUNT SUBPLATE
910450-TERM-4	TERMINAL ARRANGEMENT & WIRING FOR 910SM"P20 SURFACE MOUNT
910450-SEQ-1	SEQUENCE DIAGRAM CHARTS
910450-K"-1	WIRING DIAGRAM FOR INPUT OPTION "K" (OPTICALLY COUPLED)
910450-T"-1	WIRING DIAGRAM FOR INPUT OPTION "T" (SWITCH CONTACT)
910450-KM"-1	WIRING DIAGRAM FOR INPUT OPTION "KM"" (SERIES CONTACT MONITORING)

NOTES:

[1] IF OPTIONS ARE NOT SPECIFIED, NO OPTION NUMBERS WILL BE REQUIRED (STANDARD FLUSH MOUNT WILL BE SUPPLIED).

[2] NOT AVAILABLE WITH "SM" OPTION.

[3] NOT AVAILABLE WITH "WM OPTION.

[4] NOT ALL OPTIONS AVAILABLE ARE SHOWN. CONSULT FACTORY FOR SPECIAL REQUIREMENTS.

PART 2

SPECIFICATIONS

2.1 Input Power

Model:
AC120, 105 to 130 VAC, 50-60 Hz, transformer isolated
AC230, 210 to 260 VAC, 50-60 Hz, transformer isolated
DC24, 24 VDC nominal, 20-30 VDC, converter isolated (maximum ripple 10%)
DCF24, 24 VDC nominal, 20-30 VDC, non-isolated filter only.
DC48, 48 VDC nominal, 40-60 VDC, converter isolated (maximum ripple 10%)
DC8, 100-280VDC, converter isolated (maximum ripple 10%)

Transformer/converter isolation — 1500 VRMS
Power consumption - Less than 10 VA, all models
Flasher - Integral only, no provisions for external SYNC.

2.2 Operating Temperature Range ..... 0 to 50°C. Ambient

2.3 Humidity ..... 5% to 95% Non-condensing

2.4 Storage Temperature Range ..... -55°C to +85°C

2.5 Signal Inputs

INPUT TYPE	NOMINAL INPUT VOLTAGE	MINIMUM MAXIMUM SIGNAL VOLTAGE	% OF NOMINAL W/O COMPONENT DAMAGE	MAXIMUM CURRENT INPUT	MAXIMUM SERIES RESISTANCE	MINIMUM LEAKAGE RESISTANCE
T24	24VDC	20-30	200%	3 mA	6.5K	45K
T48	48VDC	40-60	200%	3 mA	5.0K	65K
T125	125VDC	105-140	135%	3 mA	5.0K	150K
TC24	24VDC	20-30	200%	3 mA	6.5K	45K
TC48	48VDC	40-60	200%	3 mA	5.0K	65K
TC125	125VDC	105-140	135%	3 mA	5.0K	150K
K24	24VDC	20-28	200%	3 mA	10K	25K
KC24	24VAC/DC	20-28	200%	3 mA	10K	25K
KC48	48VAC/DC	40-56	200%	3 mA	10K	50K
KC120	120VAC	100-130	115%	3 mA	10K	100K
KC125	125VDC	105-140	150%	3 mA	10K	100K
KC240	240VAC	210-250	110%	3 mA	10K	100K
	250VDC	210-260	110%	3 mA	10K	100K
KM120	120VAC/DC	105-130	110%	17 mA	N/A	N/A
KM240	240VAC/DC	210-250	110%	13 mA	N/A	N/A

Note:

Signal contact series resistance (maximum resistance of wiring and contacts to be recognized as a closed contact).

Signal input leakage resistance (minimum resistance in parallel to input terminals to be recognized as an open contact).

Maximum series resistance and minimum leakage resistance values are valid if field contact voltage is ± 15% of nominal.

Inputs of 24V or higher have been tested to meet or exceed the requirements of IEEE Std. 472-1974 and ANSI C.37.90-1978 without damage or false indication.

Isolation voltage rating for input opto-isolator is 1066 VRMS continuous and 1770 VRMS surge.

2.6 Response Time

Response time is defined as time between application of step voltage at signal input and recognition of the voltage change as an alarm. System will not respond to momentary signals shorter than response time. Standard response time is 20 mS ± 2.5 mS. When opto-isolated inputs are specified, the response time will be the specified response time *plus* 20-60mS. (See Para. 2.9).

2.7 Resolution Time

Resolution time is defined as minimum time between the start of two signals in a First-Out group required by the system to recognize only the first occurring signal as First-Out. Resolution time is 6 mS for standard time delay, and 25% of specified delay for other delay options. When opto-isolated inputs are used, resolution time is as above, *plus* 40 mS.

2.8 Relay Isolation

1500 VRMS from contacts to system common
750 VRMS across open contacts

2.9 Time Delay (Response Time)

Standard - 20 mS ±12.5%
"D1" Option - 50 mS ±12.5%
"D2" Option - 100 mS ±12.5%

2.10 Output Relay Ratings (Horn Relay, Reflash Relay) ("1E" Relays)

CONTACT RATING:

5A @ 250VAC or 28VDC RESISTIVE, SEALED RELAY (STANDARD, "1E" SEALED RELAY)
500 mA @ 125VAC or 28VDC LAMP LOAD
500 mA @ 125VDC RESISTIVE LOAD ONLY
125 mA @ 125VDC LAMP LOAD ONLY

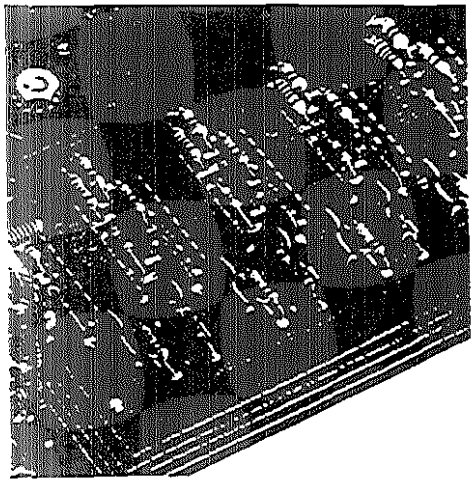
WARNING!
EXPOSURE TO SOME CHEMICALS MAY DEGRADE THE SEALING PROPERTIES. RELAYS SHOULD BE INSPECTED PERIODICALLY FOR SIGNS OF ATTACK (CRACKING, SWELLING, OR DEFORMATION). REPLACE P.C. BOARD IF DEGRADATION IS.OBSERVED.

RT 3

ERATIONAL SEQUENCES

e seven operating sequences are: AF, AFNL (non lock-in), AM, FR, FRM, TFS & TFSFR. dinarily all 10 points must be same sequence. However TFS and AF can be mixed on same unit. TFSFR and FR can also be mixed.

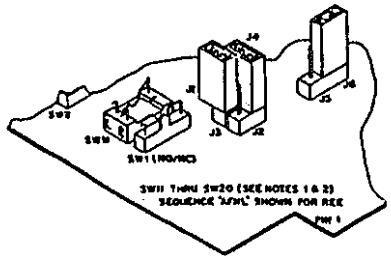
- AF - Basic Flashing (ISA Type A)
- AFNL - Basic Flashing, non-lock-in (ISA Type A-4)
- FR - Basic Flashing with Separate Horn Silence (ISA Type A-1-2)
- AM - Basic Flashing with Manual Reset (ISA Type M)
- FRM - Basic Flashing with Separate Horn Silence and Manual Reset (ISA Type M-1-2)
- TFS - Tri-Flash First Out Sequences (ISA Type F3A-3)
- TFSFR - Tri-Flash First Out with Separate Horn Silence (ISA Type F3A-1-2-3)



ctional test is included on all models. The annunciator may be tested at any time. If nts are in alarm when the test PB is pressed, all points will revert to initial alarm state rided points in alarm have been acknowledged (and flash reset, if applicable). Points in m with flashing lamps will not accept the test. If an alarm occurs while in a test uence, the point will re-alarm after ACK or after FLRST for sequences using the ST pushbutton. Alarms are never lost because of test, nor will the sequence be upset e system is tested while points are in alarm.

y one first-out group is available per Model 910 but a group terminal, "Z", is furnished hat some or all points in one cabinet may be grouped with some or all points of other del 910 cabinets. Up to 100 points may be so grouped.

uence selection is accomplished with proper placement of three jumpers. In addition, ngle-pole double-throw switch for each point is used to select points in a first-out up when TFS or TFSFR is employed. All ten points must operate in the same sequence ot that AF may be randomly mixed with TFS, or FR may similarly be mixed with FR.



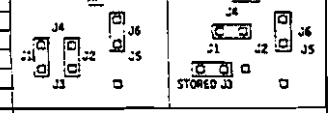
SEQUENCE JUMPER CONFIGURATIONS			
SEQUENCE	ISA TYPE	SW11-20 LEFT	SW11-20 RIGHT
AF	A		X
AFNL	A-4		X
FR	A-1-2		X
AM	M		X
FRM	M-1-2		X
TFS	F3A-3	X	
TFSFR	F3A-1-2-3	X	

NOTES:

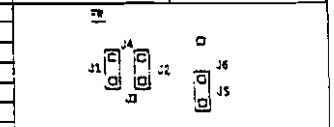
1. FOR FIRST-OUT SEQUENCE TFS OR TFSFR, PLACE SWITCHES SW11-20 IN "LEFT" POSITION. FOR ALL OTHER SEQUENCES PLACE SW11-20 IN "RIGHT" POSITION.
2. NORMALL, ALL 10 SWITCHES (SW11-20) MUST BE IN SAME POSITION, HOWEVER, AF MAY BE MIXED WITH TFS OR FR MAY BE MIXED WITH TFSFR BY FIRST PROGRAMMING JUMPERS FOR AF OR FR, THEN SELECTING FIRST OUT GROUP BY PLACING ANY OF SWITCHES 11 THROUGH 20 IN THE LEFT POSITION.

OPERATIONAL SEQUENCE 'AF & AFNL'		
INPUT STATUS	VISUAL	AUDIBLE
ALARM OR TEST	FLASHING	ON
ACKNOWLEDGE	STEADY-ON	OFF
RETURN TO NORMAL	OFF	OFF

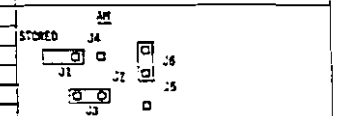
JUMPER DETAIL J1 THRU J6



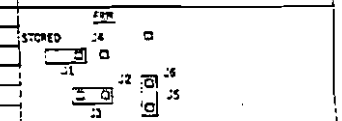
OPERATIONAL SEQUENCE 'FR'		
INPUT STATUS	VISUAL	AUDIBLE
ALARM OR TEST	FLASHING	ON
ACKNOWLEDGE	FLASHING	OFF
FLASH RESET	STEADY-ON	OFF
RETURN TO NORMAL	OFF	OFF



OPERATIONAL SEQUENCE 'AM'		
INPUT STATUS	VISUAL	AUDIBLE
ALARM OR TEST	FLASHING	ON
ACKNOWLEDGE	STEADY-ON	OFF
RETURN TO NORMAL	STEADY-ON	OFF
RESET	OFF	OFF

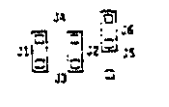


OPERATIONAL SEQUENCE 'FRM'		
INPUT STATUS	VISUAL	AUDIBLE
ALARM OR TEST	FLASHING	ON
ACKNOWLEDGE	FLASHING	OFF
FLASH RESET	STEADY-ON	OFF
RETURN TO NORMAL	STEADY-ON	OFF
RESET	OFF	OFF

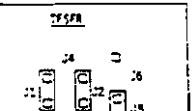


OPERATIONAL SEQUENCE 'TFS'			
INPUT STATUS	FIRST VISUAL	SUBSEQUENT VISUAL	AUDIBLE
1st ALARM OR TEST	INTERM.FAST FL		ON
SUBSEQUENT ALARM		FAST FLASH	ON
ACKNOWLEDGE	SLOW FLASH	STEADY-ON	OFF
FIRST RESET	STEADY-ON	STEADY-ON	OFF
RETURN TO NORMAL	OFF	OFF	OFF

JUMPER DETAIL J1 THRU J6



OPERATIONAL SEQUENCE 'TFSFR'			
INPUT STATUS	FIRST VISUAL	SUBSEQUENT VISUAL	AUDIBLE
1st ALARM OR TEST	INTERM.FAST FL		ON
SUBSEQUENT ALARM		FAST FLASH	ON
ACKNOWLEDGE	INTERM.FAST FL	FAST FLASH	OFF
FIRST RESET	SLOW FLASH	STEADY-ON	OFF
RETURN TO NORMAL	STEADY-ON	STEADY-ON	OFF
	OFF	OFF	OFF



ART 4

INPUT OPTIONS

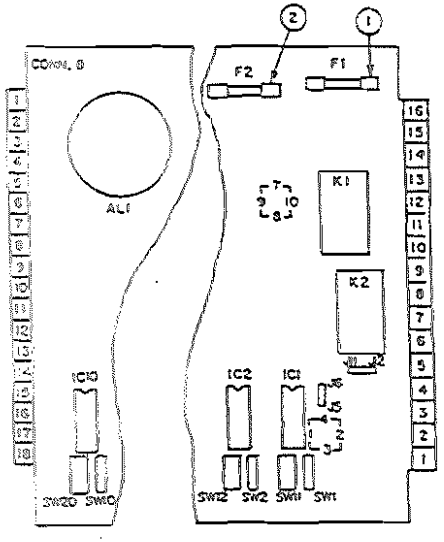
1 Input Power

Input power options include 120VAC/240VAC @ 50-60 Hz, 24VDC, 48VDC, 125VDC input isolated and 24VDC non-isolated with filter only.

POWER-ON INDICATOR AND FUSES

Models with T24, T48, T125 or K24 type inputs are designed to operate from the internal field contact supply. On these models the input power line is fused as well as the field contact output voltage. The power-on indicator, (green LED) monitors the internal logic supply voltage. Therefore, if the F1 fuse blows or input power is lost, the power-on LED will go off.

Models designed for external customer supplied FC voltage (TC24, TC48, TC125, KC24, KC48, KC120, KC125, KM120, KM240) are supplied with the power-on LED connected to monitor logic supply and input power only, and the FC fuse is not used. The user should ascertain that his field contact supply is properly fused according to system and other requirements.



① INPUT POWER	INTERNAL	FUSE RATING CHART	
INPUT VOLTAGES	FUSE	RATING	P/N
24VDC	F1	1/2A 250V	110738
120VAC	F1	2/10A 250V S.B.	110698
230VAC	F1	1/16A 250V S.B.	110699
24VDC ISOLATED	F1	1/2A 250V S.B.	110739
48VDC ISOLATED	F1	1/4A 250V S.B.	110732
100-280VDC ISOLATED	F1	2/10A 250V S.B.	110698

FC (+) SUPPLY IS FUSED INTERNALLY AS SHOWN BELOW. FUSE IS NOT IN CIRCUIT IF CUSTOMER PROVIDES F.C. POWER SUPPLY

② SIGNAL CONTACT	INTERNAL	FUSE RATING CHART	
INPUT VOLTAGES	FUSE	RATING	P/N
ALL	F2	1/8A AGC 3AG	110797

MAIN PRINTED CIRCUIT BOARD

4.2 Switch Contact Input

Standard input is an internal resistor network designed to couple a voltage level into the field contact input of the custom integrated circuit. Since the input of the IC is high impedance, a large isolating resistor is used between the resistor network and the IC. The IC is therefore protected from large noise spikes which might be present on field contact wiring, and is also immune to overvoltage or misapplication of voltage.

T12 - SWITCH CONTACT INPUT, 12VDC (internally supplied FC voltage)
T24 - SWITCH CONTACT INPUT, 24VDC (internally supplied FC voltage)
T48 - SWITCH CONTACT INPUT, 24VDC (internally supplied FC voltage)
T125 - SWITCH CONTACT INPUT, 48VDC (internally supplied FC voltage)
TC24 - SWITCH CONTACT INPUT, 24VDC (cust. supplied FC voltage)
TC48 - SWITCH CONTACT INPUT, 48VDC (cust. supplied FC voltage)
TC125 - SWITCH CONTACT INPUT, 125VDC (cust. supplied FC voltage)

4.3 Optically Coupled Input

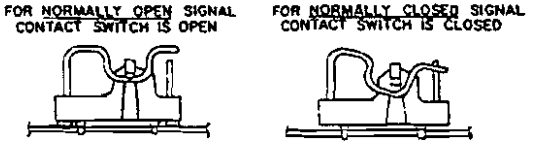
Optional opto-isolated inputs include internal current-limiting resistors feeding into a bridge circuit so that the input may be either AC or DC voltage. The output of the bridge is filtered and drives the input of the opto-isolator. The output of the opto-isolator is connected to the input of the IC. The integral field contact supply is a nominal 24 VDC only. It is isolated from the logic supply. When used with T24, T48 or T125 inputs, FCC(-) must be connected to OV on the rear terminal blocks. With K24 & all "KC" and "KM" opto-isolated inputs, this connection is not used.

The negative side of the field contact supply is internally connected to one side of each bridge input and the positive side is connected per wiring diagrams (Paragraphs 8.3, 8.4, 8.5.) The customer may use his own supply for field contact voltages by ordering TC24, TC48, or TC125; or KC24, KC48, KC120, KC125, KM120 or KM240 input options. For TC inputs, the negative side of the power supply must be connected to the OV terminal. For KC inputs the negative side is connected to the FCC(-) terminal. Note that factory jumpers are installed based on input type ordered, and wiring must be in accordance with the wiring diagram for that type input.

KC12 - OPTICALLY COUPLED, 12VDC (cust. supplied FC voltage)
K24 - OPTICALLY COUPLED, 24VDC (internally supplied FC voltage)
KC24 - OPTICALLY COUPLED, 24VAC/VDC (cust. supplied FC voltage)
KC48 - OPTICALLY COUPLED, 48VAC/VDC (cust. supplied FC voltage)
KC120 - OPTICALLY COUPLED, 120VAC (cust. supplied FC voltage)
KC125 - OPTICALLY COUPLED, 125VDC (cust. supplied FC voltage)
KM120 or 240 (Series Contact Monitoring), Ref. Paragraph 8.5

4.4 NO/NC Selection

SW1 thru SW10 are used to select (NO) or (NC) operation.



4.5 Input Time Delay

The standard input time delay (which requires no model number distinction) is factory set at 20 mS. If 50 mS input is required specify "D1" as part of your model number. If 100 mS input delay is required specify "D2". (Input time delay is not field selectable).

PART 5

OUTPUT OPTIONS

5.1 Sealed Relay

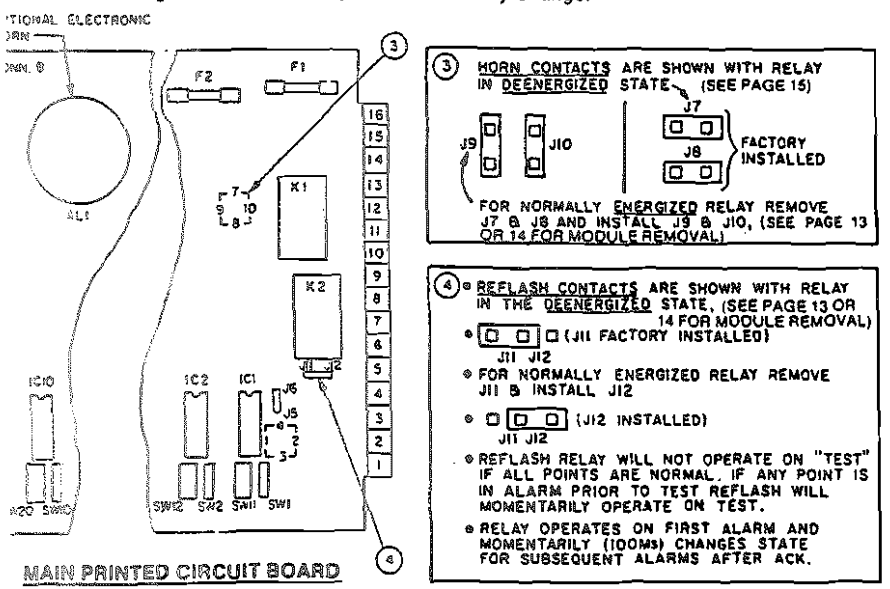
The standard relay output options (horn relay & reflash relay) use sealed relays. Specify "E1" as part of your model number. Relay ratings are detailed in the specification section of this manual.

5.2 Horn Relay

The horn relay is driven from the internal horn bus through a set of field-changeable jumpers to select normally energized or normally de-energized relay operation. Form "C" contacts are brought out to the main terminal block for complete flexibility in connecting an external horn.

5.3 Reflash Relay

The reflash relay operates on first alarm. After ACK, it momentarily changes state (100 mS) on subsequent alarms. The reflash relay will not operate on test if all points are clear. However, if test is activated while an alarm is present and acknowledged, the reflash relay will momentarily change.

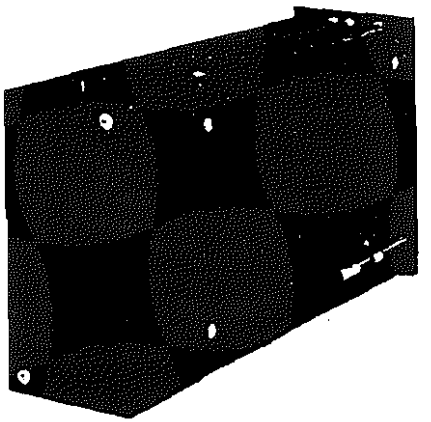


MAIN PRINTED CIRCUIT BOARD

5.4 Integral Horn

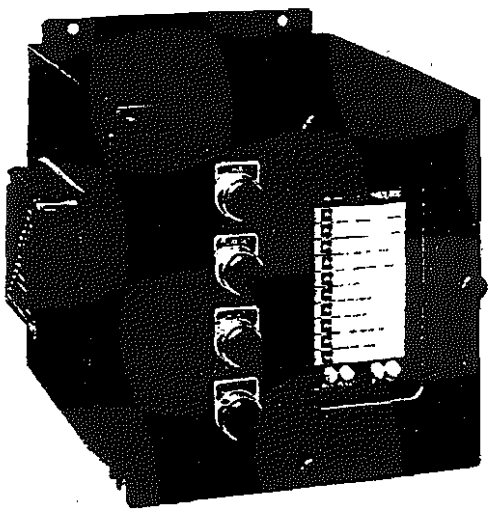
The Model 910 annunciator is supplied with a horn relay. If an integral horn is required, option "H1" must be specified as part of the model number. The integral horn sound output is approximately 75 db at 10 feet.

Enclosure Options



6.1 Wiring Box

The standard Model 910 annunciator includes rear mounted terminals which are exposed to ease customer field wiring. If enclosed terminals are preferred, specify Option "WB1" which will allow access via removeable rear cover plate.

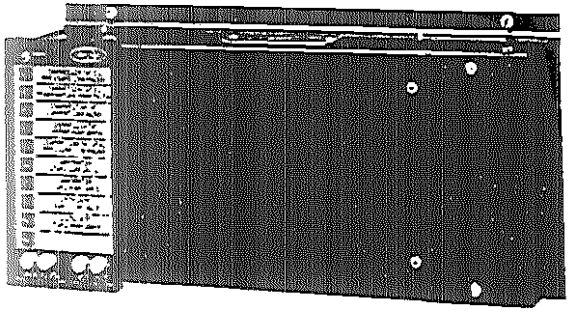


6.2 Surface Mount Cabinet

When the Model 910 annunciator is to be subjected to harsh environment or when the standard flush mounting is not acceptable, specify option "SM4". This is a surface mount cabinet which is designed to meet Nema 4 and Nema 12 application conditions. Option "SM4X" is option "SM4" with a corrosion resistant cabinet. Option "SMP420" is a Nema 4 housing containing two Model 910 annunciators (20 points).

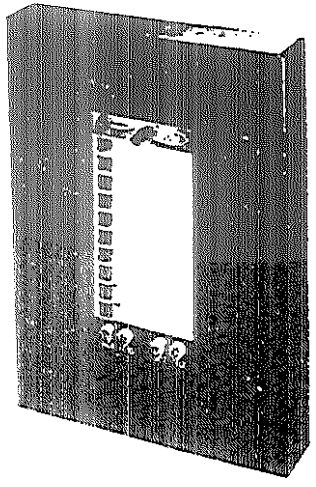
Note: Pushbuttons and horn must be ordered separately. They are not automatically furnished as part of the SM* option.

N Mount Cabinet

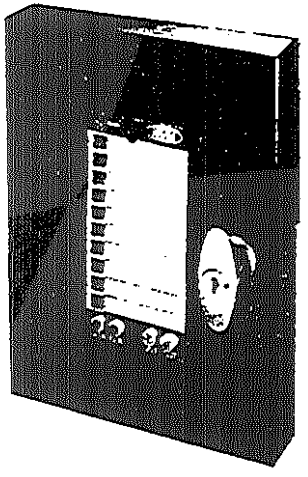


MODEL 910 — WM* NEMA 1 WALL MOUNT
*WM1 FOR T, K, TC OR KC SIGNAL INPUTS
WM2 FOR KM SIGNAL INPUTS

ertight Doors



MODEL 910DT1
FOR NEMA 4
APPLICATIONS



MODEL 910DH1
FOR NEMA 12
APPLICATIONS

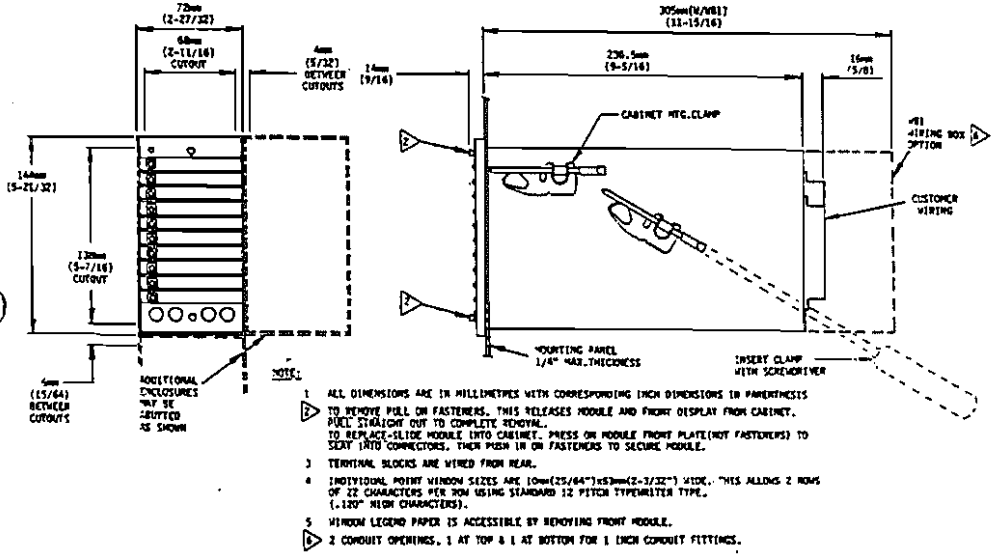
PART 7

MOUNTING & INSTALLATION

7.1 Flush Mount Cabinet

Physically, the front panel of the annunciator is a standard DIN size of 72 x 144 mm and is designed for panel mounting in a standard DIN cutout of 68 x 138 mm. The unit is mounted with DIN type clamps (43 835, Form B). Behind the panel depth is approximately 252 mm, or 305 mm if an optional wiring box is added.

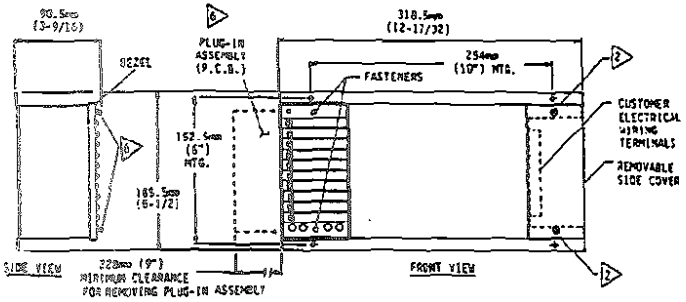
To mount a Model 910 annunciator, remove DIN clamps and insert assembly into the cutout from the front. Push the annunciator all the way through the cutout. Slip the DIN clamp fastener on the end of a ⅛" straight blade long shank screwdriver (minimum 10" long). Engage front slot of clamp to front screw head at about a 45° angle. Pivot clamp and screwdriver up to engage the rear clamp slot to the rear screwhead. Now tighten clamp against the front panel, turning clockwise with the screwdriver. (See detail below).



To achieve desired system operation, the user may be required to set user changeable options by moving various jumpers and changing switch positions on the internal printed wiring board. To check or change these options or to gain access to the slip-out window legend card, it will be necessary to remove the front display and internal logic assembly module from the annunciator enclosure. This assembly removal is accomplished by pulling out on the two front panel fasteners approximately 3 mm to disengage them and then continuing to pull straight out to withdraw the complete internal assembly.

After the nameplate legend card is completed and installed, and after all jumpers and switches are placed in their proper position for desired NO/NC field switch operation, lock-in option selection, first-out group selection, relay(s) energized/de-energized operation and annunciator sequence selection, the internal assembly may be reinserted into the enclosure. Slide the printed wiring board into the internal enclosure guides and push in on the module front plate (not the disengaged fasteners) until the module assembly is fully seated into the rear connectors. The two fasteners should then be pushed in to reengagement position to secure the module in place.

Wall Mount Cabinet

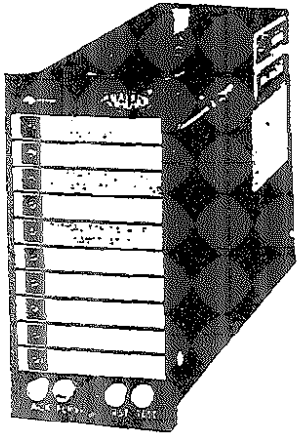


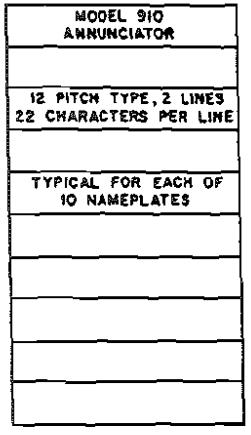
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES WITH CORRESPONDING INCH DIMENSIONS IN PARENTHESES.
2. TWO CONDUIT OPENINGS, ONE AT TOP & ONE AT BOTTOM FOR ONE INCH CONDUIT FITTINGS.
3. TERMINAL BLOCKS ARE WIRED FROM THE RIGHT SIDE.
4. INDIVIDUAL POINT WINDOW SIZES ARE 10mm(25/64") x 53mm(2-1/32"). THIS ALLOWS TWO ROWS OF 22 CHARACTERS PER ROW USING STANDARD 12 PITCH TYPEWRITER TYPE.(120" HIGH CHARACTERS).
5. WINDOW LEGEND PAPER IS ACCESSIBLE BY REMOVING FRONT DISPLAY.
6. REMOVE PLUG-IN ASSEMBLY AS FOLLOWS:
   A. PULL FRONT DISPLAY STRAIGHT OUT USING THE FASTENERS.
   B. GRASP TOP AND BOTTOM OF BEZEL ASSEMBLY AND PULL STRAIGHT OUT.
   C. PULL PLUG-IN ASSEMBLY OUT FROM LEFT SIDE OF ENCLOSURE.

   TO REPLACE, REVERSE ABOVE PROCEDURE EXCEPT WHEN REINSTALLING FRONT DISPLAY. PRESS ON FRONT PLATE (NOT FASTENERS) TO SEAT DISPLAY INTO CONNECTOR, THEN PUSH IN ON FASTENERS.

Legend Card

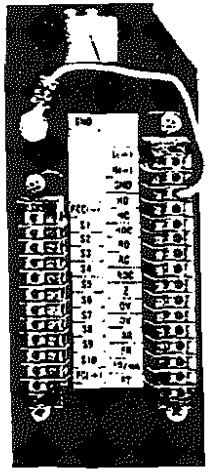




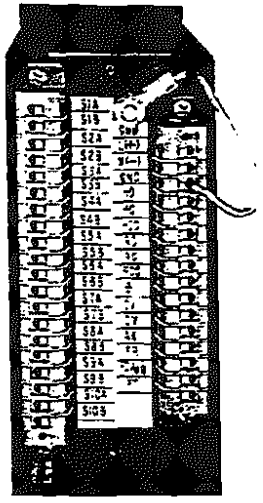
ends for point identification are provided by a slip-out card behind a clear overlay. ends may be typed or printed by any legible means. Each legend area is 10 x 53 mm and easily accommodate two lines of typing or printing with up to 22 characters per line.

PART 8

WIRING



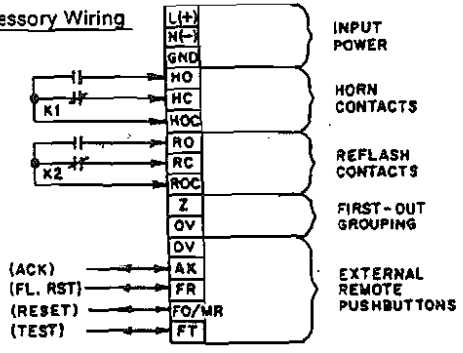
T, K, TC, KC Signal Input Version



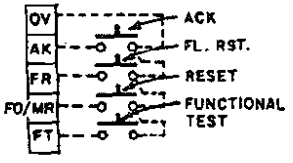
KM Signal Input Version

Two terminal blocks are used for all external connections. One twelve-point block (twenty-point on KM version) includes 10 inputs and connections for field contact supply. The other terminal block is 16 points and includes input power, horn relay contact out, reflash relay contact out, group bus terminal, and terminals for external or interconnecting pushbuttons. Both horn relay and reflash relay may be operated in a normally de-energized or normally energized mode by placement of internal jumpers.

8.1 Accessory Wiring

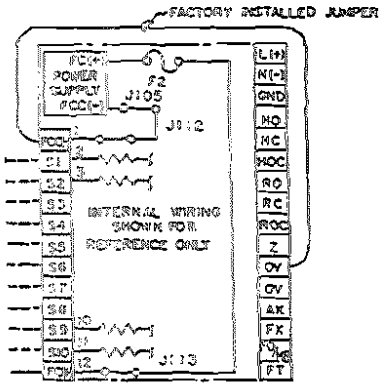


EXTERNAL PUSHBUTTONS FOR REMOTE LOCATIONS CAN BE WIRED AS SHOWN IN ADDITION TO THE INTEGRAL PUSHBUTTONS.



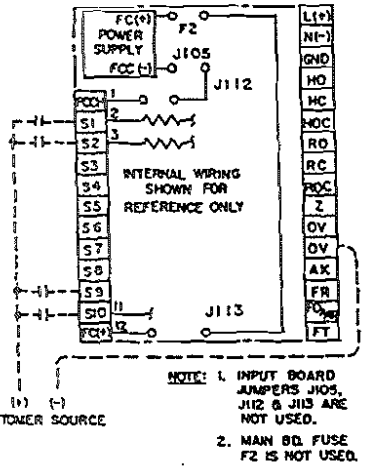
If more than one Model 910 is employed, each model may operate with a separate sequence but with common pushbuttons. Integral pushbuttons are always operational but connections for remote PB's are furnished. When remote PB's are used, either the integral or the remote PB's will operate the annunciator. With multiple Model 910's, if the pushbuttons are wired together externally, any of the integral or remote PB's will operate all annunciators. Removal of an annunciator module wired in common with others will not affect operation of the remaining units.

"T" & "TC" Type Signal Inputs



NOTE: JUMPERS J105, J112 & J113 ARE FACTORY INSTALLED ON INPUT BOARD.

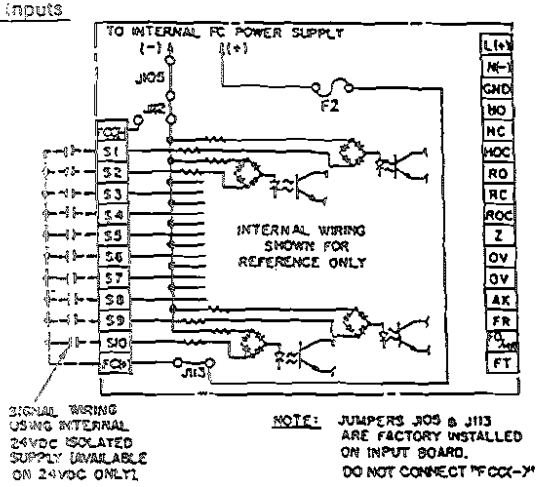
"T24", "T48", OR "T125" INPUT (SWITCH CONTACT)
WIRING DIAGRAM WITH INTERNALLY SUPPLIED
"FC" VOLTAGE (24, 48, OR 125 VDC ONLY)



NOTE: 1. INPUT BOARD JUMPERS J105, J112 & J113 ARE NOT USED.
2. MAIN BD. FUSE F2 IS NOT USED.

TYPE "TC24", "TC48", OR "TC125" INPUT (SWITCH CONTACT)
WIRING DIAGRAM WITH CUSTOMER SUPPLIED
"FC" VOLTAGE (24, 48 OR 125 VDC ONLY)

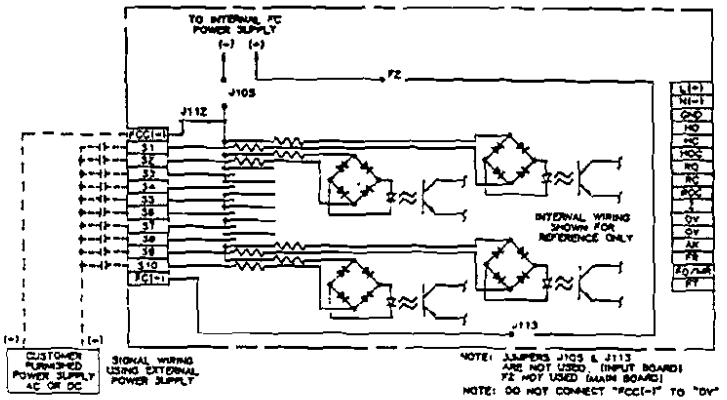
"K" Type Signal Inputs



NOTE: JUMPERS J105 & J113 ARE FACTORY INSTALLED ON INPUT BOARD.
DO NOT CONNECT "FCC(-)" TO "OV"

TYPE "K24" INPUT (OPTICALLY COUPLED)
WIRING DIAGRAM WITH INTERNALLY SUPPLIED
"FC" VOLTAGE (24 VDC)

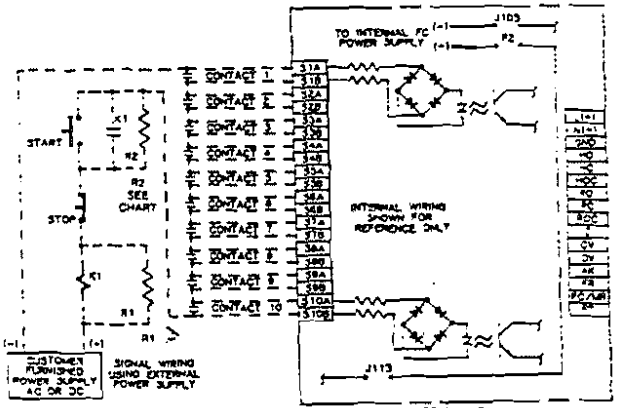
8.4 "KC" Type Signal Inputs



NOTE: JUMPERS J105 & J113 ARE NOT USED. (INPUT BOARD)
F2 NOT USED (MAIN BOARD)
NOTE: DO NOT CONNECT "FCC(-)" TO "OV"

TYPE "KC24", "KC48", "KC120", "KC125" OR "KC240" INPUT (OPTICALLY COUPLED)
WIRING DIAGRAM WITH CUSTOMER SUPPLIED
"FC" VOLTAGE, (24VAC/VDC, 48VAC/DC, 120VAC, 125VDC, 240VAC/250VDC)

8.5 "KM" Type Signal Inputs



NOTE: JUMPERS J105 & J113 ARE NOT USED. (INPUT BOARD)
F2 NOT USED (MAIN BOARD)

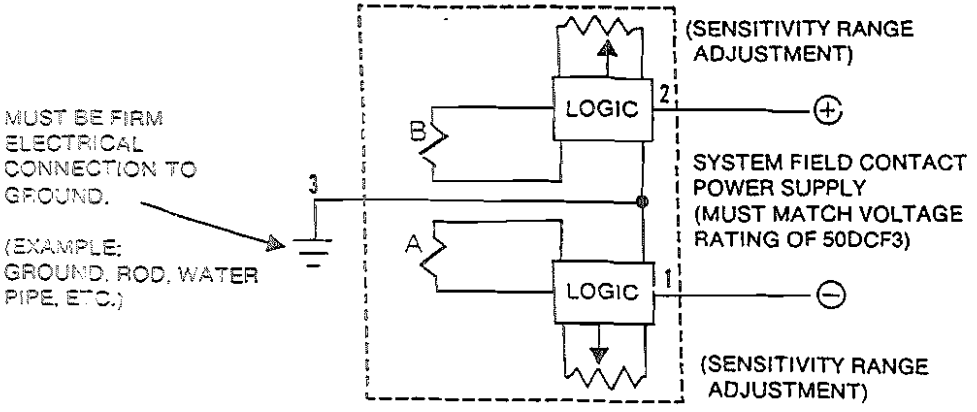
TYPE "KM120" OR "KM240" INPUT (CONTACT MONITORING)
WIRING DIAGRAM WITH CUSTOMER SUPPLIED
"FC" VOLTAGE, 120VAC/DC, 240VAC/DC

INPUT TYPE	INPUT VOLTAGE	R2 VALUE
KM120	120VAC/DC	15K ohm, 2W
KM240	240VAC/DC	30K ohm, 3W

NOTES:
1. From one to ten contacts may be monitored when wired as shown.
2. Set all inputs used for contact monitoring to "N.O." (SW1-10 Open)
3. Combination of K1 and R1 (when required) must meet the following requirement:
   KM120 — Maximum impedance $\leq$ 10K ohm, Minimum holding current $\geq$ 20 mA. Power dissipation for R1 (when required) may be found by dividing 18225 by the resistance in ohms.
   KM240 — Maximum impedance $\leq$ 20K ohm, Minimum holding current $\geq$ 15 mA. power dissipation for R1 (when required) may be found by dividing 70225 by the resistance in ohms.
4. All contacts shown de-energized. Series contacts and K1 contact are closed in normal operation.

8.6 GROUND FAULT MONITORS

SIMPLIFIED WIRING DIAGRAM

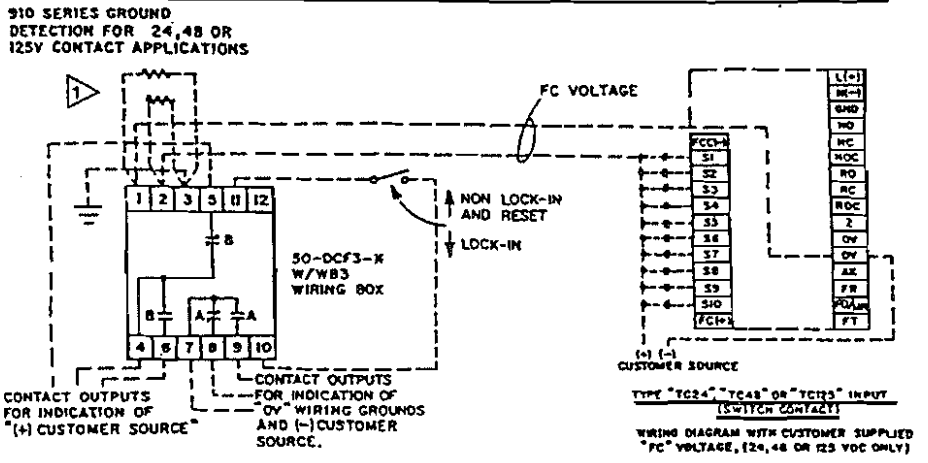


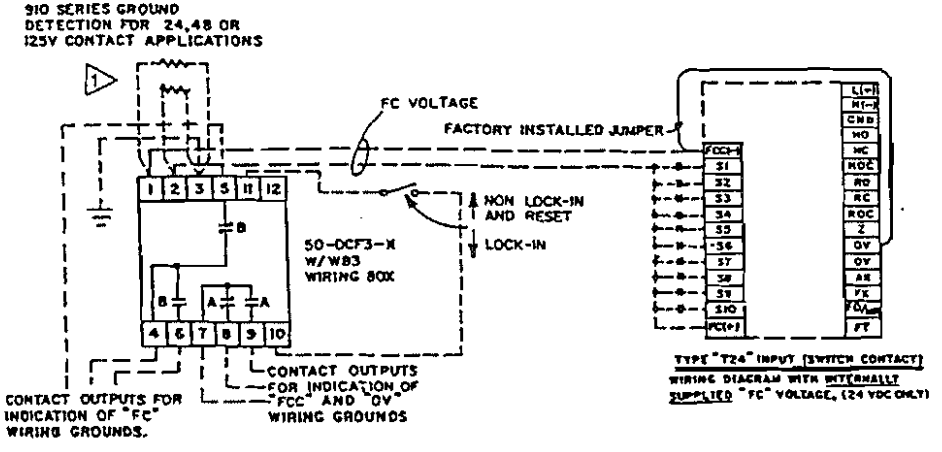
MODEL VOLTAGE	DETECTION RANGE	LABEL MARKING
24 V DC	25k ohm TO 500k ohm	WB-3
48 V DC	25k ohm TO 500k ohm	↓
125 V DC	250k ohm TO 1.5M ohm	↓
▷ 120 V AC	40K ohm TO 260K ohm WITH EXTERNAL 150k ohm RESISTORS	WB-3/150k/150k

OPERATING DATE: (X=ENERGIZED)			
50 - DCF3* ALL VOLTAGES			
FAULT RESISTANCE	FAULT LOCATION GND TO	RELAY "A"	RELAY "B"
> "SET" VALUE	NONE	—	—
0 OHMS TO "SET" VALUE	PLUS (TERM 2)	—	X
0 OHMS TO "SET" VALUE	MINUS (TERM 1)	X	—

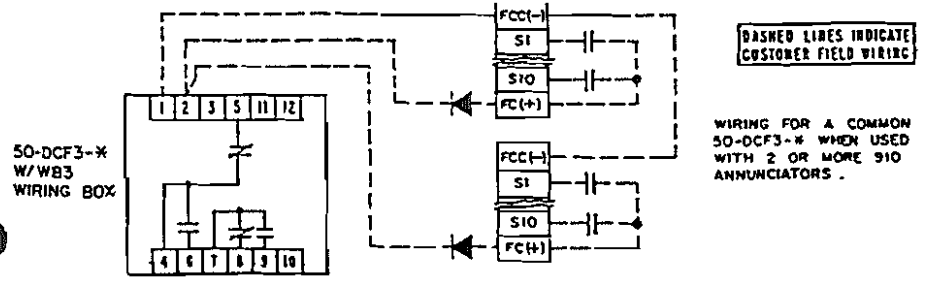
8.6 (continued)

910 SERIES GROUND DETECTION FOR 24, 48 or 125V CONTACT APPLICATIONS





WIRING FOR A COMMON 50-DCF3-* WHEN USED WITH TWO OR MORE 910 ANNUNCIATORS



TROUBLESHOOTING GUIDE FOR MODEL 910

SYMPTOM	PROBABLE CAUSE
1. NO LEDS ON	FUSE F1, F2 OR POWER WIRING
2. NO ALARMS	FCC(-) TO OV WIRE MISSING MODEL "T24" INPUTS ONLY. NOTE: DO NOT WIRE FOR "TC", "K" OR "KC" INPUTS, CHECK WIRING TO FIELD CONTACT SUPPLY FOR ALL OTHER TYPE INPUTS.
3. REMOTE PUSHBUTTONS INOPERATIVE	CHECK WIRING. MAKE SURE PUSHBUTTON COMMON IS CONNECTED TO OV.
4. SEQUENCE INCORRECT	CHECK JUMPER POSITIONS AND SW11-SW20 FOR CORRECT POSITION.
5. NORMAL POINT IN ALARM	CHECK NO/NC SWITCH FOR CORRECT POSITION.
6. NO EXTERNAL HORN	CHECK WIRING TO HO, HC, HOC
7. REFLASH INOPERATIVE	CHECK WIRING TO RO, RC, ROC

SUPPLIER DOCUMENT SUBMITTAL

DP 2/23/01

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-001N	REV: 87	DATE: 22-Feb-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
David R. Opalka
SIGNATURE: David R. Opalka

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Denise Wenk DATE: 2/23/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16900-001N	1						X			Kobald Float Switch O&M		X		16900	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
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Tim Cherry	525				
Jim Jenkins	525				
Mike Godbee	64				
Bob Knapp	525				
B. Scott Wheeler	525				
Geosyntec Consultants	38				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [illegible] DATE 3/05/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

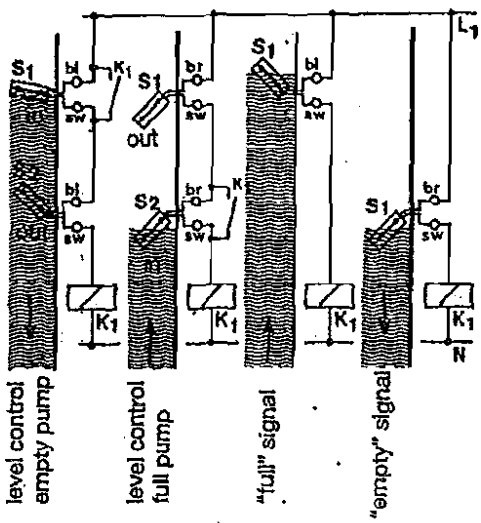
ORIGINAL

Description

Application

Series NSM, NSP, NSE and NST float switches enable liquid levels to be monitored easily.
By installing at least 2 floats, one as a minimum, the other as a maximum contact maker, filling levels may also be controlled.
The switches can be installed wherever magnetic liquid level switches are unsuitable due to the risk of the float jamming with dirt particles or the formation of deposits.
Even extremely aggressive, hot, dirty or pulp-like media may be monitored with these float switches (depending on the shape and material of the float).

Applications



Construction

The float consists of a hollow cylinder or sphere with an integral mercury or micro-switch.
The contact is supplied as a changeover contact, to be connected as a normally open or normally closed contact as desired.
The contact operates when the level rises above or falls below the horizontal float position.
The switching point is fixed by installing the switch horizontally at the required position or by clamping the cable.
When installing from above the switching point is fixed using weights.

Summary of types

Type NSM:

Material: Polypropylene
Contact: Microswitch
max. temperature: 60° C
max. pressure: 1 bar

Type NSP:

Material: Polyethylene
Contact: Mercury switch
max. temperature: 90° C
max. pressure: 2 bar

Type NST:

Material: Teflon
Contact: Mercury switch
max. temperature: 160° C
max. pressure: 1 bar

Type NSE:

Material: Stainless steel
Contact: Mercury switch
max. temperature: 160° C
max. pressure: 15 bar

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate Transmission System Project
STAVER # 7052

Submittal # 641-16900-001N
Reviewed By: DEO
Date: 2/22/01

~~N~~A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [signature] Date: 3/05/01

Electrical connection: "DRY" CONDITION

Contact function with a rising level:

cable – black/brown = contact closed
cable – black/blue = contact open

Types NSM and NSE are supplied with a yellow/green protective sheath.

INFORMATION ONLY

Contact relay:

We recommend in general the use of a contact relay with our float switches.
- especially for personal protection when in contact with the liquid.
- for liquid level control with a lock-up relay

Type MSR 10: 1 changeover contact
Type MSR 20: 2 changeover contacts
Type MSR 11: 1 changeover contact, lock up

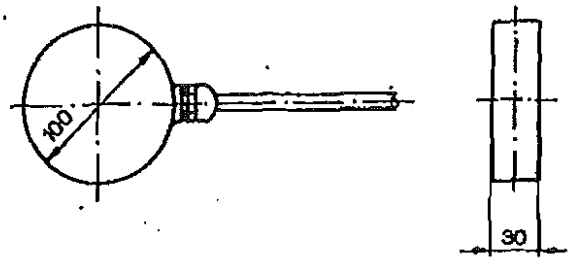
Order data:

	NSPO	2 m	PVC	R 2"	PVC
Type:					
Cable length (m):					
Cable material:					
Thread:					
Thread material:					

Standard Types

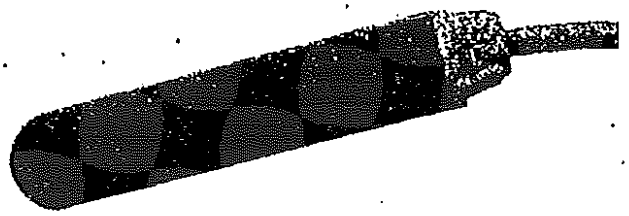
Type NSM...: Polypropylene

Type NSM -5101

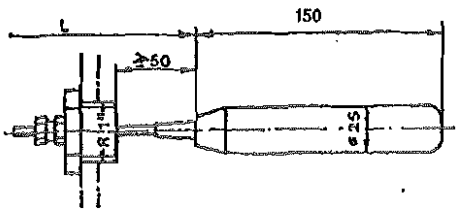


Application:	Reasonably priced float switch for liquids such as oils, solvents, weak acids and alkalis.
Installation:	From above in an open container
Material:	Polypropylene float Polyamide cable gland
Cable:	2 m Neoprene
max. pressure:	1 bar
max. temperature:	60° C
Contact:	microswitch, changeover-function medium density: > 0,6 kg/l

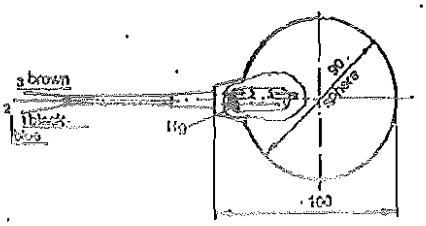
Type NSP...: Polyethylene



Float switch Type NSPO-NSPO-R 1"



Float switch Type NSPK



Application:	For all types of liquids eg. dirty water, oil, weak acids and alkalis.
Installation:	External, using a R 1" cable gland. The float may be installed from above in an open container. The switching point is fixed using weights.
Float material:	Polyethylene
Cable:	Standard 2 m PVC cable (3×0,75²) Special execution silicon, oilflex, teflon cable, teflon wire, PVC cable with ethylene polymer sheathing.
max. pressure:	Type NSPO 1 bar Type NSPK 2 bar
max. temperature:	60° C 90° C silicon or teflon cable
medium density:	Type NSPO > 0,9 kg/l Type NSPK > 0,8 kg/l
Contact:	mercury switch, may be connected as a normally closed or normally open contact.

SUPPLIER DO ...NT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-002	REV: 0	22-Feb-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: R Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Denise Wentz DATE: 2/23/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION A	B	C
8	641-16900-002	0						X			**Quality Certification**			X	16900	X		
											GLI Level Transmitter							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Jim Cherry	52-5				
Jim Jenkins	52-5				
Mike Godber	104				
Rob Kneup	52-5				
B. Scott Wheeler	52-5				
GeoSyntec Consultants	28				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: MW Gill DATE 3/05/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

Quality Statement VH 1 NoPTH

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If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 8-28-00 Q.A. Technician: GA

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 690L0F5A0AN
LEVEL TRANSMITTER, 3 WIRE,
24VDC, ALUM ENC & TAG
Serial# 20000803069

INFORMATION ONLY

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16900-002
Reviewed By: [illegible]
Date: 2/22/01

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 3/05/01

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It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

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This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Model # 690L0F5A0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 20008003073

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Tell us how we did:

Did your instrument arrive on time?	☐ Yes	☐ No
Is your shipment complete and correct?	☐ Yes	☐ No
Is your instrument in good working order?	☐ Yes	☐ No
Is the operating manual clear and concise?	☐ Yes	☐ No

Comments/Suggestions: _____

Classify your industry:

- ☐ Drinking Water
- ☐ Wastewater Treatment
- ☐ Pharmaceuticals
- ☐ Pulp & Paper
- ☐ Pure Water/Water Purification
- ☐ Chemical Process
- ☐ Power Utility
- ☐ Metals Industry
- ☐ Food Processing
- ☐ Other _____

Briefly describe your process application and conditions: _____

Quality Statement

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 8-28-00 Q.A. Technician: GH

North VH #2

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 690L0F5A0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 20000803067

Quality Statement

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 8-28-00 Q.A. Technician: GH

South VH #2

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Conductivity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 690L0F5A0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 200008030068

Quality Statement

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at **www.gliint.com**

Quality Inspection Date: 8 28-00 Q.A. Technician: M.H

North VH #3

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 690L0F5A0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 20000803070

Quality Statement

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 8-28-00 Q.A. Technician: GH

Sath ##3

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 690L0F5R0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 2000080307 1

Quality Statement VH #4 SOUTH

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 5-28-00 Q.A. Technician: GLA

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 690L0F5A0FN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 20000803074

Quality Statement VH #4 NORTH

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 8-28-00 Q.A. Technician: [illegible]

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 690L0F5A0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 20000803072

Quality Statement

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at **www.gliint.com**

Quality Inspection Date: 8-28-00 Q.A. Technician: [illegible]

South VH#5

Thank You for purchasing instrumentation from GLI International

---

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 690L0F5A0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 200008003075

Quality Statement

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 8-28-00 Q.A. Technician: G.H

North VH #5

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 6S0L0F5A0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 20000803076

Quality Statement

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 8-28-00 Q.A. Technician: G.H

North VH #5

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 690L0FSA0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC,ALUM ENC & TAG
Serial# 20008003076

Quality Statement

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 8-28-00 Q.A. Technician: [illegible]

South VA #6

Thank You for purchasing instrumentation from GLI International

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Electrodeless Conductivity
- ☐ Ultrasonic Flow
- ☐ Turbidity
- ☐ Contacting Conductivity
- ☐ Dissolved Oxygen
- ☐ Flow
- ☐ Suspended Solids
- ☐ Residual Chlorine
- ☐ Level
- ☐ Sludge Blanket Level
- ☐ Other _____

Model# 690L0F5A0AN
LEVEL TRANSMITTER,3 WIRE,
24VDC, ALUM ENC & TAG
Serial# 200008C3077

Quality Statement

It is the goal of GLI International to produce and deliver products and services that consistently meet or exceed the expectations of our customers.

If you require assistance, please call your GLI Representative, the GLI Technical Support Group at (800) 543-8907, or send e-mail to info@gliint.com. For additional information about GLI International, our products and technologies, visit us at ***www.gliint.com***

Quality Inspection Date: 8-28-00 Q.A. Technician: GH

North VH #6

Thank You for purchasing instrumentation from GLI International

---

Product Registration Card

Please take a moment to fill out this card.
This information helps us to understand your needs and keep you informed regarding new products and programs.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone ( ) _____
Fax ( ) _____
E-mail _____

Please check the appropriate category to receive additional product information:

- ☐ pH/ORP
- ☐ Turbidity
- ☐ Flow
- ☐ Level
- ☐ Electrodeless Conductivity
- ☐ Contacting Conductivity
- ☐ Suspended Solids
- ☐ Sludge Blanket Level
- ☐ Ultrasonic Flow
- ☐ Dissolved Oxygen
- ☐ Residual Chlorine
- ☐ Other _____

Model# 590L0FSR0AN
LEVEL TRANSMITTER, 3 WIRE,
24VDC, ALUM ENC & TAG
Serial# 200008030278

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-003	REV: 0	Feb. 26, 2001	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Denise Wentz DATE: 2/27/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
3	641-16900-003	0						X			Instrumentation Calibration Info.		X		16900			

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Jim Cherry	52-5				
Jim Jenkins	52-5				
Mike Godber	64				
Rob Knepp	52-5				
B. Scott Wheeler	52-5				
GeoSyntec Consultants	38				

RECEIVED
MAR 0 1 2001

NO COMMENTS: X
COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE 3/6/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

STAVER

e Staver Group, Inc.
271 East 2nd St.
Franklin, Ohio 45005

February 23, 2001

Willie Frazier
Fluor Fernald, Inc.
P.O. Box 538704
Cincinnati, Ohio 45253-8704

Re: Field Calibration Reports
Contract No. FSC – 641
OSDF Permanent Leachate
Transmission System Project

Dear Mr. Frazier:

As required by specification section 16900, all instruments have been field calibrated as required per manufacturer instructions. Listed below are the parameter settings as required for each instrument. All necessary O&M manuals and available factory calibrations have been submitted which detail all operating and service information.

Please call with any questions.

Sincerely,
The STAVER Group, Inc.

David R. Opalka
Project Manager

cc: file

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16900-003
Reviewed By: DW
Date: 2/26/01

Tel (513) 743-7995

Fax (513) 743-5873

FIELD CALIBRATION DATA

Contrec Rate Totalizer Model 202D.44L

CAL00 = 0	CAL09 = 0
CAL01 = 0	CAL10 = 0
CAL02 = 100000	CAL11 = 0
CAL03 = 0.02	CAL12 = 0
CAL04 = 3	CAL13 = 0
CAL05 = 1	CAL14 = 0
CAL06 = 1	CAL15 = 0
CAL07 = 2	CAL16 = 300
CAL08 = 1	CAL17 = 0

Apollo Intelligent Meters

PRO 9

CODE = 66 **Re-Sets all Apollo meters to base settings (clears settings)**

IMP23160 - Level Indicators

PRO 2

dECPNt = 0.00
round = 0.01
SCALE=YES
DSP1 = 0
INP1 = 4
DSP2 = 100
INP2 = 20

IMP20162 - Flow Rate/Totalizers

PRO 2

dECPNt = 0.00
round = 0.01
SCALE=YES
DSP1 = 0
INP1 = 4
DSP2 = 300
INP2 = 20
SEGt = 1

PRO 5

dECPNt = 0.0
tBase = 1
SCLFAC = 0.140
Lo-cut = 0.00

GLI International, Inc. - Model 690L Level Transmitter

Calibrated per Section 2 of the GLI O&M manual

SUPPLIER DOC' T SUBMITTAL

FDF PROJE... 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-004	REV: 21	DATE: 19-Mar-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
David R. Opalka
SIGNATURE: [signature]

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Denise Wenz DATE: 3/20/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16900-004A	1						X			Digital Pr. Recorder Factory Calibraion (TROLL 4000)		X		16900	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Tim Cherry	52-5				
Jim Jenkins	52-5				
Mike Godber	164				
Rob Kneup	52-5				
Z. Scott Wheeler	52-5				
Geo Syntec Consultants	138				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE 3/22/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

In-Situ Inc.

INFORMATION ONLY

TO: Dave Opalka
COMPANY: The Staver Group
PHONE:
FAX: 513-648-~~4118~~ 4187

FROM: Jason Evans
E-MAIL: jason@in-situ.com
PHONE: 800-446-7488
FAX: 307-721-7598

Number of Pages: 5 **Date:** Monday, March 19, 2001

Dear Mr. Opalka:

Please accept this fax as confirmation that the Ruska Instrument s/n 53144 was in fact the instrument used to calibrate the following Troll 4000's:

Troll 4000 Serial Numbers

13778
13777
14061
14046
13779
13780
14035
14040
14039
14041
14042
14043

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16900-004A
Reviewed By: DRO
Date: 3/19/01

Thank you and fee free to contact me if I may be of further assistance.

Sincerely,

JASON

Jason Evans
Technical Support Manager

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 3/22/01

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-004	REV: 0	Feb. 26, 2001	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: R Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Denise Wentz DATE: 2/27/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION A	B	C
8	641-16900-004A	0						X			Digital Pressure Recorder Factory Cal.		X		16900		X	
8	641-16900-004B	0						X			Flowmeter Factory Calibration		X		16900			X

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Tim Cherry	52-5				
Jim Jenkins	52-5				
Mike Godber	64				
Rob Kneip	52-5				
B. Scott Wheeler	52-5				
GeoSyntec Consultants	38				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

A - In Situ documentation needs to state that instrument (Serial # 53144) was used to calibrate Troll Instruments (list by serial number) - MWG 3/05/01

B - Metron documentation does not correspond to installed flow meters and does not meet spec. requirements - MWG 3/05/01

RECEIVED BY: MW Griffin DATE 3/05/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

RUSKA

A Druck Company

Ruska Instrument Corporation • 10311 Westpark • Houston TX 77042 • Phone: 713 975 0547 • FAX: 713 975 6358

CALIBRATION REPORT 00071353144

Digital Pressure Controller

for

In-Situ, Inc.
210 South 3rd Street
Laramie, WY 82070
USA

Date of Issue: July 13, 2000
Sales Order: 203190
Manufacturer: Ruska Instrument Corporation
Serial Number: 53144

Page: 4 of 4
ID Number: 002803
Model Number: 7215xi
Full Scale Pressure: 100 psi gauge

STATEMENT OF ACCURACY

Preceding the calibration, the elastic element of this gauge was exercised. The horizontal plane of reference for pressure measurement is at the top edge of the front panel for instruments without an external reference mark, or the center of the pointer pivot for all instruments with a pointer.

The Ruska transfer standards used to calibrate this instrument are PC-59, PC-49, WS-98 and WS-42. The calibration and traceability of Ruska transfer standards are maintained according to Ruska Instrument Corporation Quality Policy. At the time of calibration, the environmental conditions were 19 °C, 57 %RH and 101 kPa. The best estimate of gravitational acceleration at the site of calibration is 9.7927783 m/s². The calibration procedure CS-125 satisfies the requirements of ANSI/NCSL Z540-1-1994, ISO 9001 and MIL-STD-45662A.

The two sigma rss uncertainty in the pressure generated using these standards is estimated to be less than or equal to 15 ppm or 0.00002 psi, whichever is greater, for negative and barometric pressures and 23 ppm for positive pressure. The reported values are traceable to the National Institute of Standards and Technology

This report shall not be reproduced, except in full, without the written permission of the issuing laboratory.

INFORMATION ONLY

Calibrated by: Chris A. Bortz
Calibration Technician
Calibration Service Center

Reviewed by: Greg A. Hume
Supervisor
Calibration Service Center

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-[illegible]
Reviewed By: [illegible]
Date: 2/21/01

[ ] A - Conforms to the Subcontract Requirements
[X] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
By: [illegible] Date: 3/05/01

RUSKA

A Druck Company

Ruska Instrument Corporation • 10311 Westpark • Houston TX 77042 • Phone: 713 975 0547 • FAX: 713 975 6338

CALIBRATION REPORT 00071353144

Digital Pressure Controller

for

In-Situ, Inc.

210 South 3rd Street
Laramie, WY 82070
USA

Date of Issue: July 13, 2000
Sales Order: 203190
Manufacturer: Ruska Instrument Corporation
Serial Number: 53144

Page: 1 of 4
ID Number: 002803
Model Number: 7215xi
Full Scale Pressure: 100 psi gauge
Full Scale Negative Pressure: −14.5 psi gauge

As Left Calibration Data

Calibration Date	July 11, 2000
Sensor Temperature	50.00 °C
Calibration Medium	nitrogen

Applied psi	Displayed psi
14.50000	14.50004
−7.25000	−7.25000
0.00000	−0.00001
5.00000	5.00005
10.00000	10.00004
20.00000	19.99998
40.0000	39.9992
70.0000	70.0005
100.0000	99.9993

NOTES: The instrument was inoperable as received, hence no as found data was observed.

RUSKA

A Druck Company

Ruska Instrument Corporation • 10311 Westpark • Houston TX 77042 • Phone: 713 975 0547 • FAX: 713 975 6338

CALIBRATION REPORT 00071353144

Digital Pressure Controller

for

In-Situ, Inc.

210 South 3rd Street
Laramie, WY 82070
USA

Date of Issue: July 13, 2000
Sales Order: 203190
Manufacturer: Ruska Instrument Corporation
Serial Number: 53144

Page: 2 of 4
ID Number: 002803
Model Number: 7215xi
Full Scale Pressure: 100 psi gauge

Calibration Coefficients

K1F 5	K10 306	K11 0.497354	K12 10155
K1H 7565059	K1L 3412310	K2F 4	K20 -363
K21 0.996874	K22 23481	K2H 7400903	K2L 3720290
K3F 0	K4F 0	K5F 4	K50 0
K51 1.028797	K52 -236803	K5H -17938	K5L -4567656
K6F 5	K60 0	K61 0.520659	K62 -53765
K6H 7249384	K70 69	K71 1.028908	K6L -141781
K72 -204937	K7H 7211306	K7L 3614308	K7F 4
K80 0			

RUSKA

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CALIBRATION REPORT 00071353144

Digital Pressure Controller

for

In-Situ, Inc.

210 South 3rd Street
Laramie, WY 82070
USA

Date of Issue: July 13, 2000
Sales Order: 203190
Manufacturer: Ruska Instrument Corporation
Serial Number: 53144

Page: 3 of 4
ID Number: 002803
Model Number: 7215xi
Full Scale Pressure: 100 psi gauge

Full Scale Pressure: 16.5 psi absolute (Barometric Option)

As Left Calibration Data

Calibration Date: July 11, 2000
Calibration Medium: nitrogen

Applied psi	Displayed psi
11.0000	11.0003
13.0000	13.0002
15.0000	15.0000

Calibration Coefficients

C0 0.022189

C1 1.000025

NOTES: The Instrument was inoperable as received, hence no as found data was observed.

In-Situ Inc.

TO:	Dave Opalka	**FROM:**	Jason Evans
COMPANY:	The Staver Group	**E-MAIL:**	jason@in-situ.com
PHONE:		**PHONE:**	800-446-7488
FAX:	513-~~594 8520~~ 648-4187	**FAX:**	307-721-7598
Number of Pages:	5	**Date:**	Friday, February 23, 2001

In-Situ needs to provide documentation that states 53144 was used to calibrate serial#s

13778	14038
13777	14040
14061	14039
14046	14041
13779	14042
13780	14043

3/05/01

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16900-005	REV: 1	DATE: 23-Mar-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
David R. Opalka
SIGNATURE: David R. Opalka

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Jarrett DATE: 3/26/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16900-005	1						X			Instrumentation Field Calibration		X		16900	X		
											Report							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Jim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Bob Knepp	525				
Scott Wheeler	525				
Kwasi Badu-Tweneboah	38				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [illegible] DATE 3/30/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-66900-005
Reviewed By: DBO
Date: 3/23/01

Instrument
Field Calibration Report
The STAVER Group, Inc.
EPLTS Project - FSC-641

VALVE HOUSE 1 **Date Calibrated: March 06, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-106	INPUT	Contrec FT-103
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.94gpm	4.80mA	1 pulse@ 30 sec	14.91gpm	4.80mA
29.96gpm	5.60mA	1 pulse@ 15 sec	29.92gpm	5.60mA
59.45gpm	7.17mA	1 pulse@ 7.5 sec	59.61gpm	7.17mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level LI -104	INPUT	Apollo LDS Level LI -101
0.00%	4.00mA	0.00%
50.00%	12.00mA	50.01%
100.00%	20.00mA	100.01%

Apollo LCS Total/Rate FQI - 106	INPUT	Apollo LDS Total/Rate FQI - 103
0.00gpm	4.00mA	0.00gpm
150.00gpm	12.00mA	150.00gpm
300.00gpm	20.00mA	300.00gpm

VALVE HOUSE 2 **Date Calibrated: March 07, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-206	INPUT	Contrec FT-203
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.93gpm	4.80mA	1 pulse@ 30 sec	14.97gpm	4.80mA
29.91gpm	5.60mA	1 pulse@ 15 sec	29.89gpm	5.60mA
59.62gpm	7.18mA	1 pulse@ 7.5 sec	59.71gpm	7.18mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level LI -204	INPUT	Apollo LDS Level LI -201
0.00%	4.00mA	0.00%
50.00%	12.00mA	50.01%
100.00%	20.00mA	100.00%

Apollo LCS Total/Rate FQI - 206	INPUT	Apollo LDS Total/Rate FQI - 203
0.00gpm	4.00mA	0.00gpm
150.02gpm	12.00mA	150.00gpm
300.01gpm	20.00mA	300.02gpm

INFORMATION ONLY

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 3/30/01

VALVE HOUSE 3 **Date Calibrated: March 06, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-306		INPUT	Contrec FT-303	
7.48gal		(1) 3.6 v Pulse	7.48gal	
149.61gal		(20) 3.6 v Pulse	149.61gal	
299.23gal		(40) 3.6 v Pulse	299.23gal	
Rate Test	Output	INPUT	Rate Test	Output
14.92gpm	4.80mA	1 pulse@ 30 sec	14.93gpm	4.80mA
29.96gpm	5.60mA	1 pulse@ 15 sec	29.87gpm	5.60mA
59.55gpm	7.18mA	1 pulse@ 7.5 sec	59.49gpm	7.18mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level LI -304	INPUT	Apollo LDS Level LI -301
0.00%	4.00mA	0.00%
50.01%	12.00mA	50.00%
100.00%	20.00mA	100.01%

Apollo LCS Total/Rate FQI - 306	INPUT	Apollo LDS Total/Rate FQI - 303
0.00gpm	4.00mA	0.00gpm
150.00gpm	12.00mA	150.00gpm
300.01gpm	20.00mA	300.00gpm

VALVE HOUSE 4 **Date Calibrated: March 07, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-406		INPUT	Contrec FT-403	
7.48gal		(1) 3.6 v Pulse	7.48gal	
149.61gal		(20) 3.6 v Pulse	149.61gal	
299.23gal		(40) 3.6 v Pulse	299.23gal	
Rate Test	Output	INPUT	Rate Test	Output
14.92gpm	4.80mA	1 pulse@ 30 sec	14.93gpm	4.80mA
29.93gpm	5.60mA	1 pulse@ 15 sec	29.89gpm	5.60mA
59.65gpm	7.18mA	1 pulse@ 7.5 sec	59.81gpm	7.19mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level LI -404	INPUT	Apollo LDS Level LI -401
0.00%	4.00mA	0.00%
50.00%	12.00mA	50.00%
100.01%	20.00mA	100.01%

Apollo LCS Total/Rate FQI - 406	INPUT	Apollo LDS Total/Rate FQI - 403
0.00gpm	4.00mA	0.00gpm
150.01gpm	12.00mA	150.00gpm
300.00gpm	20.00mA	300.00gpm

VALVE HOUSE 5 **Date Calibrated: March 07, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-506	INPUT	Contrec FT-503
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.93gpm	4.80mA	1 pulse@ 30 sec	14.95gpm	4.80mA
29.89gpm	5.60mA	1 pulse@ 15 sec	29.91gpm	5.60mA
59.65gpm	7.19mA	1 pulse@ 7.5 sec	59.68gpm	7.19mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level LI -504	INPUT	Apollo LDS Level LI -501
0.00%	4.00mA	0.01%
50.00%	12.00mA	50.00%
100.00%	20.00mA	100.00%

Apollo LCS Total/Rate FQI - 506	INPUT	Apollo LDS Total/Rate FQI - 503
0.00gpm	4.00mA	0.00gpm
150.00gpm	12.00mA	150.00gpm
300.01gpm	20.00mA	300.01gpm

VALVE HOUSE 6 **Date Calibrated: March 07, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-606	INPUT	Contrec FT-603
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.97gpm	4.80mA	1 pulse@ 30 sec	14.97gpm	4.80mA
29.98gpm	5.60mA	1 pulse@ 15 sec	29.87gpm	5.60mA
59.71gpm	7.19mA	1 pulse@ 7.5 sec	59.64gpm	7.19mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level LI -604	INPUT	Apollo LDS Level LI -601
0.00%	4.00mA	0.00%
50.01%	12.00mA	50.00%
100.01%	20.00mA	100.00%

Apollo LCS Total/Rate FQI - 606	INPUT	Apollo LDS Total/Rate FQI - 603
0.00gpm	4.00mA	0.00gpm
150.00gpm	12.00mA	150.00gpm
300.00gpm	20.00mA	300.00gpm

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJE.	CONTRACT NO:	SUBMITTAL NO:	REV:		PAGE
20111	FSC - 641	16900-005	0	12-Mar-01	1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: R Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Jeema Kyrus DATE: 12 March 2001

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION A	B	C
8	641-16900-005	0						X			**Instrumentation Field Calibration Report**		X		16900	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin (Approver)	525				
Jim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Bob Weis	525				
Scott Wheeler	525				
Kuari Bau-Tuneebah (Westinghouse)	38				

NO COMMENTS: X

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

ORIGINAL

RECEIVED BY: Mike Griffin DATE 3/13/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641 16900-005
Reviewed By: RW
Date: 3/12/01

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 3/13/01

Instrument Field Calibration Report
The STAVER Group, Inc.
EPLTS Project - FSC-641

VALVE HOUSE 1 **Date Calibrated: March 06, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-103	INPUT	Contrec FT-106
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.94gpm	4.80mA	1 pulse@ 30 sec	14.91gpm	4.80mA
29.96gpm	5.60mA	1 pulse@ 15 sec	29.92gpm	5.60mA
59.45gpm	7.17mA	1 pulse@ 7.5 sec	59.61gpm	7.17mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level	INPUT	Apollo LDS Level
0.00%	4.00mA	0.00%
50.00%	12.00mA	50.01%
100.00%	20.00mA	100.01%

Apollo LCS Total/Rate	INPUT	Apollo LDS Total/Rate
0.00gpm	4.00mA	0.00gpm
150.00gpm	12.00mA	150.00gpm
300.00gpm	20.00mA	300.00gpm

INFORMATION ONLY

VALVE HOUSE 2 **Date Calibrated: March 07, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-103	INPUT	Contrec FT-106
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.93gpm	4.80mA	1 pulse@ 30 sec	14.97gpm	4.80mA
29.91gpm	5.60mA	1 pulse@ 15 sec	29.89gpm	5.60mA
59.62gpm	7.18mA	1 pulse@ 7.5 sec	59.71gpm	7.18mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level	INPUT	Apollo LDS Level
0.00%	4.00mA	0.00%
50.00%	12.00mA	50.01%
100.00%	20.00mA	100.00%

Apollo LCS Total/Rate	INPUT	Apollo LDS Total/Rate
0.00gpm	4.00mA	0.00gpm
150.02gpm	12.00mA	150.00gpm
300.01gpm	20.00mA	300.02gpm

VALVE HOUSE 3 **Date Calibrated: March 06, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-103	INPUT	Contrec FT-106
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.92gpm	4.80mA	1 pulse@ 30 sec	14.93gpm	4.80mA
29.96gpm	5.60mA	1 pulse@ 15 sec	29.87gpm	5.60mA
59.55gpm	7.18mA	1 pulse@ 7.5 sec	59.49gpm	7.18mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level	INPUT	Apollo LDS Level
0.00%	4.00mA	0.00%
50.01%	12.00mA	50.00%
100.00%	20.00mA	100.01%

Apollo LCS Total/Rate	INPUT	Apollo LDS Total/Rate
0.00gpm	4.00mA	0.00gpm
150.00gpm	12.00mA	150.00gpm
300.01gpm	20.00mA	300.00gpm

VALVE HOUSE 4 **Date Calibrated: March 07, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-103	INPUT	Contrec FT-106
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.92gpm	4.80mA	1 pulse@ 30 sec	14.93gpm	4.80mA
29.93gpm	5.60mA	1 pulse@ 15 sec	29.89gpm	5.60mA
59.65gpm	7.18mA	1 pulse@ 7.5 sec	59.81gpm	7.19mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level	INPUT	Apollo LDS Level
0.00%	4.00mA	0.00%
50.00%	12.00mA	50.00%
100.01%	20.00mA	100.01%

Apollo LCS Total/Rate	INPUT	Apollo LDS Total/Rate
0.00gpm	4.00mA	0.00gpm
150.01gpm	12.00mA	150.00gpm
300.00gpm	20.00mA	300.00gpm

VALVE HOUSE 5 **Date Calibrated: March 07, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-103	INPUT	Contrec FT-106
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.93gpm	4.80mA	1 pulse@ 30 sec	14.95gpm	4.80mA
29.89gpm	5.60mA	1 pulse@ 15 sec	29.91gpm	5.60mA
59.65gpm	7.19mA	1 pulse@ 7.5 sec	59.68gpm	7.19mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level	INPUT	Apollo LDS Level
0.00%	4.00mA	0.01%
50.00%	12.00mA	50.00%
100.00%	20.00mA	100.00%

Apollo LCS Total/Rate	INPUT	Apollo LDS Total/Rate
0.00gpm	4.00mA	0.00gpm
150.00gpm	12.00mA	150.00gpm
300.01gpm	20.00mA	300.01gpm

ALVE HOUSE 6 **Date Calibrated: March 07, 2001**

Calibration Equipment No.: Transcat 23200E #9710084 4/28/01

Contrec FT-103	INPUT	Contrec FT-106
7.48gal	(1) 3.6 v Pulse	7.48gal
149.61gal	(20) 3.6 v Pulse	149.61gal
299.23gal	(40) 3.6 v Pulse	299.23gal

Rate Test	Output	INPUT	Rate Test	Output
14.97gpm	4.80mA	1 pulse@ 30 sec	14.97gpm	4.80mA
29.98gpm	5.60mA	1 pulse@ 15 sec	29.87gpm	5.60mA
59.71gpm	7.19mA	1 pulse@ 7.5 sec	59.64gpm	7.19mA

Calibration Equipment No.: Altek 334 #223063 11/02/01

Apollo LCS Level	INPUT	Apollo LDS Level
0.00%	4.00mA	0.00%
50.01%	12.00mA	50.00%
100.01%	20.00mA	100.00%

Apollo LCS Total/Rate	INPUT	Apollo LDS Total/Rate
0.00gpm	4.00mA	0.00gpm
150.00gpm	12.00mA	150.00gpm
300.00gpm	20.00mA	300.00gpm

ELECTRICAL TESTING AND RESULTS

- Electrical Testing Procedures
- Calibration Certificates
- Continuity Checks
- Ground Resistance Tests
- Pole Megger Tests
- Pole Mounted Transformer Tests

ELECTRICAL TESTING PROCEDURES

SUPPLIER DOC SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16050-001	REV: 1	DATE: 14-Jul-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.

Ron Wood

SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Erika Jarrett DATE: 7/17/00

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	641-16050-001	1						X			Electrical Testing Procedures		X		16050	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Tim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Bob Kreip	525				
Scott Wheeler	525				
Kwasi Baw Tweneboah	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

See note on ground resistance test procedure

RECEIVED BY: [signature] DATE 8/3/00

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)

CFC - CERTIFIED FOR CONSTRUCTION

INF - INFORMATION/RECORD

DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)

A - Conforms to Subcontract Requirements

B - Minor Comments - Incorporate and Resubmit

C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

B & J ELECTRICAL COMPANY, Inc.

INDUSTRIAL AND COMMERCIAL CONTRACTOR

6316 WIEHE ROAD CINCINNATI, OHIO 45237 PHONE (513) 351-7100 FAX (513) 351-7101

CONTINUITY CHECK TEST PROCEDURE

Contact Construction Manager 24 hrs. prior to test.

Record all information on forms provided.

Send copies to Construction Manager & keep one copy for our file for future reference.

If defective items are found repair or replace per Construction Manager's instruction.

Contact the supplier of the equipment &/or material to allow them to repair &/or replace the defective item.

Upon receipt of the wire check for any physical defects.

Compare the wire to approved submittal & drawing/spec. requirements.

Use an OHM meter to check continuity of wire.

List cable I.D. number.

List the number of conductors.

Take one end of the wire & ground it.

Ground the meggar at the other end of the wire.

Send a signal over the wire to the other end.

Receive a return signal either through the conduit or through another wire.

If you do not receive a return signal you have continuity problems. This serves as the insulation resistance test for shielded cable.

Re-test item until it performs proper function or is determined to be defective.

List test result.

List equipment number.

Verify test results with Construction Manager.

[✓] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: MWD Date: 8/3/00

INFORMATION ONLY

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16050-001
Reviewed By: [illegible]
Date: 7/14/00

B & J ELECTRICAL COMPANY, Inc.

INDUSTRIAL AND COMMERCIAL CONTRACTOR

6316 WIEHE ROAD CINCINNATI, OHIO 45237 PHONE (513) 351-7100 FAX (513) 351-7101

Insulation Resistance Test Procedure

Contact Construction Manager 24 hrs. prior to test.

Record all information on forms provided.

Send copies to Construction Manager & keep one copy on file for future reference.

If defective items are found either repair or replace per the Construction Manager's instructions.

Contact the supplier of the equipment and/or material to replace or repair the defective item.

Compare wire to approved submittal & drawing/spec. requirements.

Check wire reels for any damage & note accordingly.

Check continuity of all wires.

Use a calibrated meggar for test: 1000V meggar 600V insulation (could include 120/220V wiring)

List equipment name & number on report sheet.

Put the leads on the conductors.

Push the meggar button.

Send voltage through the wire to see if there is any break in the insulation.

Take action when the reading is less than 100 meg OHMs or when multiple readings indicate a significant downward trend in resistance readings.

Take a meggar reading between the phases.

Take a meggar reading between the ground & each phase/neutral conductor.

Re-test item until it performs per the proper function or is determined to be defective.

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16050-001
Reviewed By: D
Date: 7/14/00

B&J ELECTRICAL CO., INC.

6316 WIEHE ROAD
CINCINNATI, OHIO 45237
(513) 351-7100

b Number _____
Job Name _____

Date _____
Supervisor _____

INSULATION RESISTANCE TEST FOR FEEDER CABLES

TEST DATA	WIRE GAGE	EQUIPMENT FROM:	EQUIPMENT TO:	CONTINUITY ALL WIRES	PHASE A TO GROUND	PHASE B TO GROUND	PHASE C TO GROUND	PHASE A TO B	PHASE A TO C	PHASE B TO C	NEUTRAL TO GROUND/ PHASE B

INSPECTED BY SUPERVISOR _____ DATE _____

INSPECTED BY QA _____ DATE _____

ACCEPTED BY QA _____ DATE _____

Date Calibrated: _____ Calibration Due: _____

B & J ELECTRICAL COMPANY, Inc.

INDUSTRIAL AND COMMERCIAL CONTRACTOR

6316 WIEHE ROAD CINCINNATI, OHIO 45237 PHONE (513) 351-7100 FAX (513) 351-7101

GROUND RESISTANCE TEST PROCEDURE

Contact Construction Manager 24 hours prior to test.

Record all information on test forms.

Send copies to Construction Manager and keep one copy for our file for future reference.

If defective items are found either repair or replace per the Construction Manager's instruction.

Contact the supplier of the equipment and/or material to allow them to repair or replace the defective item.

Re-test item until it performs per the proper function.

Prior to ground resistance test physically check all grounding to make sure that grounding is properly installed.

Check all grounds for tight connections.

Check all ground wires to visually verify that the wire is not cut in half.

Use an earth ground resistance tester OHMER which is calibrated.

Drive stakes 50' & 100' away from ground grid and/or power pole butt plate/ground wire.

Test the resistance between the stakes and the ground grid, maximum resistance is 5 Ohms.

Verify resistance with the Construction Manager.

If ground resistance reports do not meet the Construction Manager's approval install extra ground rods per Construction Manager's instructions and specifications. Record final resistance. MW 8/3/00

Accurately record location of ground grid on As-built drawings.

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16050-001
Reviewed By: [illegible]
Date: 7/14/00

B&J ELECTRICAL CO. INC.

6316 WIEHE RD.
Cincinnati, Ohio 45237
(513) 351-7100

Ground Resistance Test Report

Drawing Number	Test Point/Location	Resistance

Test Type _____
Test Instrument I.D. # _____
Inspected by B&J Sup. _____ Date _____
Inspected by QA _____ Date _____
Calibration Date _____

CALIBRATION CERTIFICATES

SUPPLIER DOC ENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16400-006	REV: 0	08-Dec-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Barrett DATE: 12/11/00

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16400-006A	0						X			B&J Electric- Test Instruments		X		16400	X		
											Certificates of Calibration							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Jim Cherry	525				
Jenkins, Jim	525				
Mike Gather	161				
Rob Kneip	525				
Scott Wheeler	525				
Kwasi Bru Tuzneboah	38				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE 12-14-00
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

FIELD APPARATUS SERVICE & TESTING CORPORATION

Electrical Systems Specialists

6078 Rt. 128, Suite #4, Miamitown, Ohio 45041 • Fax: (513) 353-9389 • Office: (513) 353-9399

Certificate of Calibration

This certifies that the following equipment has been tested and the accuracy meets or exceeds specifications. All standards used are traceable to N.I.S.T.

EQUIPMENT TYPE: DIG1 Ground Megger

MFG: AEMC

MODEL: DIG1 Ground Vomeg

SERIAL #: 60407

FULL SCALE ACCURACY: +/- 1%

CALIBRATION DATE: 10/19/00

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate Transmission System Project
STAVER # 7052

Submittal # 641-16400-006
Reviewed By: RW
Date: 12/8/00

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: MW Date: 12-14-00

INFORMATION ONLY

Trace Number: F00084001
Calibration By: JS
Reviewed By: Jeffrey Jones

FIELD APPARATUS SERVICE & TESTING CORPORATION
Electrical Systems Specialists
6088 Rt. 128, Suite #3, Miamitown, Ohio 45041 • Fax: (513) 353-9399 • Office: (513) 353-9399

ELECTRICAL EQUIPMENT INSPECTION REPORT

CUSTOMER	B & J Electric	JOB #	00-0840
OWNER		DATE	10/19/00
EQUIPMENT TYPE	Ground Megger		
ID	98078401		
MFG	AEMC		
MODEL	D1G1 Ground Vomeg		
SN	60407		
VOLTS	0-600 VAC	HERTZ	
	Meg Ohm 1-100 DC	PHASE	
	Ohms 0-2000		
CALIBRATION INSTR USED	Fluke F0601 /		
CALIBRATION INSTR SN	75100719 / Fixed Resistors		
DATE CALIBRATED	6/28/00		
EQUIP CALIBRATION			
DATE OF LAST CALIBRATION			

PART ID Check:	Range:	AS FOUND	AS LEFT
Voltmeter	FS 600 VAC		+/- 1%
Meg Ohms @ 500 VDC	FS 100 meg ohm		+/- 1%
Ground Resistance Low	FS 20 ohm		+/- 1%
Ground Resistance	FS 2000 ohm		+/- 1%
Test Leads		OK	OK

ACCEPT / REJECT EXPLAIN

NEXT CALIBRATION DUE 4/19/01

REMARKS

TECHNICIAN JS

FIELD APPARATUS SERVICE & TESTING CORPORATION
Electrical Systems Specialists

6078 Rt. 128, Suite #4, Miamitown, Ohio 45041 • Fax: (513) 353-9389 • Office: (513) 353-9399

Certificate of Calibration

This certifies that the following equipment has been tested and the accuracy meets or exceeds specifications. All standards used are traceable to N.I.S.T.

EQUIPMENT TYPE: Insulation Tester

MFG: Greenlee

MODEL: 5778

SERIAL #: 8BU0150RA

FULL SCALE ACCURACY: +/- 2.0%

CALIBRATION DATE: 10/19/00

Trace Number: F00084002
Calibration By: JS
Reviewed By: Jeffrey Jones

FIELD APPARATUS SERVICE & TESTING CORPORATION
Electrical Systems Specialists
6088 Rt. 128, Suite #3, Miamitown, Ohio 45041 • Fax: (513) 353-9399 • Office: (513) 353-9399

ELECTRICAL EQUIPMENT INSPECTION REPORT

CUSTOMER	B & J Electric	JOB #	00-0840
OWNER	Same	DATE	10/19/00
EQUIPMENT TYPE	G Insulation Tester		
ID	F 99031601		
MFG	Greenlee		
MODEL	5778		
SN	8BU0150RA		
VOLTS	250 / 500 / 1000 DC	HERTZ	-
KW	-	PHASE	
AMPS	-		
CALIBRATION INSTR USED	Fluke F0601 / Fixed Resistors		
CALIBRATION INSTR SN	75100719 /		
DATE CALIBRATED	6/28/00 /		
EQUIP CALIBRATION			
DATE OF LAST CALIBRATION			

PART ID	AS FOUND	AS LEFT
Volts 250	0 - 260	+/- 2.0%
500	0 - 530	+/- 2.0%
1,000	0 - 1100	+/- 2.0%
Meg Ohms X .5, X 1, X 2	+/- 1.0	All Ranges

ACCEPT REJECT EXPLAIN

NEXT CALIBRATION DUE 4/19/01

REMARKS

TECHNICIAN JS

CONTINUITY CHECKS

FDF PROJECT #: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16050-002	REV: 1	19-Mar-01	PROD #7084 Vol 5

FROM: The S[illegible]/ER GROUP, Inc.
Ron Wood
SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Jarrett DATE: 3/20/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16050-002	1						X			VH 1-6 & CVH		X		16050	X		
											Continuity Checks							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Tim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Bob Kneip	525				
Scott Wheeler	525				
Kwasi Badu-Tweneboah	38				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [illegible] DATE 3/22/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.

Cinti., OH 45237

Control Cable Continuity Check

Cable ID #	Number of Conductors	Continuity	Equipment #
VH1 Secondary	#4 Triplex	Yes	1/31/01
VH2 Secondary	#4 Triplex	Yes	2/2/01
VH3 Secondary	#4 Triplex	Yes	2/2/01
VH4 Secondary	#4 Triplex	Yes	2/3/01
VH5 Secondary	#4 Triplex	Yes	2/3/01
VH6 Secondary	#4 Triplex	Yes	2/12/01
VH7 Secondary	#4 Triplex	Yes	3/2/01

Inspected by QA N/A

Inspected by B&J Supervisor Denny Dickerson [redacted]

Test Equipment ID #: Fluke 30 # 63255953

Date Calibrated : N/A

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.

Cinti., OH 45237

Control Cable Continuity Check

Cable ID #	Number of Conductors	Continuity	Equipment #
VH1 LIGHTS	3 - #12 THHN	Yes	1/31/01
VH1 Receptacles	3 - #12 THHN	Yes	1/31/07
VH1 UH-1	4 - #10 THHN	Yes	1/31/01
VH1 UH-2	4 - #10 THHN	Yes	1/31/07
VH1 MCP	3 - #12 THHN	Yes	1/31/01
VH1 Ceiling Fan	3 - #12 THHN	Yes	1/31/01
VH1 EF-1	3 - #12 THHN	Yes	1/31/01
VH1 EF-1 Strobe	3 - #12 THHN	Yes	1/31/01

Inspected by B&J Supervisor Denny Dickerson [redacted]

Test Equipment ID # : Fluke 30 #63255953

Date Calibrated : N/A

Inspected by QA : N/A

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.

Cinti., OH 45237

Control Cable Continuity Check

Cable ID #	Number of Conductors	Continuity	Equipment #
VH2 UH-1	4 - #10 THHN	Yes	2/02/01
VH2 UH-2	4- #10 THHN	Yes	2/02/01
VH2 Receptacles	3 - #12 THHN	Yes	2/02/01
VH2 Lights	3- #12 THHN	Yes	2/02/01
VH2 Ceiling Fan	3 - #12 THHN	Yes	2/02/01
VH2 MCP	3 - #12 THHN	Yes	2/02/01
VH2 EF-1 & Strobe	3 - #12 THHN	Yes	2/02/01

Inspected by B&J Supervisor Denny Dickerson [redacted]

Test Equipment ID # : Fluke 30 #63255953

Date Calibrated : N/A

Inspected by QA : N/A

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.

Cinti., OH 45237

Control Cable Continuity Check

Cable ID #	Number of Conductors	Continuity	Equipment #
VH3 Receptacles	3-#12 THHN	Yes	2/8/01
VH3 UH-1	4-#10 THHN	Yes	2/8/01
VH3 UH-2	4-#10 THHN	Yes	2/8/01
VH3 MCP	3-#12 THHN	Yes	2/8/01
VH3 Lights	3-#12 THHN	Yes	2-8-01
VH3 Cieling Fan	3-#12 THHN	Yes	2-8-01
VH3 EFI & Strobe lts	3-#12 THHN	Yes	2-8-01

Inspected by B&J Supervisor Denny Dickerson [redacted]

Test Equipment ID #: Fluke 30 #63255953

Date Calibrated : N/A

Inspected by QA : N/A

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.

Cinti., OH 45237

Control Cable Continuity Check

Cable ID #	Number of Conductors	Continuity	Equipment #
VH4 Receptacles	3 - #12 THHN	Yes	2/09/01
VH4 UH-1	4 - #10 THHN	Yes	2/09/01
VH4 UH-2	4 - #10 THHN	Yes	2/09/01
VH4 MCP	3 - #12 THHN	Yes	2/09/01
VH4 Lights	3 - #12 THHN	Yes	2/09/01
VH4 Ceiling Fan	3 - #12 THHN	Yes	2/09/01
VH4 EF-1 & Strobe H.	3 - #12 THHN	Yes	2/09/01

Inspected by B&J Supervisor Denny Dickerson [redacted]

Test Equipment ID #: Fluke 30 #63255953

Date Calibrated : N/A

Inspected by QA : N/A

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.

Cinti., OH 45237

Control Cable Continuity Check

Cable ID #	Number of Conductors	Continuity	Equipment #
VH5 Lights	3-#12THHN	Yes	2-13-01
VH5 Receptacles	3-#12THHN	Yes	2-13-01
VH5 UH-1	4-#10THHN	Yes	2-13-01
VH5 UH-2	4-#10THHN	Yes	2-13-01
VH5 MCP	3-#12THHN	Yes	2-13-01
VH5 Ceiling fan	3-#12THHN	Yes	2-13-01
VH5 EF-1 & strobe	3-#12THHN	Yes	2-13-01

Inspected by B&J Supervisor Dewey Dickerson [redacted]

Test Equipment ID # : Fluke 30 #63255953

Date Calibrated : N/A

Inspected by QA : N/A

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.
Cinti., OH 45237

Control Cable Continuity Check

Cable ID #	Number of Conductors	Continuity	Equipment #
VHL Lights	3-#12 THHN	Yes	2/15/01
VHL Recptacles	3-#12 THHN	Yes	2/15/01
VHL UH-1	4-#10 THHN	Yes	2/15/01
VHL UH-2	4-#10 THHN	Yes	2/15/01
VHL MCP	3-#12 THHN	Yes	2/15/01
VHL Ceiling Fan	3-#12 THHN	Yes	2/15/01
VHL EF-1 & Strobe Lt.	3-#12 THHN	Yes	2/15/01

Inspected by B&J Supervisor Denny Dickerson

Test Equipment ID #: Fluke 30 #63255953

Date Calibrated : N/A

Inspected by QA : N/A

INFORMATION ONLY

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.
Cinti., OH 45237

VH-7 = CVH
3/22/01

Control Cable Continuity Check

Cable ID #	Number of Conductors	Continuity	Equipment #
VH-7 Lights	3-#12THHN	Yes	3-5-01
VH-7 Receptacles	3-#12THHN	Yes	3-5-01
VH-7 UH-1	4-#10THHN	Yes	3-5-01
VH-7 UH-2	4-#10THHN	Yes	3-5-01
VH-7 MCP	3-#12THHN	Yes	3-5-01
VH-7 Ceiling Fan	3-#12THHN	Yes	3-5-01
VH-7 EF-1 & strobe	3-#12THHN	Yes	3-5-01

[X] A - Conforms to the Subcontract Requiremc
[ ] B - Minor Comment - Incorporate and Resul
[ ] C - Revise and Resubmit
Sig: MWS Date: 3/22/01

Inspected by B&J Supervisor Danny Dickerson [redacted]

Test Equipment ID #: Fluke 30 #63255953

Date Calibrated : N/A

Inspected by QA : N/A

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16050-001
Reviewed By: Dan
Date: 3/19/01

GROUND RESISTANCE TESTS

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16450-002	REV: 2	09-Feb-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.

Ron Wood

SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7

RECEIVED BY: Denise Wenty DATE: 2/09/01

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
8	641-16450-002C	0						X			CVH Ground Resistance Test		X		16450	✓		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	52-5				
Tim Cherry	52-5				
Jim Jenkins	52-5				
Mike Godber	164				
Bob Knoys	52-5				
B. Scott Wheeler	52-5				
GeoSyntec Consultants	38				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [illegible] DATE 2/15/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)

CFC - CERTIFIED FOR CONSTRUCTION

INF - INFORMATION/RECORD

DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)

A - Conforms to Subcontract Requirements

B - Minor Comments - Incorporate and Resubmit

C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: MWGiffin Date: 2/15/01

INFORMATION ONLY

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate Transmission System Project
STAVER # 7052

Submittal # 641- 16450-002
Reviewed By: RW
Date: 2/9/01

B&J ELECTRICAL CO. INC.

6316 WIEHE RD.

Cincinnati, Ohio 45237

(513) 351-7100

Ground Resistance Test Report

Drawing Number	Test Point/Location	Resistance
90X-6000-E-0262	CONTROL VALVE HOUSE	3 Ω

Test Type: DIGI GROUND MEG
Test Instrument I.D. #: FC98078401
Inspected by B&J Sup.: [signature] Date: 2-8-01
Inspected by QA: [signature] Date: 2/8/01
Calibration Date: 10-19-00

SUPPLIER DOC ENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16450-002	REV: 1	25-Jan-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: R Wood

TO: FDF EN INEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Sarrett DATE: 1/29/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION A	B	C
8	641-16450-002B	0						X			VH-5&6 Ground Resistance Tests		X		16450	X		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Jim Cherry	525				
Jim Jenkins	525				
Mike Godlzer	525				
Rob Kneip	525				
Scott Wheeler	525				
Kwasi Bau Twenebroh	38				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: MW Griffin DATE 2/08/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ADDITIONAL

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-164450-002
Reviewed By: [illegible]
Date: 1/25/01

B&J ELECTRICAL CO. INC.

6316 WIEHE RD.
Cincinnati, Ohio 45237
(513) 351-7100

Ground Resistance Test Report

Drawing Number	Test Point/Location	Resistance
90Y-6000-E-00261	Valve House 5	4 OHMS
90Y-6000-E-00261	Valve House 6	3 OHMS
90Y-6000-E-00258	Pole 741	1 OHM

[✓] A - Conforms to the Subcontract Requir
[ ] B - Minor Comment - Incorporate and R
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 2/8/0

INFORMATION ONLY

Test Type: Ground Resistance Megger
Test Instrument I.D. #: FC98078-101
Inspected by B&J Sup.: D. Dickens [redacted] Date: 1-25-01
Inspected by QA: [illegible] Date: 1-25-01
Calibration Date: 10-19-00

SUPPLIER DOCUMENT SUBMITTAL

FDF PRO NO: 20111	CONTRACT NO: FSC - 6	SUBMITTAL NO: 16450-002	REV: 0	08-Dec-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Jarrett DATE: 12/11/00

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-16450-002A	0						X			VH1-4 GROUND RESISTANCE TESTS		X		16450			

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Jim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Bob Kneip	525				
Scott Wheeler	525				
Kwasi Bau Twenebah	38				

RECEIVED
DEC 12 2000

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE 12/12/00
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-164SO-002
Reviewed By: [illegible]
Date: 12/8/00

B&J ELECTRICAL CO. INC.

6316 WIEHE RD.

Cincinnati, Ohio 45237

(513) 351-7100

Ground Resistance Test Report

Drawing Number	Test Point/Location	Resistance
E-5	VALVE HOUSE 1	2 Ω
	Test WELL	

Test Type
Test Instrument I.D. # FC98078401
Inspected by B&J Sup. [illegible] Date 10-10-00
Inspected by QA [illegible] (Staver) Date 10-10-00
Calibration Date 10-2000

B&J ELECTRICAL CO. INC.

6316 WIEHE RD.
Cincinnati, Ohio 45237
(513) 351-7100

Ground Resistance Test Report

Drawing Number	Test Point/Location	Resistance
FEMP	Test Well	1 Ω
90X-6000-E-002661	Valve House Two	
	Grid	

Test Type: Ground Megger Resistance
Test Instrument I.D. #: FC98078401
Inspected by B&J Sup.: [redacted] Date: 10-12-00
Inspected by QA: [redacted] Date: 10-12-00
Calibration Date: 10-99

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.
Cinti., OH 45237

Ground Resistance Test

Test Type	Drawing Number	Test Point	Resistance
Ground megger	90X-1000-E-00261	Ground Grid	3 Ω
Resistance	Valve House		
	Three		

Inspected by B&J Supervisor Dennis L. Dickerson [redacted] 10-13-00

Test Equipment ID #: FC980 78401

Date Calibrated : 10-99

Inspected by QA : RWD 10/13/00

Accepted by QA: RWD 10/13/00

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.
Cinti., OH 45237

Ground Resistance Test

Test Type	Drawing Number	Test Point	Resistance
GROUND MEGGER	90X-6000-E-00261-	GROUND	4 Ω
RESISTANCE	VALVE HOUSE #4	GRID	

Inspected by B&J Supervisor Dennis L. Nickerson [redacted]

Test Equipment ID #: FC98078401

Date Calibrated: 10-19-00

Inspected by QA: [illegible] 11/29/00

Accepted by QA: [illegible] 11/29/00

POLE MEGGER TESTS

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16400-005	REV: 0	07-Dec-00	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: R. Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Jerma Kraus DATE: 12-11-2000

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
6	641-16400-005A	0						X			Pole Ground Mergger Tests		X		16400	ρ		

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
[redacted]	[redacted]				
Jim Cherry	525				
Jim Gensin	525				
Mike Godber	64				
Bob Krieg	525				
B. Scott Wheeler	525				
Kwai-Bau Tunnebark	38				

NO COMMENTS: ρ COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

DEC 11 6 44 AM '00

RECEIVED BY: [signature] DATE 12-11-00
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.
Cinti., OH 45237

Ground Resistance Test

Test Type	Drawing Number	Test Point	Resistance
		Pole 756	12 Ω
		755	13 Ω
		754	17 Ω
		753	9 Ω
		752	8 Ω
		751	11 Ω
		750	9 Ω
		749	11 Ω
		748	13 Ω
		747	11 Ω
		746	11 Ω
		745	12 Ω
		744	9 Ω
		743	22 Ω
		742	16 Ω
		741	25 Ω
		740	10 Ω
		739	20 Ω

ECDC CONTROLLED COPY NO. 76896

HA - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
[ ] D - Rejected
Date: 12-14-00

Inspected by B&J Supervisor: Denny Dickerson [redacted]

Test Equipment ID #: 98078401

Date Calibrated: 10/19/00

Inspected by QA: [signature] 11/30/2000

Accepted by QA:

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate Transmission System Project
STAVER # 7052

Submittal # 641-16100-055
Reviewed By: [signature]
Date: 12/16/00

B&J ELECTRICAL CO. INC.

6316 Wiehe Rd.
Cinti., OH 45237

Ground Resistance Test

Test Type	Drawing Number	Test Point	Resistance
	Pole 738		22 Ω
	737		13 Ω
	736		12 Ω
	735		13 Ω
	734		7 Ω
	733		7 Ω
	732		12 Ω
	731		11 Ω
	730		13 Ω
	561		1 Ω

Inspected by B&J Supervisor Denny Dickerson Denny Dickerson [redacted]

Test Equipment ID #: 98078401

Date Calibrated : 10-19-00

Inspected by QA : Clayton Ring 11/30/2000

Accepted by QA:

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16400-008	REV: 0	22-Feb-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: Ron Wood

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Jarrett DATE: 2/26/01

			DOCUMENT FAMILY									SUBMITTAL TYPE				SUBMITTAL ACTION		
QTY	DOCUMENT NUMBER	REV	PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	DRFT	CFC	INF	ASSOCIATED SPECIFICATION	A	B	C
3	641-16400-008	0						X			Megger Test #2 ASCR		X		16400			
											Pole 730 to Pole756 & #1/0 Pole 561 to PLS							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Jim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Rob Kneip	525				
Scott Wheeler	525				
Kwasi Badu-Tweneboah	38				

RECEIVED
FEB 26 2001

NO COMMENTS: X

COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: [signature] DATE 2/27/01

(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

B&J ELECTRICAL CO., INC.

6316 WIEHE ROAD
CINCINNATI, OHIO 45237
(513) 351-7100

Job Number: FSC 641
Name: EPLTS LEACHATE SYSTEM

Date: 1/24/01
Supervisor:

INSULATION RESISTANCE TEST FOR FEEDER CABLES

TEST DATA	WIRE GAGE	EQUIPMENT FROM:	EQUIPMENT TO:	CONTINUITY ALL WIRES	PHASE A TO GROUND	PHASE B TO GROUND	PHASE C TO GROUND	PHASE A TO B	PHASE A TO C	PHASE B TO C	NEUTRAL TO GROUND PHASES
	1/0	Pole 561 Xfmrs.	100A Existing Service for Permanent Lift Station	N/A	∞	∞	∞	∞	∞	∞	N/A

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-16400-008
Reviewed By: [illegible]
Date: 2/22/01

INSPECTED BY SUPERVISOR [signature] DATE 1-24-01
INSPECTED BY QA [signature] DATE 1/24/01
ACCEPTED BY QA [signature] DATE 1/24/01

Test Equipment # 5778 Meger 8Bu150RA Date calibrated 10/19/00

Next calibration 1/01

Job Number EPLTS
Job Name 20111/7052 Staver EDB

B&J ELECTRICAL CO., INC.

6316 WIEHE ROAD
CINCINNATI, OHIO 45237
(513) 351-7100

Date 1-26-01
Supervisor D. [redacted]

INSULATION RESISTANCE TEST FOR FEEDER CABLES

TEST DATA	WIRE GAGE	EQUIPMENT FROM:	EQUIPMENT TO:	CONTINUITY ALL WIRES	PHASE A TO GROUND	PHASE B TO GROUND	PHASE C TO GROUND	PHASE A TO B	PHASE A TO C	PHASE B TO C	NEUTR TO GROUN PHASE
	#2 ACSR	Pole 730	Pole 756	N/A	∞	∞	∞	∞	∞	∞	N/A

TEST EQUIPMENT ID #: 8B110150CA — DATE CALIBRATED 10-19-00
INSPECTED BY SUPERVISOR D. Dickerson — DATE 1-26-01
INSPECTED BY QA [signature] — DATE 1/26/01
ACCEPTED BY QA [signature] — DATE 1/26/01

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-1/26/00-005
Reviewed By: [signature]
Date: 2/24/00

POLE MOUNTED TRANSFORMER TESTS

SUPPLIER DOCUMENT SUBMITTAL

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 16400-007	REV: 0	22-Feb-01	PAGE 1 OF 1

FROM: The STAVER GROUP, Inc.
Ron Wood
SIGNATURE: RWW

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erla Jarrett DATE: 2/22/01

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION A	B	C
8	641-16400-007	0						X			Pole Mounted Xfmer		X		16400	X		
											Serial #214398 Retest							

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Jim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Rob Kneip	525				
Scott Wheeler	525				
Kwasi Badu-Tweneboah	38				

NO COMMENTS: X COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: MW Griffin DATE 3/05/01
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

INTERSTATE TRANSFORMER COMPANY, LLC
P. O. Box 11339, Lexington, KY 40575-1339
Toll-free 800-626-7106 (24 hour service) • Fax 502-863-0481
e-mail: sales@interstatetransformer.com • Website: www.interstatetransformer.com

TRANSFORMER ACCEPTANCE TEST REPORT FOR:
COOPER POWER SYSTEMS

KVA:	25	HERTZ:	60	CUSTOMER ORDER NO:	RA# 01B0204
PHASE:	1	TYPE:	OISC	SERIAL NUMBER:	0002143898
H.V. WINDING:	13200			SHOP JOB NUMBER:	6577
TAPS:	4) 2 1/2% TAPS, 2AN & 2BN			DATE OF TEST:	02-21-01
L.V. WINDING:	120/240			INSULATING FLUID:	
POLARITY:	SUBTRACTIVE			ERGON HYVOLT II OIL	

LOSSES IN WATTS AT 85'C:

NO LOAD: 89 LOAD: 494 TOTAL: 583

EXCITING CURRENT (%) AT 100% RATED VOLTAGE: 0.67%

IMPEDANCE IN (%) AT 85' C: 3.03

H.V. WINDING RESISTANCE IN OHMS AT 85'C: 77.06426
L.V. WINDING RESISTANCE IN OHMS AT 85'C: 0.01767

EFFICIENCY AT VARIOUS LOADS, EXPRESSED AS A % :

100%LOAD	75%LOAD	50%LOAD	25%LOAD
97.72%	98.08%	98.33%	98.11%

REGULATION AT VARIOUS POWER FACTORS, EXPRESSED AS A % :

100% PF	90% PF	80% PF	70% PF
2.00%	2.78%	2.96%	3.03%

TURN RATIO TEST: H.V. / L.V.

TAP POS	COIL 1	CALCULATE	% ERROR
A	57.742	57.750	-0.01%
B	56.374	56.375	0.00%
C	55.006	55.000	0.01%
D	53.638	53.625	0.02%
E	52.271	52.250	0.04%

INSULATION RESISTANCE TEST @ 5 K.V.D.C. FOR 1 MINUTE:

H.V. TO GROUND:	140000	MEGOHMS
L.V. TO GROUND:	90000	MEGOHMS
H.V. TO L.V.:	150000	MEGOHMS

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Review and Resubmit
Sig: [illegible] Date: 3/05/01

PCB CONTENT (PPM): NON DETECTABLE AT TIME OF FILLING

APPROVED BY : Terry Tackett
TERRY TACKETT
SENIOR ENGINEER

DATE: 2/21/01

INFORMATION ONLY

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641-[illegible]
Reviewed By: [illegible]
Date: 2/22/01

APPENDIX K

APPENDIX K

REQUESTS FOR CLARIFICATION OF INFORMATION (RCIs)

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 79 (XBT)	(6) DATE 15 May 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-001R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]	(4A) RCI/DCN TITLE: Corner Detail		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House 1, 2, 3 Details II	S2 - Detail 115	0	
Valve House 4, 5, 6 Details II	M4 - Detail 121		
Control Valve House Details II	S7 - Detail 128		

RECEIVED MAY 24 2000

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Is the wall corner detail necessary to the function of the VH and CVH? ACI recommends a single, continuous pour where possible to preserve the integrity of the structure except in extreme soil conditions. If yes, is the wall corner detail typical for all corners of the VH and CVH? There seems to be some obstructions at the LTS pipe penetrations. Please advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	5/15/00	J. C. JENKINS	5/16/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See attached response.
KWASI BADU-TWENEBOAH GEOSYNTEC

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 5/22/00
KWASI BADU-TWENEBOAH
[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

S-F-4259
REV. 5: 10/01/99

ORIGINAL INFORMATION ONLY

Response to RCI No. 20111-001R
(Dated 15 May 2000)
(Page 2 of 9)

The wall corner details for the valve houses (VHs) and control valve house (CVH) have been included to minimize cracking of the walls, and thereby minimize the potential for infiltration through the walls into the interior of the VHs and CVH.

As shown on the Construction Drawings, there are wall corner details for the VHs and CVH, which are as follows:

- VHs 1, 2, and 3: Detail 115 on Sheet S-2;
- VHs 4, 5, and 6: Detail 121 on Sheet S-4; and
- CVH: Detail 128 Sheet S-7.

Therefore, the wall corner details are not typical for the VHs and CVH. It is noted that the corner details for VHs 1 through 6 are the same. Details 115 and 121 are duplicates of one another and are provided separately for VHs 1, 2, and 3 and VHs 4, 5, and 6, respectively, for convenience.

Based on a review of Details 115 and 121, the attached Figure 1 has been prepared to show the reinforcement steel for the inside face of VHs 1 through 6. On Figure 1, the reinforcement steel location and length are compared to the size and location of the LTS pipe penetrations on the north and south wall sections. Results of the comparison indicate that the reinforcement steel hook bars shown in Details 115 and 121 should be locally shortened at the LTS pipe penetrations from 10 in. to 8 in. The locations where the local shortening should occur are shown on Section H on Sheet S-2 (attached) and Section H on Sheet S-4. Additionally, the approximate locations of the keys in the corner details have been shown on attached Detail 113 on Sheet S-1 and Detail 119 on Sheet S-3.

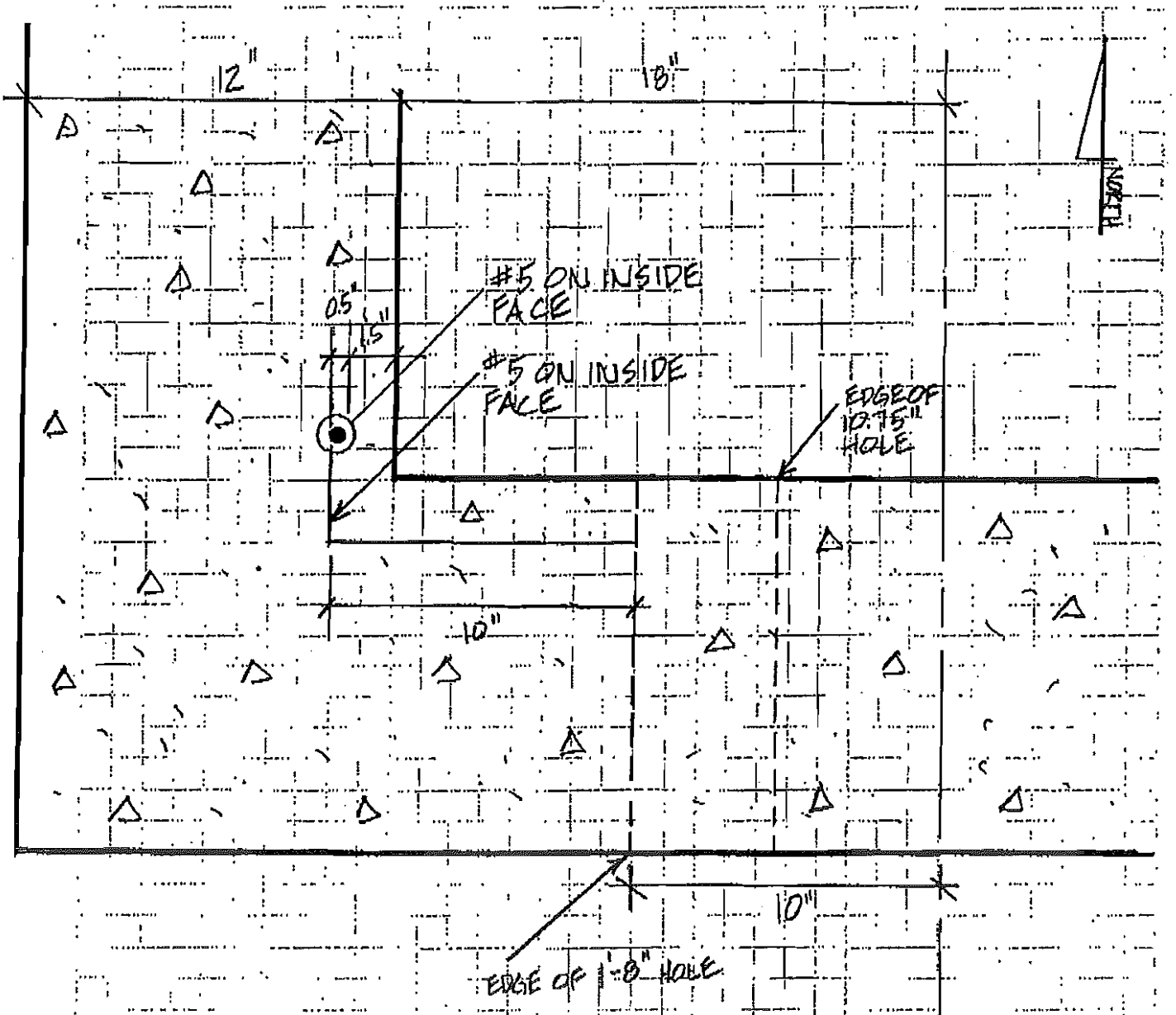
Based on a review of Detail 128, the attached Figure 2 has been prepared to show the reinforcement steel for the inside of the CVH. The reinforcement steel location and length are compared to the size and location of the LTS pipe penetrations on the north and south wall sections. Results of the comparison indicate that the reinforcement steel hook bars shown in Detail 128 should be locally shortened at the LTS pipe penetrations from 14 in. to 12 in. The locations where the local shortening should occur are shown on attached Section A on Sheet S-6 and Section B on Sheet S-6. Additionally, the approximate locations of the keys in the corner details have been shown on attached Detail 127 on Sheet S-6.

5/22/00

GEOSYNTEC CONSULTANTS

Written by: VANDER LINDE Date: 00/5/16 (YY MM DD) Reviewed by: _____ Date: / / (YY MM DD)

Client: FLUOR FERUALD Project: EPLTS Project/Proposal No.: GQ1030 Task No.: 07.1



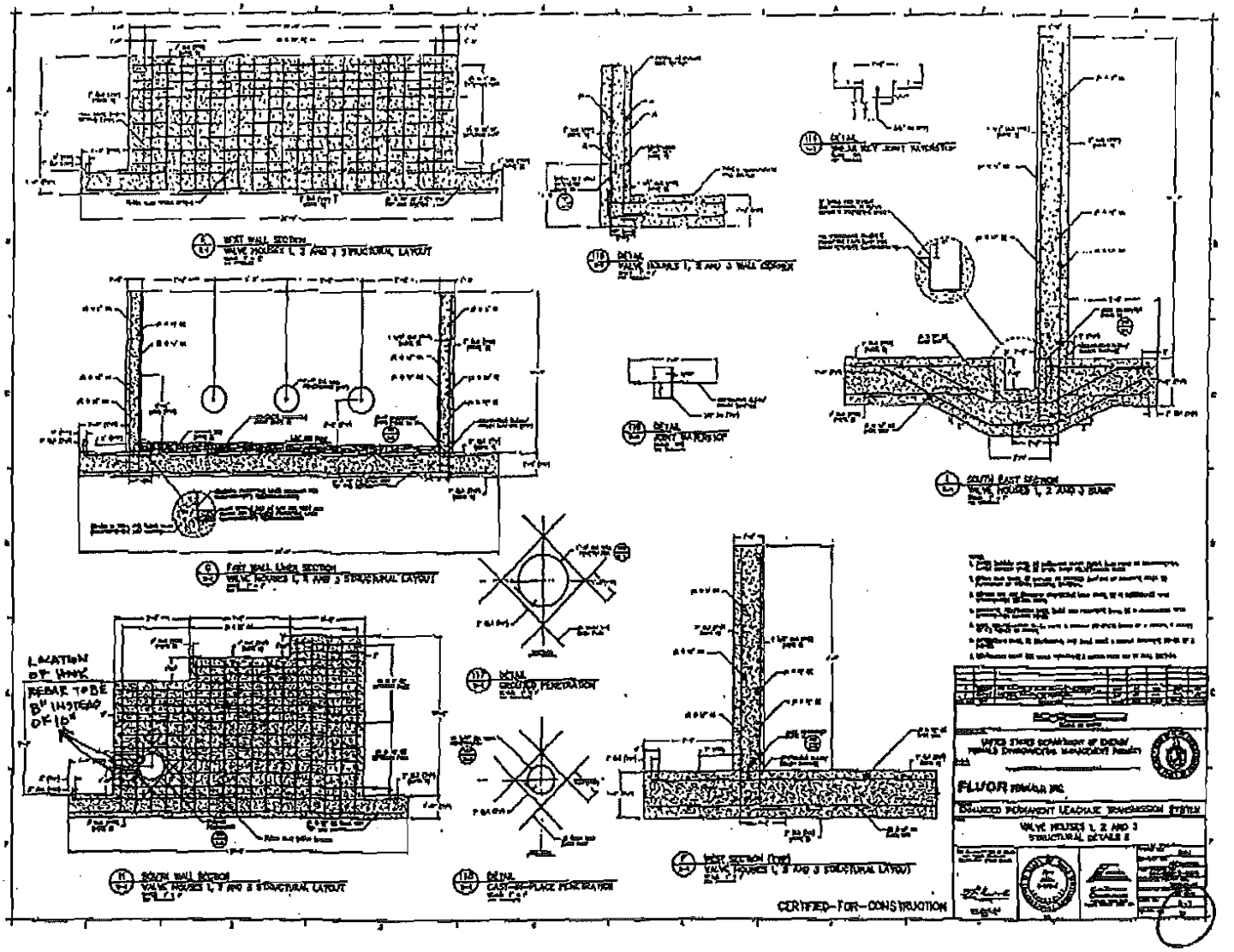
CORNER VALVE HOUSES

℄ 1'-8" HOLE

NOTE: PARTIAL REBAR SHOWN

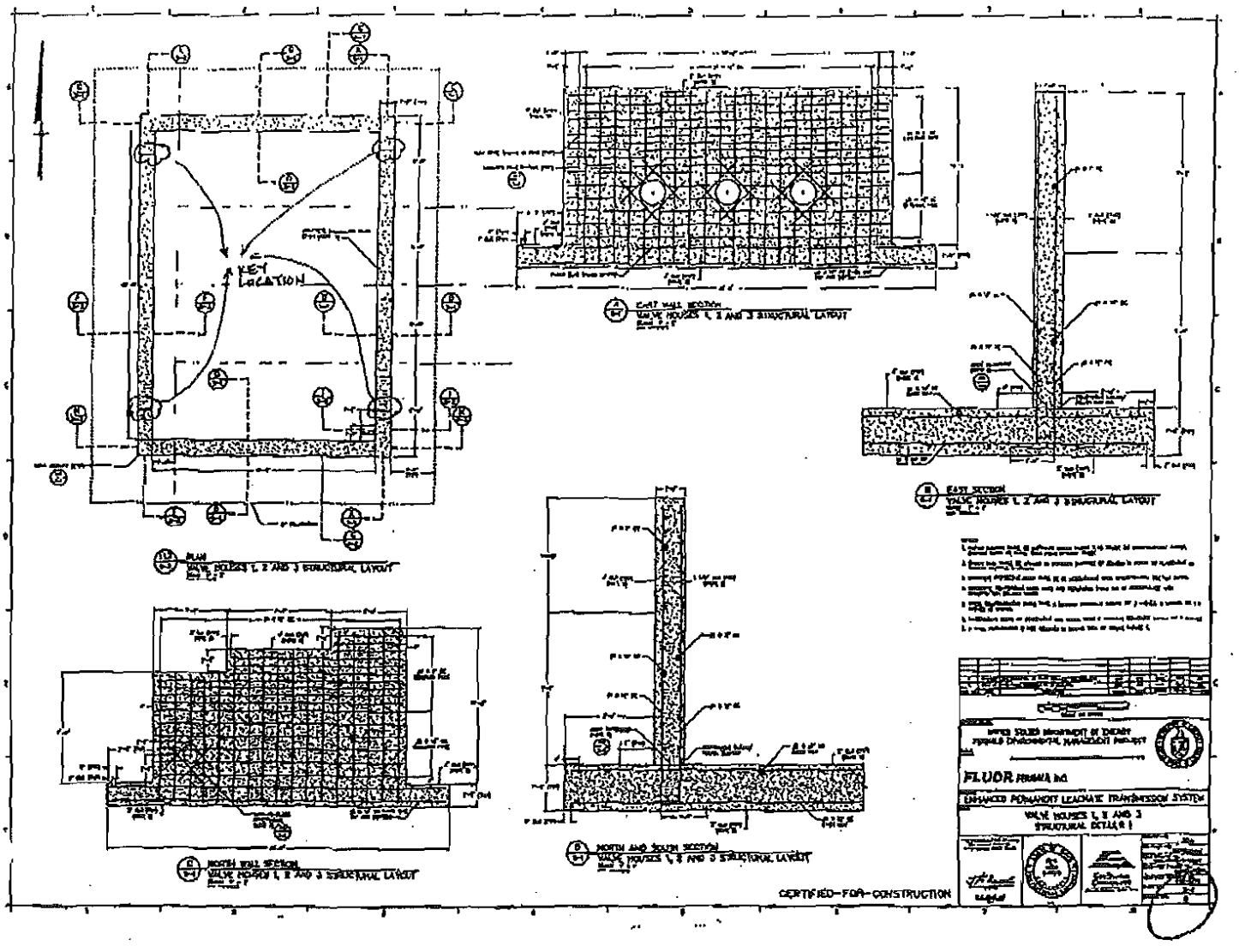
REF. FIG. 2211-D01R

FIGURE 1



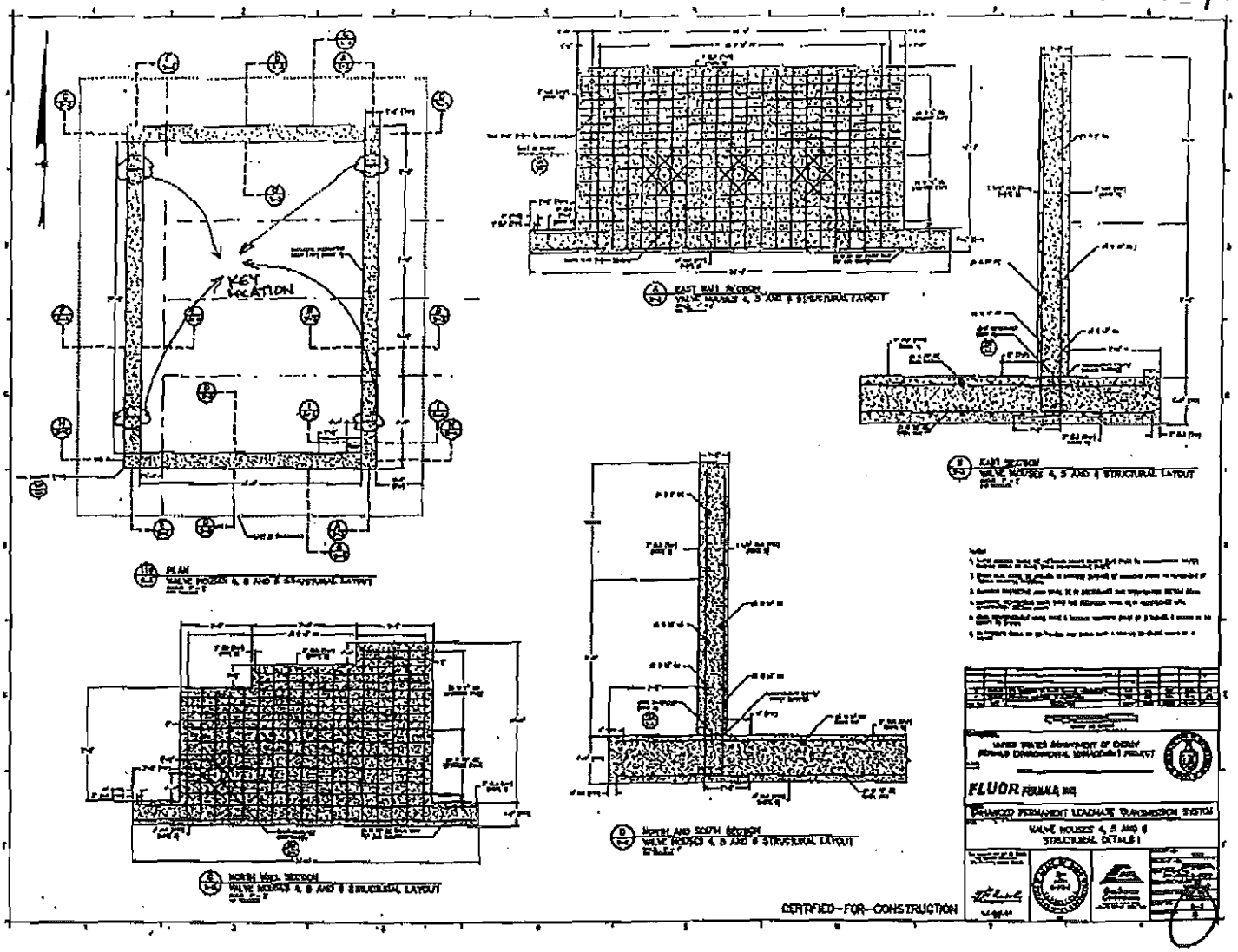
S-2

RCI NO. 20111-001R



5-1

RCI No. 2011-001R



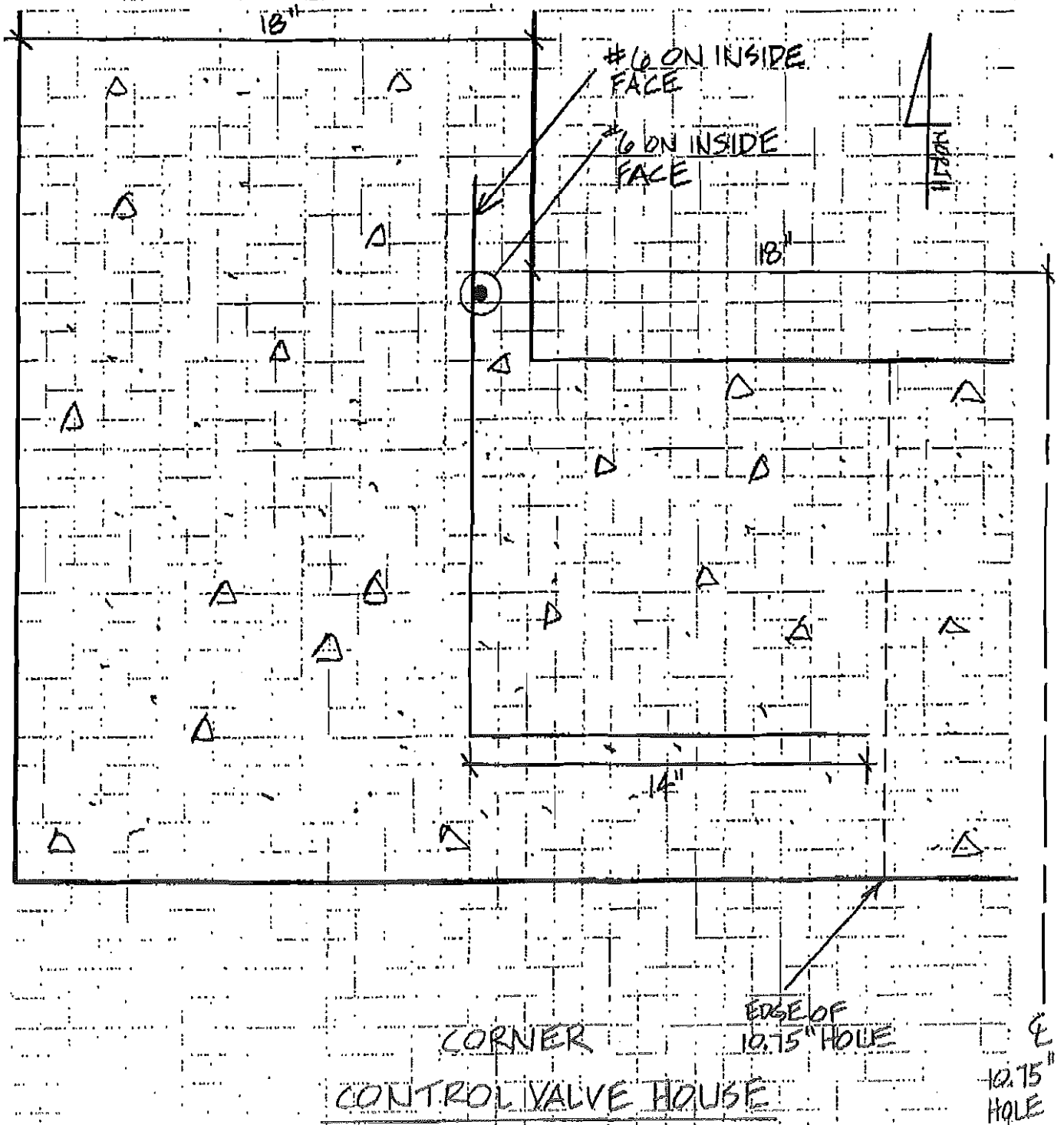
5-3

RCI NO. 20111-001R

GEOSYNTEC CONSULTANTS

Written by: VANDER LINDE Date: 00/5/16 (YY MM DD) Reviewed by: _____ Date: __/__/__ (YY MM DD)

Client: FLUOR FERNALD Project: EPLTS Project/Proposal No.: SQ1030 Task No.: 07.1

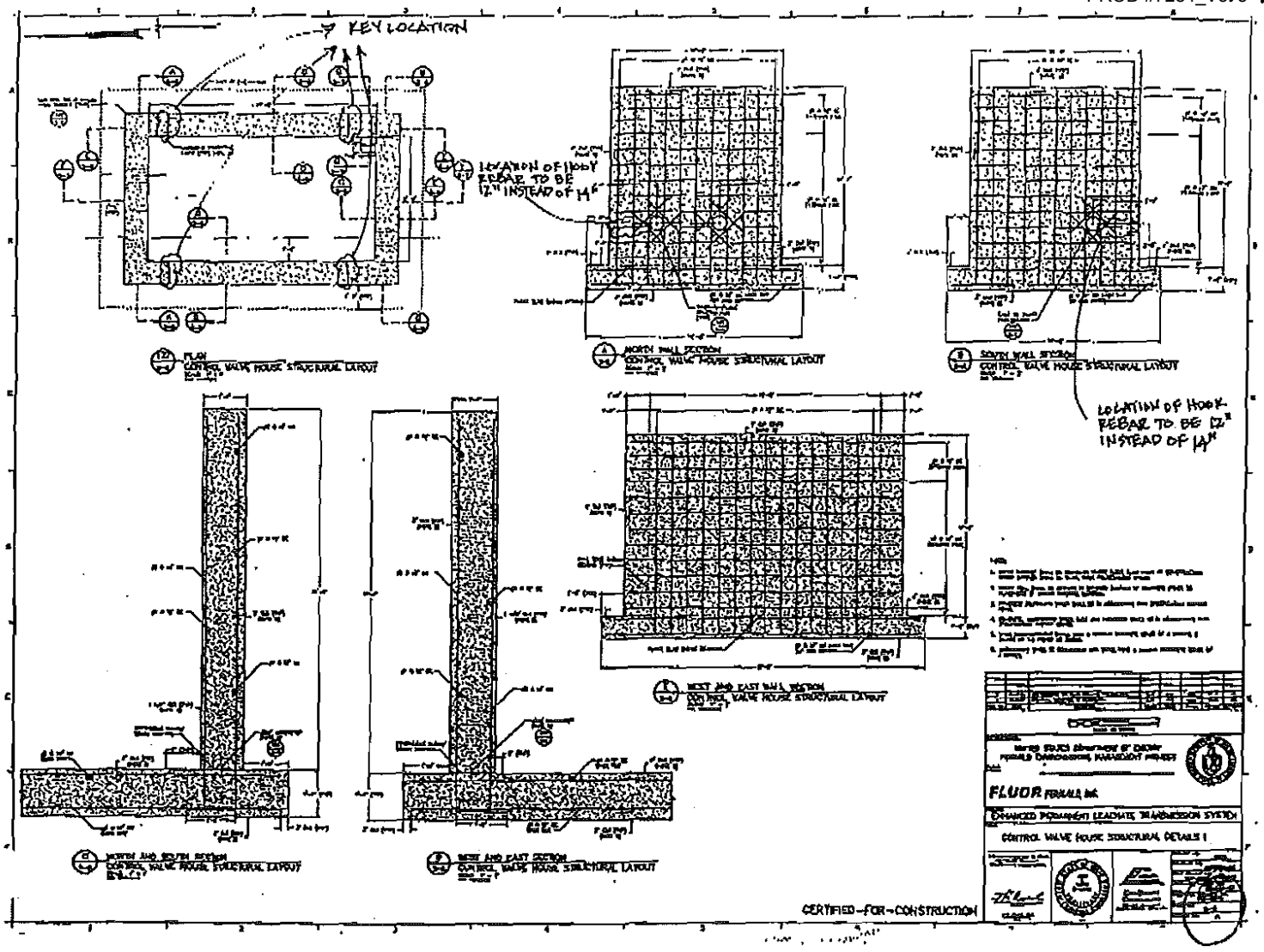


CORNER CONTROL VALVE HOUSE

NOTE: PARTIAL REBAR SHOWN

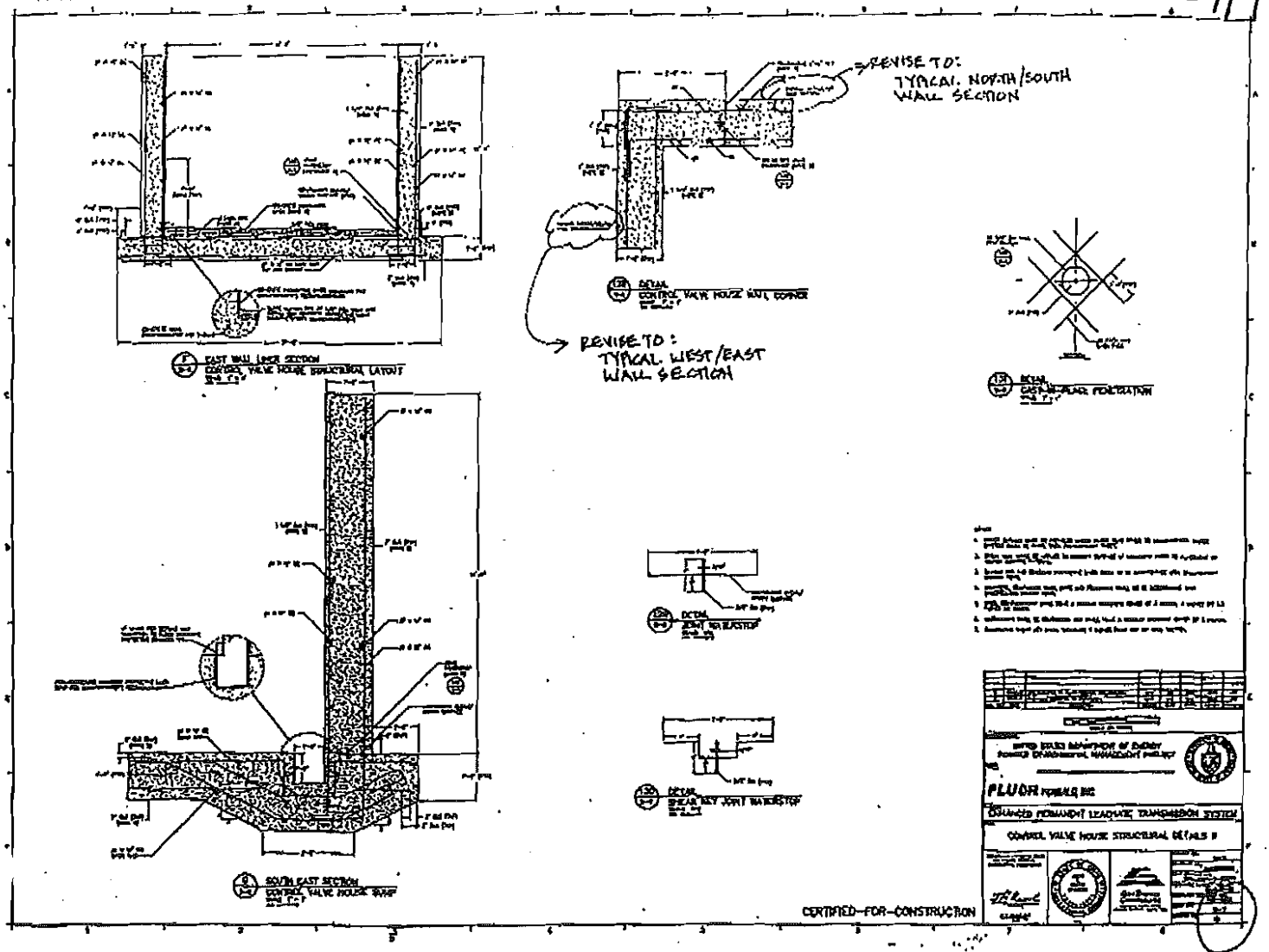
RCI No. 2511-001R

FIGURE 2



5-6

RCI No. 20111-001R



5-7

RCI No. 20111-001R

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111

(2) S/C NO.: FSC - 841

Pg 1 Of 1

(6) DATE 6/1/00

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111-002R

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [X] OTHER [ ]

(4A) RCI/DCN TITLE: PVC Waterstop Selection

(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	3100-2.01-H	0	
Controlled Project Drawings	90X-6000-S-00272	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The PVC Waterstop specified; Greenstreak Type 741 Dumbbell with center bulb is not manufactured by Greenstreak. Type 741 is manufactured only dumbbell ends and not with a centerbulb. Please advise.

(10) REQUESTOR: Ron Wood

COMPANY: The STAVER Group, Inc.

DATE: 6/1/00

(12) CE / PE: J. C. JENKINS

DATE: 6/1/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES

(14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

Delete "with centerbulb" from specification. Therefore, Type 741 Dumbbell is acceptable.

6/2/00

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/2/00

KUMASI BABU-TWENEBOAH

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)

DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE)

DATE:

INFORMATION ONLY

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 2 FBT	(6) DATE June 1, 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-003R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]	(4A) RCI/DCN TITLE: GIS Unsuitable sub-grade		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Controlled Project Drawings	90X-6000-S-00279	0	
Technical Specifications	03100-3.06	0	
Technical Specifications	02200-3.07B	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Upon excavation of GIS structures #1, #3, and # 5, unsuitable subgrade was encountered. Ground-water infiltrated into each excavation and accumulated to an approximate depth of 6". Please advise STAVER of Geo-Syntecs approved method of corrective action. The GIS base units are scheduled to be set June 1, 2000.

RECEIVED JUN 02 2000

(10) REQUESTOR:	COMPANY:	DATE:	(12) CEVP:	DATE:
Ron Wood RWood	The STAVER Group, Inc.	June 1, 2000	James C. Jenkins JAMES C. JENKINS	6/2/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

see page 2 of 2 for response

GEOSYNTEC RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/2/00
KWASI BADU-TWENEBOAH, GEOSYNTEC
[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDRPE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:
PERFORMANCE GRADE:

(18) CONSTRUCTION CONCURRENCE DATE:
PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

INFORMATION ONLY

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

Response to RCI No. 20111-003R
(Dated June 1, 2000)
(Page 2 of 2)

GeoSyntec's approved method of corrective action is detailed out in the Technical Specifications. Sections 02200 (Earthwork) and 02215 (Trenching and Backfilling) provide details on managing and controlling seepage of groundwater into, and surface water runoff in, excavations. Water that accumulates in excavations shall be collected in a toe drain, or other suitable sump, and pumped out as indicated in Part 3.05B of Section 02200. Additionally surface water run-on from adjacent areas shall be prevented from entering the excavation.

Part 3.07B of Section 02200 also requires the removal of unsuitable soils, and replacement with compacted fill, to a minimum depth of 1 foot below the proposed subgrade elevation. Removal of unsuitable subgrade to a deeper (or additional) depth if necessary to obtain a firm surface for placement of compacted fill is spelled out in Section 02200. The removal of unsuitable soils to additional depth may be as approved by the Construction Manager. Part 3.07D of Section 02200 also requires the Contractor to implement measures to remove water that accumulates in excavations.

Finally, Parts 3.02D and H of Section 02215 also emphasize the need to protect and maintain the trench bottom as well as continuously dewater trenches and excavations. References are made to the applicable parts of Section 02200 described above.

It is therefore evident that if groundwater and/or surface water is managed and controlled, as specified in the Technical Specification, the GIS structures can be constructed as shown on the Construction Drawings. During a walk-down to the excavation areas on 2 June 2000 with representatives from Fluor Fernald, the Contractor, and GeoSyntec, it was observed that significant sloughing and caving had taken place in GIS No.1 excavation. The depth of unsuitable subgrade encountered and the amount of accumulated water was not easily discernible due to sloughing and caving in the excavation. GIS No. 2 excavation did not have significant water that could not be controlled and managed as detailed in the Specifications. The GIS No. 3 excavation was in progress and no unsuitable subgrade was evident at the depth of excavation.

It was also observed that there were no surface-water management and erosion control measures, such as berms and diversions, constructed upgradient of the three GIS excavations to divert surface water run-on from entering the excavations. Therefore any precipitation that occurs during the weekend will indeed cause more water to accumulate in the excavations and thereby render the subgrade unsuitable.

In summary, the Technical Specifications provide sufficient information to control water and manage unsuitable subgrade when encountered during trenching and excavation for the EPLTS project. However, the Contractor may propose alternative methods to the Construction Manager for review and approval.

6/2/2000

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 12 (KBT)	(6) DATE June 7, 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-004R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]	(4A) RCI/DCN TITLE: Rip-Rap Selection		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Controlled Drawings	90X-6000-G-00292, 00279	0	
Technical Specifications	02271-Part 2, 2.01	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

RECEIVED
JUN 12 2000

Visual examination of rip-rap currently in place in the 25 year drainage channel indicates that the Rip-Rap may be Type D. Specification Section 2.01-D Calls for Type D dumped rock fill to be used as channel and ditch lining, Contract Drawings however call for Type C. Please clarify.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood Ron Wood	The STAVER Group, Inc.	June 7,2000	MW Griffith Rec'd	6/12/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See attached response (Page 2 of 2)

KWASI BADU-TWENEBOAH, GEOSYNTEC 6/13/00

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/13/00
KWASI BADU-TWENEBOAH
[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL INFORMATION ONLY

Response to RCI No. 20111-004R
(Dated June 7, 2000)
(Page 2 of 2)

It is possible that Riprap Type D might have been installed in the northwest section of the 25-yr drainage channel. However, the correct type of riprap to be used for the 25-yr drainage channel within the EPLTS project is Riprap Type C, as shown on the Construction Drawings and required by Section 02271 of the Technical Specifications.

K Booth Henderson
6/13/00

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111

(2) S/C NO.: FSC - 641

(5) Pg. 1 of 4 EBT

(6) DATE June 14, 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111-005R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]

(4A) RCI/DCN TITLE: Controlled Density Fill

(11) DCN NO.: 20111-014

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	02215-3.02-E	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Staver proposes to substitute 4" to 6" of Controlled Density Fill for the 6" of compacted backfill under the Valve and Control Valve House foundations. This would provide a working surface equivalent to compacted fill material that would not be susceptible to deterioration under heavy rainfall conditions.

(10) REQUESTER:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood	The STAVER Group, Inc.	June 14,2000	JAMES C. JENKINS	6/14/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

The controlled density fill (CDF) shall be the same grades and elevation of subgrade prior to placing concrete slab and vapor barrier. See attached drawing 1 of 2000 CDF. Provide quality control data and as-built information on red-line drawings.

RECEIVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/16/00

KWASI BADU-TWENEBOAH

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A. James C. Jenkins 6/19/00

(18) CONSTRUCTION CONCURRENCE DATE: 6/19/00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

EDDC CONTROLLED COPY NO. C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE June 14, 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111-00LR

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Slump Requirement for Concrete with High Range Water Reducing Admixture

(11) DCN NO.: 20111-015

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	03100-Table 03100-01	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

RECEIVED JUN 15 2000

The Technical Specifications allows for the use of a High Range Water Reducing Admixture to add workability and better bonding to the concrete mix. By increasing workability, the Admixture will provide a better bond at the critical area between the concrete and the studs on the HDPE liner. Also, considering the weather factor, the Admixture will aid in placing and finishing operations. Our Concrete supplier recommends delivering concrete at a slump of 5" +/- 2", while maintaining the water/cement ratio of 0.38. Please advise.

(10) REQUESTER:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood Ron Wood	The STAVER Group, Inc.	June 14, 2000	James C. Jenkins	6/14/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

Revise Table 03100-01 to read as follows: "Slump—ASTM C 143 5 inches ± 2 inches".

K Badu-Twenebah 6/19/00

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/19/00

K Badu-Twenebah

KWASI BADU-TWENEBAH, GEOSYNTEC

[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 6/30/00

PERFORMANCE GRADE: (17) N.A. James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE:

(21) FIELD WORK COMPLETED:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19) (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO. C01

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JUL 13 2000

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 OF 2 EBT	(6) DATE June 23, 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-007R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Distance from Valve House to Tie-In Locations		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Drawings	90X-6000-G-00281	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Please provide the distance from the East wall of the Valve house to the tie-in points for the LDS, LCS and the RLCS lines. This information is needed in order to accurately order the HDPE pipe.

James C. Jenkins

(10) REQUESTER:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood	The STAVER Group, Inc.	June 14, 2000	J. C. JENKINS	6/27/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See attached response on page 2 of 2.

K Badu-Tweneboah

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: K Badu-Tweneboah 7/7/2000 KWASI BADU-TWENEBOAH, GEOSYNTEC [ ] FIT [X] FORM [ ] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) N.A.	DATE:
(18) CONSTRUCTION CONCURRENCE DATE: PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

INFORMATION ONLY

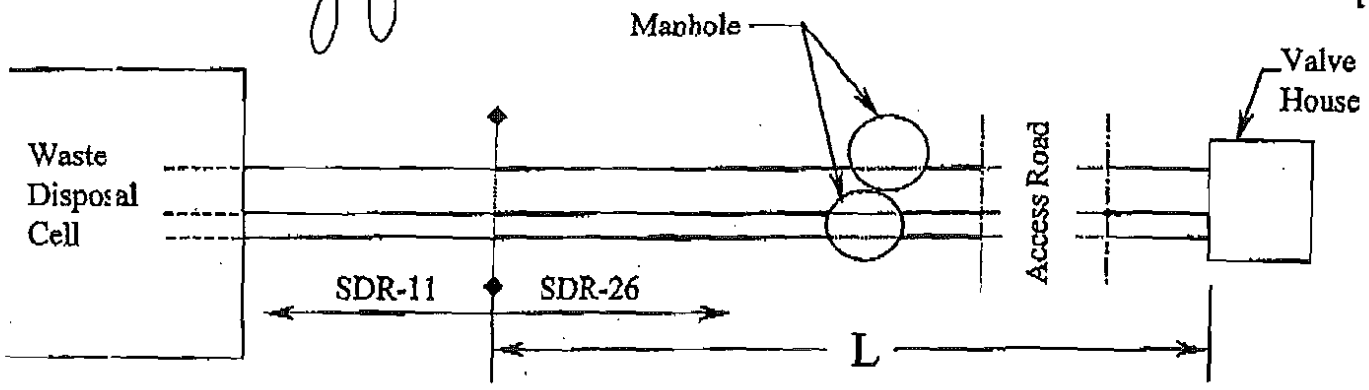
FS-F-4259
REV. 5: 10/01/99

ORIGINAL

GQ1030.07.1

ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM (EPLTS)

~~Revised~~ Response to RCI 20111-007R (page 2 of 2)



LCS	$Northing_1$ (1)	$Easting_1$ (1)	$Northing_2$ (1)	$Easting_2$ (1)	Calculated Length, L (feet)	Minimum Recommended Length (2) (feet)
Cell 1	482968.97	1350710.20	482969.60	1350658.71	51.49	60
Cell 2	482569.00	1350705.31	482569.63	1350653.82	51.49	60
Cell 3 Survey No. 1	482169.23	1350681.69	482169.66	1350648.93	32.76	40
Cell 3 Survey No. 2	482168.24	1350698.88	482169.66	1350648.93	49.97	60

LDS	$Northing_1$ (1)	$Easting_1$ (1)	$Northing_2$ (1)	$Easting_2$ (1)	Calculated Length, L (feet)	Minimum Recommended Length (2) (feet)
Cell 1	482978.97	1350710.33	482979.60	1350658.83	51.50	60
Cell 2	482579.00	1350705.44	482579.63	1350653.94	51.50	60
Cell 3 Survey No. 1	482178.98	1350688.01	482179.66	1350649.05	38.97	40
Cell 3 Survey No. 2	482178.77	1350700.70	482179.66	1350649.05	51.66	60

RLCS	$Northing_1$ (1)	$Easting_1$ (1)	$Northing_2$ (1)	$Easting_2$ (1)	Calculated Length, L (feet)	Minimum Recommended Length (2) (feet)
Cell 1	482973.97	1350710.26	482974.60	1350658.77	51.49	60
Cell 2	482574.00	1350705.38	482579.63	1350653.88	51.81	60
Cell 3 Survey No. 1	482174.07	1350684.48	482174.66	1350648.99	35.49	40
Cell 3 Survey No. 2	482173.50	1350701.84	482174.66	1350648.99	52.87	60
				Total Length of Pipe (feet)	463.79	540

USE 60' FOR EACH CELL

MAXIMUM

Notes:

1. $Northing_1$ for Cells 1 and 2 is defined as the Northing where the 6"\10" SDR-11 HDPE pipe terminates and the 6"\10" SDR-26 pipe begins and was obtained from FEMP Drawing No. 90X-6000-G-00076. $Northing_1$ for Cell 3 Survey No. 1 is defined as the Northing where the pipe sleeve terminates and was obtained from As-Built Survey Data (dated August 1999). $Northing_1$ for Cell 3 Survey No. 2 is defined as the Northing where the pipe sleeve terminates and was obtained from As-Built Survey Data (provided in July 2000).
   $Easting_1$ for Cells 1 and 2 is defined as the Easting where the 6"\10" SDR-11 HDPE pipe terminates and the 6"\10" SDR-26 pipe begins and was obtained from FEMP Drawing No. 90X-6000-G-00076. $Easting_1$ for Cell 3 Survey No. 1 is defined as the Easting where the pipe sleeve terminates and was obtained from As-Built Survey Data (dated August 1999). $Easting_1$ for Cell 3 Survey No. 2 is defined as the Easting where the pipe sleeve terminates and was obtained from As-Built Survey Data (provided in July 2000).
   $Northing_2$ is defined as the Northing where the new 6"\10" SDR-11 HDPE pipe penetrates the East wall of the valve house. $Northing_2$ for Cells 1 through 3 was obtained from FEMP Drawing Nos. 90X-6000-G-00281 and 90X-6000-G-00282.
   $Easting_2$ is defined as the Easting where the new 6"\10" SDR-11 HDPE pipe penetrates the East wall of the valve house. $Easting_2$ for Cells 1 through 3 was obtained from FEMP Drawing Nos. 90X-6000-G-00281 and 90X-6000-G-00282.
2. The minimum recommended length is calculated based on the above data. If additional as-built information is available, minimum recommended length should be recalculated.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111

(2) S/C NO.: FSC - 641

(5) Pg 1 Of 2 KBT

(6) DATE July 5, 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111-008R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Zumro Inflatable Balloon Packer

(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	02050-2.01-E	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Please provide additional information on the Zumro Inflatable Balloon Packer Assembly. We have been unable to locate this device.

James C. Jenkins 7/5/00

(10) REQUESTOR: Ron Wood Ron Wood

COMPANY: The STAVER Group, Inc.

DATE: July 5, 2000

(12) CE / PE JAMES C. JENKINS

DATE: 7/5/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES

(14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See page 2 of 2 for response

7/6/00

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 7/6/00

KWASI BADU-TWENEBOAH, GEOSYNTEC

[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY)

DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE)

DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

INFORMATION ONLY

Response to RCI No. 20111-008R
(Dated July 5, 2000)
(Page 2 of 2)

The Zumro Inflatable Balloon Packer is currently manufactured under the trade name Lampe Pipe Plugging System by Zumro®, Inc., P.O. Box 655, Willow Grove, PA 19080; Tel. No. 1-800-932-6003; Fax No. 215-957-6501. Contractor should confirm that this product would hold the 10-psi internal test pressure required by Section 02605 of the Technical Specifications.

Another product is manufactured/supplied by Stemar Equipment & Supply Co., Inc., 353 South Central Avenue, Los Angeles, CA 90013; Tel No. 1-800-992-0100; Fax No. 213-625-0826.

7/6/00

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 OF 2	(6) DATE 2 August 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-009Rm0
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Backup Ring Material		(11) DCN NO.: 20111-021

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Specifications 20111-TS-0001	02605, 3.04 H	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Specifications denote using Type Schedule 40 carbon steel lap joint flanges. The piping manufacture suggests using 150 psi ductile iron lap joint flanges for this application. The ductile is equilivent in strength and commonly used in these applications. Please advise on material selection.

(10) REQUESTOR: David R. Opalka, SPO The STAVER Group, Inc.	DATE: 8/2/00	(12) CE / PE MW Griffin	DATE: 8/03/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES MWG 8/3/00 (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

See Page 2 of 2 for proposed change.

KWASI BADU-TWENEBOAH, GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 8/10/00 Kwasi Badu-Tweneboah, GeoSyntec [ ] FIT [ ] FORM [X] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 8/22/00

PERFORMANCE GRADE: (17) 4 James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE:	(21) FIELD WORK COMPLETED:
PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19) 8/22/00	(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

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ECDC CONTROLLED
COPY NO.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

KBT

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 12	(6) DATE 31 July 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 010R 20111-009R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: WP Locations		(11) DCN NO.: 20111-020

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Overhead Power Transmission System Plan 90X-6000-E-00258	E1	0	
Baumann Engineering Coordinate Listings	Dated 5/22/00	0	
Baumann Engineering Field Drawing	G-3 to G - 8	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Please verify the location of the electrical work poles (WP). As the attached drawings show, most of the WPs plotted to the coordinates on drawing E1 do not match the plotted WP symbols contained in the project drawings. For example, the Northing coordinate of WP 745 is closer to the Northing Coordinate for Station 14+50, not Station 14+00 as shown graphically on the attached drawings.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka	The STAVER Group, Inc.	7/31/00		8/01/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

The correct coordinates as inferred from the plan drawings are shown on page 12 of 12. Replace coordinates on Pole Schedule Table with coordinates on page 12 of 12.

KWASI BADU-TWENEBOAH, GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 8/10/00

Kwasi Badu-Tweneboah, GeoSyntec

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LT52

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 8/22/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: 8/22/00

PURCHASE REQUISITION REQUIRED [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

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REV. 5: 10/01/99

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE August 16, 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-~~010~~ 011 gcg
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: HDPE Tanks –Distance from floor to tank inlet.		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications Fig. 15070-1	~~Table 15070-2~~	0	
Project Drawings	90X-600-M-0026 6	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

~~Table 15070-2, Tank Data Sheet~~ Figure 15070-1 shows the distance from the finished floor to the 3" tank inlet to be 2' 9". Drawing No. 90X-6000-M-0026 6 shows the distance from the finished floor to the LCS to be 2' 8" and the distance from finished floor to the LDS to be 2' 6". Please advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood	The STAVER Group, Inc.	8/16/00	James C. Jenkins / James C. Jenkins	8/17/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

The correct distances are those shown on the construction drawings:
2' 8" to the LCS; and 2' 6" to the LDS.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 8/22/00 KWASI BADU-TWEREBOAH, GEOSYNTEC [ ] FIT [X] FORM [ ] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) N.A.	DATE:
(18) CONSTRUCTION CONCURRENCE DATE: PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

INFORMATION ONLY

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 4	(6) DATE 22 August 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111 - 012R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]	(4A) RCI/DCN TITLE: Drainage Channel Elevation		(11) DCN NO.: 20111 - 026

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
ELPTS Project Drawing	90X-6000-G00281 (G-3)	0	
Baumann Engineering Survey Data	Dated July 6, 2000		

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The existing drainage channel from Valve House 1 to the Rail Yard Entrance appears to be at a greater elevation than the invert of GIS-1. Please advise on the required path forward.

PROPOSE TO REVISE CONTROL POINT ELEVATIONS TO ENSURE DRAINAGE

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	8/22/00	James C. Jenkins	9/8/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

See pages 2, 3, 4 of 4 for finished grades and control point data.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 9/11/00 K. BADU-TWENEBOAH, GEOSYNTEC [ ] FIT [ ] FORM [ ] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) James C. Jenkins	DATE: 9/27/00
(18) CONSTRUCTION CONCURRENCE DATE: PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19) J. R. Hughes by JCJ	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

S-F-4259
REV. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO. C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of ~~1~~ 4	(6) DATE 9/27/00
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-013R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Embedment Depth of 1 ¼" Stainless Steel Flange Anchor Bolts		(11) DCN NO.: 20111-027

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Drawings	90X-6000-M-00270	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The 6" embedment depth of the 1 1/4" anchor bolts for the Stainless-Steel/ HDPE Flange combination is unattainable in some locations due to reinforcement interference. Please advise.

(10) REQUESTOR	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood	The STAVER Group, Inc.	9/27/00	JAMES C. JENKINS	9/27/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

SEE ATTACHED PAGES 2, 3, & 4

GEOSYNTEC RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 3 Oct 2000
KUMAR BABU-THEMBIAH, GEOSYNTEC

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 10/17/00

PERFORMANCE GRADE: (17) for James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE: 10-17-00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

F-4259
V. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111

(2) S/C NO.: FSC - 641

(5) Pg 1 Of 1

(6) DATE 28 September2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111 - 014R

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Support Guy Eelvation

(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Overhead Power Transmission Details II	90X-6000-E-00260	0	Sheet E-3
Overhead Power Transmission System Plan	90X-6000-E-00258	0	Sheet E-1

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The guy wire attachment elevations contained in the Guy Assembly Schedule on Sheet E1 do not allow installation of the lower guy to be at 9" below the crossarm as indicated in Detail 74 on Sheet E3. Please clarify the attachment locations of the guy wires.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	9/22/00	M.W. Griffin MWG	9-28-00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

Install lower guy at 9" below upper (top) crossarm.

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/12/00

KWASI BADU-TWEREBOAH, GEOSYNTEC

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

INFORMATION ONLY

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

10/4/00

Kwan

(014R, 015R)

- RCI's for Electrical question/clarification have already been answered as indicated. Please sign unless you have a question or don't agree.

- DCN-028 (RCI-016R)

This is acceptable to FF, however, I suggest that response include that Steven incorporate installation as part of their "plan" for tie-ins (ie submittal) ~~and~~ that

Thanks

Jim J.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE 28 September2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111-015R

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Pole Termination Hardware

(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Overhead Power Transmission Details II	90X-6000-E-00260	0	Sheet E-3
Overhead Power Transmission Details I	90X-6000-E-00259	0	Sheet E-2

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Work Pole (WP) 756 is termination pole similar to WP 561, but the insulator hardware is different. Should there be dead end insulators vs. pin insulators on WP 756 similar to WP 561. Please advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	9/22/00	M.W. Griffin MWGriffin	9-28-00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

Dead-end insulators are to be used on pole WP 756.

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/12/00
Kenneth Bards-Timenbach, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

ORIGINAL INFORMATION ONLY

FS-F-4259
REV. 5: 10/01/99

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE 03 October 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111 - 016R

(4) RESPONSIBLE DISCIPLINE: E. [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: VH East Wall HDPE Flatstock Plate Revision

(11) DCN NO.: 20111 - 028

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House and Control Valve House Mechanical Details II	90X-6000-M-00270	0	Sheet M6

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Since the first length of centralized piping located at the East walls of VH's 1-3 will be a pre-fabricated unit, installation will have to be from outside the VH into the inside. We propose to use split 1" flatstock HDPE plate at the inside East wall pipe penetrations for VH's 1-3 versus full diameter flatstock HDPE plate as shown on sheet M6 because the flatstock rings are larger in diameter than the pipe penetration grout rings. The split HDPE plate will similar to Detail III on sheet M6 and will be extrusion welded continuous to the wall liner per sheet details. Please advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	10/3/00	J. C. JENKINS	10/4/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

Proposed change should be incorporated in Contractor's tie-in plan (Section 02050) submittal.

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/12/00

[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 10/24/00

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE: 10-12-00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

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ECDC CONTROLLED COPY NO.

C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 of 2	(6) DATE 04 October 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-017R
(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Grounding Test Procedures		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	Section 16450, part 3.08	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The testing procedure outlined in specification 16450 requires individual ground rod testing as opposed to testing the completed grounding grid system after all ground wire connections are welded. We request to test the grounding as a completed grid systems, which is an accepted site practice. The overall resistance will be held to 5 ohms or less as indicated in the specification. Please advise on the grounding test procedures.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	10/4/00	James C. Jenkins	10/4/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

see page 2 of 2 for response.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10-13-00
KWASI BADU-TWENEBOAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A 10/24/00

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19) N.A. 10/24/00

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

S-F-4259
REV. 5: 10/01/99

ORIGINAL

DUPLICATE ORIGINAL

INFORMATION ONLY

Response to RCI No. 20111-017R
(Dated October 04, 2000)
(Page 2 of 2)

The following response has been prepared based on recommendations from Fluor Fernald Electrical Engineer and in accordance with site practice:

Test each pole ground separately and report resistance. Connect to all grounds on poles and report resistance. At building connect all grounding rods as indicated on Construction Drawings, test system and record resistance. If individual ground rods in the system are greater than 5 ohms add ground rod and check resistance. If resistance is above 25 ohms notify the Construction Manager for further resolution.

K Brian Kreinbach
10/13/00

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(KBT)

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 2	(6) DATE 04 October 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111 - 018R
(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: WP 561 Obstructions		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Overhead Power Transmission Details I	90X-6000-E-00259	0	Sheet E-2

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The existing guy on Work Pole (WP) 561 obstructs the installation of the new cross arms per Detail 64 on sheet E2. Also, the existing communication cable attached to the WP 561 obstructs the installation of the three(3) transformers per Detail 64. Please advise on the corrective actions required.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	10/4/00	James C. Jenkins JAMES C. JENKINS	10/4/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See Page 2 of 2 for response.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/13/00
KHASI BADU-TWEREBOAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FOR PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) NA 10/24/00

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)
NA 10/24/00

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

S-F-4259
REV. 5: 10/01/99

ORIGINAL

DUPLICATE ORIGINAL

INFORMATION ONLY

Response to RCI No. 20111-018R
(Dated October 04, 2000)
(Page 2 of 2)

The following response has been prepared based on recommendations from Fluor Fernald Electrical Engineer:

The existing guy wire requires moving and reconstruction. The guy should be moved so that it does not interfere with the new cross arm and a fiberglass rod would be required due to limited clearance to the live wiring. The communication wires must be coordinated with the Communication Group.

10/13/00

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

KBT

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 OF 2	(6) DATE 04 October 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-019R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]	(4A) RCI/DCN TITLE: CVH Subgrade		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	Section 02200	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

After field inspection of the Control Valve House (CVH) excavation, it appears there is unsuitable subgrade materials and excessive water infiltration. Per specification section 02200, a 1 foot overdig is required, followed by backfilling to subgrade elevation with approved materials. Due to excessive ground water conditions, a 1 foot overdig probably will not provide suitable subgrade conditions due to the location of the CVH slab relative to the water table. Please advise on the required method of backfill and ground stabilization methods required if such conditions are encountered.

James C. Jenkins

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	10/4/00	JAMES C. JENKINS	10/4/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See page 2 of 2

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/10/00

KRAFSI BADUS-TWEHEBOALE, GEOSYNTEC

[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL INFORMATION ONLY

Response to RCI No. 20111-019R
(Dated October 04, 2000)
(Page 2 of 2)

During a field inspection on Friday 6 October 2000, it was determined that ~~the~~ KBT most of the excessive water infiltration was from water flowing through the abandoned temporary leachate transmission system (LTS), running from south of the existing manhole No. 3 to immediately north of the permanent lift station (PLS). This temporary LTS was abandoned following construction of the interim LTS in 1999. It appears that the ends of the temporary LTS pipeline were not capped during abandonment, thereby causing water to accumulate in the dual-containment pipe. It is therefore recommended that the ends of the pipe should be capped to minimize continual flow of water into the control valve house (CVH) excavation.

Other questions regarding unsuitable subgrade due to groundwater seepage and surface water runoff/run-on have previously been clarified under RCI No. 20111-003.

It was also observed on Monday 9 October 2000 that the bottom of the CVH had been excavated to a deeper depth than the minimum 1-ft depth below the proposed subgrade elevation, filled with a No. 2 aggregate and an overlying geotextile prior to placement of the controlled density fill. While GeoSyntec does not have any technical concerns on the use of the No. 2 aggregate and geotextile below the CVH floor slab, it is requested that the EPLTS project team follow the submittal/review/approval process that has been established for the project.

KBarnwell
10/10/00

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/WO/REQ NO.: 20111 | (2) S/C NO.: F&C - 041 | (3) Pg 1 of 2 | (4) DATE 10-9-00

(5) S/C TITLE: OSOF Enhanced Permanent Leachate Transmission System Project | (11) RCI NO.: 20111-020R

(4) RESPONSIBLE DISCIPLINE: E [X] M [X] C [ ] OTHER [ ] | (4A) RCI/DCN TITLE: CEILING FANS | (11) DCN NO

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV	(8) OTHER
Spec. 15865 Pt. 2.03 A&B. rev. 0			
90x-6000-E-00261			
90x-6000-E-00262			

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED-PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Spec. 15865 does not list/state the CFM ~~requirements~~ requirements for the Ceiling fans for the Control Valve House & the Valve Houses. What CFM are required for each of the buildings. Please advise.

(10) REQUESTOR: [signature] COMPANY: B&J ELEC. CO. INC DATE: 10-9-00 | (12) CE/PE: J. C. Jenkins JAMES C. JENKINS DATE: 10/11/00

(13) RESPONSE: OR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See page 2 of 2 for response.

GEOSYNTEC — RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: [signature] 10/13/00 KYVASI BADU-TWEREBOAH, GEOSYNTEC [X] FIT [ ] FORM [ ] FUNCTION | (20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE

PERFORMANCE GRADE: (17) N.A. 10/24/00

(18) CONSTRUCTION CONCURRENCE DATE: | (21) FIELD WORK COMPLETED.

PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19) N.A. 10/24/00 | (SIGNOFF BY CE OR PE) DATE:

ORIGINAL DUPLICATE ORIGINAL INFORMATION ONLY

FS-F-4239 (REV. 5/10/99)

Response to RCI No. 20111-020R
(Dated October 09, 2000)
(Page 2 of 2)

- Fans are for mixing.
- Fans shall be industrial grade as indicated on the Construction Drawings.
- Furnish one (1) 36-in. blade sweep for the control valve house (CVH); and Six (6) 56-in. blade sweeps for the valve houses (VHs).

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(8) DATE 12 October 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-021R
(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Surge Arrestor Clarification		(11) DCN NO.: 20111-029

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Overhead Power Transmission System Details II	90X-6000-E-00260	0	Sheet E-3
Project Specifications	16400	0	Part 2.08

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Specification 16400, part 2.08 says the surge arrestors should have a rating of 15kV. Sheet E3, note 4E and the approved submittal 16400 – 002 rate the surge arrestors at 9kV. Please clarify the surge arrestor requirements.

CHANGE SPECIFICATION 16400 PART 2.08

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka	The STAVER Group, Inc.	10/12/00	M.W. Griffin	10-17-00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

The surge arrestors shall be 9kV. CHANGE 2ND SENTENCE IN 16400 PART 2.08 TO READ: "SHALL BE 15 kV VALVE TYPE EQUIPMENT WITH 9 kV FLASHOVER POINT FOR LIGHTNING ARRESSTOR

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/17/00

J.E. Kerl 10/17/00 KURASI BADU-THEMBAH

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 10/24/00

PERFORMANCE GRADE: (17) A.J. Cohrkuma

(18) CONSTRUCTION CONCURRENCE DATE: 10/24/00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19) by CG

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

ECDC CONTROLLED COPY NO.

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE 05 October 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111 – 022 R

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: WP 737 Location

(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Overhead Power Transmission System Plan	90X-6000-E-00258	0	Sheet E-1

INFORMATION ONLY

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The location Work Pole (WP) 737 does not allow for proper installation due to the location of the adjacent LTS HDPE piping. The distance from centerline of WP 737 to centerline of LTS piping is approximately 2'-3" based on coordinate information. Relocation of WP 737 will allow for proper installation and minimize schedule impact allowing high voltage lines to proceed after WP installation is completed. Please advise on corrective actions.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	10/5/00	James C. Jenkins JAMES C. JENKINS	10/5/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

Move WP 737 a minimum 2 ft to the east and as-built on red-line drawings

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/18/00

KIM ASI BADGS - GEOSYNTEC

[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LT52

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

KBT

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 2	(6) DATE October 23, 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-023R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]	(4A) RCI/DCN TITLE: ILTS Pipe dimension @ CVH		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Control Valve House Structural Details I	90X-6000-S-00276	0	Sheet S-6
Valve House & Control Valve House Foundation Excavation Plan	90X-6000-G-00252	0	Sheet G-15

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The dimension on sheet S-6 from the inside face of the Control Valve House (CVH) wall to the centerline of the ILTS HDPE piping is listed as 1'-6". Actual field dimensions measure out at 1'-10" at the North wall penetration and 1'-8 ¾" at the South wall penetration (the vertical dimensions is 2'-9" as listed on sheet S-6). The coordinates of the CVH slab are as listed on sheet G-15. Please advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE/PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	10/23/00	J. C. Jenkins James C. Jenkins	10/23/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See page 2 of 2 for response.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/24/00 K. Badu-Tweneboah, GEOSYNTEC [ ] FIT [X] FORM [ ] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) N.A.	DATE:
(18) CONSTRUCTION CONCURRENCE DATE: PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

INFORMATION ONLY

Response to RCI No. 20111-023R
(Dated October 23, 2000)
(Page 2 of 2)

- Excavate ILTS to the limits shown on Section B of Drawing G-15 (i.e., 25'-0" north of the Control Point).

- Position ILTS in formwork before concrete placement for the North and South walls such that the centerline is parallel to the East-West walls as close to the 1'-6" centerline dimension as possible.

- Position EPLTS similarly in North wall formwork such that it is parallel to the East-West walls and as close to the 2'-6" centerline dimension as possible.

- Record as-built on red-line drawings.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111

(2) S/C NO.: FSC 641

(5) Pg 1 of 3

(6) DATE: 10/26/00

(3) S/C TITLE: OSDF ENHANCED PERM. LEACHATE TRANS. SYSTEM PROJ.

(11) RCI NO.: 20111 - 024R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: SAMPLING PORT CLARIFICATION

(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
90X-6000-M-00265		0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

- SAMPLING PORTS SHOWN ON P&ID DOWN STREAM OF FLOW METERS ARE NOT SHOWN ON MECH. PIPE SECTIONS
- NEED TO CLARIFY

(10) REQUESTOR: J.C. JENKINS COMPANY: FFI DATE: 10/26/00

(12) CE/PE: J.C. JENKINS DATE: 10/26/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

SEE ATTACHED PAGES 2 & 3

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/31/00

KURT BADU-TWEBEBAH, GEOSYNTEC

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) NA.

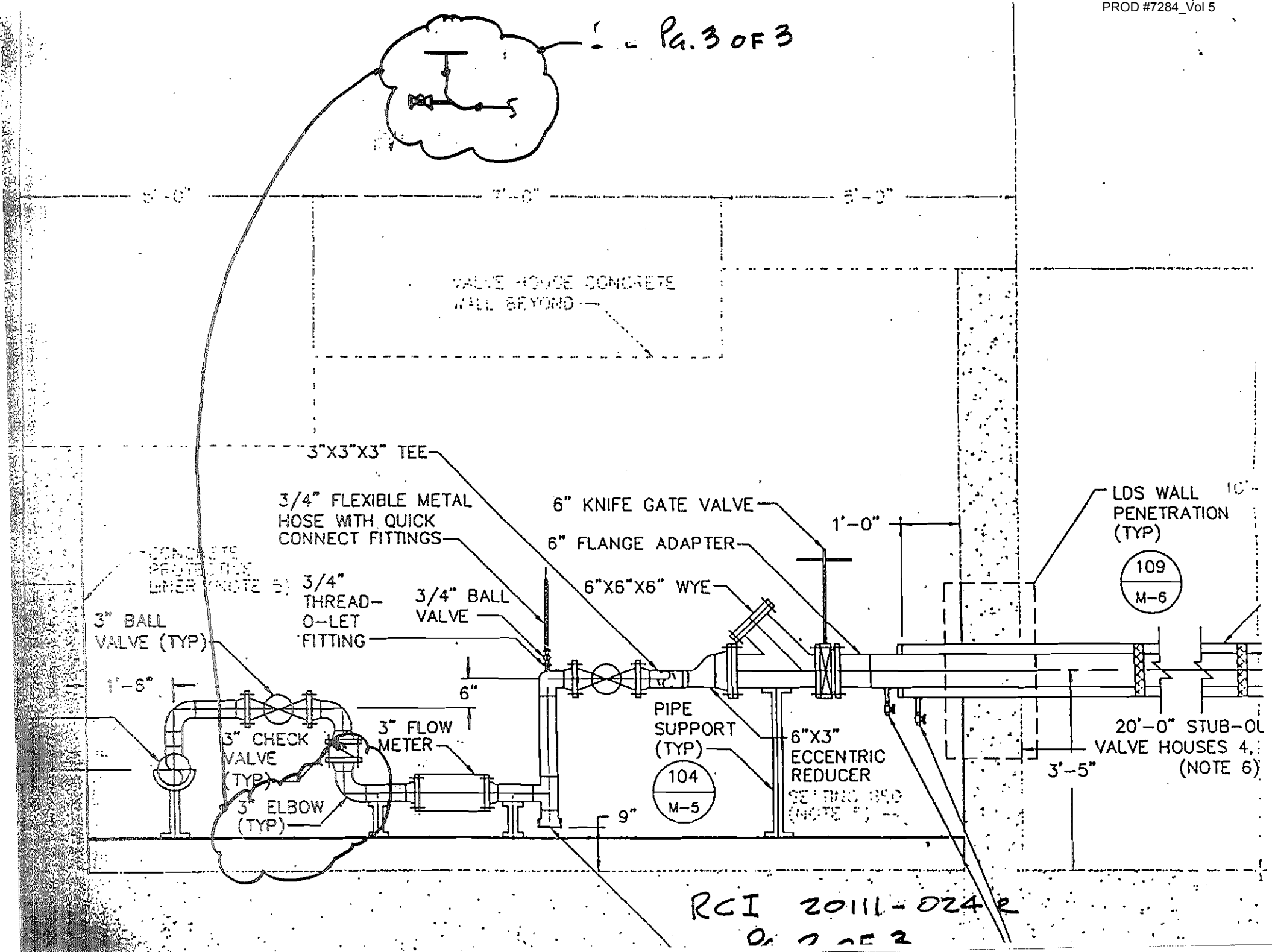
(18) CONSTRUCTION CONCURRENCE DATE: N.A.

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99



RCI 20111-024 R
Pg 2 of 3

- PROVIDE 2 - 3/4" THREADED ELBOLETS AT EACH VALVE HOUSE (LCS & LDS) WITH 3/4" NON - CORROSIVE INSERT AND 3/4" BALL VALVE

- VALVE NUMBERS FROM P&ID, SHEET M-1 ARE

VALVE HOUSE	VALVE NOS.
1	V-117, V-137
2	V-217, V-237
3	V-317, V-337
4	V-417, V-437
5	V-517, V-537
6	V-617, V-637

RCI 20111-024R

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 OF 2	(6) DATE 11/01/00
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-025R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: LTS Monitoring Port 3/4" Service Saddle Length		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Drawings	90X-6000-M-00265	0	
Project Drawings	90X-6000-M-00266	0	
Project Drawings	90X-6000-M-00267	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The length of the 3/4" Monitoring Port Service Saddle, as shown on the above referenced drawings, does not provide sufficient clearance for the installation of the 3/4' PVC Valve. Please Advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood Ron Wood	The STAVER Group, Inc.	11/01/00	James C. Jenkins	11/01/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

SEE Pg. 2

GEO SYNTEC RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 11/14/00
Bryan Brown-Twentbank, Geosyntec
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

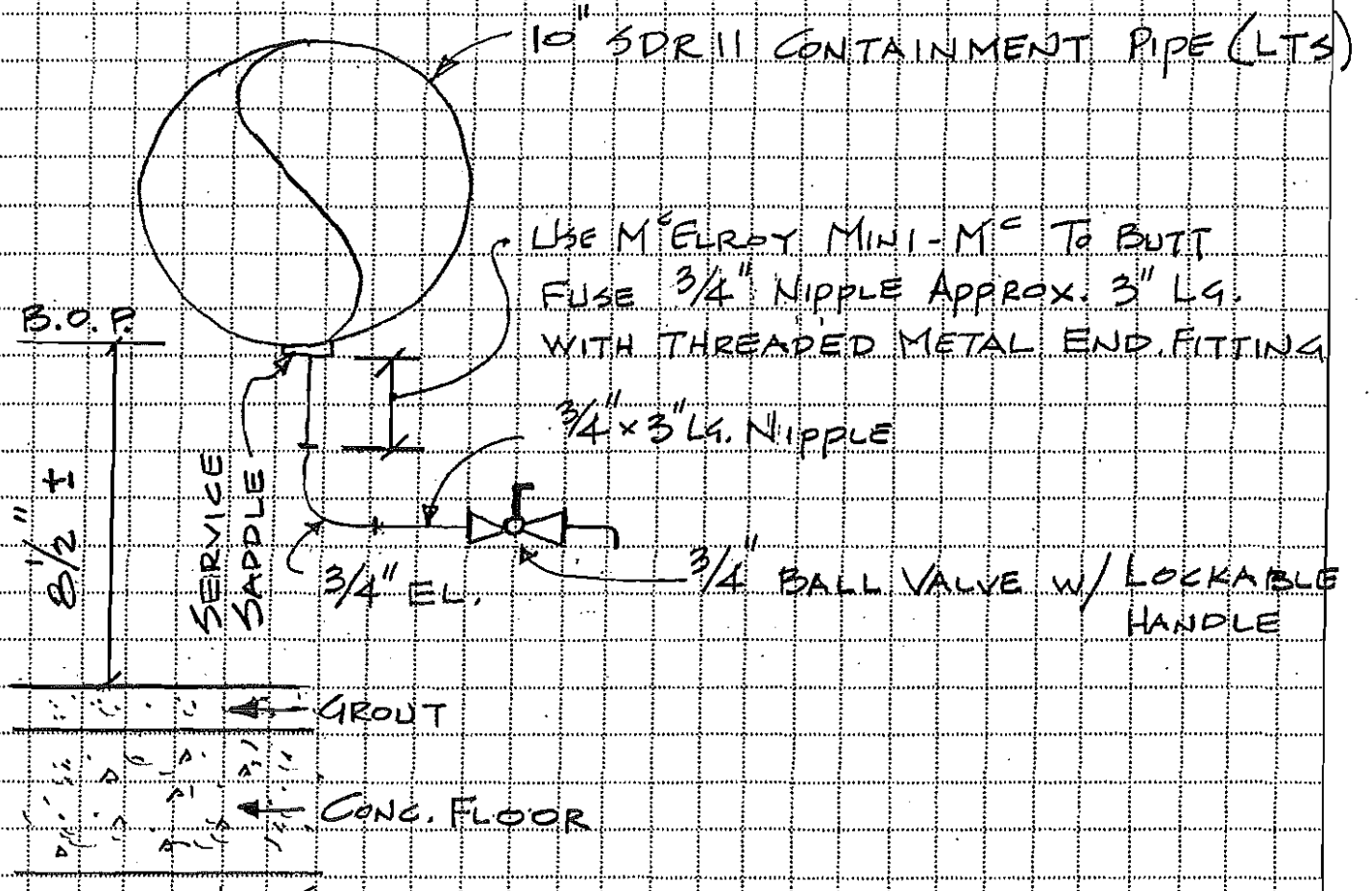
INFORMATION ONLY

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

ENGINEERING CALCULATION

PROJECT NUMBER:	
BY:	DATE:
CHECKED BY:	DATE:
PAGE	OF
REVISED:	

SUBJECT: MONITORING PORT - LTS



NO SCALE

NOTE: SUBMIT OPERATING INSTRUCTIONS FOR M^cELROY MINI-M^c

TYPICAL @ NORTH WALL OF VALVE HOUSES 2-6 AND CONTROL V.H.

RCI 20111-025R

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111 | (2) S/C NO.: FSC - 641 | (5) Pg 1 Of 1 | (6) DATE 11/07/00

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project | (11) RCI NO.: 20111-026R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ] | (4A) RCI/DCN TITLE: Painting of Carbon Steel Pipe | (11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	09900-1.01-B	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

We interpret Technical Specification Section 09900-1.01-B to exclude carbon steel piping covered with condensation insulation from receiving paint. Only exposed, uninsulated carbon steel piping & support devices are scheduled to receive paint. Please verify.

(10) REQUESTOR: Ron Wood | COMPANY: The STAVER Group, Inc. | DATE: 11/07/00 | (12) CE / PE: James C. Jenkins | DATE: 10/08/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

SPEC. 09900 - 1.01 B.(1) "INCLUDES CARBON STEEL PIPING IN VALVE HOUSES AND CONTROL VALVE HOUSE."
CARBON STEEL PIPING SHALL BE PAINTED AND INSULATED IN ACCORDANCE WITH PLANS AND SPECIFICATIONS.

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 11/14/00
KARTASI BADU-TWEREBOAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

INFORMATION ONLY

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 2	(6) DATE 01/08/01
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111 - 027 RJK 01/10/01
(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Mounting Height of Unit Heaters		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	Section 15500	0	
Project Drawings	90X-6000-E-00261		

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Please provide a mounting height for the unit heaters to be located in VH'S 1-6 and the CVH.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood	The STAVER Group, Inc.	01/08/01	James C. Jenkins	1/10/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

MOUNT UNIT HEATERS (U.H.) AS HIGH AS POSSIBLE ON THE CONCRETE WALLS AT THE LOCATIONS SHOWN. USE A WALL MOUNTING BRACKET AS SHOWN ON PG. 2 OF 2.

GEOSYNTEC

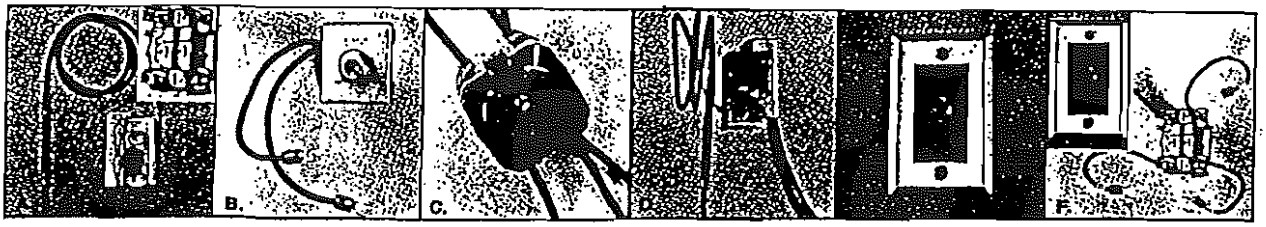
RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 1/10/2001 KWASI BADU-TWENEBOAH, GEOSYNTEC [ ] FIT [ ] FORM [X] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) N.A.	DATE:
(18) CONSTRUCTION CONCURRENCE DATE: PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

INFORMATION ONLY

SATELLITE CONTROL KITS INSTALL EASILY IN THE FIELD TO CLEARLY MARKED TERMINALS



Heat recovery thermostat & low voltage relay | Summer fan switch | Power disconnect switch (25 or 63 amp) | One & two-stage thermostats | Remote manual fan switch (line voltage) | Remote manual fan switch (with relay) 24V

Specifications

Cat. No.	Accessory	Electrical Rating	Use with Heater No.
MT-1	Single Pole Internal Thermostat Temp Range: 40°F—85°F	25A; 120, 240V. A.C. Res. 22A; 277V. A.C. Res.	All MUH Series Heaters (except MUH05-21 30, and MUH05-81 30, which use MT-2).
MT-2	Two-Stage Internal Thermostat Temp Range: 40°F—85°F	25A; 120, 240V. A.C. Res. 22A; 227V. A.C. Res. 125V. A; Pilot Duty	MUH05-21 30, MUH05-81 30, MUH-15-8, MUH-20-8, MUH-25-2, MUH-30-2, MUH-30-8, MUH-40-2, MUH-40-4, MUH-50-2, MUH-50-4, MUH-50-8.
MCFS	Internal Summer Fan Switch	6A; 600V. A.C. Res. 2HP; 250, 480, 600V. A.C. 1, 2, or 3Ø	All MUH Series Heaters.
MRFS-1	Remote Summer Fan Switch (Line Voltage)	2HP; 250-480V. A.C.	All MUH Series Heaters.
MRFS-2	Remote Summer Fan Switch with Relay (24V Coil-Single Pole Normally Open)	8 AFL, 35 ALR, 250V. A.C. 60 HZ 3 AFL, 18 ALR, 480V. A.C. 60 HZ	All MUH Series Heaters (except MUH03-21, MUH03-71, MUH03-81, MUH05-21, MUH05-71, MUH05-81 Units, unless optional control transformer is supplied).
MHRT	Heat Recovery Thermostat with Relay (24V Coil-Single Pole Normally Open) Hi—120°F; Low—60°F	8 AFL, 35 ALR, 250V. A.C. 60 HZ 3 AFL, 18 ALR, 480V. A.C. 60 HZ	All MUH Series Heaters (except MUH03-21, MUH03-71, MUH03-81, MUH05-21, MUH05-71, MUH05-81 Units, unless optional control transformer is supplied).
MPDS-25	Power Disconnect Switch (3 Pole)	25A, 600V. A.C. Res.	MUH03-21, MUH03-41, MUH03-71, MUH03-81, MUH05-21, MUH05-41, MUH05-71, MUH05-81, MUH-07-4, MUH-10-4, MUH-15-4, MUH-20-4.
MPDS-60	Power Disconnect Switch (3 Pole)	63A, 600V. A.C. Res.	MUH-07-2, MUH-07-7, MUH-07-8, MUH-10-2, MUH-10-7, MUH-10-8, MUH-15-2, MUH-15-8 3Ø only. MUH-20-2, MUH-20-8, MUH-25-2, MUH-25-4, MUH-30-4, MUH-40-4, MUH-50-4.

NOTE: *Summer Fan Switch MCFS cannot be used with Remote Fan Switch/Relay MRFS-2 or with Heat Recovery Thermostat/Relay MHRT.
**MHRT cannot be used with MT-1 or MT-2.

Dimension Data

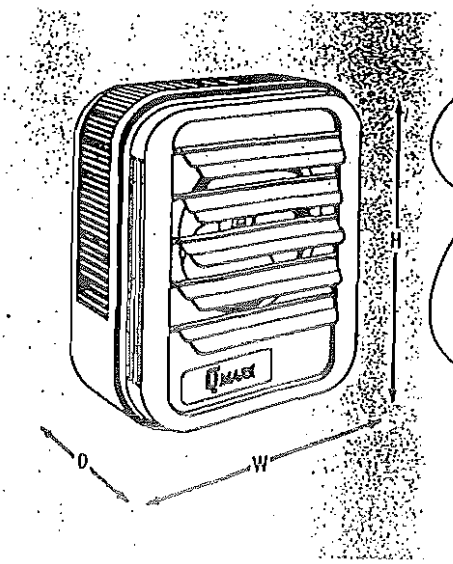
Cat. No.	Height	Width	Depth
MUH-03 & 05	16"	14"	[illegible]
MUH-07 & 10	21¾"	19"	[illegible]
MUH-15 & 20	21¾"	19"	12¼"
MUH-25 & 30	30"	26¾"	11¾"
MUH-40 & 50	30"	26¾"	17¼"

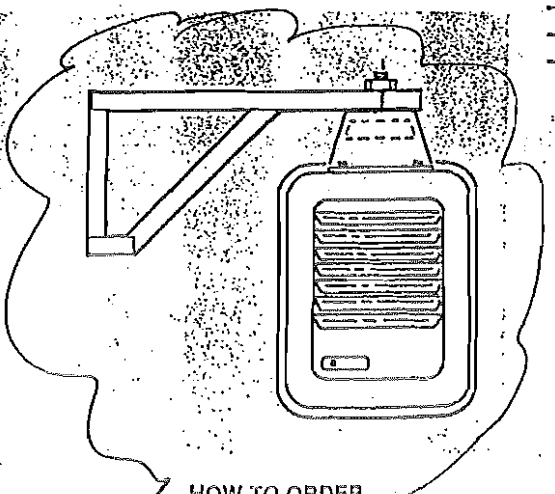
Universal Wall & Ceiling Mounting Bracket

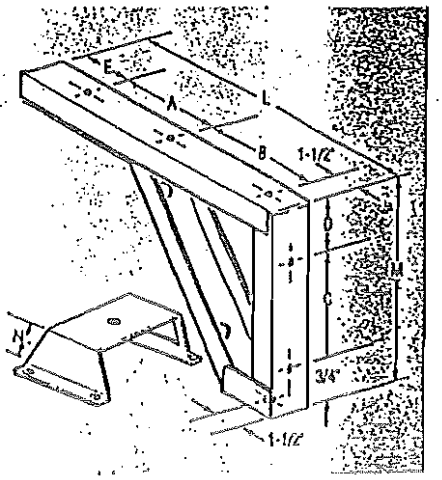
Cat. No.	Used On
MMB-5	MUH-03 & 05
MMB-10	MUH-07 & 10
MMB-20	MUH-15 & 20
MMB-30	MUH-25 & 30
MMB-50	MUH-40 & 50

Bracket Size

DIM	3-5Kw	7.5-20Kw	25-50Kw
A	4 7/16"	7¼"	[illegible]
B	6¾"	9¼"	[illegible]
C	5"	7¼"	12¼"
D	1 1/16"	1 11/16"	2 1/16"
E	2"	2¼"	2 1/16"
L	14 5/16"	20¼"	28 5/16"
M	6 1/16"	9 15/16"	14 11/16"
N	2½"	3¼"	4½"







HOW TO ORDER

When ordering specify the following:
Basic Unit Heater
Qty ___ Cat. No. ___ Kw ___ Volts ___ Phase ___
Optional Control Kits
Qty ___ Cat. No. ___
Optional Mounting Brkt.
Qty ___ Cat. No. ___

RCI 2011-027

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE 01/11/01
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-028R
(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Unit Heater Conduit Size		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	Section 16110	0	
Project Drawings	90X-6000-E-0262	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Project Drawings show 1" diameter RGS to be routed to the Unit Heaters. We propose to use 3/4" RGS in lieu of the 1". Please Advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood Ron Wood	The STAVER Group, Inc.	01/11/01	James C. Jenkins JAMES C. JENKINS	1/11/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

3/4" RGS IS ACCEPTABLE FOR WIRE SIZE AND NUMBER INDICATED. INCORPORATE ON AS-BUILT DWGS.

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RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: Collin P. Gibson 12 Jan 2001 [X] FIT [ ] FORM [ ] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:	(21) FIELD WORK COMPLETED:
PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)	(SIGNOFF BY CE OR PE) DATE:

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EV. 5: 10/01/99

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 2	(6) DATE
20111	FSC-641		1/12/2001

(3) S/C TITLE: OSDF ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM PROJECT

(11) RCI NO.: 20111- 029R

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: MEGGER TESTING

(11) DCN NO.: 20111 - 035

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
TECHNICAL SPECIFICATIONS	16050-3.06-A, B, C	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

The Specifications indicate that all conductors with insulation rated for 600v be megger tested. All of the conductors on this project have insulation rated at 600v. Could clarification be provided as to which conductors/circuits need megger testing. A large number of circuits on this job are 110v, which are not normally megger tested.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Brian S. Wheeler	Fluor Fernald	1/12/01	James C. Jenkins	1/16/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

DELETE PARAGRAPHS 3.06 A., B. & C.
REPLACE WITH NEW PARAGRAPHS (SEE SHEET 2 OF 2) TO CONFORM TO CURRENT FEMP STANDARDS.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 1 Feb 2001

[ ] FIT [ ] FORM [X] FUNCTION for Jay Beach 24 Jan 2001

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 2/01/01

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE: 02/01/01

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

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REV. 5: 10/01/99

ECDC CONTROLLED COPY NO. C01

3.06 TESTING DURING INSTALLATION

A. All electrical equipment, materials and systems installed shall be thoroughly tested for satisfactory operation in accordance with applicable industry standards and as herein specified to determine compliance with the Drawings and Specifications.

B. Wire and cable shall be visually inspected prior to installation for faulty insulation. Before connection to equipment, all wire shall be tested for resistance to ground.

C. Perform insulation resistance test on 480-volt circuits and on motors phase to ground after installation and before energizing. Investigate causes and take remedial action when insulation resistance tests indicate a significant downward trend in the resistance readings. Insulation resistance shall be one megohm or greater.

D. Do not perform insulation resistance test of circuits operated at or below120 volts, on solid state equipment, static ground fault devices, including ground fault circuit interrupters, or on any circuit connected to equipment containing solid state devices, unless such test is authorized by, and is performed in strict accordance with equipment manufacturer's recommendations.

E. Provide all test results to CQC Engineer.

RCI 20111-029R
DCN 20111-035

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 20	(6) DATE
20111	FSC-641		1/17/2001

(3) S/C TITLE: OSDF ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM PROJECT

(11) RCI NO.: 20111- 030 R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: HYDROSTATIC TESTING OF CARBON STEEL

(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
TECHNICAL SPECIFICATIONS	15060-3.08-D	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The Specifications indicate that carbon steel pipe shall be tested at 60psi for a period of 3 hours. Can the test time be reduced to the ASME B31.3 code requirements for carbon steel testing as indicated in the attached.

Attached is ASME B31.3-1993 edition. Page 82, section 345.2.2(a) A leak test shall be maintained for at least 10 minutes, and all joints and connections shall be examined for leaks.

(10) REQUESTOR	COMPANY:	DATE:	(12) CE / PE	DATE:
Brian S. Wheeler	Fluor Fernald	1/17/2001	James C. Jenkins	1/23/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

- ASME B31.3 STATES THAT TEST SHALL BE AT LEAST 10 MIN.
- TO BE CONSISTENT WITH HDPE PIPE TESTING AND SCRUTINY ON THE EPLTS PROJECT, THE CARBON STEEL PIPING SHALL BE TESTED AS SPECIFIED.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 23 Jan 2001

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

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recognizing the hazard of energy stored in compressed gas.

(c) Where the owner considers both hydrostatic and pneumatic leak testing impracticable, the alternative specified in para. 345.9 may be used if both of the following conditions apply:

(1) a hydrostatic test would damage linings or internal insulation, or contaminate a process which would be hazardous, corrosive, or inoperative in the presence of moisture, or would present the danger of brittle fracture due to low metal temperature during the test; and

(2) a pneumatic test would present an undue hazard of possible release of energy stored in the system, or would present the danger of brittle fracture due to low metal temperature during the test.

345.2 General Requirements for Leak Tests

Requirements in para. 345.2 apply to more than one type of leak test.

345.2.1 Limitations on Pressure

(b) *(a) Stress Exceeding Yield Strength.* If the test pressure would produce a stress in excess of yield strength at test temperature, the test pressure may be reduced to the maximum pressure that will not exceed the yield strength at test temperature. [See paras. 302.3.2(e) and (f).]

(b) Test Fluid Expansion. If a pressure test is to be maintained for a period of time and the test fluid in the system is subject to thermal expansion, precautions shall be taken to avoid excessive pressure.

(c) Preliminary Pneumatic Test. A preliminary test using air at no more than 25 psi (170 kPa) gage pressure may be made prior to hydrostatic testing to locate major leaks.

345.2.2 Other Test Requirements

(a) Examination for Leaks. A leak test shall be maintained for at least 10 min, and all joints and connections shall be examined for leaks.

(b) Heat Treatment. Leak tests shall be conducted after any heat treatment has been completed.

(c) Low Test Temperature. The possibility of brittle fracture shall be considered when conducting leak tests at metal temperatures near the ductile–brittle transition temperature.

345.2.3 Special Provisions for Testing

(a) Piping Subassemblies. Piping subassemblies may be tested either separately or as assembled piping.

(b) Flanged Joints. A flanged joint at which a blank is inserted to isolate other equipment during a test need not be tested.

345.2.4 Externally Pressured Piping. Piping subject to external pressure shall be tested at an internal gage pressure 1.5 times the external differential pressure, but not less than 15 psi (103 kPa).

345.2.5 Jacketed Piping

(a) The internal line shall be leak tested on the basis of the internal or external design pressure, whichever is critical. This test must be performed before the jacket is completed if it is necessary to provide visual access to joints of the internal line as required by para. 345.3.1.

(b) The jacket shall be leak tested in accordance with para. 345.1 on the basis of the jacket design pressure unless otherwise specified in the engineering design.

345.2.6 Repairs or Additions After Leak Testing. If repairs or additions are made following the leak test, the affected piping shall be retested, except that for minor repairs or additions the owner may waive retest requirements when precautionary measures are taken to assure sound construction.

345.2.7 Test Records. Records shall be made of each piping system during the testing, including:

(a) date of test
(b) identification of piping system tested
(c) test fluid
(d) test pressure
(e) certification of results by examiner

These records need not be retained after completion of the test if a certification by the Inspector that the piping has satisfactorily passed pressure testing as required by this Code is retained.

345.3 Preparation for Leak Test

345.3.1 Joints Exposed. All joints, including welds and bonds, are to be left uninsulated and exposed for examination during leak testing, except that joints previously tested in accordance with this Code may be insulated or covered. All joints may be primed and painted prior to leak testing unless a sensitive leak test (para. 345.8) is required. (c)

345.3.2 Temporary Supports. Piping designed for vapor or gas shall be provided with additional temporary supports, if necessary, to support the weight of test liquid.

345.3.3 Expansion Joints. Expansion joints shall be tested without temporary restraint at the lesser of the

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE 01/18/01
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-031R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Teel Drum Pumps		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Drawings	90X-6000-G-00251	0	
Technical Specifications	15070-2.02,Table 15070-1	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The specified electric drum pump: Teel Model 3P652B is manufactured with pump intake tube of 35 1/2" in length. The HDPE Tanks are 42" in depth. The bottom of the intake tube after installation, is approximately 9" to 10" off of the tank bottom. Please verify that this was the intended design.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood	The STAVER Group, Inc.	01/18/01	James C. Jenkins	1/25/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

TEEL PUMP MODEL 3P652B WITH 35½" INTAKE TUBE AND THE 42" DEEP HDPE TANKS ARE AS SPECIFIED. HOWEVER, THE PUMP INTAKE TUBE SHOULD BE EXTENDED TO THE BOTTOM OF THE TANK USING RIGID POLYETHYLENE TUBING. THE TUBING SHOULD BE CLAMPED AS NEEDED TO ALLOW PUMP INSTALLATION & REMOVAL THROUGH THE 2" BULKHEAD FITTING. BOTTOM OF TUBING EXTENSION SHALL BE CUT @ 45°.

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: Collin P. Sutton 29 Jan 2001

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of ~~1~~ 15	(6) DATE 2/1/01
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-032R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: LTS Monitoring/Sampling Port Valve Identification		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Drawings	90X-6000-M-00263	0	
Technical Specifications	Section 15190	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Valve Numbers for the LTS sampling and monitoring ports are not shown on the Piping and Identification Drawings. Please advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood Ron Wood	The STAVER Group, Inc.	2/1/01	James C. Jenkins JAMES C. JENKINS	2/01/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

- SEE ATTACHED PAGES 2 THRU 15
- INCORPORATE AS AS-BUILTS ON DRAWINGS & SPECS.

GEOSYNTEC RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: Collin F. Jackson 1 Feb 2001 [X] FIT [ ] FORM [ ] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) N.A.	DATE:
(18) CONSTRUCTION CONCURRENCE DATE: PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

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INFORMATION ONLY

TABLE 15190-1
VALVE LABEL LIST
VALVE HOUSE 1

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

V-111 LDS CONTAINMENT MONITORING PORT	V-121 RLCS CONTAINMENT ~~MONIOTRING~~ MONITORING PORT	V-137 LCS SAMPLE PORT
V-112 LDS CARRIER SAMPLE PORT	V-122 RLCS CARRIER SAMPLE PORT	V-138 LCS CHECK VALVE
V-113 LDS FROM CELL	V-123 RLCS FROM CELL	V-139 LCS TO LTS LINE
V-114 LDS TANK BYPASS	V-131 LCS CONTAINMENT MONITORING PORT	V-150 LTS HOSE CONNECT
V-115 LDS TANK INLET	V-132 LCS CARRIER SAMPLE PORT	V-160 LTS HEADER BLOCK
V-116 LDS TANK OUTLET	V-133 LCS FROM CELL	
V-117 LDS SAMPLE PORT	V-134 LCS ~~FROM CELL~~ TANK BYPASS	
V-118 LDS CHECK VALVE	V-135 LCS TANK INLET	
V-119 LDS TO LTS LINE	V-136 LCS TANK OUTLET	

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TABLE 15190-2
VALVE LABEL LIST
VALVE HOUSE 2

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

MONITORING

V-211 LDS CONTAINMENT MONITORING PORT	V-221 RLCS CONTAINMENT ~~MONIOTRING~~ PORT	V-237 LCS SAMPLE PORT
V-212 LDS CARRIER SAMPLE PORT	V-222 RLCS CARRIER SAMPLE PORT	V-238 LCS CHECK VALVE
V-213 LDS FROM CELL	V-223 RLCS FROM CELL	V-239 LCS TO LTS LINE
V-214 LDS TANK BYPASS	V-231 LCS CONTAINMENT MONITORING PORT	V-250 LTS HOSE CONNECT
V-215 LDS TANK INLET	V-232 LCS CARRIER SAMPLE PORT	V-260 LTS HEADER BLOCK
V-216 LDS TANK OUTLET	V-233 LCS FROM CELL	V-261 LTS CONTAINMENT MONITORING PORT (New)
V-217 LDS SAMPLE PORT	V-234 LCS ~~FROM CELL~~ ← TANK BYPASS	
V-218 LDS CHECK VALVE	V-235 LCS TANK INLET	
V-219 LDS TO LTS LINE	V-236 LCS TANK OUTLET	

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TABLE 15190-3
VALVE LABEL LIST
VALVE HOUSE 3

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

V-311 LDS CONTAINMENT MONITORING PORT	V-321 RLCS CONTAINMENT ~~MONIOTRING~~ PORT MONITORING	V-337 LCS SAMPLE PORT
V-312 LDS CARRIER SAMPLE PORT	V-322 RLCS CARRIER SAMPLE PORT	V-338 LCS CHECK VALVE
V-313 LDS FROM CELL	V-323 RLCS FROM CELL	V-339 LCS TO LTS LINE
V-314 LDS TANK BYPASS	V-331 LCS CONTAINMENT MONITORING PORT	V-350 LTS HOSE CONNECT
V-315 LDS TANK INLET	V-332 LCS CARRIER SAMPLE PORT	V-360 LTS HEADER BLOCK
V-316 LDS TANK OUTLET	V-333 LCS FROM CELL	V-361 LTS CONTAINMENT MONITORING PORT (New)
V-317 LDS SAMPLE PORT	V-334 LCS ~~FROM CELL~~ ← TANK BYPASS	
V-318 LDS CHECK VALVE	V-335 LCS TANK INLET	
V-319 LDS TO LTS LINE	V-336 LCS TANK OUTLET	

TABLE 15190-4
VALVE LABEL LIST
VALVE HOUSE 4

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

V-411 LDS CONTAINMENT MONITORING PORT	V-421 RLCS CONTAINMENT ~~MONIOTRING~~ MONITORING PORT	V-437 LCS SAMPLE PORT
V-412 LDS CARRIER SAMPLE PORT	V-422 RLCS CARRIER SAMPLE PORT	V-438 LCS CHECK VALVE
V-413 LDS FROM CELL	V-423 RLCS FROM CELL	V-439 LCS TO LTS LINE
V-414 LDS TANK BYPASS	V-431 LCS CONTAINMENT MONITORING PORT	V-450 LTS HOSE CONNECT
V-415 LDS TANK INLET	V-432 LCS CARRIER SAMPLE PORT	V-460 LTS HEADER BLOCK
V-416 LDS TANK OUTLET	V-433 LCS FROM CELL	V-461 LTS CONTAINMENT MONITORING PORT (New)
V-417 LDS SAMPLE PORT	V-434 LCS ~~FROM CELL~~ ← TANK BYPASS	
V-418 LDS CHECK VALVE	V-435 LCS TANK INLET	
V-419 LDS TO LTS LINE	V-436 LCS TANK OUTLET	

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TABLE 15190-5
VALVE LABEL LIST
VALVE HOUSE 5

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

V-511 LDS CONTAINMENT MONITORING PORT	V-521 RLCS CONTAINMENT MONITORING PORT	V-537 LCS SAMPLE PORT
V-512 LDS CARRIER SAMPLE PORT	V-522 RLCS CARRIER SAMPLE PORT	V-538 LCS CHECK VALVE
V-513 LDS FROM CELL	V-523 RLCS FROM CELL	V-539 LCS TO LTS LINE
V-514 LDS TANK BYPASS	V-531 LCS CONTAINMENT MONITORING PORT	V-550 LTS HOSE CONNECT
V-515 LDS TANK INLET	V-532 LCS CARRIER SAMPLE PORT	V-560 LTS HEADER BLOCK
V-516 LDS TANK OUTLET	V-533 LCS FROM CELL	V-561 LTS CONTAINMENT MONITORING PORT (New)
V-517 LDS SAMPLE PORT	V-534 LCS ~~FROM CELL~~ ← TANK BYPASS	
V-518 LDS CHECK VALVE	V-535 LCS TANK INLET	
V-519 LDS TO LTS LINE	V-536 LCS TANK OUTLET	

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TABLE 15190-6
VALVE LABEL LIST
VALVE HOUSE 6

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

V-611 LDS CONTAINMENT MONITORING PORT	V-621 RLCS CONTAINMENT MONITORING PORT	V-637 LCS SAMPLE PORT
V-612 LDS CARRIER SAMPLE PORT	V-622 RLCS CARRIER SAMPLE PORT	V-638 LCS CHECK VALVE
V-613 LDS FROM CELL	V-623 RLCS FROM CELL	V-639 LCS TO LTS LINE
V-614 LDS TANK BYPASS	V-631 LCS CONTAINMENT MONITORING PORT	V-650 LTS HOSE CONNECT
V-615 LDS TANK INLET	V-632 LCS CARRIER SAMPLE PORT	V-660 LTS HEADER BLOCK
V-616 LDS TANK OUTLET	V-633 LCS FROM CELL	V-661 LTS CONTAINMENT MONITORING PORT (New)
V-617 LDS SAMPLE PORT	V-634 LCS ~~FROM CELL~~ ← TANK BYPASS	
V-618 LDS CHECK VALVE	V-635 LCS TANK INLET	
V-619 LDS TO LTS LINE	V-636 LCS TANK OUTLET	

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TABLE 15190-7
VALVE LABEL LIST
CONTROL VALVE HOUSE

V-1001 LTS HEADER BLOCK
V-1002 LTS MOTORIZED VALVE
V-1003 LTS HEADER BLOCK
V-1004 INTERIM LTS HEADER BLOCK

New labels

V-1005
LTS
HOSE CONNECT

V-1006
LTS CONTAINMENT
MONITORING PORT

V-1007
LTS CONTAINMENT
MONITORING PORT

V-1008
ILTS CONTAINMENT
MONITORING PORT

V-1009
LTS SAMPLE
& DRAIN PORT

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TABLE 15190-8
EQUIPMENT LABEL LIST

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

VALVE HOUSE 1

PMP-101 LDS Pump LP 1- 2	T-101 LDS Tank
PMP-102 LCS Pump LP 1- 4	T-102 LCS Tank
UH-1A Heater LP 1- 5, 7	Receptacles LP 1- 12, 14
UH-1B Heater LP 1- 9, 11	Interior Lights LP 1- 15
~~EF-1~~ B-1 ~~Exhaust Fan~~ Blower LP 1- 6	Exterior Wall Pack Lights LP 1- 13
F-1 Ceiling Fan LP 1- 8	

RCI 20111-032R
Pg. 9 of 15

TABLE 15190-9
EQUIPMENT LABEL LIST

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

VALVE HOUSE 2

PMP-201 LDS Pump LP 2- 2	T-201 LDS Tank
PMP-102 LCS Pump LP 2- 4	T-202 LCS Tank
UH-2A Heater LP 2- 5, 7	Receptacles LP 2- 12, 14
UH-2B Heater LP 2- 9, 11	Interior Lights LP 2- 15
~~EF-2~~ B-2 ~~Exhaust Fan~~ Blower LP 2- 6	Exterior Wall Pack Lights LP 2- 13
F-2 Ceiling Fan LP 2- 8	

RCI 20111-032R
Pg. 10 of 15

TABLE 15190-10
EQUIPMENT LABEL LIST

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

VALVE HOUSE 3

PMP-301 LDS Pump LP 3- 2	T-301 LDS Tank
PMP-302 LCS Pump LP 3- 4	T-302 LCS Tank
UH-3A Heater LP 3- 5, 7	Receptacles LP 3- 12, 14
UH-3B Heater LP 3- 9, 11	Interior Lights LP 3- 15
~~EF 3~~ B-3 ~~Exhaust Fan~~ Blower LP 3- 6	Exterior Wall Pack Lights LP 3- 13
F-3 Ceiling Fan LP 3- 8	

RCL 20111-032R
PG. 14 OF 15

TABLE 15190-11
EQUIPMENT LABEL LIST

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

VALVE HOUSE 4

PMP-401 LDS Pump LP 4- 2	T-401 LDS Tank
PMP-402 LCS Pump LP 4- 4	T-402 LCS Tank
UH-4A Heater LP 4- 5, 7	Receptacles LP 4- 12, 14
UH-4B Heater LP 4- 9, 11	Interior Lights LP 4- 15
~~EF-4~~ B-4 ~~Exhaust Fan~~ Blower LP 4- 6	Exterior Wall Pack Lights LP 4- 13
F-3 Ceiling Fan LP 4- 8	

RCI 20111-032R
Pg. 12 OF 15

TABLE 15190-12
EQUIPMENT LABEL LIST

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

VALVE HOUSE 5

PMP-501 LDS Pump LP 5- 2	T-501 LDS Tank
PMP-502 LCS Pump LP 5- 4	T-502 LCS Tank
UH-5A Heater LP 5- 5, 7	Receptacles LP 5- 12, 14
UH-5B Heater LP 5- 9, 11	Interior Lights LP 5- 15
~~EF-5~~ B - 5 ~~Exhaust Fan~~ Blower LP 5- 6	Exterior Wall Pack Lights LP 5- 13
F-5 Ceiling Fan LP 5- 8	

RCI 20111-032R
PG. 13 OF 15

TABLE 15190-13
EQUIPMENT LABEL LIST

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

VALVE HOUSE 6

PMP-601 LDS Pump LP 6- 2	T-601 LDS Tank
PMP-602 LCS Pump LP 6- 4	T-602 LCS Tank
UH-6A Heater LP 6- 5, 7	Receptacles LP 6- 12, 14
UH-6B Heater LP 6- 9, 11	Interior Lights LP 6- 15
~~EF-6~~ B-6 ~~Exhaust Fan~~ Blower LP 6- 6	Exterior Wall Pack Lights LP 6- 13
F-6 Ceiling Fan LP 6- 8	

RCI 20111 - 032 R
PG. 14 OF 15

TABLE 15190-14
EQUIPMENT LABEL LIST

VALVE LABEL LIST
LINE 1 – 3/8" lettering
LINE 2 – 3/16" lettering
LINE 3 – 3/16" lettering

CONTROL VALVE HOUSE

~~EF-0~~ B-0 ~~Exhaust Fan~~ Blower LP 0 7- 2	Interior Lights LP 0 - 17
F-0 Ceiling Fan LP 0 7- 8	Exterior Wall Pack Lights LP 0- 11
Receptacles LP 0 -14	UH-0A Heater LP0-5,7

New

UH-0B
Heater
LP 0 - 13,15

New

[END OF SECTION]

ROI 20111-032R
Pg. 15 OF 15

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Page	Of	(6) DATE:
20111	641	1	2	02/07/01

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.: 20111-033R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: VH1 LTS Vent

(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Drawing – "Valve House Mechanical Details I"	90X-6000-M-00264	0	
Design Change Notice "VH Tank Vents"	20111-023		

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

DCN 20111-023 did not provide adequate detail for vents in VH1. Connection of LDS tank vent to LTS Vent in VH1 will eliminate need for an additional roof penetration. It is recommended that PVC pipe be used from high point of LTS vent (C.S.).

See attached sketch.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
M. W. Griffin MWG	Fluor Fernald, Inc	02/07/01	James C. Jenkins JAMES C. JENKINS	2/07/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI – DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 2/15/01

KWASI BADU-TWEREBOAH GEOSYNTEC

[X] FIT [ ] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLT52

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

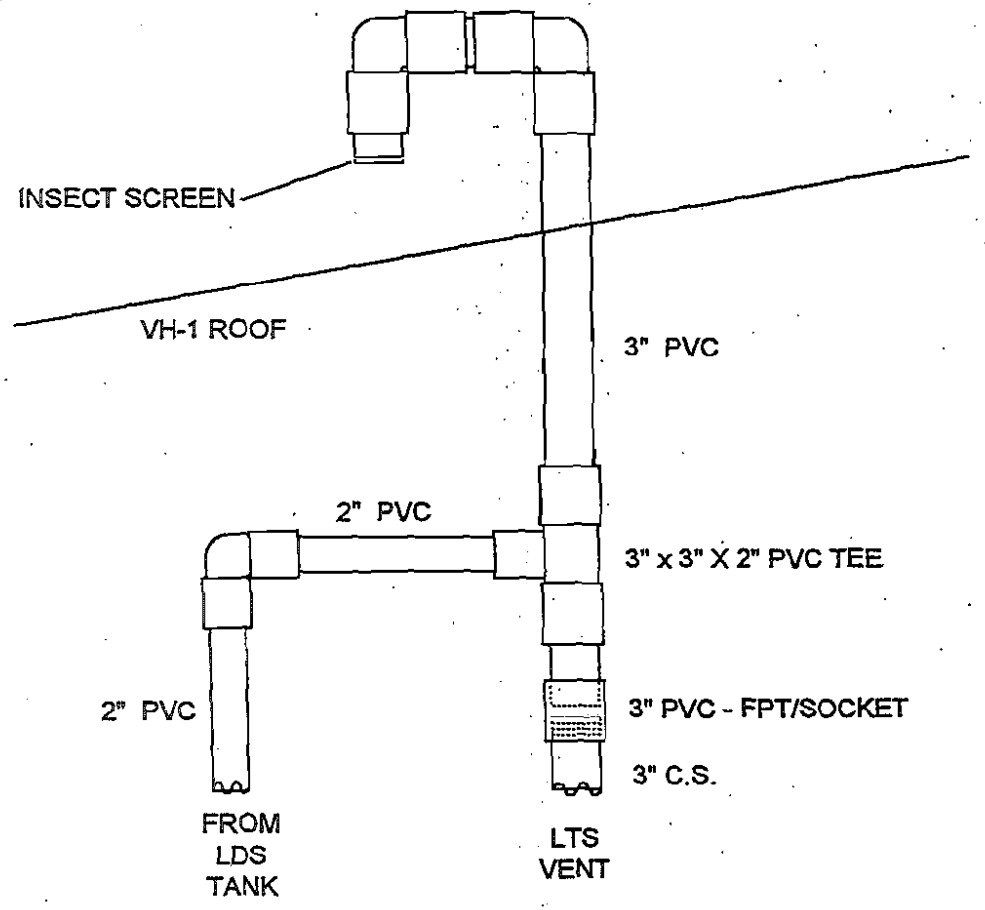
(18) CONSTRUCTION CONCURRENCE PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19) DATE:

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

INFORMATION ONLY

ORIGINAL



RCI: 20111-033R
PG. 2 OF 2

NOT TO SCALE

MW Griffin
2/7/01

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of ~~1~~ 2 gcg	(6) DATE 2/27/01
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111 - 034R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: LTS Fixed End Seal		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Drawings	90X-6000-M-00264-00265	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Please provide clarification on the type and method of installation for the fixed end seals on the non-centralized LTS 10" line.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood	The STAVER Group, Inc.	2/27/01	James C. Jenkins	2/28/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

- SINCE HDPE WELD NECK FLANGE HAS BEEN INSTALLED, FIXED END SEAL WILL HAVE TO BE INSTALLED USING 2 PIECES.
- SEE PG. 2 OF 2

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 2/28/01

KWASI BADU-TWENEBOAH, GEOSYNTEC

[X] FIT [ ] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

INFORMATION ONLY

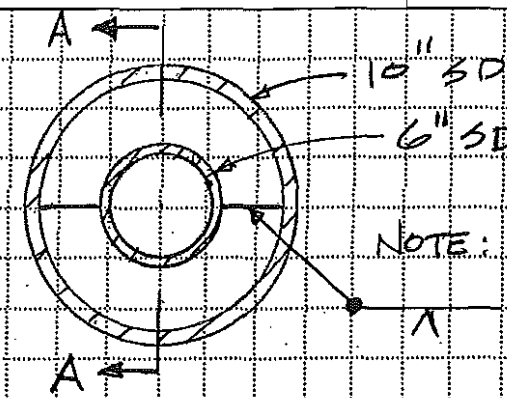
ORIGINAL

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

ENGINEERING CALCULATION

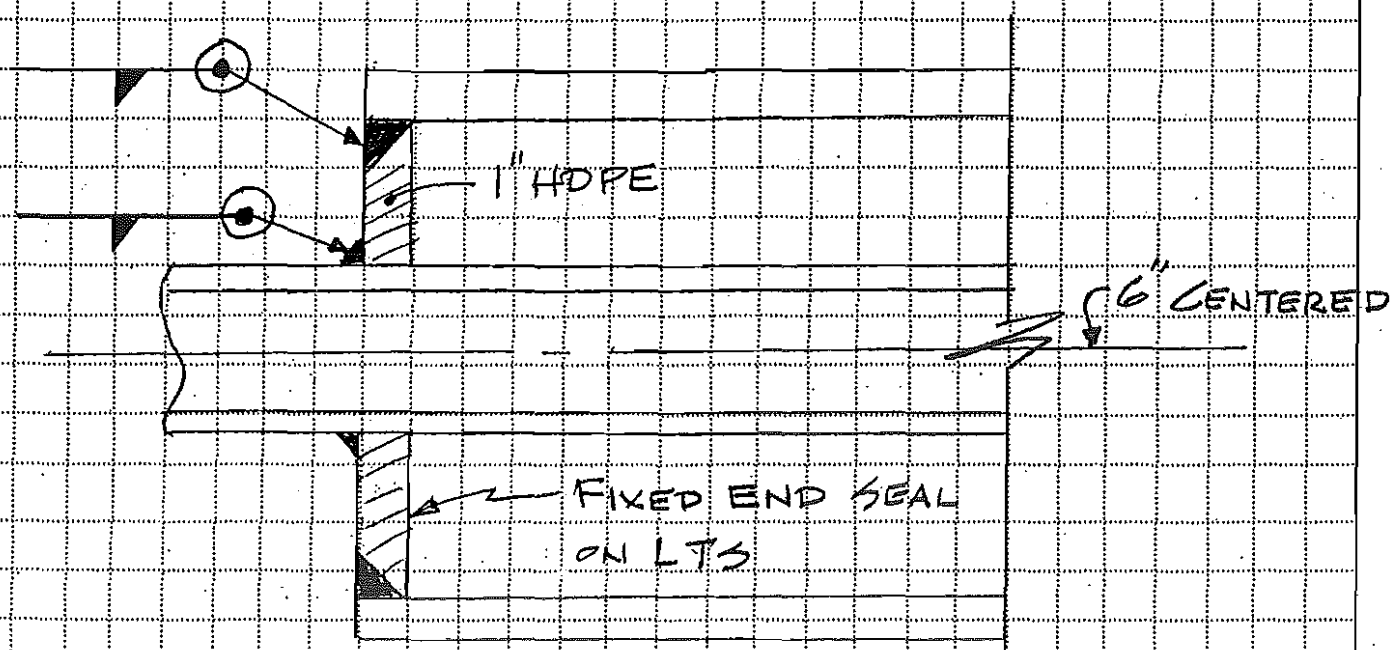
PROJECT NUMBER: 20111	
BY: JCJ	DATE: 2/28/01
CHECKED BY:	DATE:
PAGE OF	
REVISED:	

SUBJECT: FIXED END SEAL



NOTE: V-GROOVE AND WELD CAN BE LOCATED AS NEEDED FOR EASE OF WELDING.

NO SCALE



SECTION A-A

NO SCALE

RCI 20111-034R

Pg. 2 of 2

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of ~~1~~ 2	(6) DATE 01/17/01
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-035R
(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [X] OTHER [ ]	(4A) RCI/DCN TITLE: Valve House Entrance Concrete Stoops		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Drawings	90X-6000-G-00251	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Detail 50 on Sheet G –14, Drawing 90X-6000-G-00251 details the VH entrance pads with two six inch risers. By forming these entrances similarly to the CVH entrance pads shown in Detail 51 on the same sheet these steps could be eliminated, facilitating access to the buildings. Please advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood Ron Wood	The STAVER Group, Inc.	01/17/01	James C. Jenkins JAMES C. JENKINS	3/7/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

- SEE Pg. 2 OF 2
- RECORD AS BUILT INFORMATION

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 3/8/2001

K Badu-Tweneboah

KWASI BADU-TWENEBOAH GEOSYNTEC

[X] FIT [ ] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLT52

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

INFORMATION ONLY

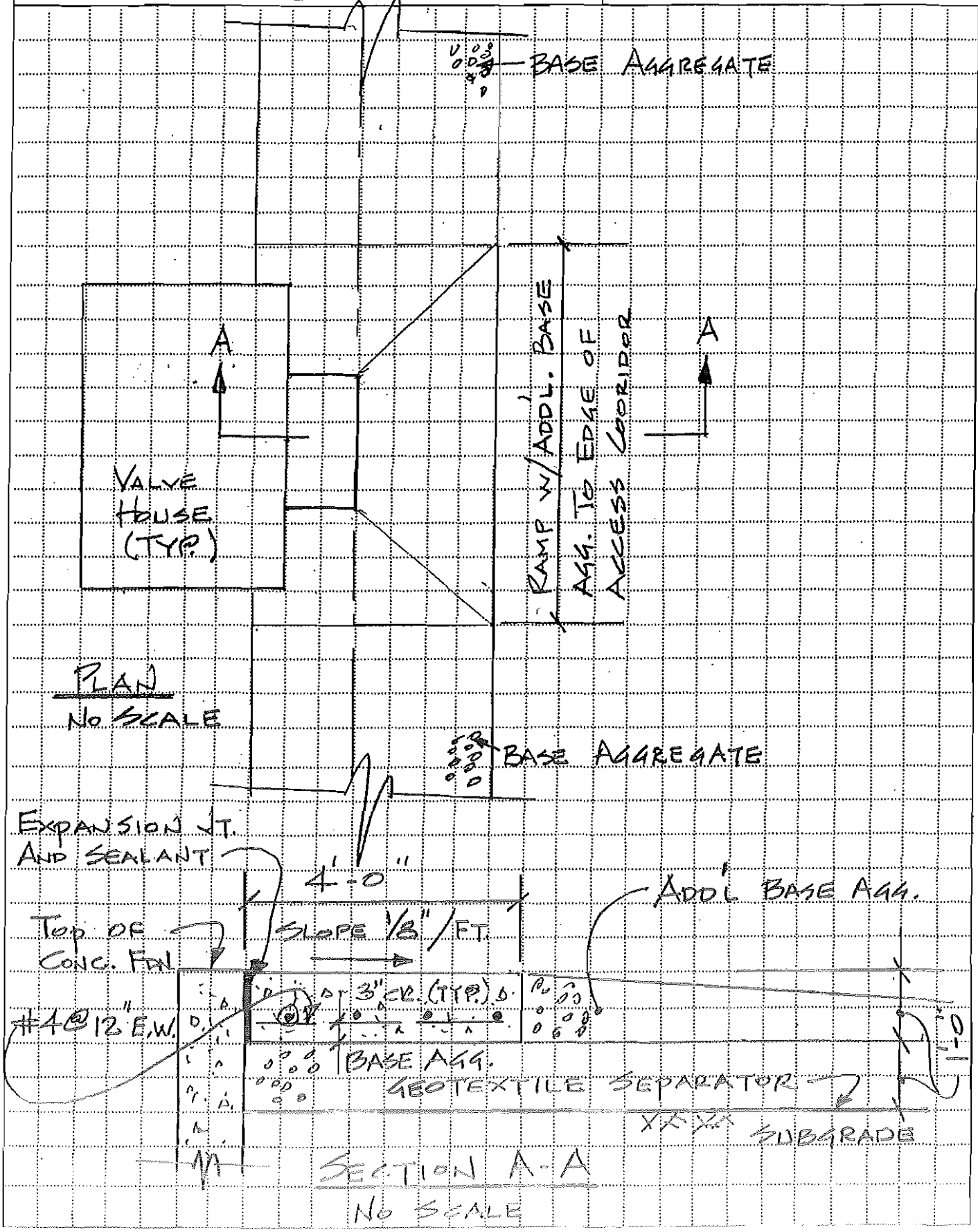
ORIGINAL

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

ENGINEERING CALCULATION

PROJECT NUMBER: 20111	
BY: JCJ	DATE: 3/8/01
CHECKED BY:	DATE:
PAGE	OF
REVISED:	

SUBJECT: VALVE HOUSE ENTRANCE



RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg	Of	(6) DATE
20111	FSC-641	1	2	03/21/01

(3) S/C TITLE: ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM

(11) RCI NO.: 20111-036R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: ILTS PIPE VENT RECONSTRUCTION

(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
VALVE HOUSE AND CONTROL VALVE HOUSE MECHANICAL DETAILS I	90X-6000 -M-00266	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

* SEE PAGE 2 OF 2

* INCORPORATE ON "REDLINE DRAWINGS"

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
JAMES C. JENKINS (James C. Jenkins 3/21/01)	FFI	03/21/01	JAMES C. JENKINS (James C. Jenkins 3/21/01)	

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 3/23/01
KURASI BADU-TWENEBOAH
[X] FIT [ ] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FOF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N.A.

(18) CONSTRUCTION CONCURRENCE DATE: N.A.

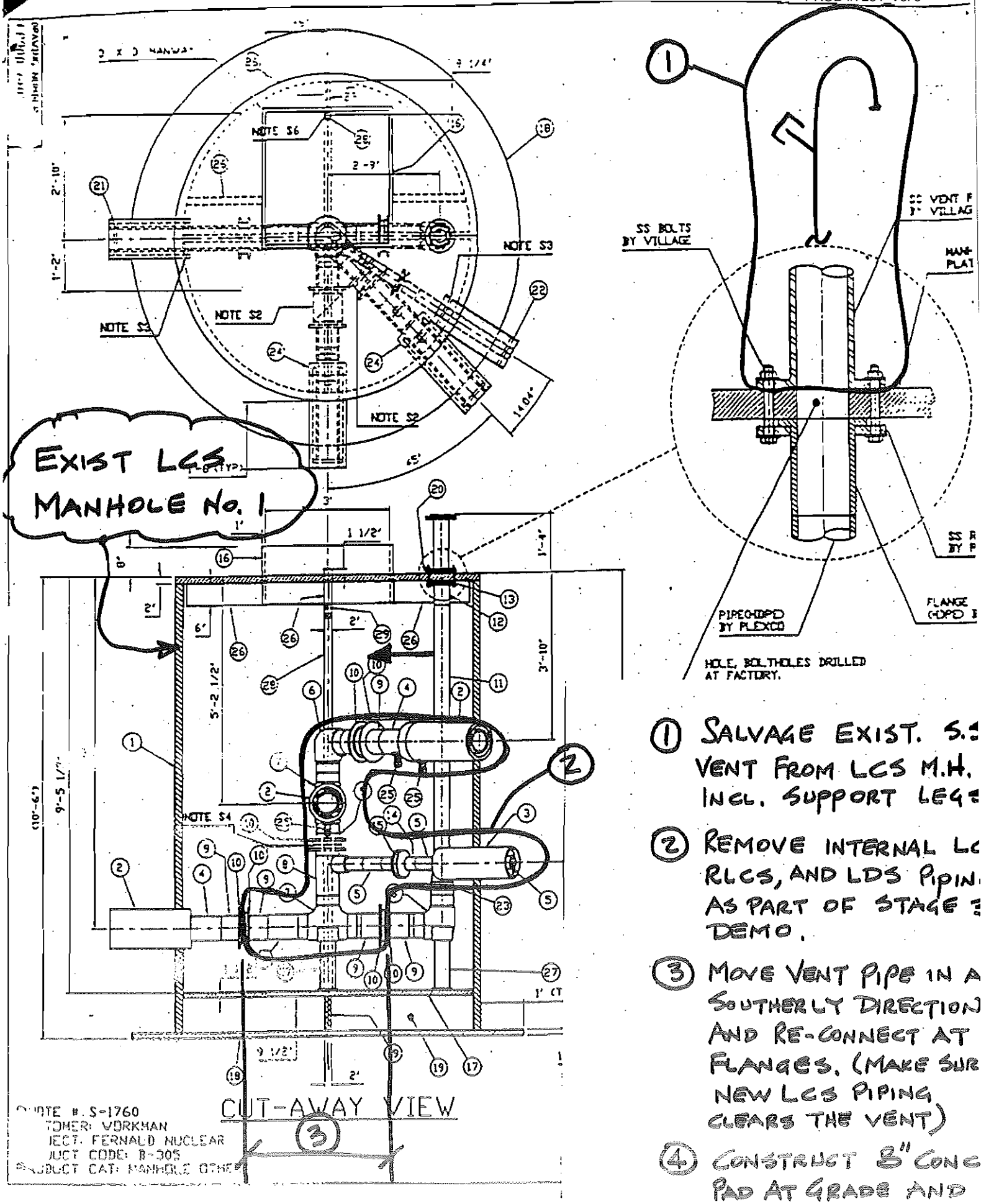
PURCHASE REQUISITION REQUIRED : [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 6: 10/01/99; ED-12-5002

INFORMATION ONLY



① SALVAGE EXIST. S.S VENT FROM LCS M.H. INCL. SUPPORT LEGS

② REMOVE INTERNAL LCS RLCS, AND LDS PIPING AS PART OF STAGE 3 DEMO.

③ MOVE VENT PIPE IN A SOUTHERLY DIRECTION AND RE-CONNECT AT FLANGES. (MAKE SURE NEW LCS PIPING CLEARS THE VENT)

④ CONSTRUCT 8" CONC PAD AT GRADE AND ANCHOR S.S. LEGS

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE March 28, 2001
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-037R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Existing Manhole Weight		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Stage 3 Demolition and Details	90X-6000-G-00257	0	Sheet G-19

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Please provide the weight and lifting point details of the existing HDPE Manholes for each location. This information will be used to calculate the required lifting plan to remove the Manholes per sheet G-19.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	3/28/01	M. W. Griffin MWG	3/30/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See attached information. Information is for Contractor use only and is not considered as direction from Fluor Fernald Inc.

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 3/30/01
KWASI BADU-TWENEBOAH, GEOSYNTEC
[X] FIT [ ] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N/A

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

INFORMATION ONLY

RCI # 20111-

The following is provided <u>for information only</u>:

STAVER should develop its own plan(s) for demolition and removal of the manholes. STAVER should consult with the manholes manufacturer (Plexco) as necessary.

(1) Info from prior project submittal file:

a. HDPE RISER (MAIN MANHOLE COMPONENT):
Part # 4717, 84" ID; CLASS 100

b. Quote: S-1760
Customer: Workman
Project: Fernald Nuclear
Product Code: B-305
Product Cat: Manhole Other

c. Reference drawings (Plexco): FP90D-688
689
690
691

d. LDS Primary Containment Vessel
36" IPS SDR 17 (HDPE)

(2) Attached - Lifting Plan submitted for setting the manholes.
Includes Plexco drawing for manhole lifting lugs and ~~MH~~ weights.

MW 3/29/01

FEMP

ATTACHMENT 7

LIFTING PLAN (For Mobile Cranes)

This form is to be filled out by qualified riggers and operators for all lifts and given to the rigging engineer at least 24 hours before the lift is made. Permission for the lift may be denied if this time scale is not observed.

Location: LEACHATE CONVEYANCE SYSTEM Date of Lift:

Load Description: SEE ATTACHED LIST

Lift Description: SET PIPE, MAN HOLES, PUMPS, BORING MACHINE, ETC.

DIAGRAM CRANE LIFTS AND LOAD PLACEMENT
Attach additional sheets if necessary

SEE ATTACHED

DIAGRAM RIGGING CONFIGURATION
Attach additional sheets if necessary

SEE ATTACHED

A. Weight

1. Equipment Condition New ____ Used X
2. Weight Empty N/A Lbs.
   Weight of Contents 5070 Lbs
3. Weight of Headache Ball 150 Lbs
4. Weight of Block N/A Lbs.
5. Weight of Lifting Bar N/A Lbs.
6. Weight of Slings and Shackles 100 Lbs.
7. Weight of Jib ____ Erect ____ Stowed N/A Lbs.
8. Weight of Headache Ball on Jib N/A Lbs.
9. Weight of Cable (Load Fall) 100 Lbs.
10. Allowance for Unaccounted Material in Equipment 50 Lbs.
11. Other ____ Lbs.

TOTAL WEIGHT 5470 Lbs.

Source of Load Weight:

VENDOR DATA
(Site Drawings Calculated, Etc.)

Weights Verified By:

B. JIB

1. Erected N/A Stowed REMOVED
2. If Jib to be Used N/A
3. Length of Jib N/A
4. Angle of Jib N/A
5. Rated Capacity of Jib (From Chart) —

C. CRANE PLACEMENT

1. Any Deviation from Smooth Solid Foundation in the Area?
2. Electrical Hazards in Area? N/A
3. Obstacles of Obstructions to Lift or Swing? N/A
4. Swing Direction and Degree (Boom Swing) VARIOUS, 360°

MULTIPLE CRANE LIFTS REQUIRE A SEPARATE LIFT PLAN FOR EACH CRANE.

ANY CHANGES IN THE CONFIGURATION OF THE CRANE, PLACEMENT, RIGGING, LIFTING SCHEME, ETC., OR CHANGES IN ANY CALCULATIONS REQUIRE THAT A NEW LIFT PLAN BE DEVELOPED.

Signature of Operator Date

Signature of Job Supervisor Date 4-24-97

Signature of Rigging Engineer Date

D. CABLE

1. Number of parts of cable 5/8" 6X ONE
2. Size of cable 5/8 6X19 IWRC
3. Capacity of Cable 7000 Lbs

E. SIZING OF SLINGS

1. Sling Selection
   a. Type of arrangement SEE ATTACHED
   b. Number of Slings in Hook-up
   c. Sling Size
   d. Sling Type
   e. Rated Capacity of Sling (Per tags)
2. Shackle Selection
   a. Pin Diameter (inches) SEE ATTACHED
   b. Capacity (tons)
   c. Number of Shackles
   d. Shackle Secured to Load by:

F. CRANE

1. Type of Crane GROVE RT-522
2. Crane Capacity 22 Tons
3. Lifting Arrangement
   a. Max Distance-Center of Load to center pin of Crane 40 ft.
   b. Ft. Boom Configuration N/A
   c. Angle of Boom 47° degrees
   d. Angle of boom at set N/A degrees
      1. Over Rear N/A lbs.
      2. Over Front 5470 lbs
      3. Over Side 5470 lbs.
      4. From Chart-Rated Capacity of crane for this lift at 360 Radius
      5. Max Load on crane 5470
      6. Lift is 68 % of cranes Rated Capacity.

IF LIFT EXCEEDS 75% OF CRANE'S CAPACITY, ATTACH ADDITIONAL SHEETS FOR SPECIAL INSTRUCTION, RESTRICTIONS, DIAGRAMS FOR CRANE, RIGGING, LIFT, ETC. ____ YES X NO

PRE-LIFT CHECK LIST - to be completed immediately Prior to Lift.

	YES	NO
1. Mating Acceptable		
2. Outriggers fully extended		
3. Crane in good condition		
4. Swing Room		
5. Head Room Checked		
6. Max. Counterweights Used		
7. Experienced Operator		
8. Tag Line Used		
9. Experienced Designated Flagman		
10. Experienced Rigger		
11. Load Chart in Crane		

12. Wind Conditions:
13. Crane Inspected By:
14. Functional Test of Crane By:

FS-P-3244 (04/20/88)

Material and weights to be lifted:

Pipe:

Pipe Size	Unit Weight (lbs./ft.)	Weight per 80 foot section	Lifting Diagram
3"	0.93	74.40	B, E, F
4"	1.54	123.20	B, E, F
6"	2.23	178.40	B, E, F
8"	3.79	303.20	B, E, F
10"	5.87	469.60	B, E, F
12"	12.36	988.80	B, E, F
4" inside of 8"	5.33	426.40	B, E, F
6" inside of 10"	8.10	648.00	B, E, F

Pumps:

Pump Size	Weight (lbs.)	Lifting Diagram
4"	675.0	D

Manholes:

Man Hole Number	Weight (lbs.)	Lifting Diagram
LCS #1	4822.0	C
LCS #2	4822.0	C
LCS #3	4822.0	C
LDS #1	5070.0	C
LDS #2	5070.0	C
LDS #3	5070.0	C
C.O. #1	1495.0	C
C.O. #1A	1555.0	C
C.O. #2	1435.0	C
C.O. #3	1495.0	C
C.O. #4	1852.0	C

Man Holes (cont.):

Man Hole Number	Weight (lbs.)	Lifting Diagram
C.O. #5	1435.0	C
C.O. #6	1435.0	C
C.O. #7	1735.0	C
C.O. #8	1675.0	C
C.O. #9	1435.0	C
C.O. #10	1879.0	C
C.O. #11	1507.0	C
C.O. #12	1687.0	C

Midwest Mole, Inc. Augur:

Equipment	Weight (lbs.)	Lifting Diagram
Barbco Boring Machine	3073.0	J

Pipe Casings:

Pipe Size	Weight per Ft.	10 Ft.	20 Ft.	Lifting Diagram
12"	82.77	827.7	1655.4	I

Trench Boxes:

Manufacturer/Model	Weight (lbs.)	Lifting Diagram
GME / E812SW	3740.0	G
Efficiency Products / 612XLSM	2210.0	G
Speed Shore / 8x6-M-SS	1005.0	G
Speed Shore / U-7-46	75.0	G

A GREAT NEW FULL-POWER BOOM!

TRAPEZOIDAL† SHAPED... STRONG...LIGHT...RIGID

for greater capacity.

5/8 CABLE 10,200 lbs - 6x19 IWRC

RT-522

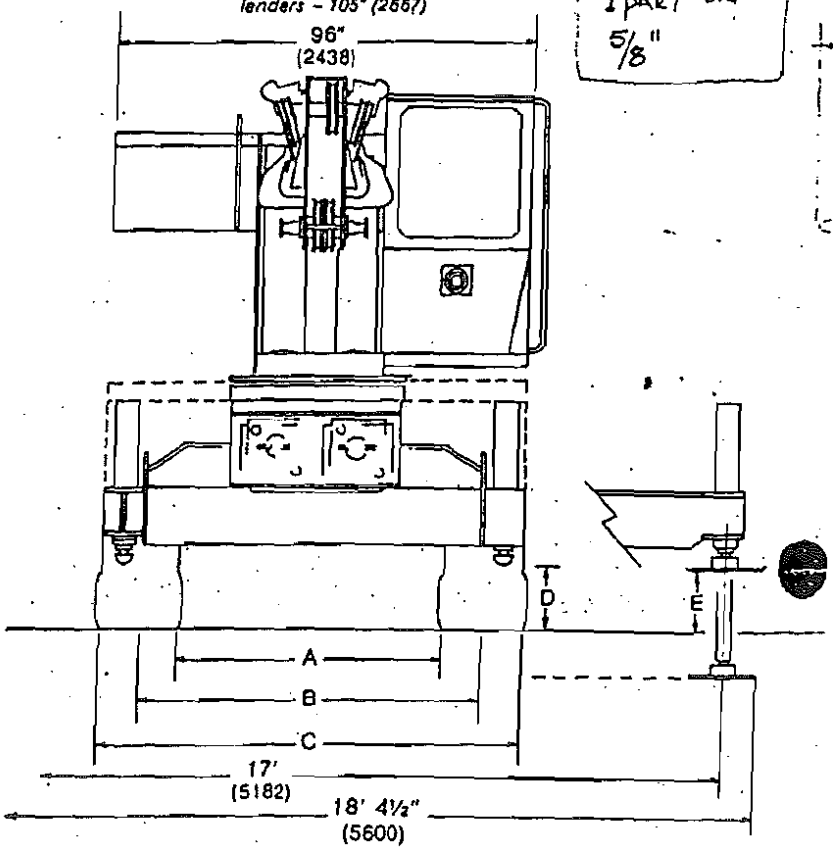
1 PART

7,000 LBS 1 PART ON 5/8"

GROVE

DIMENSIONS

NOTE: With 20.5x25 tires with fenders, the extreme travel width is over the fenders – 105" (2667)



TAIL SWING
10' 3 1/8" (3127) [w/28 – 70 ft. and 25 – 60 ft. (7.5 – 18.2m), (8.6 – 21.2m) booms with or w/o aux. hoist]

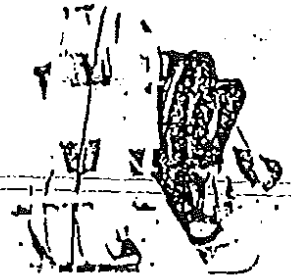
TURNING RADIUS
17' (5182) (4 wheel steer)

NOTE: Dimensions shown in parentheses are in millimeters (mm).

DIMENSIONAL DRAWING

Tire Size	A	B	C	D	E	F	G	H	J	AUXILIARY HOIST	K
*16.00x25	59" (1499)	77½" (1969)	96" (2438)	18½" (470)	13⅜" (340)	23°	22°	10' 9¾" (3296)	27" (686)	15S-11B	8' 10¼" (2669)
20.5x25	58¼" (1480)	81⅛" (2061)	105" (2667)	19½" (495)	14⅜" (365)	17°	16°	10' 9½" (3289)	26¾" (680)	GEARMATIC MODEL 25	9' 1 1/16" (2770)

BOOM LENGTH	L	M
*25' – 60' 3-section (7.6m - 18.2m)	33' 0" (10 058)	12' 6 3/16" (3818)
28' – 70' 3-section (8.6m – 21.2m)	36' 4" (11 074)	15' 10 5/16" (4850)



A STRONG, RIGID LIFTING BASE

A 17' (5.2m) outriggers mounted integral

RT-522

AXLE WEIGHT DISTRIBUTION CHART

ITEM	POUNDS			KILOGRAMS		
	GROSS	FRONT	REAR	GROSS	FRONT	REAR
Basic standard machine to include: 28 ft. – 70 ft. (8.6m – 21.2m) 3-section Trapezoidal-shaped boom, Grove Model HO15H-16B main hoist w/450 ft. (137m) of rope, 20.5x25 tires, *7,970 lb. (3615kg) counterweight GM4-53N diesel engine, 4x4 drive.	49,738	24,061	25,677	22,561	10,914	11,647
ADD:						
20 ft. (6.1m) jib for 25 ft. – 60 ft. (7.5m – 18.2m) boom	+668	+1,106	–438	+303	+502	–199
23 ft. (7.1m) jib for 28 ft. – 70 ft. (8.6m – 21.2m) boom	+952	+1,732	–780	+432	+786	–354
23 ft. – 38 ft. (7.1m – 12.2m) jib for 28 ft. – 70 ft. (8.6m – 21.2m) boom	+1,686	+2,955	–1,269	+765	+1,340	–575
Fenders (16:00 tires)	+424	+204	+220	+192	+92	+100
Fenders (20.5 tires)	+462	+222	+240	+210	+101	+109
22 ton (20mt) 3 sheave hook block	+320	+949	–629	+145	+340	–285
12 ton (11mt) 1 sheave hook block	+285	+846	–561	+129	+384	–255
5 ton (4.5mt) headache ball	+150	+452	–302	+68	+205	–137
Auxiliary boom nose	+100	+309	–209	+45	+140	–95
Kruger load moment and anti-two block system	+376	+337	+39	+171	+153	+18
*Grove HO15S-11B auxiliary hoist w/350 ft. (106.7m) of ½ in. (13mm) dia. rope (Use with 28 ft. – 70 ft. (8.6m – 21.2m) boom).	+839	–297	–1,136	+381	–135	+516
*Gearmatic Model 25 auxiliary hoist w/350 ft. (106.7m) of ½ in. (13mm) dia. rope (Use with 28 ft. – 70 ft. (8.6m – 21.2m) boom)	+1,151	–408	+1,559	+522	–185	+707
**Grove HO15S-11B auxiliary hoist w/350 ft. (106.7m) of ½ in. (13mm) dia. rope (Use with 25 ft. – 60 ft. (7.5m – 18.2m) boom)	+239	–77	+316	+109	–34	+143
**Gearmatic Model 25 auxiliary hoist w/350 ft. (106.7m) of ½ in. (13mm) dia. rope (Use with 25 ft. – 60 ft. (7.5m – 18.2m) boom)	+551	–188	+739	+250	–85	+335
SUBSTITUTE:						
***25 ft. – 60 ft. (7.5m – 18.2m) 3-section Trapezoidal-shaped boom	–2,493	–2,576	+83	–1,131	–1,168	–37
European boom configuration	+361	+1,138	–777	+164	+516	–352
Cummins V378-C145 diesel engine	+171	+95	+76	+78	+43	+35
Caterpillar 3208 diesel engine	+539	+35	+504	+245	+16	+229
Deutz F6L912 diesel engine	–220	–10	–210	–100	–5	–95
16:00x25 tires	–1,008	–504	–504	–458	–229	–229
Gearmatic Model 25 main hoist w/450 ft. (137m) of ½ in. (13mm) dia. rope	–	–	–	–	–	–

* 7970 lb. (3615kg) cwgt. used on 70 ft. boom with or w/o aux. hoist.
** 6020 lb. (2731kg) cwgt. used only on 60 ft. boom with aux. hoist.
*** 6620 lb. (3003kg) cwgt. used only on 60 ft. boom w/o aux. hoist.

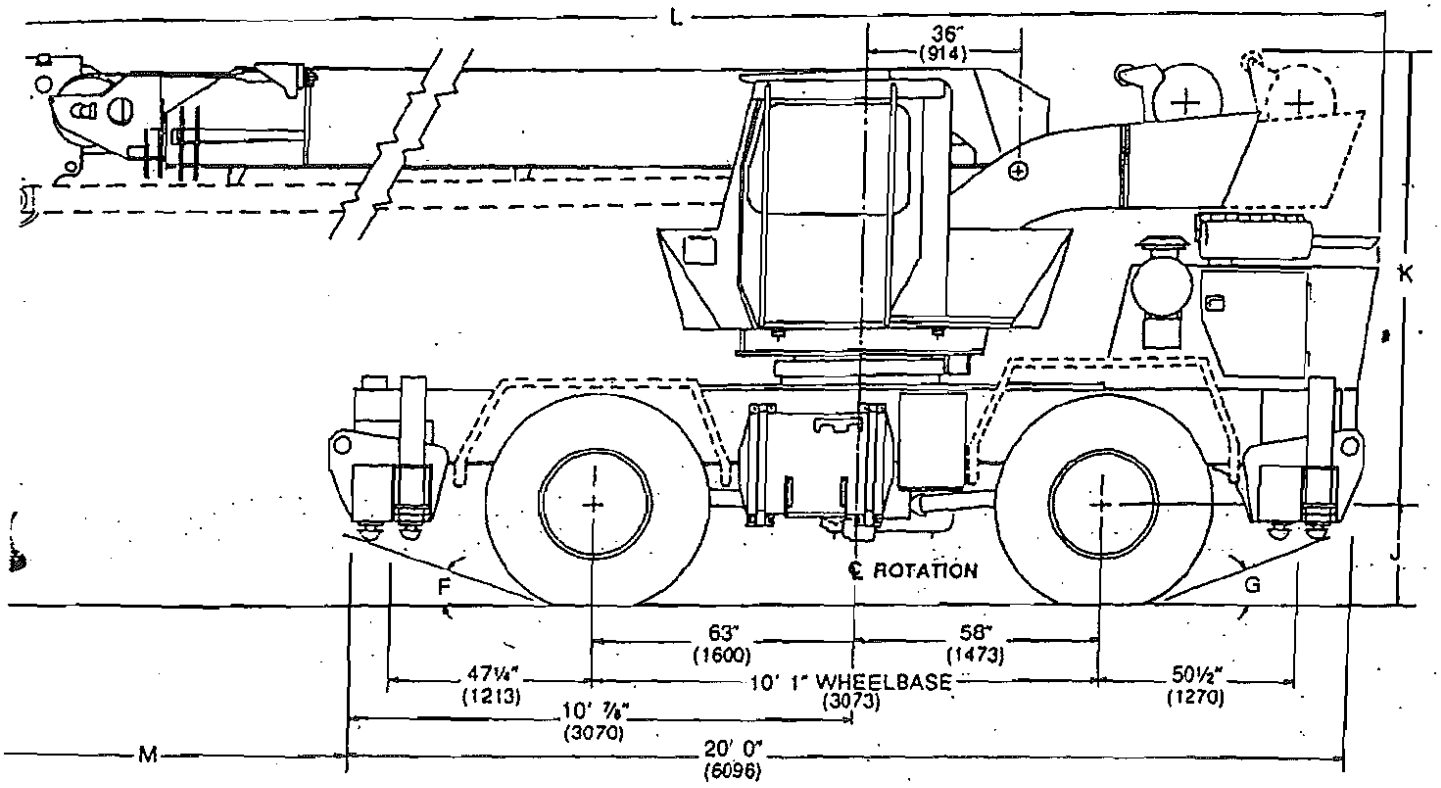
SPEED AND GRADEABILITY

Forward Drive	Transmission Range	Gear Shift	Maximum Speed MPH	Maximum Speed KM/H	Gradeability @ Stall (%)	Tractive Effort at Stall LBS.	Tractive Effort at Stall KG
4 Wheel Drive	Low	1st	2.4	3.9	98.8	37,852	17,170
4 Wheel Drive	Low	2nd	5.5	8.9	31.0	16,562	7,513
4 Wheel Drive	Low	3rd	15.2	24.5	8.6	5,532	2,509
2 Wheel Drive	High	1st	5.4	8.7	31.7	16,877	7,655
2 Wheel Drive	High	2nd	11.7	18.8	12.2	7,388	3,351
2 Wheel Drive	High	3rd	24.1	38.8	2.7	2,461	1,112

NOTE: All performance data is based on 48,000 lb. (21 772kg) machine with 16:00 x 25 tires, 4 x 4 drive and GM4-53N engine and may vary plus or minus 10% due to variations in engine performance.
Machines should be operated within the limits of engine crankcase design (30° – Cat, 20° – GM & Deutz, 40° – Cummins). Gradeability values above 45% (4 x 4 drive) and above 27% (4 x 2 drive) are theoretical.

A STRONG, RIGID LIFTING BASE

RT-522



ENGINE SPECIFICATIONS

MAKE & MODEL	Detroit Diesel 4-53N	*Cummins V378-145	*Caterpillar 3208	*Deutz F6L912
TYPE	4 Cylinder O.H.V.	6 Cylinder O.H.V.	8 Cylinder O.H.V.	6 Cylinder O.H.V.
BORE	3.875 in. (98.4mm)	4.625 in. (117.5mm)	4.5 in. (114.3mm)	3.937 in. (100.0mm)
STROKE	4.50 in. (114.3mm)	3.75 in. (95.3mm)	5.0 in. (127.0mm)	4.724 in. (120.0mm)
DISPLACEMENT	212 cu. in. (3475cm³)	378 cu. in. (6915cm³)	636 cu. in. (10 424cm³)	345 cu. in. (5656cm³)
HORSEPOWER (NET)	115 @ 2800	121 @ 2800	121 @ 2800	114 @ 2650
GOVERNED RPM	2800	2800	2800	2650
TORQUE (NET)	246 ft. lbs. (34kg.m) @ 1800	250 ft. lbs. (34.6kg.m) @ 1800	279 ft. lbs. (38.6kg.m) @ 1400	240 ft. lbs. (33.2kg.m) @ 1500
ELECTRICAL SYSTEM	12 Volt, Negative Ground	12 Volt, Negative Ground	12 Volt, Negative Ground	12 Volt, Negative Ground
STARTING SYSTEM	24 Volt	24 Volt	24 Volt	24 Volt
COMBUSTION SYSTEM	2 Cycle w/blower	4 Cycle, Naturally Aspirated	4 Cycle, Naturally Aspirated	4 Cycle, Naturally Aspirated
COOLING SYSTEM (CAP.)	Liquid – 9.4 gal. (35.5 liters)	Liquid – 8.6 gal. (36.4 liters)	Liquid – 13.1 gal. (50.6 liters)	Air Cooled
FUEL CAPACITY	60 gal. (227 liters)	60 gal. (227 liters)	60 gal. (227 liters)	60 gal. (227 liters)
ALTERNATOR	90 AMP	90 AMP	90 AMP	90 AMP
BATTERY	(2) 625 CCA @ 0°F	(4) 625 CCA @ 0°F	(4) 625 CCA @ 0°F	(2) 625 CCA @ 0°F
AIR CLEANER	Dry Type	Dry Type	Dry Type	Dry Type
AIR COMPRESSOR	12 CFM	13.2 CFM	12 CFM	7.5 CFM
HOURMETER	Standard	Standard	Standard	Standard

*CCA = cold cranking amperage per battery.
†Located inside engine compartment

GROVE®

RT522 22 TON CAPACITY
28 ft. - 70 ft. BOOM
PCSA CLASS 10-80

RATED LIFTING CAPACITIES IN P
28 ft. - 70 ft. BOOM

ON OUTRIGGERS FULLY EXTENDED - 360°

Radius in Feet	Boom Length in Feet							
	28	34	40	46	52	58	64	70
10	44,000 (64)	36,000 (69)	36,000 (73)					
12	40,000 (59.5)	36,000 (65.5)	36,000 (70)	35,000 (73)				
15	31,000 (51.5)	31,000 (59.5)	30,700 (65)	29,850 (69)	29,150 (72)	28,600 (74.5)		
20	23,200 (36.5)	23,200 (49)	23,200 (57)	23,200 (62)	23,000 (66)	22,600 (69.5)	22,150 (72)	20,500 (74)
25	17,950 (6)	17,950 (36)	17,950 (47.5)	17,950 (54.5)	17,950 (60)	17,950 (64)	17,950 (67)	17,650 (69.5)
30		13,470 (15.5)	13,470 (36.5)	13,470 (46.5)	13,470 (53)	13,470 (58)	13,470 (62)	13,470 (65)
35			10,220 (20)	10,220 (36.5)	10,220 (45.5)	10,220 (51.5)	10,220 (56.5)	10,220 (60)
40	See Warning Note 16			8,010 (23)	8,010 (36.5)	8,010 (45)	8,010 (50.5)	8,010 (55)
45					6,530 (25)	6,530 (37)	6,530 (44.5)	6,530 (49.5)
50						5,430 (26.5)	5,430 (37)	5,430 (43.5)
55						4,440 (3.5)	4,440 (28)	4,440 (37)
60							3,620 (13)	3,620 (28.5)
65								2,980 (15.5)
Min. boom angle (deg.) for indicated length (No Load)								0
Max. boom length (ft.) at 0 degree boom angle (No Load)								70.0

NOTE: Boom Angles are in degrees. A6-829-003710 & -003716

ON OUTRIGGERS FULLY EXTENDED - OVER FRONT

Radius in Feet	Boom Length in Feet							
	28	34	40	46	52	58	64	70
10	44,000 (64)	36,000 (69)	36,000 (73)					
12	40,000 (59.5)	36,000 (65.5)	36,000 (70)	35,000 (73)				
15	31,000 (51.5)	31,000 (59.5)	30,700 (65)	29,850 (69)	29,150 (72)	28,600 (74.5)		
20	23,200 (36.5)	23,200 (49)	23,200 (57)	23,200 (62)	23,000 (66)	22,600 (69.5)	22,150 (72)	20,500 (74)
25	17,950 (6)	17,950 (36)	17,950 (47.5)	17,950 (54.5)	17,950 (60)	17,950 (64)	17,950 (67)	17,650 (69.5)
30		15,350 (15.5)	15,350 (36.5)	15,350 (46.5)	15,350 (53)	15,150 (58)	14,950 (62)	14,750 (65)
35			11,900 (20)	11,900 (36.5)	11,900 (45.5)	11,900 (51.5)	11,900 (56.5)	11,900 (60)
40	See Warning Note 16			9,410 (23)	9,410 (36.5)	9,410 (45)	9,410 (50.5)	9,410 (55)
45					7,720 (25)	7,720 (37)	7,720 (44.5)	7,720 (49.5)
50						6,410 (26.5)	6,410 (37)	6,410 (43.5)
55						5,410 (3.5)	5,410 (28)	5,410 (37)
60							4,530 (13)	4,530 (28.5)
65								3,780 (15.5)
Min. boom angle (deg.) for indicated length (No Load)								0
Max. boom length (ft.) at 0 degree boom angle (No Load)								70.0

A6-829-003704 & -003718

14.00x24 TIRES

Radius in Feet	Stationary Capacity: Defined Arc Over Front (3)	Stationary Capacity: 360° Arc	Pick & Carry Capacity Up to 2.5 MPH: Boom Centered Over Front (7)
10	25,600 (a)	21,830 (a)	21,610 (a)
12	21,260 (a)	17,890 (a)	18,520 (a)
15	17,770 (a)	11,830 (b)	15,050 (a)
20	12,840 (b)	6,750 (c)	12,060 (a)
25	9,610 (b)	4,050 (d)	8,740 (b)
30	7,060 (c)	2,630 (e)	6,970 (c)
35	5,280 (d)	1,670 (f)	5,280 (d)
40	3,990 (e)	1,040 (f)	3,000 (d)
45	3,020 (f)		2,270 (e)
50	2,290 (g)		1,680 (e)
55	1,730 (g)		1,220 (f)
60	1,280 (h)		
65	1,000 (h)		

A6-829-003762

Maximum Permissible Boom Length:
(a) 28 ft. (e) 52 ft.
(b) 34 (f) 58
(c) 40 (g) 64
(d) 46 (h) 70

		Main Boom 70 ft.	Main Boom w/23 ft. Jib
Front (No Load)	Min. Boom Angle (deg.) for Indicated Boom Length	0	0
	Max. Boom Length (ft.) at 0 degree Boom Angle	70	93
360° (No Load)	Min. Boom Angle (deg.) for Indicated Boom Length	42	51
	Max. Boom Length (ft.) at 0 degree Boom Angle	52	57

ON

Radius in Feet	S Defin Over F
10	29,15
12	24,03
15	20,15
20	14,65
25	9,76
30	7,13
35	5,27
40	4,11
45	3,18
50	2,41
55	1,85
60	1,41
65	1,09

NOTES

1. Cap
2. Cap
3. Defi
4. Cap: as a
5. Cap:
6. On r
7. For enga shou
8. Axle func lock
9. All t tire oper

LIFT

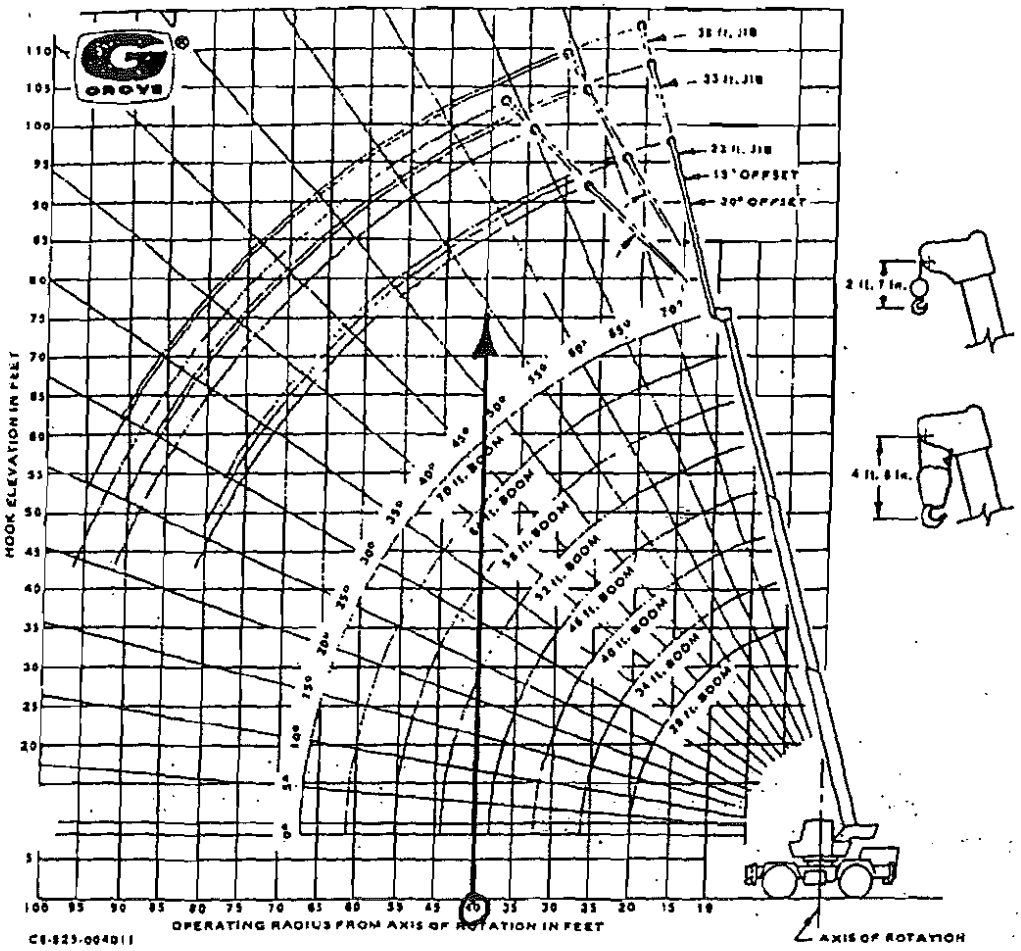
GENERAL:
1. Rated loads as shown on lift chart pertain to this machine as originally ma and equipped. Modifications to the machine or use of optional equipment that specified can result in a reduction of capacity.
2. Construction equipment can be hazardous if improperly operated or m Operation and maintenance of this machine shall be in compliance information in the operator's, parts, and safety manuals supplied with thi If these manuals are missing, order replacements from the manufacturer t distributor.
3. The operator and other personnel associated with this machine shall fully themselves with the latest applicable American National Standards Institu Safety Standards for cranes.

SETUP:
1. The machine shall be leveled on a firm supporting surface. Depending on of the supporting surface, it may be necessary to have structural supports outrigger floats or tires to spread the load to a larger bearing surface.
2. For outrigger operation, outriggers shall be fully extended with tires rais crane weight before operating the boom or lifting loads.
3. If machine is equipped with front jack cylinder, the front jack cylinder sha accordance with written procedure.
4. If machine is equipped with extendable counterweight, the counterweig fully extended before operation.
5. Tires shall be inflated to the recommended pressure before lifting on rubbe
6. With certain boom and hoist tackle combinations, maximum capacities m obtainable with standard cable lengths.

OPERATION:
1. Rated loads at rated radius shall not be exceeded. Do not tip the m determine allowable loads. For clamshell or concrete bucket operation, bucket and load must not exceed 80% of rated lifting capacities.
2. Rated loads do not exceed 85% of the tipping load as determined by S Stability Test Code J-765a.
3. Rated loads include the weight of hook block, slings and auxiliary lifting d their weights shall be subtracted from the listed ratings to obtain the net lifted.
4. Load ratings are based on freely suspended loads. No attempt shall be mad a load horizontally on the ground in any direction.
5. Rated loads do not account for wind on lifted load or boom. It is recom when wind velocity is above 20 mph (32 km/h), rated loads and boom le be appropriately reduced.

GROVE RT522

RANGE DIAGRAM



WEIGHT REDUCTIONS FOR LOAD HANDLING DEVICES

23 ft. JIB with 28-70 ft. BOOM	
*Stowed	381 lbs.
*Erected	1,950 lbs.

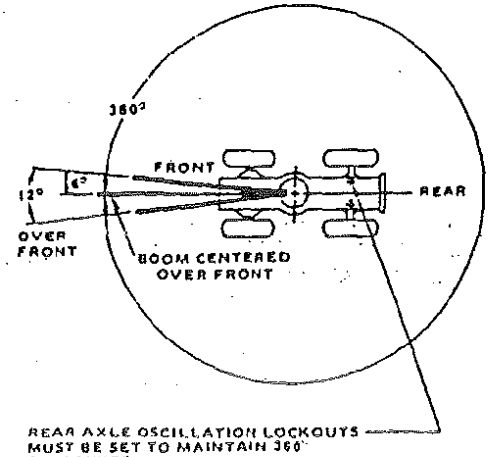
23-38 ft. TELE. JIB with 28-70 ft. BOOM	
*Stowed	604 lbs.
*Erected (Retracted)	3,659 lbs.
*Erected (Extended)	4,583 lbs.

*Reduction of main boom capacities.

HOOK BLOCKS	
22 Ton, 3 Sheave (12 1/8" OD)	320 lbs.
22 Ton, 3 Sheave (15 7/8" OD)	455 lbs.
15 Ton, 2 Sheave	298 lbs.
12 Ton, 1 Sheave (15 7/8" OD)	400 lbs.
12 Ton, 1 Sheave (12 1/8" OD)	285 lbs.
Auxiliary Boom Head	100 lbs.
3 Ton Headache Ball	150 lbs.

NOTE: All Load Handling Devices and Boom Attachments are Considered Part of the Load and Suitable Allowances MUST BE MADE for Their Combined Weights.
Weights are for Grove furnished equipment.

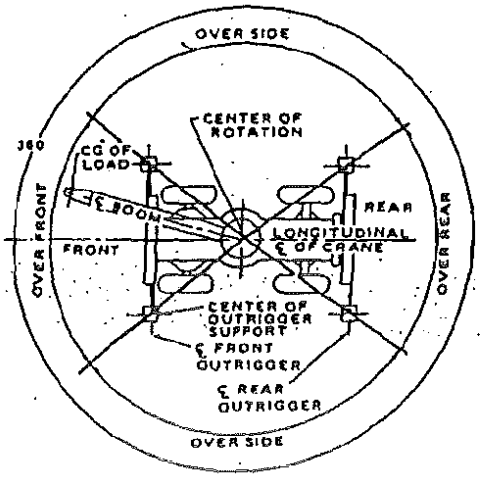
LIFTING AREA DIAGRAMS



REAR AXLE OSCILLATION LOCKOUTS MUST BE SET TO MAINTAIN 360° CAPACITIES.

NOTE: BOLD LINES DETERMINE THE LIMITING POSITION OF ANY LOAD FOR OPERATION WITHIN ANY WORKING AREAS INDICATED.

C6-829-003529



NOTE: BOLD LINES DETERMINE THE LIMITING POSITION OF ANY LOAD FOR OPERATION WITHIN WORKING AREAS INDICATED.

NOTE: OVER SIDE CAPACITIES CAN BE LIFTED IN THE OVER REAR AREA.

C6-829-001159

GROVE MANUFACTURING COMPANY
Division of Walter Kidde & Company, Inc.
KIDDE
Box 21, Shady Grove, Pennsylvania 17256

Distributed by:

GROVE®

RT522 22 TON CAPACITY
28 ft. - 70 ft. BOOM
PCSA CLASS 10-80

GROVE® FULL HYDRAULIC SELF-PROPELLED CRANE

RATED LIFTING CAPACITIES IN POUNDS
28 ft. - 70 ft. BOOM

ON OUTRIGGERS FULLY EXTENDED - 360°

Radius in Feet	Boom Length in Feet: 28	34	40	46	52	58	64	70
10	44,000 (64)	36,000 (69)	36,000 (73)					
12	40,000 (59.5)	36,000 (65.5)	36,000 (70)	35,000 (73)				
15	31,000 (51.5)	31,000 (58.5)	30,700 (65)	29,850 (69)	29,150 (72)	28,600 (74.5)		
20	23,200 (36.5)	23,200 (49)	22,200 (57)	23,200 (62)	23,000 (68)	22,600 (69.5)	22,150 (72)	20,500 (74)
25	17,350 (6)	17,350 (36)	17,350 (47.5)	17,350 (54.5)	17,350 (60)	17,350 (64)	17,350 (67)	17,850 (69.5)
30		13,470 (15.5)	13,470 (36.5)	13,470 (46.5)	13,470 (53)	13,470 (58)	13,470 (62)	13,470 (65)
35			10,220 (20)	10,220 (36.5)	10,220 (45.5)	10,220 (51.5)	10,220 (56.5)	10,220 (60)
40	See [illegible]			8,010 (23)	8,010 (36.5)	8,010 (45)	8,010 (50.5)	8,010 (55)
45					6,530 (25)	6,530 (37)	6,530 (44.5)	6,530 (49.5)
50						5,430 (26.5)	5,430 (37)	5,430 (43.5)
55						4,440 (7.5)	4,440 (28)	4,440 (37)
60							3,620 (13)	3,620 (28.5)
65								2,980 (15.5)
Min. boom angle (deg.) for indicated length (No Load)								0
Max. boom length (ft.) at 0 degree boom angle (No Load)								70.0

NOTE: Boom angles are in degrees. A6-829-002716 & -002716

ON OUTRIGGERS FULLY EXTENDED - OVER FRONT

Radius in Feet	Boom Length in Feet: 28	34	40	46	52	58	64	70
10	44,000 (64)	36,000 (69)	36,000 (73)					
12	40,000 (59.5)	36,000 (65.5)	36,000 (70)	35,000 (73)				
15	31,000 (51.5)	31,000 (59.5)	30,700 (65)	29,850 (69)	29,150 (72)	28,600 (74.5)		
20	23,200 (36.5)	23,200 (49)	23,200 (57)	23,200 (62)	23,000 (66)	22,600 (69.5)	22,150 (72)	20,500 (74)
25	17,350 (6)	17,350 (36)	17,350 (47.5)	17,350 (54.5)	17,350 (60)	17,350 (64)	17,350 (67)	17,650 (69.5)
30		15,350 (15.5)	15,350 (36.5)	15,350 (46.5)	15,350 (53)	15,150 (58)	14,950 (62)	14,750 (65)
35			11,900 (20)	11,900 (36.5)	11,900 (45.5)	11,900 (51.5)	11,900 (56.5)	11,900 (60)
40	See [illegible]			9,410 (23)	9,410 (36.5)	9,410 (45)	9,410 (50.5)	9,410 (55)
45					7,720 (25)	7,720 (37)	7,720 (44.5)	7,720 (49.5)
50						6,410 (26.5)	6,410 (37)	6,410 (43.5)
55						5,410 (3.5)	5,410 (28)	5,410 (37)
60							4,530 (13)	4,530 (28.5)
65								3,780 (15.5)
Min. boom ang[illegible]) for indicated length (No Load)								0
Max. boom [illegible] at 0 degree boom angle (No Load)								70.0

NOTE: Bo[illegible] in degrees. A6-829-002794 & -002716

ON RUBBER CAPACITIES

14.00x24 TIRES

Radius in Feet	Stationary Capacity: Defined Arc Over Front (3)	Stationary Capacity: 360° Arc	Pick & Carry Capacity Up to 2.5 MPH: Boom Centered Over Front (7)
10	25,600 (a)	21,830 (a)	21,610 (a)
12	21,260 (a)	17,890 (a)	18,520 (a)
15	17,770 (a)	11,830 (b)	15,050 (a)
20	12,840 (b)	6,750 (c)	12,060 (a)
25	9,610 (b)	4,050 (d)	8,740 (b)
30	7,060 (c)	2,630 (e)	6,970 (c)
35	5,280 (d)	1,670 (f)	5,280 (d)
40	3,990 (e)	1,040 (f)	3,000 (d)
45	3,020 (f)		2,270 (e)
50	2,290 (g)		1,680 (e)
55	1,730 (g)		1,220 (f)
60	1,280 (h)		
65	1,000 (h)		

A6-829-002752

16.00x25 TIRES

Radius in Feet	Stationary Capacity: Defined Arc Over Front (3)	Stationary Capacity: 360° Arc	Pick & Carry Capacity Up to 2.5 MPH: Boom Centered Over Front (7)
10	29,150 (a)	22,260 (a)	30,460 (a)
12	24,030 (a)	16,550 (a)	26,320 (a)
15	20,150 (a)	11,780 (b)	21,670 (a)
20	14,650 (b)	6,780 (c)	15,130 (a)
25	9,760 (b)	3,970 (d)	8,290 (b)
30	7,130 (c)	2,450 (e)	6,350 (c)
35	5,270 (d)	1,630 (f)	5,140 (d)
40	4,110 (e)	1,000 (f)	4,110 (d)
45	3,180 (f)		3,140 (e)
50	2,410 (g)		2,410 (e)
55	1,850 (g)		1,850 (f)
60	1,410 (h)		
65	1,090 (h)		

A6-829-002756

20.5x25 TIRES

Radius in Feet	Stationary Capacity: Defined Arc Over Front (3)	Stationary Capacity: 360° Arc	Pick & Carry Capacity Up to 2.5 MPH: Boom Centered Over Front (7)
10	28,380 (a)	27,150 (a)	26,020 (a)
12	23,800 (a)	19,490 (a)	22,420 (a)
15	19,100 (a)	13,200 (b)	18,380 (a)
20	15,320 (b)	8,140 (c)	14,170 (a)
25	10,190 (b)	4,910 (c)	10,390 (b)
30	7,530 (c)	3,330 (d)	4,830 (c)
35	5,780 (d)	2,270 (e)	3,790 (d)
40	4,560 (e)	1,360 (f)	3,020 (d)
45	3,560 (f)	1,000 (g)	2,310 (e)
50	2,760 (g)		1,710 (e)
55	2,110 (g)		1,210 (f)
60	1,640 (h)		
65	1,250 (h)		

A6-829-002744

Maximum Permissible Boom Length:
(a) 28 ft. (e) 52 ft.
(b) 34 (f) 58
(c) 40 (g) 64
(d) 46 (h) 70

NOTES FOR RUBBER CAPACITIES

1. Capacities do not exceed 85% of tipping loads as determined by test in accordance with SAE J-765.
2. Capacities are applicable to machines equipped with:

	Cold Inflation	2.5 MPH
14.00x24 (20 ply)	115 PSI	110 PSI
16.00x25 (20 ply)	95 PSI	80 PSI
20.5x25 (20 ply)	80 PSI	65 PSI

3. Defined Arc - Over front includes 26° on either side of longitudinal centerline of machine.
4. Capacities appearing above bold line are based on structural strength and tipping should not be relied upon as a capacity limitation.
5. Capacities are applicable only with machine on a firm level surface.
6. On rubber lifting with jib not permitted.
7. For pick and carry operation, boom must be centered over front of machine and mechanical swing lock engaged. When handling loads in the structural range with capacities close to maximum ratings, travel should be reduced to creep speed.
8. Axle lockouts must be functioning before lifting on rubber. (Check automatic lockout system for proper functioning: Refer to "Operation and Maintenance Manual" for description of a proper functioning axle lockout system).
9. All lifting depends on proper tire inflation, capacity and condition. Capacities must be reduced for lower tire inflation pressures. See lifting capacity chart for tire used. Damaged tires are hazardous to safe operation of crane.

A6-829-003742

LIFTING CAPACITY NOTES

GENERAL:

1. Rated loads as shown on lift chart pertain to this machine as originally manufactured and equipped. Modifications to the machine or use of optional equipment other than that specified can result in a reduction of capacity.
2. Construction equipment can be hazardous if improperly operated or maintained. Operation and maintenance of this machine shall be in compliance with the information in the operator's, parts, and safety manuals supplied with this machine. If these manuals are missing, order replacements from the manufacturer through the distributor.
3. The operator and other personnel associated with this machine shall fully acquaint themselves with the latest applicable American National Standards Institute (ANSI) Safety Standards for cranes.

SETUP:

1. The machine shall be leveled on a firm supporting surface. Depending on the nature of the supporting surface, it may be necessary to have structural supports under the outrigger floats or tires to spread the load to a larger bearing surface.
2. For outrigger operation, outriggers shall be fully extended with tires raised free of crane weight before operating the boom or lifting loads.
3. If machine is equipped with front jack cylinder, the front jack cylinder shall be set in accordance with written procedure.
4. If machine is equipped with extendable counterweight, the counterweight shall be fully extended before operation.
5. Tires shall be inflated to the recommended pressure before lifting on rubber.
6. With certain boom and hoist tackle combinations, maximum capacities may not be obtainable with standard cable length.

OPERATION:

1. Rated loads at rated radius shall not be exceeded. Do not tip the machine to determine allowable loads. For clamshell or concrete bucket operation, weight of bucket and load must not exceed 80% of rated lifting capacities.
2. Rated loads do not exceed 85% of the tipping load as determined by SAE Crane Stability Test Code J-765a.
3. Rated loads include the weight of hook block, slings and auxiliary lifting devices and their weights shall be subtracted from the listed ratings to obtain the net load to be lifted.
4. Load ratings are based on freely suspended loads. No attempt shall be made to move a load horizontally on the ground in any direction.
5. Rated loads do not account for wind on lif[illegible] or boom. It is recommended when wind velocity is above 20 mph (32 [illegible] loads and boom lengths shall be appropriately reduced.
6. Rated loads are for lift crane service only.
7. Do not operate at a radius or boom length where capacities are not listed. At these positions, the machine may overturn without any load on the hook.
8. The maximum load which can be telescoped is not definable because of variations in loadings and crane maintenance, but it is safe to attempt retraction and extension within the limits of the capacity chart.
9. When either boom length or radius or both are between values listed, the smallest load shown at either the next larger radius or boom length shall be used.
10. For safe operation, the user shall make due allowances for his particular job conditions, such as: soft or uneven ground, out of level conditions, high winds, side loads, pendulum action, jerking or sudden stopping of loads, hazardous conditions, experience of personnel, two machine lifts, traveling with loads, electric wires, etc. Side pull on boom or jib is extremely dangerous.
11. Power telescoping boom sections must be extended equally at all times.
12. Handling of personnel from the boom is not authorized except with equipment furnished and installed by Grove Manufacturing Company.
13. Keep load handling devices a minimum of 12 inches (30 cm) below boom head when lowering or extending boom.
14. Loaded boom angles give an approximation of the operating radius at specified boom lengths. The boom angle before loading should be greater to account for deflection.
15. Capacities appearing above bold line are based on structural strength and tipping should not be relied upon as a capacity limitation.
16. Capacities for 28 ft. (8.6m) boom length shall be lifted with the boom fully retracted. If boom is not fully retracted, capacities shall not exceed those shown for the 34 ft. (10.4m) boom length.

DEFINITIONS:

1. Operating Radius: Horizontal distance from a projection of the axis of rotation to the supporting surface before loading to the center of the vertical hoist line or tackle with load applied.
2. Loaded Boom Angle (Shown in Parenthesis on Main Boom Capacity Chart): is the angle between the boom base section and the horizontal, after lifting the rated load at the rated radius.
3. Working Area: Areas measured in a circular arc about the center line of rotation as shown on the working area diagram.
4. Freely Suspended Load: Load hanging free with no direct external force applied except by the lift cable.
5. Side Load: Horizontal force applied to the lifted load either on the gr[illegible] or in the air.

RT522

22 TON CAPACITY

28 ft. - 70 ft. BOOM

N/A

JIB CAPACITIES IN POUNDS

23 ft. "A" FRAME JIB

MAIN BOOM ANGLE	0° OFFSET		15° OFFSET		30° OFFSET	
	Radius (Ref.)	Cap. lbs.	Radius (Ref.)	Cap. lbs.	Radius (Ref.)	Cap. lbs.
75°	27.1	12,000	32.3	7,700	36.0	5,070
70	32.9	10,400	37.9	7,000	41.5	4,800
65	39.5	8,300	44.7	6,300	48.1	4,500
60	46.6	5,870	51.0	5,450	54.2	4,300
55	53.0	4,450	57.0	4,080	60.1	3,690
50	58.9	3,560	62.6	3,170	65.5	3,030
45	64.4	2,910	67.7	2,610	70.2	2,590
40	69.4	2,400	72.2	2,230	74.5	2,160
35	73.8	2,020	76.2	1,730	78.2	1,880
30	77.7	1,730	79.5	1,680	81.2	1,670

A6-829-003755

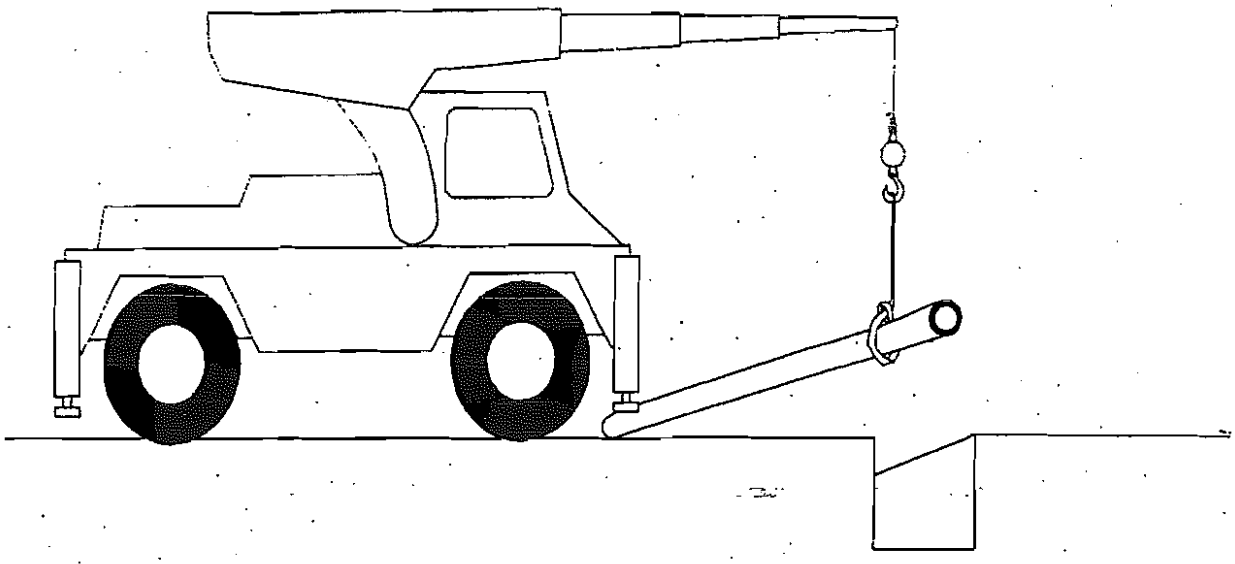
23 ft. - 38 ft. TELE. JIB

Loaded Boom Angle	23 ft. TELE. JIB			33 ft. TELE. JIB			38 ft. TELE. JIB		
	0° Offset	15° Offset	30° Offset	0° Offset	15° Offset	30° Offset	0° Offset	15° Offset	30
75	12,500	7,300	4,500	7,600	4,900	2,900	5,000	3,750	
70	9,390	6,390	4,150	6,500	4,270	2,650	4,650	3,300	
65	6,670	5,750	3,900	5,300	3,820	2,440	4,470	2,950	
60	5,020	4,630	3,680	4,300	3,450	2,330	3,550	2,640	
55	3,860	3,420	3,120	3,320	2,770	2,230	2,910	2,450	
50	3,080	2,790	2,650	2,590	2,190	1,910	2,430	2,030	
45	2,450	2,280	2,180	2,060	1,730	1,600	1,920	1,660	
40	1,980	1,870	1,750	1,640	1,400	1,360	1,480	1,360	
35	1,580	1,530	1,440	1,300	1,150	1,130	1,080	1,020	
30	1,290	1,270	1,230	1,020	940	920	860	840	

NOTES FOR JIB CAPACITIES

1. 23 ft. jib and 23 ft. tele. jib length may be used for double lifting service. 33 and 38 ft. tele. jib lengths may be used for single lifting service only. Capacities based on structural strength of every jib at a given main boom angle regardless main boom length.
2. WARNING: Operation of machine with heavier loads than the capacities listed strictly prohibited. Machine tipping with jib occurs rapidly and without adva warning.
3. Capacities listed are with fully extended outriggers only.
4. WARNING: Lifting on rubber with jib is prohibited.
5. Reference radii listed are for fully extended main boom only.
6. No load stability on outriggers with:
   - 23 ft. jib installed —
     - a. Minimum boom angle for fully extended main boom = 0°
     - b. Maximum boom length at 0° main boom angle = 93 ft.
   - 23 ft. - 38 ft. Tele. Jib installed —
     - a. 23 ft. Tele. Jib
       - 1) Minimum main boom angle for fully extended main boom (70 ft.) w fully retracted tele. jib (23 ft.) = 0°
       - 2) Maximum main boom length at 0° main boom angle = 93 ft. (includes ft. jib length)
     - b. 33 ft. Tele. Jib
       - 1) Minimum main boom angle for fully extended main boom (70 ft.) with ft. tele. jib = 0°
       - 2) Maximum main boom length at 0° main boom angle = 103 ft. (includes ft. jib length)
     - c. 38 ft. Tele. Jib
       - 1) Minimum main boom angle for fully extended main boom (70 ft.) w fully extended tele. jib (38 ft.) = 0°
       - 2) Maximum main boom length at 0° main boom angle = 108 ft. (includes ft. jib length)

Attachment "A"



Pipe Installation - General:

The following information is to supplement the FDF Lifting Plan for Mobile Cranes.

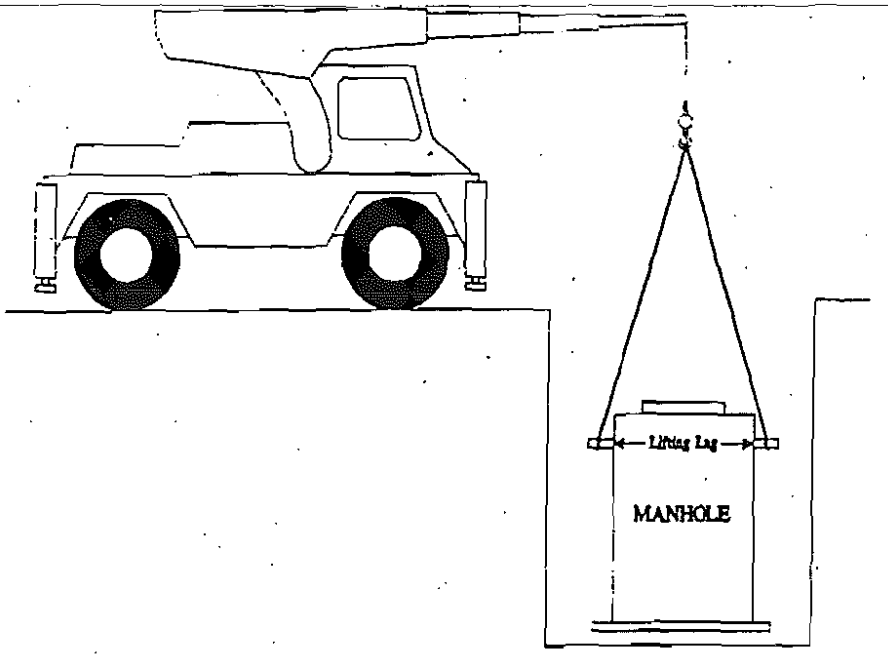
Section E. Sizing of Slings:

1. Sling Selection
   a. Type of Arrangement: Choked
   b. Number of Slings in the Hook: 1
   c. Sling Size: 6" x 8' long
   d. Sling Type: Nylon Webbing Sling (3 plies)
   e. Rated Capacity of Sling: 24,480 lbs.

Section F. Crane:

3. Lifting Arrangement:
   a. Maximum Distance - Center of load to Center Pin of Crane: 40 feet
   b. Boom Configuration: 28' - 70' (3 sections)
   c. Angle of Boom: 47° degrees
   d. Angle of Boom at set
      1. Over Rear: N/A
      2. Over Front @ 40 feet Max.: 1000 lbs. *(1 ea. 12" pipe)*
      3. Over Side @ 360°Rotation: 1000 lbs. *(1 ea. 12" pipe)*
      4. N/A
      5. Maximum Load of Crane: 1000 lbs. *(See list for pipe weights)*
      6. Based upon the manufacturers load chart (see attached), for a maximum distance from the center pin to the center of the load of 40 feet, a maximum boom angle of 47°, 360° rotation of the load, and a maximum load of 1000 lbs. The load is 14.29% of the cranes rated load capacity.

Attachment "C"



Manhole Installation - General:

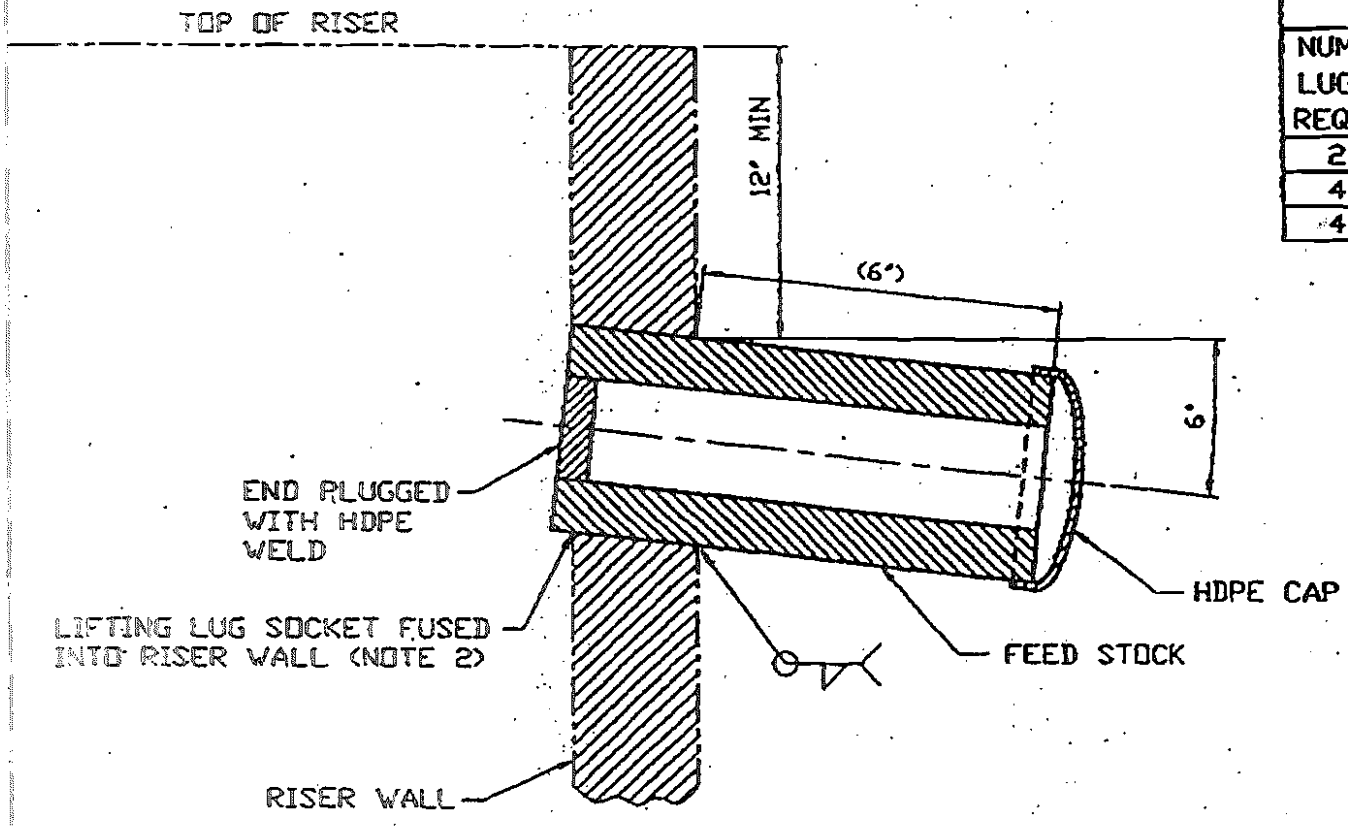
The following information is to supplement the FDF Lifting Plan for Mobile Cranes.

Section E. Sizing of Slings:

1. Sling Selection
   a. Type of Arrangement: 2 leg
   b. Number of Slings in the Hook: 2
   c. Sling Size: 6"" x 12' long
   d. Sling Type: Nylon Webbing Sling (3 plies)
   e. Rated Capacity of Sling: 24,480 lbs.

Section F. Crane:

3. Lifting Arrangement:
   a. Maximum Distance -
      Center of load to Center Pin of Crane: 40 feet
   b. Boom Configuration: 28 - 70 *(3 sections)*
   c. Angle of Boom: 47° degrees
   d. Angle of Boom at set
      1. Over Rear: N/A
      2. Over Front @ 40 feet Max.: 5,070 lbs.
      3. Over Side: @ 360° 5,070 lbs.
      4. N/A
      5. Maximum Load of Crane: 5,070 lbs. *(See list for man hole weights)*
      6. Based upon the manufacturers load chart (see attached), for a maximum distance from the center pin to the center of the load of 40 feet, a maximum boom angle of 47°, 360° rotation of the load, and a maximum load of 5070 lbs. The load is 72.43% of the cranes rated load capacity.



LUG SCHEDULE			
NUMB LUGS REQ'D	FEED STOCK REQ'D	SPACING	MAX MANHOLE WEIGHT
2	3" SDR 4	180°	6,000 LB.
4	3" SDR 4	90°	10,000 LB.
4	4" SDR 3	90°	20,000 LB.

APPROVALS

ACAD13
PLOT DATE: 12/4/96

CUT-A-WAY VIEW

PRODUCT CODE: FAB OTHER
PRODUCT CAT: B-289

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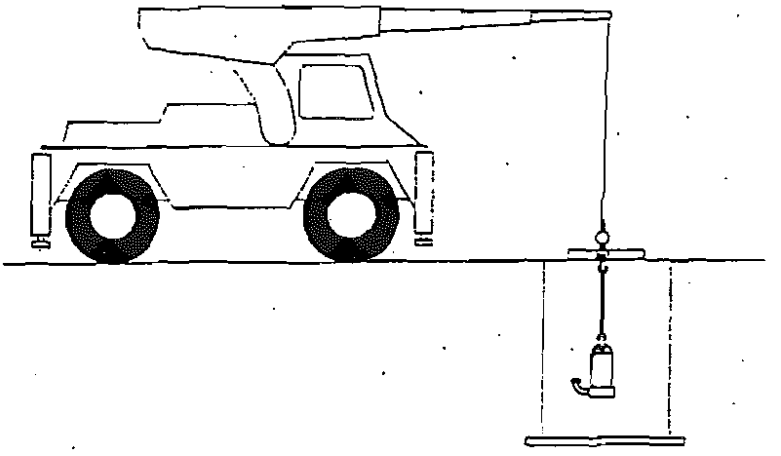
TOLERANCES except as noted
± 1"
± 1"

Plexco
SUBMITTAL

SCALE: NONE
DATE: 10/10/96
DRAWN BY: K.VOLNIK
TITLE: STD. MANHOLE LIFTING LUG
CU70B-664

Attachment "D"



Pump Installation - General:

The following information is to supplement the FDF Lifting Plan for Mobile Cranes.

Section E. Sizing of Slings:

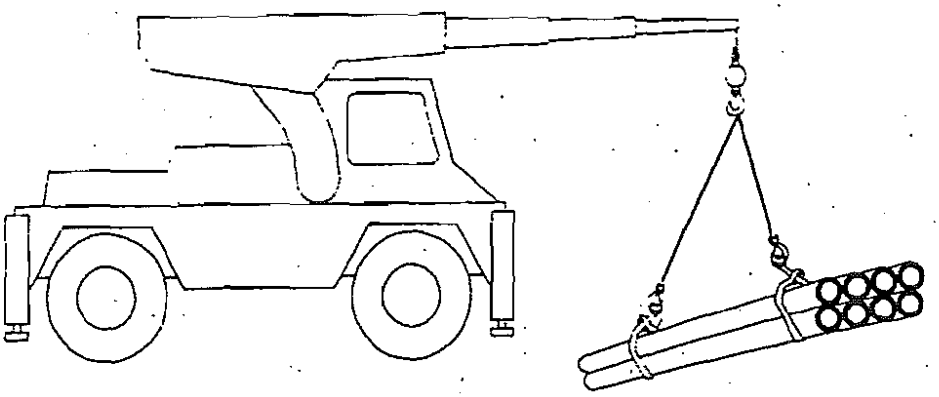
1. Sling Selection
   a. Type of Arrangement: Vertical
   b. Number of Slings in the Hook: 1
   c. Sling Size: 6" x 8' long
   d. Sling Type: Nylon Webbing Sling (3 plies)
   e. Rated Capacity of Sling: 24, 480 lbs.

2. Shackle Selection
   a. Pin Diameter: 5/8"
   b. Capacity: 3 1/4 Tons
   c. Number of Shackles: 2
   d. Shackle Secured to Load by: Choker and Hook

Section F. Crane:

3. Lifting Arrangement:
   a. Maximum Distance - Center of load to Center Pin of Crane: 40 feet Max.
   b. Boom Configuration: 28 - 70 (3 sections)
   c. Angle of Boom: 47° degrees
   d. Angle of Boom at set
      1. Over Rear: N/A
      2. Over Front @ 40 feet Max.: 675 lbs. Max.
      3. Over Side: @ 360° 675 lbs. Max.
      4. N/A
      5. Maximum Load of Crane: 675 lbs.
      6. Based upon the manufacturers load chart (see attached), for a maximum distance from the center pin to the center of the load, of 40 feet, a maximum boom angle of 47°, 360° rotation of the load, a maximum load of 675 lbs. The load is 9.64% of the cranes rated load capacity.

Attachment "H"



Pipe off- loading - General:

The following information is to supplement the FDF Lifting Plan for Mobile Cranes.

Section E. Sizing of Slings:

1. Sling Selection
   a. Type of Arrangement: 2-Leg (60
   b. Number of Slings in the Hook: 2
   c. Sling Size: 6" x 12' long and 5/8" x 10' spreader
   d. Sling Type: Nylon Webbing Sling (3 plies) and 2-Leg w/ hooks
   e. Rated Capacity of Sling: 24, 480 lbs. / 11,800 lbs.

2. Shackle Selection
   a. Pin Diameter: N/A
   b. Capacity: N/A
   c. Number of Shackles: N/A
   d. Shackle Secured to Load by: N/A

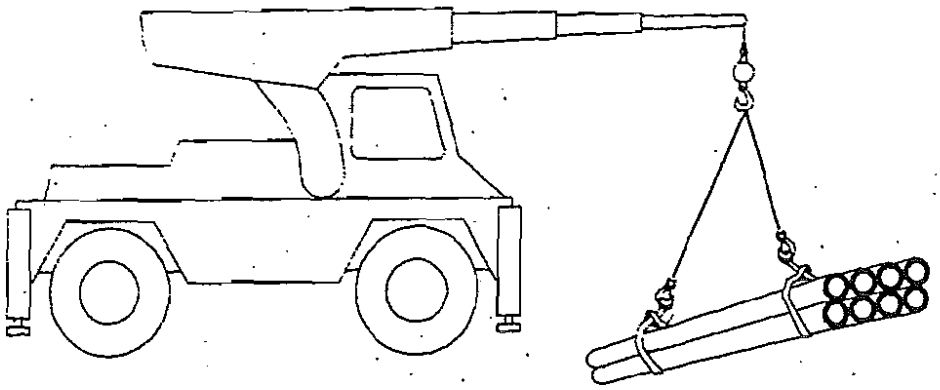
Section F. Crane:

3. Lifting Arrangement:
   a. Maximum Distance - Center of load to Center Pin of Crane: 40 feet Max.
   b. Boom Configuration: 28 - 70 *(3 sections)*
   c. Angle of Boom: 47° degrees
   d. Angle of Boom at set
      1. Over Rear: N/A
      2. Over Front @ 40 feet Max.: 4450 lbs. Max. *(9 ea. 12" pipes)*
      3. Over Side: @ 360° 4450 lbs. Max. *(9 ea. 12" pipes)*
      4. N/A
      5. Maximum Load of Crane: 4450 lbs. *(See list for max. No of pipes)*
      6. Based upon the manufacturers load chart (see attached), for a maximum distance from the center pin to the center of the load, of 40 feet, a maximum boom angle of 47°, 360° rotation of the load, a maximum load of 4450 lbs. The load is 63.57% of the cranes rated load capacity.

Maximum number of pipe per bundle
(Based on 70% of the rated capacity of the Grove RT-522)

Pipe size	Weight per 40 foot section (lbs.)	Number of pipes
3"	37.2	131
4"	61.6	79
6"	89.2	54
8"	151.6	32
10"	234.8	20
12"	494.4	9
4" inside of 8"	213.2	22
6" inside of 10"	324.0	15

Attachment "I"



Setting Pipe casings for Midwest Mole, Inc. - General:

The following information is to supplement the FDF Lifting Plan for Mobile Cranes.

Section E. Sizing of Slings:

1. Sling Selection
   a. Type of Arrangement: 2-Leg (60°)
   b. Number of Slings in the Hook: 2
   c. Sling Size: 6" x 12' long and 5/8" x 10' spreader
   d. Sling Type: Nylon Webbing Sling (3 plies) and 2-Leg w/ hooks
   e. Rated Capacity of Sling: 24, 480 lbs. / 11,800 lbs.

2. Shackle Selection
   a. Pin Diameter: N/A
   b. Capacity: N/A
   c. Number of Shackles: N/A
   d. Shackle Secured to Load by: N/A

Section F. Crane:

3. Lifting Arrangement:
   a. Maximum Distance - Center of load to Center Pin of Crane: 40 feet Max.
   b. Boom Configuration: 28 - 70 *(3 sections)*
   c. Angle of Boom: 47° degrees
   d. Angle of Boom at set
      1. Over Rear: N/A
      2. Over Front @ 40 feet Max.: 3310.8 *(1 ea. 40 ft. Casing @ 82.77 lbs per ft)*
      3. Over Side: @ 360° 3310.8 *(1 ea. 40 ft. Casing @ 82.77 lbs per ft)*
      4. N/A
5. Maximum Load of Crane: 3310.8 *(1 ea. 40 ft. Casing @ 82.77 lbs per ft)*
6. Based upon the manufacturers load chart (see attached), for a maximum distance from the center pin to the center of the load, of 40 feet, a maximum boom angle of 47°, 360° rotation of the load, a maximum load of 3310.8 lbs. The load is 47.3% of the cranes rated load capacity.

USS Standard and Line Pipe Data
Seamless, Electric Weld, Plain End (Cont'd)

Size, Inches: Nominal Size	Size, Inches: OD	Wall Thickness, Inches	Weight Lbs./Ft. Plain End	Nominal T & C Weight, Lbs./Ft.: Standard Pipe Coupling	Nominal T & C Weight, Lbs./Ft.: Line Pipe Coupling	Class	Sched. No.	Mill Test Pressure, psi: Grade A	Mill Test Pressure, psi: Grade B	Actual OD, Inches
10	10.750	0.188	21.21					790	920	10¾
		0.203	22.87					850	990	
		0.219	24.63					920	1070	
		0.250	28.04				20	1050	1220	
		0.279	31.20		32.75			1170	1360	
		0.307	34.24		35.75		30	1290	1500	
		0.344	38.23					1440	1680	
		0.365	40.48		41.85	Std.	40	1530	1780	
		0.438	48.24					1830	2140	
		0.500	54.74		55.82	XS	60	2090	2440	
		0.562	61.15					2350	2740	
		0.594	64.43					2490	2800	
		0.625	67.58					2620	2800	
		0.719	77.03				100	2800	2800	10¾
		0.812	86.18					2800	2800	
		0.844	89.29				120	2800	2800	
		1.000	104.13				140	2800	2800	
		1.125	115.64				160	2800	2800	
		1.438	143.01					2800	2800	
12	12.750	0.188*	25.22					660	770	12¾
		0.203*	27.20					720	840	
		0.219*	29.31					770	900	
		0.250*	33.38				20	880	1030	
		0.281	37.42					990	1160	
		0.312	41.45					1100	1280	
		0.330	43.77		45.45		30	1160	1360	
		0.344	45.58					1210	1420	
		0.375	49.56		51.15	Std.		1320	1540	
		0.406	53.52				40	1430	1670	
		0.438	57.59					1550	1800	
		0.500	65.42		66.71	XS		1760	2060	
		0.562	73.15				60	1980	2310	
		0.625	80.93					2210	2570	
		0.688	88.63				80	2430	2800	
		0.750	96.12					2650	2800	
		0.844	107.32				100	2800	2800	
		1.000	125.49				120	2800	2800	
		1.125	139.67				140	2800	2800	
		1.312	160.27				160	2800	2800	
		1.500	180.23					2800	2800	
		1.594	189.92					2800	2800	
		1.625	193.07					2800	2800	
		1.750	205.59					2800	2800	
		2.000	229.62					2800	2800	
		2.375	263.16					2800	2800	
		2.500	273.68					2800	2800	

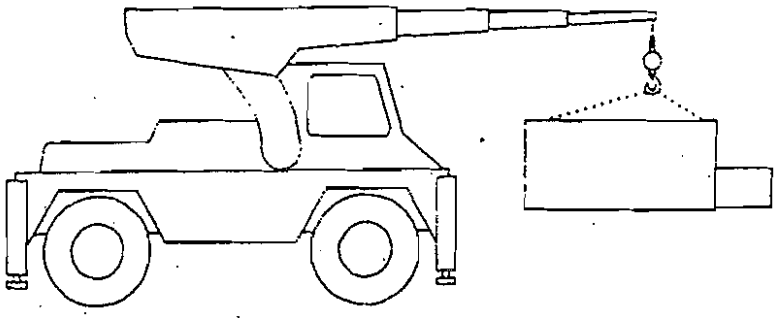
Size, Inches: Nominal Size	Size, Inches: OD	Wall Thickness, Inches	Weight Lbs./Ft. Plain End	Class	Schedule No.	Mill Test Pressure, psi: Grade A	Mill Test Pressure, psi: Grade B	Actual OD, Inches
14	14.000	0.188*	27.73			600	700	14
		0.203*	29.91			650	760	
		0.210*	30.93			670	790	
		0.219*	32.23			700	820	
		0.250*	36.71			800	940	
		0.281	41.17			900	1060	
		0.312	45.61		20	1000	1170	
		0.344	50.17			1110	1290	
		0.375	54.57	Std.	30	1210	1410	
		0.406	58.94			1300	1520	
		0.438	63.44		40	1410	1640	
		0.459	67.78			1510	1760	
		0.500	72.09	XS		1610	1880	
		0.562	80.66			1810	2110	
		0.594	85.05		60	1910	2230	
		0.625	89.28			2010	2340	
		0.688	97.81			2210	2580	
		0.750	106.13		80	2410	2800	
		0.812	114.37			2610	2800	
		0.938	130.85		100	2800	2800	
		1.094	150.79		120	2800	2800	
		1.250	170.21		140	2800	2800	
		1.406	189.11		160	2800	2800	
		1.500	200.25			2800	2800	
		2.000	256.32			2800	2800	

NOTE: Some OD's, walls and grades are listed for information only and are not necessarily regular production items. In addition, certain items listed in this chart, are available as AWWA Water Pipe.
Some OD's, walls and grades are non-API.
*Not available in seamless.

Size, Inches: Nominal Size	Size, Inches: OD	Wall Thickness, Inches	Weight Lbs./Ft. Plain End	Class	Schedule No.	Mill Test Pressure, psi: Grade A	Mill Test Pressure, psi: Grade B	Actual OD, Inches
16	16.00	0.188*	31.75			530	620	16
		0.203*	34.25			570	670	
		0.219*	36.91			620	720	
		0.250*	42.05			700	820	
		0.281	47.17			790	920	
		0.312	52.27		20	880	1020	
		0.344	57.52			970	1130	
		0.375	62.58	Std.	30	1050	1230	
		0.406	67.62			1140	1330	
		0.438	72.80			1230	1440	
		0.469	77.79			1320	1540	
		0.500	82.77	XS	40	1410	1640	
		0.562	92.66			1580	1840	
		0.625	102.63			1760	2050	
		0.656	107.50		60	1840	2150	
		0.688	112.51			1930	2260	
		0.750	122.15			2110	2460	
		0.812	131.71			2280	2660	
		0.844	136.61		80	2370	2770	
		1.031	164.32		100	2800	2800	
		1.219	192.43		120	2800	2800	
		1.438	223.64		140	2800	2800	
		1.594	245.25		160	2800	2800	
		1.618	248.52			2800	2800	
		2.000	299.04			2800	2800	
18	18.000	0.219*	41.59			550	640	18
		0.250*	47.39			630	730	
		0.281	53.18			700	820	
		0.312	58.94		20	780	910	
		0.344	64.87			860	1000	
		0.375	70.59	Std.		940	1090	
		0.406	76.29			1010	1180	
		0.438	82.15		30	1090	1280	
		0.469	87.81			1170	1370	
		0.500	93.45	XS		1250	1460	
		0.562	104.67		40	1400	1640	
		0.625	115.98			1560	1820	
		0.688	127.21			1720	2010	
		0.750	138.12		60	1880	2190	
		0.812	149.06			2030	2370	
		0.938	170.92		80	2340	2740	
		1.156	207.96		100	2800	2800	
		1.375	244.14		120	2800	2800	
		1.500	264.33			2800	2800	
		1.562	274.22		140	2800	2800	
		1.652	288.43			2800	2800	
20	20.000	0.219*	46.27			490	570	20
		0.250*	52.73			560	660	
		0.281	59.18			630	740	
		0.312	65.60			700	820	
		0.344	72.21			770	900	
		0.375	78.60	Std.	20	840	980	
		0.406	84.96			910	1070	
		0.438	91.51			990	1150	
		0.469	97.83			1060	1230	
		0.500	104.13	XS	30	1130	1310	
		0.562	116.67			1260	1480	
		0.594	123.11		40	1340	1560	
		0.625	129.33			1410	1640	
		0.688	141.90			1550	1810	
		0.750	154.19			1690	1970	
		0.812	166.40		60	1830	2130	
		1.031	208.87		80	2320	2710	
		1.281	256.10		100	2750	2750	
		1.375	273.51			2800	2800	
22	22.000	0.375	86.61	Std.	20	770	890	22
		0.406	93.63			830	970	
		0.438	100.36			900	1050	
		0.469	107.85			960	1120	
		0.500	114.81	XS	30	1020	1190	
		0.562	128.67			1150	1340	
		0.625	142.68			1280	1490	
		0.688	156.60			1410	1640	
		0.750	170.21			1530	1790	
		0.812	183.75			1660	1940	
		0.875	197.41		60	1790	2090	
		1.125	250.81		80	2300	2500	
		1.219	270.55			2500	2500	

NOTE: Some OD's, walls and grades are listed for information only and are not necessarily regular production items.
Some OD's, walls and grades are non-API.
*Not available in seamless.

Attachment "J"



Setting Pipe casings for Midwest Mole, Inc. - General:

The following information is to supplement the FDF Lifting Plan for Mobile Cranes.

Section E. Sizing of Slings:

1. Sling Selection
   a. Type of Arrangement: 2-Leg (60°)
   b. Number of Slings in the Hook: 1
   c. Sling Size: 3/8" Chain Sling
   d. Sling Type: Chain
   e. Rated Capacity of Sling: 12,300 lbs.

2. Shackle Selection
   a. Pin Diameter: N/A
   b. Capacity: N/A
   c. Number of Shackles: N/A
   d. Shackle Secured to Load by: N/A

Section F. Crane:

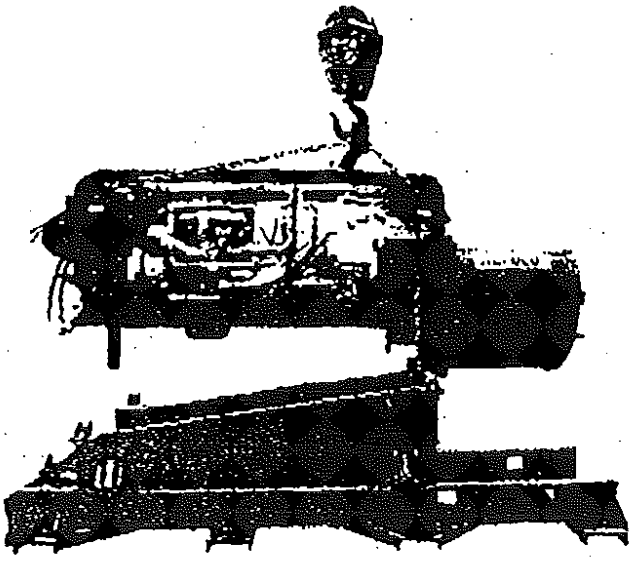
3. Lifting Arrangement:
   a. Maximum Distance - Center of load to Center Pin of Crane: 40 feet Max.
   b. Boom Configuration: 28 - 70 *(3 sections)*
   c. Angle of Boom: 47° degrees
   d. Angle of Boom at set
      1. Over Rear: N/A
      2. Over Front @ 40 feet Max.: 3073
      3. Over Side: @ 360° 3073
5. Maximum Load of Crane: 3073
6. Based upon the manufacturers load chart (see attached), for a maximum distance from the center pin to the center of the load, of 40 feet, a maximum boom angle of 47°, 360° rotation of the load, a maximum load of 3073 lbs. The load is 43.9% of the cranes rated load capacity.

23 Reasons Why

your next boring machine should be a **Barbco**

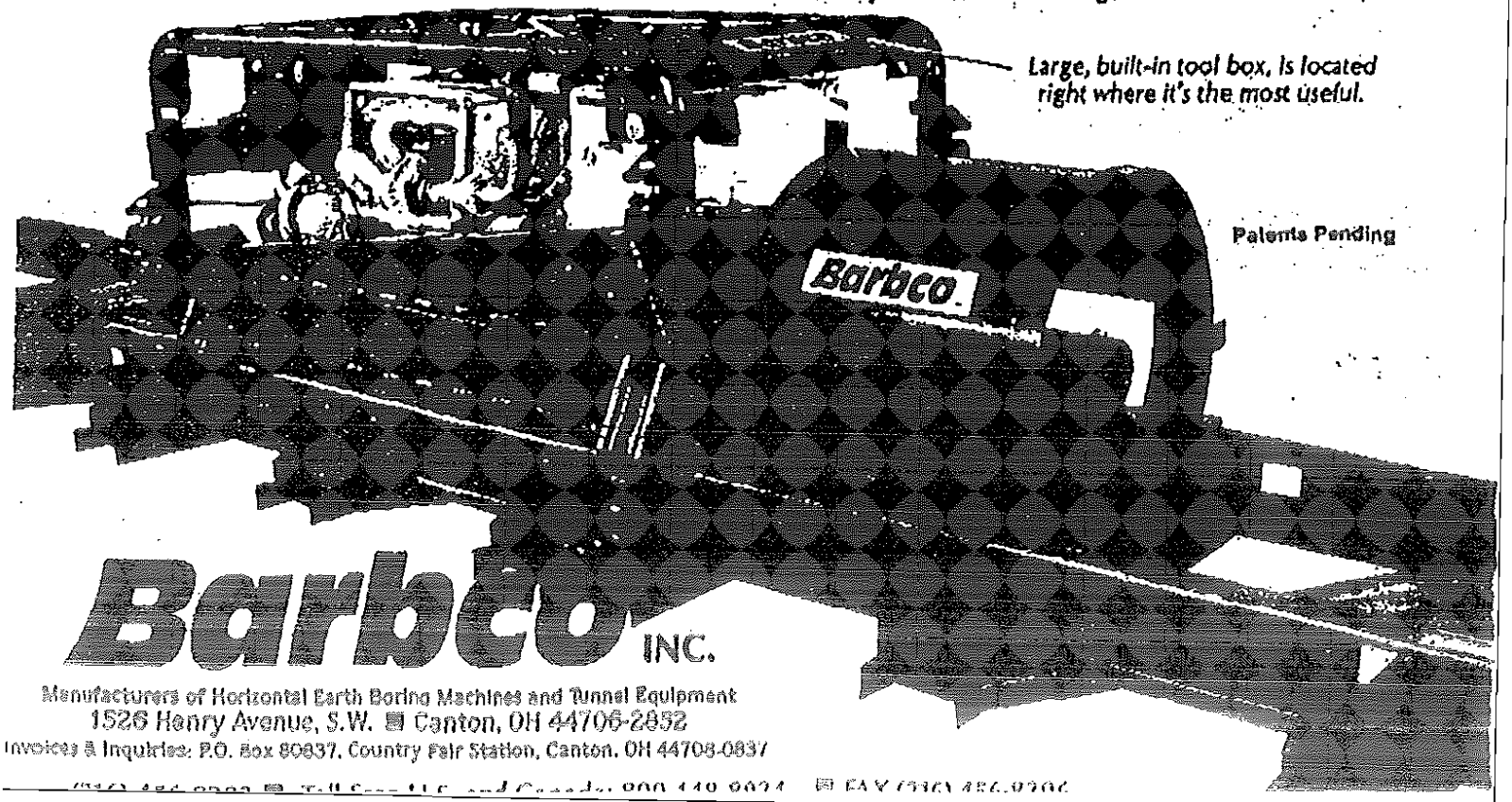
Horizontal Earth Boring Machine

Dual models from 24/30 to 60/66



Power-Pack includes engine, drive train, and gear box. No need to disconnect drive train, since all lift out together. No tedious disassembly or reassembly. Balanced weight: Power-Pack and Base Unit weigh almost the same, for two easy lifts.

- ☑ 1. Larger engines (some turbocharged) for more power.
- ☑ 2. Split design with easy disconnect features.
- ☑ 3. Dual size machine with one investment.
- ☑ 4. Up-graded motor mounts (to Deutz specifications).
- ☑ 5. Fuel gauge (no more welding rod as a probe).
- ☑ 6. Hydraulic sight gauge, with thermometer.
- ☑ 7. Up-graded hydraulic quick disconnect, operable under pressure.
- ☑ 8. Pressure compensated load sensing hydraulic system.
- ☑ 9. Extra large hydraulic tank to reduce heat build-up.
- ☑10. Load sensing hydraulic valves.
- ☑11. Battery hold-down bracket (no box to build up heat).
- ☑12. Travel pocket for lift bar built into vandalism shield.
- ☑13. Hydraulic push bars (no springs or hydraulic cylinder exposed).
- ☑14. Hydraulic winch cable roller bars feed cable snugly onto drum.
- ☑15. Better weight distribution for more equal picks.
- ☑16. Wider rack for easier maintenance.
- ☑17. Convenient, roomy tool box, built into front of rack.
- ☑18. Track pick-up locations.
- ☑19. Track gussets are heavier ½" steel, not usual ⅜".
- ☑20. Heavy duty sub-frame won't bend under engine weight.
- ☑21. Base can be used as a pipe-jacking unit.
- ☑22. No obstacle in the way of muck car when pipe jacking.
- ☑23. Quality construction throughout.



Large, built-in tool box, is located right where it's the most useful.

Patents Pending

Barbco INC.

Manufacturers of Horizontal Earth Boring Machines and Tunnel Equipment
1526 Henry Avenue, S.W. ■ Canton, OH 44706-2852
Invoices & Inquiries: P.O. Box 80837, Country Fair Station, Canton, OH 44708-0837

SPECIFICATIONS

Model 24/30-[illegible]0

POWER TRAIN

Engine:

De[illegible] F3L1011 Air Cooled diesel w/[illegible]ctric Start, 36.2 HP (27K[illegible] at 2800 RPM Continuous Du[illegible]ating, 83.3 ft-lbs (113 N-M) [illegible]x Torque at 1800 RPM

Clutch:

9" (229 MM) D[illegible]eter

Transmi[illegible]on:

T-18 - 4[illegible]ed

	Auger Speed
[illegible] Gear 6.32 : [illegible]atio	... 10 RPM
[illegible] Gear 3.09 : [illegible]atio	... 20 RPM
3[illegible] Gear 1.69 [illegible] Ratio	... 37 RPM
4[illegible]ear 1.00 [illegible] Ratio	... 62 RPM
Re[illegible]se 7.4[illegible] Ratio	... 8 RPM

[illegible]arbox:

[illegible]BC[illegible] - 45 : 1 Ratio

[illegible]ger Drive:

[illegible] (76.2 MM)

Max[illegible]m Output Torques

1st Gea[illegible]	3694 ft-lbs (32223.8 N-M)
2nd Ge[illegible]	1584 ft lbs (15754 N-M)
3rd Ge[illegible]	336 ft-lbs (8616.9 N-M)
4th Ge[illegible]	749 ft-lbs (5098.6 N-M)
Reve[illegible]	93 ft-lbs (37934 N-M)

H[illegible]RA[illegible]LIC SYSTEM

[illegible]ump:

#6 Hydu[illegible] 3800 P[illegible] Pressure Compensated, Load [illegible]nsing Sy[illegible]m, Axial Piston Pump [illegible] 10.5 GP[illegible] 2800 RPM

Cyl[illegible]ers:

Two 5[illegible] (27 MM) Bore [illegible]6" (914.4 MM) Stroke [illegible]0,000 lbs. (667[illegible] N) Max Thrust

Filt[illegible]

S[illegible]on — 100 Micron [illegible]anable Wire Mesh [illegible]eturn 10 Micron Rep[illegible]eable Element

DIMENSI[illegible]S

Work [illegible]nge:	4" to 24"-3[illegible]	(101.6 to 609.6-762 MM)
Cente[illegible]ne	17.25"-20.25[illegible]	438-514 MM)
Heig[illegible]	39"-42"	[illegible]91-1067 MM)
Wid[illegible]	48"	[illegible]20 MM)
Len[illegible]n	120"	[illegible]48 MM)

WEIGHTS

B[illegible]e Unit	2150[illegible]	(967.5 Kg)
P[illegible]wer Unit	2300 [illegible]	(1035 Kg)
[illegible]sing Pusher 24"	450 l[illegible]	202.5 Kg)
[illegible]sing Pusher 30"	673 lb[illegible]	302.8 Kg)
[illegible]aster Track	1160 lb [illegible]	[illegible]22 Kg)
[illegible]xtension Track	1000 lb [illegible]	[illegible]0 Kg)

OPTIONAL

Vandalism Shield

Model 30/36-200

POWER TRAIN

Engine:

Deutz F4L1011 Air Cooled Diesel w/ Electric Start, 48.3 HP ([illegible] KW) at 2800 RPM Continuous Duty Rating, 113.5 ft-lbs (1[illegible] N-M) Max Torque at 1800 RPM

Clutch:

9" (229 MM) Diameter

Transmission:

T-18 - 4 Speed

	Auger Speed
1st Gear 6.32 : 1 Ratio	... 10 RPM
2nd Gear 3.09 : 1 Ratio	... 20 RPM
3rd Gear 1.69 : 1 Ratio	... 37 RPM
4th Gear 1.00 : 1 Ratio	62 RPM
Reverse 7.44 : 1 Ratio	... 8 RPM

Gearbox:

BBC #10 - 45 . 1 Ratio

Auger Drive:

3" (76.2 MM) Hex

Maximum Output Torques

1st Gear	32279 ft-lbs (43899 N-M)
2nd Gear	15782 ft-lbs (21463 N-M)
3rd Gear	8632 ft-lbs (11739 N-M)
4th Gear	5108 ft-lbs (6946 N-M)
Reverse	38000 ft-lbs (51680 N-M)

HYDRAULIC SYSTEM

Pump:

#15 Hydura, 3500 PSI Pressure Compensated Load Sensing System, Axial Piston Pump, 24.9 GPM at 2800 RPM

Cylinders:

Two 6" (152.4 MM) Bore x 36" (914.4 MM) Stroke 200,000 lbs (889600N) Maximum Thrust

Filter:

Suction — 100 Micron Cleanable Wire Mesh Return 10 Micron Replaceable Element

DIMENSIONS

Work Range:	4" to 30"-36"	(101.6 to 762-914.4 MM)
Centerline	19"-22"	(482.6-558.8 MM)
Height	48"-51"	(1219.2-1295.4 MM)
Width	50"	(1270 MM)
Length	120"	(3048 MM)

WEIGHTS

Base Unit	2500 lb	(1125 Kg)
Power Unit	2400 lb	(1080 Kg)
Casing Pusher 30"	673 lb	(306 Kg) } 3073#
Casing Pusher 36"	750 lb	(340 Kg)
Master Track	1175 lb	(528 Kg)
Extension Track	1100 lb	(495 Kg)

OPTIONAL

Vandalism Shield

Rated Sling Capacity Charts

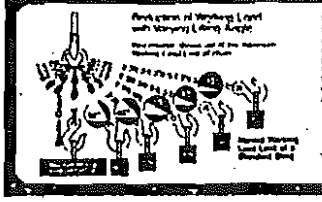
- Arc Force Inc.
- F&M Supply Inc.
- Malco Equipment Co.
- Vulcan Industrial Supplies

The F&M Group
P.O. Box 11013
Cincinnati, Ohio
45211-1113
Tel: 513-367-2151
Fax: 513-367-0363

The F&M Group
P.O. Drawer 360188
Birmingham, Alabama
35236-0188
Tel: 205-664-5300
Fax: 205-664-5188

Cam-Alloy Chain Slings Working Load Limits* (Lbs.)

TRADE SIZE INCHES	SINGLE SLING TYPE S	DOUBLE SLINGS TYPE D			TRIPLE TYPE T AND QUADRUPLE TYPE Q SLINGS			TRADE SIZE MM
7/32	2100	3600	3000	2100	5500	4500	3200	5.5
9/32	3500	6100	4900	3500	9100	7400	5200	7
3/8	7100	12300	10000	7100	18400	15100	10600	10
1/2	12000	20600	17000	12000	31200	25500	18000	13
5/8	18100	31300	25600	18100	47000	38400	27100	16
3/4	28300	49000	40000	28300	73500	60000	42400	20
7/8	34200	59200	48400	34200	88900	72500	51300	22
1	47700	82600	67400	47700	123900	101200	71500	25
1-1/4	72300	125200	102200	72300	187800	153400	108400	32



CARE and PRECAUTIONS

Campbell Chain

RATED CAPACITIES FOR SINGLE LEG SLINGS
6 X 19 AND 6 X 37 CLASSIFICATION IMPROVED PLOW STEEL GRADE ROPE WITH INDEPENDENT WIRE ROPE CORE (IWRC)

Rope		Rated Capacities, Tons (2,000 lb)								
		Vertical			Choker			Vertical Basket*		
Dia (Inches)	Constr	HT	MS	S	HT	MS	S	HT	MS	S
¼	6 × 19	0.53	0.56	0.59	0.40	0.42	0.44	1.0	1.1	1.2
5/16	6 × 19	0.81	0.87	0.92	0.61	0.65	0.69	1.6	1.7	1.8
⅜	6 × 19	1.1	1.2	1.3	0.86	0.93	0.98	2.3	2.5	2.6
7/16	6 × 19	1.5	1.7	1.8	1.2	1.3	1.3	3.1	3.4	3.5
½	6 × 19	2.0	2.2	2.3	1.5	1.6	1.7	3.9	4.4	4.6
9/16	6 × 19	2.5	2.7	2.9	1.8	2.1	2.2	4.9	5.5	5.8
⅝	6 × 19	3.0	3.4	3.6	2.2	2.5	2.7	6.0	6.8	7.2
¾	6 × 19	4.2	4.9	5.1	3.1	3.6	3.8	8.4	9.7	10.0
⅞	6 × 19	5.5	6.6	6.9	4.1	4.9	5.2	11.0	13.0	14.0
1	6 × 19	7.2	8.5	9.0	5.4	6.4	6.7	14.0	17.0	18.0
1⅛	6 × 19	9.0	10.0	11.0	6.8	7.8	8.5	18.0	21.0	23.0
1¼	6 × 37	10.0	12.0	13.0	7.9	9.2	9.9	21.0	24.0	26.0
1⅜	6 × 37	13.0	15.0	16.0	9.6	11.0	12.0	25.0	29.0	32.0
1½	6 × 37	15.0	17.0	19.0	11.0	13.0	14.0	30.0	35.0	38.0
1⅝	6 × 37	18.0	20.0	22.0	13.0	15.0	17.0	35.0	41.0	44.0
1¾	6 × 37	20.0	24.0	26.0	15.0	18.0	19.0	41.0	47.0	51.0
2	6 × 37	26.0	30.0	33.0	20.0	23.0	25.0	53.0	61.0	66.0

HT = Hand Tucked Splice.
For hidden tuck splice (IWRC) use Table H-3 values in HT column.
MS = Mechanical Splice.
S = Swaged or Zinc Poured Socket
*These values only apply when the D/d ratio for HT slings is 10 or greater, and for MS and S slings is 20 or greater where:
D = Diameter of curvature around which the body of the sling is bent.
d = Diameter of rope.

RATED CAPACITIES FOR 2-LEG & 3-LEG BRIDLE SLINGS
6 X 19 AND 6 X 37 CLASSIFICATION IMPROVED PLOW STEEL GRADE ROPE WITH FIBER CORE (FC)

Rope		Rated Capacities, Tons (2,000 lb)											
		2-Leg Bridle Slings						3-Leg Bridle Slings					
Dia (Inches)	Constr	Vert 30 degree Horz 60 degree		45 degree Angle		Vert 60 degree Horz 30 degree		Vert 30 degree Horz 60 degree		45 degree Angle		Vert 60 degree Horz 30 degree	
		HT	MS	HT	MS	HT	MS	HT	MS	HT	MS	HT	MS
¼	6 × 19	0.85	0.88	0.70	0.72	0.49	0.51	1.3	1.3	1.0	1.1	0.74	0.7
5/16	6 × 19	1.3	1.4	1.1	1.1	0.76	0.79	2.0	2.0	1.6	1.7	1.1	1.2
⅜	6 × 19	1.8	1.9	1.5	1.6	1.1	1.1	2.8	2.9	2.3	2.4	1.6	1.7
7/16	6 × 19	2.5	2.6	2.0	2.2	1.4	1.5	3.7	4.0	3.0	3.2	2.1	2.3
½	6 × 19	3.2	3.4	2.6	2.8	1.8	2.0	4.8	5.1	3.9	4.2	2.8	3.0
9/16	6 × 19	4.0	4.3	3.2	3.5	2.3	2.5	6.0	6.5	4.9	5.3	3.4	3.7
⅝	6 × 19	4.8	5.3	4.0	4.4	2.8	3.1	7.3	8.0	5.9	6.5	4.2	4.6
¾	6 × 19	6.6	7.6	5.5	6.2	3.9	4.4	10.0	11.0	8.3	9.3	5.8	6.6
⅞	6 × 19	8.9	10.0	7.3	8.4	5.1	5.9	13.0	15.0	11.0	13.0	7.7	8.9
1	6 × 19	11.0	13.0	9.4	11.0	6.7	7.7	17.0	20.0	14.0	16.0	10.0	11.0
1⅛	6 × 19	14.0	16.0	12.0	13.0	8.4	9.5	22.0	24.0	18.0	20.0	13.0	14.0
1¼	6 × 37	17.0	19.0	14.0	16.0	9.8	11.0	25.0	29.0	21.0	23.0	15.0	17.0
1⅜	6 × 37	20.0	23.0	17.0	19.0	12.0	13.0	31.0	35.0	25.0	28.0	18.0	20.0
1½	6 × 37	24.0	27.0	20.0	22.0	14.0	16.0	35.0	41.0	30.0	33.0	21.0	24.0
1⅝	6 × 37	28.0	32.0	23.0	26.0	16.0	18.0	43.0	48.0	35.0	39.0	25.0	28.0
1¾	6 × 37	33.0	37.0	27.0	30.0	19.0	21.0	49.0	56.0	40.0	45.0	28.0	32.0
2	6 × 37	43.0	48.0	35.0	39.0	25.0	28.0	64.0	72.0	52.0	59.0	37.0	41.0

HT = Hand Tucked Splice
MS = Mechanical Splice

Date 2/21/97

Chain Sling Registration No. 971753, 64

TEST CERTIFICATE
GUNNEBO ALLOY CHAIN SLING & COMPONENTS

This is to certify that Gunnebo has subjected all Gunalloy™ alloy chain and chain sling components used in this sling to the appropriate proof test loads in accordance with ASTM Designation A391 and the pertinent OSHA requirements for alloy steel chain slings.

GUNNEBO CORPORATION
CHAIN & LIFTING DIVISION

Distributor THE TWAY CO. INC.

The working-load-limit of the chain and components shown hereon is established as pounds applied tensile load to the indicated degrees from horizontal. **PROPER MODIFICATION OF THIS WORKING-LOAD-LIMIT SHOULD BE MADE TO COMPENSATE FOR ADDED STRESS WHEN USED AT OTHER ANGLES.** (See chart reverse side.)

Customer's Order No. 5857

Customer's Name MIDWEST MOLE COMPANY

No. of Slings 2 Size & Material 3/8" ALLOY

Type and Reach DOG X 15'0"

Working Load Limit 12,300 Pounds

From Horizontal at 60 Degrees

This is to certify that this certificate, identified by the customer's order number and date, is composed of the chain and components set forth herein.

Signature Earl O. Hall

This sling is subject to the warranty terms on the back of this certificate.

MAY-31-97 11:08A Midwest Mole Inc. (shop) 317 841 3306 P.01

WARNING Inspect this product and review industry and OSHA standards before each use. The product may fail if damaged, abused, misused, overloaded or improperly maintained.

WARRANTY

Gunnebo warrants this chain and components to be free from defects in workmanship and materials for one year. No other express warranty is given and no affirmation of Gunnebo, by words or action, shall constitute a warranty. Gunnebo makes no warranty of MERCHANTABILITY and no warranty that this chain and components is suitable for any particular purpose.

REMEDIES

The Buyer's remedy for breach of any warranty including merchantability and fitness for a particular purpose is limited exclusively to obtaining, at the discretion of Gunnebo, either repair or replacement of this chain and or components if, and only if, it is returned to the Gunnebo plant, transportation prepaid within one year of delivery and inspection by Gunnebo finds it to be defective.

WORKING LOAD LIMITS (LBS)

Chain size	Single Sling 90°	Double Sling 60°	Double Sling 45°	Double Sling 30°	Triple Sling 60° / Quadruple Sling 60°	Triple Sling 45° / Quadruple Sling 45°	Triple Sling 30° / Quadruple Sling 30°
1/4	4,100	7,100	5,800	4,100	10,700	8,700	6,150
3/8	7,800	12,800	10,300	7,300	19,000	15,500	11,000
1/2	13,000	22,500	18,400	13,000	33,800	27,600	19,500
5/8	20,300	35,200	28,700	20,300	53,000	43,100	30,500
3/4	29,300	50,800	41,400	29,300	76,100	62,100	44,000
7/8	39,900	69,000	56,500	39,900	104,000	85,000	60,000

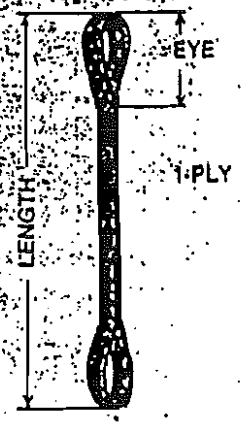
12,300 lbs.

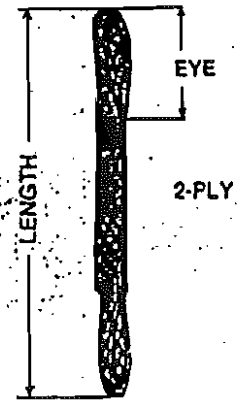
RECEIVED APR 2 ? 1997

EYE AND EYE TYPE
(LOOP AND LOOP TYPE)

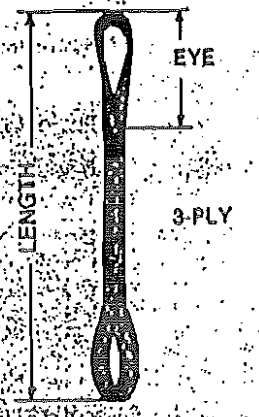
An eye (or loop) at each end of this type sling makes it ideal for use as a basket hitch. Also, by passing one eye around the load and through the other eye creates a choker hitch.

WSA TYPE III





TAPERED EYES STANDARD ON SLINGS 3" AND WIDER. FLAT EYES AND TURNED EYES CAN BE FURNISHED AT NO EXTRA COST. EYE WIDTH IS APPROXIMATELY 1/3 OF SLING WIDTH. WIDER SLINGS AVAILABLE.



URNED EYES AVAILABLE ON SLING WIDTHS 2" AND LESS.

WSA TYPE IV

REMEMBER TO SPECIFY LENGTH AND CODE NUMBER. OVERSIZED EYES AVAILABLE.

RATED CAPACITY (LBS)

WIDTH INCHES	NUMBER PLIES	EYE SIZE	SPLICE	CHOKER	VERTICAL	BASKET	CODE NUMBER
1	1	8	8	960	1200	2400	6B-EE
1	2	8	8	1920	2400	4800	6DB-EE
1	3	9	9	2830	3540	7080	6TB-EE
1	4	9	9	3740	4680	9360	6QB-EE
1	1	8	8	1280	1600	3200	9B-EE
1	2	8	8	2560	3200	6400	9DB-EE
1	3	9	9	3770	4720	9440	9TB-EE
1	4	9	9	4990	6240	12480	9QB-EE
1¼	1	9	9	1520	1900	3800	6F-EE
1¼	2	9	9	2880	3610	7220	6DF-EE
1¼	3	10	10	4320	5410	10820	6TF-EE
1¼	4	10	10	5770	7220	14440	6QF-EE
1¼	1	9	9	2160	2700	5400	9F-EE
1¼	2	9	9	4100	5130	10260	9DF-EE
1¼	3	10	10	6150	7690	15380	9TF-EE
1¼	4	10	10	8200	10260	20520	9QF-EE
2	1	9	9	1920	2400	4800	6I-EE
2	2	9	9	3840	4800	9600	6DI-EE
2	3	10	10	5560	6960	13920	6TI-EE
2	4	10	10	7290	9120	18240	6QI-EE
2	1	9	9	2560	3200	6400	9I-EE
2	2	9	9	5120	6400	12800	9DI-EE
2	3	10	10	7420	9280	18560	9TI-EE
2	4	10	10	9720	12160	24320	9QI-EE
3	1	10	10	2880	3600	7200	6M-EE
3	2	10	10	5320	6660	13320	6DM-EE
3	3	12	12	7990	9990	19980	6TM-EE
3	4	12	12	10650	13320	26640	6QM-EE
3	1	10	10	3840	4800	9600	9M-EE
3	2	10	10	7100	8880	17760	9DM-EE
3	3	12	12	10650	13320	26640	9TM-EE
3	4	12	12	14200	17760	35520	9QM-EE
4	1	12	10	3840	4800	9600	6P-EE
4	2	12	10	6910	8640	17280	6DP-EE
4	3	16	12	10360	12960	25920	6TP-EE
4	4	16	12	13820	17280	34560	6QP-EE
4	1	12	10	5120	6400	12800	9P-EE
4	2	12	10	9210	11520	23040	9DP-EE
4	3	16	12	13820	17280	34560	9TP-EE
4	4	16	12	18430	23040	46080	9QP-EE
5	1	15	12	4800	6000	12000	6S-EE
5	2	15	12	8400	10500	21000	6DS-EE
5	3	18	14	12600	15750	31500	6TS-EE
5	4	18	14	16800	21000	42000	6QS-EE
5	1	15	12	6400	8000	16000	9S-EE
5	2	15	12	11200	14000	28000	9DS-EE
5	3	18	14	16800	21000	42000	9TS-EE
5	4	18	14	22400	28000	56000	9QS-EE
6	1	18	14	5760	7200	14400	6V-EE
6	2	18	14	9790	12240	24480	6DV-EE
6	3	20	16	14680	18360	36720	6TV-EE
6	4	20	16	19580	24480	48960	6QV-EE
6	1	18	14	7680	9600	19200	9V-EE
6	2	18	14	13060	16320	32640	9DV-EE
6	3	20	16	19580	24480	48960	9TV-EE
6	4	20	16	26110	32640	65280	9QV-EE
8	1	20	18	10240	12800	25600	9W-EE
8	2	20	18	16380	20480	40960	9DW-EE
8	3	24	20	24570	30720	61440	9TW-EE
8	4	24	20	32760	40960	81920	9QW-EE
10	1	22	20	12800	16000	32000	9X-EE
10	2	22	20	19200	24000	48000	9DX-EE
10	3	24	24	28800	36000	72000	9TX-EE
10	4	24	24	38400	48000	96000	9QX-EE
12	1	24	24	15360	19200	38400	9Y-EE
12	2	24	24	21500	28880	53760	9DY-EE
12	3	26	26	32250	40320	80640	9TY-EE
12	4	26	26	43000	53760	107520	9QY-EE

WARNING!

- Not to exceed rated capacity. Sling's rated capacity is based on new sling only.
- Do not exceed working load limit.
- Keep away from heat and sharp edges, use corner protectors.
- Meets or exceeds OSHA Standards.

F&M MAFCO Inc.
Cincinnati • Birmingham • Orlando
1-800-333-2151

½	6 X 19	2.0	2.2	2.3	1.5	1.6	1.7	3.9	4.4	4.6
9/16	6 X 19	2.5	2.7	2.9	1.8	2.1	2.2	4.9	5.5	5.8
⅝	6 X 19	3.0	3.4	3.6	2.2	2.5	2.7	6.0	6.8	7.2
¾	6 X 19	4.2	4.9	5.1	3.1	3.6	3.8	8.4	9.7	10.0
⅞	8 X 19	5.5	6.6	6.9	4.1	4.9	5.2	11.0	13.0	14.0
1	6 X 19	7.2	8.5	9.0	5.4	6.4	6.7	14.0	17.0	18.0
1⅛	6 X 19	9.0	10.0	11.0	6.8	7.8	8.5	18.0	21.0	23.0
1¼	6 X 37	10.0	12.0	13.0	7.9	9.2	9.9	21.0	24.0	26.0
1⅜	6 X 37	13.0	15.0	16.0	9.6	11.0	12.0	25.0	29.0	32.0
1½	6 X 37	15.0	17.0	19.0	11.0	13.0	14.0	30.0	35.0	38.0
1⅝	6 X 37	18.0	20.0	22.0	13.0	15.0	17.0	35.0	41.0	44.0
1¾	6 X 37	20.0	24.0	26.0	15.0	18.0	19.0	41.0	47.0	51.0
2	6 X 37	26.0	30.0	33.0	20.0	23.0	25.0	53.0	61.0	66.0

HT = Hand Tucked Splice.
For hidden tuck splice (IWRC) use Table H-3 values in HT column.
MS = Mechanical Splice.
S = Swaged or Zinc Poured Socket
*These values only apply when the D/d ratio for HT slings is 10 or greater, and for MS and S slings is 20 or greater where:
D = Diameter of curvature around which the body of the sling is bent.
d = Diameter of rope.

RATED CAPACITIES FOR 2-LEG & 3-LEG BRIDLE SLINGS 6 X 19 AND 6 X 37 CLASSIFICATION IMPROVED PLOW STEEL GRADE ROPE WITH FIBER CORE (FC)

Rope		Rated Capacities, Tons (2,000 lb)											
		2-Leg Bridle Slings						3-Leg Bridle Slings					
Dia (Inches)	Constr	Vert 30 degree Horz 60 degree		45 degree Angle		Vert 60 degree Horz 30 degree		Vert 30 degree Horz 60 degree		45 degree Angle		Vert 60 degree Horz 30 degree	
		HT	MS	HT	MS	HT	MS	HT	MS	HT	MS	HT	MS
¼	6 X 19	0.85	0.88	0.70	0.72	0.49	0.51	1.3	1.3	1.0	1.1	0.74	0.7
9/16	6 X 19	1.3	1.4	1.1	1.1	0.78	0.79	2.0	2.0	1.6	1.7	1.1	1.2
⅜	6 X 19	1.8	1.9	1.5	1.6	1.1	1.1	2.8	2.9	2.3	2.4	1.6	1.7
7/16	6 X 19	2.5	2.6	2.0	2.2	1.4	1.5	3.7	4.0	3.0	3.2	2.1	2.3
½	6 X 19	3.2	3.4	2.6	2.8	1.8	2.0	4.8	5.1	3.9	4.2	2.8	3.0
9/16	6 X 19	4.0	4.3	3.2	3.5	2.3	2.5	6.0	6.5	4.9	5.3	3.4	3.7
⅝	6 X 19	4.8	5.3	4.0	4.4	2.8	3.1	7.3	8.0	5.9	6.5	4.2	4.6
¾	6 X 19	6.8	7.8	5.5	6.2	3.9	4.4	10.0	11.0	8.3	9.3	5.8	6.6
⅞	6 X 19	8.9	10.0	7.3	8.4	5.1	5.9	13.0	15.0	11.0	13.0	7.7	8.9
1	6 X 19	11.0	13.0	9.4	11.0	6.7	7.7	17.0	20.0	14.0	16.0	10.0	11.0
1⅛	6 X 19	14.0	16.0	12.0	13.0	8.4	9.5	22.0	24.0	18.0	20.0	13.0	14.0
1¼	6 X 37	17.0	19.0	14.0	16.0	9.8	11.0	25.0	28.0	21.0	23.0	15.0	17.0
1⅜	6 X 37	20.0	23.0	17.0	19.0	12.0	13.0	31.0	35.0	25.0	28.0	18.0	20.0
1½	6 X 37	24.0	27.0	20.0	22.0	14.0	16.0	36.0	41.0	30.0	33.0	21.0	24.0
1⅝	6 X 37	28.0	32.0	23.0	26.0	16.0	18.0	43.0	48.0	35.0	39.0	25.0	28.0
1¾	6 X 37	33.0	37.0	27.0	30.0	19.0	21.0	49.0	56.0	40.0	45.0	28.0	32.0
2	6 X 37	43.0	48.0	35.0	39.0	25.0	28.0	64.0	72.0	52.0	59.0	37.0	41.0

HT = Hand Tucked Splice.
MS = Mechanical Splice.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

EBT

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 13	(6) DATE April 16, 2001
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111 - 038R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Horizontal Monitoring Well Details		(11) DCN NO.:

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Horizontal Monitoring Well Structural Details	90X-6000-S-00280	0	Sheet S-10

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Drawing S-10 details HDPE pipe extensions to the existing Horizontal Monitoring well piping. The existing piping terminations are flange connections. Due to the difficulty of vertical HDPE welding and since the existing terminations are flanges, we request to extend the existing piping using flange to flange connections. Also, the as-built condition of the existing lateral piping at manhole 1 is not a 45 degree angle as detailed on sheet S-10. Extending this piping above finish grade will move this piping horizontally past the 10" monitoring well piping. Please advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	4/16/01	M.W. Griffin MWG	4/17/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [X] NO [ ] YES (14) FOR DCN: [ ] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

See attached response

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 4/20/01
KWASI BADOU-TWENEBOAH, CH2M HILL
[X] FIT [ ] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) N/A

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

MW Griffin for W. Frazier 4/20/01

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

INFORMATION ONLY

ORIGINAL

Response to RCI No. 20111-038R
(Dated April 16, 2000)
(Page 2 of 3)

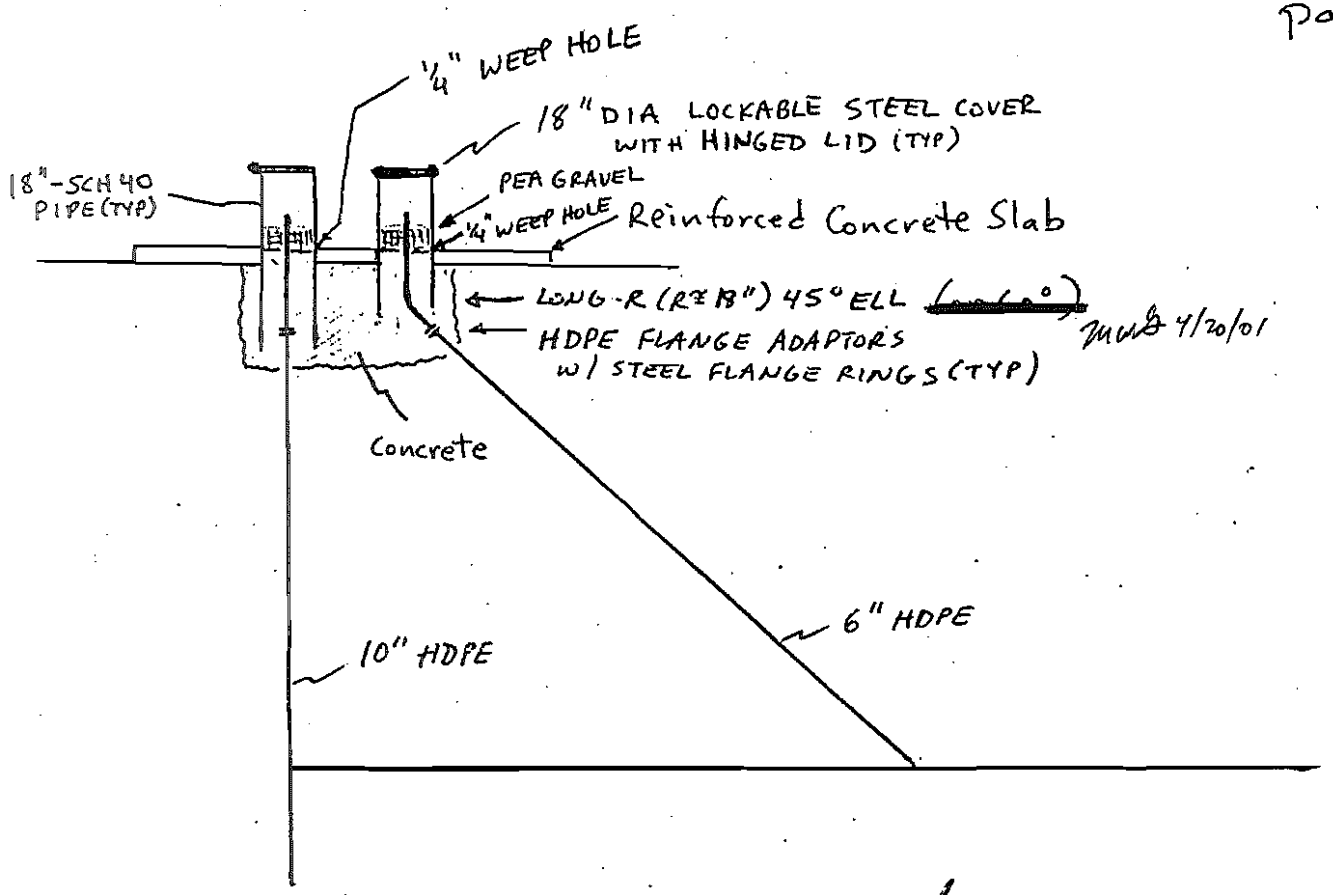
- Flange-to-flange connections are acceptable. However, at the discretion of the Construction Manager, additional measures such as painting may be required to protect the flanges from rusting.

- Use a (long-radius) 45-degree elbow fitting or equivalent, at the existing end of the cleanout for the connection.

- Embed below-grade flange connections in concrete. Use 18-in. diameter steel casing. See Page 3 of 3 attached.

- Record as-built on red-line drawings.

RCI 20111-038R
Page 3 of 3



MWB 4/20/01

MWB
4/17/01

AMPAD
22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111 | (2) S/C NO.: FSC - 641 | (5) Pg 1 Of 1 | (6) DATE: May 31, 2001

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project | (11) RCI NO.: 20111 - 039R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ] | (4A) RCI/DCN TITLE: Fixed End Seal Repair | (11) DCN NO.: 20111 - 042

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House and Control Valve House Mechanical Details I	90X-6000-M-00266	0	Sheet M5

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

A question arose concerning the integrity of the fixed end seals on the LTS piping system. Gaps were detected between the end seals and inside wall of the 10" containment pipe at Valve Houses 1, 2, 3, 5, and 6. These gaps were most likely caused by the expansion and contraction of the piping system. This may be a continuous problem. We suggest two possible solutions: One, install steel spacers in the branch lines(cell piping) to move the LTS line into proper alignment and reweld the end seals with an additional extrusion weld pass; or Two, completely remove the end seals and install link seals into the annular space to "seal" this space. Please advise on a method of repair to correct this problem.

(10) REQUESTOR: David R. Opalka — The STAVER Group, Inc. — DATE: 5/31/01 | (12) CE / PE: James C. Jenkins — DATE: 6/4/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

- REMOVE EXIST. FIXED END SEALS ON NORTH & SOUTH WALLS OF LTS PIPING AT VALVE HOUSES 1, 2, 3, 4, 5, & 6. (11 TOTAL)
- REPLACE WITH LINK SEALS

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/5/01
KYMAS BADU-TWEREBOAH, GEOSYNTEC
[X] FIT [ ] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 6/20/01
PERFORMANCE GRADE: (17) James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE:

(21) FIELD WORK COMPLETED:

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19) (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ECDC CONTROLLED ORIGINAL
COPY NO. 011

APPENDIX L

APPENDIX L

DESIGN CHANGE NOTICES (DCNs)

Ohio EPA

State of Ohio E

Soutl

401 East Fifth Street
Dayton, Ohio 45402-2911

TELE: (9

M

Post-it® Fax Note 7671	Date 10/3/00	# of pages ▶ 1
To Dave Brettschneider	From Tom Ontko	
Co./Dept. Fluor Fernald	Co. Ohio EPA	
Phone #	Phone #	
Fax # X4029	Fax #	

ioverno
ioverno
Director

TO: J.D. Chiou, SDFP Manager, Fluor Fernald
FROM: Tom Ontko, Ohio EPA
DATE: June 19, 2001
RE: OSDF Phase III DCN 20111-042
DCN 20111-043

The fixed end seals on the LTS system seal the opening between the 6-inch carrier and the 10-inch container pipe inside the valve house where the 10-inch pipe stops. Recently, the extruded welds were observed to have failed at the 10-inch pipe. Thermal expansion/contraction is suspected to be the cause of the failed welds. This DCN replaces the fixed-end seals with link seals.
The Ohio EPA approves this DCN.

Ohio EPA commented on the EPLTS design that an air-gap should be placed in the piping that connects the LDS line to the LTS line. This DCN satisfies that comment by removing the valve in the LDS line which would permit by-passing the LDS tank and thereby allowing flow directly to the LTS system. With this change, LDS flow must go directly to the tank. The tank can be drained with the existing quick-connect.
The Ohio EPA approves this DCN.

Approval of these changes does not constitute an assurance that the proposed facilities will operate in compliance with Ohio laws and regulations or that these facilities will perform in a fashion that achieves the objectives of the Operable Unit 2 Record of Decision.

MEMORANDUM

TO: J.D. Chiou, SDFP Manager, Fluor Fernald
FROM: Tom Ontko, Ohio EPA
DATE: March 16, 2001
RE: EPLTS DCN 20111-038

This DCN adds a dedicated power source to the Control Valve House for a 2 HP pump called for in the Contingency Plan.

The Ohio EPA approves this change.

Approval of these changes does not constitute an assurance that the proposed facilities will operate in compliance with Ohio laws and regulations or that these facilities will perform in a fashion that achieves the objectives of the Operable Unit 2 Record of Decision.

03/09/01 10:20 9372856404
MAR-14-01 11:20AM FROM-OEPA SOUTHWEST OFC, E 9372856404 T-526 P.01/01 F-108

OhioEPA
State of Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911
(513) 285-6357
FAX (513) 285 6249

Post-it® Fax Note 7671	Date	# of pages ▶
To J.D. Chiou	From Ohio EPA	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # X5131	Fax #	

MEMORANDUM

TO: J.D. Chiou, SDFP Manager, Fluor Fernald
FROM: Tom Ontko, Ohio EPA
DATE: March 14, 2001
RE: EPLTS DCN 20111-040

MAR 15 REC'D

This DCN replaces the existing transfer pump circuit breakers in the valve houses with GFCI breakers.

The Ohio EPA approves this change.

Approval of these changes does not constitute an assurance that the proposed facilities will operate in compliance with Ohio laws and regulations or that these facilities will perform in a fashion that achieves the objectives of the Operable Unit 2 Record of Decision.

Ohio EPA
State of Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911
(513) 285-6357
FAX (513) 285-6249

Received 8/3/00 KBT

George V. Voinovich
Governor

MEMORANDUM

TO: J.D. Chiou, SDFP Manager, Fluor Fernald
FROM: Tom Ontko, Ohio EPA Tom Ontko
DATE: July 26, 2000
RE: OSDF DCNs 20103-001
20102-057R
EPLTS DCN 20111-017
20111-018
20111-019

This memorandum is a revision of a memo faxed on July 24, 2000. The original version was inadvertently sent with some of the text missing.

DCN 20103-001 removes the Cell 4 liner and clay screening operation from the OSDF Phase III contract. Phase III will now comprise only the construction of the Cell 1 cap. Clay screening for the cap will be performed by the site support contractor and Cell 4 liner has been deferred to a different contract. This DCN also deletes mulching from the vegetation specification because the seed drill method doesn't require mulching. Attached to the DCN is a list of Construction Drawings that remain in the Phase III scope.
The Ohio EPA approves this DCN.

DCN 20102-057R clarifies that the 3 ft layer of Category 1 material placed over bagged impacted material placed in a trench must remain intact and not be used for placement of additional materials.
The Ohio EPA approves this clarification.

EPLTS DCN 20111-017 Sources of riprap (and other off-site borrow materials) have been pre-certified (Off-Site Borrow Materials Geotechnical Evaluation Report, Parsons, 1996). This DCN removes the conformance testing requirement on type D riprap. Testing on Type C riprap will be reduced to bulk specific gravity and maximum absorption per ASTM C 127. Both ripraps are still required to conform to ODOT specifications.
The Ohio EPA approves this DCN

EPLTS DCN 20111-018 adds performance testing requirements for compacted fill used for berms and roads

OK2

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The Ohio EPA approves this DCN.

EPLTS DCN 20111-01 re routes the proposed ditch which connects the two sediment basins to the east. A utility pole not shown on the drawings is located in the original position of the ditch.

Approval of these DCNs does not constitute an assurance that the proposed facilities will operate in compliance with Ohio laws and regulations or that these facilities will perform in a fashion that achieves the objectives of the Operable Unit 2 Record of Decision.

MEMORANDUM

Post-it® brand fax transmittal memo 7671	# of pages ▸ 1
To: Jay Jalovec	From: Tom Ontko
Co.	Co. Ohio EPA
Dept.	Phone # 937 285-6073
Fax # x3076	Fax #

To: Jay Jalovec, DOE
From: Tom Ontko, Ohio EPA
Re: EPLTS DCNs
Date: April 14, 2000

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X4029

DCN 20111-001 bent strap testing of HDPE pipe butt-fused welds
We approve this change.

DCN 20111-002 valve spec revisions
We approve this change.

DCN 20111-003 pipe insulation wire
We approve this change.

DCN 20111-004 conduit markers
We approve this change.

DCN 20111-005 delete exterior strobe light
We approve this change.

DCN 20111-006 utility pole setting depth
We approve this change.

DCN 20111-007 low pressure pneumatic testing required for all new pipe lengths
We approve this change.

DCN 20111-008 valve house landings
We approve this change.

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APR 19 2000

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 of 2	(6) DATE
Project # 20111	FSC 641		04/03/00

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: N/A

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Bent Strap Testing of Butt Fused HDPE Pipe Joints

(11) DCN NO.: 20111-001

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specification Section 02605 3.04 Para. F	~~N/A~~ 20111-TS-0001	0	March 2000

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER [ ] REQUIRED [X] NOT REQUIRED

(9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

Add the following test requirement to the Technical Specifications for HDPE Pipe (02695) in section 3.04 paragraph F. This Test shall be performed by the Subcontractor each day on the trial Butt-fusion joints prior to proceeding with field fusion.

See Page 2, attached for details of text to be added.

D.J. Breitkreuter COMPANY: FF DATE: 4/6/00

(12) CE / PE J.C. JENKINS DATE: 4/6/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES

(14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 4/7/00

KUASI BADU-TWENEBOAH

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: NA

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 4/17/00

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE: J.R. HUGHES 4/6/00

(21) FIELD WORK COMPLETED:

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19) (SIGNOFF BY CE OR PE) DATE:

S-F-4259
REV. 5: 10/01/99

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The Subcontractor shall destructively test the trial butt-fusion joints made each day to confirm joint integrity, operator procedure, and fusion machine set-up. A field-performed "Bent Strap" Test is to be performed as follows:

> The bent strap test specimen is prepared from the trial butt fusion spool after it has been allowed to cool to ambient temperature. A test strap that is at least 6" or 15 pipe wall thicknesses long on each side of the fusion, and about 1" or 1.5 wall thicknesses wide is cut out of the trail fusion pipe. The Strap is then bent so the ends of the strap touch. Any disbondment at the fusion is unacceptable, and indicates poor fusion quality. If failure occurs, fusion procedures and/or machine set-up should be changed, and a new trial fusion and bent strap test specimen shall be prepared and tested. Field fusion should not proceed until a test joint has passed the bent strap test.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 2	(6) DATE
20111	641		4/3/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Valve Specification Revisions

(11) DCN NO.: 20111- 002

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	20111-TS-0001	0	Section 15080

(9) [ ] RCI-INQUIRY [ ] USOD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Tables in Paragraphs 2.10A & B in Section 15080 provide listings of valves required at each Valve House and the Control Valve House. No technical specification is provided in Section 15080 for the 3" auxiliary connection required on the LTS pipe in each Valve House or the 3" auxiliary connection required in the Control Valve House.
Proposed Change: Revise Section 15080 per Attachment A.
Justification: Tables contain confusing and inaccurate information. Technical information needed on the ball valve and coupler for the auxiliary connections.

(10) REQUESTOR: J. R. Hughes COMPANY: F.F. DATE: 4/6/00 (12) CE / PE J. C. JENKINS DATE: 4/6/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 4/7/00
KWASI BADU-TWENEBOAH
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) James C. Jenkins DATE: 4/17/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J. R. HUGHES 4/6/00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
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ATTACHMENT A
DCN 20111-xxx

Revisions to Section 15080:

1. Revise Table in Paragraph 2.01A per the following:
   - Under the "LDS" column, revise to:
   - 6" Knife Valve
   - 3" Ball Valves
   - ¾" Ball Valves
   - 3" Check Valve

2. Revise Table in Paragraph 2.01B per the following:
   - 6" Knife Valves
   - 6" Motor-Operated Ball Valve (Relocated from Lift Station)
   - ¾" Ball Valves
   - 3" Ball Valve
   - 3" Auxiliary Connection

3. Add the following to Paragraph 2.02:

H. Furnish Leachate Transmission System (LTS) 3-inch auxiliary connection from OPW, Twin-Cam Kamlok Coupler or approved equal, consisting of a cast iron, flanged end 633-A Adapter with neoprene gasket and dust cap.

4. Add the following to Paragraph 2.03:

D. Furnish 3-inch flanged ball valve consisting of heavy duty construction carbon steel stems and chrome plated ball with reinforced PTFE seals rated at 150 psi or better. Valve to have lockable wrench operator

C. Furnish 3-inch auxiliary connection from OPW, Twin-Cam Kamlok Coupler or approved equal, consisting of a cast iron, flanged end 633-A Adapter with neoprene gasket and dust cap.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 1	(6) DATE
20111	641		3/30/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Piping Insulation Wire

(11) DCN NO.: 20111-003

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	20111-TS-001	0	Section 015250

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Paragraph 3.01A in Section 015250 requires the use of #B&S Gage No.16, annealed, 302 or 304 stainless steel wire on process piping anti-condensation insulation.
Proposed Change: Delete Paragraph 3.01A in Section 015250.
Justification: Flexible elastomeric anti-condensation insulation specified is installed using fire resistant adhesive; wiring is not required.

(10) REQUESTOR: R.J. Bethunada COMPANY: F.F. DATE: 4/6/00

(12) CE / PE J.C. JENKINS DATE: 4/6/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE:
K. Bradbury
KURASI BADV-TW ENGBRACH
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) James C. Jenkins DATE: 4/17/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J.R. HUGHES 4/6/00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

3-F-4259
REV. 5: 10/01/99

ECDC CONTROLLED COPY NO.
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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg Of	(6) DATE
20111	641		4/3/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Conduit Markers

(11) DCN NO.: 20111-004

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	20111-TS-0001	0	Section 16110

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Paragraph 3.09A of Section 16110 states "Conduits shall have stainless steel indented marker plates..."
Proposed Change: Revise Paragraph 3.09A of Section 16110 to read: "Conduits shall be labeled with W.H. Brady, or approved equal, adhesive labels. Label will indicate the highest voltage being carried by the conductors inside the conduit. Contractor shall provide labels that are sized to fit the conduit; letter size and label colors shall be per industrial standards".
Justification: Stainless steel identification plates not required on conduits.

(10) REQUESTOR: [signature] COMPANY: F.F. DATE: 4/6/00

(12) CE / PE: J.C. JENKINS [signature] DATE: 4/6/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: [signature] 4/7/00
KAMASI BADU-TWENEBOAH
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) James C. Jenkins DATE: 4/17/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J.R. HUGHES [signature] 4/6/00

PURCHASE REQUISITION REQUIRED? [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

J-F-4259
REV. 5: 10/01/99

ECDC CONTROLLED COPY NO.

C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of	(6) DATE
20111	641		4/30/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Delete Strobe Light

(11) DCN NO.: 20111-005

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House & Control Valve House General Layouts	90X-6000-G-00251	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Detail 42 on Dwg. 90X-6000-G-00251 shows an "exterior strobe indicator light" on Valve House North Elevation. Strobe light is not shown in Details 40 or 43. Strobe light is not shown in Valve House Electric Plan or Detail 78 on Dwg. 90X-6000-E-00261.
Proposed Change: Revise "exterior strobe indicator light" in Detail 42 on Dwg. G-00251 to "exterior illumination light".
Justification: Light shown in Detail 42 of Dwg. G-00251 is incorrectly labeled.

(10) REQUESTOR: R.J. Gutzmerder COMPANY: F.F. DATE: 4/6/00 (12) CE / PE J.C. JENKINS DATE: 4/6/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 4/7/00
KWASI BADU-TWENEBOAH
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LT52

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 4/17/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J.R. HUGHES 4/6/00
PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ECDC CONTROLLED COPY NO. C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of	(6) DATE
20111	641		4/3/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Pole Setting Depths

(11) DCN NO.: 20111-006

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	20111-TS-0001	0	Section 16400

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Paragraph 2.01C of Section 16400 states "The minimum setting depth for poles shall be 8 feet, 6 inches for 55 foot poles; 8 feet, benches for 60 foot poles; and 6 feet, 6 inches for 80 foot poles". Dwgs. E-00259 & E-00260 show a typical minimum pole depth of 8'-6"; Detail 75 shows a minimum 6'-6" setting depth for Poles 731 & 732..
Proposed Change: Revise Para 2.01C of Section 16400 to "The minimum setting depth for poles shall be as indicated on the drawings".
Justification: Pole setting depths currently indicated in Section 16400 are incorrect.

(10) REQUESTOR: D.J. Hammerly COMPANY: F.F. DATE: 4/6/00 (12) CE / PE J. C. JENKINS DATE: 4/6/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 4/7/00
EDWARD BADV-TWENEBOAGA
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) James C. Jenkins DATE: 4/17/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J.R. HUGHES 4/6/00
PURCHASE REQUISITION REQUIRED? [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

3-F-4259
REV. 5: 10/01/99

ECDC CONTROLLED COPY NO.

C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC-641	(5) Pg 1 Of 1	(6) DATE 4/10/00
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System			(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Low Pressure Pneumatic Test		(11) DCN NO.: 20111-007

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specification	20111-TS-0001	0	Section 02605

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Justification: Maximize the testing of butt fusion joints for HDPE piping

Existing Condition: Current specification allows for the option to pneumatically test HDPE piping prior to placement

Proposed Change: Revise paragraph 02605, 3.05, E., 3 to read: Contractor shall perform a pre-installation above ground low pressure air test (i.e., no greater than 10 psi) including soaping of joints for all HDPE piping prior to placement in the trench

(10) REQUESTOR: D. J. Brettschneider	COMPANY: Fluor Fernald	DATE: 4/10/00	(12) CE / PE J. C. Jenkins — DATE: 4/10/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC — RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 4/10/00 KUNASI BADU-TWEBRAH [ ] FIT [ ] FORM [X] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N/A

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 4/17/00
PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J. R. Hughes 4/10/00 PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ECDC CONTROLLED COPY NO. C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 1	(6) DATE
20111	641		3/30/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]

(4A) RCI/DCN TITLE: Valve House Landings

(11) DCN NO.: 20111-008

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House & Control Valve House General Layouts	90X-6000-G-00251	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Details 50 & 51 on Dwg 90X-6000-G-00251 require 3'-0" exterior concrete landings at Valve House & Control Valve House. Detail 41 shows 2- 4'x7' access doors in Valve House. Detail 44 shows a 4'x7' access door in Control Valve House.
Proposed Change: Revise the dimension for the exterior concrete landing in Details 50 & 51 from 3'-0" to 4'-0".
Justification: Para. 5-2.1.3, Floor Level, of 1999 NFPA states "The elevation shall be maintained on both sides of the doorway for a distance at least equal to the width of the widest leaf".

(10) REQUESTOR: D.J. BRETTSCHNEIDER COMPANY: FF DATE: 4/11/00

(12) CE / PE J.C. JENKINS DATE: 4/11/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 4/11/00
KURASI BADU-TWEREBOAH
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 4/17/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J. R. HUGHES 4/11/00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

ECDC CONTROLLED COPY NO. 011

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REV. 5: 10/01/99

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 1	(6) DATE
20111	641		5/9/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Pole Schedule

(11) DCN NO.: 20111-009

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Overhead Power Transmission System Plan	90X-6000-E-00258	0	
Overhead Power Transmission System Details II	90X-6000-E-00260		

RECEIVED MAY 25 2000

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Pole Information Schedule on Dwg. 90X-6000-E-00258 shows length of Poles 731 & 732 at 55'. Pole Schedule on same Dwg. shows length of Poles 731 & ~~731~~ 732 (KBT) at 40'. ~~Detail 75~~ on Dwg. 90X-6000-E-00260 shows dimensions of Poles 731 & 732 that add up to only 38'-0".

Proposed Change: Revise Pole Length for Poles ~~731 & 732~~ on Pole Schedule on Dwg. E-00258 from 55' to 40'. Revise 28'-6" dimension on Detail 75 on Dwg. E-00260 to 30'-6".

Justification: Correct pole length for Power Poles 731 & 732 is 40'-0"

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
D. J. Brettschneider	Fluor Fernald, Inc.	5/10/00	J. C. Jenkins	5/10/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

KWASI BADU-TWENEBOAH

GEOSYNTEC RCI – DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 5/16/00

KWASI BADU-TWENEBOAH

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 5/24/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J. R. Hughes

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

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ECDC CONTROLLED COPY NO. C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 1	(6) DATE
20111	641		5/9/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Emergency Lighting & Exit Signs

(11) DCN NO.: 20111-010

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	20111-TS-0001	0	Section 16500
Valve House Electrical Details	90X-6000-E-00261	0	
Control Valve House Electrical Details	90X-6000-E-00262	0	

RECEIVED MAY 25 2000

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: CFC Specifications and drawings do not provide any detail for emergency lighting and exit signs.
Proposed Change: Revise Section 16500 to include technical specifications for self contained emergency lighting units and internally lighted exit signs. Revise Dwgs E-00261 and E-00262 to show emergency lighting units and exit signs and electrical supply requirements.
Justification: Paragraphs 4-6 and 5-10.1 of ~~NFPA~~ NFPA 101 require emergency lighting and Exit signs respectively. KBT

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
D. J. Brettschneider	Fluor Fernald, Inc.	5/10/00	J. C. Jenkins J. C. Jenkins	5/10/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

KWASI BADU-TWENEBOAH

GEOSYNTEC — RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 5/16/00
KWASI BADU-TWENEBOAH
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) James C. Jenkins DATE: 5/24/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: 5/10/00
J. R. Hughes
PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

S-F-4259
REV. 5: 10/01/99

UNCONTROLLED COPY NO. C011

ORIGINAL

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 8	(6) DATE
20111	641		5/18/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Valve House Ventilation

(11) DCN NO.: 20111-011

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	20111-TS-0001	0	Sections 10211 & 15865
Valve House & Control Valve House General Layouts	90X-6000-G-00251		
Valve House Electrical Details	90X-6000-E-00261	0	
Control Valve House Electrical Details	90X-6000-E-00262		
Valve House & Control Valve House Mechanical Details I	90X-6000-M-00266	0	

RECEIVED MAY 25 2000

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Affected CFC Specifications and drawings listed above provide for a mechanical exhaust (negative pressure) system in each Valve House consisting of a cabinet fan with backdraft damper and an intake louver with damper assembly.
Proposed Change: Revise Sections 10211 & 15865 and Dwgs. G-00251, E-00261, E-00262 & M-00266 per Attachments.
Justification: Positive pressure condition required inside Valve Houses per Fluor Fernald Industrial Hygene Department Comment Resolution Response Memo of 3/27/00.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
D. J. Brettschneider	Fluor Fernald, Inc.		J. C. Jenkins	5/18/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

Any additional loads applied shall be coordinated with the pre-engineered building manufacturer.
KWASI BADU-TWENEBOAH, 5/22/00

GEOSYNTEC RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 5/22/00
KWASI BADU-TWENEBOAH
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) James C. Jenkins DATE: 5/24/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: 5/18/00
J. R. Hughes
PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

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REV. 5: 10/01/99

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SECTION 10211

METAL WALL LOUVERS

PART 1 GENERAL

1.01 SCOPE

A. This Section includes all labor and materials for installation of ~~intake~~ INTAKE AND EXHAUST louvers and damper assembly.

1.02 RELATED SECTIONS AND PLANS

A. Section 13120 - Pre-Engineered Buildings

B. Section 15500 - Heating

C. Section 15865 - Fans

D. Part 6 - Statement of Work

E. Part 8 - Environmental Health & Safety/Training Requirements

1.03 REFERENCES

A. Latest version of Air Movement Control Association (AMCA) Standards:
1. AMCA 500 Test Method for Louvers, Dampers, and Shutters.

1.04 SUBMITTALS

A. Shop Drawings: Indicate the louver layout plan and elevations; opening and clearance dimensions; tolerances; head, jamb, and sill details; blade configuration; bird screens; blankout areas required; and frames. Submit shop drawings prior to installation.

B. Product Data: Provide data to Construction Manager prior to installation, describing design characteristics, maximum recommended air velocity, maximum free area, materials, and finishes.

C. Maintenance Data: Include lubrication schedules and adjustment requirements at completion of work.

1.05 HEALTH AND SAFETY REQUIREMENTS

A. Environmental health & safety/training requirements shall be as specified in Part 8 of the Contract Documents.

PART 2 PRODUCTS

2.01 GENERAL

A. Louver: to permit passage of air at a velocity as required by AMCA 500 without blade vibration or noise.
DIMENSIONS - 24"x24", 35 PERCENT FREE AIR MINIMUM

B. Louver: ~~to permit 50 percent free area, minimum.~~

C. Perform work in accordance with AMCA Certification for Louvers.

2.02 MANUFACTURERS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum 3 years documented experience, including the following.
1. Airolite Co.;
2. Louvers & Dampers, Inc.;
3. Ruskin; and
4. Other manufacturers who meet or exceed the requirements of this Specification.

2.03 MATERIALS

TYPE KX 827 FOR EXHAUST AIR FLOW AND KN 827 FOR INTAKE AIR FLOW

A. Furnish and install extruded aluminum drainable blade combination louver/shutters similar to ~~Type K6746~~, as manufactured by the Airolite Company, Marietta, Ohio. Louvers shall be ~~6~~ 4" inches deep and assembled entirely by welding. Blades and frame shall be rigid extruded aluminum, alloy 6063-T5. All louver/shutters shall be factory finished after assembly with a Kynar® 500 equivalent coating in a color selected from the manufacturer's chart. Louvers shall be fixed on the outside with shutter damper assemblies which open ~~inward~~ IN THE DIRECTION OF AIRFLOW. Color shall be selected by Construction Manager during shop drawing review.
LOUVERS SHALL HAVE SCREENS.

B. The product of a particular manufacturer has been used as the basis of design in preparation of these documents. Any modifications to the mechanical systems and their components, the electrical systems, the building structure and its architecture, or any other portion of the building that result from the use of any product other than the basis of design equipment shall be coordinated with all other trades. Such coordination shall occur before delivery of products from the manufacturer (before shop drawing submittals) and shall be clearly indicated on the shop drawings. Any related modifications shall be performed at no additional cost.

C. Manufacturer: Subject to compliance with requirements, provide fans of one of the following: 1. HARTZELL FAN CO.
2. ~~1.~~ Acme Engineering and Manufacturing Corp.
3. ~~2.~~ Loren Cook Co.
4. ~~3.~~ Penn Ventilator Co.
~~4. Greenheck~~
~~5. Carnes~~

HARTZELL, SERIES 48V, SIZE 12, DIRECT DRIVE DUCT AXIAL FAN WITH SCREENED DISCHARGE OUTLET. ALUMINUM HOUSING AND ALUMINUM IMPELLER. MAX. SOUND LEVEL 70 dBA. LUBRICATION FITTINGS EXTENDED TO OUTSIDE HOUSING. UNIT MOUNTED JUNCTION BOX.

2.02 INLINE DUCT FANS ~~CABINET FANS~~

A. Cabinet Fans shall be designed for suspended mounting with integral exhaust grille, of type, size, and capacity specified in this Section. Fan housing shall be galvanized steel lined with baked enamel finish and ½ inch thick acoustical insulation, electrical junction box and backdraft damper. Centrifugal fan wheels shall be mounted on motor shaft with fan shrouds, all removable for service. Motors shall be permanent split-capacitor type with resilient elastic grommets and permanently lubricated with grounded cord and plug.

B. Air Delivery: 600 CFM AT 0.500 INCHES W.G. STATIC PRESSURE ~~540 CFM AT 0.250" WG Static Pressure~~

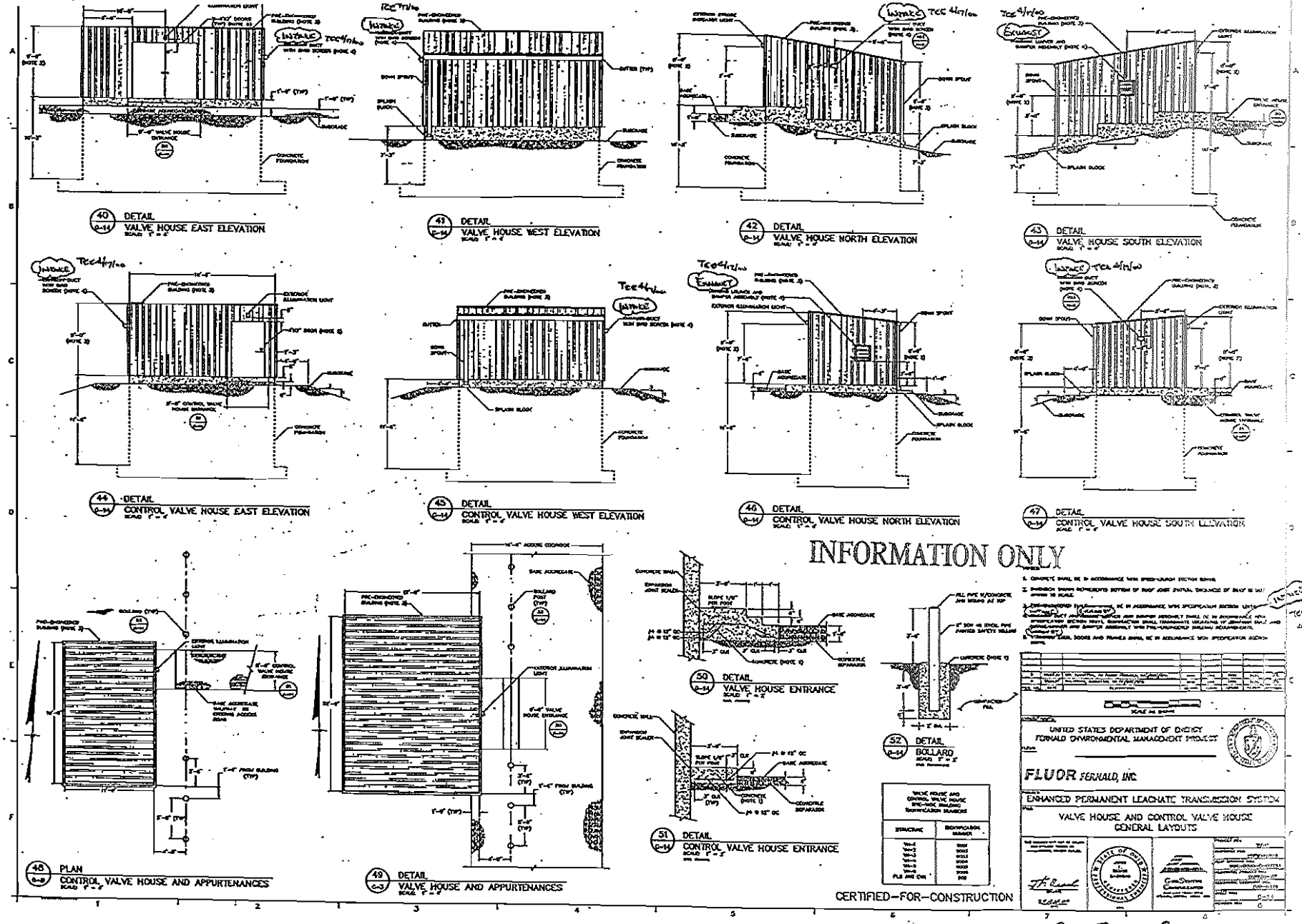
C. Motor: ⅓ HP ~~130 watts~~, 120 VAC, 1 phase, 60 hz

D. Speed Control: For direct drive fans, provide variable speed switch with off-on control, and speed control for 100% to 50% of fan air delivery. Controls shall be internal to the unit and not adjustable without removing access cover or panel.

2.03 CEILING FANS

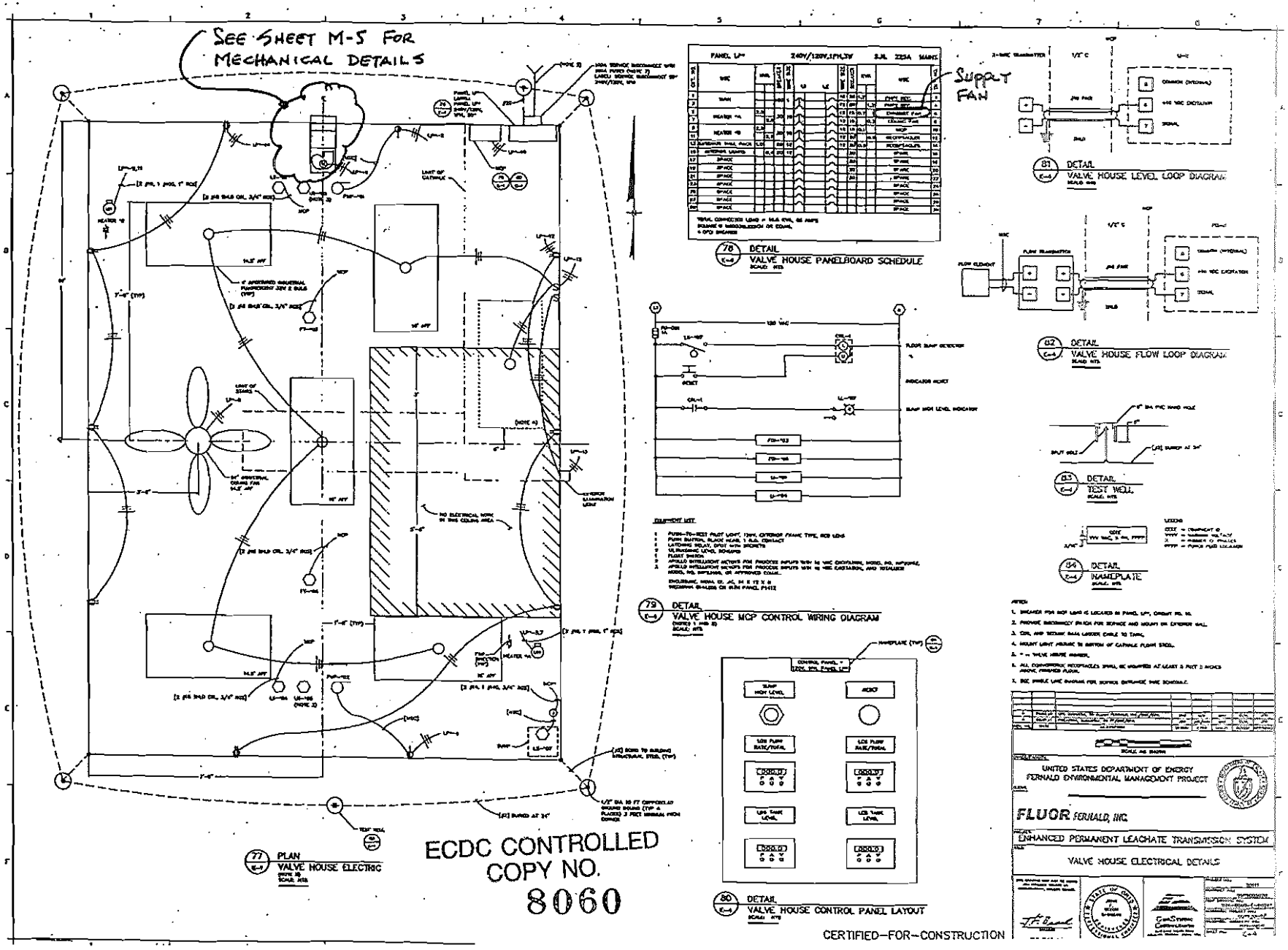
A. Ceiling fans shall have 56-inches blade sweep for Valve Houses and 36 inch blade sweep for the Control Valve House, with painted steel blades. Down rod length shall be 18 inches. Motor shall be thermally protected PSC type variable speed motor with permanently lubricated bearings. Motor shall be capable of down draft only.

PROD #7284_Vol 5

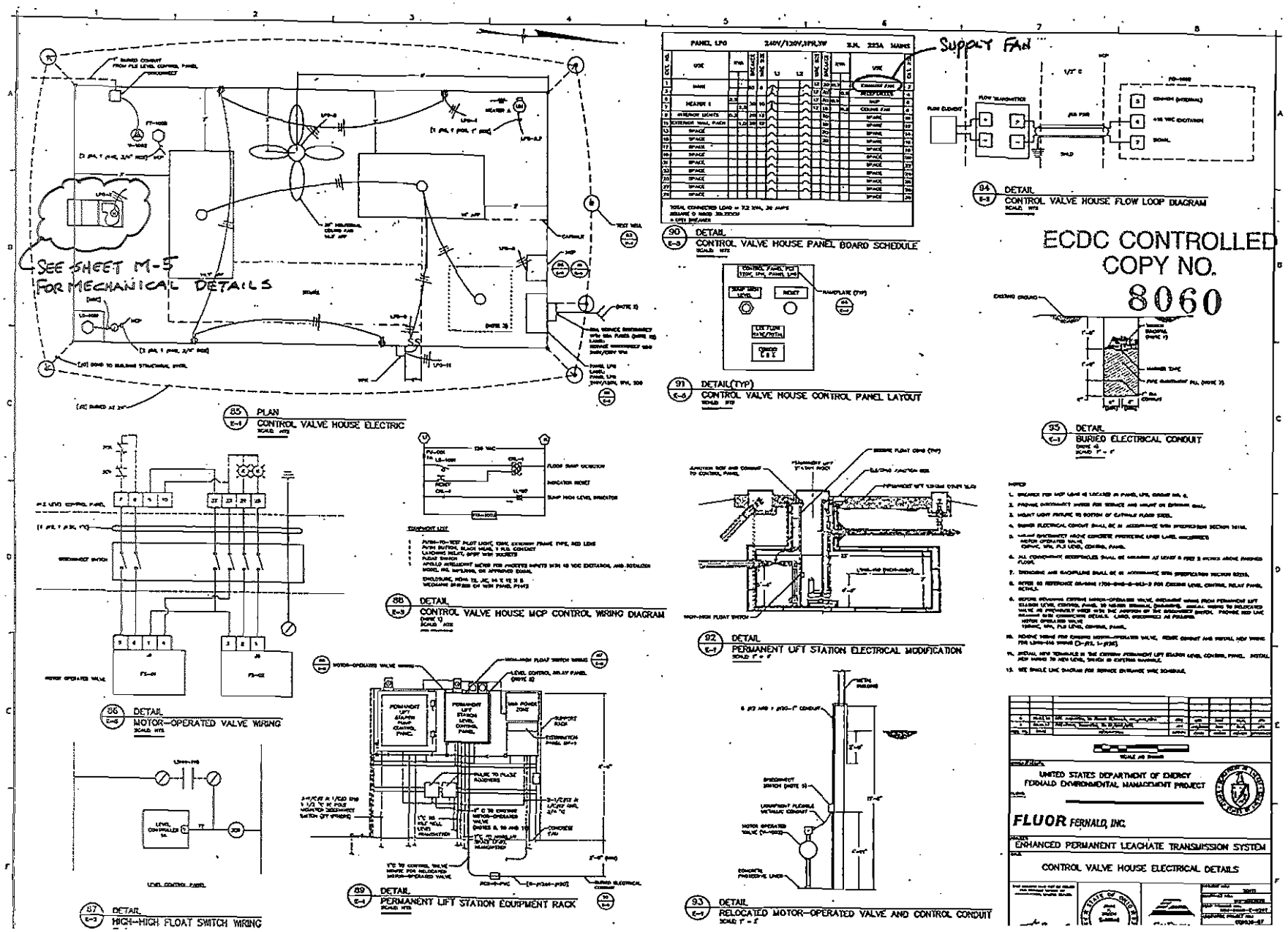


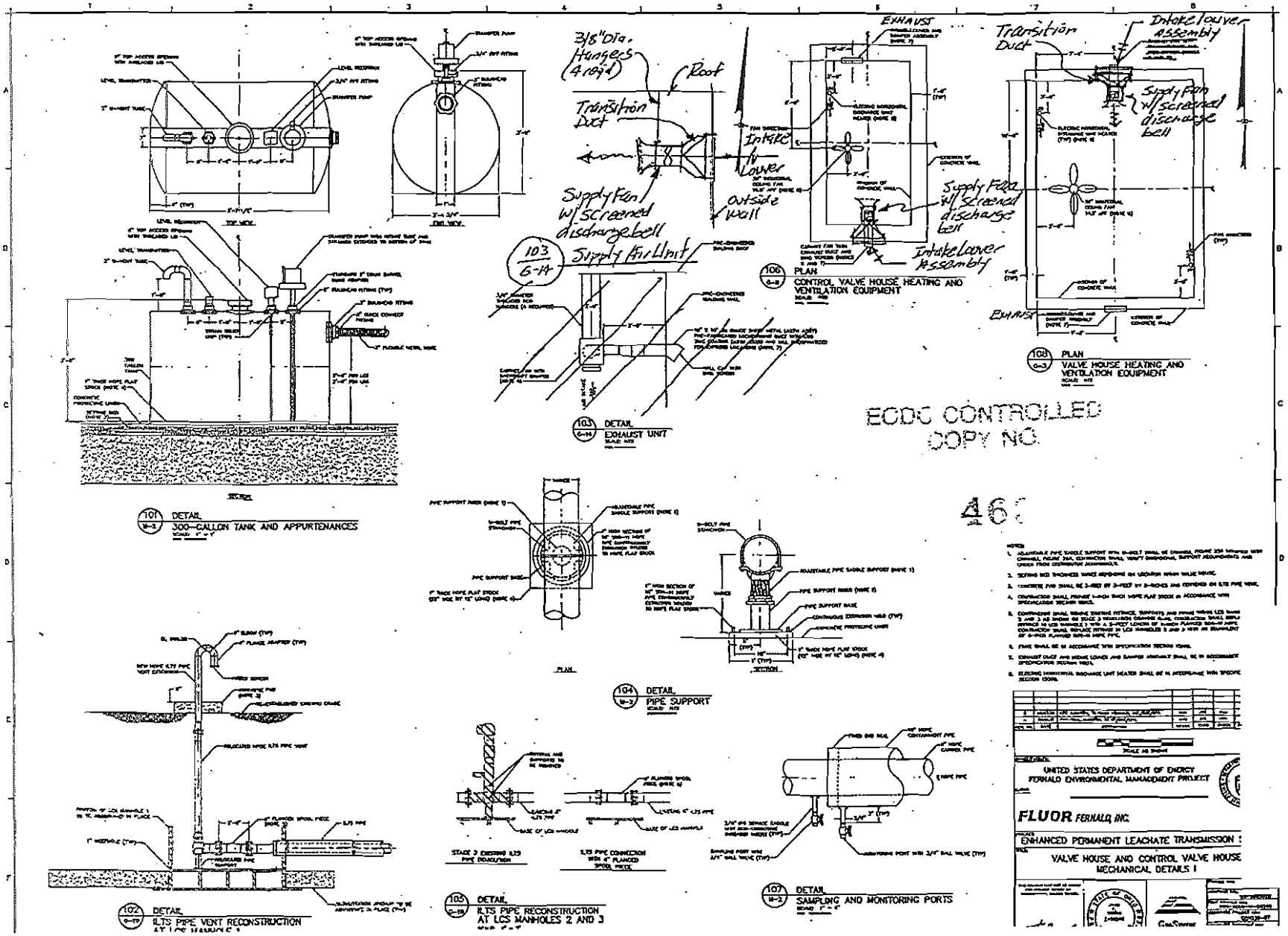
DCN 20111-011 Pg. 5 of 8

PROD #7284_Vol 5



DCN 20111-011 Pg. 6 of 8


SEE SHEET M-5 FOR MECHANICAL DETAILS
Supply Fan
ECDC CONTROLLED COPY NO. 8060
85 PLAN E-1 CONTROL VALVE HOUSE ELECTRIC
90 DETAIL E-5 CONTROL VALVE HOUSE PANEL BOARD SCHEDULE
91 DETAIL(TYP) E-6 CONTROL VALVE HOUSE CONTROL PANEL LAYOUT
94 DETAIL E-8 CONTROL VALVE HOUSE FLOW LOOP DIAGRAM
95 DETAIL E-1 BURIED ELECTRICAL CONDUIT
88 DETAIL E-5 CONTROL VALVE HOUSE MCP CONTROL WIRING DIAGRAM
86 DETAIL E-5 MOTOR-OPERATED VALVE WIRING
87 DETAIL E-3 HIGH-HIGH FLOAT SWITCH WIRING
89 DETAIL E-4 PERMANENT LIFT STATION EQUIPMENT RACK
92 DETAIL E-1 PERMANENT LIFT STATION ELECTRICAL MODIFICATION
93 DETAIL E-1 RELOCATED MOTOR-OPERATED VALVE AND CONTROL CONDUIT
UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FLUOR FERNALD, INC.
ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM
CONTROL VALVE HOUSE ELECTRICAL DETAILS



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DCN 20111-011

PROD #7284_Vol 5

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 3	(6) DATE
20111	FSC-641		5/16/00

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Piping changes at Valve Houses

(11) DCN NO.: 20111-012

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House Mechanical Details I	90X-6000-M-00264	0	
Valve House Mechanical Details II	90X-6000-M-00265	0	
Control Valve House Mechanical Details	90X-6000-M-00267	0	
Safety Assessment	SA99-1079	0	

RECEIVED MAY 25 2000

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Design allows for a "cascading flow" secondary containment in the event of a major rupture in the LTS gravity piping.
Proposed Change: Eliminate the 6 inch diameter hole in the containment piping at the north end of each valve house and both north and south ends of the Control Valve House and the 3-3" holes at the PLS. Provide a new fixed end seal with 6 holes, 5/8" diameter each weep holes evenly spaced 60° apart at the south end of each valve house. Provide 6 holes, 5/8"diameter each weep holes evenly spaced 60° apart in the fixed end seal at the south end of the Control Valve House.
Justification: As directed by OEPA in May 12, 2000 letter to DOE, item 1 (attached).

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
D. J. Brettschneider	Fluor Fernald, Inc.	5/16/00	J. C. Jenkins	5/16/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

This DCN will not impact the function of the EPLTS; however, it will eliminate some of the redundancies included in the EPLTS design.

GEOSYNTEC RCI - DCN ACCEPTANCE
Kwasi Badu-Tweneboah 5/22/00

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 5/22/00
K Badu-Tweneboah
KWASI BADU-TWENEBOAH
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 5/24/00
James C. Jenkins

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE:
J. R. Hughes
PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

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MAY-12-00 02:25PM FROM-OEPA SOUTHWEST DFC. E 9372856404 T-143 P 01/02 F-175
MAY 16 2000

Ohio EPA
State of Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911
(513) 285-6357
FAX (513) 285-6249

Post-it® Fax Note 7671	Date	# of pages ▶
To Johnny Reising	From Ohio EPA	
Co./Dept.	Co.	
Phone #	Phone # 937 285 6466	
Fax # x3076	Fax #	

Voinovic

May 12, 2000

409

Mr Johnny Reising
U.S. Department of Energy, Fernald Area Office
P.O. Box 538705
Cincinnati, OH 45253-8705

copy:
Griffin
Krieg
Hughes
Jenkins

RE: 90% EPLTS DESIGN

Dear Mr. Reising:

The design package for the Enhanced Permanent Leachate Transmission System (EPLTS) 90% design was submitted to the Ohio Environmental Protection Agency directly by Fluor Fernald and not under the more typical DOE cover letter bearing your signature. It is our understanding that a sub-contract has been issued for the construction of the EPLTS and that notice to proceed is expected soon.
Before Ohio EPA will be able to approve the final design of the EPLTS, the following conditions must be met:

1) Infrastructure elements which allow for the "cascade flow" of leachate through the secondary containment pipe in the event of a catastrophic failure of the primary carrier pipe should be removed from the design.
We have determined that this design does not comply with OAC 3745-27-08(C)(5)(c) which has been cited as an ARAR in both the Operable Unit 2 and Operable Unit 5 Records of Decision. OAC 3745-27-08(C)(5)(c) requires that leachate lines be double cased. In the event of failure of the primary containment pipe, the design would allow flow in all sections of the EPLTS that are down-gradient of the failure to be in a single-contained pipe. In this case, all valve houses would be used to carry leachate and would also be single-contained. The change we are asking would result in single-contained flow only in the length of pipe in which the failure occurs; flow in subsequent down-gradient runs would be in double-cased pipe and the valve houses would not contain leachate.

The circular hole placed in the top of the container pipe at the down gradient ends of piping runs between the various valve houses should be removed. Fixed-end seals at the up gradient ends of the piping runs should be added. It is our understanding that these changes will require the addition of "weep holes" in

C:\temp\cu2\split\case.wpd

Mr Johnny Reising
May 12, 2000
Page 2

the new fixed-end seals.

2) Procedures for the step-wise routing of leachate flow from the interim system to the EPLTS as should be developed. These procedure should detail sequencing of connections, contingencies for managing leachate when flows through the LCS lines must be stopped to allow for construction, etc.

3) Prior to operation/final inter-connection of the EPLTS, a systems plan should be submitted to Ohio EPA for review and approval. The system plan should detail the operation of the system.

4) Prior to operation/final inter-connection of the EPLTS, a leachate management contingency plan should be submitted to Ohio EPA for review and approval. The contingency plan is required by OAC 3745-27-19(K)(6) which is cited as an ARAR in the Operable Unit 2 ROD.

Construction should not proceed prior to Ohio EPA approval on the DCNs that enable the changes we requested in 1 and 2.

Operations/final inter-connection may begin after Ohio EPA has approved the plans specified inn 3 and 4.

If you have any questions, please contact Tom Ontko or me.

Sincerely,

Thomas A. Schneider
Fernald Project Manager
Office of Federal Facilities Oversight

cc: Jim Saric, U.S. EPA
Terry Hagen, FDF
Mark Shupe, HSI GeoTrans
Francie Hodge, Tetra Tech EM Inc.

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5)	Of	(6) DATE
20111	FSC-641	1	2	6/5/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: HDPE Piping Change at Valve Houses 2 thru 6

(11) DCN NO.: 20111-013

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House Mechanical Details II	90X-6000-M-00265	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Existing dimensions for interfacing the HDPE piping with Carbon Steel (CS) in Valve Houses 2 thru 6 does not provide adequate space for the butt fusion equipment.

Proposed changes at the north wall of Valve Houses 2 thru 6 will allow space for butt fusion equipment as well as flexibility during installation.

See Pg 2 of 2 for piping schematic of changes

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
D. J. Brettschneider	Fluor Fernald, Inc.	6/5/00	J. C. Jenkins	6/5/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC — RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/7/00

KWASI BADU-TWEREBOAH, GEOSYNTEC

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 6/30/00

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J. R. Hughes 6/6/00

PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

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FERNALD
ENVIRONMENTAL RESTORATION
MANAGEMENT CORPORATION

ENGINEERING CALCULATION

PROJECT NUMBER:	
BY:	DATE:
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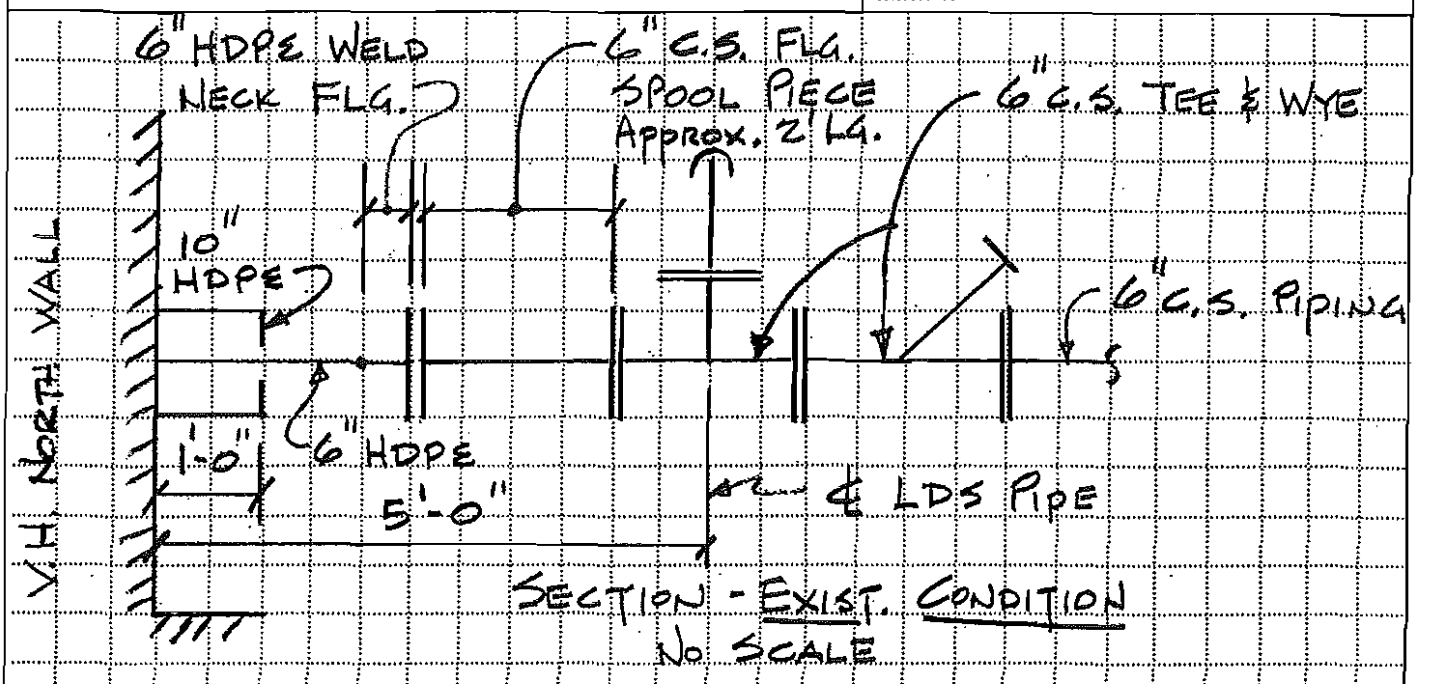
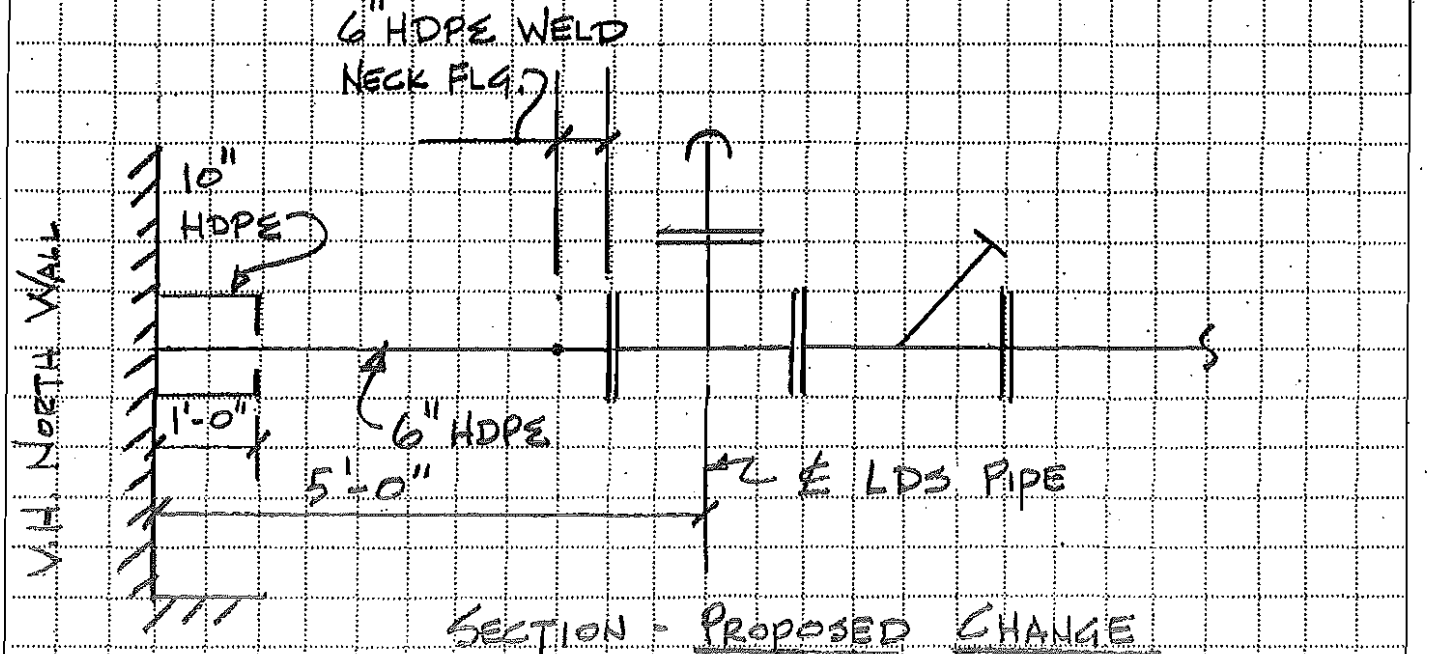
SUBJECT:



SECTION - EXIST. CONDITION
No SCALE



SECTION - PROPOSED CHANGE
No SCALE

DCN 20111-013
Pg. 2 OF 2

J.C.J.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg. 1 Of 4 KBT	(6) DATE June 14, 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-005R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]	(4A) RCI/DCN TITLE: Controlled Density Fill		(11) DCN NO.: 20111-014

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	02215-3.02-E	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Staver proposes to substitute 4" to 6" of Controlled Density Fill for the 6" of compacted backfill under the Valve and Control Valve House foundations. This would provide a working surface equivalent to compacted fill material, that would not be susceptible to deterioration under heavy rainfall conditions.

(10) REQUESTER:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood	The STAVER Group, Inc.	June 14,2000	JAMES C. JENKINS	6/14/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

The controlled density fill (CDF) shall be the same grades and elevation of subgrade prior to placing concrete slab and vapor barrier. See attached dwg 1 of 2000 CDF. Provide quality control data and as-built information on red-line drawings.

RECEIVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/16/00
KWASI BADU-TWENEBOAH
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:
PERFORMANCE GRADE: (17) N.A. 6/19/00

(18) CONSTRUCTION CONCURRENCE DATE: 6/19/00
PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

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Transmittal Form

RECEIVED JUN 15 2000

PROD #7284_Vol 5 page 2 of 4 LRBT

DCN No. 20111-01

To: **Fluor Fernald**

- ☐ First Class Mail
- ☐ Overnight
- ☒ Courier
- ☐ Other

the STAVER group

1271 East 2nd Street
Franklin, Ohio 45005

(513) 743-7995
Fax (513) 743-5873

Date: 15-Jun-00

Attn: **Kwasi**

Re: **OSDF Permanent Leachate Transmission System**
Contract FSC - 641

We are sending you: ☒ Attached ☐ Under separate covering the following

☐ Drawings	☐ Copy of letter	☐ Samples
☒ Specifications	☐ Catalog Cuts	☐ Color Samples
☐ Shop Drawings	☐ Change Order	☐

Copies	Date	Description	Action
1		**Control Density Fill mix design and test reports**	

RECEIVED JUN 15 2000 LRBT @ 12:44 pm

These are Transmitted for the action checked below or as listed in the above columns.

☐ Shop Drawing	1. Submit _____ Copies for distribution	**Action Codes**
☐ For Approval as noted	2. Resubmit _____ Copies for approval	A - Approval
☐ For information only	3. Return _____ Copies Corrected prints	AN - Approval as Noted
☐ For review and Comment	☐ For your use	ANR - Approval as noted(Resubmit)
☐ As Requested	☐ Preliminary	NA - Not Approved
☐ For bids due	☐	

Remarks: **Please use this data in conjunction with the RCI submitted under a separate cover**

Copy to: File

Signed: David R. Opalka

DCN No. 20111-014 Page 3 of 4 ~~EB~~ T

H. C. NUTTING COMPANY

EMPLOYEE OWNED

GEOTECHNICAL, ENVIRONMENTAL AND TESTING ENGINEERS
SINCE 1921

CORPORATE CENTER
4120 AIRPORT ROAD
CINCINNATI, OHIO 45226
(513) 321-5816
FAX (513) 321-0294

Cyl12757(9/18/98)smo

REPORT OF TESTS OF 3"X6" C D F CYLINDERS

Client:	Miami Valley Ready Mix Conc.	Order No.	08493.015
Contractor:		Report No.	
Project:	C D F (Controlled Density Fill)		
Location:			

FIELD INFORMATION

Date Made	6/17/98	Mix Data	
Cylinder Group No.	15	Cement Brand	Type
No. Cyls in Set	4	Fine Agg. - Source	
Type of Mix	CL 2	Coarse Agg. - Source	
Specified Strength			
Left Plant	Time Sampled	Type of Mixing	
Mixing Time		Batch Size	
Weather	Temp.	Batch Weights -	SSD
Temperature of Concrete		Cement - 50	
Concrete Furnished By		Fine Agg. - 2410	2550
Truck No.	Ticket No.	Fly Ash - 100	
Information from		Water - 400	27 gal
Cyl. Made by HCN Tech.		Admixture - 20.02	
Cyl. Made by Others	X	Sample Taken From	
Field Cure	C.B. Temp.	Type of Mold	
Slump	8.5" spread / Air Content 22%	Portion of Load Sampled	

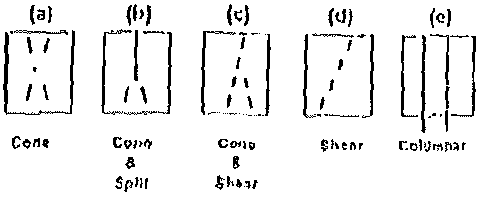
LABORATORY RESULTS

Field Sample No.								
Lab Sample No.	56	57	58	70	71	72		
Laboratory No.	12757	12758	12759	16263	16264	16266		
Age to be Tested	30	30	30	90	90	90		
Date Received								
Date Tested	7/17/98	7/17/98	7/17/98	9/15/98	9/15/98	9/15/98		
Age	30	30	30	90	90	90		
Condition								
Weight, Lbs.	2.30	2.30	2.30	2.30	2.30	2.30		
Diameter, Ins.	3.00	3.00	3.00	3.00	3.00	3.00		
Area, Sq. Ins.	7.06	7.06	7.06	7.06	7.06	7.06		
Type of Break								
Total Load, Lbs.	140	110	135	255	260	265		
Unit Load, PSI	20	19	20	36	37	37		
Specified Strength								

CONCRETE TEST SPECIMEN CURED IN ACCORDANCE WITH ASTM C-31 AFTER RECEIVED IN LABORATORY.

H.C. NUTTING COMPANY

Robert L. House,
Vice President/Lab Director



"AS A MUTUAL PROTECTION TO CLIENTS, THE PUBLIC, AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS, AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS, OR EXTRACTS FROM OR REGARDING OUR REPORTS IS RESERVED PENDING OUR WRITTEN APPROVAL."

DCN No. 20111-024

H.C. NUTTING COMPANY 4120 Airport Road Cincinnati, OH 45226		RESULTS OF FALLING HEAD PERMEABILITY TEST		
W.O.#	Client Name	Project Site	Project Name	Date
08493.015	Miami Valley Ready Mix Concrete		CDF (Controlled Density Fill)	10/16/98
	Boring /Test Pit/ Stockpile	Sample / Bag No.	Depth, ft	Lab No.
		73		16266

Material Description:

Initial Specimen Height (in.)	2.87		
Initial Specimen Diameter (in.)	2.99	=> Area =	4530 mm^2
Final Specimen Height (in.)	2.93	=> Height =	74.4 mm
Specimen Mass (grams)	503.80		
Specific Gravity	2.66		
Trimmings Wet Mass + Tare (grams)	162.60		
Trimmings Dry Mass + Tare (grams)	161.70		
Trimmings Tare (grams)	43.40		
Initial Wet Mass + Tare (grams)	652.60		
Final Wet Mass + Tare (grams)	738.10		
Final Dry Mass + Tare (grams)	639.20		
Tare (grams)	148.80		
Head Buret No.	102		
Head Buret Area, a-in (mm^2)	90.60		
Head Buret Head/Volume, (mm/cc)	11.0375276		
Head Buret Offset, (mm)	0		
Tail Buret No.	103		
Tail Buret Area, a-out (mm^2)	90.60		
Tail Buret Head/Volume, (mm/cc)	11.0375276		
Cell Pressure (psi)	90.0		
Head Buret Back Pressure (psi)	86.0		
Tail Buret Back Pressure (psi)	86.0		
Permeability Station No.			

Notes:

HCN Buret Calibrations

Buret No.	Area (mm^2)	Head/Volume (mm/cc)	Offset (mm)
101	90.6	11.0	
102	90.6	11.0	
103	90.6	11.0	
104	90.6	11.0	
105	90.6	11.0	
106	90.6	11.0	
107	90.6	11.0	
108	90.6	11.0	
109	90.6	11.0	
110	90.6	11.0	0
111	90.6	11.0	
112	90.6	11.0	
113	90.6	11.0	
114	90.6	11.0	
115	90.6	11.0	
116	90.6	11.0	
117	90.6	11.0	
118	90.6	11.0	
119	90.6	11.0	
120	88.04	10.2	4
121	97.09	10.3	
122	50.76	19.7	4
123	50.76	19.7	
124	50.00	20.0	0
125	48.78	20.5	

Date	Time (hrs+min/60)	Inflow Buret (cc)	Outflow Buret (cc)	Water Temp. (o Cent)	Head Loss, h (mm)	Elapsed Time (min.)	Permeability (cm/sec)	Corrected Permeability (cm/sec)
15-Oct-98	13.4667	0.6	24.1		1668.5739			
15-Oct-98	13.4694	4.2	20.4		1587.8999	0.17	3.68E-04	
15-Oct-98	13.4722	7.5	17.1		1515.1523	0.17	3.49E-04	
15-Oct-98	13.4750	10.7	13.8		1443.4083	0.17	3.61E-04	
15-Oct-98	13.4778	13.7	10.9		1378.2869	0.17	3.44E-04	
15-Oct-98	13.4806	16.7	7.9		1312.0618	0.17	3.68E-04	
15-Oct-98	13.4833	19.3	5.2		1253.5629	0.17	3.39E-04	
15-Oct-98	13.4861	22.1	2.5		1192.8565	0.17	3.69E-04	

RESULTS	Trimmings	Initial	Final
Moisture Content	0.8	2.7	20.2
Percent Saturation		9.2	64.7
Wet Mass Density (pcf)		95.2	109.0
Dry Mass Density (pcf)		92.6	90.7
Height of Solids (in.)		1.602	
Void Ratio		0.791	0.829

H.C. NUTTING COMPANY

Robert L. House

Robert L. House,
Vice President/Lab. Director

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE June 14, 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111-006R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Slump Requirement for Concrete with High Range Water Reducing Admixture

(11) DCN NO.: 20111-015

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	03100-Table 03100-01	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

RECEIVED JUN 15 2000

The Technical Specifications allows for the use of a High Range Water Reducing Admixture to add workability and better bonding to the concrete mix. By increasing workability, the Admixture will provide a better bond at the critical area between the concrete and the studs on the HDPE liner. Also, considering the weather factor, the Admixture will aid in placing and finishing operations. Our Concrete supplier recommends delivering concrete at a slump of 5" +/- 2", while maintaining the water/cement ratio of 0.38. Please advise.

(10) REQUESTER:	COMPANY:	DATE:	(12) CE / PE	DATE:
Ron Wood Ron Wood	The STAVER Group, Inc.	June 14, 2000	James C. Jenkins	6/14/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

Revise Table 03100-01 to read as follows: "Slump—ASTM C 143 5 inches ± 2 inches".

K Boadu-Tweneboah 6/19/00

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/19/00

K Boadu-Tweneboah

KWASI BADU-TWENEBOAH, GEOSYNTEC

[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 6/30/00

PERFORMANCE GRADE: (17) N.A. James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5; 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO. C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE -

(1)WP / WO NO.: 20111	(2)S/C NO.: FSC-641	(5)Pg 1 OF 1	(6)DATE June 22, 2000
(3)S/C TITLE: OSDF EPLTS		(11)RCI NO.:	
(4) RESPONSIBLE DISCIPLINE: E ☐ M ☐ C x☐ OTHER ☐	(4A)RCI/DCN TITLE: Construction Quality Requirements for Controlled Density Fill	(11)DCN NO.: 20111- 016	

(7)DOCUMENTS AFFECTED	(7)DOCUMENT NOS.	(7)REV	(8)OTHER
Technical Specifications	02200, Part 3.10.B 02215, Part 3.04.B	0 0	DCN No. 20111-014

(9) RCI - INQUIRY USQD SCREENING BY PROJECT ENGINEER

DCN No. 20111-014 allows the use of 4- to 6-in. thick layer of Controlled Density Fill (CDF) in lieu of the 6-in. thick layer of compacted fill under the Valve House and Control Valve House foundations. Construction quality requirements for the CDF are being added. Note that CDF is also referred to as Controlled Low Strength Material (CLSM) in the technical literature.

Add the following to Section 02200, Part 1.03.A (page 02200-2):
11. ASTM D 4832. Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.

Add the following to Section 02200, Part 3.10.B (page 02200-10):
4. CQC Consultant will perform conformance testing on controlled density fill placed under Valve House and Control Valve House foundations to establish compliance with this Section:
a. Six test cylinders (minimum) shall be taken for compressive strength testing (ASTM D 4832); and
b. Samples shall be taken at a minimum frequency of one set of cylinders per each valve house foundation.

(10)REQUESTOR:	COMPANY:	DATE:	(12)CE / PE	DATE:
Kwasi Badu-Tweneboah	GeoSyntec	22 June 2000	J. C. JENKINS	6/27/00

(13)RESPONSE: FOR RCI, IS A DCN REQ'D? ☐ NO ☐ YES (14) FOR DCN: ☒ APPROVED ☐ APPROVED AS NOTED ☐ DISAPPROVED

GEOSYNTEC RCI - DCN ACCEPTANCE

(15)DESIGN ORGANIZATION APPROVAL/DISAPPROVAL: DATE: 6/27/00 Kwasi Badu-Tweneboah ☐ FIT ☒ FORM ☐ FUNCTION	(20)CHARGE NO. FOR CADD SERVICES TO INCORPORATE: N.A.

(16)FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 6/30/00

(17) PERFORMANCE GRADE: 4

(18)CONSTRUCTION CONCURRENCE: DATE: J. R. HUGHES	(21)WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:
(19) PURCHASE REQUISITION REQUIRED: ☐ YES ☒ NO	

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FS-F-4259 (2/16/98)

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111
(2) S/C NO.: FSC-641
(5) Pg 1 Of 2
(6) DATE June 29, 2000
(3) S/C TITLE: OSDF EPLTS
(11) RCI NO.:
(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [x] OTHER [ ]
(4A) RCI/DCN TITLE: Riprap Material Requirements
(11) DCN NO.: 20111-01 017

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	20111-TS-0001	0	02271

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [x] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Justification: Revise 02271, Parts 1.04A, 2.01C, and 2.01D to reflect previous testing performed by Fluor Fernald, Inc. to pre-qualify riprap sources, and to meet the requirements of the Ohio Department of Transportation (DOT) Specifications for riprap.

Existing Condition: Submittal and material requirements for Riprap Types C and D require additional testing.

Proposed Change: See page 2 of 2.

(10) REQUESTOR: Kwasi Badu-Tweneboah
COMPANY: GeoSyntec
DATE: June 29, 2000
(12) CE / PE: JAMES C JENKINS
DATE: 6/30/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES
(14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/30/00
Kwasi Badu-Tweneboah, GeoSyntec
[ ] FIT [x] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 8/2/00
PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J. R. HUGHES 7/5/00
PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

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ECDC CONTROLLED COPY NO. C011

FS-F-4259
REV. 5: 10/01/99

DCN 20111-017
Project No. 20111
OSDF Enhanced Permanent Leachate Transmission System

Revise Section 02271, Part 1.04A, subparagraphs 2 and 3 (page 02271-2) as follows:

2. for approved sources identified in Parsons [1996] or by Fluor Fernald, Inc., certification from the supplier that the Riprap Type C, as shown on the Construction Drawings, meets the material requirements of this Section and test results conducted on Type C Dumped Rock Fill, as defined in Item 601.07 of Ohio DOT Specifications, in accordance with ASTM C 127 and ASTM D 5240; and
3. certification from the supplier that the Riprap Type D, as shown on the Construction Drawings, meets the material requirements of this Section and test results conducted on Type D Dumped Rock Fill, as defined in Item 601.07 of Ohio DOT Specifications, in accordance with ASTM C 535 and ASTM D 5240.

Revise Section 02271, Part 2.01, paragraphs C and D (page 02271-3) as follows:

C. Furnish Riprap Type C having a minimum bulk specific gravity of 2.60 and a maximum absorption of 0.83 percent when measured in accordance with ASTM C 127.

D. Riprap Type D, used for slope protection, channel and ditch lining, and other surface-water management and erosion control measures specified in Section 02270 and as shown on the Construction Drawings, shall conform to requirements of Type D Dumped Rock Fill specified in Item 601.07 of the Ohio DOT Specifications. In addition the Riprap Type D shall be relatively free of laminations, seams, and fractures. The Riprap Type D shall have a maximum loss of 15 percent from a sodium sulfate soundness test conducted in accordance with ASTM D 5240, and a maximum loss of 50 percent in a Los Angeles Abrasion test conducted in accordance with ASTM C 535.

Based on the above revisions Schmidt Hammer Rebound Number (ASTM C 805) conformance testing is not required. Delete Section 022721, Part 3.02.A.3 (page 02271-4). Delete also Tables 02271-1 and 02271-2 from Section 02271. They are no longer necessary.

6/30/00

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111

(2) S/C NO.: FSC-641

(5) Pg 1 Of 2

(6) DATE June 29, 2000

(3) S/C TITLE: OSDF EPLTS

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [x] OTHER [ ]

(4A) RCI/DCN TITLE: ~~Riprap Material Requirements~~ PERFORMANCE TESTING

(11) DCN NO.: 20111-~~01~~ 018

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	20111-TS-0001	0	02200, Part 3.10.B
			DCN No. 20111-016
			02230, Part 3.06.B

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [x] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Justification: Revise 02200, Part 3.10.B to include performance testing for compacted fill used for berm and road construction components of the EPLTS.

Existing Condition: Current specifications do not include performance testing for compacted fill used for berm and road construction except for valve houses and LTS pipelines.

Proposed Change: See page 2 of 2.

(10) REQUESTOR: Kwasi Badu-Tweneboah — COMPANY: GeoSyntec — DATE: June 29, 2000

(12) CE / PE: JAMES C. JENKINS — DATE: 6/30/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES

(14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/30/00

Kwasi Badu-Tweneboah, GeoSyntec

[ ] FIT [x] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) 8/2/00 — DATE:

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE: J. R. HUGHES 7/5/00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) — DATE:

S-F-4259
REV. 5: 10/01/99

ORIGINAL

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C011

DCN 20111-018
Project No. 20111
OSDF Enhanced Permanent Leachate Transmission System

Revise Section 02200, part 3.10.B.2.b. (page 02200-10) as follows:

b. in-situ density (ASTM D 2922) at 1 test per 1,000 ft^2 per lift; and

Add the following to Section 02200, Part 3.10.B (page 02200-10):

5. CQC Consultant will perform performance testing on compacted fill used for berms, road construction, and other fill areas to establish compliance with this Section. The performance testing to be performed and the minimum testing frequencies shall be as follows:
   a. in-situ moisture (ASTM D 3017) at 2 tests per acre per lift; and
   b. in-situ density (ASTM D 2922) at 2 tests per acre per lift.

6/30/00

OhioEPA
State of Ohio Environmental Protection Agency
uthwest District Office
. East Fifth Street
Dayton, Ohio 45402-2911
(513) 285-6357
FAX (513) 285-6249

George V. Voinovich
Governor

MEMORANDUM

TO: J.D. Chiou, SDFP Manager, Fluor Fernald
FROM: Tom Ontko, Ohio EPA
DATE: July 26, 2000
RE: OSDF DCNs 20103-001
20102-057R
EPLTS DCN 20111-017
20111-018
20111-019

This memorandum is a revision of a memo faxed on July 24, 2000. The original version was inadvertently sent with some of the text missing.

DCN 20103-001 removes the Cell 4 liner and clay screening operation from the OSDF Phase III contract. Phase III will now comprise only the construction of the Cell 1 cap. Clay screening for the cap will be performed by the site support contractor and Cell 4 liner has been deferred to a different contract. This DCN also deletes mulching from the vegetation specification because the seed drill method doesn't require mulching. Attached to the DCN is a list of Construction Drawings that remain in the Phase III scope.
The Ohio EPA approves this DCN.

DCN 20102-057R clarifies that the 3 ft layer of Category 1 material placed over bagged impacted material placed in a trench must remain intact and not be used for placement of additional materials.
The Ohio EPA approves this clarification.

EPLTS DCN 20111-017 Sources of riprap (and other off-site borrow materials) have been pre-certified (Off-Site Borrow Materials Geotechnical Evaluation Report, Parsons, 1996). This DCN removes the conformance testing requirement on type D riprap. Testing on Type C riprap will be reduced to bulk specific gravity and maximum absorption per ASTM C 127. Both ripraps are still required to conform to ODOT specifications.
The Ohio EPA approves this DCN

EPLTS DCN 20111-018 adds performance testing requirements for compacted fill used for berms and roads

OWZ

O:\temp\00\epltsdcn56.wpd

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5)	Of	(6) DATE
20111	FSC-641	1	2	7/13/00

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]

(4A) RCI/DCN TITLE: Sedimentation Basin Connection

(11) DCN NO.: 20111-019

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
LTS Pipe Plan and Profile Stations 17+00 to 23+00	90X-6000-G00284	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Justification: To allow contractor to proed with scheduled construction

Existing Condition: A power pole not shown on contract drawings is located at bottom of proposed ditch connecting the sedimentation basins. Pole (6'6" depth) would be undermined.

oposed Change: Relocat ditch to the east as shown on Pg. 2. Record As-Builts.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
James C. Jenkins	Fluor Fernald, Inc.	7/13/00	J. C. Jenkins	7/13/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) ~~FOR DCN~~: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

Record As-Builts on "Red-Line Drawings".

GEOSYNTEC RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 7/14/00
KBadu-Twenebwah
KWASI BADU-TWENEBOAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:

PERFORMANCE GRADE: (17) 4 8/2/00

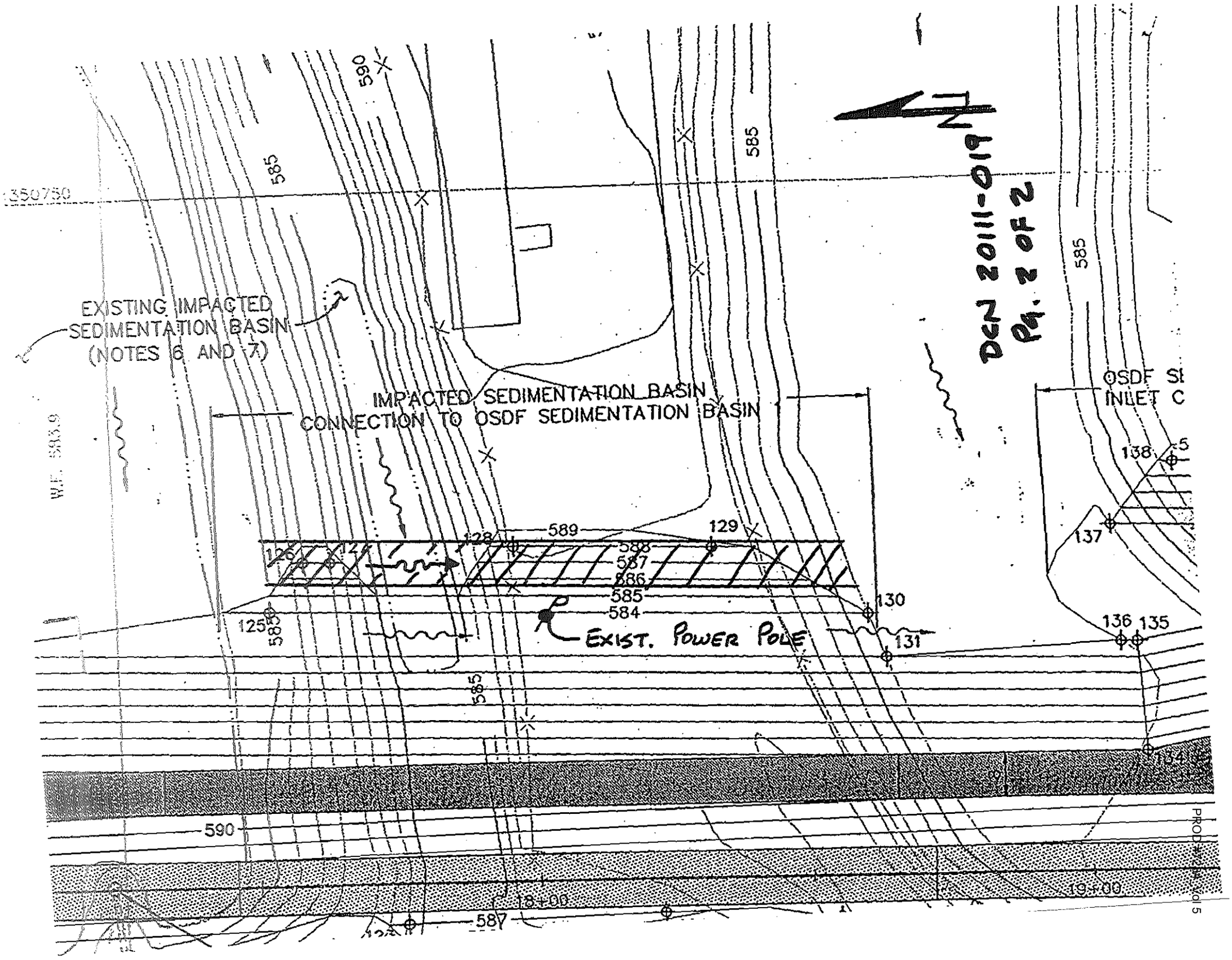
(18) CONSTRUCTION CONCURRENCE DATE: J. R. Hughes 7/14/00
PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

ECDC CONTROLLED COPY NO.

C011

F-4259
REV. 5: 10/01/99


DCN 2011-019
Pg. 2 of 2
EXISTING IMPACTED SEDIMENTATION BASIN (NOTES 6 AND 7)
IMPACTED SEDIMENTATION BASIN CONNECTION TO OSDF SEDIMENTATION BASIN
OSDF SI INLET C
EXIST. POWER POLE
W.F. 583.9
1350750
590
585
589
588
587
586
584
126
127
128
129
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131
125
138
137
136
135
134
18+00
19+00

OhioEPA
State of Ohio Environmental Protection Agency
Southwest District Office
East Fifth Street
Dayton, Ohio 45402-2911
(513) 285-6357
FAX (513) 285-6249

George V. Voinovich
Governor

MEMORANDUM

TO: J.D. Chiou, SDFP Manager, Fluor Fernald
FROM: Tom Ontko, Ohio EPA
DATE: July 26, 2000
RE: OSDF DCNs 20103-001
20102-057R
EPLTS DCN 20111-017
20111-018
20111-019

This memorandum is a revision of a memo faxed on July 24, 2000. The original version was inadvertently sent with some of the text missing.

DCN 20103-001 removes the Cell 4 liner and clay screening operation from the OSDF Phase III contract. Phase III will now comprise only the construction of the Cell 1 cap. Clay screening for the cap will be performed by the site support contractor and Cell 4 liner has been deferred to a different contract. This DCN also deletes mulching from the vegetation specification because the seed drill method doesn't require mulching. Attached to the DCN is a list of Construction Drawings that remain in the Phase III scope.
The Ohio EPA approves this DCN.

DCN 20102-057R clarifies that the 3 ft layer of Category 1 material placed over bagged impacted material placed in a trench must remain intact and not be used for placement of additional materials.
The Ohio EPA approves this clarification.

EPLTS DCN 20111-017 Sources of riprap (and other off-site borrow materials) have been pre-certified (Off-Site Borrow Materials Geotechnical Evaluation Report, Parsons, 1996). This DCN removes the conformance testing requirement on type D riprap. Testing on Type C riprap will be reduced to bulk specific gravity and maximum absorption per ASTM C 127. Both ripraps are still required to conform to ODOT specifications.
The Ohio EPA approves this DCN

EPLTS DCN 20111-018 adds performance testing requirements for compacted fill used for berms and roads

Printed on recycled paper

The Ohio EPA approves this DCN.

EPLTS DCN 20111-01 re routes the proposed ditch which connects the two sediment basins to the east. A utility pole not shown on the drawings is located in the original position of the ditch.

Approval of these DCNs does not constitute an assurance that the proposed facilities will operate in compliance with Ohio laws and regulations or that these facilities will perform in a fashion that achieves the objectives of the Operable Unit 2 Record of Decision.

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111 | (2) S/C NO.: FSC - 641 | (5) Pg 1 Of 12 (KBT) | (6) DATE 31 July 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project | (11) RCI NO.: 010R 20111-009R mg

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ] | (4A) RCI/DCN TITLE: WP Locations | (11) DCN NO.: 20111-020

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Overhead Power Transmission System Plan 90X-6000-E-00258	E1	0	
Baumann Engineering Coordinate Listings	Dated 5/22/00	0	
Baumann Engineering Field Drawing	G-3 to G - 8	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Please verify the location of the electrical work poles (WP). As the attached drawings show, most of the WPs plotted to the coordinates on drawing E1 do not match the plotted WP symbols contained in the project drawings. For example, the Northing coordinate of WP 745 is closer to the Northing Coordinate for Station 14+50, not Station 14+00 as shown graphically on the attached drawings.

(10) REQUESTOR: David R. Opalka | COMPANY: The STAVER Group, Inc. | DATE: 7/31/00 | (12) CE / PE: MW Griffin | DATE: 8/01/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

The correct coordinates as inferred from the plan drawings are shown on page 12 of 12. Replace coordinates on Pole Schedule Table with coordinates on page 12 of 12.

KWASI BADU-TWENEBOAH, GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 8/10/00
Kwasi Badu-Tweneboah, GeoSyntec
[ ] FIT [ ] FORM [x] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LT52

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 8/22/00
PERFORMANCE GRADE: (17) 4 James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE: 8/22/00
PURCHASE REQUISITION REQUIRED [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO. C011

DCN NO. 20111-02

Date: 05-22-2000
Page: 1

GEODIMETER SURVEYING SOFTWARE - V 4.5E
COORDINATE LISTING

F:\2020FER\AREA

Coordinates from the file LTS-PE PE.XYZ
on the disk labeled NT_C

Stn./Point	Pt. Code	Northing/Y	Easting/X	Elev./Z
00	1970 0+00	482974.770	135064 4.270	597.050
01	1969 0+50	482924.780	135064 3.660	596.740
02	1968 1+00	482874.780	135064 3.050	596.350
003	1967 1+50	482824.780	135064 2.440	595.950
004	1966 2+00	482774.790	135064 1.820	595.550
05	1965 2+50	482724.790	135064 1.210	595.160
06	1964 3+00	482674.800	135064 0.600	594.760
	1963 3+50	482624.800	135063 9.990	594.360
08	1962 4+00	482574.800	135063 9.380	594.050
09	1961 4+50	482524.810	135063 8.770	593.740
10	1960 5+00	482474.810	135063 8.160	593.350
11	1959 5+50	482424.810	135063 7.550	592.950
12	1958 6+00	482374.820	135063 6.940	592.550
13	1957 6+50	482324.820	135063 6.330	592.160
14	1956 7+00	482274.830	135063 5.710	591.760
15	1955 7+50	482224.830	135063 5.100	591.360
16	1954 8+00	482174.830	135063 4.490	591.050
17	1953 8+50	482124.840	135063 3.880	590.740
8	1952 9+00	482074.840	135063 3.270	590.350
9	1951 9+50	482024.840	135063 2.660	589.950

DCN No. 241140 [redacted] 20

GEODIMETER SURVEYING SOFTWARE - [redacted] V4.5E
COORDINATE LISTING

/Point	Pt. Code	Northing/Y	East[redacted]ing/X	Elev./Z
	1950 10+00	481974.850	1350[redacted]632.050	589.550
	1949 10+50	481924.850	1350[redacted]631.440	589.160
	1948 11+00	481874.860	1350[redacted]630.830	588.760
	1947 11+50	481824.860	1350[redacted]630.220	588.360
	1946 12+00	481774.860	1350[redacted]629.600	588.050
	1945 12+50	481724.870	1350[redacted]628.990	587.740
	1944 13+00	481674.870	1350[redacted]628.380	587.350
	1943 13+50	481624.870	1350[redacted]627.770	586.950
	1942 14+00	481574.880	1350[redacted]627.160	586.550
	1941 14+50	481524.880	1350[redacted]626.550	586.160
	1940 15+00	481474.890	1350[redacted]625.940	585.760
	1939 15+50	481424.890	1350[redacted]625.330	585.360
	1938 16+00	481374.890	1350[redacted]624.720	585.050
	1937 16+50	481324.900	1350[redacted]624.100	584.740
	1936 17+00	481274.900	1350[redacted]623.490	584.350
	1935 17+50	481224.900	1350[redacted]622.880	583.950
	1934 18+00	481174.910	1350[redacted]22.270	583.550
	1933 18+50	481124.910	1350[redacted]21.660	583.160
	1932 19+00	481074.910	1350[redacted]21.050	582.760
	1931 19+50	481024.920	1350[redacted]20.440	582.360
	1930 20+00	480974.920	1350[redacted]19.830	582.050
	1929 20+50	480924.930	1350[redacted]19.220	581.500

DCN No. 20111-0 -20 Pg. 4 of 12

GEODIMETER SURVEYING SOFTWARE — V4.5E
COORDINATE LISTING

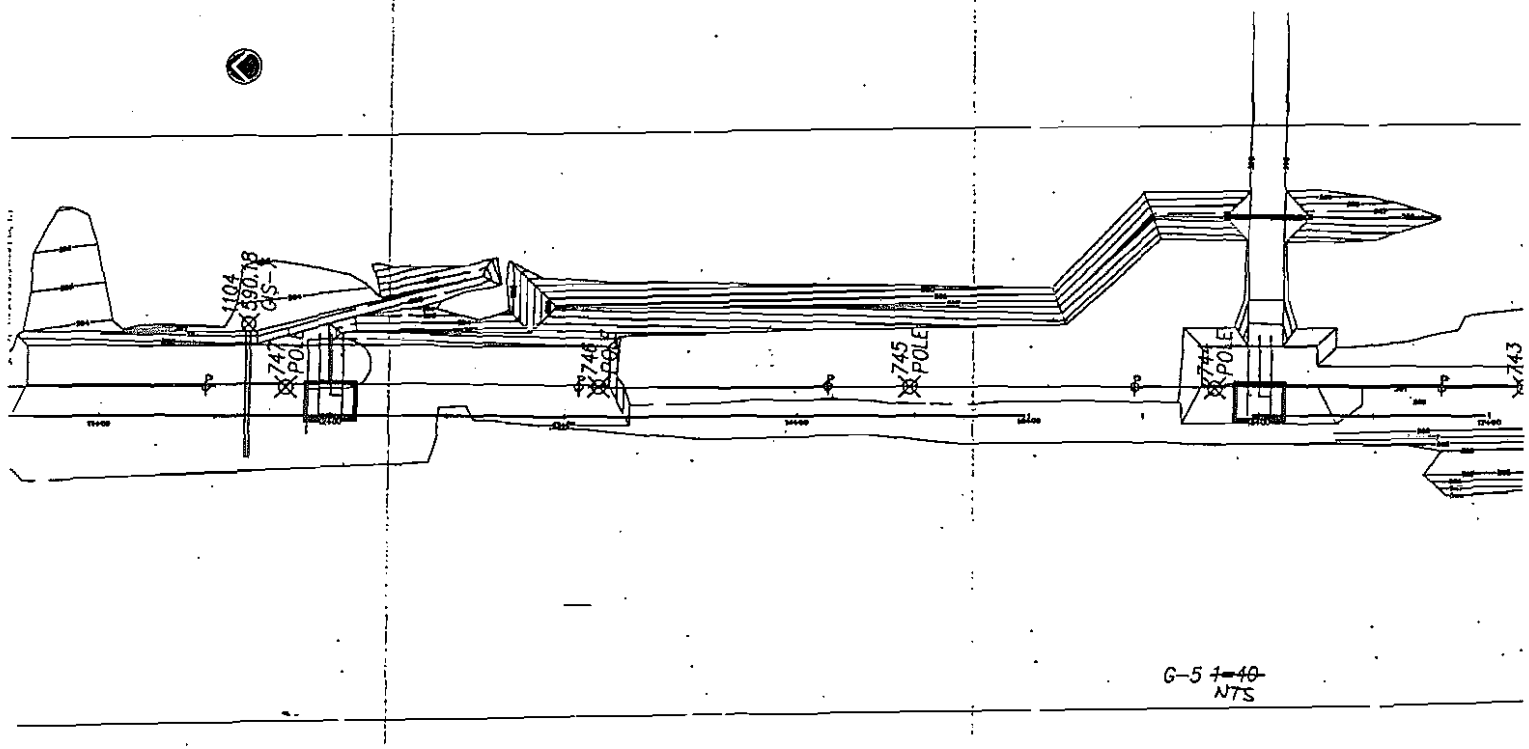
Stn./Point	Pt. Code	Northing/Y	Easting/X	Elev./Z
.042	1928 21+00	480874.930	135 0618.610	580.790
.043	1927 21+50	480824.930	135 0617.990	580.080
.044	1926 22+00	480774.940	135 0617.380	579.370
.045	1925 22+50	480724.940	135 0616.770	578.660
.046	1924 23+00	480674.940	135 0616.160	577.950
.047	1923 23+50	480624.950	135 0615.550	577.750
.048	1922 24+00	480574.950	135 0614.940	577.550
.049	1921 24+50	480525.060	135 0616.510	577.350
050	1920 25+00	480475.320	135 0621.650	577.150
051	1919 25+50	480425.580	135 0626.790	576.950
?	1918 26+00	480375.850	135 0631.930	576.750
053	1917 26+50	480326.110	135 0637.070	576.550
054	1916 27+00	480276.380	135 0642.200	576.350
055	1915 27+50	480226.640	135 0647.340	576.150
056	1914 28+00	480176.760	135 0649.180	575.950
057	1913 28+50	480126.760	135 0648.560	575.750
058	1912 29+00	480076.770	135 0647.950	575.550
059	1911 29+50	480026.770	135 0647.340	575.350
060	1910 30+00	479976.770	135 0646.730	575.150
061	1909 30+50	479926.780	135 0646.120	574.950
062	1908 31+00	479876.780	135 0645.510	574.750
063	1907 31+50	479826.780	135 0644.900	574.550

DCN No. 20111-020 Pg 5 of 12

GEODIMETER SURVEYING SOFTWARE - V4.5E
COORDINATE LISTING

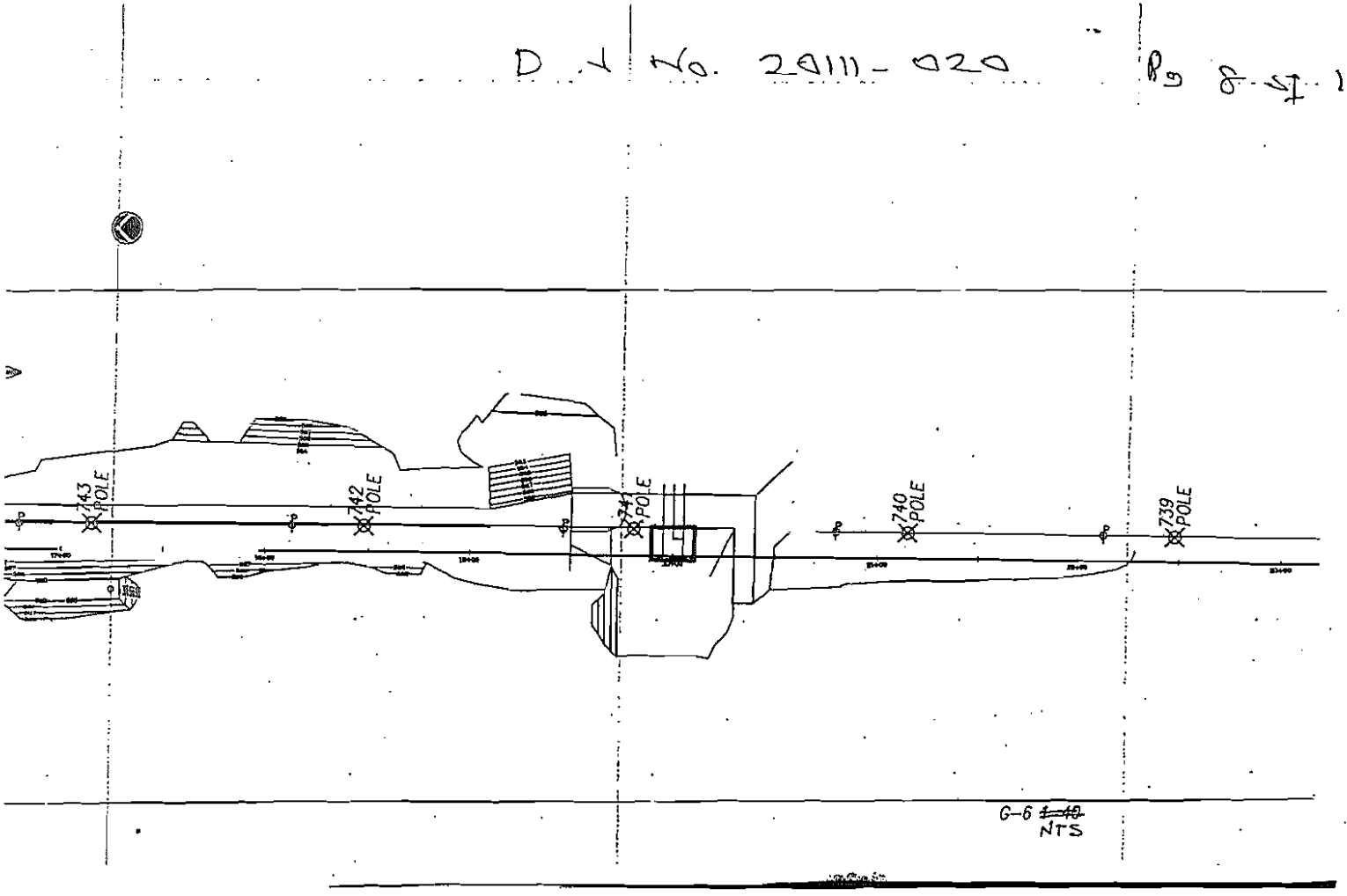
Stn./Point	Pt. Code	Northing/Y	Easting/X	Elev./Z
1064	1906 32+00	479776.790	1350644.290	574.350
1065	1905 32+50	479727.070	1350640.820	574.150
1066	1904 33+00	479677.920	1350631.670	573.950
1067	1903 33+50	479628.760	1350622.520	573.750
1068	1902 34+00	479579.600	1350613.380	573.550
1069	1901 PI	479575.340	1350612.580	573.530
1070	1900 END	479555.380	1350613.930	573.450
1071	1901 PI	479743.540	1350643.880	574.220
1072	1901 PI	480205.500	1350649.530	576.070
1073	1901 PI	480543.950	1350614.560	577.430
1100	1899 GIS-1	483010.040	1350683.690	599.180
1101	1898 GIS-3	482610.070	1350678.800	596.180
1102	1897 GIS-5	482210.100	1350673.920	593.180
1103	1896 GIS-6	481995.120	1350671.290	591.570
1104	1895 GIS-7	481810.130	1350669.030	590.180

DCN No. 20111-020 Pg 6 of 12

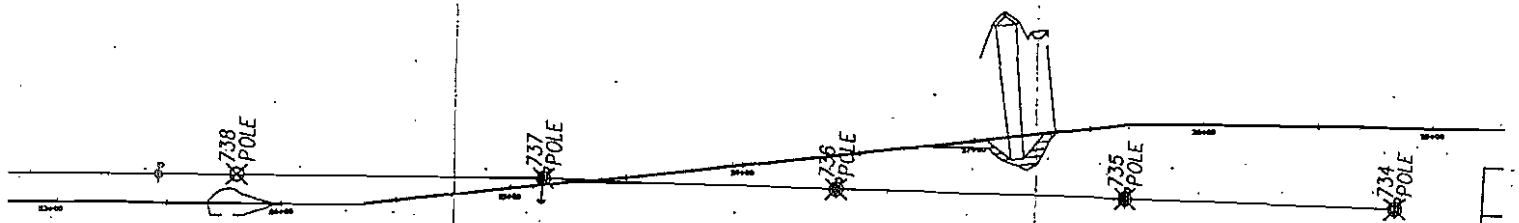


T N No. 2011-020 Pg 7 of 12

D.T. No. 29111-020 Pg 8 of 12

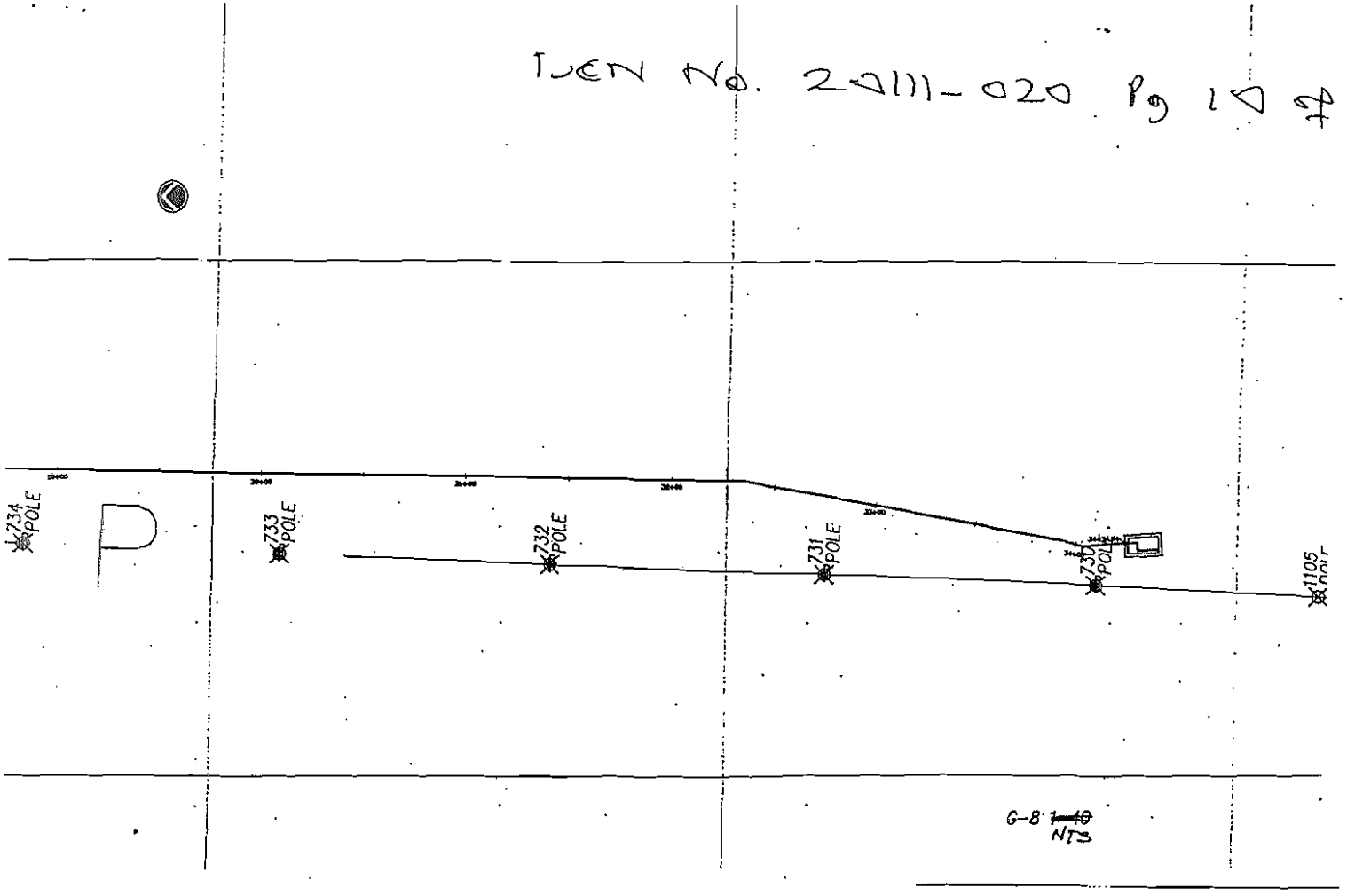


DCN No. 20111-020 Pg 9 of 12

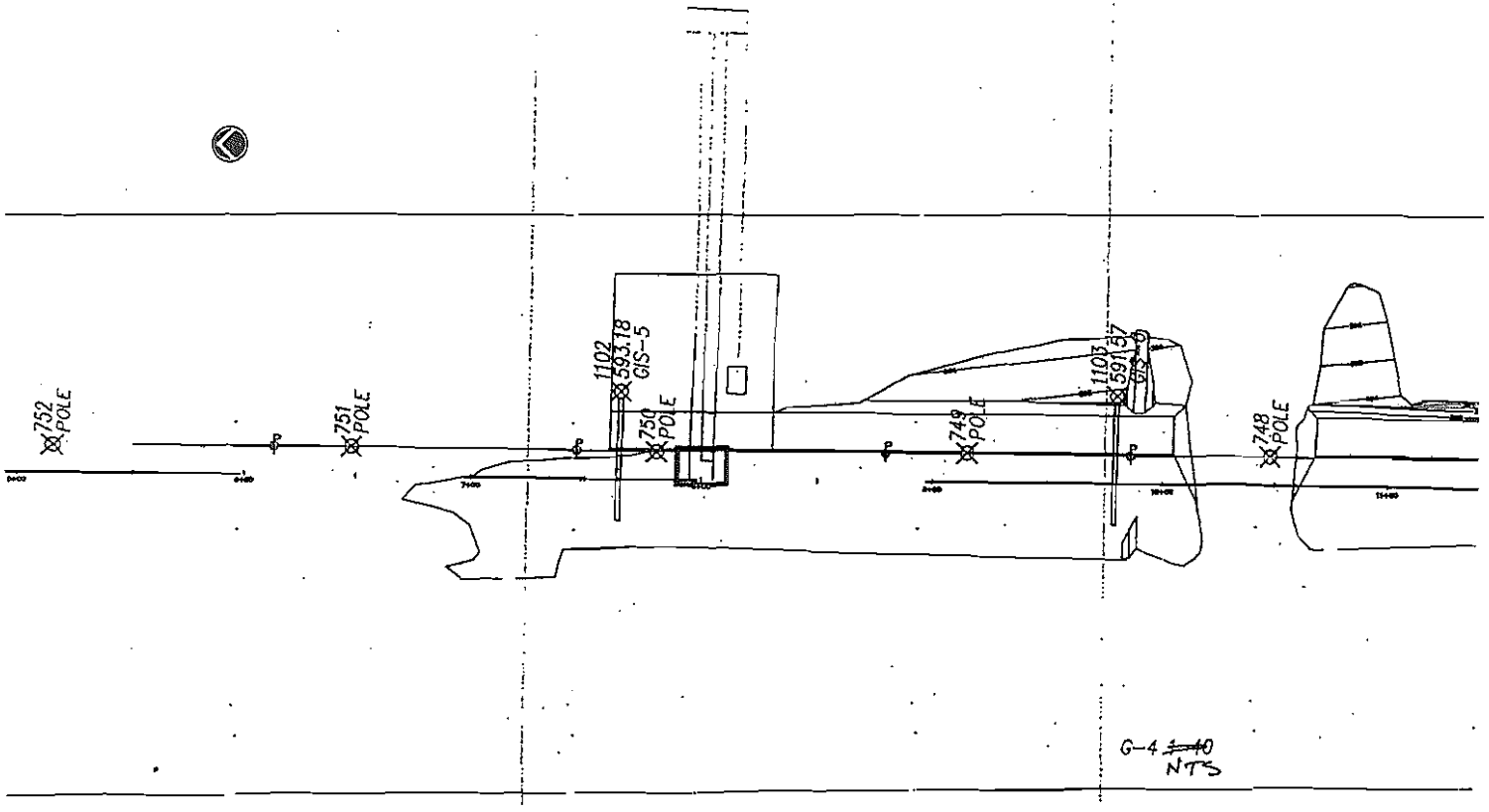


G-7 ~~1=10~~
NTS.

IJEN No. 20111-020 Pg 10 of 12



DCN No. 20111-020 Pg 11 of 12



DCN No. 20111-020

Point	Plan View Northing	Plan View Easting	Table Northing	Table Easting	Delta Northing	Delta Easting
561	479459.2677	1350587.9288	479460	1350589	-0.7323	-1.0712
730	479569.2641	1350593.0447	479569	1350593	0.2641	0.0447
731	479702.5028	1350597.9768	479703	1350598	-0.4972	-0.0232
732	479835.2731	1350602.8915	479835	1350603	0.2731	-0.1085
733	479967.3597	1350607.7809	479967	1350608	0.3597	-0.2191
734	480092.4510	1350612.4114	480092	1350612	0.4510	0.4114
735	480210.5472	1350616.7829	480211	1350617	-0.4528	-0.2171
736	480335.6386	1350621.4134	480336	1350621	-0.3614	0.4134
737	480460.7300	1350626.0439	480461	1350626	-0.2700	0.0439
738	480628.7907	1350628.1010	480594	1350628	34.7907	0.1010
739	480762.1182	1350629.7292	480727	1350629	35.1182	0.7292
740	480895.4415	1350631.3586	480860	1350631	35.4415	0.3586
741	481028.7649	1350632.9881	480994	1350633	34.7649	-0.0119
742	481162.0884	1350634.6172	481127	1350634	35.0884	0.6172
743	481295.4118	1350636.2466	481260	1350636	35.4118	0.2466
744	481428.7352	1350637.8761	481394	1350637	34.7352	0.8761
745	481562.0587	1350639.5113	481527	1350639	35.0587	0.5113
746	481668.7174	1350640.8080	481660	1350641	8.7174	-0.1920
747	481828.7054	1350642.7702	481794	1350642	34.7054	0.7702
748	481988.6935	1350644.7187	481927	1350644	61.6935	0.7187
749	482095.3523	1350646.0287	482060	1350646	35.3523	0.0287
750	482228.6757	1350647.6581	482194	1350647	34.6757	0.6581
751	482361.9992	1350649.2811	482327	1350649	34.9992	0.2811
752	482495.3226	1350650.9106	482460	1350650	35.3226	0.9106
753	482628.6460	1350652.5400	482594	1350652	34.6460	0.5400
754	482761.9695	1350654.1691	482727	1350654	34.9695	0.1691
755	482895.2928	1350655.7986	482860	1350655	35.2928	0.7986
756	483028.6162	1350657.4280	482993	1350657	35.6162	0.4280

Revised Table for
Drawing E-1 Pole Schedule

K Boothwerth
8/14/00

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 OF 2	(6) DATE 2 August 2000
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 009Rmb 20111-010R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Backup Ring Material		(11) DCN NO.: 20111-021

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Specifications 20111-TS-0001	02605, 3.04 H	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Specifications denote using Type Schedule 40 carbon steel lap joint flanges. The piping manufacture suggests using 150 psi ductile iron lap joint flanges for this application. The ductile is equilivent in strength and commonly used in these applications. Please advise on material selection.

(10) REQUESTOR: David R. Opalka DRO The STAVER Group, Inc.	DATE: 8/2/00	(12) CE / PE MW Griffin	DATE: 8/03/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES MWG 8/3/00 (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

See Page 2 of 2 for proposed change.

KWASI BADU-TWENEBOAH, GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 8/10/00 Kwasi Badu-Tweneboah, GeoSyntec [ ] FIT [ ] FORM [X] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) 4 James C. Jenkins	DATE: 8/22/00
(18) CONSTRUCTION CONCURRENCE DATE: PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19) 8/22/00	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

3-F-4259
REV. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED
COPY NO. C011

DCN No. 20111-021
Project No. 20111
OSDF Enhanced Permanent Leachate Transmission System

Replace "Type Schedule 40 carbon steel" with "ductile iron" in Parts 3.05H and 3.05I of Section 02605 of Technical Specifications

The ductile iron lap joint flanges shall meet the requirements of the Technical Specifications.

K Boothroyd
8/10/00

RCI/DCN FORM ORIGINAL

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 of 8	(6) DATE
20111	641		8/3/2000

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Valve House Ventilation Fan Flow Switch

(11) DCN NO.: 20111-022

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Design Change Notice	20111-011	0	
Drawing – Valve House Electrical Details	90X-6000-E-00261	0	E-4
Drawing – Control Valve House Electrical Details	90X-6000-E-00262	0	E-5
Drawing – Valve House & Control Valve House General Layouts	90X-6000-G-00251	0	G-14
Drawing – Valve House & Control Valve House Mechanical Details I	90X-6000-M-00266	0	M-5

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Ventilation supply fan for Valve Houses 1 thru 6 and Control Valve House has no malfunction indicator.

Proposed Change: Add air flow switch on supply fan discharge and low flow indicator light & sign on valve house building exterior. (See information on page 2)

Justification: Recommendation by Fluor Fernald Industrial Hygiene (Memo M:2000-0038)

(10) REQUESTOR: M. W. Griffin MW Griffin Fluor Fernald DATE: 8/3/00

(12) CE / PE J. C. Jenkins James C. Jenkins DATE: 8/8/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

K Badu-Tweneboah

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 8/9/00

K Badu-Tweneboah

KWASI BADU-TWENEBOAH, GEOSYNTEC

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LT52

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 8/22/00

PERFORMANCE GRADE: (17) 4 James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

JR Hughes 8/22/00

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

F-4259
V. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO. C011

Project: 20111
S/C: 641
DCN: 20111-022

Valve House Ventilation Fan Flow Switch
(Valve Houses 1 thru 6 and Control Valve House)

SCOPE

1. Install air flow switch and associated duct, per switch manufacturer's installation instructions, on supply fan discharge.

   Air Flow Switch: McMaster-Carr catalog # 1783K13, paddle-style air flow switch

2. Install weatherproof, flashing amber light (approximately 4" dia.) on valve house exterior wall, next to entry doors, about 5' height. Install light test pushbutton and information sign just below the light.

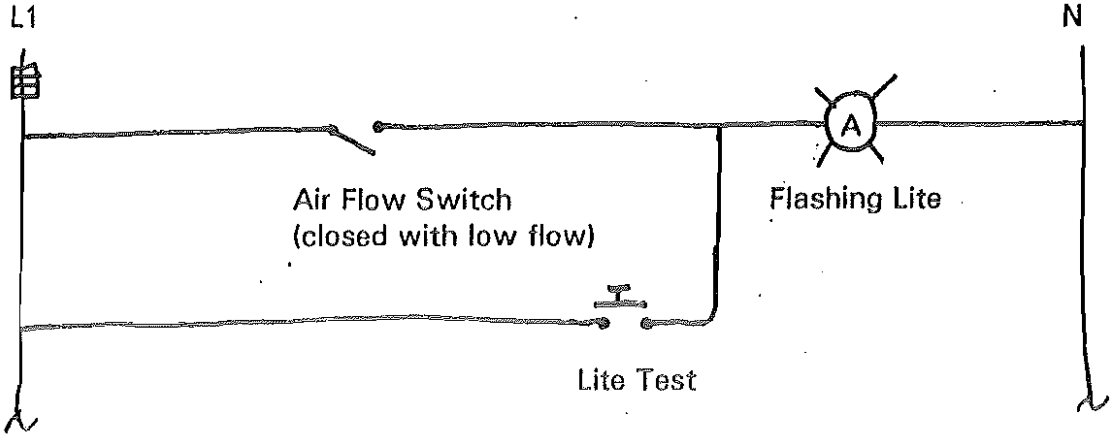
3. Install associated wiring and conduit from switch to low flow indicator light.

Sign: Appx. 16" x 8"

LOW VENTILATION

CONTACT INDUSTRIAL HYGIENE PRIOR TO ENTRY INTO BUILDING

Electrical:



Pg 388

PROD#7284_Vol.5

DCN No. 20111-022

Gas Mt

- Plastic b
- Nylon, T
  steel, an

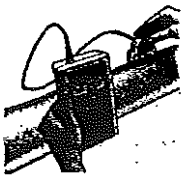
Flow Range	Each		
In sccm (Standard Cubic Centimeters per Minute)			
0-10	4145K1	$603.82	4145K61 ..... $635.88
0-100	4145K2	496.95	4145K62 ..... 529.01
0-500	4145K3	496.95	4145K53 ..... 529.01
In slm (Standard Liters per Minute)			
0-1	4145K4	496.95	4145K54 ..... 529.01
0-20	4145K5	496.95	4145K55 ..... 529.01
0-40	4145K6	496.95	4145K56 ..... 529.01

- Teflon, Type 304 and Type 316 stainless steel wetted parts

Flow Range, gpm	Pipe Size, NPT		
0.1-1.4	¼" Male	9147K11	$2343
0.23-5.5	⅜" Male	9147K12	2343
0.52-12.5	½" Male	9147K13	2343
0.92-22	¾" Male	9147K14	2343
2.07-50	1" Male	9147K15	2343

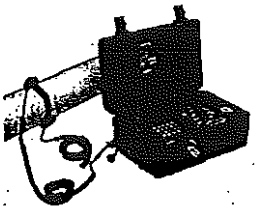
Ultrasonic Flowmeters

By measuring flow from the outside of a pipe, ultrasonic flowmeters never actually come in contact with the liquid in a pipe. These "non-invasive" meters offer several advantages: 1) They don't restrict flow like other flowmeters can; 2) they work well with liquids containing solids that would clog other flowmeters; 3) they're ideal in situations where it's not possible or practical to get inside a pipe.



Handheld Flowmeter—Portable flowmeter measures the velocity of liquid flow in a pipe (to convert velocity into a flow rate, multiply velocity × cross-sectional area of the pipe). It has one transducer with 6½-ft. cord to send and receive signals, a four-digit LCD display, and a NEMA 12X, ABS plastic body. Operates on four AA alkaline batteries (included). Accuracy is ±2%. Temperature range is -28° to +140° F.

42195K8 ..... Each $902.90



Deluxe Flowmeter—Measures fluid velocity in a pipe and displays flow rate in several user-selectable units of measure. It's field-programmable with an easy-to-use menu-driven interface. Separate transducers strapped onto the outside of the pipe send and receive ultrasonic signals. Transducers come with 20 feet of extractable cord. The display is a 2-line 20-character alphanumeric LCD readout, and is housed in a NEMA 4 ABS plastic body. Flowmeter produces a 4-20 mA output signal for use with a remote display. Operates up to eight hours on rechargeable batteries (included) and comes with a 110 VAC charging adapter plug. Accuracy is ±2%. Transducer temperature range is -40° to +180° F, and transmitter temperature range is -22° to +160° F.

42125K6 ..... Each $4459.

Paddle-Style Liquid Flow Switches

Standard

Easy-to-use paddle flow switches install directly into a threaded fitting in horizontal pipe runs of liquid processes. The paddle extends down into the flow and actuates a SPDT switch when flow reaches set point. The switch enclosure is sealed to prevent damage from leaks. Switches are rated 7.4 amps @ 120 VAC and 3.7 amps @ 240 VAC. UL listed and CSA certified. Accuracy is ±10%. Maximum temperature is 300° F unless noted.

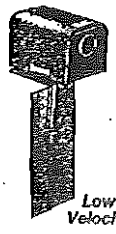
Standard switches fit 1" to 6" pipe ID and have 1" NPT male connections. Set point range is 0 to 166 gpm unless noted.

Heavy-duty switches fit 1¼" to 16" pipe ID and have 1¼" NPT male connections. Set point range is 5 to 998 gpm.

Enclosure	Body Material	Paddle Material	Max. Press., psi		Each
Standard					
NEMA 1	Brass	Monel	150	4971K3	$91.7
NEMA 1	Brass	Type 302 SS	150	4971K6	105.8
NEMA 1	Type 316 SS	Monel	150	4971K4	279.2
NEMA 4X	Brass	Monel	150	4971K5▲	126.9
Heavy Duty					
NEMA 1	Brass	Bronze	300	4939K1	242.7
NEMA 1	Type 316 SS	Type 302 SS	1000	4939K2	406.5
NEMA 4X	Brass	Bronze	300	4939K3	297.8
NEMA 4X	Type 316 SS	Type 302 SS	1000	4939K4	472.3

▲ Maximum temperature is 225° F; set point range is 5 to 245 gpm.

Paddle-Style Air-Flow Switches



Low Velocity

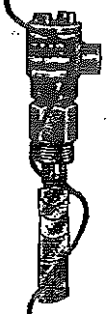
Adjustable switches detect air flow in ducts. For horizontal mounting applications only.

Low Velocity—Has a SPDT switch rated 16 amps @ 120 VAC and 8 amps @ 240 VAC. The paddle is Type 316 stainless steel, measures 3⅛" Wd. × 6⅞" Ht., and may be trimmed to fit duct ID. Unit has a NEMA 1 steel enclosure with a ⅞" hole for ½" conduit and a 1 3/32" knockout ring for ¾" conduit. Comes with a gasket for mounting. UL listed. Accuracy is ±10%. Maximum temperature is 104° F.

High Velocity—Has a SPDT switch rated 1 amp @ 28 VDC and 5 amps @ 250 VAC. Eight interchangeable vanes let you control set point (the largest vane extends 2½" into the duct). Switch has an aluminum enclosure with a ⅛" to ⅝" diameter hole for electrical conduit connection. Comes with a 10-32 × ¼" steel socket screw for duct connection. Accuracy is ±15%. Maximum temperature is 185° F.

	Set Point Range, fpm		Each
Low Velocity	350- 750	1783K13	$90.38
High Velocity	700-4000	2088K12	360.81

Paddle-Style Hazardous-Location Flow Switches



Switches are UL listed and CSA certified Class I, Groups C and D; Class II, Groups E, F, and G. They have 1½" NPT male threads to connect to a tee, threadolet, or flange, and a ¾" NPT female electrical conduit connection. They fit 1½" to 8" diameter pipe. Use in pipes where flow is horizontal.

Paddle is Type 316 stainless steel. Set point is adjustable from 8.8-85 gpm for liquids; 61-360 scfm for gases. Switch is rated 10 amps @ 125/250 VAC. Accuracy is ±15%. Maximum temperature is 275° F.

Body Material	Max. Press., psi	Switch		Each
Brass	1000	SPDT	48005K53	$193.4
Brass	1000	DPDT	48005K54	216.2
Type 316 SS	2000	SPDT	48005K55	282.2
Type 316 SS	2000	DPDT	48005K56	304.9

DCN No. 20111-022 PROD #7284_Vol 5

Po 4 58

FLUOR GLOBAL SERVICES

Memorandum

To:	Mr. Jack Hughes, (MS52-5)	Date:	July 10, 2000
Location:	Fernald	Reference:	N/A
From:	Sandra L. Geibel, (MS-35)	Fernald #:	M:2000-0038
Location:	Fernald	Client:	DOE DE-AC24-92OR21972
Extension:	648-5113	Subject:	Confined Space Determination for OSDF

c: File Record Subject Confined Space Determination for OSDF
Project Number 20111
Industrial Hygiene (MS31)
Mike Griffin (MS52-5)
Everett Henry (MS52-5)
Keith Lanning (MS52-5)
David Moore (MS45)
Don Pfister (MS45)
Chad Replogle (MS31)

As requested Industrial Hygiene has completed a confined space determination for the valve houses, currently under construction, for the OSDF Permanent Leachate Transmission System. The following documents were reviewed during this evaluation:

1) 29 Code of Federal Regulation 1910.146, Permit Required Confined Spaces.
2) Site Safety Performance Requirement 12-3, Permit Required Confined Space Entry.
3) Drawings from the Enhanced Permanent Leachate Transmission System (Contract Number FSC-641).
4) The following proposed design changes: venting the holding tanks to the outdoors, reversing the flow of the building ventilation to provide forced air and, installation of an indicator light on the forced air system showing that air flow is present.

In accordance with site Safety Performance Requirement 12-3, paragraph 1.3.c ("not be designed for continuous occupancy"), the new valve houses do not qualify as a confined space. The valve house design requirements (to include proposed changes) calls for: continuous forced air ventilation at six air changes per hour, heating to 50 degrees Fahrenheit, lighting to meet IES Guidelines, a ceiling fan to ensure proper air circulation, an indicator light showing that air flow is present, information sign (describing that any work other than operations, such as maintenance work, could classify the space as a confined space and to contact IH prior to work), and barrier separation from any and all contaminants that could possibly be introduced into the space from the cell.

DCN No. 20111-022

Supporting information for this decision is attached (obtained from www.Osha-slc.gov/OshDoc/Interp_data/I19951027A.html). The letter of interpretation describes an almost identical situation where the Directorate for Compliance Assistance for OSHA came to the same conclusion.

PLEASE NOTE that this decision is valid as long as the EPA approves the proposed changes (i.e. venting the tank to the outdoors). If, at any time, any of the design requirements listed above are changed, the valve houses will have to be reevaluated for a confined space determination.

It should be noted that Chad Replogle (Confined Space Subject Matter Expert) was consulted on the contents of this letter and was in agreement with the determination and limiting conditions of the determination.

If you have any questions or concerns please feel free to contact me at extension 5113.

sig
OSHA Interpretation 19951027A

DCN No. 20111-022

Pg 6 of 8

OSHA Standards Interpretation and Compliance Letters

10/27/1995 - Determining whether certain spaces meet the definition of a "confined space" according to the Permit-Required Confined Spaces standard.

OSHA Standard Interpretation and Compliance Letters - Table of Contents

- **Record Type:** Interpretation
- **Standard Number:** 1910.146
- **Subject:** Determining whether certain spaces meet the definition of a "confined space" according to the Permit-Required Confined Spaces standard.
- **Information Date:** 10/27/1995

October 27, 1995

Mr. William Taylor
ELB & Associates
605 Eastowne Dr.
Chapel Hill, N.C. 27514

Dear Mr. Taylor:

This is in further response to your letter of March 24, 1994, requesting guidance in determining whether certain spaces meet the definition of a "confined space" according to the Permit-Required Confined Spaces (PRCS) standard. Please accept our apology for the delay in this response.

Question #1 Is a sewer lift station with built in power ventilation system considered designed for human occupancy and thereby NOT a confined space? (Manufacturer's literature included with submission)

The third component in the definition is very clear for those spaces where a known or suspect hazard is considered and eliminated or controlled in the design of a workplace. When hazards are eliminated and/or managed through the application of engineering controls for the safety and health of the humans who will be occupying the space, the employee protective measures, intended by the standard, have been met.

As is the case in the literature provided, the manufacturer has considered the hazards of sewage and its by-products in the design of their pump station so humans can work in the space. Design measures such as barrier separation from the sewage, powered ventilation providing a minimum of 20 air changes an hour, automatic-on and timed (ventilation) control, lighting and even optional heating or air conditioning demonstrates that this unit was designed to accommodate the worker who will enter it.

Using or employing a pump station such as those described in the literature provided would negate the application of the 1910.146 standard for routine entries. Where system repairs would compromise the design intent, the space would have to be reevaluated per 1910.146(c)(6).

Question #2 Is a roll-off refuse container such as the 40 yard open top dumpster considered permit-required, assuming entry is over the side or through a man-way?

DCN No. 20111-022

Pg. 7-8

An open top roll-off refuse container would be considered a confined space when the second element in the standard's definition ("has limited or restricted means for entry and exit") would apply. When the doors are in a secured open position, the containers described above would not be considered a confined space either on or off the transport vehicle. For those open top roll-off containers that do not have doors, the use of a temporary stair meeting the specifications for a fixed industrial stair, securely installed, would provide an unrestricted means of entry or exit.

Question #3 Under what circumstances might dikes be considered confined spaces and, further, when would they be permit spaces?

As a containment structure, the design of a dike will determine whether it falls within the definition of PRCS standard. A dike formed of mounded or sloped earth to a height of 4 to 6 feet would not normally represent a restricted means for entry or exit. Conversely a dike formed of a vertical block or concrete wall of the same height would constitute a restricted means for entry or exit.

The determination of whether a diked area determined to be a confined space would constitute a PRCS would have to be determined based on the hazard(s) present. For example, the potential hazard of engulfment or the potential of a hazardous atmosphere from a heavier-than-air gas or vapor would have to be considered in making the determination.

Question #4 Does 1910.146 apply to rail hopper cars?

Each individual hopper of a rail hopper car should be classified as a confined space, and a permit space if their hazard characteristics fall within the scope of the standard's definitions. The activities which would most likely result in the standard's application would be associated with manufacturing, maintenance, inspection, and repair operations.

Question #5 What is an employer's responsibility and liability when the city-owned permit space on the employer's property is entered by city employees?

This response only addresses responsibility and liability from the standpoint of the Occupational Safety and Health Act and the standards developed from its authority. The employer's responsibility with respect to its duties under 1910.146 is determined in part by whether its workplace contains confined spaces. If the space is located in the employer's workplace, they have the duty under 1910.146(c)(1) to evaluate the space and determine if it is a permit-required space. If it is, but the employer decides to prohibit its employees from entering it, they shall both inform their employees of the existence of the space and take effective measures to prevent them from entering. If the space is controlled by the city and only the city arranges for city employees to enter it and only the city arranges for contractors' employees to enter it, the workplace (property) owner/employer would **not** be considered a "host" employer under 1910.146(c)(8).

Question #6 In a permit space where the only hazard is inwardly converging walls, can a temporary floor above the smaller cross-section area that eliminated fall potential into this area allow an employer to reclassify the space under (c)(7)? What if instead of a floor, entrants wore harness and restraint line that would not permit him to fall to bottom?

A temporary floor, installed so as to carry the anticipated total load of the authorized entrants and would-be rescuers without moving, can be a method of hazard elimination which could be employed to meet the requirements of 1910.146(c)(7). The use of a harness and restraint line in lieu of a temporary floor would not be a basis to reclassify the space because they (harness and restraint line) are a form of hazard control rather than hazard elimination.

Question #7 Where inwardly converging walls converge at a 45-degree angle to a point 4 inches in diameter, too small for someone to get stuck in, would this still be considered permit required? (attached sketch provided)

The inward converging walls alone, in the absence of any other hazard, would not render the

space permit-required. The sketch clearly indicates that an entrant could not be entrapped in the 4-inch diameter cross-section, thus causing asphyxiation. However, the present of other factors such as a potentially unsafe atmosphere or engulfment, would render it permit-required.

Question #8 Is there a maximum time for which a permit can remain valid?

Yes. Paragraph (e)(4) states..."**The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with paragraph (f)(2).**" Paragraph (f)(2) requires the employer to identify the **purpose of the entry.** In summary, the duration of the permit can only be for the time required to accomplish the task for which the permit was issued.

As an example, a permit is issued to inspect a space and the inspection determined that repair was needed. The inspection permit could not be extended to cover the repair. The reasoning behind this is to assure that all potential hazards are identified, protective measures incorporated, and evaluations performed before employees enter. That is not to say that relevant and unchanged information of the inspection permit could not be used if the issuance of the repair permit. A combination inspection/repair permit could be issued **IF AND ONLY when all the potential hazards of ALL the anticipated repair activities are evaluated and addressed** on the permit and during the entry procedures.

Should you have further questions on this response, please contact Mr. Don Kallstrom in the Office of General Industry Compliance Assistance at (202)219-8031.

Sincerely,

DCN No. 20111-022

Pg 8 of 8

John B. Miles, Director
Directorate of Compliance Assistance

◀ OSHA Standard Interpretation and Compliance Letters - Table of Contents

ORIGINAL

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 2	(6) DATE
20111	641		8 / 3 / 2000

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Valve House Tank Vents

(11) DCN NO.: 20111 - 023

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Drawing – Valve House & Control Valve House General Layouts	90X-6000-G-00251	0	G-14
Drawing – Valve House & Control Valve House Mechanical Details I	90X-60000-M-00266	0	M-5

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: LCS & LDS collection tank vents exhaust inside valve houses 1 thru 6.

Proposed Change: Revise tank vent piping design to exhaust outside valve houses. Piping to include gravity check valve to allow potential tank liquid overflow inside valve house.
(See attached details)

Justification: Recommendation by Fluor Fernald Industrial Hygiene (Memo M:2000-038)

(10) REQUESTOR: M. W. Griffin MWGriffin COMPANY: Fluor Fernald DATE: 8/3/00

(12) CE / PE J. C. Jenkins James C. Jenkins DATE: 8/8/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 8/15/00
KWASI BADU-TWEREBOAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LT52

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 8/22/00
PERFORMANCE GRADE: (17) 4 James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19) J D Hughes 8/22/00

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

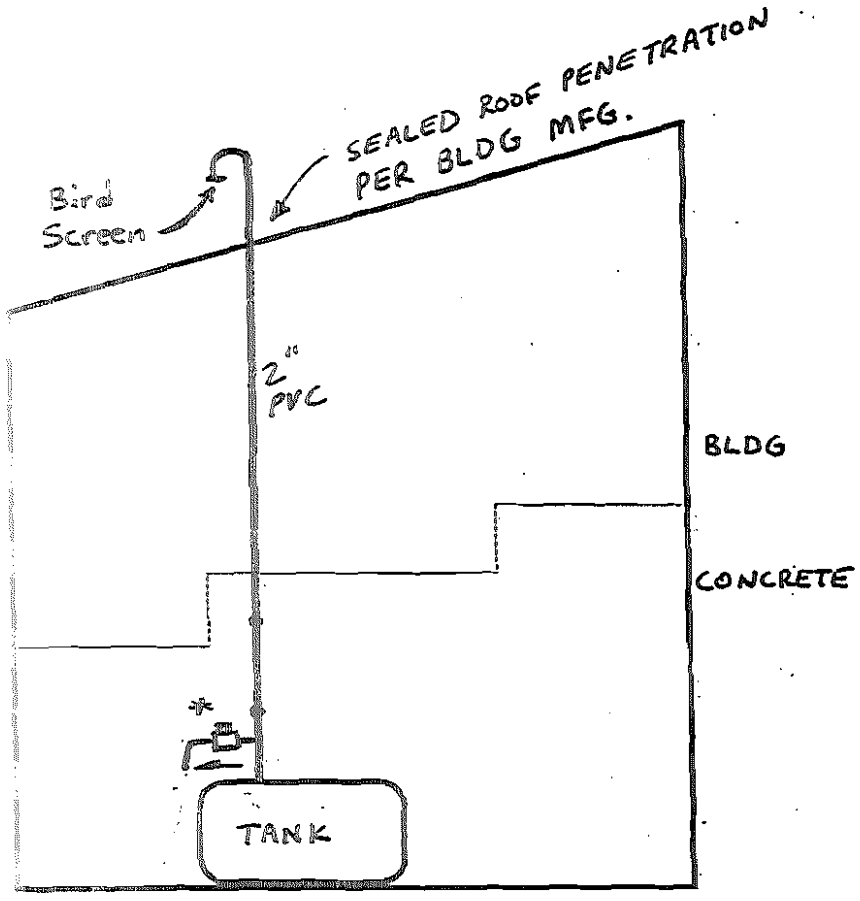
F-4259
V. 5: 10/01/99

ORIGINAL

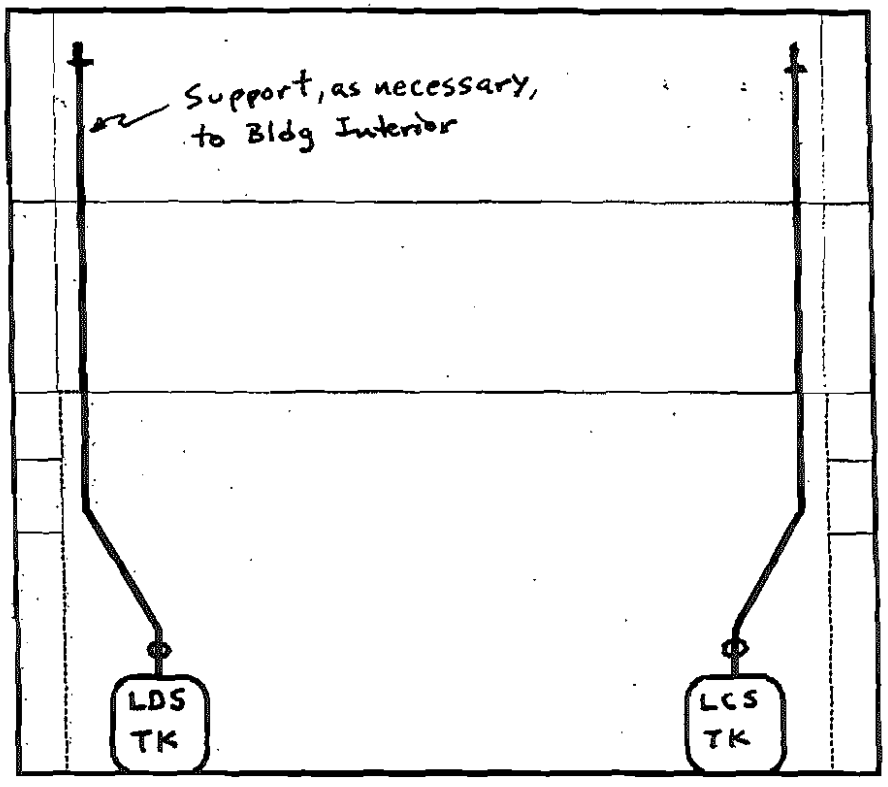
ECDC CONTROLLED COPY NO. C

*2" PVC Check Valve - McMaster-Carr 4670K14

Project: 20111
S/C : 641
DCN : 20111-023 -Pg 2 of 2
VALVE HOUSE TANK VENTS



V.H. - South View

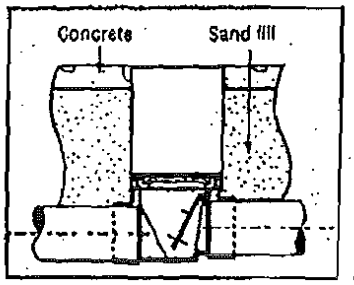


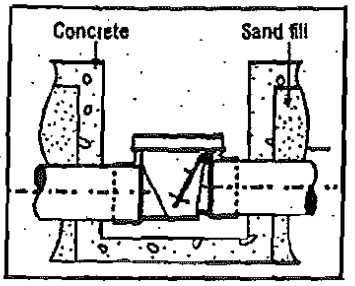
V.H. - WEST VIEW

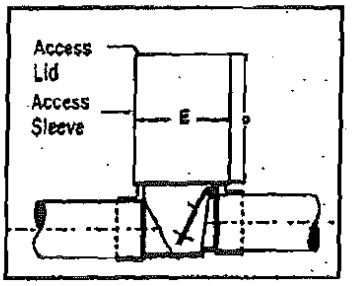
PVC CHECK VALVE

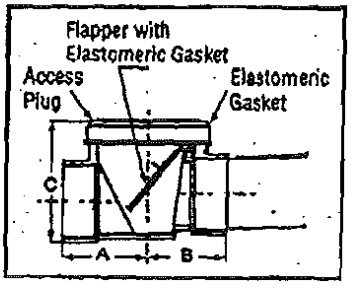
Installation

- Valves are to be installed in nominally horizontal lines only.
- Access opening must be at top.
- Arrows on sides must point in direction of flow.
- When welding solvent connections, ensure that no solvent enters the valve body. After solvent connections have completely cured, remove lid and verify free movement of the valve flapper.
- If the valve is to be used with a sleeve, the top of which is inside the building, or if groundwater levels are expected to rise above the level of the valve, the sleeve should be solvent welded in place.
- When solvent welding a sleeve, care must be taken to ensure that the operation of the cleanout lid is not affected.
- All Canplas Backwater Valves are socket x socket with all sockets being DWV (Schedule 40).
- To connect sewer pipe to the DWV sockets, the following sewer adapter sleeves are available from Canplas:
  2" - PIN 2840;
  3" - PIN 2841;
  4" - PIN 2842;
  6" - PIN 2846;
- Prior to testing or commissioning the system, remove the cleanout lid and check the flapper lid for freedom of movement.









Dimensions

PART NO.	SIZE	JOINT	A	B	C	D	E	CARTON QUANTITY
3281	1 1/2"	SxS	2 3/16"	2"	3 7/8"			12
PVC → 3282	2"	SxS	2 7/16"	2 1/16"	3 7/8"			12
3283	3"	SxS	3 7/8"	3 1/2"	6"			4
3284	4"	SxS	5 3/8"	5 3/8"	6 3/4"			2
3287	3"	SxS	3 7/8"	3 1/2"	6"	16"	5"	2
3285	4"	SxS	5 3/8"	5 3/8"	6 3/4"	16"	7 3/4"	1
3286†	6"	SxS	7 11/16	7 7/16	10 1/8			1

* Sleeve can be cut from 10" diameter S.D.R. 35 pipe ** Sleeve lid is Canplas part # 3286-6 (15 per carton)

Approvals

CSA Certified to B181.1 & B181.2
BNQ Certified to 3632.670
IAPMO Approved
† Approvals pending

SBCCI Approved
City of L.A. Approved
State of Wisconsin Approved

Sample Specification

All Backwater Valves 1 1/2" through 6" shall be Canplas ABS or PVC Horizontal In-Line Backwater Valves, conforming to CSA, BNQ, IAPMO or other locally recognized standards.

FLUOR GLOBAL SERVICES

Memorandum

To:	Mr. Jack Hughes, (MS52-5)	Date:	July 10, 2000
Location:	Fernald	Reference:	N/A
From:	Sandra L. Geibel, (MS-35)	Fernald #:	M:2000-0038
Location:	Fernald	Client:	DOE DE-AC24-92OR21972
Extension:	648-5113	Subject:	Confined Space Determination for OSDF

c: File Record Subject Confined Space Determination for OSDF
Project Number 20111
Industrial Hygiene (MS31)
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Chad Replogle (MS31)

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3) Drawings from the Enhanced Permanent Leachate Transmission System (Contract Number FSC-641).
4) The following proposed design changes: venting the holding tanks to the outdoors, reversing the flow of the building ventilation to provide forced air and, installation of an indicator light on the forced air system showing that air flow is present.

In accordance with site Safety Performance Requirement 12-3, paragraph 1.3.c ("not be designed for continuous occupancy"), the new valve houses do not qualify as a confined space. The valve house design requirements (to include proposed changes) calls for: continuous forced air ventilation at six air changes per hour, heating to 50 degrees Fahrenheit, lighting to meet IES Guidelines, a ceiling fan to ensure proper air circulation, an indicator light showing that air flow is present, information sign (describing that any work other than operations, such as maintenance work, could classify the space as a confined space and to contact IH prior to work), and barrier separation from any and all contaminants that could possibly be introduced into the space from the cell.

Supporting information for this decision is attached (obtained from www.Osha-slc.gov/OshDoc/Interp_data/I19951027A.html). The letter of interpretation describes an almost identical situation where the Directorate for Compliance Assistance for OSHA came to the same conclusion.

PLEASE NOTE that this decision is valid as long as the EPA approves the proposed changes (i.e. venting the tank to the outdoors). If, at any time, any of the design requirements listed above are changed, the valve houses will have to be reevaluated for a confined space determination.

It should be noted that Chad Replogle (Confined Space Subject Matter Expert) was consulted on the contents of this letter and was in agreement with the determination and limiting conditions of the determination.

If you have any questions or concerns please feel free to contact me at extension 5113.

slg
OSHA Interpretation 19951027A

OSHA Standards Interpretation and Compliance Letters

10/27/1995 - Determining whether certain spaces meet the definition of a "confined space" according to the Permit-Required Confined Spaces standard.

OSHA Standards Interpretation and Compliance Letters - Table of Contents

- **Record Type:** Interpretation
- **Standard Number:** 1910.146
- **Subject:** Determining whether certain spaces meet the definition of a "confined space" according to the Permit-Required Confined Spaces standard.
- **Information Date:** 10/27/1995

October 27, 1995

Mr. William Taylor
ELB & Associates
605 Eastowne Dr.
Chapel Hill, N.C. 27514

Dear Mr. Taylor:

This is in further response to your letter of March 24, 1994, requesting guidance in determining whether certain spaces meet the definition of a "confined space" according to the Permit-Required Confined Spaces (PRCS) standard. Please accept our apology for the delay in this response.

Question #1 Is a sewer lift station with built in power ventilation system considered designed for human occupancy and thereby NOT a confined space? (Manufacturer's literature included with submission)

The third component in the definition is very clear for those spaces where a known or suspect hazard is considered and eliminated or controlled in the design of a workplace. When hazards are eliminated and/or managed through the application of engineering controls for the safety and health of the humans who will be occupying the space, the employee protective measures, intended by the standard, have been met.

As is the case in the literature provided, the manufacturer has considered the hazards of sewage and its by-products in the design of their pump station so humans can work in the space. Design measures such as barrier separation from the sewage, powered ventilation providing a minimum of 20 air changes an hour, automatic-on and timed (ventilation) control, lighting and even optional heating or air conditioning demonstrates that this unit was designed to accommodate the worker who will enter it.

Using or employing a pump station such as those described in the literature provided would negate the application of the 1910.146 standard for routine entries. Where system repairs would compromise the design intent, the space would have to be reevaluated per 1910.146(c)(6).

Question #2 Is a roll-off refuse container such as the 40 yard open top dumpster considered permit-required, assuming entry is over the side or through a man-way?

An open top roll-off refuse container would be considered a confined space when the second element in the standard's definition ("has limited or restricted means for entry and exit") would apply. When the doors are in a secured open position, the containers described above would not be considered a confined space either on or off the transport vehicle. For those open top roll-off containers that do not have doors, the use of a temporary stair meeting the specifications for a fixed industrial stair, securely installed, would provide an unrestricted means of entry or exit.

Question #3 Under what circumstances might dikes be considered confined spaces and, further, when would they be permit spaces?

As a containment structure, the design of a dike will determine whether it falls within the definition of PRCS standard. A dike formed of mounded or sloped earth to a height of 4 to 6 feet would not normally represent a restricted means for entry or exit. Conversely a dike formed of a vertical block or concrete wall of the same height would constitute a restricted means for entry or exit.

The determination of whether a diked area determined to be a confined space would constitute a PRCS would have to be determined based on the hazard(s) present. For example, the potential hazard of engulfment or the potential of a hazardous atmosphere from a heavier-than-air gas or vapor would have to be considered in making the determination.

Question #4 Does 1910.146 apply to rail hopper cars?

Each individual hopper of a rail hopper car should be classified as a confined space, and a permit space if their hazard characteristics fall within the scope of the standard's definitions. The activities which would most likely result in the standard's application would be associated with manufacturing, maintenance, inspection, and repair operations.

Question #5 What is an employer's responsibility and liability when the city-owned permit space on the employer's property is entered by city employees?

This response only addresses responsibility and liability from the standpoint of the Occupational Safety and Health Act and the standards developed from its authority. The employer's responsibility with respect to its duties under 1910.146 is determined in part by whether its workplace contains confined spaces. If the space is located in the employer's workplace, they have the duty under 1910.146(c)(1) to evaluate the space and determine if it is a permit-required space. If it is, but the employer decides to prohibit its employees from entering it, they shall both inform their employees of the existence of the space and take effective measures to prevent them from entering. If the space is controlled by the city and only the city arranges for city employees to enter it and only the city arranges for contractors' employees to enter it, the workplace (property) owner/employer would **not** be considered a "host" employer under 1910.146(c)(8).

Question #6 In a permit space where the only hazard is inwardly converging walls, can a temporary floor above the smaller cross-section area that eliminated fall potential into this area allow an employer to reclassify the space under (c)(7)? What if instead of a floor, entrants wore harness and restraint line that would not permit him to fall to bottom?

A temporary floor, installed so as to carry the anticipated total load of the authorized entrants and would-be rescuers without moving, can be a method of hazard elimination which could be employed to meet the requirements of 1910.146(c)(7). The use of a harness and restraint line in lieu of a temporary floor would not be a basis to reclassify the space because they (harness and restraint line) are a form of hazard control rather than hazard elimination.

Question #7 Where inwardly converging walls converge at a 45-degree angle to a point 4 inches in diameter, too small for someone to get stuck in, would this still be considered permit required? (attached sketch provided)

The inward converging walls alone, in the absence of any other hazard, would not render the

space permit-required. The sketch clearly indicates that an entrant could not be entrapped in the 4-inch diameter cross-section, thus causing asphyxiation. However, the present of other factors such as a potentially unsafe atmosphere or engulfment, would render it permit-required.

Question #8 Is there a maximum time for which a permit can remain valid?

Yes. Paragraph (e)(4) states..."**The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with paragraph (f)(2).**" Paragraph (f)(2) requires the employer to identify the **purpose of the entry.** In summary, the duration of the permit can only be for the time required to accomplish the task for which the permit was issued.

As an example, a permit is issued to inspect a space and the inspection determined that repair was needed. The inspection permit could not be extended to cover the repair. The reasoning behind this is to assure that all potential hazards are identified, protective measures incorporated, and evaluations performed before employees enter. That is not to say that relevant and unchanged information of the inspection permit could not be used if the issuance of the repair permit. A combination inspection/repair permit could be issued **IF AND ONLY when all the potential hazards of ALL the anticipated repair activities are evaluated and addressed** on the permit and during the entry procedures.

Should you have further questions on this response, please contact Mr. Don Kallstrom in the Office of General Industry Compliance Assistance at (202)219-8031.

Sincerely,

John B. Miles, Director
Directorate of Compliance Assistance

◀ OSHA Standard Interpretation and Compliance Letters - Table of Contents

RECEIVED
AUG 28 2000

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 3	(6) DATE
20111	641		8 / 7 / 2000

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: HDPE Piping Centralizers

(11) DCN NO.: 20111 - 024

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Technical Specifications	20111-TS-001	0	Section 02605, 2.04 E

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Referenced specification section states: "... furnish centralizers to provide a continuous annular space between the carrier and the containment pipes in conformance with the recommendations of the Manufacturer or with a maximum spacing of 4 feet, whichever is less."

Proposed Change: Revise maximum spacing of centralizers to 5 feet maximum.

Justification: Piping supplier has provided manufacturer's technical data (attached) that demonstrates that proposed, standard 5-feet spacing is structurally acceptable.

(10) REQUESTOR: M. W. Griffin — Fluor Fernald — DATE: 8-7-00

(12) CE / PE: J. C. Jenkins — DATE: 8/8/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES

(14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 8/9/00

KWASI BADU-THENEBUAH, GEOSYNTEC

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 8/25/00

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE: 8/27/00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

S-F-4259
REV. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO.

011

DRISCOPIPE

DCN No. 20111-024

DRISCOPIPE® SYSTEMS INSTALLATION

Driscopipe products have been installed in many applications above and below ground. Polyethylene pipe has been used to cross land, lakes, deserts, bogs, and arctic tundra. Each installation requires thorough consideration of the environment in which the pipe is being installed.

Typical pipe installations can be categorized as one of seven types. The following pages discuss design details for each type of installation.

TYPE 1: Supported or Suspended Pipelines
TYPE 2: Overland Pipelines
TYPE 3: Marine Pipelines
TYPE 4: Water Surface Pipelines
TYPE 5: Marsh Pipelines
TYPE 6: Siliplined Pipelines
TYPE 7: Buried Pipelines

SUPPORTED OR SUSPENDED PIPELINES

Horizontally supported pipelines are affected by the weight of the pipe and its contents between supports. When the sag or deflection between supports is minimized, the stress in the pipe wall can be controlled. Supports should be spaced to limit the mid-span deflection to about ¼" using a simple, continuous beam analysis.

Supports should cradle the pipe for at least 4" or 1.5 times the pipe diameter, whichever is greater. A minimum of 120° of the pipe's circumference should be supported. The supports should be free of sharp edges.

Often, supported pipelines are installed outdoors. These installations are exposed to temperature changes due to weather. If possible, a supported or suspended pipeline should be installed as near its maximum operating temperature as practical (or in the hottest weather).

When a supported system is warmer than its installation temperature, the pipe will expand. As the pipe increases in length, lateral deflection or "snaking" will occur between restraints. The total amount of expansion that will occur depends on the pipe's length and the temperature increase above the system's installation temperature. While the total amount of expansion in a pipe cannot be changed, the designer can limit the deflection in a section of the pipe by selecting appropriate anchoring points.

The pipe must be restrained at all fittings and can be restrained at each support. Clamping the pipe at each support is recommended to limit deflections due to expansion. If the support is designed as an anchor point, it must be capable of restraining the pipe. If the pipeline is designed to move during expansion, the supports should provide a guide without restraint in the direction of movement.

PIPE SUPPORT SPACING Figures 9 through 13 give the required design support spacing for various DRs and pipe diameters. The distance between supports is based upon a continuous beam analysis and a mid-span deflection of 0.25" when the pipe is filled with water.

Figure 9: Pipe Support Spacing for DR32.5

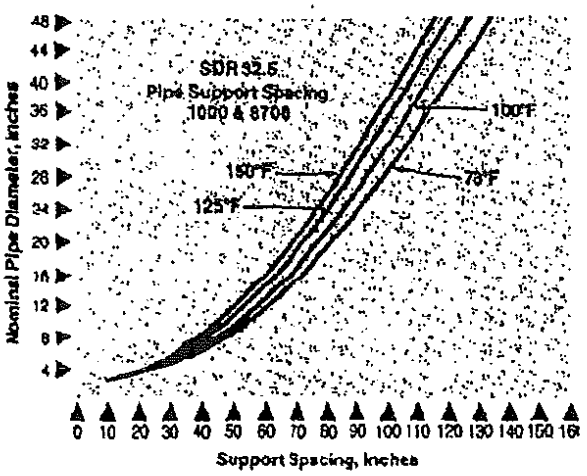


Figure 10: Pipe Support Spacing for DR26

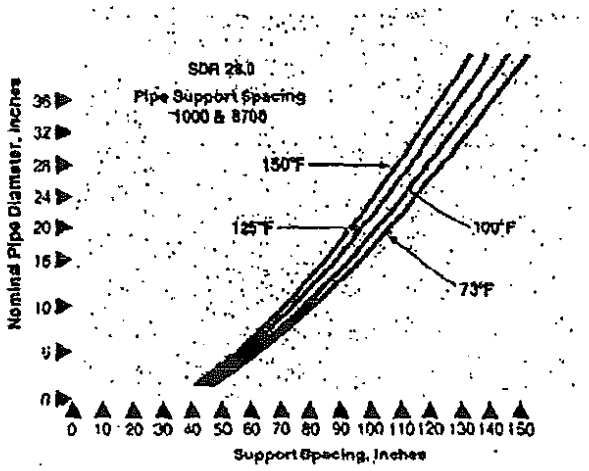


Figure 11: Pipe Support Spacing for DR17

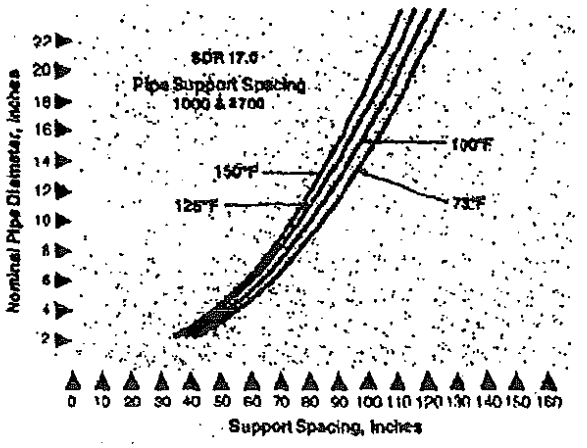


Figure 12: Pipe Support Spacing for DR11

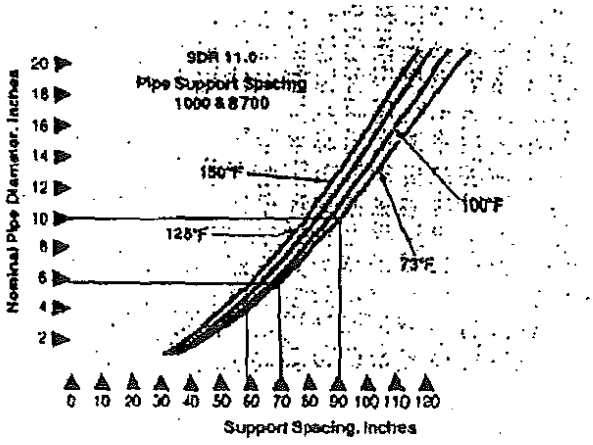
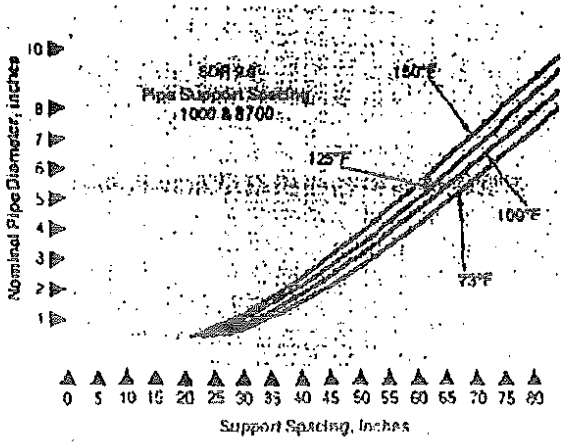


Figure 13: Pipe Support Spacing for DR9



RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 21	(6) DATE
20111	641		8/24/2000

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Valve House Sump Alarms Grouping

(11) DCN NO.: 20111 - 25

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Engineering Drawing	92X-5900-E-00325	1	
Engineering Drawing	92X-5900-E-00323	1	
Engineering Drawing	90X-6000-E-00259	0	
Engineering Drawing	90X-6000-E-00260	0	
Engineering Drawing	90X-6000-E-00261	0	
Engineering Drawing	90X-6000-E-00262	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: Valve House liquid level switches activate local alarm indication inside each valve house.

Proposed Change: Install wiring from VHs 1 – 6, Control Valve House, and Permanent Lift Station (PLS) sump level switches to new alarm Panel at PLS. Group alarms at new panel to provide a single "trouble" alarm indication at AWWT via existing alarm system.

Justification: In the event of a significant piping leak or break in the valve houses, the grouped alarm will inform operating personnel at AWWT (manned 24 hrs/day) of the alarm, such that immediate response can be performed. This will reduce the potential of Liquid (leachate) accumulating in the VH containment to an overflow level.

(10) REQUESTOR: M. W. Griffin — Fluor Fernald — DATE: 8/24/00

(12) CE / PE: J. C. Jenkins — DATE: 8/25/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES

(14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 9/28/00

KURASH BADU-TWEREBOAH, GEOSYNTEC

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 9/28/00

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE: 9/28/00 J. R. HUGHES

PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO. C011

Ohio EPA

State of Ohio Environmental Protection Agency

Southwest District Office

Post-it® Fax Note 7671	Date 5/23/00	# of pages ▶ 1
To Jay Jones	From Tom Ontko	
Co./Dept. JDOE	Co. Ohio EPA	
Phone #	Phone # 937-285-6073	
Fax # x3076	Fax #	

MEMORANDUM

TO J D Chiou SDFP Manager, Fluor Fernald
FROM Tom Ontko Ohio EPA Tom Ontko
DATE September 12, 2000
RE EPLTS DCN 20111-25

DCN 20111-25 adds wiring so that liquid level switches in the sumps in the Valve Houses will activate alarms at a new panel in the Permanent Lift Station. This alarm is interfaced with the existing trouble alarm to alert personnel at AWWT. The operator then can determine which Valve House has the problem by going to the PLS panel. The Ohio EPA approves this change.

Approval of this change does not constitute an assurance that the proposed facilities will operate in compliance with Ohio laws and regulations or that these facilities will perform in a fashion that achieves the objectives of the Operable Unit 2 Record of Decision.

TO: Jim Jenkins

x4029

Fernald
Environmental Restoration
Management Corporation
PO Box 398704
Cincinnati, Ohio 45239-8704
(513) 738 6200

ENGINEERING CALCULATION

PROJECT NUMBER:	RES 4056
BY:	JEK
DATE:	9-21-00
PAGE:	OF
REVISED:	

SUBJECT: NOTES FOR VALVE HOUSES SUMPS ANNUNCATION

1) INSTALL A NEW ANNUNICATOR IN A WEATHER-PROOF ENCLOSURE AT THE PERMANENT LIFT STATION.
2) POWER THE ANNUNICATOR FROM DP-1, 20 AMP - 120 VAC. CIR.
3) CONNECT THE CONTROL HOUSE AND 6 - VALVE HOUSE SUMP WIRING BY AERIAL WIRING TO THE ANN.
4) CONNECT THE PERMANENT LIFT STATION ALARM TO THE ANN.
5) CONNECT THE ANN. ALARM OUTPUT TO THE AWWT ALARM WIRING IN THE PERMANENT LIFT STATION CONTROL PANEL.
6) THE AERIAL CONTROL WIRING HAS A 120 V AC SIGNAL AND IS INSULATED WITH 600 V INSULATION SO THIS WIRING SHALL BE INSTALLED IN THE 120/480 V SECTION OF POLE WIRING, NOT THE COMM. ZONE.
7) ALL THE CONTROL WIRING SHALL BE SUSPENDED FROM MESSENGER WIRE. SEE DWGS 16X-5500-E-00105 AND -00106 FOR DETAILS ON POLE HARDWARE FOR AERIAL WIRING. NOTE THESE DWGS REF TO THE SUSPENDED CABLE AS ALARM CABLE, THIS IS THE HARDWARE REQUIRED FOR THE CONTROL WIRING.
8) ADD TERMINAL STRIPS TO ANN. ENCLOSURE TO PROVIDE FOR GROUND WIRE CONNECTIONS AND SIGNAL WIRING TO REMOTE CONTACTS.
9) USE SAME 120V CIR. FROM DP-1 FOR ANN. POWER AND CONTACT SIGNALS.
10) ALL WIRING TO BE COPPER #12 AWG WITH 600 V INSULATION UNLESS OTHERWISE STATED.

DCN 20111-25
Pg. 2 of 21

Fernald
Environmental Restoration
Management Corporation
PO Box 398704
Cincinnati, Ohio 45239-8704
(513) 738 6200

ENGINEERING CALCULATION

PROJECT NUMBER:	
BY:	JEK
DATE:	8-17-00
PAGE:	OF
REVISED:	

SUBJECT:

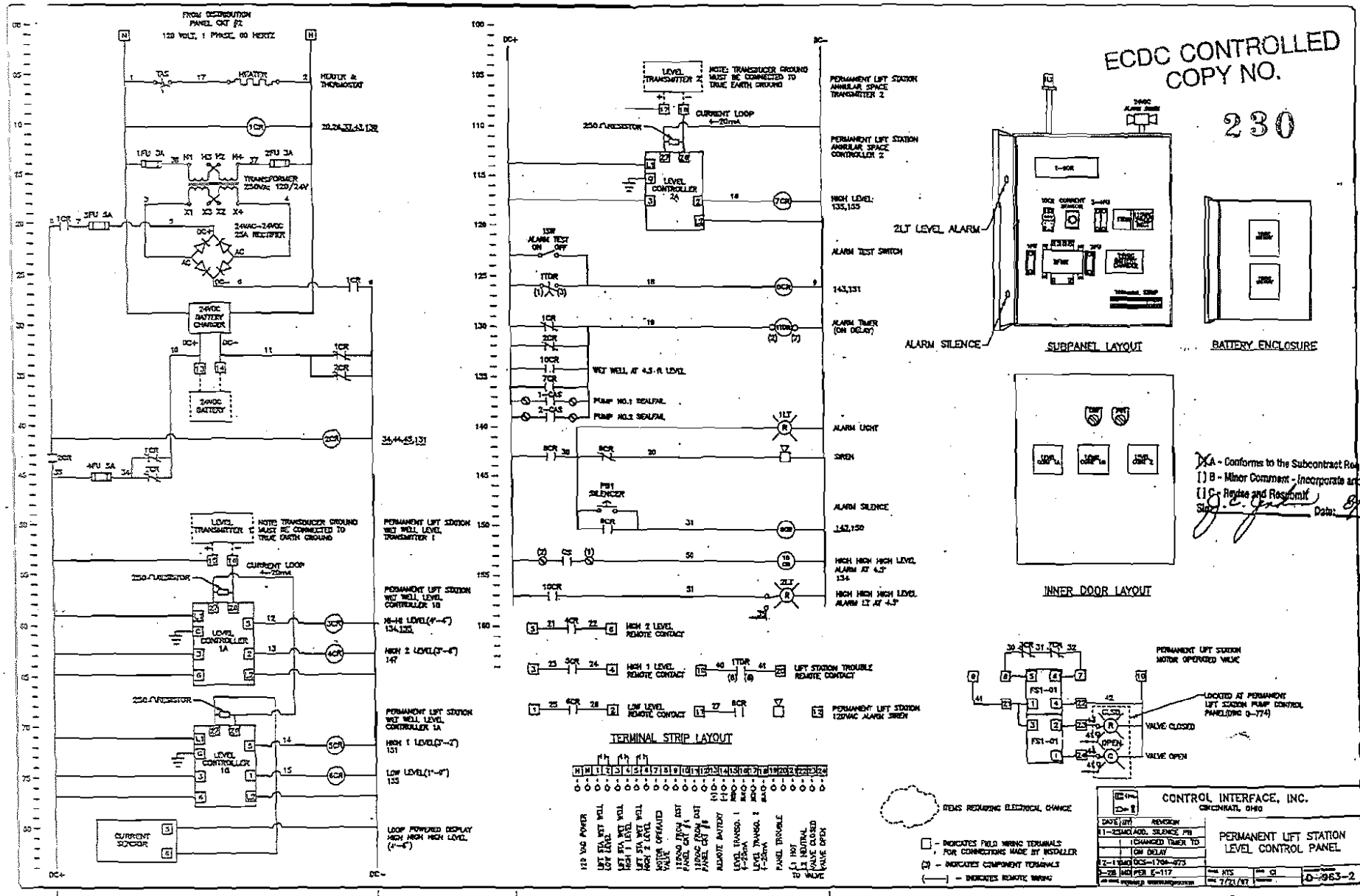
ANN. NAMEPLATE

1	VALVE HOUSE #1 SUMP ALARM
2	VALVE HOUSE #2 SUMP ALARM
3	VALVE HOUSE #3 SUMP ALARM
4	VALVE HOUSE #4 SUMP ALARM
5	VALVE HOUSE #5 SUMP ALARM
6	VALVE HOUSE #6 SUMP ALARM
7	(BLANK)
8	(BLANK)
9	CONTROL VALVE HOUSE SUMP ALARM
10	PERMANENT LIFT STATION ALARM

DCN 20111-25
Pg 3 of 21

ECDC CONTROLLED COPY NO.

230



X A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sign: J. C. [illegible] Date: 8/20/9[illegible]

DCN 20111-25 Pa 3A of 21

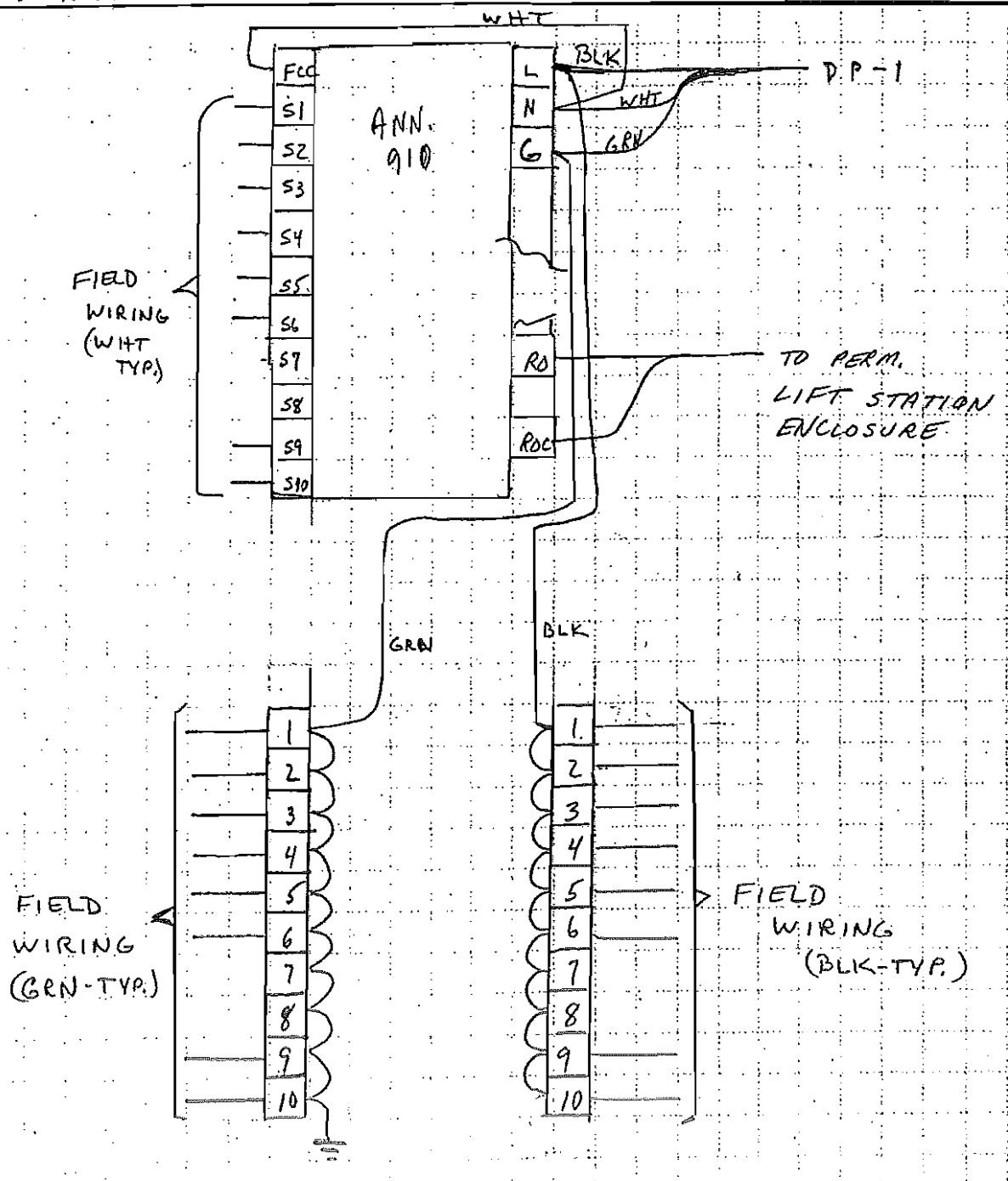
PROD #7284_Vol 5

Fernald Environmental Restoration Management Corporation
PO Box 398704
Cincinnati, Ohio 45239-8704
(513) 738 6200

ENGINEERING CALCULATION

PROJECT NUMBER:	
BY:	JEK
DATE:	9-21-00
PAGE:	OF
REVISED:	

SUBJECT: ANN. WIRING

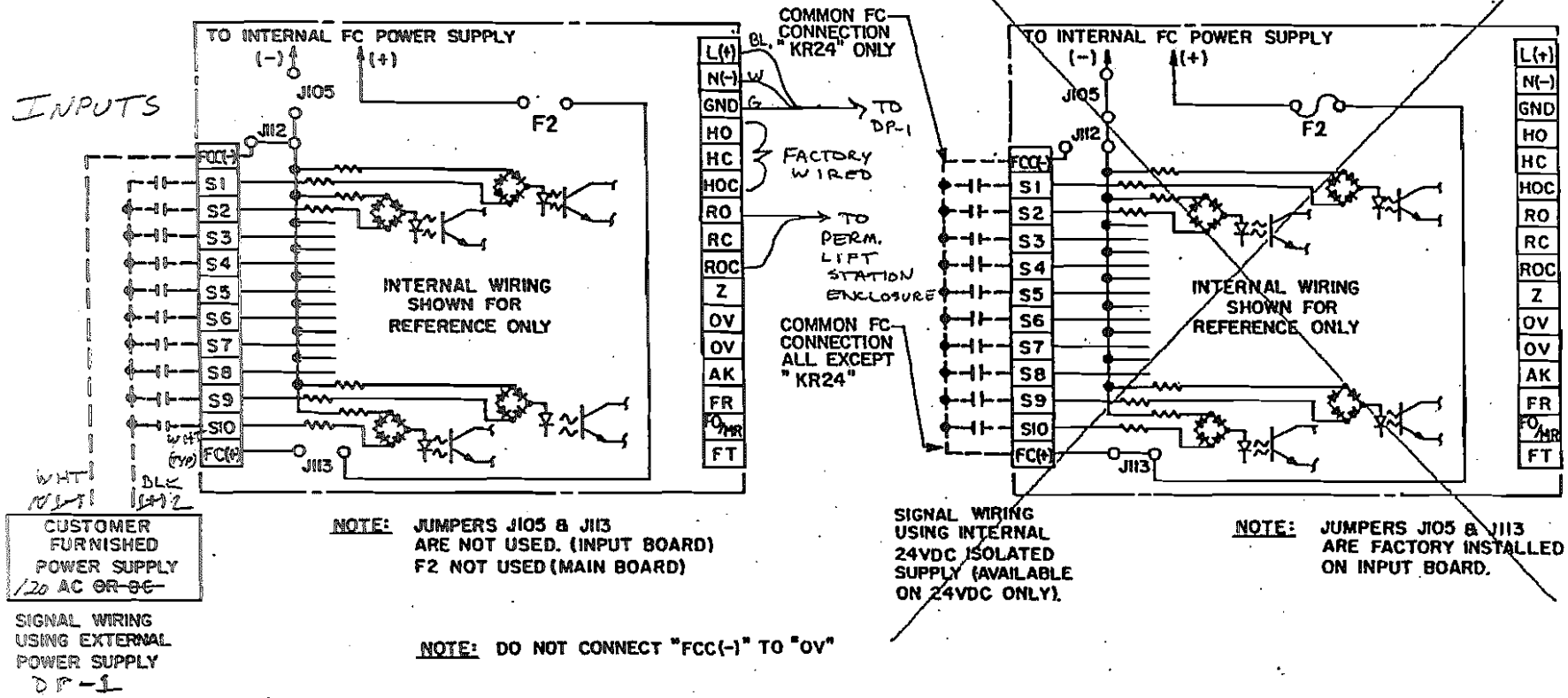


DCN 20111-25

Pg 4 of 21

J. E. Kerl 9-21-00

NOTES:
1) "B" VERSION CARD WILL DE-ENERGIZE AT A HIGHER VOLTAGE THAN STANDARD "KC" UNIT TO COMPENSTATE FOR THE UNDESIREABLE EFFECT OF RESIDUAL VOLTAGE CAUSED BY DISTRIBUTED CAPACITANCE ALONG FIELD CONTACT WIRING (APPROX. 90VAC AND 180VAC FOR 120 & 240VAC UNITS RESPECTIVELY).



NOTE: JUMPERS J105 & J113 ARE NOT USED. (INPUT BOARD) F2 NOT USED (MAIN BOARD)

NOTE: JUMPERS J105 & J113 ARE FACTORY INSTALLED ON INPUT BOARD.

NOTE: DO NOT CONNECT "FCC(-)" TO "OV"

DCN 20111-25 R4A 4-21

TYPE "KC12", "KC24", "KC48", "KC120", "KCB120", "KC125", "KC240", OR "KCB240" (OPTICALLY COUPLED)
WIRING DIAGRAM WITH CUSTOMER SUPPLIED
"FC" VOLTAGE, 12VAC/DC, 24VAC/DC, 48VAC/DC, 120VAC, 125VDC, 240VAC, 250VDC

TYPE "K24" & "KR24" INPUT (OPTICALLY COUPLED)
WIRING DIAGRAM WITH INTERNALLY SUPPLIED "FC" VOLTAGE (24VDC)

REV.	ECN NO.	BY	APPD	DATE
0	7032-4	RSP	RS	7-8-83
1	7032-12	W.W.	RAS	10-4-83
2	8683-11	W.W.	Ba	10-25-83
3	7032-23	WW	JWK	3-22-84
4	7100-28	JS	MG	1/8/87
5	7100-35	LJ	HG	4/14/87
6	10915	SK	PM	7/24/92

DASHED LINES INDICATE CUSTOMER FIELD WIRING

USED ON/REF. DWG'S.	DESCRIPTION
910450-SEQ.-1	SEQUENCE CHARTS, 10 PT. ANN.
910450-TERM.-1	TERMINAL ARRANGMENT

DR RSP | APPD RS | DATE 7-8-83
SCALE —H— | COPYRIGHT 1983
THIRD ANGLE PROJECTION | INCH (mm)

TOLERANCES UNLESS SPECIFIED

INCHES	MILLIMETRES
.X = .04	0.X = 1
.XX = .016	0.XX = 0.4
.XXX = .004	0.XXX = 0.1

ANGLES ±0° 30'

PANALARM LTD.
BURY ST. EDMUNDS
SUFFOLK, ENGLAND

PANALARM
SKOKIE, ILLINOIS, U.S.A.

PANALARM DIV.
MISSISSAUGA
ONTARIO, CANADA

CUSTOMER WIRING DIAGRAM
"KC", "K", & "KR"
INPUTS (OPTICALLY COUPLED)
FOR MODEL 910 ANNUNCIATOR

DWG. NO. 910450-K*-1

SHT. 1 OF 1

RUNNING 40-020

ATTN: JAMES KERL

PER OUR PHONCON

CLEVELAND · COLUMBUS · CINCINNATI · TOLEDO
BRIGHTON, MI · PITTSBURGH, PA

Joan Karpi
CUSTOMER SUPPORT REPRESENTATIVE

JOHNSON EQUIPMENT COMPANY
MFG. AGENTS AND DISTRIBUTORS
7777 Hub Parkway
Valley View, OH 44125

(216) 447-5010
1-800-878-5010
Fax: (216) 447-1038
E-mail: johnsoneq@johnsoneq.com
Web: www.johnsoneq.com

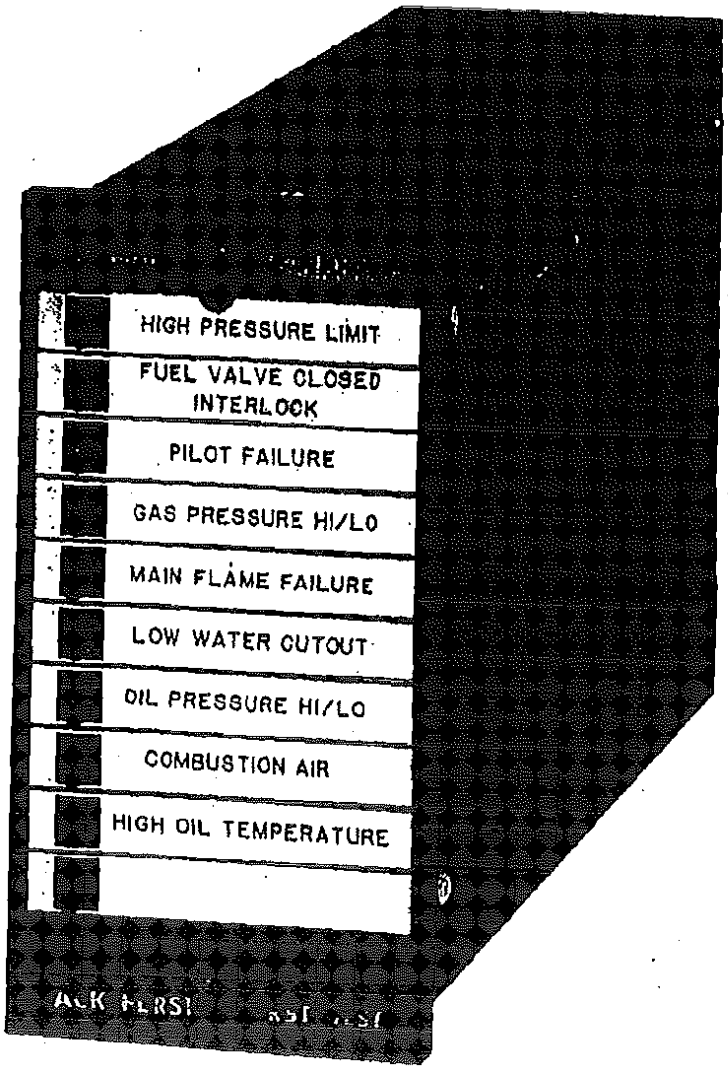
7 Pgs. Total

BULLETIN 910-A

PANALARM®

910 Annunciator

ONE STANDARD SIZE / 10 POINT CONFIGURATION / COMPACT - COMPLETE



- INTEGRAL
  - LED Display
  - Audible (Optional)
  - Control Pushbuttons
  - Power Supply
  - Output Reflash Relay
  - Relay for External Audible
- Ten Alarm Points on One Card
- Dedicated I²L Logic IC Per Point
- NO/NC Signal Contacts
- DIN 43700 Standard
- Seven Operational Sequences

AMETEK
PANALARM DIVISION

DCN 2011-25
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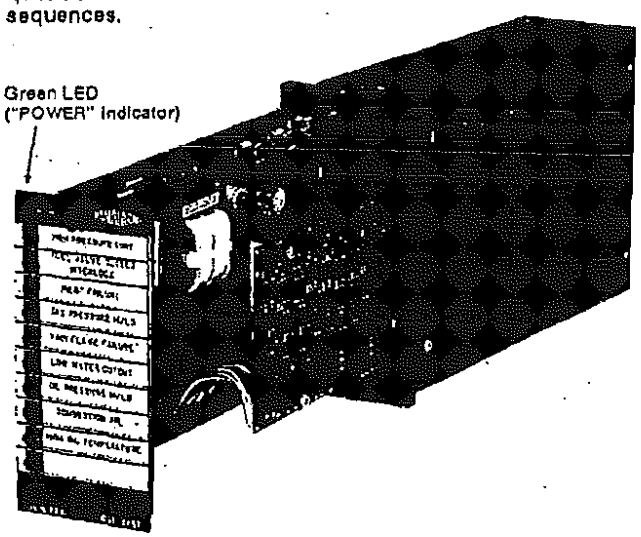
910 ANNUNCIATOR

The PANALARM Model 910 is a compact ten-point annunciator that meets DIN 43700 standard dimensions. A complete integral package includes an LED display, power supply, pushbuttons, two relays (output reflash and common audible). Optional integral horn is also available.

The Model 910 offers a unique combination of economy and small size using microchip I²L logic.

It has normally open/normally closed field contact selectability with ten input points on one logic card. Operational sequences are field selectable; choose from seven available sequences.



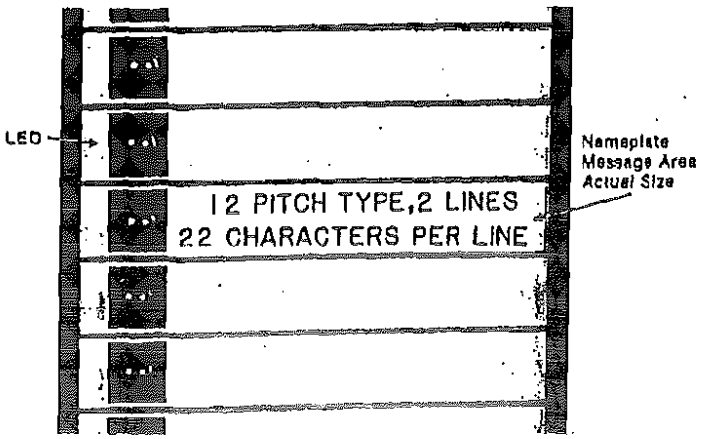
Available operating voltages are 12VDC, 24VDC, 48VDC, 100-280VDC, 120V, 50/60Hz or 230V, 50/60Hz.

A provision for connecting remote pushbuttons is also available on the rear terminal blocks.

Although available as a stand alone annunciator, multiple units can be added for side by side or top and bottom mounting to give a multiple array of visual display points.

LED DISPLAY

One long life LED (light emitting diode) visual indicator is used per point. The LED used in the 910 annunciator has extra brightness for greater visibility.



NAMEPLATE

Nameplate card inserts easily behind front transparent face. Individual alarm point message area is 10mm high × 53mm wide. Messages can be made using a standard office typewriter. Typical 12 pitch letter, gothic type style provides for two lines of 22 characters each.

RELAY OUTPUTS

A relay contact output for operating an external audible device is standard. A second relay contact output (reflash) for signaling a remote annunciator is also available as a standard feature.

Either relay can be field selectable as de-energized or energized during normal for self-policing operation. Environmentally sealed relays are optional. Standard Form C relay contact rating is 5 amps at 110 to 260 VAC or 28 VDC resistive.

OPERATIONAL SEQUENCES

Seven operational sequences are standard; AF, AFNL (Non Lock-In), AM, FR, FRM, TFS and TFSFR. Ordinarily, all 10 points must be the same sequence. However, TFS and AF can be mixed on the same unit. TFSFR and FR can also be mixed. Sequence TFS first-out grouping can be extended to additional units beyond the first ten. Up to 100 points can be connected in a single first-out group.

Operational sequence is field programmable using a combination of 10 "DIP-FIX" switches and 3 jumper blocks. NO/NC signal contact selection is also made via "DIP-FIX" switches.

OPERATIONAL SEQUENCE 'AF' (I.S.A. TYPE A) OPERATIONAL SEQUENCE 'AFNL' (I.S.A. TYPE A-4)		
Input Status	Visual	Audible
Alarm or Test	Flashing	On
Acknowledge	Steady-On	Off
Return To Normal	Off	Off

OPERATIONAL SEQUENCE 'FR' (I.S.A. TYPE A-1-2)		
Input Status	Visual	Audible
Alarm or Test	Flashing	On
Acknowledge	Flashing	Off
Flash Reset	Steady-On	Off
Return To Normal	Off	Off

OPERATIONAL SEQUENCE 'AM' (I.S.A. TYPE M)		
Input Status	Visual	Audible
Alarm or Test	Flashing	On
Acknowledge	Steady-On	Off
Return To Normal	Steady-On	Off
Reset	Off	Off

OPERATIONAL SEQUENCE 'FRM' (I.S.A. TYPE M-1-2)		
Input Status	Visual	Audible
Alarm or Test	Flashing	On
Acknowledge	Flashing	Off
Flash Reset	Steady-On	Off
Return To Normal	Steady-On	Off
Reset	Off	Off

OPERATIONAL SEQUENCE 'TFS' (I.S.A. TYPE F3A-3)			
Input Status	First Visual	Subsequent Visual	Audible
1st Alarm or Test	Interm. Fast Fl.		On
Subsequent Alarm		Fast Flash	On
Acknowledge	Slow Flash	Steady-On	Off
First Reset	Steady-On	Steady-On	Off
Return To Normal	Off	Off	Off

OPERATIONAL SEQUENCE 'TFSFR' (I.S.A. TYPE F3A-1-2-3)			
Input Status	First Visual	Subsequent Visual	Audible
1st Alarm or Test	Interm. Fast Fl.		On
Subsequent Alarm		Fast Flash	On
Acknowledge	Interm. Fast Fl.	Fast Flash	Off
Flash Reset	Slow Flash	Steady-On	Off
First Reset	Steady-On	Steady-On	Off
Return To Normal	Off	Off	Off

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SPECIFICATIONS

Input Power

AC120: 105 to 130 VAC, 50-60 Hz, transformer isolated
AC230: 210 to 260 VAC, 50-60 Hz, transformer isolated
DC24: 24 VDC nominal, 20-30 VDC, converter isolated
DCF12: 12 VDC nominal, 10.5-15 VDC, non-isolated filter
DCF24: 24 VDC nominal, 20-30 VDC, non-isolated filter
DC48: 48 VDC nominal, 40-60 VDC, converter isolated
DC9: 100-280 VDC, converter isolated

DC inputs: 10% Max. allowable ripple.
AC inputs: 100mS Power interrupt buffer
Transformer/converter isolation—1500 VRMS
Power consumption—Less than 10 VA, all models
Flasher—Integral only, no provisions for external SYNC.

Operating Temperature Range ..... 0 to 50°C. Ambient
Humidity ..... 5% to 95% Non-condensing
Storage Temperature Range .....-55°C to +85°C

Signal Inputs

INPUT TYPE	NOMINAL INPUT VOLTAGE	MINIMUM MAXIMUM SIGNAL VOLTAGE	% OF NOMINAL w/o COMPONENT DAMAGE	MAXIMUM CURRENT INPUT	MAXIMUM SERIES RESISTANCE	MINIMUM LEAKAGE RESISTANCE
T12	12VDC	10.5-15	200%	3 mA	1.0K	6.0K
T24	24VDC	20-28	200%	3 mA	6.5K	45K
T48	48VDC	40-56	200%	3 mA	5.0K	65K
T125	125VDC	105-140	135%	3 mA	5.0K	150K
TC24	24VDC	20-28	200%	3 mA	6.5K	45K
TC48	48VDC	40-56	200%	3 maA	5.0K	65K
TC125	125VDC	105-140	135%	3 mA	5.0K	150K
K24	24VDC	20-28	200%	3 mA	10K	25K
KC24	24VAC/VDC	20-28	200%	3 mA	10K	25K
KC48	48VAC/VDC	40-56	200%	3 mA	10K	50K
KC120	120VAC	100-130	200%	3 mA	10K	100K
KC125	125VDC	105-140	200%	3 mA	10K	100K
KC240	240VAC	210-260	150%	3 mA	10K	100K
KC250	250VDC	210-260	110%	3 mA	10K	100K
KM120	120VAC/DC	105-130	110%	17 mA	N/A	N/A
KM240	240VAC/DC	210-250	110%	13 mA	N/A	N/A

Notes:

1. Signal contact series resistance (maximum resistance of wiring and contacts to be recognized as a closed contact).

   Signal input leakage resistance (minimum resistance in parallel to input terminals to be recognized as an open contact).

   Maximum series resistance and minimum leakage resistance values are valid if field contact voltage is ±15% of nominal.

2. Inputs of 24V or higher have been tested to meet or exceed the requirements of ANSI/IEEE C37.90-1978 (SWC)

3. Isolation voltage rating for input opto-isolator is 1066 VRMS continuous and 1770 VRMS surge.

Response Time
Response time is defined as time between application of step voltage at signal input until sequence logic recognizes the voltage change as an alarm. System will not respond to momentary signals shorter than response time. Standard response time is 20 mS ±2.5 mS. When opto-isolated inputs are used, 20 to 60 mS will be added to the response time.

Resolution Time
Resolution time is defined as minimum time between the start of two signals in a First-Out group required by the system to recognize only the first occurring signal as First-Out. Resolution time is 6 mS for standard time delay, and 25% of specified delay for other delay options. When opto-isolated inputs are used, resolution time is increased by 40 mS.

Relay Isolation
1500 VRMS from contacts to coil (logic voltage)
750 VRMS across open contacts

Time Delay (Response Time)
Standard—20 mS ±12.5%
"D1" Option—50 mS ±12.5%
"D2" Option—100 mS ±12.5%

Output Relay Ratings (Horn Relay, Reflash Relay) (Std. and Option "1E" Relays)
CONTACT RATING:
5A @ 250VAC or 28VDC RESISTIVE, DUST TIGHT RELAY (STANDARD)
3A @ 250VAC or 28 VDC RESISTIVE, SEALED RELAY ("1E" OPTION)
500 mA @ 125VAC or 28VDC LAMP LOAD
500 mA @ 125VDC RESISTIVE LOAD ONLY
125 mA @ 125VDC LAMP LOAD ONLY

Horn Relay
The horn relay is driven from the internal horn bus through a set of field-changeable jumpers to select normally energized or normally de-energized relay operation. Form "C" contacts are brought out to the main terminal block for complete flexibility in connecting an external horn.

Reflash Relay
The reflash relay operates on first alarm and momentarily changes state (100 mS) on subsequent alarms. The reflash relay will not operate on test if all points are clear. However, if test is activated while an alarm is present, the reflash relay will momentarily change.

Integral Horn
The Model 910 annunciator is supplied with a horn relay. If an integral horn is required, option "H1" must be specified as part of the model number. The integral horn sound output is approximately 75 db at 10 feet.

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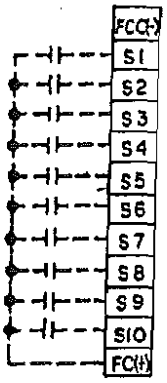
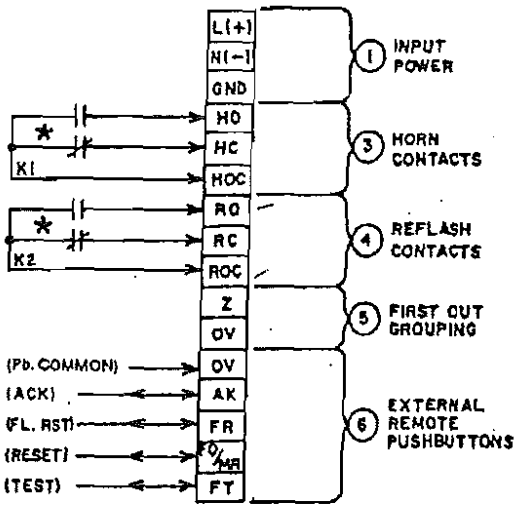
TYPICAL WIRING DIAGRAM

TYPE T12, T24, T48 OR T125 INPUT (SWITCH CONTACT)

WIRING DIAGRAM WITH INTERNALLY SUPPLIED "FC" VOLTAGE, (12, 24, 48 OR 125 VDC ONLY).





*CONTACTS SHOWN IN DEENERGIZED CONDITION

MODEL NUMBER EXPLANATION

910 AC120 KC120 STD STD H1 / WB1 DT / / SM4

WITH 4 SW101 PUSHBUTTON MOUNTED AND WIRED

MODEL 910, FLUSH MOUNT

POWER SUPPLY INPUT VOLTAGE
- AC120 — 120V, 50-60Hz (24VFC)
- AC230 — 230V, 50-60Hz (24VFC)
- DC24 — 24VDC, CONVERTER ISOLATED (24VFC)
- DC48 — 48VDC, CONVERTER ISOLATED (24 OR 48VFC)
- DC9 — 100-280VDC, CONVERTER ISOLATED (24 OR 125VFC)
- DCF12 — 12VDC, NON-ISOLATED, FILTER ONLY (12VFC)
- DCF24 — 24VDC, NON-ISOLATED, FILTER ONLY (24VFC)

SIGNAL INPUT TYPE & VOLTAGE

INTERNALLY SUPPLIED FC VOLTAGE
- T12 — SWITCH CONTACT, 12VDC (AVAILABLE WITH DCF12 FILTER ONLY)
- T24 — SWITCH CONTACT, 24VDC (AVAILABLE WITH ALL POWER SUPPLIES)
- T48 — SWITCH CONTACT, 48VDC (AVAILABLE WITH DC48 CONVERTER ONLY)
- T125 — SWITCH CONTACT, 125VDC (AVAILABLE WITH DC9 CONVERTER ONLY)
- K24 — OPTICALLY COUPLED, 24VDC (AVAILABLE WITH ALL POWER SUPPLIES)

CUSTOMER SUPPLIED FC VOLTAGE
- TC24 — SWITCH CONTACT, 24VDC
- TC48 — SWITCH CONTACT, 48VDC
- TC125 — SWITCH CONTACT, 125VDC
- KC12 — OPTICALLY COUPLED, 12VAC/VDC
- KC24 — OPTICALLY COUPLED, 24VAC/VDC
- KC48 — OPTICALLY COUPLED, 48VAC/VDC
- KC120 — OPTICALLY COUPLED, 120VAC
- KC125 — OPTICALLY COUPLED, 125VDC
- KC240 — OPTICALLY COUPLED, 240VAC
- KC250 — OPTICALLY COUPLED, 250VDC
- XM120 — FOR SERIES
- XM240 — CONTACT MONITORING } 3

SURFACE MOUNT OPTION 2 (MEETS NEMA 4 and 12)
- SM4 = C.R.S./BAKED ENAMEL FINISH
- SM4X = CORROSION RESISTANT
- SM4P20 = 2 UNITS (20 POINTS) IN ONE SM4 ENCLOSURE

OMIT INTEGRAL PUSHBUTTON OPTION
- NP1 = ON FLUSH MOUNT CABINET
- NP2 = ON WALL MOUNT CABINET

WALL MOUNT OPTION (WITH ENCLOSED TERMINALS)
- WM1 = INPUTS T, K, TC, KC
- WM2 = INPUTS KM

MOUNTED NOVA TONE HORN

WATER-TIGHT DOORS FOR FLUSH MOUNT CABINETS
- DH = WITH HANDLE (NEMA 12)
- DT = WITH THUMBSCREWS (NEMA 4)

WIRING BOX OPTION
- WB1 = TERMINAL ENCLOSURE

REPLACEMENT PLUG-IN
- MT3 = NO CABINET

INTEGRAL HORN OPTION
- H1 = INDICATES HORN

SEALED RELAY OPTION
- STD = (NO DESIGNATION, NON-SEALED RELAY)
- E1 = SEALED RELAYS

INPUT TIME DELAY OPTION
- STD = (NO DESIGN. REQ'D) = 20mS
- D1 = 50mS
- D2 = 100mS

1 IF OPTIONS NOT REQUIRED, OMIT OPTION LETTERS AND NUMBERS

2 SPECIFY QUANTITY OF SW-101 PUSHBUTTONS TO BE MOUNTED ON ENCLOSURE DOOR. ALSO, ADD NOVATONE AUDIBLE MOUNTED ON ENCLOSURE WALL, IF REQUIRED.

3 REQUIRES SPECIAL WIRED CABINET

910 MS4 SURFACE MOUNT ENCLOSURE

Pricing $ 2430.96

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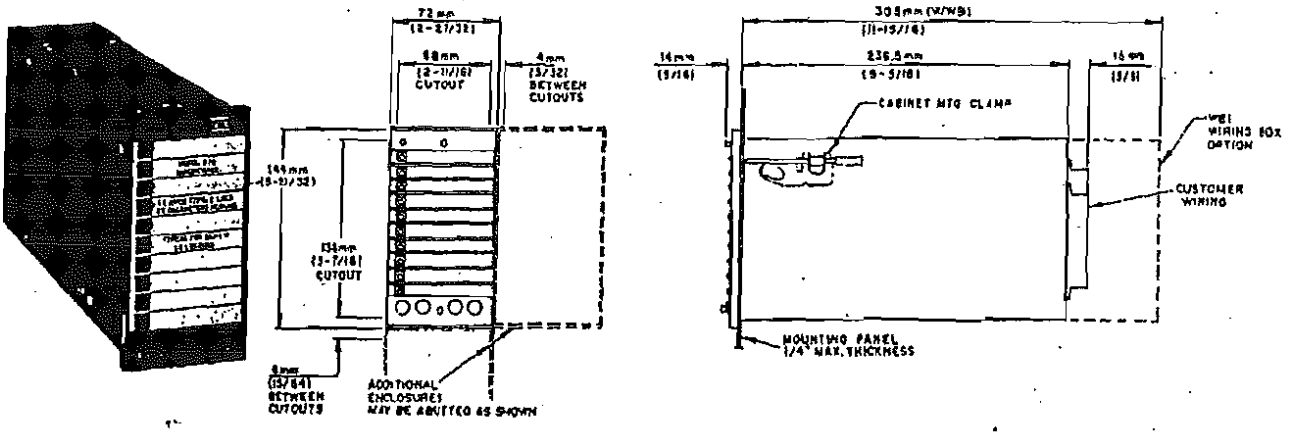
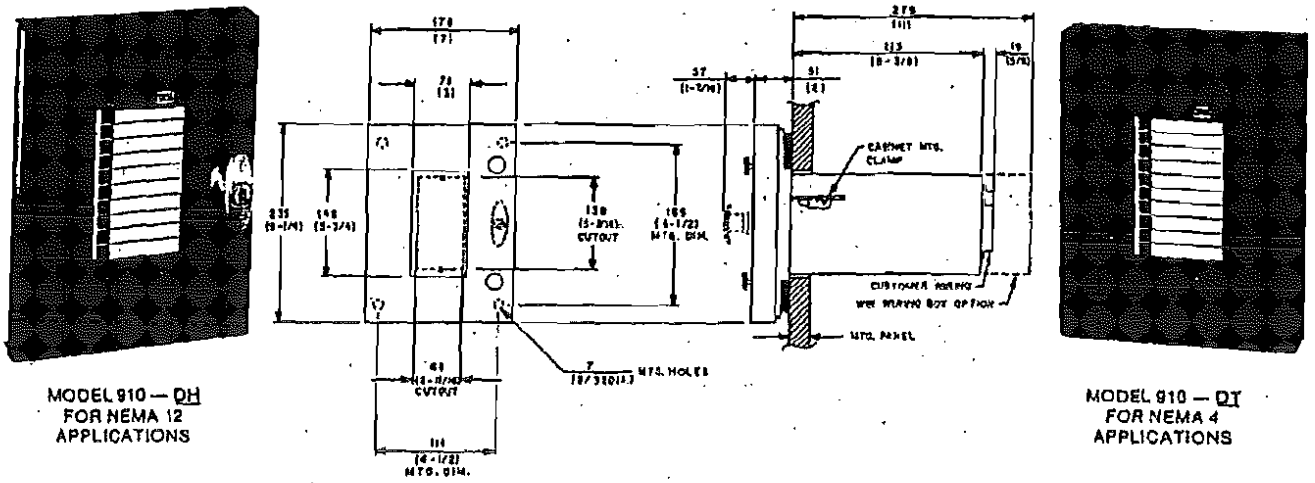
910 Annunciator

FLUSH MOUNT CABINET



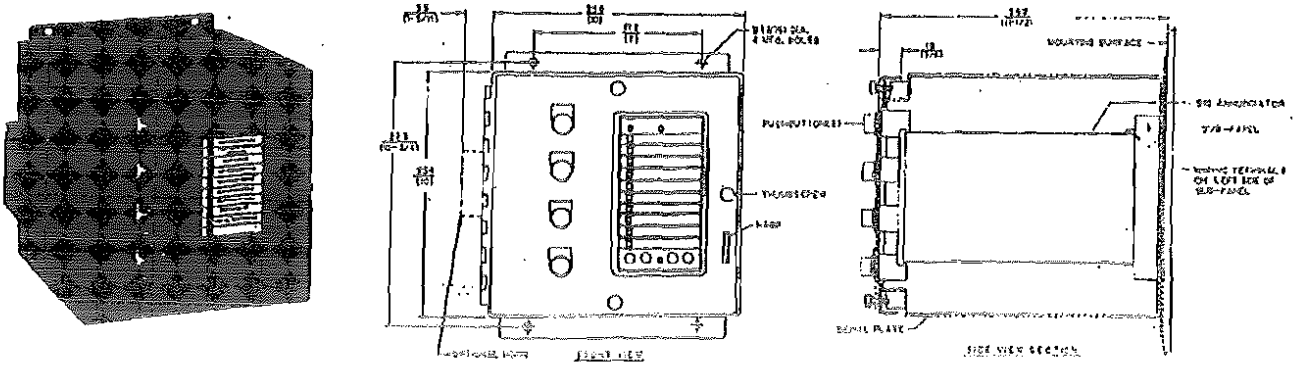
WATERTIGHT DOORS



MODEL 910 — DH
FOR NEMA 12
APPLICATIONS

MODEL 910 — DT
FOR NEMA 4
APPLICATIONS

SURFACE MOUNT ENCLOSURE



Also available with two units in one enclosure (Option SM4P20).
Height and depth are as shown. 10" width becomes 15 11/32". 7" mtg. hole spacing becomes 12 11/16".

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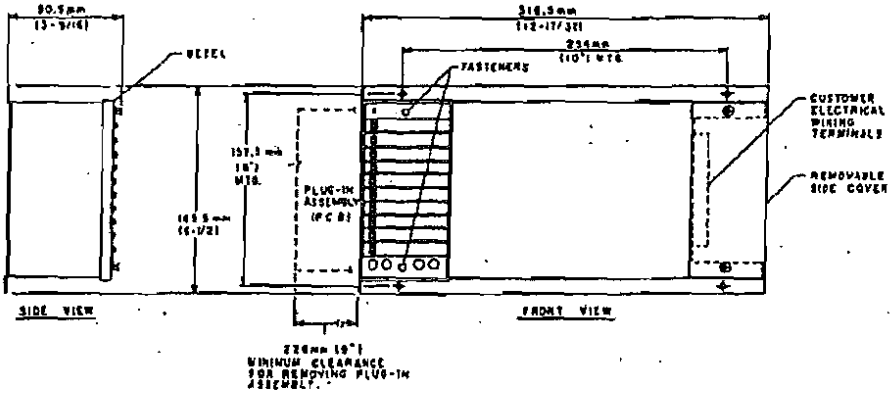
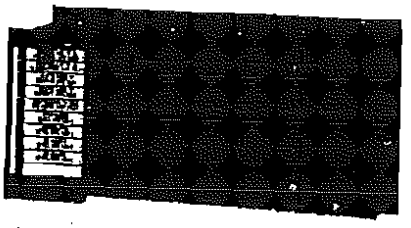
Rev 10-1-91

910 Annunciator

WALL MOUNT CABINET





TYPICAL ORDER

Model 910AC120T24D1H1WB1

The model number shown is for a Model 910 with 120 VAC power input, internally supplied 24VDC for signal contacts, an input time delay of 50mS, integral horn and wiring box terminal enclosure.

TERMS

Net 30 days, F.O.B., factory, freight collect. Shipments are normally made by Parcel Post, Truck or U.P.S. For faster shipment, specify Air Freight, Air Parcel Post, etc.

CONFIRMATION

Avoid duplication of Purchase Order by marking confirming Purchase Order "CONFIRMATION."

WARRANTY

Three year warranty in accordance with terms and conditions of sale, Form AP-85.

DELIVERY

Normal delivery is approximately two (2) weeks. However, please check with your nearest PANALARM representative's office. System requirements may be a determining factor.

Specifications and designs subject to change without notice.

AMETEK PROCESS & ANALYTICAL INSTRUMENTS DIVISION

PANALARM BUSINESS UNIT 7401 N. Hamlin Avenue, Skokie, IL 60076, USA. Phone 1 847 675 2500 Fax 1 847 675 3011

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Pacific Rim Sales:

AMETEK SINGAPORE Private Ltd 10 Ang Mo Kio Street 65, #05-12 TECHPOINT, Singapore 569059. Phone (65) 484 2388 Fax (65) 481 6588

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01/99 Printed in U.S.A.

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20/10 CONTROL CABLE

Continued

Polyethylene-PVC Insulation
PVC Jacket, 75°C 600 Volt,

AC NO.	COND. SIZE AWG	COND. SIZE mm²	NO. OF CONDS.	JKT. WALL IN	JKT. WALL mm	O.D. IN	O.D. mm	APPROX. WEIGHT Lbs./M Ft.
2B-1202	12	3.31	2	.045	1.14	.247 x .401	6.27 x 10.18	98
2B-1203	12	3.31	3	.045	1.14	.426	10.82	139
2B-1204	12	3.31	4	.045	1.14	.466	11.83	178
2B-1205	12	3.31	5	.060	1.52	.545	13.84	239
2B-1207	12	3.31	7	.060	1.52	.587	14.90	293
2B-1208	12	3.31	8	.060	1.52	.646	16.40	331
2B-1210	12	3.31	10	.060	1.52	.701	17.80	416
2B-1212	12	3.31	12	.060	1.52	.758	19.25	447
2B-1215	12	3.31	15	.080	1.52	.907	23.03	605
2B-1219	12	3.31	19	.080	2.03	.929	23.59	715
2B-1225	12	3.31	25	.080	2.03	1.094	27.78	828
2B-1237	12	3.31	37	.080	2.03	1.251	31.77	1159
2B-1002	10	5.26	2	.045	1.14	.270 x .448	6.86 x 11.37	118
2B-1003	10	5.26	3	.045	1.14	.480	12.19	186
2B-1004	10	5.26	4	.060	1.14	.556	14.12	265
2B-1005	10	5.26	5	.060	1.52	.611	15.51	312
2B-1007	10	5.26	7	.060	1.52	.663	16.84	400
2B-1008	10	5.26	8	.060	1.52	.727	18.46	460
2B-1009	10	5.26	9	.060	1.52	.770	19.56	446
2B-1010	10	5.26	10	.080	2.03	.791	20.09	592
2B-1012	10	5.26	12	.080	2.03	.912	23.16	691
2B-1015	10	5.26	15	.080	2.03	1.020	25.90	858

OTHER SIZES AND CONDUCTOR COUNTS ARE AVAILABLE ON REQUEST

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RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111
(2) S/C NO.: FSC - 641
(5) Pg 1 Of 4
(6) DATE 22 August 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project
(11) RCI NO.: 20111 - 012R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]
(4A) RCI/DCN TITLE: Drainage Channel Elevation
(11) DCN NO.: 20111 - 026

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
ELPTS Project Drawing	90X-6000-G00281 (G-3)	0	
Baumann Engineering Survey Data	Dated July 6, 2000		

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The existing drainage channel from Valve House 1 to the Rail Yard Entrance appears to be at a greater elevation than the invert of GIS-1. Please advise on the required path forward.

PROPOSE TO REVISE CONTROL POINT ELEVATIONS TO ENSURE DRAINAGE

(10) REQUESTOR: David R. Opalka DRO
COMPANY: The STAVER Group, Inc.
DATE: 8/22/00
(12) CE / PE: James C. Jenkins
DATE: 9/8/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES
(14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

See pages 2, 3, 4 of 4 for finished grades and control point data.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 9/11/00
K. Bradshaw-Tweddell, GEOSYNTEC
[ ] FIT [ ] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 9/27/00
PERFORMANCE GRADE: (17) James C. Jenkins

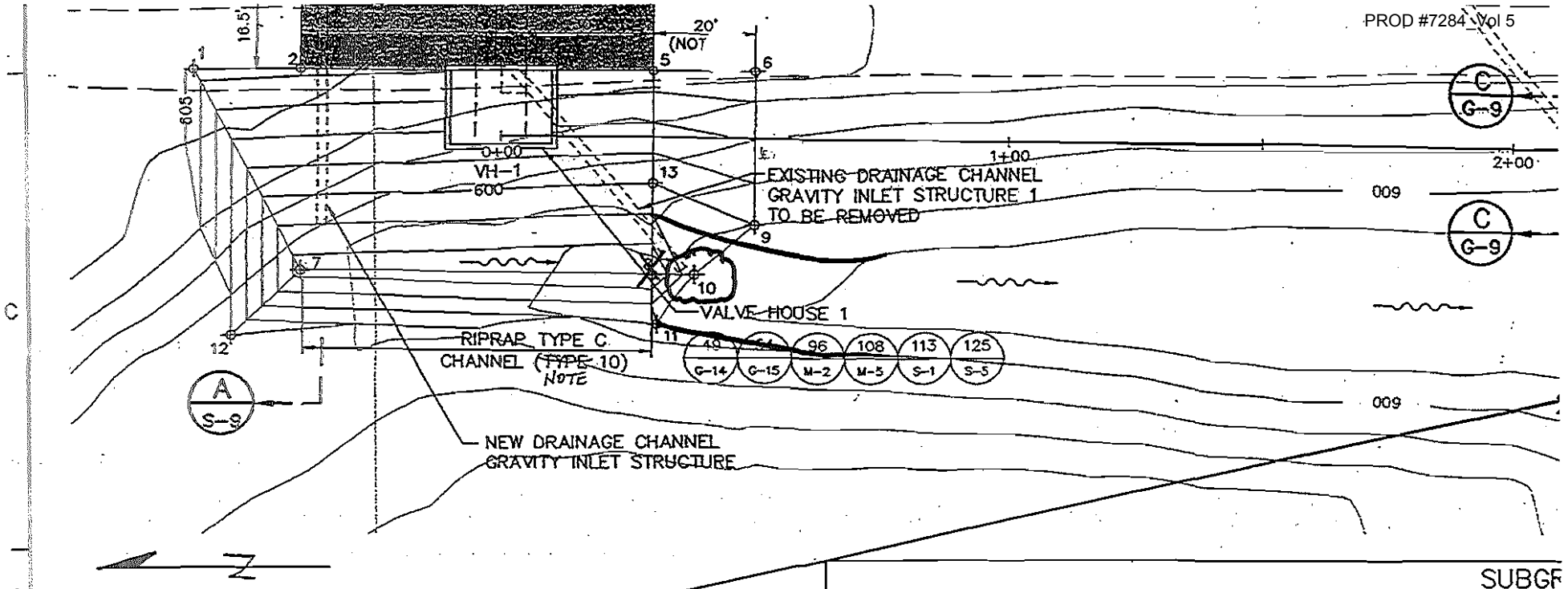
(18) CONSTRUCTION CONCURRENCE DATE:
PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)
J. R. Hughes by JCJ

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

F-4259
REV. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO. C011



Approx. EDGE OF NEW (EXIST.) RD.

SUBGR
CONSTRUCTION C

POINT NO.	NORTHING	EASTING	ELEVATION	POINT NO.	NORTHING
1	483035.38	1350658.51	604.45	15	482614.63
2	483014.61	1350658.26	604.29	16	482614.43
3	483014.40	1350674.76	604.29	17	482544.64
4	482944.41	1350673.90	603.77	18	482544.44
5	482944.60	1350657.40	603.77	19	482524.64
6	482924.61	1350657.16	603.62	20	482544.99
7	483015.10	1350617.65	597.52	21	482525.06
~~8~~	~~482945.10~~	~~1350616.00~~	~~597.06~~	22	482618.88
9	482924.99	1350626.51	600.00	23	482618.94
10	482936.84	1350616.69	~~599.75~~	24	482630.43
11	482944.23	1350606.78	600.00	25	482545.14
12	483028.69	1350604.69	602.00	26	482545.20
13	482944.89	1350634.80	600.00	27	482539.56
14	482539.15	1350653.67	601.48	28	482539.61

597.0

1
-

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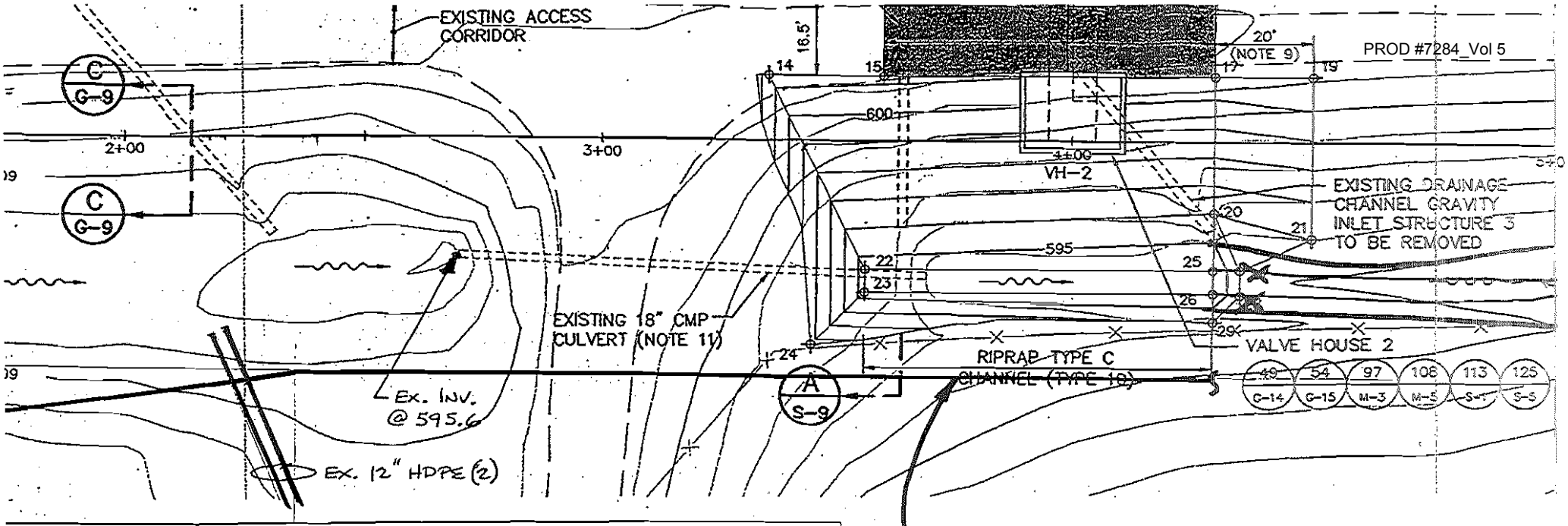


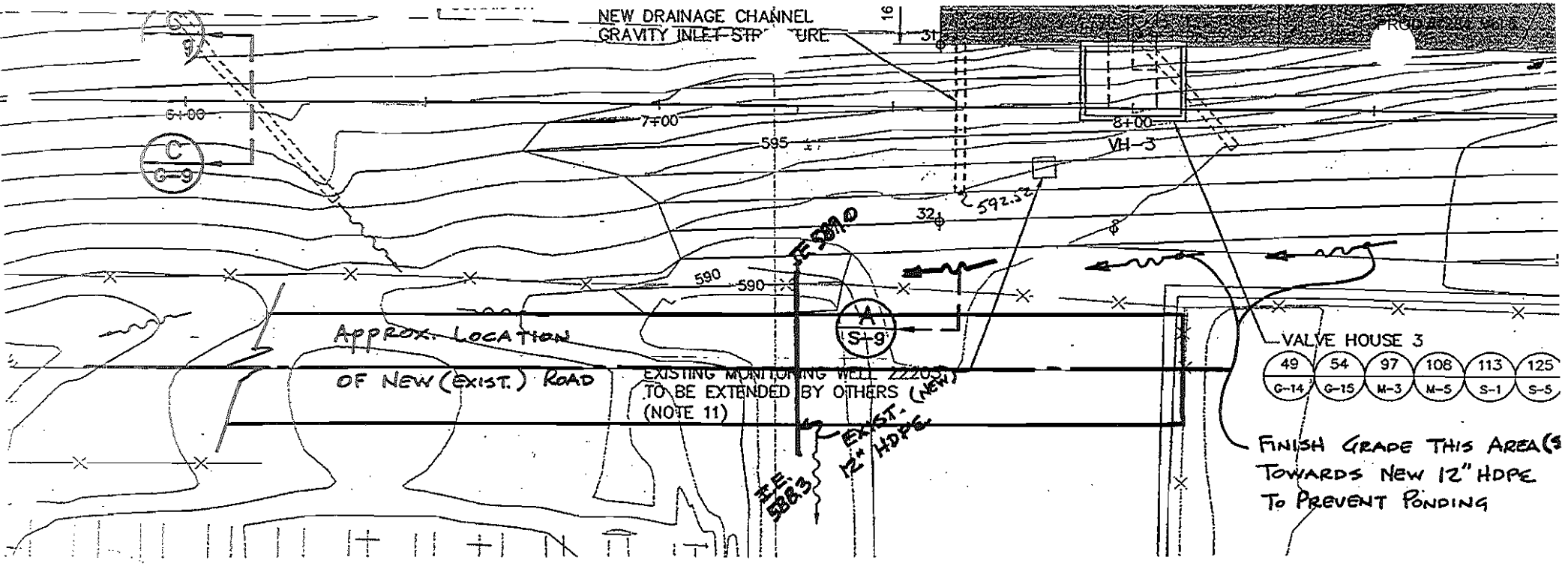
Approx. EDGE OF NEW (EXIST.) ROAD

SUBGRADE
STRUCTION CONTROL POINTS

NORTHING	EASTING	ELEVATION	POINT NO.	NORTHING	EASTING	ELEVATION
482614.63	1350653.37	601.29	29	482545.27	1350600.90	596.00
482614.43	1350669.87	601.29				
482544.64	1350652.51	600.77				
482544.44	1350669.01	600.77				
482524.64	1350652.27	600.62				
482544.99	1350623.91	596.00				
482525.06	1350618.35	596.00				
482618.88	1350612.81	594.55				
482618.94	1350607.81	594.55				
482630.43	1350596.85	598.34				
482545.14	1350611.91	594.00				
482545.20	1350606.91	594.00				
~~[illegible]~~	~~[illegible]~~	~~596.86~~				
~~[illegible]~~	~~[illegible]~~	~~596.86~~				

1 PLAN
LTS PIPE
SCALE: 1" = 20'

DCN 20111-026



SUBGRADE
CONSTRUCTION CONTROL POINTS

POINT NO.	NORTHING	EASTING	ELEVATION	POINT NO.	NORTHING	EASTING	ELEVATION
30	482214.46	1350664.98	598.29	44	481958.82	1350619.13	592.00
31	482214.66	1350648.48	598.29	45	481985.73	1350618.25	592.00
32	482215.04	1350610.73	592.00	46	481991.88	1350606.05	590.00
33	482103.80	1350669.63	595.46	47	481985.91	1350603.99	592.00
34	481992.16	1350668.26	594.62	48	481991.97	1350598.54	590.00
35	481987.37	1350700.31	596.09	49	481906.61	1350667.22	593.98
36	481982.38	1350699.56	596.05	50	481911.15	1350665.90	594.48
37	481978.16	1350668.09	594.52	51	481906.68	1350661.22	595.98
38	481964.71	1350666.95	594.75	52	481906.89	1350644.72	595.98
39	481987.81	1350663.71	596.09	53	481916.89	1350624.87	592.73
40	481982.82	1350663.65	596.05	54	481897.58	1350609.14	590.00
41	481969.91	1350661.99	596.46				
42	481970.11	1350645.49	596.46				
43	481959.98	1350625.09	593.00				

3 / - PLAN
LTS PIPE
SCALE: 1" = 20'

DCN 20111-026

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of ~~1~~ 4	(6) DATE 9/27/00
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111-013R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Embedment Depth of 1 ¼" Stainless Steel Flange Anchor Bolts		(11) DCN NO.: 20111-027

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Project Drawings	90X-6000-M-00270	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

The 6" embedment depth of the 1 1/4" anchor bolts for the Stainless-Steel/ HDPE Flange combination is unattainable in some locations due to reinforcement interference. Please advise.

(10) REQUESTOR: Ron Wood	COMPANY: The STAVER Group, Inc.	DATE: 9/27/00	(12) CE / PE: JAMES C. JENKINS	DATE: 9/27/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

SEE ATTACHED PAGES 2, 3, & 4

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 3 Oct 2000 KUMAR BABU-THEMEBJAA, GEOSYNTEC [ ] FIT [ ] FORM [X] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17)	DATE: 10/17/00
(18) CONSTRUCTION CONCURRENCE DATE: 10-17-00 PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

F-4259
V. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO. 011

* THE DESIGN INTENT OF THE GASKET,HDPE FLAT STOCK, AND S.S. BACK-UP FLANGE IS TO PROVIDE ADDITIONAL PROTECTION TO THE VALVE HOUSES FROM INFILTRATION OF ANY GROUNDWATER THROUGH THE PIPE PENETRATION AT THE VALVE HOUSE WALLS. THE EMBEDDED WATER STOP IS THE PRIMARY PROTECTION WITH THE HDPE LINER SYSTEM INSIDE ACTING AS THE SECONDARY PROTECTION.

* ENSURE DRILLED HOLES ARE PREPARED IN ACCORDANCE WITH MANUFACTURERS (HILTI) INSTRUCTIONS AND ALL SURFACES ARE CLEAN AND DRY.

* MEASURE DEPTH AND LOCATION (PATTERN) OF EACH HOLE. RECORD AS-BUILT ON RED-LINE DRAWINGS.

* ANCHOR THREADED ROD USING INJECTION ADHESIVE IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.

KBT 12-3-10

* SECURE GASKET,HDPE FLAT STOCK, AND SS FLANGE USING THE ATTACHED CHART FROM HILTI.FIRST:SELECT THE MAXIMUM THREADED ROD DIAMETER FROM TABLE 1 BASED ON THE MINIMUM DEPTH OF ANCHOR. SECOND: USE TABLE 2 TO DETERMINE THE TORQUE TO APPLY BASED ON THE SELECTED ANCHOR DIAMETER FROM STEP 1. PARTIALLY TIGHTEN EACH NUT IN DIAGONAL SUCCESSION UNTIL THE TORQUE IS ACHIEVED.
ALL NUTS SHOULD BE TORQUED THE SAME AMOUNT TO ENSURE UNIFORM DEFORMATION OF THE GASKET.
RECORD AS-BUILT TORQUE APPLIED.

EXAMPLE : MIN HOLE DEPTH = 2.5 INCHES
APPLY APPROX. 50 FT-LBS. OF TORQUE TO EACH NUT
PULL OUT STRENGTH DEVELOPED = APPROX. 1985 LBS. FOR EACH ANCHOR BOLT.
NOTE:THIS STRENGTH IS AN APPROXIMATION OF THE "ADHESIVE" BOND STRENGTH FOR A GIVEN ANCHOR DEPTH.

T KBT

DCN No. 20111-027

RCI 20111-013R
Pg. 2 of 4

HIT HY 150 Injection Adhesive Anchor

HIT HY 150 Allowable and Ultimate Bond/Concrete Capacity for HAS and HIT Rods in Normal Weight Concrete[1,2,3,4]

DCN NO. 20111-027

Anchor Diameter in (mm)	Embedment Depth in (mm)	HIT HY-150 Allowable Bond/Concrete Capacity				HIT HY-150 Ultimate Bond/Concrete Capacity			
		Tensile		Shear		Tensile		Shear	
		f_c = 2000 psi (13.8 Mpa) lb (kN)	f_c = 4000 psi (27.6 Mpa) lb (kN)	fc = 2000 psi (13.8 MPa) lb (kN)	f_c = 4000 psi (27.6 Mpa) lb (kN)	fc = 2000 psi (13.8 MPa) lb (kN)	f_c = 4000 psi (27.6 Mpa) lb (kN)	fc = 2000 psi (13.8 MPa) lb (kN)	f_c = 4000 psi (27.6 Mpa) lb (kN)
3/8 (9.5)	1 3/4 (44)	720 (3.2)	1265 (5.6)	1390 (6.2)	1965 (8.7)	2710 (12.1)	4750 (21.1)	4175 (18.6)	5900 (26.2)
	3 1/2 (89)	1895 (8.4)	2705 (12.0)	2230 (9.9)	3155 (14.0)	7120 (31.7)	10160 (45.2)	6695 (29.8)	9465 (42.1)
	5 1/4 (133)	2635 (11.7)	2800 (12.5)	4445 (19.8)	6285 (28.0)	9880 (44.0)	10510 (46.8)	13340 (59.3)	18860 (83.9)
1/2 (12.7)	2 1/8 (54)	1220 (5.4)	1575 (7.0)	1980 (8.8)	2800 (12.5)	4580 (20.4)	5910 (26.3)	5940 (26.4)	8400 (37.4)
	4 1/4 (108)	2725 (12.1)	3935 (17.5)	3385 (15.1)	4785 (21.3)	10220 (44.5)	14760 (65.7)	10150 (45.2)	14355 (63.9)
	6 3/8 (162)	4300 (19.1)	5295 (23.6)	6740 (30.0)	9535 (42.4)	16140 (71.8)	19860 (88.3)	20225 (90.0)	28605 (127.2)
5/8 (15.9)	2 1/2 (64)	1620 (7.2)	1985 (8.8)	2460 (10.9)	3480 (15.5)	6090 (27.1)	7460 (33.2)	7380 (32.8)	10440 (46.4)
	5 (127)	4395 (19.6)	5250 (23.4)	4770 (21.2)	6745 (30.0)	16480 (73.3)	19690 (87.6)	14310 (63.7)	20235 (90.0)
	7 1/2 (191)	6025 (26.8)	8225 (36.6)	9505 (42.3)	13440 (59.8)	22595 (100.5)	30850 (137.2)	28510 (126.8)	40315 (179.3)
3/4 (19.1)	3 3/8 (86)	2365 (10.5)	3925 (17.5)	5430 (24.2)	7680 (34.2)	8870 (39.5)	14720 (65.5)	16295 (72.5)	23040 (102.5)
	6 5/8 (168)	4655 (20.7)	8885 (39.5)	8130 (36.2)	11500 (51.1)	17460 (77.7)	33330 (148.3)	24385 (108.5)	34485 (153.4)
	10 (254)	9515 (42.3)	12140 (54.0)	16370 (72.8)	23150 (103.0)	35695 (158.8)	45530 (202.5)	49105 (218.4)	69445 (308.9)
7/8 (22.2)	3 3/4 (95)	3080 (13.7)	4800 (21.4)	6700 (29.8)	7105 (31.6)	11555 (51.4)	18000 (80.1)	20105 (89.4)	28430 (126.5)
	7 1/2 (191)	7845 (34.9)	11020 (49.0)	10510 (46.8)	14865 (66.1)	29430 (130.9)	41000 (182.3)	31535 (140.3)	44600 (198.4)
	11 1/4 (286)	13330 (59.3)	16645 (74.0)	20945 (93.2)	29620 (131.8)	49990 (222.4)	62425 (277.7)	62830 (279.5)	88855 (395.3)
1 (25.4)	4 1/8 (105)	3445 (15.3)	4865 (21.6)	8260 (36.7)	11680 (52.0)	12920 (57.5)	18250 (81.2)	24790 (110.3)	35050 (155.9)
	8 1/4 (210)	8330 (37.1)	11635 (51.8)	12865 (57.2)	18200 (80.9)	31250 (139.0)	43640 (194.1)	38600 (171.7)	54585 (242.8)
	12 3/8 (314)	15540 (69.1)	19525 (86.85)	25635 (114.0)	36250 (161.3)	58280 (259.3)	73220 (325.7)	76900 (342.1)	108750 (483.8)
1 1/4 (31.8)	6 (152)	4645 (20.7)	7000 (31.1)	14760 (65.7)	20870 (92.8)	17430 (77.5)	26265 (116.8)	44280 (197.0)	62610 (278.5)
	12 (305)	15490 (68.9)	20770 (92.4)	26010 (115.7)	36785 (163.6)	58085 (258.4)	77900 (346.5)	78035 (347.1)	110355 (490.9)
	15 (381)	19210 (85.5)	26815 (119.3)	38010 (169.1)	53755 (239.1)	72040 (320.5)	100560 (447.3)	114030 (507.3)	161265 (717.4)

1. Influence factors for spacing and/or edge distance are applied to concrete/bond values above, and then compared to the steel value. The lesser of the values is to be used for the design.
2. Average ultimate concrete shear capacity based on Concrete Capacity Design (CCD) method.
3. All values based on holes drilled with carbide bit (see page 236) and cleaned with wire brush.
4. For sill plate attachments, see tables on page 69.

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Pg. 3 of 4

[TABLE C]

HIT HY 150 Injection Adhesive Anchor

4.2.2.2 MATERIAL SPECIFICATIONS

DCN No. 20111-027

Material Properties for HY150

Compressive Strength ASTM C579	71.8 N/mm²	10,420 psi
Tensile Strength ASTM C307	15.9 N/mm²	2310 psi
Flexural Strength ASTM C580	29.3 N/mm²	4250 psi
Modulus of Elasticity ASTM C307	7032 N/mm²	1.02 x 10⁶ psi
Water Absorption ASTM D570	0.12%	0.12%
Electrical Resistance DIN/VDE 0303T3	2x10¹¹ OHM/cm	7.9x10¹⁰ OHM/in.

Material

	MECHANICAL PROPERTIES f_y ksi (MPa)	min. f_u ksi (MPa)
Standard HAS rod material meets the requirements of ASTM A36	36 (248)	58 (400)
High Strength or 'Super HAS' rod material meets the requirements of ASTM A193, Grade B7	105 (724)	125 (862)
Stainless HAS & HAS-E rod material meets the requirements of ASTM F593 (AISI 304) Condition CW 3/8" - 5/8"	65 (448)	100 (689)
Stainless HAS & HAS-E rod material meets the requirements of ASTM F593 (AISI 304) Condition CW 3/4" -1 1/4"	45 (310)	85 (586)
Standard HAS-E rod material meets the requirements of ISO 898 Class 5.8	58 (400)	72.5(500)
Super HAS-E rod material meets the requirements of ISO 898 Class 8.8	92.8(640)	116 (800)
HIS Insert 9SMNPB36K Carbon Steel conforming to DIN 1651	56 (390)	71 (490)
HIS-R Insert X5CrNiMo17122 K700 Stainless Steel conforming to DIN 17440	35 (241)	74 (510)

HAS Standard Nut material meets the requirements of ASTM A563, Grade A

HAS Super, HAS-E Standard & HAS-E Super Nut material meets the requirements of ASTM A563, Grade DH

HAS & HAS-E Stainless Steel Nut material meets the requirements of ASTM F594

HAS Standard and Stainless Steel Washers meets dimensional requirements of ANSI B18.22.1 Type A Plain

HAS Super, HAS-E Standard & HAS-E Super Washers meet the requirements of ASTM F436

All HAS standard & HAS Super Rods (except 7/8"), HAS-E Standard & HAS-E Super, HIS inserts, nuts & washers are zinc plated to ASTM B633 SC1

7/8" HAS Standard & HAS Super rods hot-dip galvanized in accordance with ASTM A153

HIT-I Insert Material meets 9S MN PB 28K steel conforming to DIN 1651

HIT-A Rod Material meets 9S MN PB 36K or 9S MN 36K steel conforming to DIN 1651. Mechanical properties meet or exceed ASTM A36.

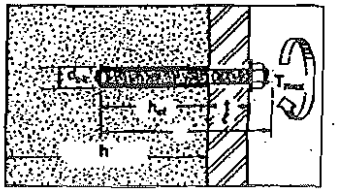
Note: Special Order product may vary from standard materials, but meets or exceeds mechanical properties of HAS materials.

4.2.2.3 TECHNICAL DATA

STEP #2 SELECT TIGHTENING TORQUE FOR ANCHOR Ø DETERMINED IN STEP ①

HY150 Installation Specification Table for HIT or HAS Threaded Rods

Details \ HIT Rod Size			in. (mm)	3/8 (9.5)	1/2 (12.7)	5/8 (15.9)	3/4 (19.1)	7/8 (22.2)	1 (25.4)	1 1/4 (31.8)
d_{bit}:	bit diameter		in.	7/16	9/16	11/16	13/16	(24mm)	1 1/16	1 1/2
h_{nom}:	std. depth of embed.[1]		in. (mm)	3 1/2 (90)	4 1/4 (110)	5 (125)	6 1/8 (170)	7 1/2 (190)	8 1/4 (210)	12 (305)
T_{max}: Max. tightening torque	HAS Std. HIT Rods	Embed $\geq h_{nom}$	ft lb (Nm)	~~13~~ (24)	~~30~~ (41)	~~75~~ (102)	~~150~~ (203)	~~175~~ (237)	~~235~~ (319)	~~400~~ (540)
	HAS SS HAS-Super	Embed $< h_{nom}$	ft lb (Nm)	15 (20)	20 (27)	50 (68)	105 (142)	125 (169)	165 (224)	280 (375)
h: min. base material thickness (@ std. embed.)			in. (mm)	5 1/2 (140)	6 1/4 (160)	7 1/8 (180)	8 7/8 (220)	9 1/2 (240)	10 1/2 (270)	15 (380)
Approximate Fastenings per:										
Small Refill Pack @ std. embedment				50	31	18	10	8	6	2
Large Cartridge @ std. embedment				185	114	67	35	30	23	6



1. Data available for varying embedments; see Load Tables.

RCI 20111-013R
Pg. 4 of 4

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE 03 October 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111 - 016R

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: VH East Wall HDPE Flatstock Plate Revision

(11) DCN NO.: 20111 - 028

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House and Control Valve House Mechanical Details II	90X-6000-M-00270	0	Sheet M6

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Since the first length of centralized piping located at the East walls of VH's 1-3 will be a pre-fabricated unit, installation will have to be from outside the VH into the inside. We propose to use split 1" flatstock HDPE plate at the inside East wall pipe penetrations for VH's 1-3 versus full diameter flatstock HDPE plate as shown on sheet M6 because the flatstock rings are larger in diameter than the pipe penetration grout rings. The split HDPE plate will similar to Detail III on sheet M6 and will be extrusion welded continuous to the wall liner per sheet details. Please advise.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
David R. Opalka DRO	The STAVER Group, Inc.	10/3/00	J. C. JENKINS	10/4/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

Proposed change should be incorporated in Contractor's tie-in plan (Section 02050) submittal.

RCI - DCN ACCEPTANCE

GEOSYNTEC

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/12/00

KHAJI BADV - THERESGACT, GEOSYNTEC

[ ] FIT [X] FORM [ ] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 10/24/00

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE: 10-12-00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO.

C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111

(2) S/C NO.: FSC - 641

(5) Pg 1 Of 1

(6) DATE 12 October 2000

(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project

(11) RCI NO.: 20111-021R

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Surge Arrestor Clarification

(11) DCN NO.: 20111-029

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Overhead Power Transmission System Details II	90X-6000-E-00260	0	Sheet E-3
Project Specifications	16400	0	Part 2.08

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Specification 16400, part 2.08 says the surge arrestors should have a rating of 15kV. Sheet E3, note 4E and the approved submittal 16400 – 002 rate the surge arrestors at 9kV. Please clarify the surge arrestor requirements.

CHANGE SPECIFICATION 16400 PART 2.08

(10) REQUESTOR: David R. Opalka — COMPANY: The STAVER Group, Inc. — DATE: 10/12/00

(12) CE / PE: M.W. Griffin — DATE: 10-17-00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

The surge arrestors shall be 9kV. CHANGE 2ND SENTENCE IN 16400 PART 2.08 TO READ: "SHALL BE 15kV VALVE TYPE EQUIPMENT WITH 9kV FLASHOVER POINT FOR LIGHTNING ARRESTOR

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/17/00

J.E. Kerl 10/17/00 KURASI BADU-TWEREBOAH

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 10/24/00

PERFORMANCE GRADE: (17) 4J. Cojkins

(18) CONSTRUCTION CONCURRENCE DATE: 10/24/00

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19) by CG

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

ECDC CONTROLLED COPY NO.

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111

(2) S/C NO.: FSC 641

(5) Pg 1 of 7

(6) DATE: 10/20/00

(3) S/C TITLE: OSDF ENHANCED PERMANENT LEACHATE SYS.

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: ADDITIONAL FUSE CUTOUTS

(11) DCN NO.: 20111 - 030

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
OVERHEAD POWER TRANS. SYS. DETAILS II	90X-6000-E-00260	0	SHT. E3
" " " " DETAILS I	-00259	0	SHT. E2
" " " " PLAN	-00258	0	SHT. E1
13.2 KV SINGELINE DIAGRAM	96X-5900-E-00358	15	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

- SITE UTILITIES REQUEST THE ABILITY TO ISOLATE LOADS ON THE 13.2 KV SYSTEM. ADDITIONAL FUSE CUT OUTS TO THE D.O. BLDG. AND THE PERMANENT LIFT STATION AND VALVE HOUSES FEEDER ARE TO BE PROVIDED.
- CORRECT END OF LINE POLE CONSTRUCTION DETAIL.
- 120 V. SIGNAL WIRING REQUIRES GUYS

J. C. Jenkins

(10) REQUESTOR: J. C. JENKINS COMPANY: FFI DATE: 10/20/00

(12) CE / PE: J. C. JENKINS DATE: 10/20/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES

(14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

- PROVIDE ADDITIONAL FUSED CUTOUTS AND POLE HARDWARE AS SHOWN ON PAGES 2 THRU 7
- PROVIDE RED LINE AS BUILTS

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 10/24/00

KHASI BADU-THERGBOTHA, GEOSYNTEC

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: 2LTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 10/24/00

PERFORMANCE GRADE: (17) J. C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE: 10-24-00

PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ORIGINAL

ECDC CONTROLLED COPY NO.

C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 2	(6) DATE
2011	FSC-641		12/15/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Containment Pipe Vents

(11) DCN NO.: 20111-031

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House Mech. Details I	90X-6000-M-00264	0	
Valve House Mech. Details II	90X-6000-M-00265	0	
Control Valve House Mech. Details	90X-6000-M-00267	0	
PIPING CHANGES AT VALVE HOUSES	DCN 20111-012		

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition

DCN-012 eliminated the "cascade" system and provided fixed end seals with weep holes for venting at north and south walls of each Valve House and Control Valve House.

Proposed Change

In lieu of weep holes drilled into fixed end seals, provide a service saddle and butt fuse a 3/4" nipple approx. 3" long with threaded metal end fitting. See page 2 of 2.

Justification

Allows for venting plus is a convenient fitting to perform hydrostatic pressure test of 10" containment pipe if contingency plan is initiated.

(10) REQUESTER:	COMPANY:	DATE:	(12) CE / PE	DATE:
D. J. Brettschneider	FFI	12/15/00	James C. Jenkins	12/15/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 12/20/00
EYASU BADU-THEREBAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 1/09/01
PERFORMANCE GRADE: (17) 4 James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE:
PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

F-4259
REV. 5: 10/01/99

ECDC CONTROLLED COPY NO. C 011

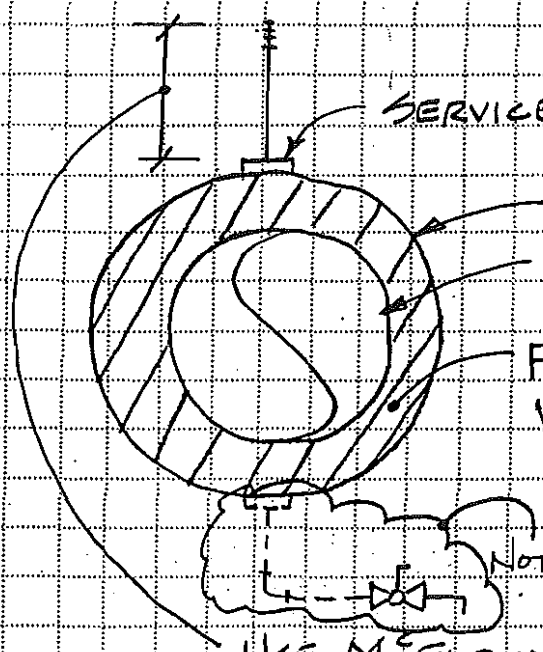
FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

ENGINEERING CALCULATION

PROJECT NUMBER:	
BY: J.C.J.	DATE:
CHECKED BY:	DATE:
PAGE	OF
REVISED:	

SUBJECT: CONTAINMENT PIPE VENT

NO SCALE



3/4" NIPPLE APPROX. 3" LG. WITH THREADED METAL END FITTING

DCN 20111-031

PG. 2 OF 2

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Page	Of	(6) DATE:
20111	641	1	1	12/12/00

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: FLEXIBLE HOSES

(11) DCN NO.: 20111- 032

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Tech. Specification, Section 15070 – Tanks, Flexible Hose, & Tank Transfer Pumps	20111-TS-0001, Sect 15070	0	N/A
Design Drawing – Valve House Mechanical Details I	90X-6000-M-00264	0	
Design Drawing – Valve House Mechanical Details II	90X-6000-M-00265	0	
Design Drawing – Valve House & Control Valve House Mechanical Details I	90X-6000-M-00266	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: LCS/LDS tank inlet (3") and outlet (3/4") flexible hoses are specified to be Type 304 SS braid & Type 316 SS liner. Hoses to be of sufficient length to allow 3-foot tank float.

Proposed Change: 3" Tank hoses shall be reinforced nitrile or nitrile/vinyl hose, min. working pressure = 150psi or greater. Min. bend radius = 12" or less. Excessive slack in hose is not required, due to VH sump switch/alarm. ¾" hose shall be low-pressure polymer hose with SS braided cover, min. working pressure = 150psi or greater. Min. bend radius = 12" or less. Excessive slack in hose is not required, due to VH sump switch/alarm.

Justification: SS hoses are not sufficiently flexible for intended service. Alternate materials provide satisfactory flexibility and pressure rating. VH sump switch/alarms provide immediate notification to operating personnel of liquid accumulation in VH; therefore, excessive hose length for 3-foot tank float is not necessary.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE/PE	DATE:
M. W. Griffin MWG	Fluor Fernald, Inc	12/12/00	J. C. JENKINS	12/13/00

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

RCI – DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 12/19/00
K. Badu-Tweneboah
KWASI BADU-TWENEBOAH, CEDS-INTEC

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLT52

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 1/09/01

PERFORMANCE GRADE: (17) James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE: 12-13-00
PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)
J. Hughes

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ECDC CONTROLLED COPY NO. C 011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 2	(6) DATE
2011	FSC-641		1/2/01

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [ ] C [X] OTHER [ ]

(4A) RCI/DCN TITLE: Lapeyre Stairs

(11) DCN NO.: 20111-033

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House Stair and Catwalk Structural Details	90X-6000-S-00275	0	
Control Valve House Stair and Catwalk Structural Details	90X-6000-S-00278	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Justification:
To ensure there are no penetrations through the HDPE liner and thus maintain the integrity of the double containment system as designed for each Valve House and Control Valve House
xisting Condition:
Current design requires securing base of stairs by anchoring into the floor of each Valve House and control Valve House as shown on CFC drawings.
Proposed Change:
As verified by Lapeyre Stair, Inc. (see Pg. 2 of 2) using a "Sleeper" underneath the stair bottom mounting plate is an acceptable alternative to anchoring to the floor, as long as the top landing secured properly. Proposed change is to use HDPE and/or Neoprene Shim attached to bottom stair plate at each Valve House and Control Valve House.

(10) REQUESTOR:	DATE:	(12) CE / PE	DATE:
J.C. Jenkins FFI	1/2/01	J.C. Jenkins	1/2/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

Contractor shall verify that the bottom does not slide after installation.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 1/03/01
KRASI BADU-TWENEBOAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 1/09/01
PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE:
PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

F-4259
V. 5: 10/01/99

ECDC CONTROLLED
COPY NO. C 011

Lapeyre Stair, Inc.

P.O. BOX 50699 • NEW ORLEANS, LA 70150 • PHONE: 504-733-6009 • FAX: 504-733-4393 • TOLL-FREE: 800-535-7631

December 20, 2000

Jim Jenkins
Fluor Daniel
4380 Malsbary Rd
Cincinnati, OH 45242

VIA FACSIMILE: (513)648-4029

Dear Mr. Jenkins:

Pam Albanese asked me to write a letter to you clarifying our position on mounting our stair into place. Our stair is designed to be mounted in place using bolts at the top and bottom of the stair.

We recognize that in some situations, it is not always practical to bolt through the bottom floor to attach the stair, especially on roof-tops and similar applications. In such cases, many of our customers have used some type of "sleeper" underneath the bottom mounting plate. The top mounting plate MUST be bolted or welded in place.

The sleeper can be as simple as a piece of neoprene attached with an epoxy type glue to the bottom mounting plate. The neoprene or similar material sits between the mounting plate and the lower floor, providing friction. That friction added to the weight of the stair and user has should keep the stair in place. Again, the top landing of the stair must be attached well, using bolts through the provided bolt holes or welded.

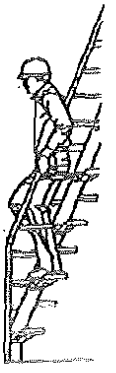
Thank you for considering our stair. Please feel free to call our office if you have any questions or need further assistance.

Sincerely,

Shannon LeBlanc

Shannon LeBlanc
Customer Service Supervisor

DCN 20111-033
Pg. 2 of 2



RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Page	Of	(6) DATE:
20111	641	1	2	01/09/01

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Ventilation Fan Speed Control

(11) DCN NO.: 20111-034

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Tech. Specification, Section 15865 – Fans	20111-TS-0001, Sect 15865	0	Relocate para 2.02, D as indicated by DCN 20111-011.
DCN 20111-011	DCN 20111-0111	0	See above.
Design Drawing – Valve House Electrical Details	90X-6000-E-00261	0	
Design Drawing – Control Valve House Electrical Details	90X-6000-E-00262	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION & EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

Existing Condition: DCN 20111-011 modified the type of ventilation fan and deleted variable speed controls.

Proposed Change: Provide variable speed control dial/switch for complete control [illegible] of fan motor speed and positive on/off action. Speed control dial/switch to be installed near VH control [illegible] housing with lockable access cover.

Justification: Speed control required to balance system and adjust ventilation [illegible] in conjunction with associated air flow alarm switch.

(10) REQUESTOR: M. W. Griffin — Fluor Fernald, Inc — DATE: 01/09/01

(11) CE / PE: James C. Jenkins — DATE: 1/10/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC — 1/31/01 — RCI – DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 1/10/2001
KWADI BADU-TWENEBOAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FOF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) — DATE: 1/11/01

PERFORMANCE GRADE: (17) James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE:
PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) — DATE:

VOID

ECDC CONTROLLED COPY NO. 011 ORIGINAL

FS-F-4259
REV. 6: 10/01/99

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 2	(6) DATE
20111	FSC-641		1/12/2001

(3) S/C TITLE: OSDF ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM PROJECT

(11) RCI NO.: 20111- 029R

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: MEGGER TESTING

(11) DCN NO.: 20111-035

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
TECHNICAL SPECIFICATIONS	16050-3.06 A, B, C	0	

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

The Specifications indicate that all conductors with insulation rated for 600v be megger tested. All of the conductors on this project have insulation rated at 600v. Could clarification be provided as to which conductors/circuits need megger testing. A large number of circuits on this job are 110v, which are not normally megger tested.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Brian S. Wheeler	Fluor Fernald	1/12/01	James C. Jenkins	1/16/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

DELETE PARAGRAPHS 3.06 A., B. & C.
REPLACE WITH NEW PARAGRAPHS (SEE SHEET 2 OF 2) TO CONFORM TO CURRENT FEMP STANDARDS.

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 1 Feb 2001

[ ] FIT [ ] FORM [X] FUNCTION for Jay Beach 24 Jan 2001

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE:

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 2/01/01

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE: 02/01/01

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

F-4259
REV. 5: 10/01/99

ECDC CONTROLLED COPY NO. C011

3.06 TESTING DURING INSTALLATION

A. All electrical equipment, materials and systems installed shall be thoroughly tested for satisfactory operation in accordance with applicable industry standards and as herein specified to determine compliance with the Drawings and Specifications.

B. Wire and cable shall be visually inspected prior to installation for faulty insulation. Before connection to equipment, all wire shall be tested for resistance to ground.

C. Perform insulation resistance test on 480-volt circuits and on motors phase to ground after installation and before energizing. Investigate causes and take remedial action when insulation resistance tests indicate a significant downward trend in the resistance readings. Insulation resistance shall be one megohm or greater.

D. Do not perform insulation resistance test of circuits operated at or below120 volts, on solid state equipment, static ground fault devices, including ground fault circuit interrupters, or on any circuit connected to equipment containing solid state devices, unless such test is authorized by, and is performed in strict accordance with equipment manufacturer's recommendations.

E. Provide all test results to CQC Engineer.

RCI 20111-029R
DCN 20111-035

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg	(6) DATE
20111	641g.2 FSC-~~599~~	1 of 10	01/29/01

(3) S/C TITLE: OSDF ENCHANCED PERMANENT LEACHATE TRANS. SYS. PROJECT

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: ELEC. POWER TO BLDG 28E

(11) DCN NO.: 20111-036

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
OVERHEAD POWER TRANSMISSION SYSTEM PLAN	9PX-0000-E-00258	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [✓] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [✓] NOT REQUIRED

PROVIDE POWER TO BLDG 28E FROM OSDF LEACHATE POWER LINE.

(10) REQUESTOR: RICK McGUIRE COMPANY: Fluor Fernald DATE: 1/29/01

(12) CE / PE DON GOETZ DATE: 01/29/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [✓] YES (14) FOR DCN: [✓] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

THIS DCN WILL REQUIRE DWG UPDATES.

THIS DCN WAS CREATED BY RFS 4201.

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: James E. Kerl 1-29-01

[ ] FIT [ ] FORM [✓] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CCC21

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 2/01/01

PERFORMANCE GRADE: (17) James C. Jenkins

(18) CONSTRUCTION CONCURRENCE DATE: 1/29/01 Richard L. McGuire

PURCHASE REQUISITION REQUIRED? [✓] YES [ ] NO (19)

(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

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REV. 5: 10/01/99

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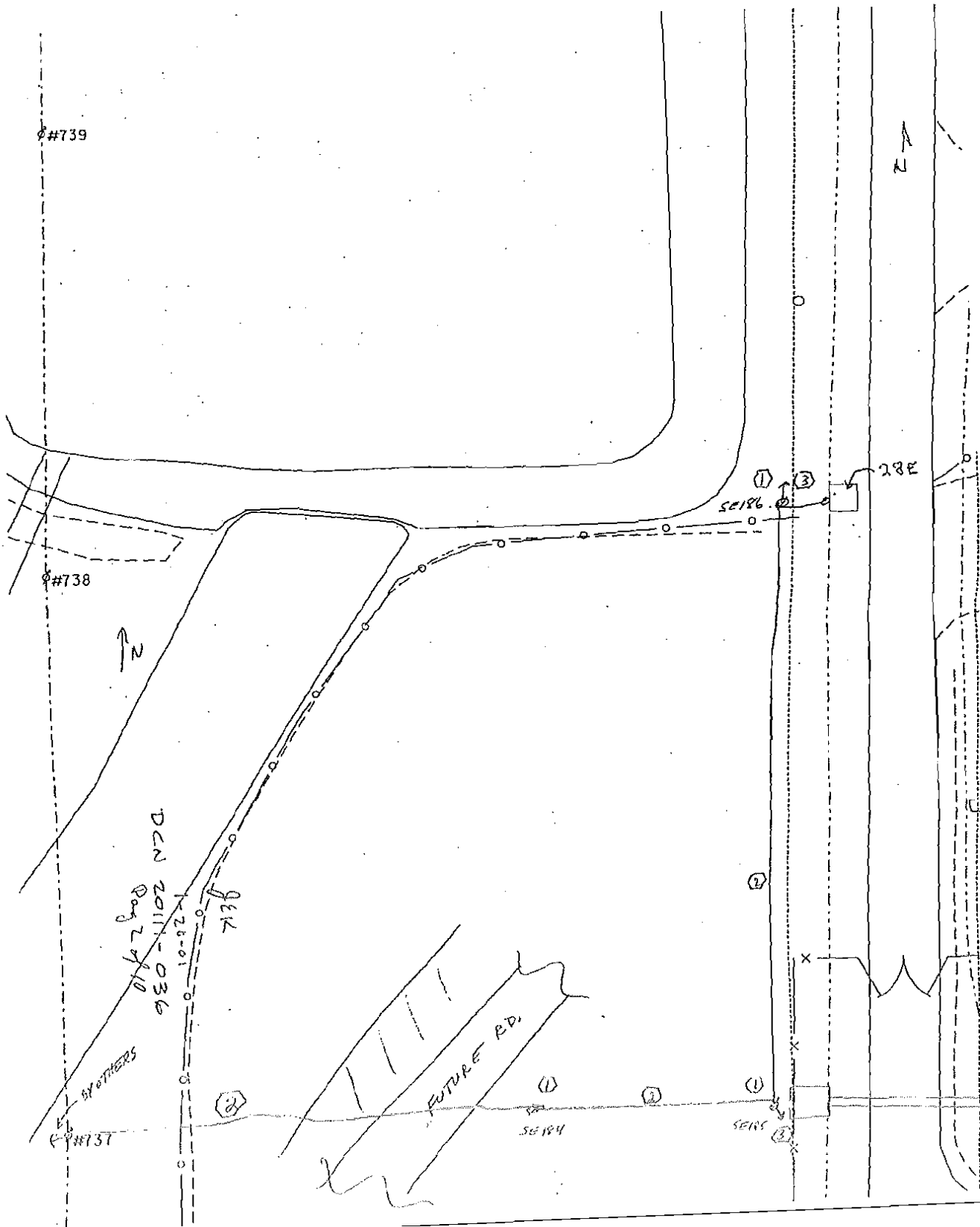
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DCN 2011-1102
1-26-01
713B

Fernald
Environmental Restoration
Management Corporation
PO Box 398704
Cincinnati, Ohio 45239-8704
(513) 738 6200

ENGINEERING CALCULATION

PROJECT NUMBER:	4201
BY:	J & K
DATE:	1-26-01
PAGE:	OF
REVISED:	

SUBJECT:

Modification Notes

1. Install NEW Poles SE184, SE185 + SE186
2. Install new 480V Feeder from Pole 737 on new poles to Bldg 28E
3. Install Guys on the following Poles SE185 and SE186.
4. Install transformer connections as detailed on dwg. 25A-5500-E-00222.

GUY Wire Anchoring

Pole #	anchor	Guys	angle of Guy Wire to Ground
SE186	1-12"	1-1/2"	60°
SE185	1-12"	1-1/2"	60°
737	OTHERS	SEE DWG 90X-6000-E-00258	

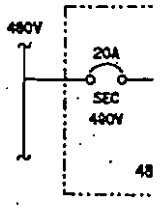
GENERAL NOTES:

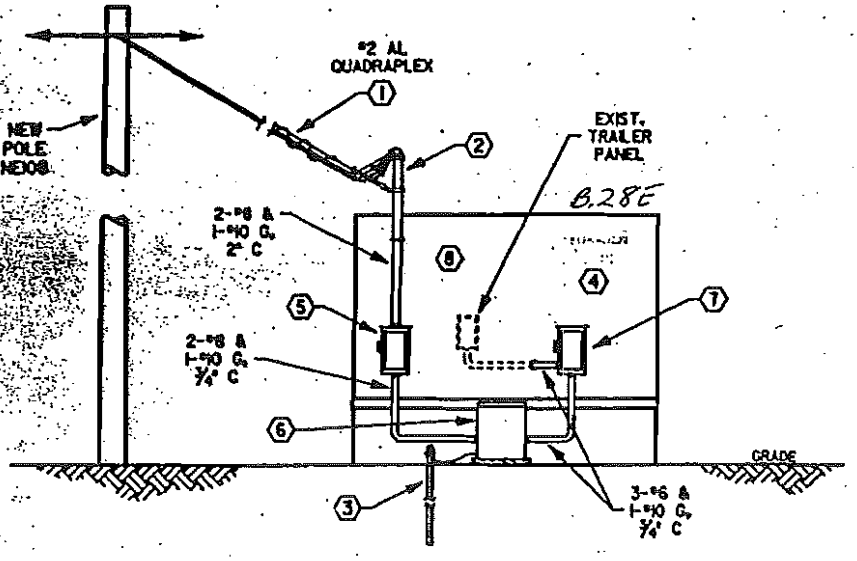
1. ALL WIRING SHALL BE COPPER (CU) WITH THWN INSULATION UNLESS OTHERWISE NOTED.
2. PRIOR TO DIGGING, CONSULT UNDERGROUND UTILITIES DRAWINGS 22F-5500-P-00663 (GRID 4) FOR THE LATEST UNDERGROUND UTILITY INFO. ON FILE.
3. DIG SETTING HOLES LARGE ENOUGH TO PERMIT USE OF POWER TAMPERS TO FULL DEPTH. PLACE EARTH IN MINIMUM 6 INCH LAYERS AND PACK TO 95% DENSITY PER ASTM D698. BANK EARTH 12" ABOVE GRADE.
4. NEW POLES SHALL BE 45 FEET, CLASS 2 SOUTHERN PINE, 100% TREATED WITH 6½ FEET MINIMUM BURIAL.
5. NEW AERIAL WIRING TO BE #2 AL QUADRAPLEX (3 INSULATED AND 1 BARE) ATTATCHED TO POLES WITH CHANCE #79M UNIVERSAL MESSENGER HANGERS WITH MAX. 3 FEET CABLE SAG BETWEEN POLES. FOR POLE GUY, ANCHORING AND ATTACHMENT DETAILS SEE DRAWINGS 16X-5500-E-00105 AND 16X-5500-E-00106.
6. MAINTAIN 10FOOT SPACING BETWEEN NEW 480V WIRING AND TOP OF POLE.
7. FOR POLE COORDINATES FOR EXISTING POLES SEE DRAWING 22X-5500-E-00958.
8. AS BUILT LOCATION COORDINATES (NAD83) FOR PROPOSED POLES TO BE SUBMITTED TO CADD SERVICES UPON COMPLETION OF JOB.

J&K
1-26-01

DCN 20111-036

FS-F-78 B (REV.)





A ELEVATION
TRAILER T-191 &
NEW POLE NEX08

FROM DWG.
#90X-5500-E-00549

ELEVATION "A" NOTES:

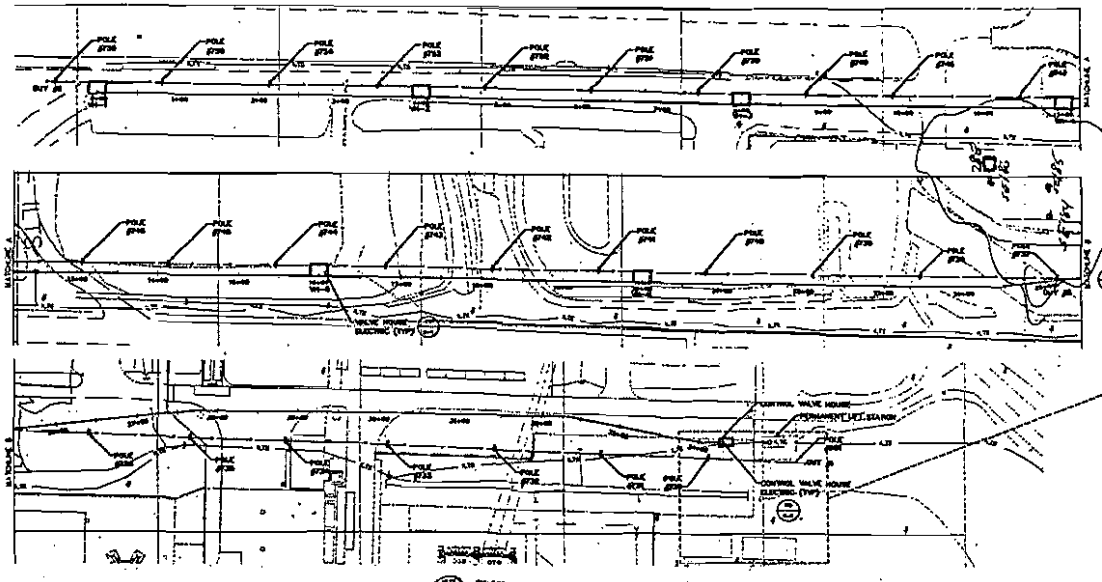
1. EXTEND FEEDER CONDUCTORS FOR AERIAL FEED TO B.28E. (ONE PHASE WILL NOT BE NEEDED DUE TO THE TRAILER SERVICE IS SINGLE PHASE).
2. INSTALL ELECTRIC MAST 12 FEET MINIMUM ABOVE GRADE.
3. INSTALL #6 BARE CU GROUND WIRE FROM TRANSFORMER TO 5/8" x 8' GROUND ROD.
4. INSTALL NUMBER AND LABELS AS DESCRIBED ON TRAILER TYPICAL INSTALLATION DRAWINGS 44X-5500-E-00363 AND 44X-5500-E-00366.
5. PROVIDE 60 AMP, 480V, 2 POLE OUTDOOR FUSE SWITCH WITH 40 AMP FUSES - LABEL SW-B28E FED FROM POLE 737
6. PROVIDE 15 KVA, 480V - 240V/120V OUTDOOR PAD MOUNT TRANSFORMER WITH 2' PRECAST CONCRETE PAD - LABEL XFMR-B28E
7. PROVIDE 60 AMP, 240V, 2 POLE OUTDOOR FUSE SWITCH WITH 60 AMP FUSES - LABEL SW-B28E FED FROM POLE 737
8. PROVIDE CONDUIT AND WIRING AS SHOWN IN ELEVATION.

JAK
1-26-01

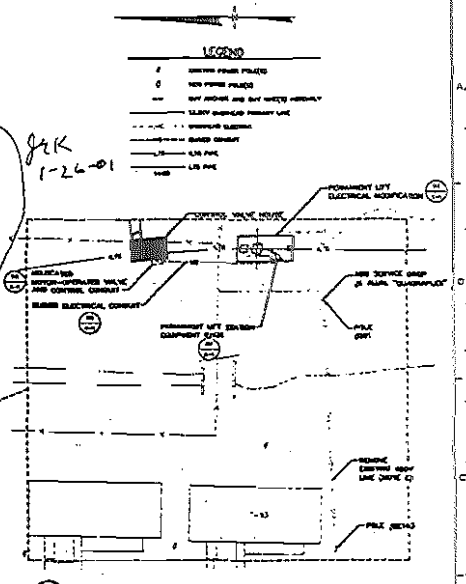
Page 4 of 10

DCN 20111-036

PROD.#7284_Vol 5



PLAN
SITE ELECTRICAL PLAN



PLAN
PERMANENT LIFT STATION AND CONTROL VALVE HOUSE ELECTRICAL PLAN

LEGEND

POLE SCHEDULE
(NADED)

POLE INFORMATION

ELECTRICAL EQUIPMENT ON POLE

CABLE STRINGING TABLE

GUY ASSEMBLY SCHEDULE

NOTES

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

FLUOR FERNALD, INC.

ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM

OVERHEAD POWER TRANSMISSION SYSTEM PLAN

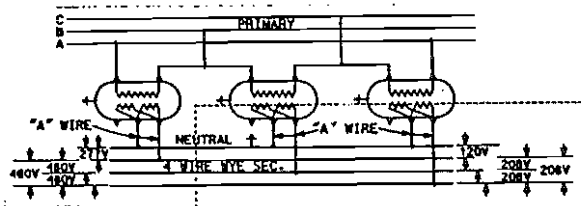
CERTIFIED–FOR–CONSTRUCTION

FOR INFORMATION ONLY
GABO SERVICES

JAN 11 2001

JRK 1-26-01

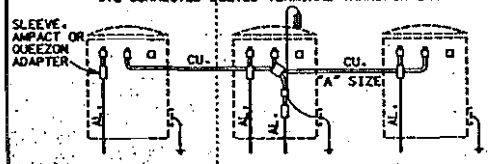
Page 5 of 10
DCN 2011-036



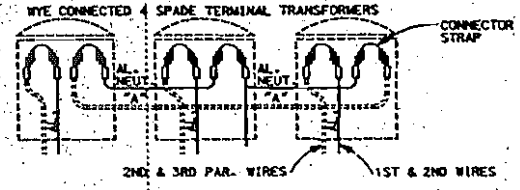
NOTES:

1. TWO BUSHING 13.2KV CONVENTIONAL TRANSFORMERS MUST BE USED.
2. THIS INSTALLATION WILL NOT OPERATE WITH ONE UNIT MISSING.

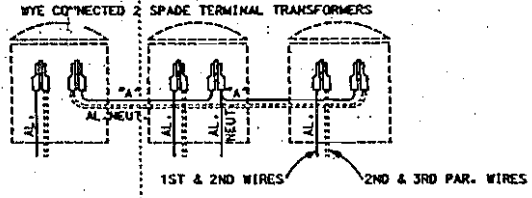
WYE CONNECTED BOLTED TERMINAL TRANSFORMERS



WYE CONNECTED 4 SPADE TERMINAL TRANSFORMERS



WYE CONNECTED 2 SPADE TERMINAL TRANSFORMERS

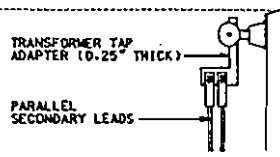


NOTES:

1. PARALLEL CONDUCTORS MUST BE OF EQUAL SIZE AND CONDUCTIVITY.
2. DO NOT STACK ALUMINUM PADS ON TRANSFORMER SPADE TERMINALS.
3. BOLT ALUMINUM PADS TO SPADES WITH STAINLESS STEEL BOLT ASSEMBLIES.
4. CONNECT SERVICE NEUTRAL TO TRANSFORMER SPADE TERMINAL IF ADEQUATE SPACE EXISTS.
5. TO PARALLEL CONDUCTORS, COPPER OR ALUMINUM, FROM BOLTED SECONDARY TERMINALS USE TRANSFORMER TAP ADAPTER.
6. TRANSFORMER WIRES ARE USUALLY #2 SOL. W.P. CU., NEVER ALUMINUM.
7. THE TRANSFORMER CASE MUST ALWAYS BE GROUNDED INTERNALLY AND EXTERNALLY.

SMALLER TRANSFORMERS (100KVA & LESS) HAVE BOLTED SECONDARY TERMINALS WHICH REQUIRE COPPER CONDUCTORS.

IF IT IS NECESSARY TO PARALLEL CONDUCTORS, COPPER OR ALUMINUM, FROM BOLTED SECONDARY TERMINALS, SUCH AS A 120/208V SERVICE, USE A TRANSFORMER TAP ADAPTER.



USE STAINLESS STEEL BOLT ASSEMBLIES TO ATTACH ALUMINUM COMPRESSION PADS TO TAP ADAPTER.

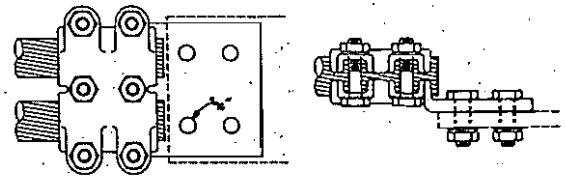
USE SILICON BRONZE BOLT ASSEMBLIES TO ATTACH BRONZE SECONDARY PAD TERMINALS TO TAP ADAPTER. SEE BELOW.

SPADE SECONDARY TERMINALS

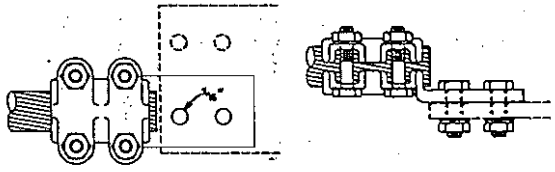
LARGER TRANSFORMERS (100KVA & UP) HAVE SPADE TYPE SECONDARY TERMINALS. BRONZE SECONDARY PAD TERMINALS ARE USED FOR COPPER CONNECTORS AND ARE BOLTED TO THE TRANSFORMER SPADE WITH SILICON BRONZE BOLTS. IF AN ALUMINUM PAD IS INSTALLED ON THE OPPOSITE SIDE OF THE TRANSFORMER SPADE, STAINLESS STEEL BOLT ASSEMBLIES ARE REQUIRED.

SILICON BRONZE BOLTS ARE AVAILABLE FROM 1" TO 4-1/2" LENGTHS WITH EACH BOLT A 1/2" NUT, A 1/2" LOCK WASHER AND A 1/2" ROUND WASHER ARE REQUIRED.

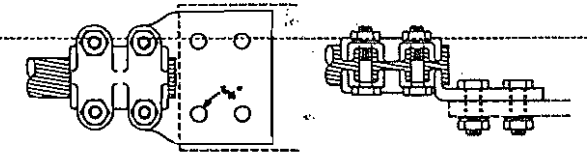
THE FOLLOWING ARE DRAWINGS OF FIVE BRONZE SECONDARY SPADES. THE FIRST THREE ARE NORMALLY USED FOR OVERHEAD TRANSFORMERS. THE LATER TWO ARE NORMALLY USED BY UNDERGROUND.



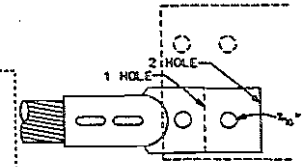
ANDERSON SWHD-050-C
250-500 MCM NORMALLY USED FOR POLE MOUNTED TRANSFORMERS



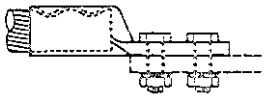
ANDERSON SWL 05082
250-500 MCM NORMALLY USED FOR POLE MOUNTED TRANSFORMERS



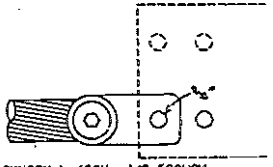
ANDERSON SWHM 100C 750-1000 MCM



FOR INDENTS USE BURNDY Y-44 PRESS. A BURNDY Y-48 PRESS WHICH MAKES SEMI-CIRCULAR CRIMPS CAN BE USED.



BURNDY HY-LUG
1 HOLE 500 MCM
2 HOLE 750 MCM
3 HOLE 1000 MCM
NORMALLY USED FOR PAD MOUNTED TRANSFORMERS AND FOR VAULT TRANSFORMERS WHERE CONDUCTOR CONNECTIONS ARE NEEDE.



AN ALLEN WRENCH IS SUPPLIED WITH CARTON OF CONNECTORS.

BLACKHORN L-400H 4/0-500MCM
USE AS ALTERNATE FOR BURNDY HY-LUG YA-34.

OVERHEAD TRANSFORMER SECONDARY CONDUCTOR LEAD SIZES

KVA SIZE FOR ONE TRANSF.	120/208V 3Ø (A, A, NA) "A" WIRE COPPER	120/208V 3Ø "A" WIRE ALUM.	120/240V 1Ø (A, N, A) "A" WIRE COPPER	120/240V 1Ø "A" WIRE ALUM.	277/480V 3Ø (A, N, A, A) "A" WIRE COPPER	277/480V 3Ø "A" WIRE ALUM.
10	2	1/0	2	1/0	—	—
15	2	1/0	2	1/0	—	—
25	2	1/0	2	1/0	2	1/0
37	2/0	4/0	2	1/0	2	1/0
50	4/0	350	2	1/0	2	1/0
75	500	2-350	2/0	4/0	2/0	4/0
100	2-300	2-500	4/0	350	4/0	350
167	2-500	3-500	500	2-350	500	2-350
333	4-500	4-750	2-500	3-500	2-500	3-350
500	—	—	—	—	3-500	4-500

NOTES:

1. THE ABOVE LISTED CONDUCTORS ARE SIZED TO CARRY AT LEAST 120% OF TRANSFORMER NAME PLATE RATINGS FOR SUMMER LOADING AND CAN BE USED FOR 170% WINTER LOADING.
2. THE SMALLER SIZE TRANSFORMERS HAVE BRONZE BOLTED CLAMP TYPE SECONDARY TERMINALS AND THE LARGER ONES HAVE SPADE TERMINALS. DO NOT PLACE ALUMINUM CONDUCTORS DIRECTLY INTO A BRONZE BOLTED CLAMP TYPE TERMINAL - USE AN ALUMINUM TO COPPER ADAPTER (i.e.-SLEEVE, SQUEEZON, AMPACT). DO NOT PLACE MORE THAN ONE CONDUCTOR IN A BOLTED CLAMP TYPE TERMINAL. USE TRANSFORMER TAP ADAPTER. ALUMINUM PADS CAN BE BOLTED DIRECTLY TO SPADE TERMINALS.
3. USE CONNECTOR STRAPS TO PARALLEL OR SERIES SECONDARY WINDINGS ON UNITS WITH FOUR SPADE TERMINALS.
4. PARALLEL CONDUCTORS MUST BE OF EQUAL SIZE AND LENGTHS.
5. FOR MECHANICAL PURPOSES, TRANSFORMER SECONDARY LEADS SHALL NOT BE ANY SMALLER THAN 2 COPPER OR 1/0 ALUMINUM.

NO.	REVISIONS	DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.
					1	AS BUILT	9/3/98	EL HE	MEA
					0	ISSUE CFC	8/6/97	JE JOHNSON	BDL

REF. DWG. NO.
96X-5500-E-00307
50-4445-E-00445
50-4445-E-00464
25A-5500-E-00223
25A-5500-E-0022[illegible]
25A-5500-E-00209
25A-5500-E-00208
25A-5500-E-00207
25A-5500-E-00206
25A-5500-E-00205
25A-5500-E-00204
25A-5500-E-00203

NOTE: PLACE SAMPL FORMATS CARD GRAPHIC, DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

APPROVALS: CIVIL & STR. ELECTRICAL ENGINEER INSTRUMENT MECHANICAL — SAFETY, ENV. MAINTENANCE, FM PROJECT, MAIN. MGMT. SECURITY, PROJECTS — CHECKED — APPROVED

Fernald Environmental Management Project

FERNALD

U.S. DEPARTMENT OF ENERGY

DEST OF ANNT

SEWAGE TREATMENT RELOCATION

OVERHEAD TRANSFORMER CONNECTIONS

NO SCALE

25A-5500-E-00222 | 1

FILE NAME: /usr2/moduireas/rea2867/25ae0222.dgn

DCN 20111-036

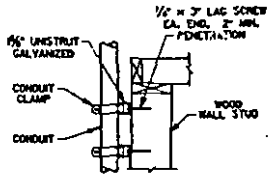
JJK 1-26-01

Page 6 of 10

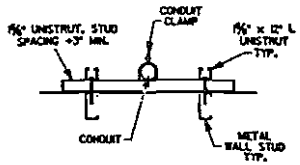
PROD #7284 Vol.5

CADD SERVICES

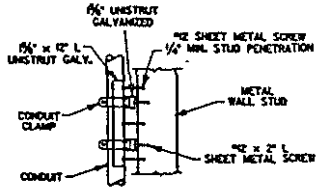
PROD #7284_Vol 5



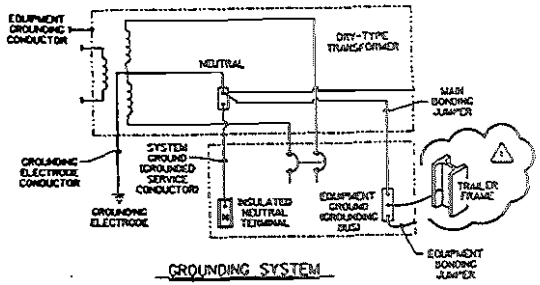
CONNECTION DETAIL
WOOD WALL STUD



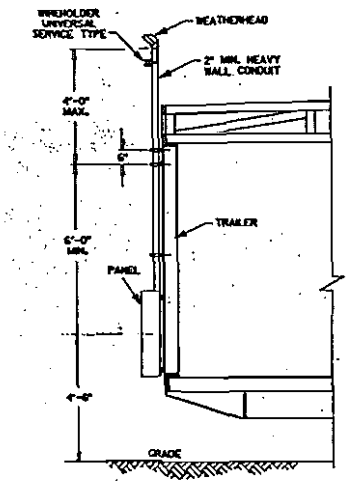
CONNECTION PLAN VIEW
METAL WALL STUD



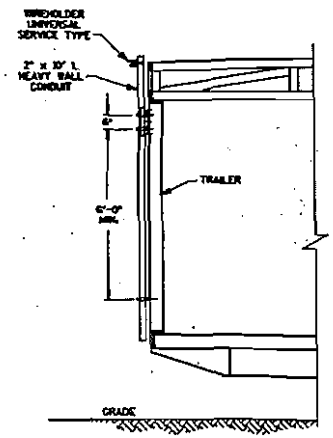
CONNECTION DETAIL
METAL WALL STUD



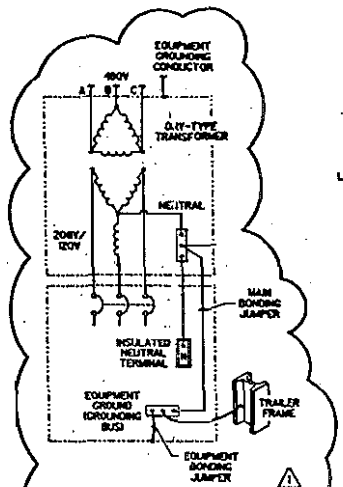
GROUNDING SYSTEM
SINGLE PHASE, 3-WIRE SERVICE



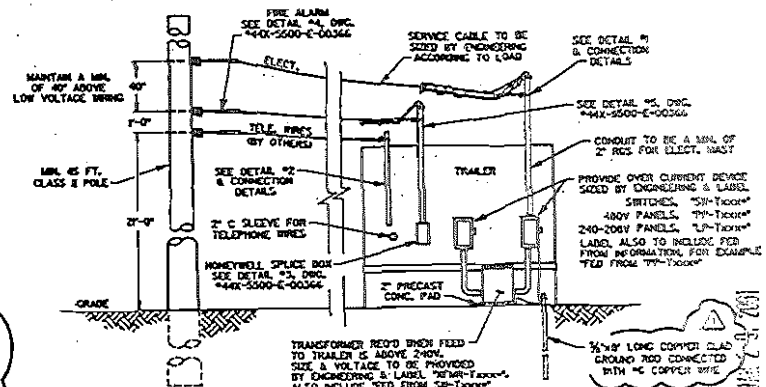
DETAIL #1
ELECTRICAL SERVICE ENTRANCE



DETAIL #2
TELEPHONE SERVICE ENTRANCE



GROUNDING SYSTEM
THREE PHASE, 4-WIRE SERVICE



ELEVATION
TRAILER FEED

CONNECTION NOTES:

1. ALL FASTENERS AND HARDWARE TO BE ZINC PLATED.
2. SHEET METAL SCREWS TO BE SELF-DRILLING TYPE WITH HEX HEAD.
3. LAG SCREWS TO BE HEX HEAD TYPE.
4. CAULKING TRAILER PENETRATIONS IS RECOMMENDED.
5. USE WASHER UNDER HEADS OF ALL FASTENERS.
6. PROVIDE A MINIMUM OF 12"-0" BETWEEN WREHOLDER AND GRADE.
7. PROVIDE A MINIMUM CLEARANCE OF 40" BETWEEN ELECTRICAL POWER AND TELEPHONE CABLES.
8. INSTALL TELEPHONE BACKBOARD. SEE SPECIFICATIONS.

FOR ~~INFORMATION ONLY~~ GJK
CADD ~~SERVICES~~

GENERAL NOTES:

1. ALL WIRING TO BE COPPER WITH THWN INSULATION UNLESS OTHERWISE SPECIFIED.
2. USE STRUCTURAL CHANNEL TO ATTACH ELECTRICAL EQUIPMENT TO STRUCTURES.
3. SET 45 FT. POLES AT 6'-6" BELOW GRADE.
4. TAP AERIAL WIRING USING SPLIT BOLT APPROVED FOR AL/CU AND TAP SPLICE.
5. ALL WIRING AND CONDUIT TO BE SIZED BY ENGINEERING.
6. GROUND TRAILER FRAME TO PANEL USING UL APPROVED GROUNDING BOLTS.

STANDARDS:

BEFORE NEW TRAILERS ARE LOCATED ON SITE OR EXISTING TRAILERS ARE RELOCATED, CONTACT FOF REAL PROPERTY: MILAN MARSHALL 640-7[illegible] FOF PM-100

SHT. 3 DWG. NO. 44X-5500-E-00366
SHT. 2 DWG. NO. 44X-5500-S-00364

NO.	REVISIONS	DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
					1	ADDED THREE PHASE GROUNDING DETAIL, NOTE #8	MW	SJS	GJK	
						& GENERAL REVISIONS PER RCS #3692				44X-5500-E-00366
					0	ISSUE FOR SYSTEM	MW	SJS	GEP	44X-5500-S-00364

NOTE: FLUOR DANIEL FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DIVISION

APPROVAL: CIVIL & STR. — SUPERVISOR; ELECTRICAL — SUPERVISOR; ENGINEER; NO THRUSHOLD; MECHANICAL; CHECKED; APPROVED

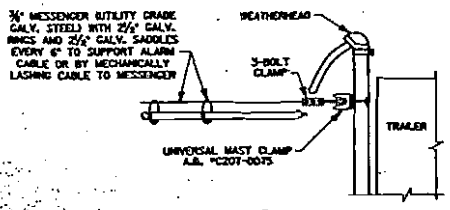
Fernald Environmental Management Project
FLUOR DANIEL FERNALD
U.S. DEPARTMENT OF ENERGY

SHEET 1 OF 3
TRAILER INSTALLATION TYPICAL DETAILS
ELECTRICAL & TELEPHONE SERVICE
SCALE: NONE
44X-5500-E-00363

FILE NAME: /TRAILER/44XE0363.DGN

R44xel363.m(924.cadd10) rmoc7314@cadd10, Mon Oct 5 11:30:10 EDT 1998

PROD #7284_Vol 5

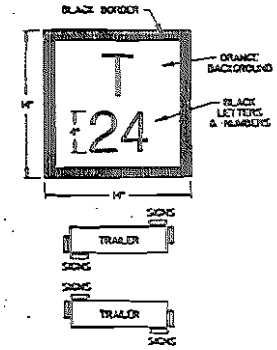


DETAIL #5
FIRE ALARM WEATHERHEAD

HONEYWELL FIRE ALARM MATERIAL LIST			
ITEM NO.	QTY.	DESCRIPTION	PART NUMBER
1		F CATING CARD	HONEYWELL P/N M50580-002
2		A ATING CARD	HONEYWELL P/N M50506-001
3		PHOTO ELECTRIC SMOKE DETECTORS	HONEYWELL P/N TC804C
4		SMOKE DETECTOR BASES	HONEYWELL P/N M50658T-001
5		RATE OF RISE/FIXED TEMPERATURE HEAT DETECTORS	HONEYWELL P/N T4057A
6		MANUAL PULL STATIONS - WEATHERPROOF	HONEYWELL P/N S464A428
7		HORN/STROBE UNITS	HONEYWELL P/N SC1768-109
8		STROBES	HONEYWELL P/N SC1835-2001
9		EVAC SPEAKERS	HONEYWELL P/N SC1A1015
10		LIGHTNING SUPPRESSORS FOR EVAC	HONEYWELL P/N M50242-016
11		LIGHTNING SUPPRESSORS FOR HORN CIRCUIT	HONEYWELL P/N M50242-018
12		LIGHTNING SUPPRESSORS FOR SMOKE DETECTORS AND MANUAL PULL STATIONS	HONEYWELL P/N M50242-005
13		1.3K (UL) LISTED END OF LINE RESISTORS FOR SMOKE DETECTORS, HEAT DETECTORS, MANUAL PULL AND HORN/STROBE CIRCUITS	HONEYWELL P/N M50600-001
14	TBD	8 PAIR 16/2 OVERHEAD CABLE	BELDEN P/N 10714
15	TBD	18/2 RED/YELLOW STATION WIRING FOR SMOKE DETECTORS AND MANUAL PULL STATIONS	HONEYWELL P/N AK3702R
16	TBD	18/2 YELLOW/BROWN STATION WIRING FOR HORN/STROBES	HONEYWELL P/N AK3702B
17	TBD	16/2 BLACK/WHITE SPEAKER WIRE FOR EVAC SPEAKERS	ANY COMMERCIAL SPEAKER CABLE IS ACCEPTABLE
18A	TBD	PLENUM CABLE - 2 PR (SEE NOTE 2)	HONEYWELL P/N B6222UL
18B	TBD	PLENUM CABLE - 1 PR (SEE NOTE 2)	HONEYWELL P/N B6220UL
19		MOBILE EVAC CABLE	HONEYWELL MOBILE EVAC

NOTES:

1. FINAL HONEYWELL WIRING CONNECTIONS SHALL BE DONE BY ON-SITE F ALARM CONTRACTOR.
2. PLENUM CABLE ...J BE USED WITHOUT PROTECTION ONLY 7FT. ABOVE FINISH FLOOR (A.F.F.). USE EMT CONDUIT BELOW 7FT. A.F.F.

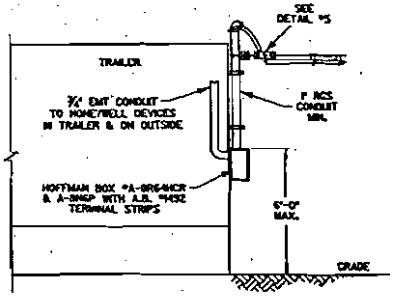


APPROVED MARKING METHODS

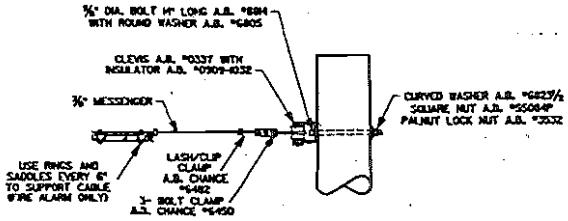
SIGN NOTES:

1. FOR TRAILER IDENTIFICATION MARKING CONTACT FIRE & SAFETY PROTECTION, GARY EVANS (648-4293), BILL PRUES (648-4295).
2. IDENTIFICATION SIGNAGE SHALL BE MADE BY FEMP GRAPHICS DEPARTMENT. CONTACT VENISA BLALOCK (648-5251).

FOR INFORMATION ONLY
CADD SERVICES



DETAIL #3
HONEYWELL SPLICE BOX



DETAIL #4
MESSENGER ATTACHMENT

Page 8 of 10

SHT. 2 DWG. NO. 44X-5500-S-00364
SHT. 1 DWG. NO. 44X-5500-E-00363

INDEX CODE				
PL & AR.	DWG.	CL.	SEQ. NO.	REV.
23X	5500	E	00194	4

NO.	REVISIONS	DATE	DWN.	BY	APPD.
4	REVISED SIGN NOTES	10/2/00	SJS	GEP	
3	REVISED AS PER RCS 3985	9/21/99	MWD	JLW	
2	ISSUED CFC PER RCS3721	8/12/99	JMW	JLW	
1	MOVED APP. MARKING METHOD DETAIL FROM SHT. 1 TO THIS SHT., CHG.'D DWG. TITLE PER RCS #3692	1/3/98	SJS	GEP	44X-5500-S-00364
0	ISSUE FOR SYSTEM	1/6/98	SJS	GEP	44X-5500-E-00363

REF. DWG. NO.

N FLUOR ... FERNALD CADD DRAWING, DO NOT REVISE MANUALLY.

CONFIG. MGMT. DRAW.

APPROVED: CIVIL & SITE, ELECTRICAL, CHEMICAL, INSTRUMENT & CONTROL, MECHANICAL, CHECKED, APPROVED — SAFETY & ENVIRONMENTAL, AIR QUALITY, WASTE MANAGEMENT, SECURITY, PROJECTS

Fernald Environmental Management Project
FERNALD
U.S. DEPARTMENT OF ENERGY

SHEET 3 OF 3
TRAILER INSTALLATION TYPICAL DETAILS
HONEYWELL SERVICE/MISC.
SCALE: NONE
44X-5500-E-00366 | 4

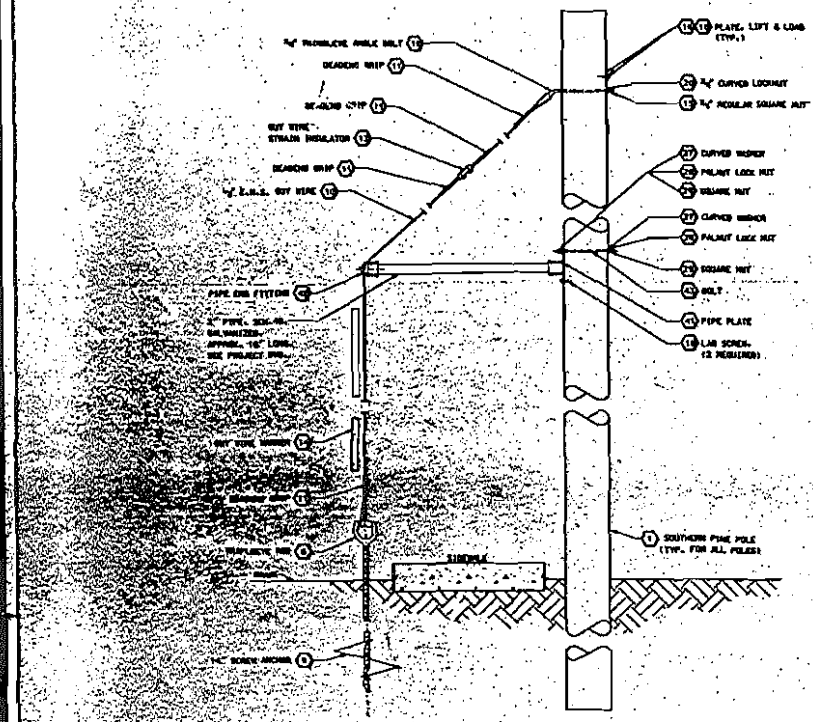
DCN 20111-036

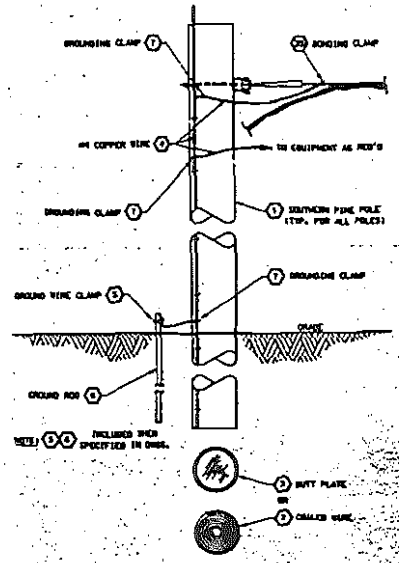
AJK 1-29-01

FILE NAME: /TRAILER/44XE00366.DGN

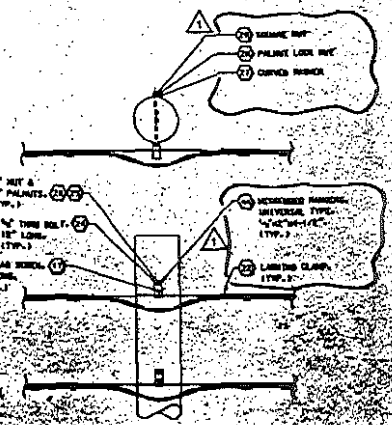
JAN 29 2001

PROD #7284_Vol 5





POLE GROUNDING
TYP. FOR ALL POLES



W/O-SPAN DETAIL

NOTES:

1. CLASS 2, 100% TREATED SOUTHERN PINE POLE.
2. 12 FEET OF #4 COPPER (CU) WIRE COILED AND STAPLED (COPPER CLAD- 1-1/2" LONG).
3. BUTT PLATE: POLE BOTTOM GROUND PLATE - COPPER. "BLACKBURN" #CP114.
4. #4 COPPER WIRE STAPLED (COPPERCLAD- 1-1/2" LONG) EVERY 2'-0" AND EXTENDED 9" ABOVE POLE.
5. GROUND CLAMP (FOR GROUND WIRE CONNECTION) - 3/8" DIAMETER. BRONZE OR BRASS. "BURNDY" #GR03H.
6. GROUND ROD. 5/8" DIAMETER x 10'-0" LONG COPPER WELD. "BLACKBURN" #CC7518.
7. GROUNDING CLAMP - WIRE TO WIRE. "BURNDY" #GR2H4C.
8. TRIPLEYE ROD. 7 FOOT MINIMUM SHAFT LENGTH. "A.B.CHANCE" #C102-0053.
9. 10 (8-SCREW) ANCHOR. "CHANCE" #C102-5203.
10. 1/4" E.H.S. GUY WIRE.
11. DEADEND GRIP - PREFORMED TWISTED LOOP. CLASS A OF 3 GALVANIZED. SIZED FOR GUY WIRE.
12. GUY CLAMP. 3 BOLT. "CHANCE" #6457.
13. GUY STRAIN INSULATOR. SIZED FOR GUY WIRE (EX: 5/8" WIRE MAX. "CHANCE" #7051.
14. GUY WIRE MARKER - HALF ROUND UV RESISTANT. YELLOW PLASTIC. 2" WIDE x 36" LONG WITH MOUNTING HARDWARE. "CHANCE" #86-950-CY.
15. 5/8" TRIPLEYE ANCHOR BOLT. 3" LONGER THAN POLE DIAMETER. "CHANCE" #8114T (14" LONG).
16. PLATE, LIFT AND LOAD - 3 HOLE. "CHANCE" #7007.
17. 1/4" DIA. x 4" LONG LAG SCREW. "CHANCE" #6007S4.
18. 1/4" DIA. x 5" LONG LAG SCREW. "CHANCE" #6007S5.
19. REGULAR SQUARE NUT. 5/8". "CHANCE" #550005.
20. CURVED LOCK NUT. 5/8". "CHANCE" #0812.
21. SERVICE CLAMP. 1-1/4" TO 2-1/2" CONDUIT. "CHANCE" #C207-0075. 3" TO 4" CONDUIT. "CHANCE" #C207-0077.
22. LASHING CLAMP. "CHANCE" #9000.
23. GUY WIRE CLIP. "CHANCE" #6404.
24. 5/8" BOLT. 12" LONG. "CHANCE" #0812.
25. 5/8" BOLT. 14" LONG. "CHANCE" #0814.
26. ROUND WASHER. "CHANCE" #6006.
27. CURVED WASHER. "CHANCE" #6820-1/2.
28. PALNUT LOCK NUT. "CHANCE" #0532.
29. SQUARE NUT. "CHANCE" #550049.
30. 5/8" OVAL-EYE BOLT. 14" LONG. "CHANCE" #291004.
31. CURVED WASHER. 5/8" BOLT HOLE. "CHANCE" #6625.
32. PALNUT LOCK NUT. 3/4". "CHANCE" #0533.
33. SQUARE NUT. 3/4". "CHANCE" #550009.
34. CLEVIS. "CHANCE" #0337.
35. INSULATOR. "CHANCE" #0800-1103.
36. STRAIGHT-LINE DEADEND CLAMP. "CHANCE" #C38720.
37. SERVE CLAMPS.

	AGR	AL	AWAC
"BLACKBURN" #MS2-4	2-4	1 STR-4 SAL	2-4
"BLACKBURN" #MS2-1	1/0-4	2/0 STR-4 SAL	1/0-4
"BLACKBURN" #MS4-2-0	4/0-2/0	4/0 STR-2/0 SAL	4/0-2/0

38. BONDING CLAMP. "CHANCE" #C01.
39. THIMBLES. GUY WIRE 1/4". "CHANCE" #6394.
40. SQUARE SHAFT "SS" SCREW ANCHOR COMBINATION: 10'-12"-14" HELICES. "CHANCE" #1256H-3CSM. 5 FOOT EXTENSION. "CHANCE" #1260T. TRIPLEYE. "CHANCE" #C102-0025.
41. POLE PLATE. "CHANCE" #0501
42. END FITTING w/ CLAMP. "CHANCE" #0512
43. 5/8" BOLT. 24" LONG. "CHANCE" #0876
44. MECHANICAL RANGER, UNIVERSAL TYPE. 5/8" x 2" x 4-1/2". "CHANCE" #7911

FOR INFORMATION ONLY
CADD SERVICES

JGK 1-25-01

NO.	REVISIONS	DATE/INIT.	STAPP.	NO.	REVISIONS	DATE/INIT.	STAPP.
1	REVISED AS PER RFI 3TH (WOOD SIDEWALK ANCHOR DETAIL)	1/8/01	JGK				

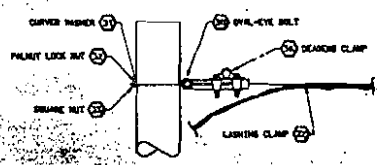
FILE-5500-E-00106
REF. DWG. NO.

Fernald Environmental Management Project
U.S. DEPARTMENT OF ENERGY

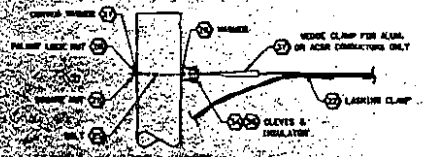
SHEET 2 OF 2
TYPICAL ELECTRICAL POWER POLE GUY WIRES, ANCHORING & AERIAL ATTACHMENT DETAILS

IGX-5500-E-00106 | 1

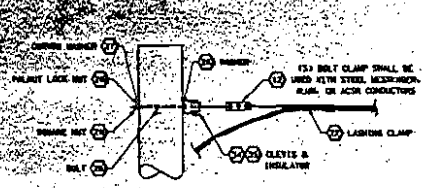
PROD #7284_Vol 5



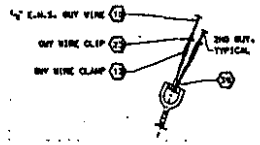
DEAD END CONNECTION DETAIL
90 - 150 FT. SPAN



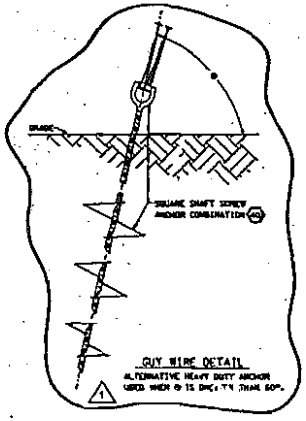
DEAD END CONNECTION DETAIL
0 - 90 FT. SPAN



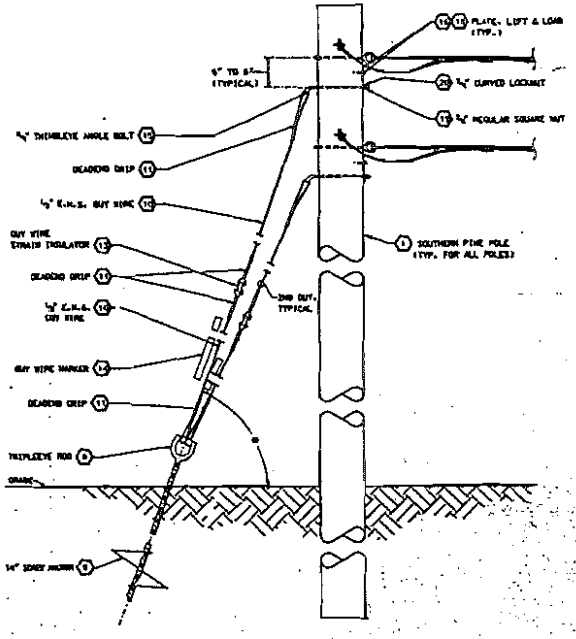
DEAD END CONNECTION DETAIL
0 - 90 FT. SPAN
(ALTERNATIVE)



GUY WIRE DETAIL
ALTERNATIVE TO WIRING PROFORMS FOR GUY WIRES LESS THAN OR EQUAL TO 1/2".

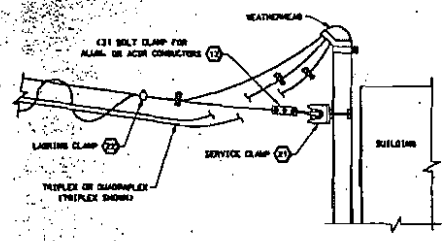


GUY WIRE DETAIL
ALTERNATIVE HEAVY DUTY ANCHOR USED WHEN Θ IS GREATER THAN 60°.

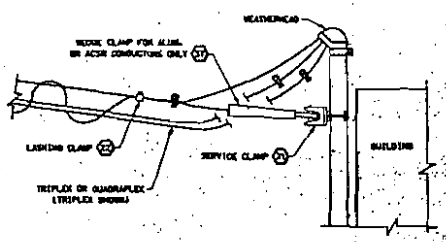


GUY WIRE DETAIL

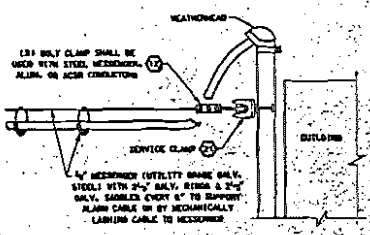
FOR INFORMATION ONLY
CADD SERVICES
JRK



SERVICE ENTRANCE DETAIL
0 - 90 FT. SPAN
TO POLE OR OTHER STRUCTURE



SERVICE ENTRANCE DETAIL
0 - 90 FT. SPAN
TO POLE OR OTHER STRUCTURE



SERVICE ENTRANCE DETAIL
0 - 90 FT. SPAN
TO POLE OR OTHER STRUCTURE

JRK 1-29-01

LEGEND:

Θ - GUY WIRE ANGLE TO BE DEFINED ON PROJECT DRAWING.

NOTES:

1. CLASS II, 100% TREATED SOUTHERN PINE POLE.
2. 12 FEET OF #4 COPPER (CU) WIRE COILED AND STAPLED (COPPER CLAD, 1-1/2" LONG).
3. BUTT PLATE: POLE BOTTOM GROUND PLATE - COPPER. "BLACKBURN" #CP114.
4. #4 COPPER WIRE STAPLED (COPPERCLAD, 1-1/2" LONG) EVERY 2'-0" AND EXTENDED 8" ABOVE POLE.
5. GROUND CLAMP (FOR GROUND WIRE CONNECTION) - 5/8" DIAMETER, BRONZE OR BRASS. "BURNDY" #GP034.
6. GROUND ROD, 3/4" DIAMETER X 10'-0" LONG COPPER WELD. "BLACKBURN" #CC1510.
7. GROUNDING CLAMP - WIRE TO WIRE. "BURNDY" #GC64C.
8. TRIPLEYE ROD, 3 FEET MINIMUM SHAFT LENGTH. "A.B.CHANCE" #C102-0053.
9. 14 IN-SCREW ANCHOR. "CHANCE" #C102-3203.
10. 1/2" E.H.S. GUY WIRE.
11. DEADEND GRIP - PREFORMED TWISTED LOOP, CLASS A OR B GALVANIZED, SIZED FOR GUY WIRE.
12. GUY CLAMP, 3 BOLT. "CHANCE" #C463.
13. GUY STRAIN INSULATOR, SIZED FOR GUY WIRE (EX: 5/8" WIRE MAX. "CHANCE" #7081.
14. GUY WIRE MARKER - HALF ROUND UV RESISTANT, YELLOW PLASTIC, 2" WIDE X 96" LONG WITH MOUNTING HARDWARE. "CHANCE" #06-750-24.
15. 3/4" THIMBLEYE ANGLE BOLT, 3" LONGER THAN POLE DIAMETER. "CHANCE" #C1147 (14" LONG).
16. PLATE, LIFT AND LOAD - 3 HOLE. "CHANCE" #7931.
17. 3/4" DIA. x 4" LONG LAG SCREWS. "CHANCE" #C0075A.
18. 3/4" DIA. x 5" LONG LAG SCREWS. "CHANCE" #C0075A.
19. REGULAR SQUARE NUT, 3/4". "CHANCE" #C5000P.
20. CURVED LOCK NUT, 3/4". "CHANCE" #C513.
21. SERVICE CLAMP, 1-1/4" TO 2-1/2" CONDUIT. "CHANCE" #CENT-0275. 3" TO 4" CONDUIT. "CHANCE" #CC07-0074.
22. LASHING CLAMP. "CHANCE" #C000.
23. GUY WIRE CLIP. "CHANCE" #C484.
24. 5/8" BOLT, 12" LONG. "CHANCE" #C012.
25. 5/8" BOLT, 14" LONG. "CHANCE" #C014.
26. ROUND WASHER. "CHANCE" #C002.
27. CURVED WASHER. "CHANCE" #C023-1/2.
28. PALNUT LOCK NUT. "CHANCE" #C532.
29. SQUARE NUT. "CHANCE" #C500P.
30. 3/4" OVAL-EYE BOLT, 14" LONG. "CHANCE" #C1100A.
31. CURVED WASHER, 3/4" BOLT HOLE. "CHANCE" #C025.
32. PALNUT LOCK NUT, 5/8". "CHANCE" #C532.
33. SQUARE NUT, 5/8". "CHANCE" #C500P.
34. CLEVIS. "CHANCE" #C137.
35. INSULATOR. "CHANCE" #C300-1032.
36. STRAIGHT-LINE DEADEND CLAMP. "CHANCE" #C0075A.
37. WEDGE CLAMP:

	ASR	AL	AAAC
"BLACKBURN" #WL2-4	2-6	1 STR-6 SOL	2-6
"BLACKBURN" #WD2-4	1/0-4	2/0 STR-2 SOL	1/0-4
"BLACKBURN" #WL4/0-4	4/0-2/0	4/0 STR-2/0 SOL	4/0-2/0

38. BORING CLAMP. "CHANCE" #C31.
39. THIMBLE, GUY WIRE 1/2". "CHANCE" #C484.
40. SQUARE SHAFT "SS" SCREW ANCHOR COMBINATION: 10"-12"-14" HELICES. "CHANCE" #C1654-3CJ4. 1 FOOT EXTENSION. "CHANCE" #C2617. TRIPLEYE. "CHANCE" #C102-0053.
41. POLE PLATE. "CHANCE" #C501
42. END FITTING W/ CLAMP. "CHANCE" #C812
43. 5/8" BOLT, 24" LONG. "CHANCE" #C874
44. MESSENGER HANGER, UNIVERSAL TYPE, 1/4" x 3" x 4-1/2". "CHANCE" #7511

NO.	REVISIONS	DATE	DRN.	CK.	APPD.
1	REVISED AS PER RES 1779 (ADDED SCREW ANCHOR DETAIL)		HS	WRD	JK/AB
0	0/2				

MKX-5500-E-0006
REV. DWG. NO.

NOTE: PLEASE REFER TO CADD DRAWING, DO NOT REVISE MANUALLY.

CONSOLIDATED EDISON
BLACKWATER
LEGEND

Fernald Environmental Management Project
FEMP
U.S. DEPARTMENT OF ENERGY

SHEET 1 OF 2
TYPICAL ELECTRICAL POWER POLE GUY WIRES, ANCHORING & AERIAL ATTACHMENT DETAILS

16X-5500-E-0010S

FILE NAME

DCN 2011-036

Page 10 of 10

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg 1 Of 4	(6) DATE
20111	641		2/01/01

(3) S/C TITLE: ENHANCED PERMANENT LEACHATE TRASMISSION SYSTEM

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: ADD UNIT HEATER @ CONTROL VALVE HOUSE

(11) DCN NO.: 20111-037

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
OVERHEAD POWER TRANSMISSION SYSTEM DETAILS 1	90X-6000-E-000259	0	
CONTROL VALVE HOUSE ELECTRICAL DETAILS	90X-6000-E-000262	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

JUSTIFICATION: ONE UNIT HEATER IN CONTROL VALVE HOUSE (CVH) WILL NOT BE ADEQUATE TO PROVIDE FREEZE PROTECTION UNDER PRESENT DESIGN CONDITIONS.
EXISTING CONDITION CVH DESIGN HAS ONE UNIT HEATER.
PROPOSED CHANGE: INSTALL ADDITIONAL UNIT HEATER (Q-MARK, MODEL MUH 05-21) INCLUDING WALL MOUNTING BRACKET. MAKE ASSOCIATED ELECTRICAL CHANGES AS SHOWN TO ACCOMODATE ADDITIONAL UNIT HEATER.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
JAMES C. JENKINS	FFI	2/01/01	JAMES C. JENKINS	2/01/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 1 Feb 2001

[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 2/06/01

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE: 2/01/01

PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

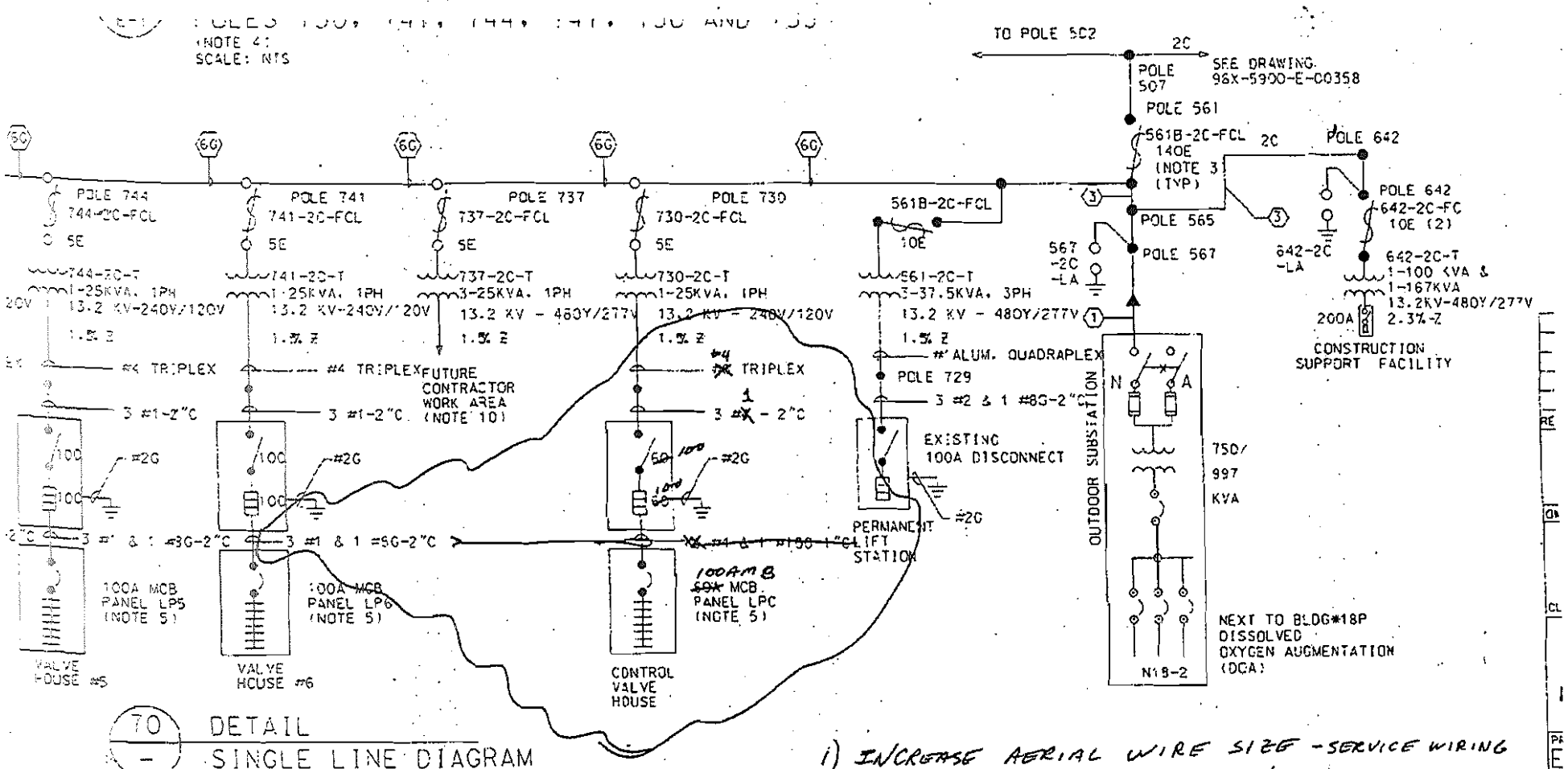
(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99: ED-12-5002

ORIGINAL

ECDC CONTROLLED
COPY NO. C 011



70 DETAIL
SINGLE LINE DIAGRAM
SCALE: NTS

1) INCREASE AERIAL WIRE SIZE - SERVICE WIRING
2) CHANGE FUSED SW. TO 100A FUSED SW + WIRING TO PANELBOARD.
3) CHANGE MAIN BRKR TO 100 E/2.
4) INSTALL NEW BRANCH BREAKER - 30/2.
5) INSTALL NEW HEATER AND CIRCUIT WIRING

JGK
1-30-01

DCN 2011-037 Pg 2 of 4

PANEL LPO 240V/120V,1PH,3W S.N. 225A MAINS

CKT. NO.	USE	KVA		BREAKER	WIRE SIZE	L1	L2	WIRE SIZE	BREAKER	KVA		USE	CKT. NO.
1	MAIN			100 ~~60~~	1 ~~8~~			12	20	0.7		EXHAUST FAN	2
3								12	20◆		0.9	RECEPTACLES	4
5	HEATER A	2.5		30	10			12	20	0.1		MCP	6
7			2.5					12	15		0.2	CEILING FAN	8
9	INTERIOR LIGHTS	0.3		20	12				20			SPARE	10
11	EXTERIOR WALL PACK		1.0	20	12				20			SPARE	12
13	~~SPACE~~ HEATER B	2.5		30	10				20			SPARE	14
15	~~SPACE~~ HEATER B		2.5	30	10				20			SPARE	16
17	SPACE											SPACE	18
19	SPACE											SPACE	20
21	SPACE											SPACE	22
23	SPACE											SPACE	24
25	SPACE											SPACE	26
27	SPACE											SPACE	28
29	SPACE											SPACE	30

TOTAL CONNECTED LOAD = 7.2 KVA. 30 AMPS
SQUARE D NQOD 30L225CU
◆ GFCI BREAKER

90
E-5

DETAIL

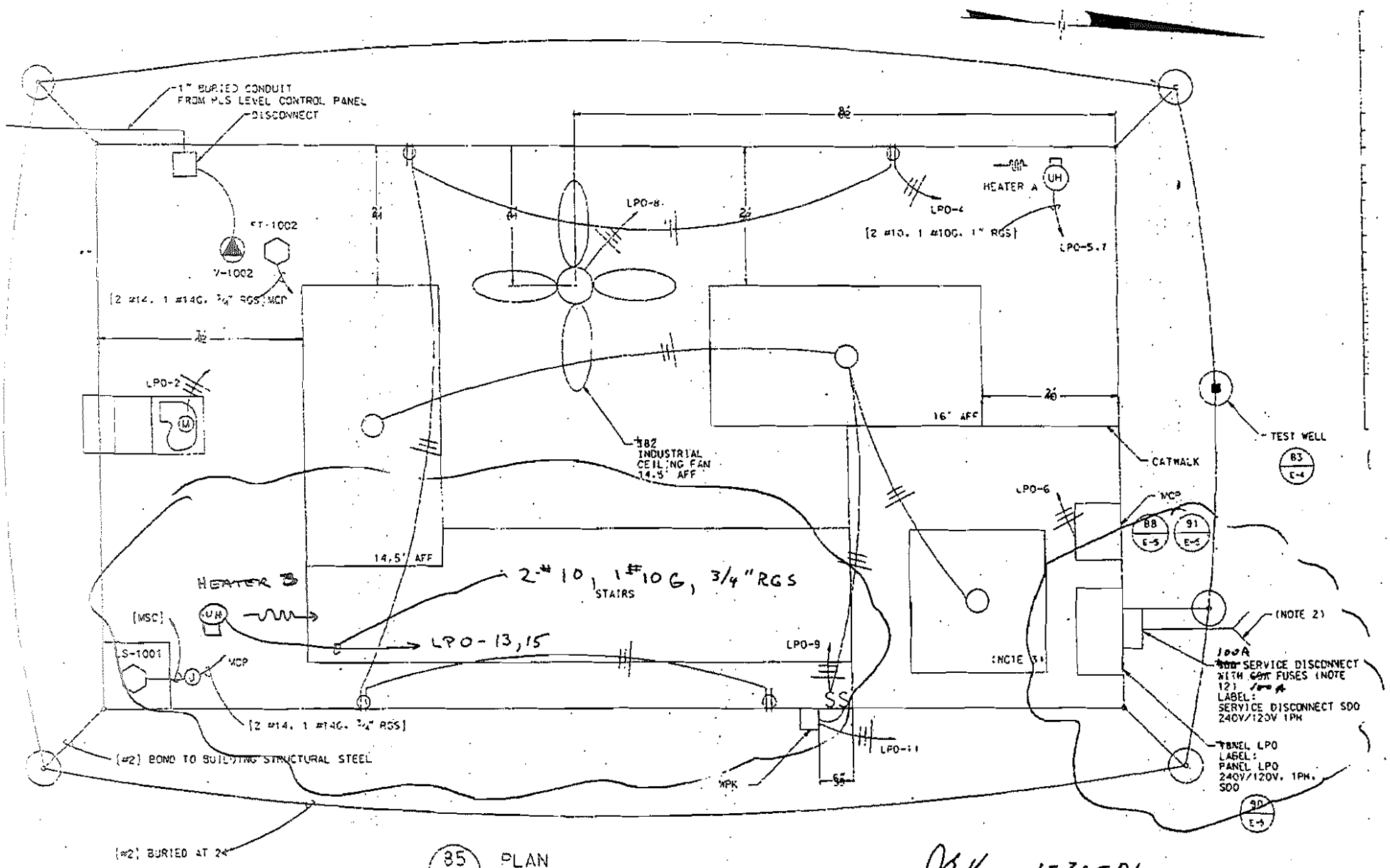
JRK 1-30-01

CONTROL VALVE HOUSE PANEL BOARD SCHEDULE

SCALE: NTS

XREF:F00X0742.DWG

DCN 20111-037 Pg 2 of 4



85 / E-1 PLAN
CONTROL VALVE HOUSE ELECTRIC
SCALE: NTS

JK 1-30-01

DCN 20111-037 Pg. 4 of 4

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg	Of	(6) DATE
20111	FSC-641	1	3	3/07/01

(3) S/C TITLE: ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: POWER FOR CONTROL VALVE HOUSE PUMP

(11) DCN NO.: 20111-038

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
CONTROL VALVE HOUSE ELECTRICAL DETAILS	90X-6000-0262	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

JUSTIFICATION: NEED A DEDICATED POWER SOURCE FOR A 2 HP PUMP AS PART OF THE EQUIPMENT FOR THE CONTINGENCY PLAN.
EXISTING CONDITION: NEW PANEL AT THE CONTROL VALVE HOUSE HAS SPARE CIRCUITS AVAILABLE FOR THE ADDED PUMP.

PROPOSED CHANGE: ADD A 30 AMP BREAKER FOR THE NEW PUMP AND PROVIDE A WEATHERPROOF RECEPTACLE AT THE LOCATION SHOWN ON SHEET 2 OF 3. PROVIDE 10 FT.POWER CORD FOR THE PUMP INCL. PLUG AS SHOWN ON SHT. 3 OF 3.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
JIM KERL	JK	3/06/01	JAMES C. JENKINS	3/06/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 3/19/01
EMPASI BASU - ENGINEER
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 3/20/01

PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

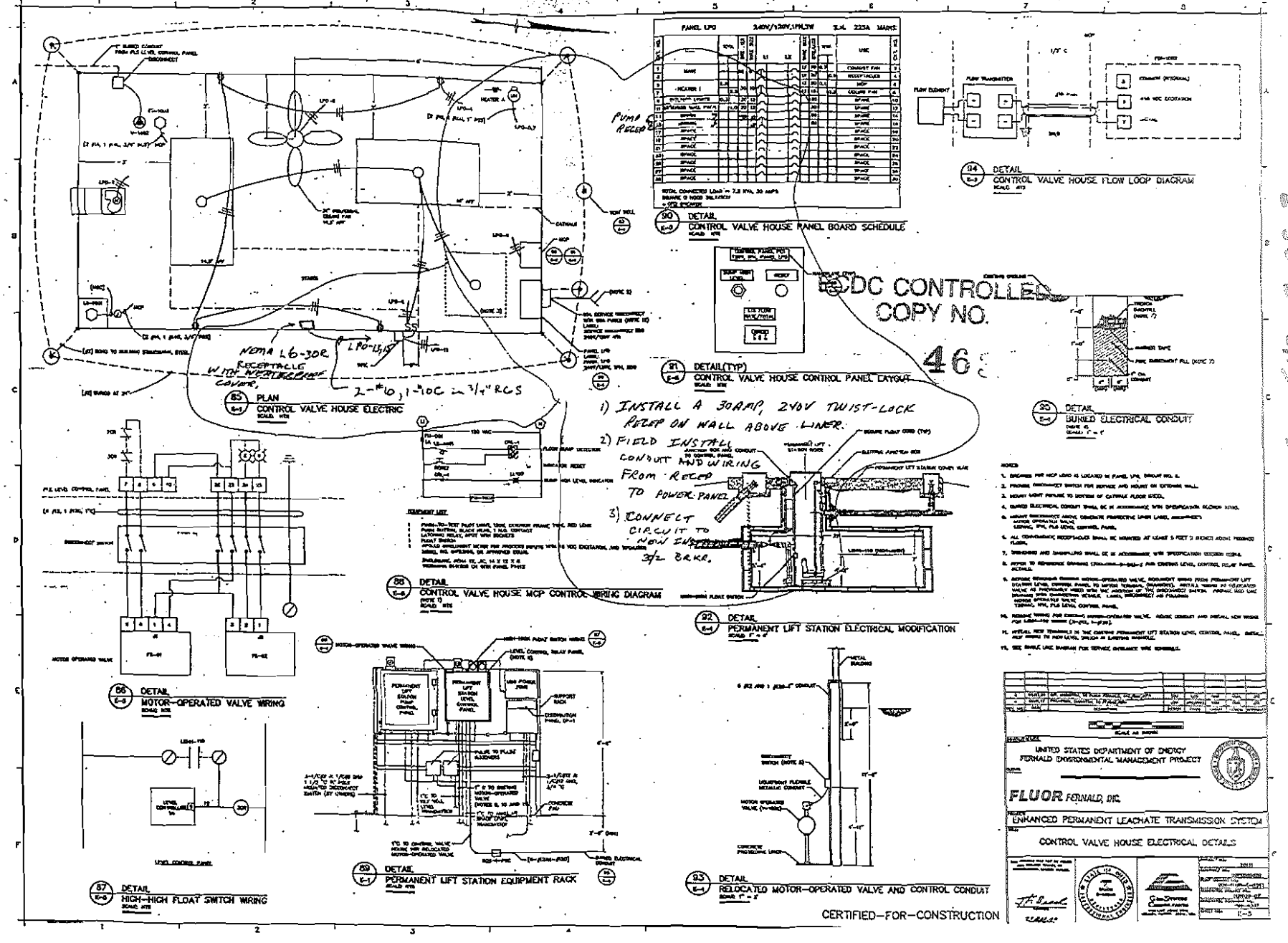
(21) FIELD WORK COMPLETED:

(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99: ED-12-5002

ECDC CONTROLLED
COPY NO. C- 011

PROD #7284 Vol. 5



DDC CONTROLLED COPY NO. 46

S 02 2 JHS 960-1102 N2C

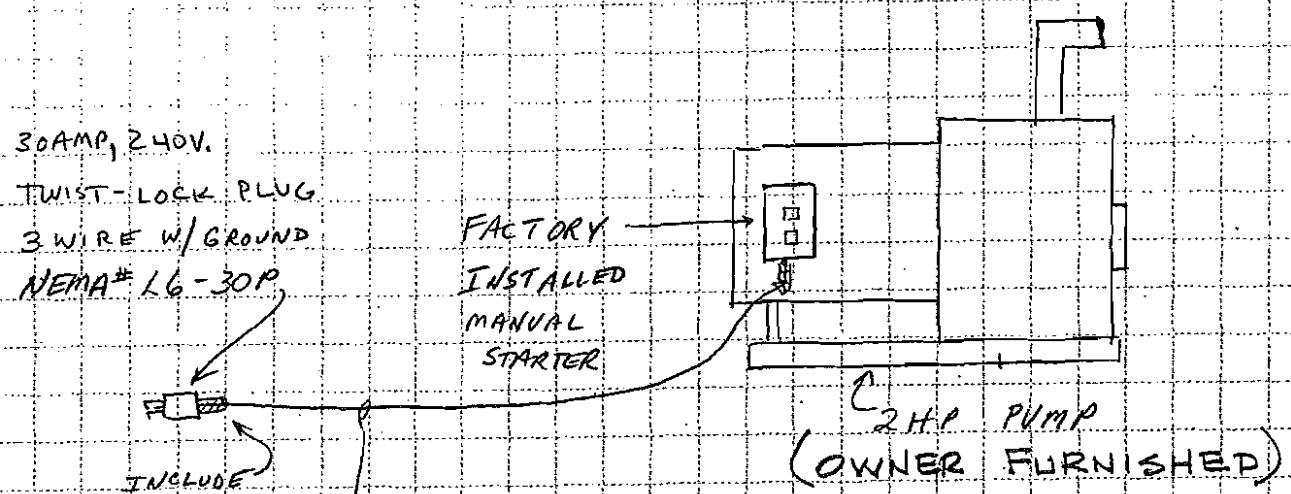
Fernald
Environmental Restoration
Management Corporation
PO Box 398704
Cincinnati, Ohio 45239-8704
(513) 738 6200

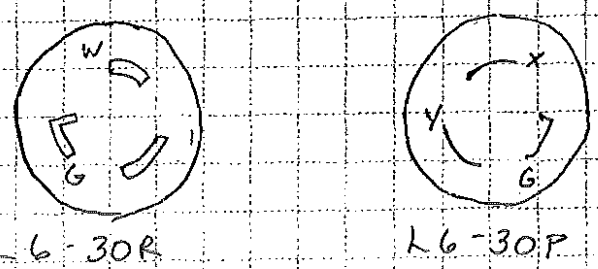
ENGINEERING CALCULATION

PROJECT NUMBER:	4060
BY:	J. E. Kerl
DATE:	2-28-01
PAGE:	OF
REVISED:	

SUBJECT:

DCN 20111-038
SHT. 3 OF 3





L6-30R L6-30P

NOTE

1. The green insulated conductor shall be used for ground.
2. The 'W' marking indicates suitability for use outdoors and for the immersion in water.

PROD #7284_Vol 5

FS-040 (REV. 2/22/93)

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: Leachate Transmission System 20111 | (2) S/C NO.: FSC 641 | (5) Pg 1 Of 13 | (6) DATE 3/8/01

(3) S/C TITLE: Leachate Transmission System | (11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Provide power feed to OSDF wheel wash

(11) DCN NO.: 20111-039

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
	96x-5500E-00358	~~19~~ 20	JK 3/26/01
	90X-6000E-00258	0	
	90x-6000E-00259	0	
	90x-600E-00260	0	
	78x-4445E-00027	7	
	90x-5500E-00549	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER

[ ] REQUIRED [X] NOT REQUIRED

(9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

Area where polesNE 100,101,102 will be excavated.New power supply to Wheelwash and bulk debris storage area required.

Add 3-100KVA 13.2KV/480volt transformers on pole 748 and run secondary to poles NE103andNE 106. Pole 748 will be revised to look like Pole737 Detail 67 except for transformer size and primary fuse size shall be 15E. Provide a 250 AMP feeder to pole NE103 overcurrent device for the Wheel Wash. And provide 100 AMP feeder to NE106 overcurrent device for the ~~bulk~~ gwTA ~~yd~~ Debris storage area.

for D. Brettschneider J. C. Jackson 3/20/01

(10) REQUESTOR: H.B.Gear COMPANY: FDF DATE: 3/8/01 | (12) CE / PE H.B.GEAR DATE: 3/8/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

Update the above dwgs and these additional ones.

90X-5500-E-00550 Rev 0
90x-5500-E-00549 Rev 2
78X-4445-E-00027 Rev 7

This DCN is in response to RES 4224

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: J.E. Kerl 3-20-01

[ ] FIT [ ] FORM [✓] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CCC21

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) J. C. Jackson 3/23/01 DATE: 3/15/01

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE: H.B.Gear 3/8/01

PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:

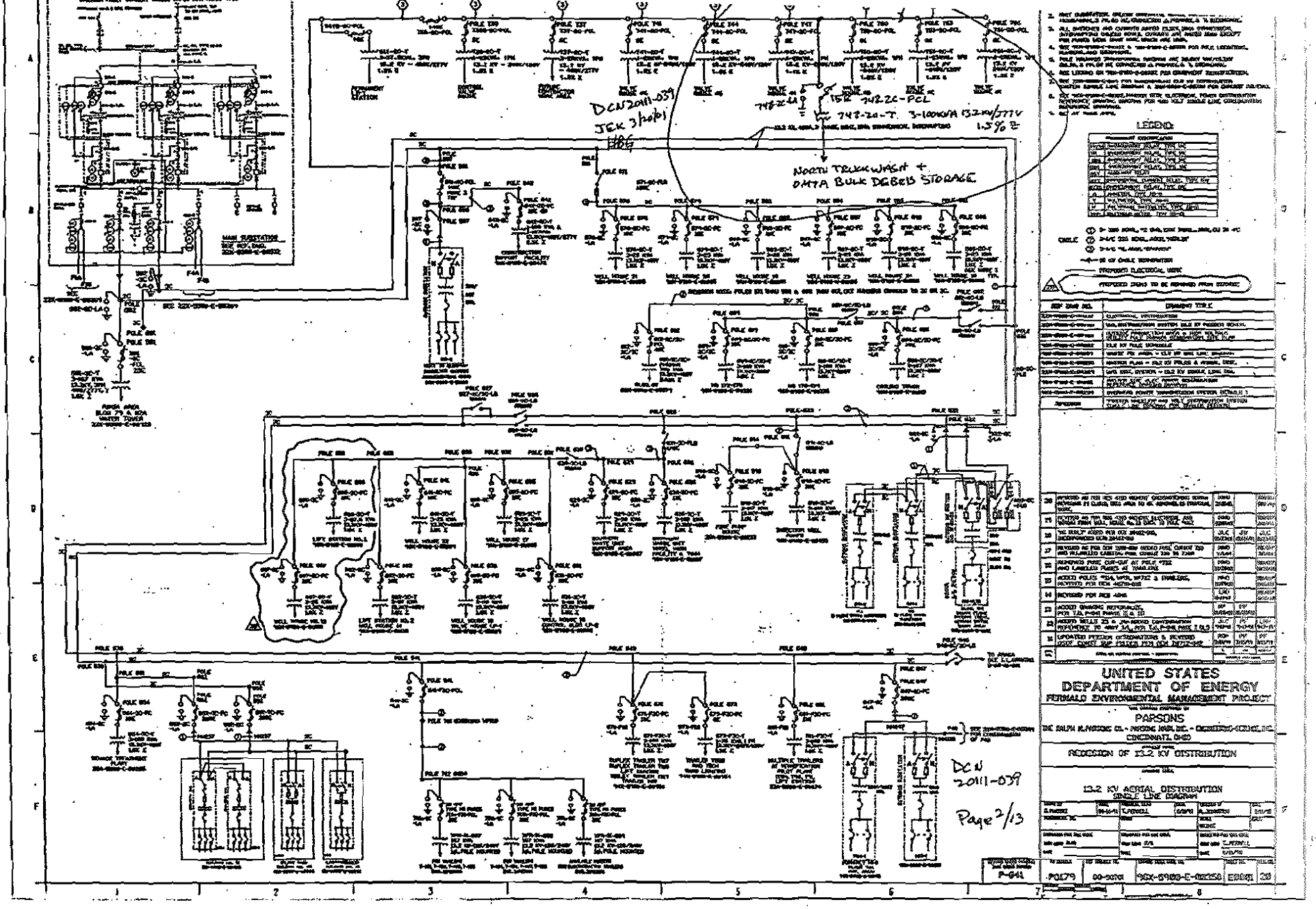
(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99: ED-12-5002

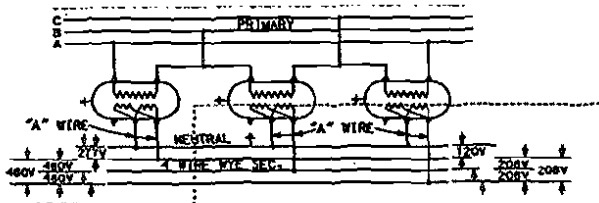
ECDC CONTROLLED COPY NO. C011

ORIGINAL

PROD #7284_Vol 5



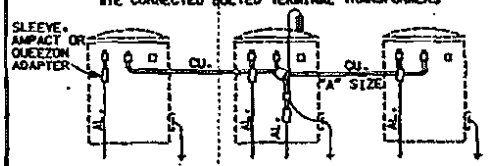
PROD #7284_Vol 5



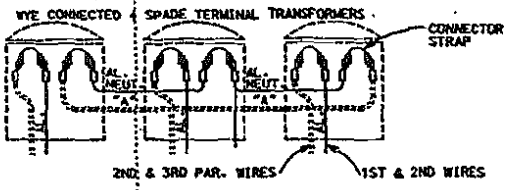
NOTES:

1. TWO BUSHING 13.2KV CONVENTIONAL TRANSFORMERS MUST BE USED.
2. THIS INSTALLATION WILL NOT OPERATE WITH ONE UNIT MISSING.

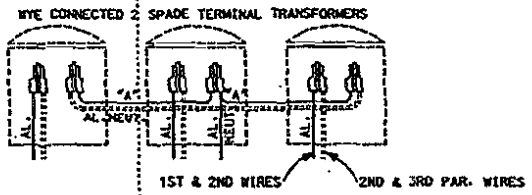
WYE CONNECTED BOLTED TERMINAL TRANSFORMERS



WYE CONNECTED 4 SPADE TERMINAL TRANSFORMERS



WYE CONNECTED 2 SPADE TERMINAL TRANSFORMERS

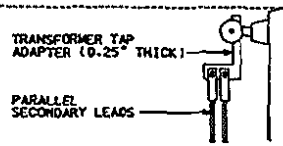


NOTES:

1. PARALLEL CONDUCTORS MUST BE OF EQUAL SIZE AND CONDUCTIVITY.
2. DO NOT STACK ALUMINUM PADS ON TRANSFORMER SPADE TERMINALS.
3. BOLT ALUMINUM PADS TO SPADES WITH STAINLESS STEEL BOLT ASSEMBLIES.
4. CONNECT SERVICE NEUTRAL TO TRANSFORMER SPADE TERMINAL IF ADEQUATE SPACE EXISTS.
5. TO PARALLEL CONDUCTORS, COPPER OR ALUMINUM, FROM BOLTED SECONDARY TERMINALS USE TRANSFORMER TAP ADAPTER.
6. TRANSFORMER WIRES ARE USUALLY #2 SOL. W.P. CU., NEVER ALUMINUM.
7. THE TRANSFORMER CASE MUST ALWAYS BE GROUNDED INTERNALLY AND EXTERNALLY.

SMALLER TRANSFORMERS (100KVA & LESS) HAVE BOLTED SECONDARY TERMINALS WHICH REQUIRE COPPER CONDUCTORS.

IF IT IS NECESSARY TO PARALLEL CONDUCTORS, COPPER OR ALUMINUM, FROM BOLTED SECONDARY TERMINALS, SUCH AS A 120/208V SERVICE, USE A TRANSFORMER TAP ADAPTER.



USE STAINLESS STEEL BOLT ASSEMBLIES TO ATTACH ALUMINUM COMPRESSION PADS TO TAP ADAPTER.

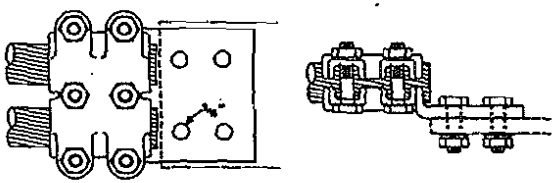
USE SILICON BRONZE BOLT ASSEMBLIES TO ATTACH BRONZE SECONDARY PAD TERMINALS TO TAP ADAPTER, SEE BELOW.

SPADE SECONDARY TERMINALS

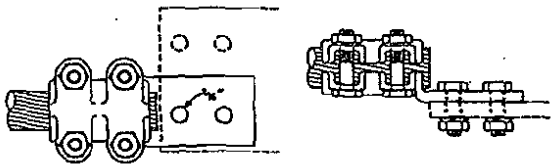
LARGER TRANSFORMERS (100KVA & UP) HAVE SPADE TYPE SECONDARY TERMINALS. BRONZE SECONDARY PAD TERMINALS ARE USED FOR COPPER CONNECTORS AND ARE BOLTED TO THE TRANSFORMER SPADE WITH SILICON BRONZE BOLTS. IF AN ALUMINUM PAD IS INSTALLED ON THE OPPOSITE SIDE OF THE TRANSFORMER SPADE, STAINLESS STEEL BOLT ASSEMBLIES ARE REQUIRED.

SILICON BRONZE BOLTS ARE AVAILABLE FROM 1" TO 4-1/2" LENGTHS WITH EACH BOLT A 1/2" NUT, A 1/2" LOCK WASHER AND A 1/2" ROUND WASHER ARE REQUIRED.

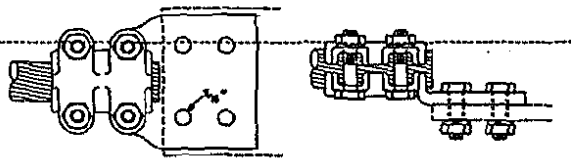
THE FOLLOWING ARE DRAWINGS OF FIVE BRONZE SECONDARY SPADES. THE FIRST THREE ARE NORMALLY USED FOR OVERHEAD TRANSFORMERS. THE LATER TWO ARE NORMALLY USED BY UNDERGROUND.



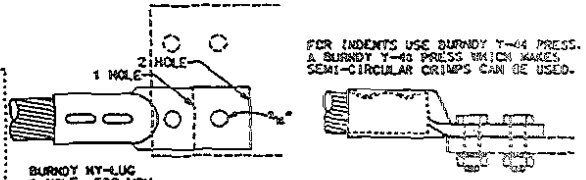
ANDERSON SMD-050-C
250-500 MCM NORMALLY USED FOR POLE MOUNTED TRANSFORMERS



ANDERSON SXL 05082
250-500 MCM NORMALLY USED FOR POLE MOUNTED TRANSFORMERS

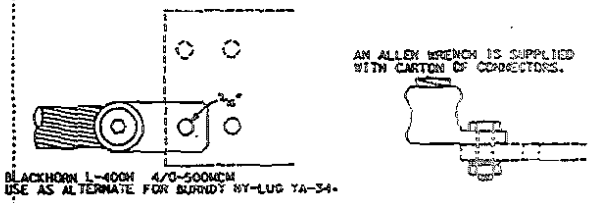


ANDERSON SMM 100C 750-1000 MCM



FOR INDENTS USE BURNDY Y-44 PRESS. A BURNDY Y-46 PRESS WHICH MAKES SEMI-CIRCULAR CRIMPS CAN BE USED.

BURNDY NY-4LUG
1 HOLE 500 MCM
2 HOLE 750 MCM
3 HOLE 1000 MCM
NORMALLY USED FOR PAD MOUNTED TRANSFORMERS AND FOR VAULT TRANSFORMERS WHERE CONDUCTOR CONNECTIONS ARE NEEDE.



AN ALLEN WRENCH IS SUPPLIED WITH CARTON OF CONNECTORS.

BLACKHORN L-400M 4/0-500MCM
USE AS ALTERNATE FOR BURNDY NY-LUG YA-34.

OVERHEAD TRANSFORMER SECONDARY CONDUCTOR LEAD SIZES

KVA SIZE FOR ONE TRANSF.	120/208V 3Ø		120/240V 1Ø		277/480V 3Ø	
	"A" WIRE		"A" WIRE		"A" WIRE	
	COPPER	ALUM.	COPPER	ALUM.	COPPER	ALUM.
10	2	1/0	2	1/0	—	—
15	2	1/0	2	1/0	—	—
25	2	1/0	2	1/0	2	1/0
37	2	4/0	2	1/0	2	1/0
50	4/0	350	2	1/0	2	1/0
75	500	2-350	2/0	4/0	2/0	4/0
100	2-300	2-500	4/0	350	4/0	350
167	2-500	3-500	500	2-350	500	2-350
333	4-500	4-750	2-500	3-500	2-500	3-350
500	—	—	—	—	3-500	4-500

NOTES:

1. THE ABOVE LISTED CONDUCTORS ARE SIZED TO CARRY AT LEAST 120% OF TRANSFORMER NAME PLATE RATINGS FOR SUMMER LOADING AND CAN BE USED FOR 170% WINTER LOADING.
2. THE SMALLER SIZE TRANSFORMERS HAVE BRONZE BOLTED CLAMP TYPE SECONDARY TERMINALS AND THE LARGER ONES HAVE SPADE TERMINALS. DO NOT PLACE ALUMINUM CONDUCTORS DIRECTLY INTO A BRONZE BOLTED CLAMP TYPE TERMINAL - USE AN ALUMINUM TO COPPER ADAPTER (i.e.-SLEEVE, SQUEEZON, IMPACT). DO NOT PLACE MORE THAN ONE CONDUCTOR IN A BOLTED CLAMP TYPE TERMINAL. USE TRANSFORMER TAP ADAPTER. ALUMINUM PADS CAN BE BOLTED DIRECTLY TO SPADE TERMINALS.
3. USE CONNECTOR STRAPS TO PARALLEL OR SERIES SECONDARY WINDINGS ON UNITS WITH FOUR SPADE TERMINALS.
4. PARALLEL CONDUCTORS MUST BE OF EQUAL SIZE AND LENGTHS.
5. FOR MECHANICAL PURPOSES, TRANSFORMER SECONDARY LEADS SHALL NOT BE ANY SMALLER THAN 2 COPPER OR 1/0 ALUMINUM.

NO.	REVISION	DATE	DWN.	BY	APPD.	NO.	REVISIONS
						1	AS BUILT
						0	ISSUE CFC

REF. DWG. NO.
9KX-5500-E-00307
50-4445-E-00495
50-4445-E-00464
25A-5500-E-00221
25A-5500-E-00221
25A-5500-E-00209
25A-5500-E-00208
25A-5500-E-00207
25A-5500-E-00206
25A-5500-E-00201
25A-5500-E-00204
25A-5500-E-00203

NOTE: FLAVOR CANEL TERMINAL CARD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

Fernald Environmental Management Project

FERNALD

U.S. DEPARTMENT OF ENERGY

WEST OF ABOT

SEWAGE TREATMENT RELOCATION

OVERHEAD TRANSFORMER CONNECTIONS

NO SCALE

25A-5500-E-00222

FILE NAME: /usr3/models/rev/r0220/25a00222.dgn

OPK 3-20-01 DCK 4-11-039 Dec 11/13

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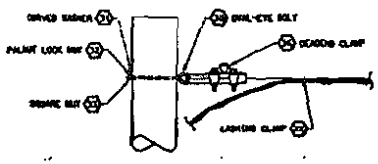
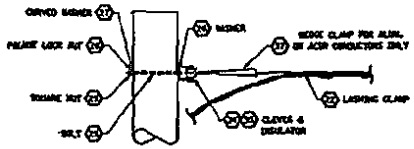
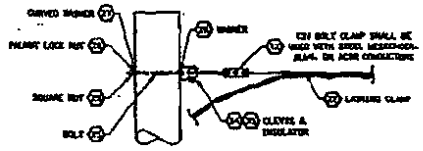


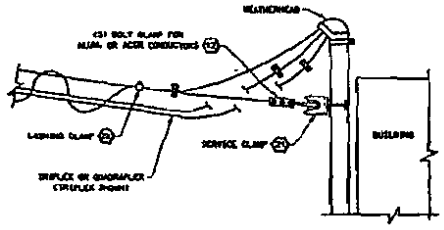
DEAD END CONNECTION DETAIL
30 - 150 FT. SPAN



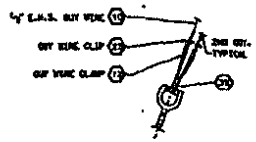
DEAD END CONNECTION DETAIL
0 - 30 FT. SPAN



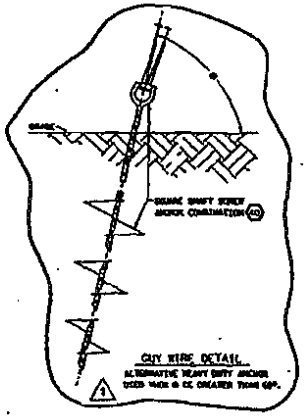
DEAD END CONNECTION DETAIL
0 - 30 FT. SPAN
(ALTERNATIVE)



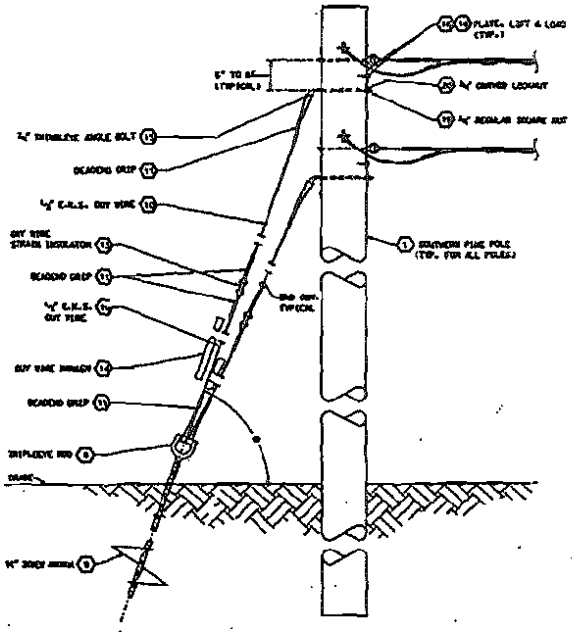
SERVICE ENTRANCE DETAIL
0 - 30 FT. SPAN
TO POLE OR OTHER STRUCTURE



GUY WIRE DETAIL
ALTERNATIVE TO WIRE PREFORMS FOR GUY WIRES LESS THAN OR EQUAL TO 1/4".

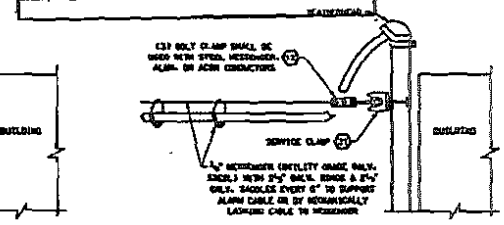


GUY WIRE DETAIL
ALTERNATIVE HEAVY DUTY ANCHOR USED WHEN 6 OR GREATER THAN 60°.



GUY WIRE DETAIL

THIS DOCUMENT IS AFFECTED BY THE FOLLOWING
DCN 4114-003



SERVICE ENTRANCE DETAIL
0 - 30 FT. SPAN
TO POLE OR OTHER STRUCTURE

LEGEND:

- GUY WIRE ANGLE TO BE DETAILED ON PROJECT DRAWING.

NOTES:

1. CLASS II. 40FT TREATED SOUTHERN PINE POLE.
2. 12 FEET OF #4 COPPER WIRE STAPLED TO POLE AND STAPLED COPPER CLAD. 1-1/2" LONG.
3. BUTT PLATE: POLE BOTTOM GROUND PLATE - COPPER. "BLACKBURN" #CP114.
4. #4 COPPER WIRE STAPLED (COPPERCLAD. 1-1/2" LONG) EVERY 2'-0" AND EXTENDED 6" ABOVE POLE.
5. GROUND CLAMP (FOR GROUND WIRE CONNECTION) - 5/8" DIAMETER. ORANGE OR BRASS. "BURNDY" #YGR50.
6. GROUND ROD. 5/8" DIAMETER x 10'-0" LONG COPPER WELD. "BLACKBURN" #CCT510.
7. GROUNDING CLAMP - WIRE TO WIRE. "BURNDY" #CC17-AC.
8. TRIPLEXE ROD. 7 FOOT MINIMUM SHAFT LENGTH. "A.B.CHANCE" #CH02-0003.
9. 14 IN-CORDY ANCHOR. "CHANCE" #C102-1410.
10. 1/4" E.H.S. GUY WIRE.
11. SEADOG GRIP - PREFORMED TWISTED LOOP. CLASS A OR B-GALVANIZED. SIZED FOR GUY WIRE.
12. GUY CLAMP. 3 BOLT. "CHANCE" #6461.
13. GUY STRAIN INSULATOR. SIZED FOR GUY WIRE (EX: 1/4" WIRE USE. "CHANCE" #7081.
14. GUY WIRE MARKER - HALF ROUND UV RESISTANT, YELLOW PLASTIC. 2" WIDE x 24" LONG WITH MOUNTING HARDWARE. "CHANCE" #05-080-07.
15. 3/4" THIMBLEYE ANGLE BOLT. 2" LONGER THAN POLE DIAMETER. "CHANCE" #8114-T (14" LONG).
16. PLATE, LIFT AND LOAD - 3 HOLE. "CHANCE" #7001.
17. 1/2" DIA. x 4" LONG LAG SCREWS. "CHANCE" #6001T04.
18. 1/2" DIA. x 5" LONG LAG SCREWS. "CHANCE" #6001T05.
19. REGULAR SQUARE NUT. 3/4". "CHANCE" #6100CP.
20. CURVED LOCK NUT. 3/4". "CHANCE" #6513.
21. SERVICE CLAMP. 1-1/4" TO 2-1/2" CONDUIT. "CHANCE" #C203-0025. 2" TO 4" CONDUIT. "CHANCE" #C207-0010.
22. LASHING CLAMP. "CHANCE" #6600.
23. GUY WIRE CLIP. "CHANCE" #6464.
24. 5/8" BOLT. 10" LONG. "CHANCE" #6812.
25. 5/8" BOLT. 14" LONG. "CHANCE" #6814.
26. ROUND WASHER. "CHANCE" #6400.
27. CURVED WASHER. "CHANCE" #6025-1/2.
28. PALNUT LOCK NUTS. "CHANCE" #6532.
29. SQUARE NUT. "CHANCE" #6100AP.
30. 5/8" EYE-BOLT. 14" LONG. "CHANCE" #C250-1.
31. CURVED WASHER. 5/8" BOLT HOLE. "CHANCE" #6025.
32. PALNUT LOCK NUT. 5/8". "CHANCE" #6531.
33. SQUARE NUT. 5/8". "CHANCE" #6100AP.
34. CLEVIS. "CHANCE" #6337.
35. INSULATOR. "CHANCE" #6757-1025.
36. STRAIGHT-LINE SEADOG CLAMP. "CHANCE" #C1007C.
37. WEDGE CLAMPS.

	ABR	AL	ACSR
"BLACKBURN" #WC-1	2-4	1 STRAND SOL	2-4
"BLACKBURN" #WC-1	1-0-4	2/0 STRND SOL	1/0-4
"BLACKBURN" #WC-1	4/0-0/0	4/0 STRAND SOL	4/0-0/0

38. SEADOG CLAMP. "CHANCE" #C01.
39. TRIPLEYE. GUY WIRE 1/4". "CHANCE" #C17A.
40. SQUARE SHAFT "SS" SCREW ANCHOR COMBINATION 10"-12"-14" HELICES. "CHANCE" #C204-[illegible]. 7 FOOT EXTENSION. "CHANCE" #C2417. TRIPLEYE. "CHANCE" #C102-0003.
41. POLE PLATE. "CHANCE" #C804
42. END FITTING W/ CLAMP. "CHANCE" #C512
43. 5/8" EYE. 24" LONG. "CHANCE" #C074
44. MESSENGER HANGER. UNIVERSAL TYPE. 1/4" x 2" x 4-1/2". "CHANCE" #7241

Proj 160610

NO.	REVISIONS	DATE	DWN.	CHK.	APPR.	NO.	REVISIONS	DATE	DWN.	CHK.	APPR.	REV. SYM. NO.
						1	REVISED AS PER DCN 4114 UNDER SCHW ANCHOR DETAIL					GLX-5500-E-00105

NOTE: PLACE OVER FEMALE CHIP SEALING. DO NOT REMOVE MANDRILL.

CONTRACTOR SIGNATURE
DATE
SPECIAL TEST
LIMITED ACCT

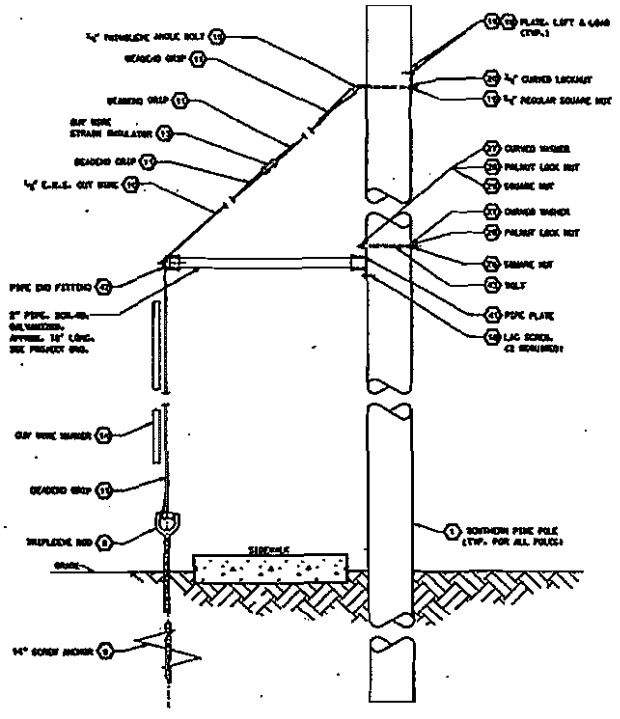
APPROVALS
DRAWN
CHECKED
ENGINEERING
PROJECT ENGINEER
PROJECT MANAGER
CONSTRUCTION
SAFETY
QA
CONTRACTOR

Fernald Environmental Management Project
FERNALD
U.S. DEPARTMENT OF ENERGY

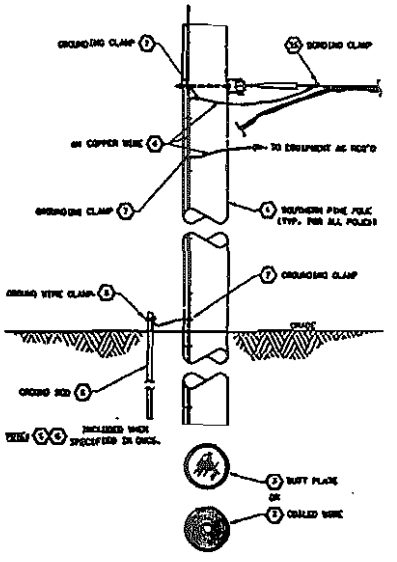
SHEET 1 OF 3
TYPICAL ELECTRICAL POWER POLE GUY WIRES, ANCHORING & AERIAL ATTACHMENT DETAILS
SCALE: NONE
DATE: 3-20-01
DWG. NO. GLX-5500-E-00105 | 1

GIL 3-20-01

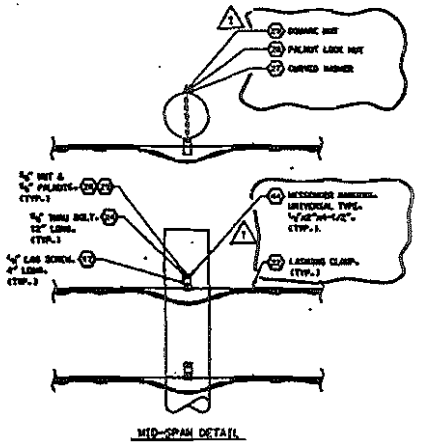
PROD #7284_Vol 5



GUY WIRE DETAIL
SIDEWALK ANCHOR



POLE GROUNDING
TYP. FOR ALL POLES



MID-SPAN DETAIL

NOTES:

1. CLASS II, 100% TREATED SOUTHERN PINE POLE.
2. 12 FEET OF #6 COPPER 100% WIRE COILED AND STAPLED (COPPER CLAD, 1-1/2" LONG).
3. SOFT PLATES POLE BOTTOM GROUND PLATE - COPPER. "BLACKBURN" #CP114.
4. #4 COPPER WIRE STAPLED (COPPERCLAD, 1-1/2" LONG) EVERY 2'-0" AND EXTENDED 6" ABOVE POLE.
5. GROUND CLAMP (FOR GROUND WIRE CONNECTION) - 3/4" DIAMETER. BRONZE OR BRASS. "BURNDY" #GRD34.
6. GROUND ROD. 3/4" DIAMETER X 10'-0" LONG COPPER WELD. "BLACKBURN" #CT3/4G.
7. GROUNDING CLAMP - WIRE TO WIRE. "BURNDY" #GRC1/4C.
8. TRIPLEDGE ROD. 7 FEET MINIMUM SHAFT LENGTH. "A.B.CHANCE" #C1748-0963.
9. 14 SCREW ANCHOR. "CHANCE" #C1732-0203.
10. 1/4" E.H.S. GUY WIRE.
11. DEADEND GRIP - PREFORMED TWISTED LOOP. CLASS A OR B. GALVANIZED. SIZED FOR GUY WIRE.
12. GUY CLAMP. 3 BOLT. "CHANCE" #C451.
13. GUY STRAIN INSULATOR. SIZED FOR GUY WIRE SIZE 1/4" THRU WIRE. "CHANCE" #C501.
14. GUY WIRE WARNER - HALF ROUND UV RESISTANT, YELLOW PLASTIC. 2" WIDE x 36" LONG WITH MOUNTING HARDWARE. "CHANCE" #C1-F05-27.
15. 3/4" TRIPLEDGE ANCHOR BOLT. 3" LONGER THAN POLE DIAMETER. "CHANCE" #C1148 (14" LONG).
16. PLATE, LIFT AND LOAD - 3 HOLE. "CHANCE" #C807.
17. 1/4" DIA. x 4" LONG LAG SCREW. "CHANCE" #C207C4L.
18. 1/4" DIA. x 5" LONG LAG SCREW. "CHANCE" #C207C5L.
19. REGULAR SQUARE NUT. 5/8". "CHANCE" #C5C0C5.
20. CURVED LOCK NUT. 5/8". "CHANCE" #C5C2.
21. SERVICE CLAMP. 1-1/4" TO 2-1/2" CONDUIT. "CHANCE" #C287-0075. 3" TO 4" CONDUIT. "CHANCE" #C287-0075.
22. LACING CLAMP. "CHANCE" #C1000.
23. GUY WIRE CLIP. "CHANCE" #C404.
24. 5/8" BOLT. 22" LONG. "CHANCE" #C0022.
25. 5/8" BOLT. 14" LONG. "CHANCE" #C0014.
26. ROUND WASHER. "CHANCE" #C000.
27. CURVED WASHER. "CHANCE" #C5C2-1/2.
28. PALNUT LOCK NUT. "CHANCE" #C5C2.
29. SQUARE NUT. "CHANCE" #C5C0CP.
30. 5/8" CNA-CYC BOLT. 14" LONG. "CHANCE" #C0014.
31. CURVED WASHER. 5/8" BOLT HOLE. "CHANCE" #C5C2.
32. PALNUT LOCK NUT. 5/8". "CHANCE" #C5C2.
33. SQUARE NUT. 5/8". "CHANCE" #C5C0CP.
34. CLEVIS. "CHANCE" #C127.
35. INSULATOR. "CHANCE" #C280-0022.
36. STRAIGHT-LINE DEADEND CLAMP. "CHANCE" #C207C.
37. WEDGE CLAMPS.

	AGC	AL	AAAC
"BLACKBURN" #CG2-1	2-0	1 STR-0 AL	2-0
"BLACKBURN" #CG3-1	1/0-1	2/0 STR-0 AL	1/0-1
"BLACKBURN" #CG4/0-1	4/0-0/0	4/0 STR-0/0 AL	4/0-0/0

38. BONDING CLAMP. "CHANCE" #C01.
39. TRIPLEDGE GUY WIRE 1/4". "CHANCE" #C204.
40. SQUARE SHAFT "SS" SCREW ANCHOR COMBINATION 10"-12"-14" HELIXES. "CHANCE" #C1854-12LAA. 7 FOOT EXTENSION. "CHANCE" #C1C7. TRIPLEDGE. "CHANCE" #C1732-0203.
41. POLE PLATE. "CHANCE" #C501
42. END FITTING w/ CLAMP. "CHANCE" #C512
43. 5/8" BOLT. 24" LONG. "CHANCE" #C0024
44. MECHANICAL MARKER, UNIVERSAL TYPE. 1/4" x 2" x 4-1/2". "CHANCE" #C101

Play 60610

NO.	REVISIONS	DATE	CHK.	APPD.	NO.	REVISIONS	DATE	CHK.	APPD.	REF. DWG. NO.
					1	REMOVED AT PGE REQ FOR MORE DETAILED ANCHOR DETAILS	1/98	DWG	2/98	
					0	C.O.	4/96			IGX-5500-E-00106

NOTE: PLEASE REFER TO DWG. IGX-5500-E-00105 FOR MORE DETAILS. DO NOT SCALE DRAWING.

Fernald Environmental Management Project

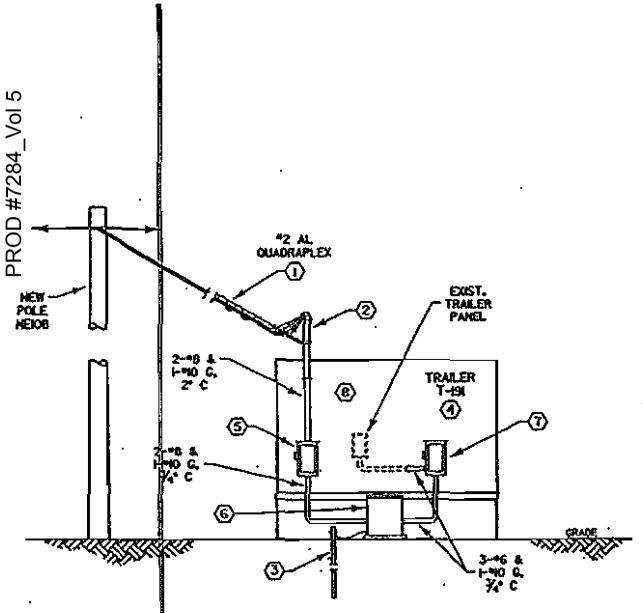
U.S. DEPARTMENT OF ENERGY

SHEET 3 OF 3

TYPICAL ELECTRICAL POWER POLE GUY WIRES, ANCHORING & AERIAL ATTACHMENT DETAILS

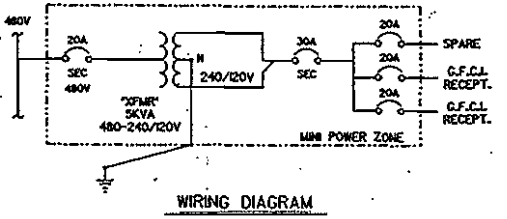
IGX-5500-E-00106 | 1

PROD #7284_Vol 5

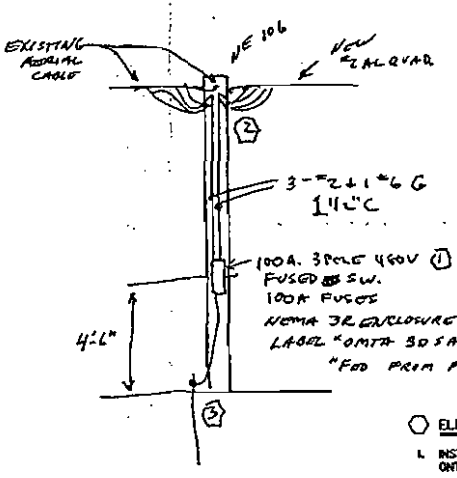


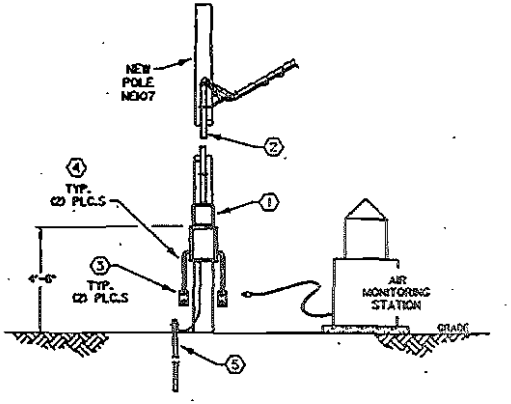
A ELEVATION
TRAILER T-191 & NEW POLE NE108

FROM DWG. #90X-5500-E-00549



WIRING DIAGRAM
MINI POWER ZONE
TYP. (4) PLCS





B ELEVATION
AIR MONITOR RECEPTACLES
TYP. (4) PLCS

FROM DWG. #90X-5500-E-00549

ELEVATION "A" NOTES:

1. EXTEND FEEDER CONDUCTORS FOR AERIAL FEED TO TRAILER T-191. (ONE PHASE WILL NOT BE NEEDED DUE TO THE TRAILER SERVICE IS SINGLE PHASE).
2. INSTALL ELECTRIC MAST 12 FEET MINIMUM ABOVE GRADE.
3. INSTALL #6 BARE CU GROUND WIRE FROM TRANSFORMER TO 5/8" x 8' GROUND ROD.
4. INSTALL NUMBER AND LABELS AS DESCRIBED ON TRAILER TYPICAL INSTALLATION DRAWINGS 44X-5500-E-00363 AND 44X-5500-E-00366.
5. PROVIDE 60 AMP, 480V, 2 POLE OUTDOOR FUSE SWITCH WITH 40 AMP FUSES - LABEL "SW-T-19A. FED FROM N78-F".
6. PROVIDE 15 KVA, 480V - 240V/120V OUTDOOR PAD MOUNT TRANSFORMER WITH 2" PRECAST CONCRETE PAD - LABEL "XFMR-T-191".
7. PROVIDE 60 AMP, 240V, 2 POLE OUTDOOR FUSE SWITCH WITH 60 AMP FUSES - LABEL "SW-T-19B. FED FROM N78-F".
8. PROVIDE CONDUIT AND WIRING AS SHOWN IN ELEVATION.

ELEV. C.

1. INSTALL NEW 3 POLE 480V FUSED SWITCH WITH 100A FUSES IN NEMA 3R ENCLOSURE
2. POWER SWITCH WITH NEW AERIAL FEED FROM POLE 798, REPLACING EXISTING AERIAL FEEDER.
3. INSTALL 5/8" x 8' LONG CU GROUND ROD WITH 1-#6 CU GROUND WIRE.

ECDC CONTROLLED COPY NO. 463

ELEVATION "B" NOTES:

1. INSTALL 5 KVA SINGLE PHASE, 480V - 240/120V MINI POWER ZONE (SQUARE D #MP25540F) ONTO POLE (4) PLACES. INSTALL (3) 20 AMP I.P. CIRCUIT BREAKERS IN POWER ZONE.
2. FEED MINI POWER ZONE FROM OVERHEAD 480V LINE WITH 2-#8 THWN & 1-#8 G. 3/4" RGS C.
3. INSTALL SINGLE GANG CAST BOX (FS) WITH 20 AMP GFCI DUPLEX RECEPTACLE WITH A WEATHER PROOF COVER (CARLON #E50DVCL.
4. FEED DUPLEX RECEPTACLES WITH 2-#12 THWN & 1-#12 G. 1/2" RGS C. FROM SQUARE D #QO-120 20 AMP CIRCUIT BREAKER.
5. INSTALL 5/8" x 8' LONG CU CLAD GROUNDING ROD WITH 1-#6 BARE CU GROUND WIRE.

DCN 20111-039 Page 3/13 J.K. 3-20-01

GENERAL NOTES:

1. ALL WIRING SHALL BE COPPER (CU) WITH THWN INSULATION UNLESS OTHERWISE NOTED.
2. USE STRUCTURAL CHANNEL TO SECURE ELECTRICAL EQUIPMENT.
3. TRAILER SHALL BE INSTALLED ACCORDING TO TRAILER TYPICAL INSTALLATION DRAWINGS 44X-5500-E-00363 AND 44X-5500-E-00366.

INDEX CODE				
PL & ML	GRID	SQ	TOL NO	DIV
00X	5500	E	02632	0

INDEX CODE				
PL & ML	GRID	SQ	TOL NO	DIV
44X	5500	E	00411	0

DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
								44X-5500-E-00363
								16X-5500-E-00806
								16X-5500-E-00805
								22X-5500-E-00958
								22C-5500-P-00668
								22C-5500-P-00660
			0	ISSUE OFC PER RES 4453 & DCN NO. 20102-108	MWB	SJS	MB	90X-5500-E-00549

NOTE: FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

APPROVALS: CIVIL & STR. — ELECTRICAL — CHEMICAL — INSTRUMENT — MECHANICAL — CHECKED — APPROVED — SAFETY ENG. — MAINTENANCE — ENC PROJECT — WASTE MANAGE — SECURITY — PROJECTS

Fernald Environmental Management Project

FLUOR FERNALD, INC.

U.S. DEPARTMENT OF ENERGY

"OMTA" EXPANSION - TRAILER T-191 GRIDS 1 & 9

BULK DEBRIS STORAGE
ELECTRICAL DETAILS
SCALE: NONE

DWG. NO. 90X-5500-E-00550 | 0

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg	Of	(6) DATE
20111	FSC-641	1	1	3/09/01

(3) S/C TITLE: ENHANCED PERMANENT LEACHATE TRAMSMISSION SYSTEM

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [X] M [ ] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: REPLACE TRANSFER PUMP CIRCUIT BREAKERS

(11) DCN NO.: 20111-040

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
VALVE HOUSE ELECTRICAL DETAILS	90X-6000-E-00261	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

JUSTIFICATION: REQUIRED BY SA 2000-1015,REV.0 AQUIFER RESTORATION AND WASTEWATER PROJECT,AUDITABLE SAFETY RECORD. (GFCI'S ARE REQUIRED FOR 15-20 AMP,120 V. CIRCUITS AT WORK SITES)
EXISTING CONDITION: EXISTING BREAKERS ARE NOT GFCI PROTECTED.
PROPOSED CHANGE: REPLACE EXISTING SIEMANS BLH-20 AMP,1 POLE BREAKERS (CIRCUITS 2 & 4) AT EACH VALVE HOUSE WITH SIEMANS BLHF-20 AMP,1 POLE-120V. GFCI BREAKERS.

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
JIM KERL	FFI	3/09/01	JAMES C. JENKINS	3/09/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

GEOSYNTEC

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 3/15/01
KURT BADU-TWEMEBOAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 3/15/01
PERFORMANCE GRADE: (17) 4

(18) CONSTRUCTION CONCURRENCE DATE:
PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

S-F-4259
REV. 5: 10/01/99: ED-12-5002

ORIGINAL

ECDC CONTROLLED COPY NO.
C011

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(5) Pg	Of	(6) DATE
20111	FSC- 641	1	4	03/23/01

(3) S/C TITLE: ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: MODIFY ILTS @ VALVE HOUSE 6

(11) DCN NO.: 20111-041

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
LTS PIPE PLAN AND PROFILE STATIONS 17+ 00 TO 23 +00	90X-6000-~~C~~-00284 GJK 5/4/01	0	
VALVE HOUSE AND CONTROL VALVE HOUSE MECHANICAL DETAILS 1 (ADD DETAILS FROM PAGE 4 OF 4)	90X-6000-M-00266	0	

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [X] NOT REQUIRED

JUSTIFICATION: NEED AN ALTERNATE MEANS FOR LEACHATE TRANSMISSION FROM V.H. 6 TO PLS AS PART OF THE CONTINGENCY PLAN.

EXISTING CONDITION: ILTS AND VALVE HOUSE 6 PIPING ARE AS CONSTRUCTED FROM CFC PLANS AND SPECS.

PROPOSED CHANGE: MODIFY THE ILTS AS SHOWN TO ALLOW USE OF THE PIPING AS PART OF THE CONTINGENCY PLAN.

(10) REQUESTOR: JAMES C. JENKINS FFI — DATE: 03/23/01

(12) CE/PE: JAMES C. JENKINS — DATE: 03/23/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [ ] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

SEE PAGES 2,3 AND 4 OF 4 FOR DETAILS OF THE PROPOSED CHANGES.

GEOSYNTEC — **RCI - DCN ACCEPTANCE**

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 5/9/01
KURASI BADU-TWENEBOAH, GEOSYNTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE: 5/10/01

PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE:

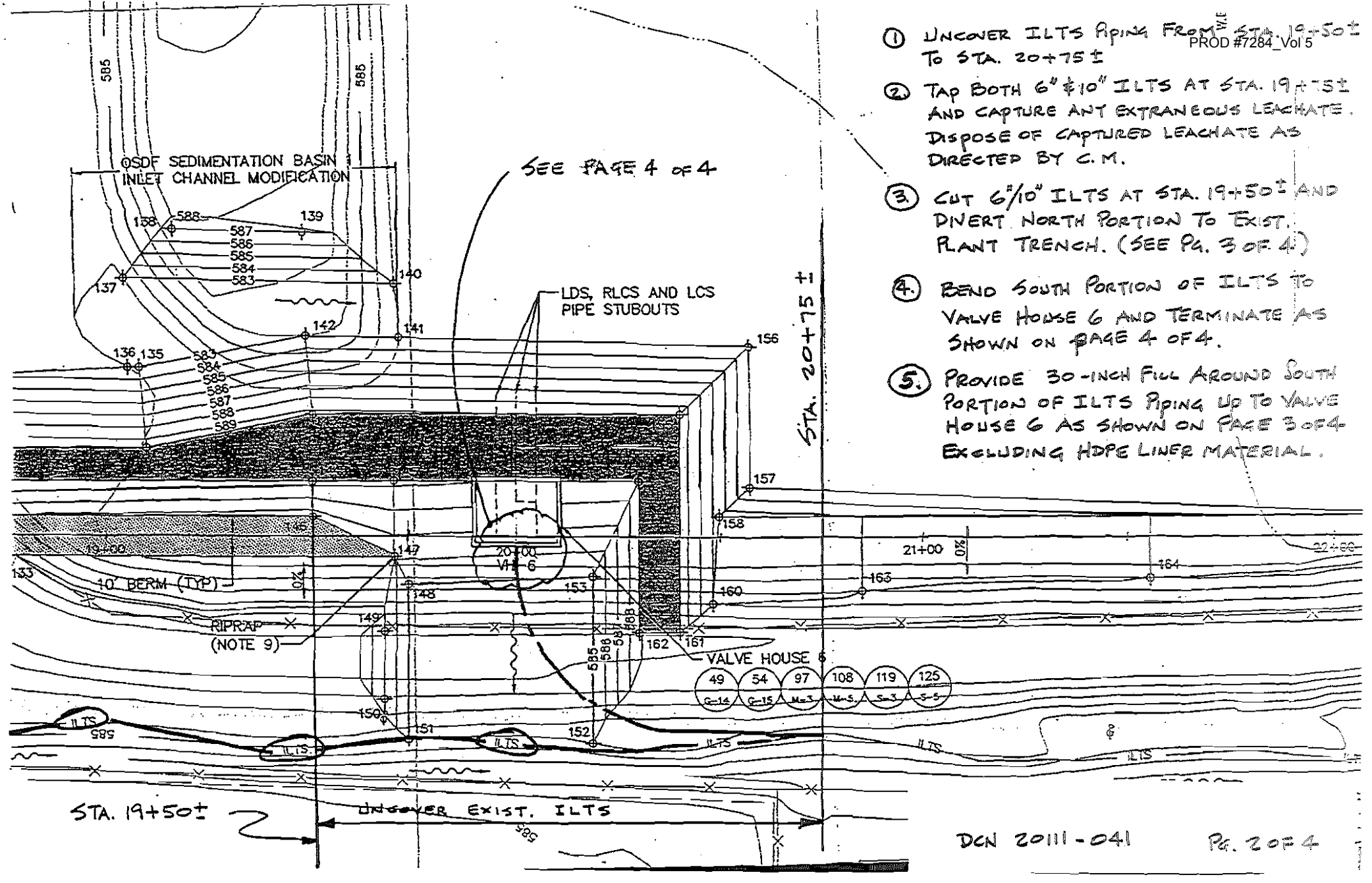
PURCHASE REQUISITION REQUIRED: [X] YES [ ] NO (19)
JACK HUGHES
J. Hughes by GJK 5/10/01

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99; ED-12-5002

ORIGINAL

ECDC CONTROLLED COPY NO. 011



① UNCOVER ILTS PIPING FROM STA. 19+50± TO STA. 20+75±

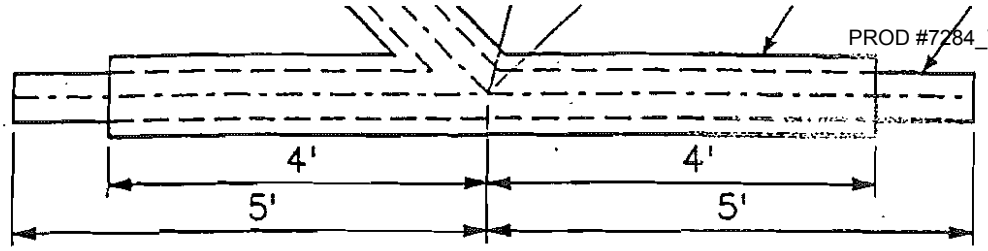
② TAP BOTH 6" & 10" ILTS AT STA. 19+75± AND CAPTURE ANY EXTRANEOUS LEACHATE. DISPOSE OF CAPTURED LEACHATE AS DIRECTED BY C.M.

③ CUT 6"/10" ILTS AT STA. 19+50± AND DIVERT NORTH PORTION TO EXIST. PLANT TRENCH. (SEE PG. 3 OF 4)

④ BEND SOUTH PORTION OF ILTS TO VALVE HOUSE 6 AND TERMINATE AS SHOWN ON PAGE 4 OF 4.

⑤ PROVIDE 30-INCH FILL AROUND SOUTH PORTION OF ILTS PIPING UP TO VALVE HOUSE 6 AS SHOWN ON PAGE 3 OF 4 EXCLUDING HDPE LINER MATERIAL.

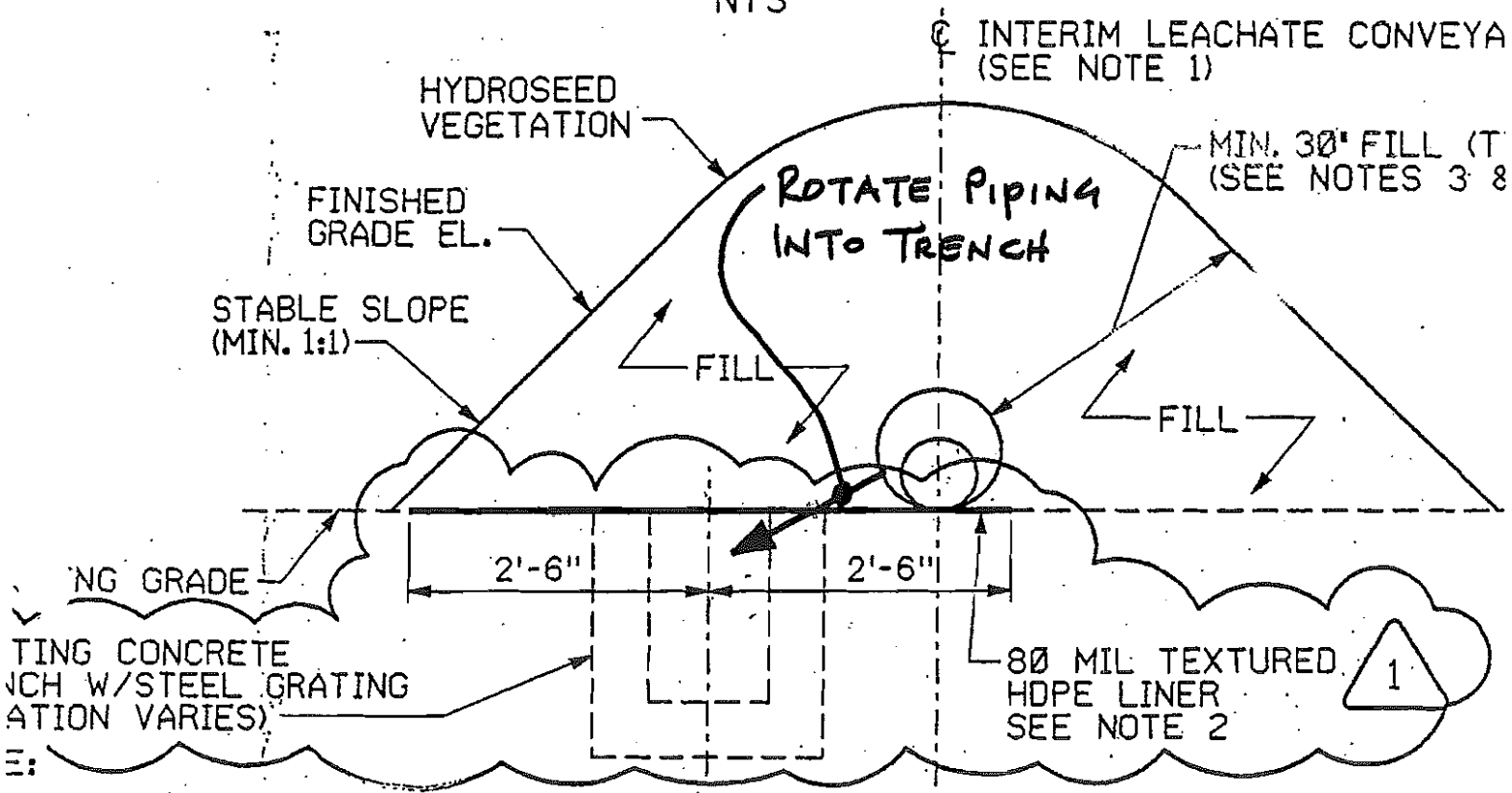
DCN 20111-041



DETAIL

EQUIPMENT WASH DRAIN LINE WYE

NTS



E:

FOR LOCATION OF INTERIM LEACHATE CONVEYANCE SYSTEM AND FOR B.O.P. EL. CONTAINMENT PIPE, SEE PLAN AND PROFILE DRAWINGS.

PRIOR TO PLACEMENT OF 80 MIL HDPE LINER, REMOVE DEBRIS, FOREIGN OBJECT FRAGMENTS, DELETERIOUS MATERIAL AND OTHER SHARP OBJECTS FROM THE PL AREA. OVERLAP HDPE LINER MIN. 2-FT. DO NOT WELD HDPE LINER.

PLACE MIN. 30-INCH FILL AROUND THE CONTAINMENT PIPE. OBTAIN FILL MATER BORROW SOURCE(S). FILL MATERIAL SHALL BE SC, SM, ML, CL OR CH ACCORDING SHALL BE FREE OF DEBRIS, FOREIGN OBJECTS, ROCK FRAGMENTS LARGER THAN AND OTHER DELETERIOUS MATERIAL. PLACE FILL TO FINISHED GRADE ELEVATIC EQUIPMENT. DO NOT OPERATE CONSTRUCTION EQUIPMENT OVER TOP OF PIPE WI OF COVER WITHOUT WRITTEN APPROVAL OF RESIDENT ENGINEER TITLE III SERV

PLACE FILL AROUND THE CONTAINMENT PIPE AFTER INTERIM LEACHATE CONVEY IS HYDROTESTED AND ACCEPTED FOR OPERATION.

PERIODICALLY INSPECT FINISHED GRADE
NISHED SLOPES.

DCN 20111 - 041

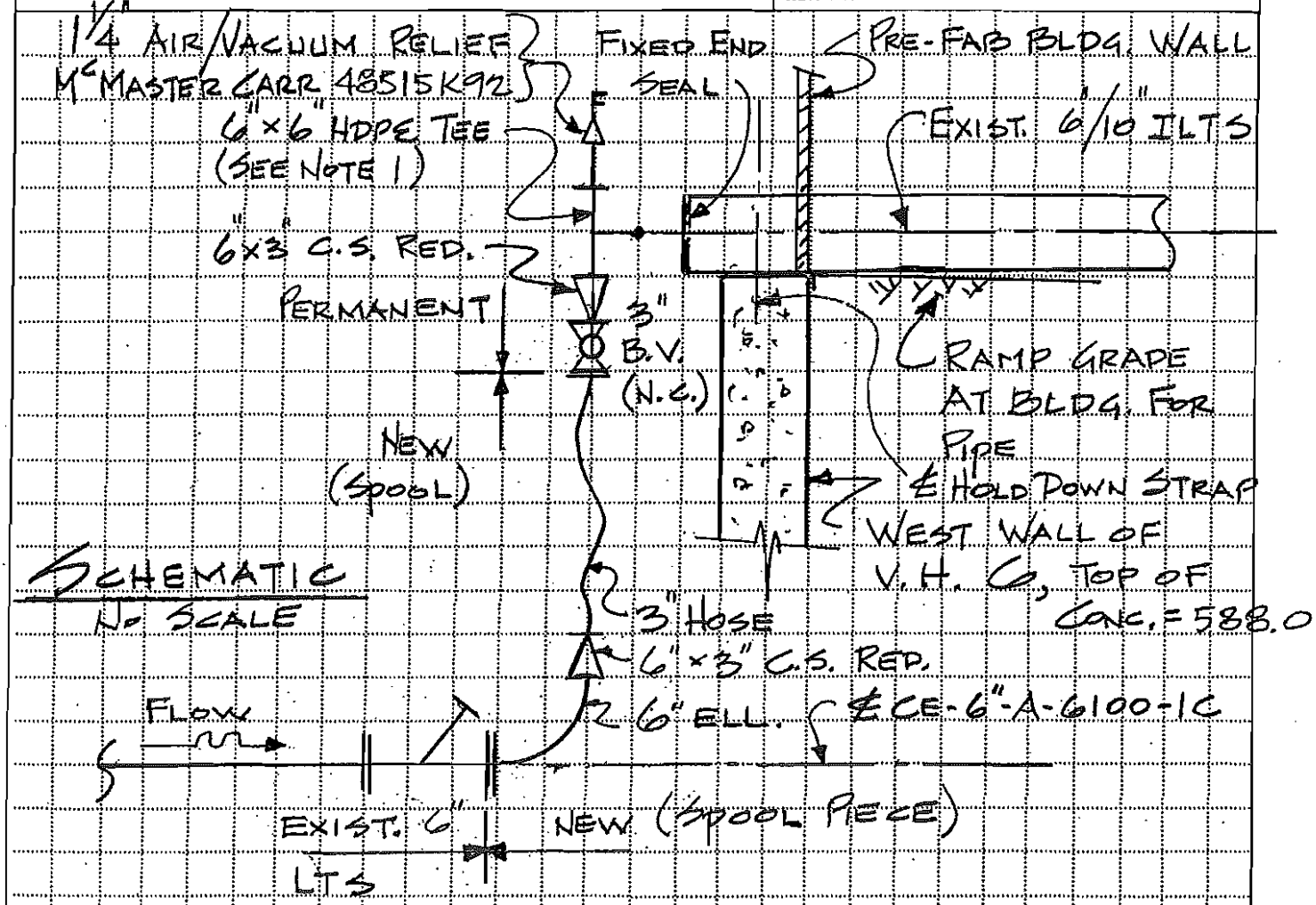
TYPICAL A
TOP OF EXIST.

Pg. 3 of 4

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

ENGINEERING CALCULATION

PROJECT NUMBER:	
BY:	DATE:
CHECKED BY:	DATE:
PAGE OF	
SUBJECT:	REVISED:



NOTE 1

BUTT FUSE 6"×6" HDPE TEE AND FIXED END SEAL TO 6"/10" ILTS BEFORE PENETRATING WEST WALL OF V.H.

SPOOL *

- 1 - 6" FLG. EL.
- 1 - 6"×3" FLG. RED.
- 1 - 3" HOSE, FLG. ENDS, APPROX. 3' LONG

* SPOOL PIECE TO BE TURNED OVER TO C.M.

DCN 20111-041

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.: 20111	(2) S/C NO.: FSC - 641	(5) Pg 1 Of 1	(6) DATE May 31, 2001
(3) S/C TITLE: OSDF Enhanced Permanent Leachate Transmission System Project			(11) RCI NO.: 20111 - 039R
(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]	(4A) RCI/DCN TITLE: Fixed End Seal Repair		(11) DCN NO.: 20111 - 042

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Valve House and Control Valve House Mechanical Details I	90X-6000-M-00266	0	Sheet M5

(9) [X] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [ ] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

A question arose concerning the integrity of the fixed end seals on the LTS piping system. Gaps were detected between the end seals and inside wall of the 10" containment pipe at Valve Houses 1, 2, 3, 5, and 6. These gaps were most likely caused by the expansion and contraction of the piping system. This may be a continuous problem. We suggest two possible solutions: One, install steel spacers in the branch lines(cell piping) to move the LTS line into proper alignment and reweld the end seals with an additional extrusion weld pass; or Two, completely remove the end seals and install link seals into the annular space to "seal" this space. Please advise on a method of repair to correct this problem.

(10) REQUESTOR: David R. Opalka	The STAVER Group, Inc.	DATE: 5/31/01	(12) CE / PE: James C. Jenkins / JAMES C. JENKINS DATE: 6/4/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [ ] APPROVED [X] APPROVED AS NOTED [ ] DISAPPROVED

- REMOVE EXIST. FIXED END SEALS ON NORTH & SOUTH WALLS OF LTS PIPING AT VALVE HOUSES 1, 2, 3, 4, 5, & 6. (11 TOTAL)
- REPLACE WITH LINK SEALS

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/5/01 KWADI BADU-TWEREBOAH, GEOSYNTEC [X] FIT [ ] FORM [ ] FUNCTION	(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2
(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) PERFORMANCE GRADE: (17) James C. Jenkins	DATE: 6/20/01
(18) CONSTRUCTION CONCURRENCE DATE: J. Hughes PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)	(21) FIELD WORK COMPLETED: (SIGNOFF BY CE OR PE) DATE:

FS-F-4259
REV. 5: 10/01/99

ECDC CONTROLLED COPY NO. 011

ORIGINAL

RCI/DCN FORM

REQUEST FOR CLARIFICATION OF INFORMATION / DESIGN CHANGE NOTICE

(1) PROJECT/CWO/RES NO.:	(2) S/C NO.:	(6) Pg 1 Of 1	(6) DATE
20111	FSC 641		June 13, 2001

(3) S/C TITLE: Enhanced Permanent Leachate Transmission System

(11) RCI NO.:

(4) RESPONSIBLE DISCIPLINE: E [ ] M [X] C [ ] OTHER [ ]

(4A) RCI/DCN TITLE: Removal of LDS Tank Bypass Valves for Valve Houses 1, 2, and 3

(11) DCN NO.: 20111-043

(7) DOCUMENTS AFFECTED	(7) DOCUMENT NOS.	(7) REV.	(8) OTHER
Piping and Instrumentation Diagram	90X6000-M-00263	0	
Valve House Mechanical Details I	90X6000-M-00264	0	
Valve House Mechanical Details II	90X-6000-M-00265	0	
~~Enhanced Permanent Leachate Transmission System Operation (SOP)~~	~~43-C-372~~	+	SR 6-20

(9) [ ] RCI-INQUIRY [ ] USQD SCREENING BY PROJECT ENGINEER (9) [X] DCN-JUSTIFICATION, EXISTING CONDITION & REQUESTED/PROPOSED CHANGE

[ ] REQUIRED [ ] NOT REQUIRED

Remove the following valves in Valve Houses 1, 2, and 3 and install blanks on both sides of the removed valve:

VH No 1, valve 90-V114-VLV
VH No 2, valve 90-V214-VLV
VH No 3, valve 90-V314-VLV

(10) REQUESTOR:	COMPANY:	DATE:	(12) CE / PE	DATE:
Rob Kneip	Fluor Fernald	June 13, 2001	JAMES C. JENKINS	6/14/01

(13) RESPONSE: FOR RCI, IS A DCN REQ'D? [ ] NO [X] YES (14) FOR DCN: [X] APPROVED [ ] APPROVED AS NOTED [ ] DISAPPROVED

ECDC CONTROLLED
COPY NO. C011

RCI - DCN ACCEPTANCE

(15) DESIGN ORGANIZATION APPROVAL/DISAPPROVAL DATE: 6/20/2001
KHABEL BADV-THEHEBAHL, CROSS-INTEC
[ ] FIT [ ] FORM [X] FUNCTION

(20) CHARGE NO. FOR CADD SERVICES TO INCORPORATE: CLTS2

(16) FDF PE ACCEPTANCE & VERIFICATION THAT ALL REQUIRED REVIEWS ARE COMPLETE: (DCN ONLY) DATE:
PERFORMANCE GRADE: (17)

(18) CONSTRUCTION CONCURRENCE DATE:

PURCHASE REQUISITION REQUIRED: [ ] YES [X] NO (19)

J.C. Jenkins for J.R. Hughes

(21) FIELD WORK COMPLETED:
(SIGNOFF BY CE OR PE) DATE: 6/20/01

FS-F-4259
REV. 5: 10/01/99; ED-12-5002

ORIGINAL

APPENDIX M

APPENDIX M

NONCONFORMANCE REPORTS (NCRs)

- **Fluor Fernald**
- **GeoSyntec Consultants**
- **Contractor**

FLUOR FERNALD

Fluor Fernald, Inc.

NONCONFORMANCE REPORT FORM

ORIGINATOR/ASSESSOR

1	Nonconformance Number/Revision	NCR No.: 70 Revision No. 0
2	Dates	Date Discovered: 6/18/01 Date NCR Issued: 6/20/01
3	Type of Nonconformance	[X] FINDING [ ] CONCERN
4	Project/Activity @ Fac/Loc/Bldg.	EPLTS 20111 @ BLDG. 90D6 (VH-6)
5	Hazard Category	Nuclear: [ ] 1 [ ] 2 [ ] 3 Radiological: [ ] Non-Nuclear: [ ] High Hazard [ ] Moderate Hazard [ ] Low Hazard Industrial: [X] Standard Industrial Hazard [ ] Other Industrial Hazard Not Designated [ ] Desktop review, document review, etc.
6	Assessment	[X] Internal [ ] External (OEPA, DOE) [ ] Supplier/Vendor_____
7	Assessment Type	[ ] Audit [ ] Surveillance [ ] Inspection [X] Other WALK THROUGH
8	Assessment Number	N/A
9	Responsible Division/Vendor	[X] S&WP [ ] SC [ ] SP [ ] DP [ ] WGS [ ] SO&M [ ] ESH&Q [ ] OP [ ]Supplier/Vendor/Subcontractor [X] Other (#52000D) JAH 6-20-01
10	Responsible Department/Vendor	ARWWP CONSTRUCTION (52000D)
11	Responsible Team Leader/Coach/Vendor (Print Name)	WILLIE FRAZIER (D. BRETTSCHNEIDER) JAH 6 20 01 (For Concerns, assign to Division Manager)
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	[ ] CM [ ] ED [ ] RD [ ] MS [ ] QA [ ] AC [ ] PM [ ] PI [ ] FM [ ] EP [ ] EW [ ] MT [ ] OP [ ] PT [ ] SE [ ] TR [X] CT [ ] HR [ ] PC [ ] EM [ ] FP [ ] NS [ ] SH [ ] RP
	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	[ ] 1 Program [ ] 2 Training [ ] 3 Quality Improvement [ ] 4 Document/Records [ ] 5 Work process [ ] 6 Design [ ] 7 Procurement [ ] 8 Inspect/Test [ ] 9 Management Assessment [ ] 10 Independent Assessment [X] Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or filed to the NCR file. Use additional or separate sheets as necessary.	20111-TS-0001, SECTION 2605, ITEM 3.02D: The Maximum allowable depth of cuts, gouges, or scratches on the exterior surface of HDPE pipe or fittings is 10 percent of the wall thickness. For SDR 11 10" pipe this is approximately 1/10 (0.1") of an inch.
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.	The section of HDPE pipe from the ILTS system that is being placed into VH-6 as part of the contingency plan has a number of gouges that are a maximum of 3/8" (.375") in depth. This exceeds the allowable amount for this pipe.
16	Tagging Required / Number of Tags	[ ] Yes [X] No Number of Tags: N/A
17	Originator/Assessor	Name: Brian S. Wheeler Signature: Brian S. Wheeler Date: 6/20/01

TEAM LEADER'S/COACH'S REVIEW

	Team Leader/Coach	Name: FRANK THOMPSON Signature: Frank Thompson Date: 6/20/01
19	Response Date From Resp. Organ.	REQUESTED RESPONSE DATE: 7/24/01 (Reply within 20 working days)

NONCONFORMANCE REPORT FORM

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

	Nonconformance Number/Revision	NCR No.: 70 Revision No. 0
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	[ ] YES [X] NO Level 1 Cat.: [ ] (human performance.) [ ] (equip.) [ ] (nat. phenom/sabotage [ ] (other) [ ] Supplier/Vendor/Subcontractor (root cause per their program) Cause _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: [X] Accept-as-is [ ] Repair [ ] Rework [ ] Reject Non-Hardware: [ ] Other _____ Attached Corrective Action Plan per QA-0019 [ ] Yes [ ] NA Gouges are on exterior of containment pipe. This pipe is typically at atmospheric pressure. Based on this and actual observation of pipe, the gouges are not considered a significant defect. MW Griffin 7/30/01
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: KWASI BADU-TWEREBOAH Signature: [signature] Date: 8/22/01
23	Was a Design Change Notice Required?	[ ] Yes [X] No DCN # Date Issued
24	Was a SBDR Performed? Was a USQD Performed?	[ ] Yes [X] No SBDR # N/A Date Issued [ ] Yes [X] No USQD # N/A Date Issued
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	
26	Proposed Completion Date For CA	Date:
	Responsible Team Leader/Coach/Vendor	Name: _____ Signature: _____ Date: _____

EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR

28	Response Acceptable?	[ ] Yes [ ] No
29	Originator's/Assessor's	Name: _____ Signature: _____ Date: _____

COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION

30	Date Corrective Action Completed	Date:
31	Responsible Team Leader/Coach /Vendor	Name: _____ Signature: _____ Date: _____

VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER

32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	
33	Verifier	Name: _____ Signature: _____ Date: _____

CLOSURE BY THE VERIFIER'S TEAM LEADER/COACH

	Verifier's Team Leader/Coach (NCR Closed)	Name: _____ Signature: _____ Date: _____

FLUOR FERNALD

NONCONFORMANCE REPORT FORM

ORIGINATOR/ASSESSOR

1	Nonconformance Number/Revision	NCR No.: FY2000-1087 Revision No. 0
	Dates	Date Discovered: 8/08/00 Date NCR Issued: 8/10/00
3	Type of Nonconformance	[x] FINDING [ ] CONCERN
4	Project/Activity @ Fac/Loc/Bldg.	ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM
5	Hazard Category	Nuclear: [ ] 1 [ ] 2 [ ] 3 Radiological: [ ] Non-Nuclear: [ ] High Hazard [ ] Moderate Hazard [ ] Low Hazard Industrial: [X] Standard Industrial Hazard [ ] Other Industrial Hazard Not Designated [ ] Desktop review, document review, etc.
6	Assessment	[X] Internal [ ] External (OEPA, DOE) [ ] Supplier/Vendor_____
7	Assessment Type	[ ] Audit [ ] Surveillance [ ] Inspection [X] Other DOCUMENT REVIEW
8	Assessment Number	NOT APPLICABLE
9	Responsible Division/Vendor	[X] S&WP [ ] SC [ ] SP [ ] DP [ ] WGS [ ] SO&M [ ] ESH&Q [ ] OP [ ]Supplier/Vendor/Subcontractor [ ] Other
10	Responsible Department/Vendor	ARWWT
11	Responsible Team Leader/Coach/Vendor (Print Name)	JACK HUGHS (For Concerns, assign to Division Manager)
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	[ ] CM [X] ED [ ] RD [ ] MS [ ] QA [ ] AC [ ] PM [ ] PI [ ] FM [ ] EP [ ] EW [ ] MT [ ] OP [ ] PT [ ] SE [ ] TR [ ] CT [ ] HR [ ] PC [ ] EM [ ] FP [ ] NS [ ] SH [ ] RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	[ ] 1 Program [ ] 2 Training [ ] 3 Quality Improvement [ ] 4 Document/Records [X] 5 Work process [ ] 6 Design [ ] 7 Procurement [ ] 8 Inspect/Test [ ] 9 Management Assessment [ ] 10 Independent Assessment [ ] Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary.	SEE ATTACHED REQUIREMENT DESCRIPTION:
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.	SEE ATTACHED DESCRIPTION OF NONCONFORMANCE:
16	Tagging Required / Number of Tags	[ ] Yes [X] No Number of Tags:
17	Originator/Assessor	Name: MIKE GODBE Signature: Michael W. Godbe Date: 8/10/00

TEAM LEADER'S/COACH'S REVIEW

18	Team Leader/Coach	Name: FRANK THOMPSON Signature: Frank Thompson Date: 8/10/00
	Response Date From Resp. Organ.	REQUESTED RESPONSE DATE: SEPT 7, 2000 (Reply within 20 working days)

FLUOR FERNALD NONCONFORMANCE REPORT FORM

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

	Nonconformance Number/Revision	NCR No.: FY2000-1087 Revision No. 0
0	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	[ ] YES [X] NO Level 1 Cat.: [ ] 1H (human perf.) [ ] 1E (equip.) [ ] 1N (nat. phenom/sabotage [ ] 1Z (other) [ ] Supplier/Vendor/Subcontractor (root cause per their program) TapRoot Cause Code(s) _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: [X] Accept-as-is [ ] Repair [ ] Rework [ ] Reject Non-Hardware: [ ] Other _____ Attached Corrective Action Plan per QA-0019 [ ] Yes [X] NA See attached justification and hydrostatic test results GEOSYNTEC Jr Engineer Fax 9/13/00 KHAS BADU-TWEREBOAH 9/13/00
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: MIKE GRIFFIN Signature: Mike Griffin Date: 9/12/00
23	Was a Design Change Notice Required?	[ ] Yes [X] No DCN # Date Issued
24	Was a SBDR Performed? Was a USQD Performed?	[ ] Yes [X] No SBDR # Date Issued [ ] Yes [X] No USQD # Date Issued
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	See attached
26	Proposed Completion Date For CA	Date: 9/13/00
7	Responsible Team Leader/Coach/Vendor	Name: JACK HUGHS Signature: J Hughes Date: 9/13/00

EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR

28	Response Acceptable?	[X] Yes [ ] No
29	Originator's/Assessor's	Name: MIKE GODBER Signature: Michael Godber Date: 9/13/00

COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION

30	Date Corrective Action Completed	Date: 9/13/00
31	Responsible Team Leader/Coach /Vendor	Name: ~~MIKE GRIFFIN~~ JACK HUGHS MG 9/13/00 Signature: J Hughes Date: 9/13/00

VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER

32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	SEE ATTACHED HYDROSTATIC TEST RESULTS.
33	Verifier	Name: MIKE GODBER Signature: Michael Godber Date: 9/13/00

CLOSURE BY THE VERIFIER'S TEAM LEADER/COACH

34	Verifier's Team Leader/Coach (NCR Closed)	Name: FRANK THOMPSON Signature: Frank Thompson Date: 9/13/00

NCR# 2000-1087

ITEM #14 REQUIREMENT DESCRIPTION:

- Contract #FSC-641, Submittal #2605-001, Rev. 1, Submittal Status "A" HDPE Pipe and Fittings Data, Submittal Comment on Section 1.04 A-7 States:

"The recommended thermometer reading on a coated heater plate is 400 to 425."

ITEM #15 NONCONFORMANCE DESCRIPTION:

The attached tables shows 12 fusion joints that were fused using plate temperatures that exceeded the recommended 425 maximum temperature.

NCR FY2000-1087

QEP NUMBER	PIPE SIZE	FUSION PRESSURE	PLATE TEMPERATURE
4740	10 INCH	218 PSI	440
4398	10	218	440
4741	10	218	440
4399	10	218	440
4400	10	218	440
4401	10	218	440
4742	10	218	440
4743	10	218	440
4405	10	218	440
4751	10	218	430 HEAT GUN
4752	10	218	434 HEAT GUN
4753	10	218	440 HEAT GUN

MS
8/17/00
~~AMBIENT TEMP. 75F~~
~~79°F~~
~~73°F~~

QUALITY EVAL' TION PLAN

QEP No. 2005216 Rev. 0

1. Source [ ] Receiving [ ] Const./Remediation [X] Maint./Operations [ ] Waste [ ] Sampling [ ] Recycling [ ]

2. Item/Title/Description:

VERIFICATION OF HDPE PIPE AND FITTINGS HYDROSTATIC TESTING / 10 INCH CONTAINMENT PIPE

3. Project/Task: ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM PROJ. NO. 20111	4. Specification/Drawing/PO/Req.: SPEC. 20111-TS-0001, SECTION 2605, 3.05, D
5. Prepared By: MIKE GODBER — Date: 5/18/00	6. Reviewed By: FRANK B. THOMPSON — Date: 5/17/00
7. NDE Level III: N/A — Date:	8. Approved By: ROB KNEIP — Date: 5/17/2000

9. Char. No.	10. Evaluation Characteristic (Code/Specification, Inspection/Test/Examination Techniques, Acceptance Criteria)	11. Status SAT	11. Status UNSAT	12. General Remarks
	IDENTIFICATION OF PIPE LENGTH BEING TESTED: (WRITTEN DESCRIPTION OR ATTACHED DRAWING SHOWING THE LOCATION) 10 inch containment pipe from VH-1 to VH-2 North to south. GeoSyntec has weld map.			TIME TEST BEGAN: 0742
				AMBIENT TEMPERATURE: 61° F
	TEST GAUGE ID#: 01 CALIBRATION DUE DATE: 8-9-2000 – 8-9-2001			INITIAL TEST PRESSURE: 16 PSI
	TEST PRESSURE: 15 PSI			TIME FULL TEST PRESSURE IS REACHED: 1123
1.	VERIFY TEST GAUGE HAS BEEN CALIBRATED WITHIN (1) YEAR OF DATE OF TESTING. CALIBRATION SHALL BE TRACEABLE TO NATIONAL OR INDUSTRY STANDARD.	X NKG 8-29-00		FULL TEST PRESSURE: 16 PSI
2.	VERIFY THAT THE CARRIER PIPE IS AT ATMOSPHERIC PRESSURE DURING THE TESTING OF THE CONTAINMENT PIPING.	X NKG 8-29-00		TIME TEST COMPLETED: 1223
	(CONTINUED ON NEXT PAGE)			FINAL TEST PRESSURE: 16 PSI

13. QA Team Member (Printed Name) Muriel K. Vigus (Signature) Muriel K. Vigus RECORD	Date: 8-29-2000
14. QA Team Coach (Completed QEP): FRANK THOMPSON Frank Thompson	Date: 9-7-00

15. Distribution: ☐ Requesting Org. ☐ Participating Org. ☐ QA Project/Activity Representative ☐ Other

FS-F-4400-RV1 (06/01/98)

QUALITY EVA' ATION PLAN
(Continuation Sheet)

QEP No. 2005216 Rev. 0

9. Char. No	10. Evaluation Characteristic (Code/Specification, Inspection/Test/Examination Techniques, Acceptance Criteria)	11. Status SAT	11. Status UNSAT	12. General Remarks
3.	VERIFY THE PIPE IS ALLOWED TO STAND AT THE SPECIFIED TEST PRESSURE UNTIL STABALIZATION IS REACHED. THIS INCLUDES THE ADDITION OF MAKE-UP WATER ON AN HOURLY BASIS FOR FOUR HOURS TO MAINTAIN THE TEST PRESSURE. STABALIZATION IS COMPLETE WHEN THERE IS NO FURTHER CHANGE IN PRESSURE OVER A ONE-HOUR PERIOD. THE INITIAL EXPANSION PHASE SHALL NOT EXCEED FOUR HOURS	X MKV 8-29-00		LENGTH OF PIPE: 400 ft. This is Sat. ALLOWANCE FOR MAKE-UP PER TABLE 02605-3 (ADJUSTED): 1 hour
4.	VERIFY THAT ONCE STABALIZATION IS COMPLETE THE FINAL HYDROSTATIC TEST PRESSURE IS HELD FOR 1, 2, OR 3 HOURS.	X MKV 8-29-00		VOLUME OF MAKE-UP WATER ADDED: none
5.	VERIFY THAT AT THE END OF THE TEST MAKE-UP WATER IS ADDED AS NEEDED TO RETURN THE PIPE TO THE ORIGINAL TEST PRESSURE. THE TEST WILL BE CONSIDERED PASSING IF THE AMOUNT OF MAKE-UP WATER DOES NOT EXCEED THAT SPECIFIED IN TABLE 02605-3. (MAKE-UP WATER VOLUMES ON TABLE 02605-3 SHALL BE ADJUSTED FOR ACTUAL TEST PRESSURE AND FOR ACTUAL AMBIENT TEMPERATURE.)	X MKV 8-29-00		No make up water was needed for the final 1 hr. test.

RECORD

Page 2 of 2

TABLE 02605-3
ALLOWANCE* FOR EXPANSION
UNDER TEST PRESSURE FOR AMBIENT CONDITIONS+
Allowance for Expansion
(U.S. Gallons / 100 Feet of Pipe)

Nominal Pipe Size (Inches)	1 Hour Test	2 Hour Test	3 Hour Test
3	0.10	0.15	0.25
4	0.13	0.25	0.40
6	0.30	0.60	0.90
8	0.50	1.0	1.5
10	0.75	1.30	2.10
11	1.0	2.0	3.0
12	1.1	2.3	3.4
14	1.4	2.8	3.2
16	1.7	3.3	5.0
18	2.2	4.3	6.5
20	2.8	5.5	8.0
22	3.5	7.0	10.5
24	4.5	8.8	13.3
28	5.5	11.1	16.8
32	7.0	14.3	21.5
36	9.0	18.0	27.0
40	11.0	22.0	33.0
48	15.0	27.0	43.0

*These allowances only apply to the actual test phase and not to the initial expansion phase. They also assume pipe is being tested at a maximum design pressure equal to 1.5 times the pressure rating. If the pipe is being tested at a lower system design pressure, the allowance should be reduced by the ratio of the system design pressure to the maximum design pressure.

+When testing at temperatures below ambient (approximately 75°F), less pipe expansion takes place, resulting in lower requirements for make-up water. For a test temperature of about 68°F, the values in this table should be multiplied by a reduction factor of 0.75. For 50°F, this factor is 0.50.

The above footnotes are in accordance with the recommendation of AWWA [1999].

[END OF SECTION]

Calibration Report # 1000 3549 3 2258 00 7633 PROD #7284_Pg 5 1 of

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

PRESSURE TEST LOG

Gauge Manufacture Weiss

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: 301029 TASK NO.: 4.2

DESCRIPTION: Phase III YEAR: 2000

CONTRACTOR: Staven / Rieck / Calibration Date, 9 Aug 2000 JPS @ BMI of Dayton

TEST DESCRIPTION: HYDROSTATIC: ☒ PNEUMATIC (ATTACH WRITTEN AUTHORIZATION): ☐

PASS/FAIL CRITERION: (16 psi)

MATERIAL DESCRIPTION: FORCEMAIN: ☐ CONTAINMENT: ☒ CARRIER ☐ OTHER: ☐

TARGET PRESSURE: TEST DURATION: GAUGE NO.: 01 GAUGE LOCATION: N/# 2

TEST LOCATION: Manhole one TO Manhole Two

FOR CONTAINMENT PIPE TESTING, CARRIER PIPE PRESSURIZED FIRST: ☐ YES ☐ NO

READING NO.	STABILIZATION TEST PERIOD	DATE (day/mo)	TIME	READING	CHANGE IN READING	CA ID
1	Start of 1st 1 hr	29 Aug	07:42	16	Start	DLE
2	@ 10 min.		07:52	16	None	
3	@ 26 min.		08:08	16	"	
4	@ 41 min.		08:23	16	"	
5	@ 51 min.		08:33	14	- 2 LB	
6	Repressure	add water	08:38	16	add water Restart	
7	@ 15 min.		08:53	16	None	
8	@ 15 min.		09:03	16	None	
9	@ 15 min.		09:18	16	None	
10	@ 15 min.		09:33	15	1 LB	
11	Repressure	add water	09:35	15	add water	
12	@ 2 min.		09:37	16	None ~~add water~~	
13	@ 15 min.		09:52	16	None	
14	@ 22 min.	add water	10:20	15	1 LB add water ~~repressure~~	
15	@ 3 min.		10:23	16	Restart	
16	@ 15 min.		10:38	16	None	DLE

PASS: ☒

FAIL: ☐

VISUAL MONITORING: David L Evans

CONTRACTOR'S REPRESENTATIVE day/mo/yr CQA REPRESENTATIVE 29 Aug 2000 day/mo/yr

FINAL APPROVAL:

CONTRACTOR'S REPRESENTATIVE day/mo/yr SITE CQA MANAGER day/mo/yr

COPY TO:

PROD #7284_Vol 5

Calibration Report # 1000 3549.32258 00 7633

GEOSYNTEC CONSULTANTS

FLUOR FERNALD, INC.

FRESSURE TEST LOG

PROJECT: ON-SITE DISPOSAL FACILITY (OSDF)

LOCATION: FERNALD, OHIO PROJECT NO.: GQ1029 TASK NO.: 4.2

DESCRIPTION: Phase III YEAR: 2000

CONTRACTOR: Steven / Rieck / Calibration Date, 9, Aug. 2000

TEST DESCRIPTION: HYDROSTATIC: ☒ / PNEUMATIC (ATTACH WRITTEN AUTHORIZATION): ☐

PASS/FAIL CRITERION: 16 PSI

MATERIAL DESCRIPTION: FORCEMAIN: ☐ CONTAINMENT: ☒ CARRIER ☐ OTHER: ☐

TARGET PRESSURE: TEST DURATION: GAUGE NO.: Ø1 GAUGE LOCATION: m/H 2

TEST LOCATION: Manhole one TO Manhole Two

FOR CONTAINMENT PIPE TESTING, CARRIER PIPE PRESSURIZED FIRST: ☐ YES ☐ NO

READING NO.	STABILIZATION TEST PERIOD	DATE (day/mo)	TIME	READING	CHANGE IN READING	CA ID
17	@15 min	29 Aug	10:53	16	None	DLE
18	@15 min	29 Aug	1108	16	"	
19	@15 min	29 Aug	1123	16	"	
20	Ø min. start	29 Aug	1123	16	Start Test No Loss	
21	1 hour	29 Aug	1223	16	No Prop in pressure	PTE

PASS: ☒

FAIL: ☐

VISUAL MONITORING: _____ CONTRACTOR'S REPRESENTATIVE day/mo/yr

David L. Evans CQA REPRESENTATIVE 29 Aug 2000 day/mo/yr

FINAL APPROVAL: _____ CONTRACTOR'S REPRESENTATIVE day/mo/yr

_____ SITE CQA MANAGER day/mo/yr

COPY TO:

Godber, Mike

From: Godber, Mike
Sent: Thursday, September 07, 2000 12:27 PM
To: Sparks, Diana; Thompson, Frank; Collier, Brenda
Cc: Godber, Mike
Subject: Extension of NCR FY2000-1087

Diana

Since the the documentation supporting the corrective action for this NCR has not been fully completed yet, please extend this NCR to September 14, 2000.

Mike GODBER

PLASTICS
PIPE
INSTITUTE

Procedure for Polyethylene Gas Pipe

TR-33

The Society

of the Plastics

Industry, Inc.

Suite 600K

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Washington, DC

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Gene[illegible] Joining Procedure for [illegible] Gas Pipe

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NCR – HDPE Piping Butt Fusion Temperature Non-Compliance

Corrective Action / "Accept-as-is" Justification

STAVER provided literature from three sources – Plastic Pipe Institute (PPI), Driscopipe, and CRS Poly Pipe – concerning PE/HDPE piping butt fusion temperature.

The PPI Technical Report TR-33 summarizes the results of comprehensive testing of 290 fusion joints made at various temperatures in the 400 – 450 DEG F range. Additional fusion joints made at 375 – 475 DEG F were also tested. The test results for each of these joints were 100% positive. The report recommended a temperature range of 400 – 450 DEG F for fusing of most PE pipes on the market.

The Driscopipe "6800 Heat Fusion Qualification Guide" specifies a temperature of 375 – 400 DEG F in the their butt fusion procedure. The procedure includes a note that states satisfactory butt fusion joints can be made at a higher temperature range (475 – 500 DEG F); however, extreme care must be exercised to avoid excessive pressure which could result in a "cold" fusion joint.

The CRS Info Brief references the PPI TR-33 report and announces revision of their procedures to reflect the use of 425 DEG F for their standard PE pipe products. The report also states that users of their old procedure may continue to use 500 DEG F.

Based on the above information, it is concluded that the butt fusion joints made on this project at 440 DEG F (which is outside of the 400 – 425 DEG F range in the submitted procedure for this project) are acceptable, provided the joints are otherwise found acceptable by quality control evaluation.

(Include results of QC evaluation here and reference/attach documentation)

Based on the acceptable QC evaluation, the subject butt fusion joints made at 440 DEG F are acceptable "as-is".

Furthermore, it has been concluded that the butt fusion temperature range used on this project can be readily controlled in the 400 – 425 DEG F range, such that no change in the submitted procedure is recommended.

Action Taken to Prevent Future Occurrence

Fluor Fernald project management has informed STAVER to ensure that work process procedures are firmly established and accepted prior to initiating the work process. Workers are to be only trained/informed on the established and accepted procedures. Appropriate and sufficient quality control must be implemented by STAVER on this project.

NCR FY2000-1087

QEP NUMBER	PIPE SIZE	FUSION PRESSURE	PLATE TEMPERATURE	
4740	10 INCH	218 PSI	68°F 440	
4398	10	218	68°F 440	
4741	10	218	68°F 440 22°F 41°F	
4399	10	218	68°F 440	
4400	10	218	70°F 440	
4401	10	218	75°F 440	
4742	10	218	75°F 440 42°F	MG 8/17/00
4743	10	218	78°F 440 16°F	
4405	10	218	~~75°F~~ 440	AMBIENT TEMP.
4751	10	218	430 HEAT GUN	75°F
4752	10	218	434 HEAT GUN	74°F
4753	10	218	440 HEAT GUN	73°F

INFO BRIEF NO. 12

CSR PolyPipe

Heat Butt Fusion Temperature

CSR PolyPipe is pleased to announce that testing of PE pipe products (both our own manufacture and that of major competitors) heat butt fused with a heater plate temperature of 425°F is complete. All tests results were acceptable. In an effort to align ourselves with the generic fusion procedures as published in the Plastics Pipe Institute Technical Report No. 33 (TR-33), we revised our published fusion procedure to reflect the use of a heater plate temperature of 425°F.

All users of the old heat butt fusion procedure may continue to use a heater plate temperature of 500°F for all of CSR PolyPipe standard** PE pipe products. For reference, the Butt Fusion Time Cycles @ 500°F chart for 4810 PE3408 and 3810 PE2406 are presented below.

** Non standard pipe products with walls in excess of 2" may need special attention - consult CSR PolyPipe Engineering Services at 800-433-5632.

BUTT FUSION TIME CYCLES @ 500°F

for CSR PolyPipe PE 2406, SDR 11 and SDR 11.5, pipe and fittings

Pipe Size IPS (inches)	Heating Time (seconds)	Cooling Time (seconds)	Molten Bead Width (in)
1	14 - 20	60	1/16
1 1/4	12 - 16	60	1/16
2	16 - 20	60	1/8
3	20 - 24	90	1/8
4	26 - 30	180	3/16
6	42 - 50	210	3/16
8	58 - 66	240	3/16 to 1/4

for CSR PolyPipe PE 3408, SDR 11 and SDR 11.5, pipe and fittings

Pipe Size IPS (inches)	Heating Time (seconds)	Cooling Time (seconds)	Molten Bead Width (in)
1	16 - 20	90	1/16
1 1/4	20 - 24	90	1/16
2	28 - 32	90	1/8
3	32 - 38	180	1/8
4	38 - 44	210	1/8 to 3/16
6	56 - 66	240	3/16
8	72 - 82	300	3/16 to 1/4

Notes:

1. *Fusion time cycles given above begin* after a bead of molten material is evident the entire circumference of pipe.
2. Temperature and time cycles are based on 73 F conditions with no wind, rain or snow. If conditions are different, time cycles may need to be altered.

CSR PolyPipe
2706 N IH35, Gainesville, Texas 76241-0590
Telephone: (940) 665-1721/(800) 433-5632, Facsimile: (940) 668-8612

Foreword

This report was developed and published with the technical help and financial support of the members of the PPI (Plastics Pipe institute), a division of SPI (The Society of the Plastic Industry, Inc). The members have shown their interest in quality products by assisting independent standards-making and user organizations in the development of standards, and also by developing reports on an industry-wide basis to help engineers, code officials, specifying groups, and users.

The purpose of this technical report is to provide important information available to PPI on a particular aspect of polyethylene pipe butt fusion to engineers, users, contractors, code officials, and other interested parties. More detailed information on its purpose and use is provided in the document itself.

This report has been prepared by PPI as a service of the industry. The information in this report is offered in good faith and believed to be accurate at the time of its preparation, but is offered without any warranty, expressed or implied, including WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Consult the manufacturer for more detailed information about the particular joining procedures to be used with its piping products. Any reference to or testing of a particular proprietary product should not be construed as an endorsement by either SPI or PPI, which do not endorse the proprietary products or processes of any manufacturer. The information in this report is offered for consideration by industry members in fulfilling their own compliance responsibilities. SPI and PPI assume no responsibility for compliance with applicable laws and regulations.

PPI intends to revise this report from time to time, in response to comments and suggestions from users of the report. Please send suggestions of improvements to the address below. Information on other publications can be obtained by contacting PPI directly or visiting the web site.

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February, 1998

INTRODUCTION

In 1994, representatives of the U.S. DOT (Department of Transportation), Office of Pipeline Safety requested that the Plastics Pipe Institute (PPI) assist in promoting greater uniformity in the joining procedures utilized by gas utilities in the butt fusion of polyethylene (PE) gas piping products. DOT reported that it had encountered a proliferation of similar but slightly varying joining procedures from individual PE pipe producers. The slight differences in the various procedures made it more difficult for pipeline operators to qualify persons with appropriate training and experience in the use of these procedures. It was even more difficult for DOT to enforce the joining requirements in § 192.283 (Plastic pipe, qualifying joining procedures) of the C.F.R. (Code of Federal Regulations) Title 49.

In response to DOT's request, PPI established a task group to examine the differences among the varying joining procedures, to identify similarities in those procedures, and to determine whether there were a sufficient number of common elements to provide a basis for a more uniform, or "generic" joining procedure that could be qualified by pipeline operators for most applications. A more uniform joining procedure would bring greater consistency to this aspect of gas pipeline installation, facilitate the pipeline operators efforts to qualify the procedure, reduce costs, and simplify DOT's enforcement duties.

SCOPE

The program undertaken by the PPI Task Group for the testing of representative materials under a generic set of conditions was designed to reflect the fusion conditions and parameters specified in most joining procedures recommended by pipe producers and qualified by pipeline operators. It was intended to provide a technical basis for the development of a generic butt fusion procedure (see Appendix A) that can be offered to the industry for use with selected PE (polyethylene) piping products. The procedure would be available for use by pipeline operators who would determine whether the procedure is appropriate for use with the PE piping products it employs. Pipeline operators could consider the recommendations and testing performed by others in their effort to comply with the fusion procedure qualification requirements of 49 C.F.R. § 192.283 (Plastic pipe, qualifying joining procedures).

It is important to emphasize that the testing performed by the PPI Task Group was intended only to establish a technical basis for developing and proposing a more generic fusion joining procedure that would offer the maximum opportunity to be qualified and used by pipeline operators with a broad range of polyethylene piping products. The testing was not intended to qualify the procedure for use with any particular pipe product, and PPI offers no opinion on whether the procedure is properly qualified for use with any particular PE pipe product. PE pipe producers remain solely responsible for any representations that they may make about the use

of this generic procedure or any other joining procedure with their proprietary PE piping products, and pipeline operators remain solely responsible for compliance with the requirements of 49 C.F.R. § 192.283 (Plastic pipe, qualifying joining procedures) when qualifying any procedure for use with the products it selects for its pipelines.

PPI hopes that the inherent value of greater uniformity will provide all the incentive necessary for companies to evaluate the generic procedure in Appendix A as a first option for butt fusion joining of its PE piping products. Use of this procedure is obviously not mandatory, and every PE pipe producer and pipeline operator retains the option of developing different procedures for its particular products and pipelines. However, PPI believes that its work in developing this procedure as a candidate for widespread acceptance throughout the industry will lead to greater efficiency, simplicity, and understanding in this area and promote the use of effective, qualified procedures for butt fusion joining of PE pipe.

TESTING PROGRAM TO EVALUATE USE OF GENERIC JOINING PROCEDURE WITH POLYETHYLENE GAS PIPING PRODUCTS

The Task Group collected and examined a large number of diverse procedures now in use by gas pipeline operators or recommended by pipe producers for specific PE piping products. It then identified those conditions and fusion parameters that were common to the majority of those procedures. The Task Group proposed the following fusion parameters as representative of the conditions in the individual procedures that they reviewed:

Heater Surface temperature	400-450°F (204-232°C)
Interfacial Pressure	60-90 PSI (4.14-6.21 bar)

From its review of the different procedures collected from PE gas pipe producers, the Task Group further developed the "generic" joining procedure set out in Appendix A, based on its assessment of the common elements in the individual procedures. It was agreed that proprietary products such as Uponor's Aldyl A MDPE products and Phillips Driscopipe's M8000 HDPE piping products were sufficiently different from the remainder of the materials being discussed that they were not included in the test program. The manufacturers should be contacted for more information on particular joining procedures for those products.

Using these parameter ranges and procedures, the Task Group initiated a 3-part test program to evaluate whether a representative cross-section of marketed PE gas piping products would qualify under the qualification requirements of Part 192 when joined in accordance with this "generic" joining procedure. The evaluation was conducted using pipe from MDPE and HDPE materials deemed suitable for fuel gas applications per ASTM D2513. These materials have a grade designation, in accordance with ASTM D3350, of PE24 and PE34, respectively.

Grade	Density (Grams/cc)	Melt Index (Grams/10min.)	Pipe Marking
PE24	.926 - .940	.15 to .40	PE2406
PE34	.941 - .955	.05 to .15	PE3408

After fusion of the samples, tensile and quick-burst tests were conducted in accordance with the requirements of 49 C.F.R. § 192.283 (Plastic pipe, qualifying joining procedures). Non-destructive ultrasonic inspections and high speed tensile impact testing were also conducted on each fusion combination. Additional testing conducted only on 8" pipe samples, included 176° F (80°C), 1,000-hour long-term hydrostatic testing at 580 psi (40 bar) hoop stress. The results of the test program are described in the following sections. PPI's Conclusions and Recommendations, based on the Task Group's work, are found in Section IV. Test data are maintained at PPI headquarters.

Part 1 - Pipe Fusion and Testing - 2" IPS DR 11 (like materials)

Part 1 of this project was to evaluate the generic procedure for use in fusing a PE pipe producers product to itself (e.g., Phillips MDPE to Phillips MDPE). The Task Group members supplied 2" SDR 11 pipe samples for fusion joining.

A total of 24 sample fusions, like material to like material, were made for each MDPE and HDPE pipe product. The total number of sample pieces was 72 and the total number of fusion joints made was 290. To evaluate the fusion parameters initially selected by the Task Group, all combinations of min/max heater surface temperatures 400 - 450°F (204 -232°C) and max/min interfacial pressures 60—90 psi (4.14-6.21 bar) were used in this testing. In addition, sample fusions at heater face temperatures (375°F and 475°F) (191°C and 246°C) and interfacial pressures (50 and 100 psi) (3.45 and 6.90 bar) were made and tested to examine conditions for fusion outside the initially generic parameters. The Task Group agreed to use these same fusion parameters for both the MDPE and HDPE.

The results of testing these fusion samples were 100% positive. All of the fusion joints (including those made under the extended parameters) passed every test conducted. As noted above, these tests included tensile testing, quick burst testing, high speed tensile impact testing and 100% ultrasonic inspection.

Part 2 - Pipe Fusion and Testing -2" IPS DR11 (Unlike Materials)

Part 2 of this project was to evaluate the generic procedure, the fusion temperature range, and the interfacial pressure range for cross fusions of unlike materials (e.g., Phillips MDPE to Plexco MDPE or Uponor MDPE to KWH Pipe HDPE).

Again 2" IPS SDR11 PE pipe was chosen. The Task Group members reviewed the information presented in Table 1 and decided that the cross fusion program could be simplified by selecting representative materials only. For MDPE materials it was decided that two materials could be selected to represent the two main families of MDPE materials (chromium oxide/slurry loop produced MDPE and Unipol Gas Phase MDPE). The two specific materials selected were Phillips Marlex TR-418 and Union Carbide DGDA 2400. The testing of these two materials would help to assess the appropriateness of the generic conditions for cross fusion of all MDPE plastic pipe gas compounds commonly being used today. The Task Group decided to use the same joining parameters as in Part 1 in these tests, based on the view that successful fusions under these conditions would cover all the other materials under the generic ranges. The chosen combination of joining parameters were (1) 475°F/100 psi (246°C/6.90 bar) and (2) 375°F/50 psi (191°C/3.45 bar). The remainder of the fusion procedures remained the same as Part 1. Fusion joints between Phillips TR-418 and Union Carbide DGDA 2400 were prepared. There were nine (9) joints made at each joining parameter for a total of (18) joints.

For HDPE materials, the Task Group selected three (3) HDPE materials for evaluation: Chevron 9308, Novacor HD2007-H and Fina 3344. There were nine (9) joints made at each of the selected combinations of fusion parameters and combinations of materials, for a total of (54) joints.

For MDPE to HDPE joints, the Task Group elected to fuse Union Carbide 2400 to Fina 3344 to establish the cross fusion procedure for the fusion of MDPE to HDPE. Nine (9) joints were made at each of the two extended parameter combinations, for a total of (18) joints.

The results of testing these fusion samples were 100% positive. All of the fusion joints passed every test conducted. As noted above, these tests included tensile testing, quick burst testing, high speed tensile impact testing and 100% ultrasonic inspection.

Part 3 - Pipe Fusion and Testing - 8" IPS DR11 (Unlike Materials)

Part 3 of this project was to test 8" IPS SDR 11 PE pipe to establish a range of pipe sizes where the generic procedure could be used. For MDPE materials, the Task Group identified five different medium density polyethylene materials which can be classed into two main types based on catalyst family, production process and melt index:

A. Phillips Marlex TR-418, Chevron 9301, 9302, Solvay Fortiflex K38-20-160
B. Novacor Chemical HD-2100, Union Carbide 2400

The Task Group agreed to make (10) joints of each of the following combinations:

UCC2400 to Phillips Marlex TR-418
UCC2400 to Chevron 9301
UCC2400 to Solvay Fortiflex K38-20-160

The joints were made at the same parameters as before with five (5) made at 475°F/100 psi (246°C/6.90 bar) interface and five (5) made at 375°F/50 psi (191°C/3.45 bar) interface. In effect, this would provide representative results for all medium density polyethylene except Uponor Aldyl A MDPE. Thus, this portion of the testing program would require 30 joints in total. It was also decided that if there were any failures with joints made under these parameters, then the fusions should be duplicated under the generic parameters 400 - 450°F/60-90 psi (204-232°C/4.14-6.21 bar).

For HDPE materials, the Task Group identified seven different high density polyethylene materials which could be classed into three main categories based on catalyst family, production process and melt index:

A. Chevron 9308, Phillips TR 480 and Solvay Fortiflex K44-15-123.
B. Novacor Chemical HD-2007-H, Chevron 9346 and UCC2480
C. Fina 3344

The HDPE cross fusion testing covered 10 joints for each of the following combinations: A to A, B to B, C to C, A to B, B to C, and A to C, for a total of 60 fusion joints. The representative materials selected from each category were the Fina 3344, UCC2480 and Phillips TR480.

For MDPE to HDPE cross fusions, the Task Group decided to use the same materials as were used for the cross fusion of 2" pipe; i.e., Fina 3344 and Union Carbide 2400. This portion of the testing program would involve A to B fusions of the two materials, for a total of 10 joints.

In addition to the tensile testing, high speed tensile impact testing, quick burst testing and 100% ultrasonic inspection, each fusion combination described in Part 3 was subjected to a long- term 176°F (80°C), 1000 hour test using 580 psi (40 bar) hoop stress. As with the 2" IPS testing, all joints passed every test conducted.

CONCLUSIONS AND RECOMMENDATIONS

The results of this study indicate that there is a single fusion procedure with defined ranges of acceptable heater surface temperature, 400-450°F (204-232°C), and interfacial pressure, 60-90 psi (4.14-6.21 bar), for fusing most of the PE gas pipes on the market today. The PE pipes used in these tests were selected PE2406 and PE3408 materials which were deemed suitable for fuel gas applications (per ASTM D2513) and which have a grade designation, in accordance with ASTM D3350, of

PE24 and PE34, respectively, excluding Uponor Aldyl A MDPE and Driscopipe M8000 HDPE. The results further indicate that there is a strong likelihood that the generic fusion procedure used in this testing (see Appendix A) could be qualified by gas pipeline operators under DOT's regulations in Part 192 for use with most of these PE gas piping products. To the extent that this PPI generic procedure in Appendix A can be qualified for use with more and more of the PE pipe products in the marketplace, the closer the industry can move to meeting DOT's objective of greater uniformity, efficiency, and simplicity in the area of fusion procedures.

ACKNOWLEDGEMENTS

This document has been produced by an industry Task Group from equipment, fitting, pipe, and resin manufacturers from the following companies.

Phillips Driscopipe
PLEXCO
CSR PolyPipe
Central Plastics
Uponor
Charter Plastics
Solvay
Fina
KWH Pipe
McElroy Manufacturing
T.D. Williamson

Table 1. Overview of Polyethylene Plastic Gas Pipe Materials

Company	Resin	Melt Index (MI) Grams/10 min	High Load MI Grams/10 min.
Phillips	TR480	.11	13
Solvay	K44-15-123	.12	13
Solvay	K44-08-123	.08	8.5
Chevron	9346	.08	10
Chevron	9308	.10	10
Novacor Chem.	HD2007H	.07	8.5
Union Carbide	2480	.10	12
Fina	3344	.10	8
Phillips	TR418	.12	
Chevron	9301	.20	
Solvay	K38-20-160	.20	
Novacor Chem.	2100	.15	
Union Carbide	2400	.20	

APPENDIX A

Generic Butt Fusion Joining Procedure for PE (Polyethylene) Gas Pipe

This Appendix is intended to be used only in conjunction with PPI's Technical Report TR-33 that more fully explains the background, scope and purposes of the PPI generic procedure. This procedure has not been qualified for use with any particular piping product or combination of piping products and must be qualified for use in accordance with 49 CFR Part 192 prior to its use to join PE pipe in a gas pipeline. Any copying or reproduction of this procedure without this footnote and the accompanying TR-33 is a violation of the copyright.

This procedure is intended for PE fuel gas pipe (per ASTM D2513) which have a grade designation (in accordance with ASTM D3350) of PE24 and PE34, excluding Uponor Aldyl A MDPE and Driscopipe M8000 HDPE.

Butt Fusion Procedure Parameters:

Generic Fusion Interface Pressure Range	60-90 psi (4.14-6.21 bar)
Generic Heater Surface Temperature Range	400 - 450°F (204-232°C)

Butt Fusion Procedures:

The principle of heat fusion is to heat two surfaces to a designated temperature, then fuse them together by application of a sufficient force. This force causes the melted materials to flow and mix, thereby resulting in fusion. When fused according to the proper procedures, the joint area becomes as strong as or stronger than the pipe itself in both tensile and pressure properties.

Field-site butt fusions may be made readily by trained operators using butt fusion machines that secure and precisely align the pipe ends for the fusion process. The six steps involved in making a butt fusion joint are:

1. Securely fasten the components to be joined
2. Face the pipe ends
3. Align the pipe profile
4. Melt the pipe interfaces
5. Join the two profiles together
6. Hold under pressure

Secure

Clean the inside and outside of the pipe to be joined by wiping with a clean lint-free cloth. Remove all foreign matter.

Clamp the components in the machine. Check alignment of the ends and adjust as needed.

Face

The pipe ends must be faced to establish clean, parallel mating surfaces. Most, if not all, equipment manufacturers have incorporated the rotating planer block design in their facers to accomplish this goal. Facing is continued until a minimal distance exists between the fixed and movable jaws of the machine and the facer is locked firmly and squarely between the jaw bushings. This operation provides for a perfectly square face, perpendicular to the pipe centerline on each pipe end and with no detectable gap.

Align

Remove any pipe chips from the facing operation and any foreign matter with a clean, untreated, lint-free cotton cloth. The pipe profiles must be rounded and aligned with each other to minimize mismatch (high-low) of the pipe walls. This can be accomplished by adjusting clamping jaws until the outside diameters of the pipe ends match. The jaws must not be loosened or the pipe may slip during fusion.

Melt

Heating tools that simultaneously heat both pipe ends are used to accomplish this operation. These heating tools are normally furnished with thermometers to measure internal heater temperature so the operator can monitor the temperature before each joint is made. However, the thermometer can be used only as a general indicator because there is some heat loss from internal to external surfaces, depending on factors such as ambient temperatures and wind conditions. A pyrometer or other surface temperature-measuring device should be used periodically to insure proper temperature of the heating tool face. Additionally, heating tools are usually equipped with suspension and alignment guides that center them on the pipe ends. The heater faces that come into contact with the pipe should be clean, oil-free and coated with a nonstick coating as recommended by the manufacturer to prevent molten plastic from sticking to the heater surfaces. Remaining molten plastic can interfere with fusion quality and must be removed according to the tool manufacturer's instructions.

Plug in the heater and bring the surface temperatures up to the proposed temperature range (400-450°F) (204-232°C). Install the heater in the butt fusion machine and bring the pipe ends into full contact with the heater. To ensure that full and proper contact is made between the pipe ends and the heater, the initial contact should be under moderate pressure. After holding the pressure very briefly, it should be released without breaking contact. Continue to hold the components in place, without force, while a bead of molten polyethylene develops between the heater and the pipe ends. When the proper bead size is formed against the heater surfaces, the heater should be removed. The bead size is dependent on the pipe size. For 2" IPS pipe, a bead size of approximately 1/16" should be present and for 8" IPS pipe, a bead size of 1/8"- 3/16" should be present before removing the heater.

Joining

After the pipe ends have been heated for the proper time, the heater tool is removed and the molten pipe ends are brought together with sufficient force to form a double rollback bead against the pipe wall. The fusion force is determined by multiplying the proposed interfacial pressure, 60-90 psi (4.14-6.21 bar), by the pipe area.

For manually operated fusion machines, a torque wrench can be used to accurately apply the proper force. For hydraulically operated fusion machines, the fusion force can be divided by the total effective piston area of the carriage cylinders to give a hydraulic gauge reading in psi. The gauge reading is theoretical; the internal and external drag need to be added to this figure to obtain the actual fusion pressure required by the machine.

Hold

The molten joint must be held immobile under pressure until cooled adequately to develop strength. Allowing proper times under pressure for cooling prior to removal from the clamps of the machine is important in achieving joint integrity. The fusion force should be held between the pipe ends until the surface of the bead is cool to the touch.

The pulling, installation or rough handling of the pipe should be avoided for an additional 30 minutes.

FUSION GUIDES

6500 HEAT FUSION GUIDE

(ADOBE ACROBAT FILE (.pdf) - 1.5 MB)

6800 HEAT FUSION GUIDE

(ADOBE ACROBAT FILE (.pdf) - 546 KB)

This fusion guide is used for all TR480 HDPE Pipe.

This includes Driscopipe 1000/1200/4000-4500/5300/6400/6800 Series.

8100 HEAT FUSION GUIDE

(ADOBE ACROBAT FILE (.pdf) - 234 KB)

This fusion guide is used for all H516 HDPE Pipe.

This includes Driscopipe 5100/8100/8700 Series.

In order to view the Adobe Acrobat files (.pdf) found on this site you will need to have the Adobe Acrobat Reader 3.0 (or higher) software. If you do not have this software you may download it freely by clicking on the icon below.

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DRISCOPIPE®

Heat Fusion Qualification Guide

Driscopipe® 6800 Gas Distribution Piping System

PHILLIPS 66

DRISCOPIPE

This brochure has been developed to assist those responsible for fusion joining Driscopipe® 6800 Gas Piping System in meeting the requirements of Title 49 of the Code of Federal Regulations §192.285 as it applies to heat fusion.

The regulations require every operator to ensure that every individual performing fusion joining is qualified in the use of the recommended fusion procedure(s) by the following:

I. Appropriate training or experience in the use of the fusion procedure, and

II. Making a sample joint according to the procedure which passes the following inspections and tests:

A. The joint must be visually examined during and after joining, and found to have the same appearance as a photograph or sample of an acceptable joint which was joined in accordance with the procedure; and

B. The joint must be tested or examined by one of the following methods:

1. Pressure and tensile test as described in 49 C.F.R. §192.283; or
2. Ultrasonic inspection and found to be free of flaws which would cause failure, or
3. Cut into at least three longitudinal straps, each of which is:
   a. Visually examined and found to be free of voids or unbonded areas on the cut surface of the joint, and
   b. Deformed by bending, torque or impact and if failure occurs, it must not initiate in the joint area.

C. A person must be requalified under an applicable procedure, if, during any twelve month period he:

1. Does not make any joints under the procedure; or
2. Has three joints or three percent of the joints he has made, whichever is greater, which are found unacceptable by testing under 49 C.F.R. §192.513.

This brochure provides photographs of acceptable and unacceptable joints and illustrates the use of cut straps for inspection and testing of the joint. The fusion procedures recommended in this brochure have been qualified in accordance with 49 C.F.R. §192.283, and are certified to produce a joint as strong as the pipe. Individuals who demonstrate their ability to follow the recommended fusion procedures and produce acceptable fusion joints as illustrated in this brochure should meet the requirements for qualification under 49 C.F.R. §192.285 as it applies to heat fusion of the Driscopipe 6800 Gas Distribution Piping System.

Note: Section 192.283 "Plastic Pipe; Qualifying Joining Procedures." Section 192.285 "Plastic Pipe; Qualifying Persons To Make Joints." Section 192.287 "Plastic Pipe; Inspection of Joints." and Section 192.513 "Test Requirements for Plastic Pipelines" of Title 49 of the Code of Federal Regulations are shown on pages 10 and 11 of this brochure.

Caution: Static Electricity - Static electricity charges are generated on polyethylene pipe by friction, particularly during the handling of pipe in storage, shipping and installation. The flow of air or gas containing dust or scale will also build up significant static charges, as will the flow of dry materials through the pipe, such as in the case of gravity flow grain chutes. These charges are a safety hazard, particularly in areas where there is leaking gas, or an explosive atmosphere.

Plastic pipe is a non-conductor of electricity and the static charge will remain in place until some grounding device comes close enough to allow it to discharge.

The discharge of these static electric charges generally happens when workmen touch the pipe themselves or upon application of mechanical tools to the pipe. The result of the discharge will vary from an insignificant physical shock to possible ignition of a flammable gas-air mixture. The most effective and simple method to minimize the hazard of the discharge is to apply a film of water to the work surface, to drain away the static electricity. A ground wire on the plastic pipe will only discharge from that point, since the plastic is a non-conductor.

When workmen must enter a bellhole to hot tap a line or make emergency repairs to a damaged or leaking line, it is important that all safety precautions be observed. The exposed working surface of the polyethylene line should be doused with water before entering the area and a wet cloth should be kept on the pipe to drain off static charge build up while working on the line.

DRISCOPIPE

Driscopipe 6800 Extra High Molecular Weight, High Density Polyethylene Gas Distribution System is joined by the heat fusion technique commonly called "butt" and "sidewall" fusion. Pioneered and developed by Phillips Petroleum Company, these are simple, visual procedures with straightforward, uncomplicated instructions. Both fusion techniques are recognized in the industry as joining systems of very high integrity and reliability. Butt fusion does not require couplings. Joints are stronger than the pipe itself in both tension and pressure conditions.

The first fusion equipment for high density polyethylene was designed, developed and built by Phillips in the mid1950s following its first commercial production of high density polyethylene piping material. Heat fusion joining proved so successful that Phillips rapidly developed more sophisticated equipment and continued this developmental activity through the late 60s. Since that time, with Phillips guidance, other firms have developed an extensive line of reliable, readily available fusion equipment. There are literally millions of Driscopipe fusion joints in service today giving dependable, trouble-free performance.

The modern day heat fusion joint is basically the same joint made in 1956 ... only the fusion equipment has evolved to gain efficiency, reliability and convenience.

Butt fusion joints may easily be cut out and re-done, if necessary, to achieve a quality joint. The butt fusion joining system has been so successful that it is the "standard" joining system for polyethylene.

Butt Fusion Procedure for Pipe, Tubing & Fittings

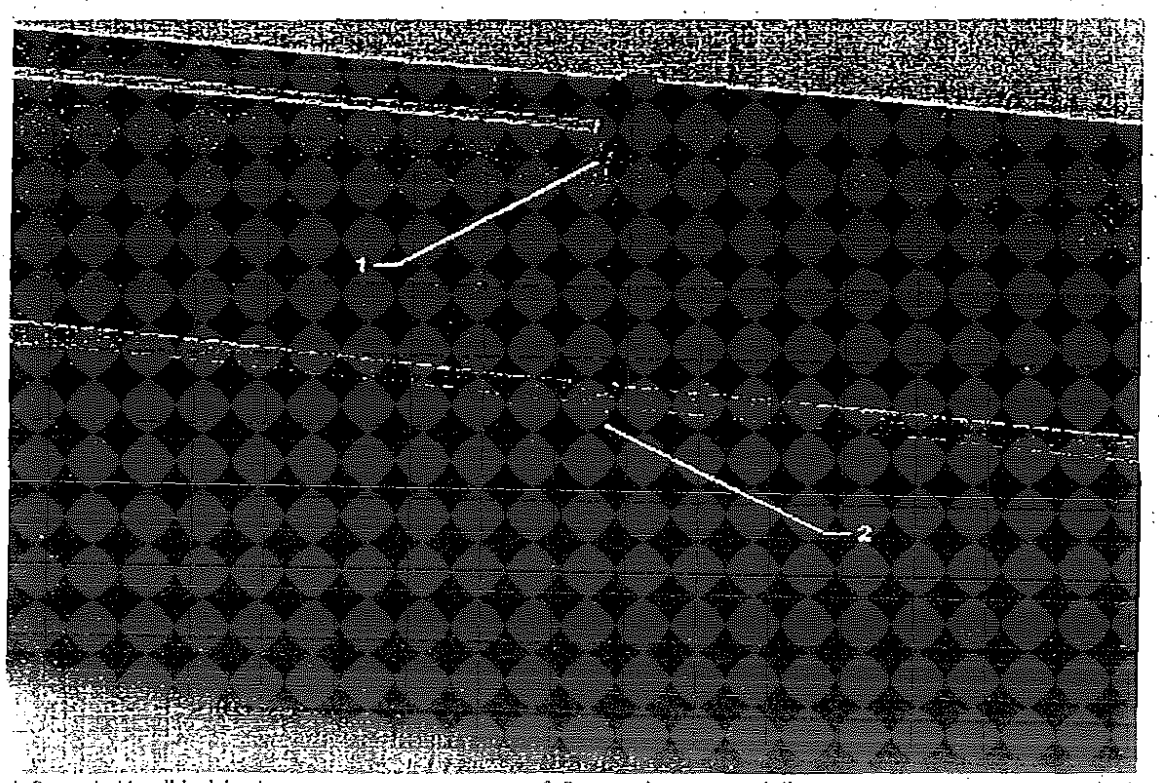
1. Clean each pipe end with clean cloth.
2. Square (face) end of each pipe to be fused.
3. Check line-up of pipe ends. Adjust high-low. Check heater plate for proper temperature, and clean surface with a clean cotton cloth.

Surface Temperature: 375°F - 400°F

4. Insert heater plate between aligned ends, and bring ends firmly in contact with plate, but *DO NOT APPLY PRESSURE* while achieving melt pattern. Watch for proper melt.

Pipe Sizes	Proper Melt
1 ¼" & smaller	1/16" melt bead
2"	1/8" melt bead
3"	1/8" - 3/16" melt bead
4" & larger	3/16" - 1/4" melt bead

Butt Fusion of Pipe
Acceptable Appearance



1. Proper double roll-back bead

2. Proper melt, pressure and alignment

DRISCOPIPE

5. Remove heater plate after achieving proper melt bead.
6. Bring melted ends together rapidly. *DO NOT SLAM. APPLY ONLY ENOUGH PRESSURE TO FORM A DOUBLE ROLL-BACK BEAD.*
7. Allow the butt fusion joint to cool properly (until finger can remain comfortably on bead).

Remember

Install proper inserts in fusion unit for the pipe, tubing or fittings being joined. A quality butt fusion joint is well aligned, has a complete double roll-back bead and is made in accordance with this procedure. Hydraulic fusions require an interfacial force of 75 psi to set the proper gage pressure

Heater plates should be double checked with a tempilstik or pyrometer for correct *surface temperature* (375°F - 400°F).

Note:

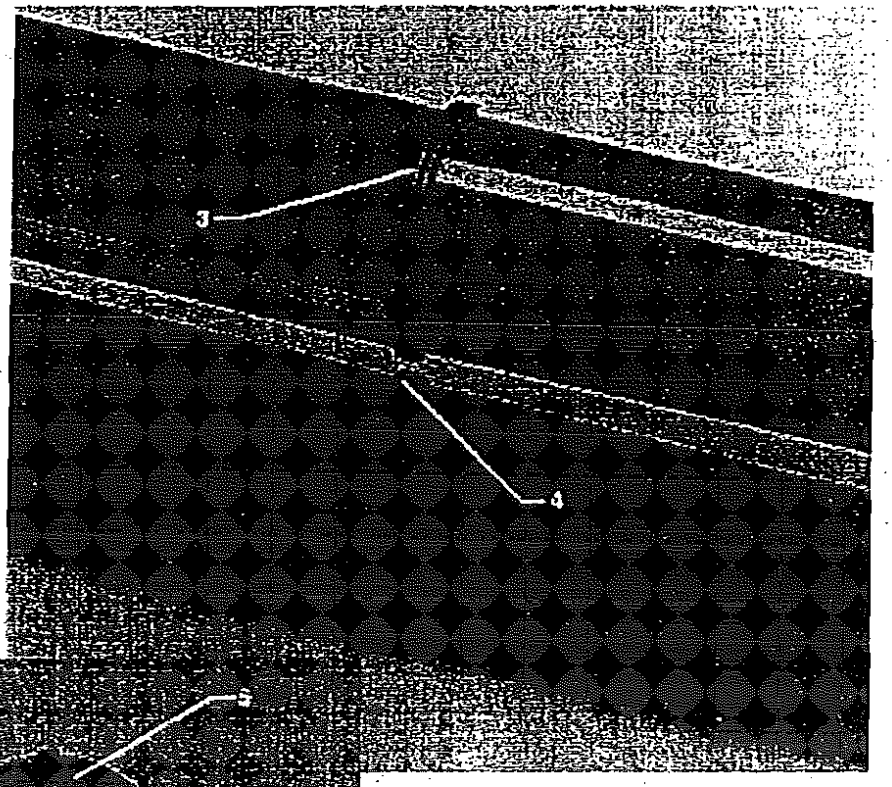
Satisfactory butt fusion joints can be made with Driscopipe® 6800 by using a heater plate surface temperature of 475°F - 500°F However, melt beads will form much more rapidly than with the lower temperature (375°F - 400°F). Extreme care must be exercised, in Step 6 above, to avoid excessive pressure which will squeeze out the melted material and result in a "cold" fusion joint.

Butt Fusion Qualification Procedure

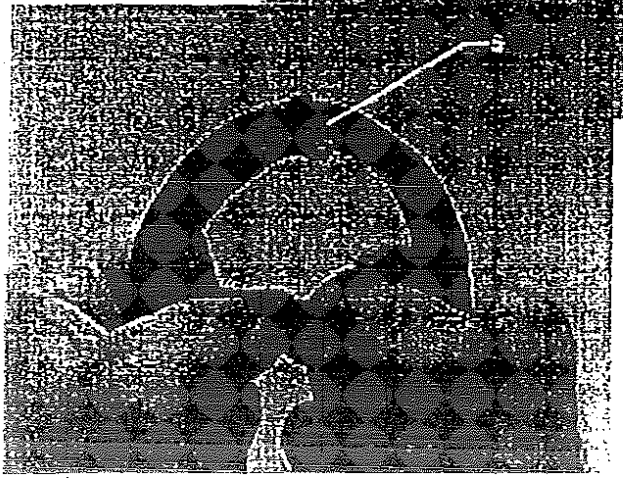
1. Observe the joining process to determine that the proper procedure is being followed.
2. Visually inspect the joint and compare it to a sample or picture of an acceptable joint.
3. Allow the joint to cool for at least one hour.
4. Cut the sample through the joint area, lengthwise of the pipe, into at least three straps.
5. Visually inspect the cut surface of the pipe wall at the joint for voids or unbonded areas.
6. Bend the sample 180°.
7. If flaws are observed in the joint, compare the appearance with pictures of poor joints, recheck the procedure and make another joint.

Butt Fusion of Pipe

Acceptable Appearance



3. Proper Double Roll Back Bead and Alignment
4. Proper Melt, Pressure



Butt Fusion of Tubing

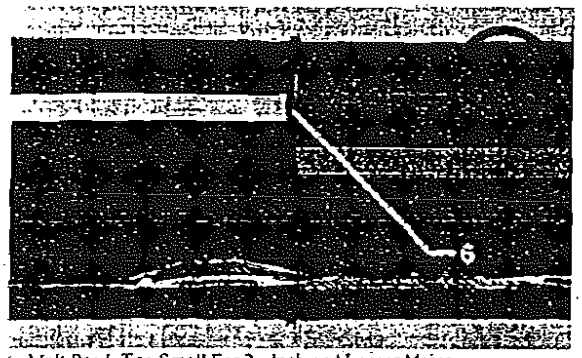
Acceptable Appearance

5. Proper Alignment - No Gaps or Voids

DRISCOPIPE

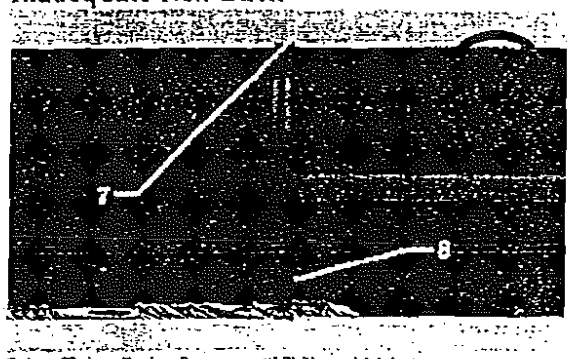
Butt Fusion of Pipe

Unacceptable Appearance - Insufficient Melt



6. Melt Bead Too Small For 2 - Inch and Larger Mains

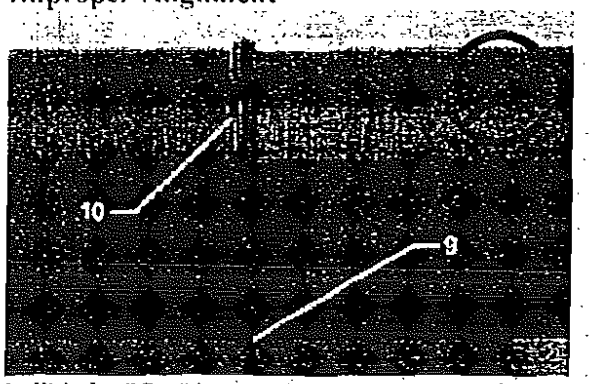
Unacceptable Appearance - Inadequate Roll Back



7. Insufficient Fusion Pressure - "V" Shaped Melt Appearance
8. Inadequate Roll Back of Bead

Butt Fusion of Pipe

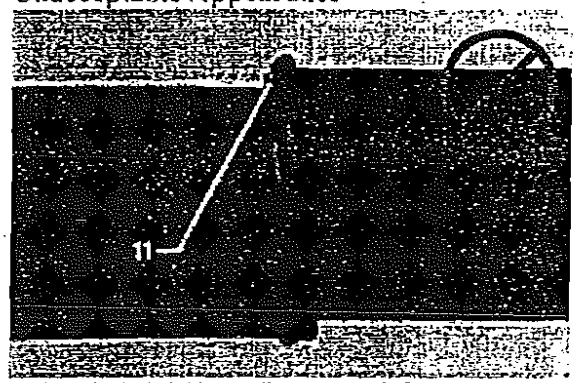
Unacceptable Appearance - Improper Alignment



9. "High - Low" Condition 10. Inadequate Roll Back Of Bead Due To Improper Alignment

Butt Fusion of Tubing

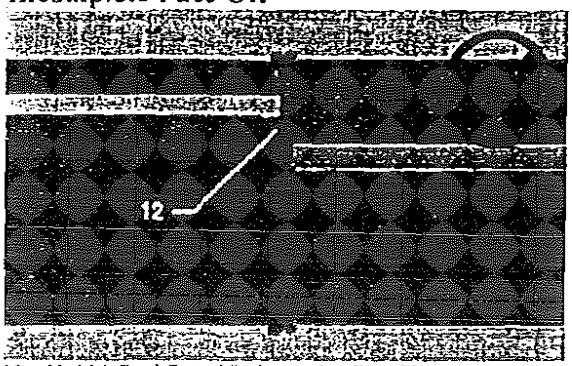
Unacceptable Appearance



11. Excessive Melt. Improper Alignment And/Or Excessive Pressure

Butt Fusion of Pipe

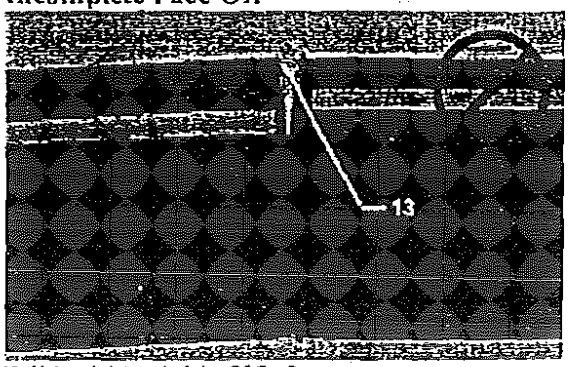
Unacceptable Appearance - Incomplete Face Off



12. No Melt Bead Caused By Incomplete Face Off

Butt Fusion of Pipe

Unacceptable Appearance - Incomplete Face Off



13. Unbonded Area In Joint Of Cut Strap

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Sidewall Fusion Procedure

1. Install fusion machine on the pipe (main).
2. Clean the pipe with clean cotton cloth. Prepare surface of pipe by roughing with 60 grit or coarser utility cloth.*
3. Prepare saddle base of tee (side fitting) by cleaning and roughing with 60 grit or coarser utility cloth.*
4. Align fitting on main and tighten clamp (insert adapter) on fitting stem while applying slight pressure on movable clamp handle.
5. Check saddle base for square alignment on main.
6. Clean face of heater adapters with clean cotton cloth. Check heater adapters for proper surface temperature (475°F - 500°F). Raise movable clamp with fitting. Roll in and center heater plate with adapter between base of fitting and main.
7. Apply a strong firm continuous pressure until complete melt bead can be seen on main. Release pressure to light pressure. Continue heat soak cycle on fitting and main. Watch base of fitting for ...

Main Sizes	Heat Soak Cycle Fitting Base Bead Size
1 1/4"	1/16" Melt Bead
2"	1/8" Melt Bead
3"	1/8" - 3/16" Melt Bead
4" & Larger	3/16" - 1/4" Melt Bead

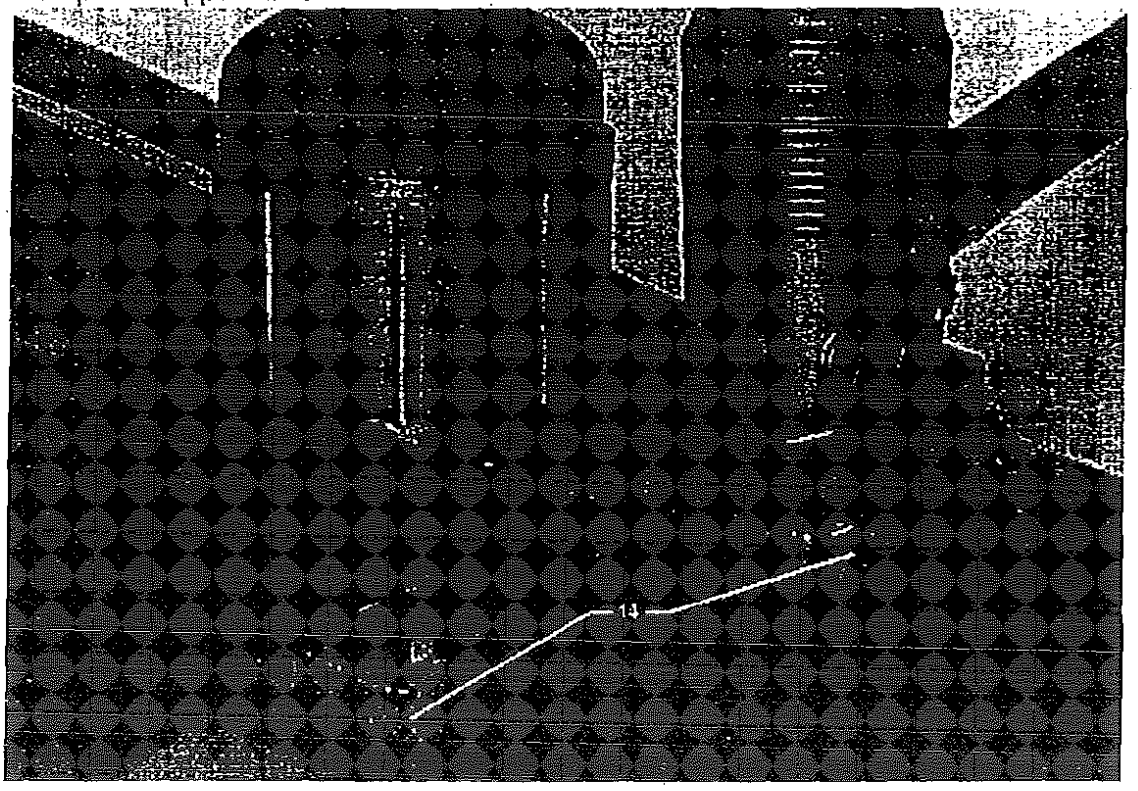
8. Raise movable clamp and cleanly remove heater plate.
9. Bring melted surfaces together rapidly *DO NOT SLAM*, apply continuous progressive pressure (as per chart on page 11) until proper fusion bead is formed. Maintain pressure until joint has cooled (until finger can remain comfortably on bead).

* *Do not use sandpaper*

Sidewall Fusion

11/4-inch Pipe:

Acceptable Appearance



14. Proper Melt, Pressure And Alignment

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Fusion Parameters

Acceptable fusion joints depend on visual verification of adequate melt and pressure parameters as outlined in the Driscopipe procedure. The following force gauge readings and heat soak time cycles are suggested to obtain the optimum sidewall fusion.

After the melt pattern is established, the pressure should be reduced to "0" during the Heat Soak Time Cycle. After the joint is made, the fusion pressure ranges listed should be maintained until the Joint has solidified with the fusion unit left in place until the joint has cooled thoroughly. The pressure shown is actual pressure. To obtain the gauge pressure contact the fusion unit's manufacturer.

Remember

Install proper sidewall and fittings inserts in fusion unit for the pipe and fittings being joined.

Be sure correct sidewall adapters are installed on heater plate.

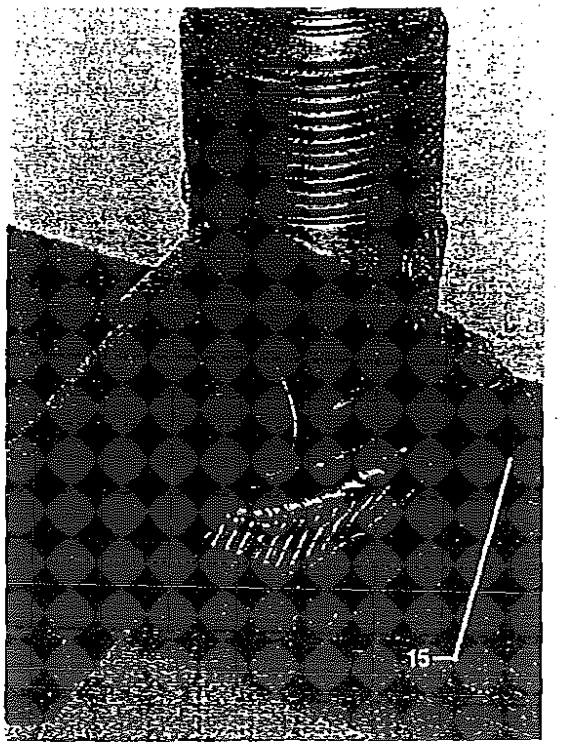
A quality side fusion joint has a uniform, well aligned appearance all around and is made in accordance with this procedure.

Heater plate should be checked periodically with a tempilstik or pyrometer for correct *surface temperature* (475°F - 500°F).

1. Observe the joining process to determine that the proper procedure is being followed.
2. Visually inspect the joint and compare it to a sample or picture of an acceptable joint.
3. Allow the joint to cool for at least one hour.
4. Cut the sample through the joint area, lengthwise of the pipe, into at least three straps.
5. Visually inspect the cut surface of the pipe wall at the joint for voids or unbonded areas.
6. Bend the sample 180°.
7. If flaws are observed in the joint, compare the appearance with pictures of poor joints, recheck the procedure and make another joint.

Sidewall Fusion

2 Inch or Larger Pipe: Acceptable Appearance



15. Proper pipe surface preparation

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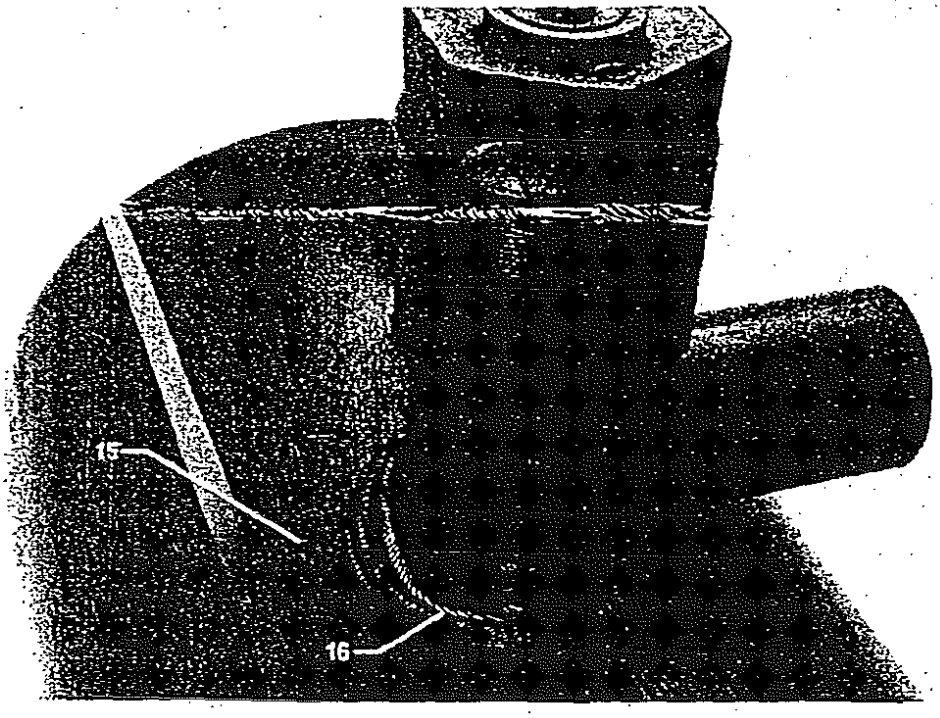
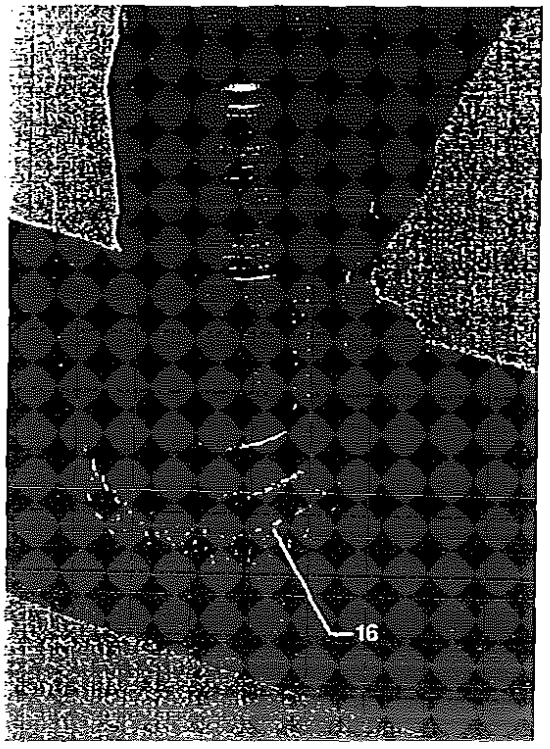
Sidewall Fusion

2 Inch or Larger Pipe:
Acceptable Appearance



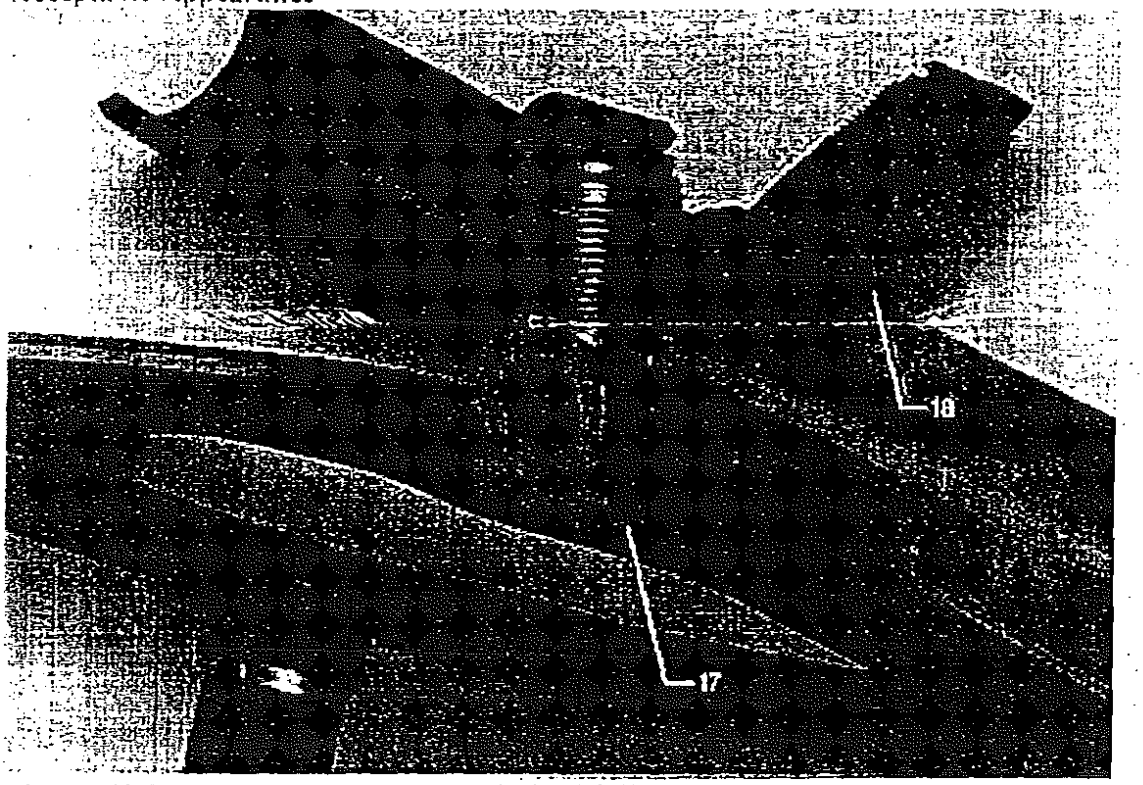


15. Proper pipe surface preparation
16. Proper melt, pressure and alignment

DRISCOPIPE

Sidewall Fusion

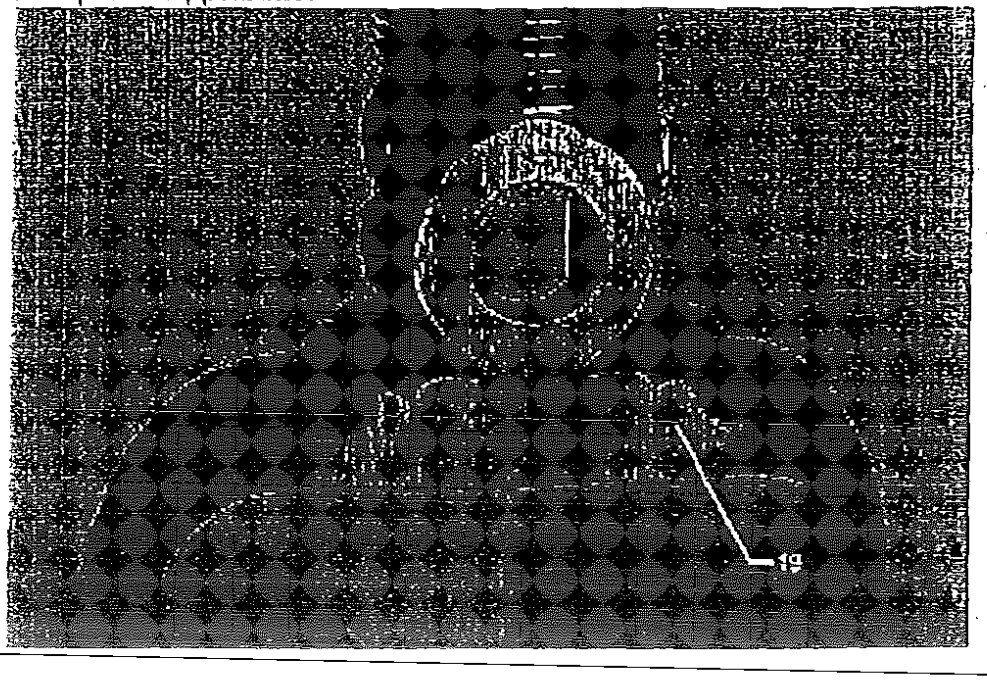
Acceptable Appearance



17. Proper Melt, Pressure And Alignment 18. No Gaps Or Voids

Sidewall Fusion

Acceptable Appearance



19. No gaps Or Voids

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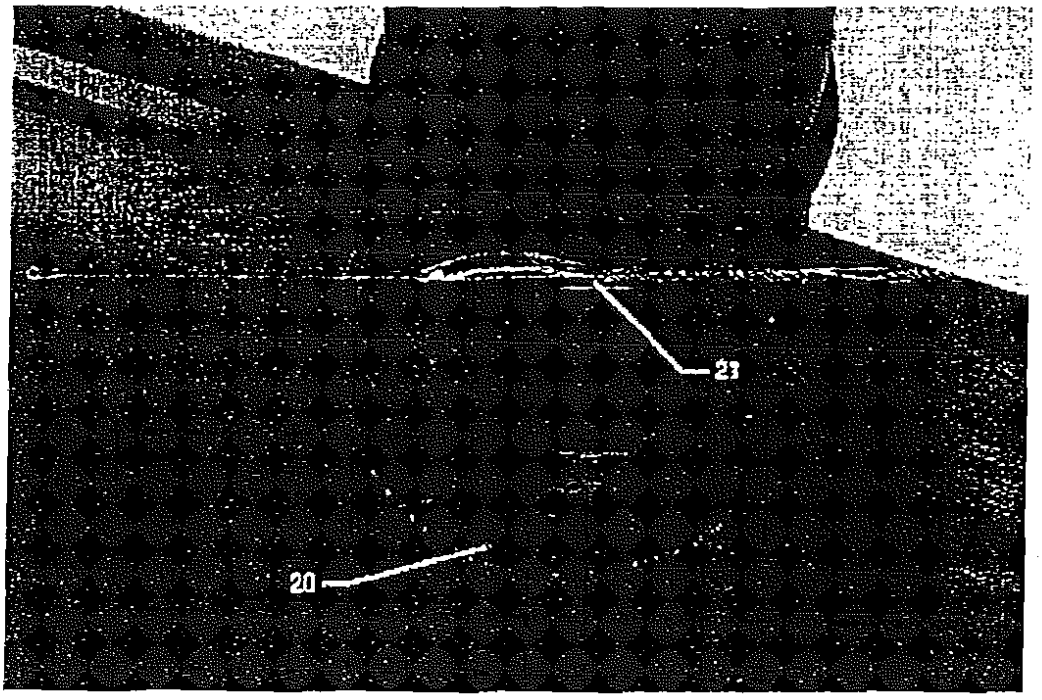
Sidewall Fusion

2-Ince or Larger Branch Saddle on 4-Inch or Larger Pipe: Acceptable Appearance

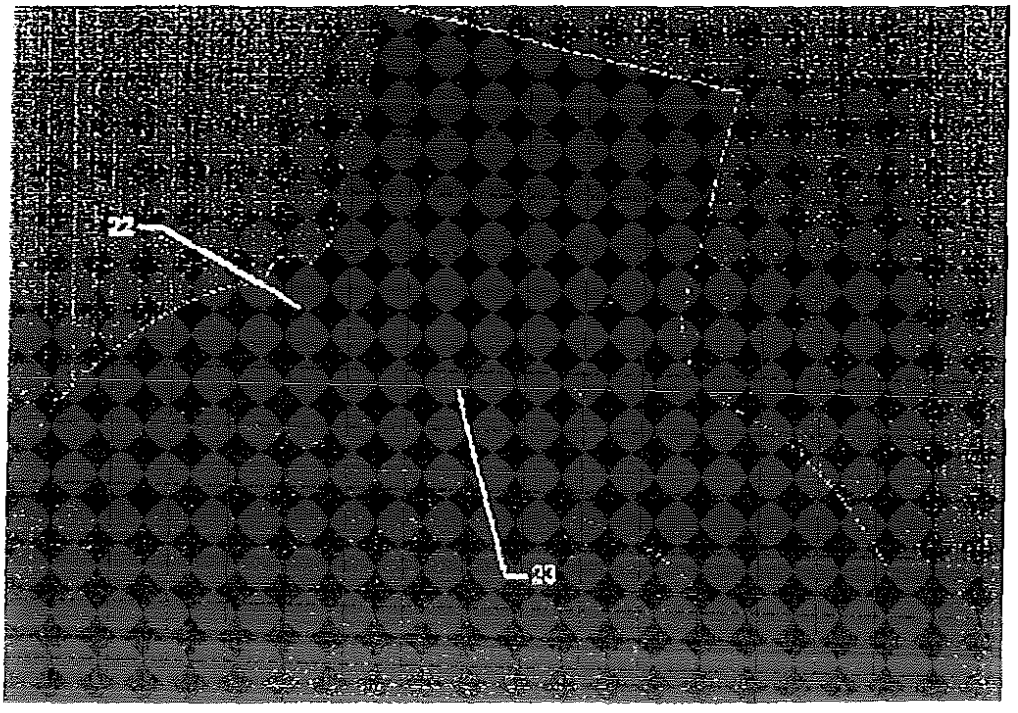


20. Proper Melt, Pressure And Alignment

21. Acceptable Pipe To Fitting Fusion Joint

Sidewall Fusion

2-Inch or Larger Branch Saddle on 4-Inch or Larger Pipe: Acceptable Appearance



22. Proper Melt, Pressure And Alignment

23. No Gaps Or Voids

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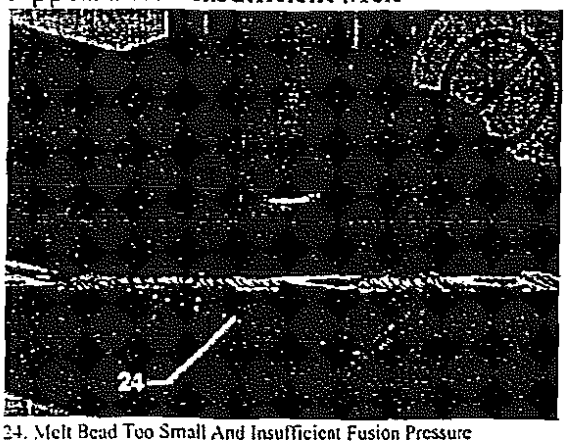
Sidewall Fusion

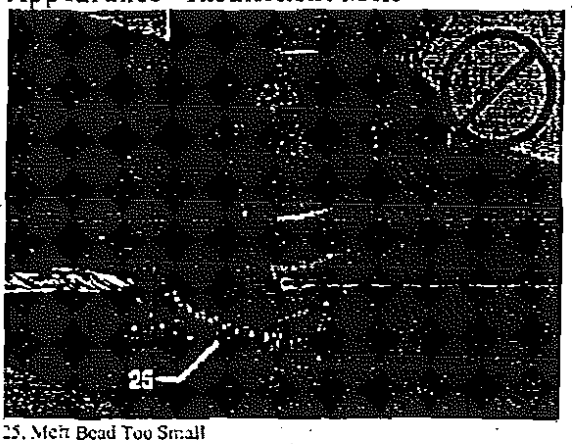
1 ¼-Inch Pipe: Unacceptable Appearance - Insufficient Melt



24. Melt Bead Too Small And Insufficient Fusion Pressure

Sidewall Fusion

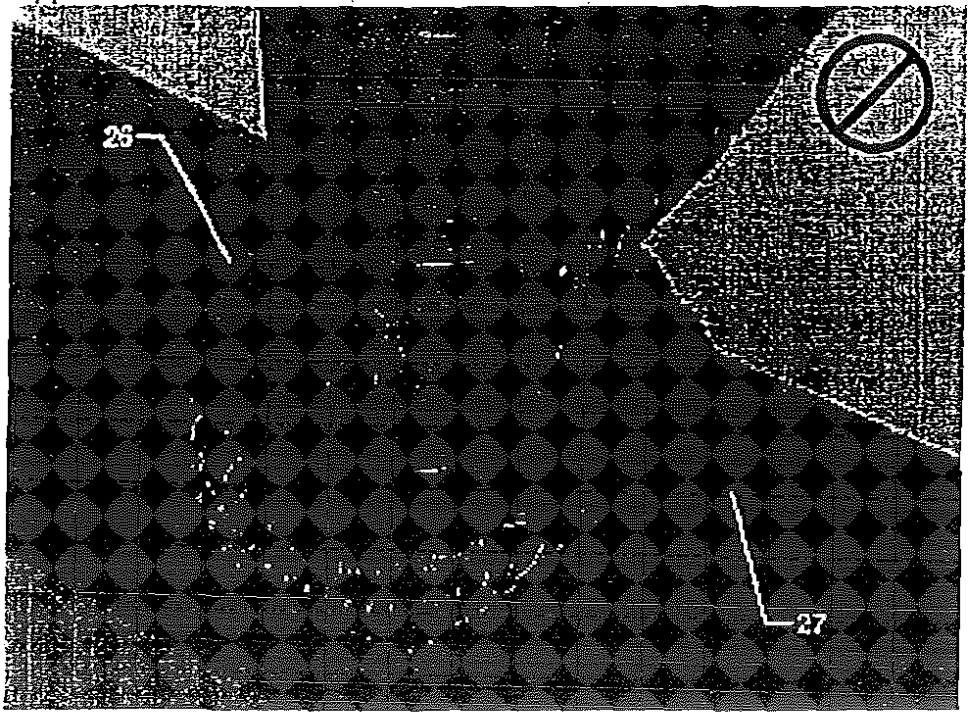
2-Inch or Larger Pipe: Unacceptable Appearance - Insufficient Melt



25. Melt Bead Too Small

Sidewall Fusion

2-Inch or Larger Pipe: Unacceptable Appearance - Excessive Melt and Pressure



26. Melt Bead Is Above Base of Fitting 27. Incomplete Pipe Surface Preparation.

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Caution

Driscopipe HDPE pipe has been used safely in thousands of applications. There are precautions that should be adhered to when using any product. Polyethylene pipe is no different. The following is a listing of some of the cautions that should be considered when using Phillips Driscopipe products.

Fusion

During the heat fusion process the equipment and pipe product may reach temperatures in excess of 400°F. Caution should be taken to prevent burns.

* Review heat fusion cards and the Design Manual

Weight

Although HDPE is not as heavy as some alternative pipe products, there can be significant weight involved. Care should be exercised when handling or working around HDPE pipe.

* Review size and dimensions sheets and Phillips Driscopipe Recommendations for Handling and Unloading sheet.

Air Pressure

High air pressure is not recommended for use in HDPE pipe for testing. HDPE pipe should not be used for process air. Consult your supplier for additional precautions.

* Review Design Manual.

Static Electricity

High static electricity charges can be associated with HDPE pipe products. Improper use of pinch-off equipment and other procedures in the presence of flammable or explosive gases can be extremely dangerous.

* Review Design Manual and Driscopipe 6800 brochure.

Unloading

Assure that proper equipment is used when unloading pipe. The equipment should be of a size to handle the loads and the condition of all straps should be checked.

*Review Engineering Manual, and Phillips Driscopipe Recommendations for Handling and Unloading sheet.

Burial

Consult the appropriate authority on trench construction requirements. All safety precautions should be taken when working in a trench.

*Review Engineering Manual

Testing

Water is the recommended test medium. All safety precautions for pipe movement or breakage during testing should be taken.

*Review Engineering Manual.

Impact or Hitting

HDPE pipe is impact resistant. Any hitting of the pipe with an instrument, such as a hammer, may result in uncontrolled rebound.

*Review data physical properties sheet and Driscopipe 8100 brochure

Product Consideration

Some products are not recommended for use in HDPE pipe systems. Consult your supplier for a listing of chemical resistance.

*Review Engineering Manual, and Phillips Marlex TIB 2 brochure

Coils

Coiled HDPE pipe may contain energy as in a spring. Uncontrolled release, i.e., cutting of straps, can result in dangerous uncontrolled forces. All safety precautions and the proper equipment is required.

*Review Phillips Driscopipe Recommendations for Handling and Unloading sheet.

Locating

Polyethylene materials are generally not detectable by standard magnetic locating equipment. There are several methods available to aid in the detection of polyethylene pipelines. These include tracer wires, identification tape, detection tape, line markers, electronic marker systems, acoustic pipe tracing and "call before you dig" line location. When installing a polyethylene pipe system, consideration should be given to a method or methods that will allow the pipeline to be located in the future. If posted signs are used to indicate the location of buried pipe, it is recommended that the signs indicate that the line is polyethylene. This alerts the locating personnel that the pipeline may not be identifiable by standard locating equipment. The gas company should always by contacted prior to any excavation or trenching.

* Contact utility companies

§192.283 Plastic Pipe; Qualifying joining procedures

(a) *Heat fusion, solvent cement, and adhesive joints.* Before any written procedure established under §192.273(b) is used for making plastic pipe joints by a heat fusion, solvent cement, or adhesive method, the procedure must be qualified by subjecting specimen joints, made according to the procedure, to the following tests-

(1) The burst test requirements of -

(i) In the case of thermoplastic pipe, paragraph 8.6 (Sustained Pressure Test) or paragraph 8.7 (Minimum Hydrostatic Burst Pressure) of ASTM D 2513; or

(ii) In the case of thermosetting plastic pipe, paragraph 8.5 (Minimum Hydrostatic Burst Pressure) or paragraph 8.9 (Sustained Static Pressure Test) of ASTM D2517;

(2) For procedures intended for lateral pipe connections, subject a specimen joint made from pipe sections joined at right angles according to the procedure to a force on the lateral pipe until failure occurs in the specimen. If failure initiates outside the joint area, the procedure qualifies for use; and

(3) For procedures intended for nonlateral pipe connections, follow the tensile test requirements of ASTM D638, except that the test may be

DRISCOPIPE

acceptability of plastic pipe joints made under the applicable joining procedure.

[Amdt. 192-34, 44 FR 42974, July 23,1979]

§192-513 Test requirements for plastic pipelines

(a) Each segment of a plastic pipeline must be tested in accordance with this section.

(b) The test procedure might insure discovery of all potentially hazardous leaks in the segment being tested.

(c) The test pressure must be at least 150 percent of the maximum operating pressure or 50 p.s.i.g., whichever is greater. However, the maximum test pressure may not be more than three times the design pressure of the pipe.

(d) The temperature of thermoplastic material must not be more than 100°F during the test.

Note:

Title 49 C.F.R. §192.285 have been amended and along with §192.287 have an effective date of April 1, 1988 Title 49 C.F.R §192.512 is also quoted and is presently effective.

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Suggested Heating Time Cycles for Driscopipe 6800®

Main Size (inches)	Pressure to Establish Melt Pattern (psi)	Heat Soak Time (sec)	Fusion Pressure (psi)
Driscopipe® 6800 - Butt Fused (Large Base) Tapping Tees 1" IPS or smaller outlets:			
1 ¼"	150 - 175	5 - 10	60 - 80
2	150 - 175	5 - 15	70 - 90
3	175 - 200	15 - 30	80 - 100
4	175 - 200	15 - 30	80 - 100
6	200 - 225	20 - 35	110 - 130
8	225 - 250	25 - 40	120 - 140
Driscopipe® 6800 - 1 ¼" IPS Outlet Tapping Tee			
2	175 - 225	12 - 20	175 - 225
3	200 - 240	20 - 40	200 - 240
4	225 - 275	30 - 45	225 - 275
6	240 - 290	45 - 60	240 - 290
8	250 - 300	55 - 80	250 - 300
Driscopipe® 6800 - Large Base 2" IPS Outlet Tapping Tee			
2	375 - 425	20 - 30	375 - 425
3	400 - 450	90 - 120	400 - 450
4	400 - 500	170 - 200	400 - 500
6	500 - 600	230 - 250	500 - 600
8	800 - 900	240 - 300	800 - 900

Driscopipe 6800® Branch Saddles

Nominal Size IPS (in) Main x Branch	Pressure to Establish Melt Pattern (psi)	Heat Soak Time (sec)	Fusion Pressure (psi)
2 x 2	140 - 160	7 - 13	140 - 160
3 x 2	140 - 160	15 - 25	140 - 160
4 x 2	160 - 180	25 - 35	160 - 180
6 x 2	175 - 190	40 - 50	175 - 190
8 x 2	180 - 210	45 - 60	180 - 210
10 x 2	180 - 210	45 - 60	180 - 210
12 x 2	180 - 210	45 - 60	180 - 210
4 x 3	350 - 380	30 - 45	350 - 380
6 x 3	380 - 410	45 - 60	380 - 410
8 x 3	410 - 450	60 - 90	410 - 450
10 x 3	410 - 450	60 - 90	410 - 450
12 x 3	410 - 450	60 - 90	410 - 450
6 x 4	630 - 680	60 - 90	630 - 680
8 x 4	680 - 730	90 - 120	680 - 730
10 x 4	680 - 730	90 - 120	680 - 730
12 x 4	680 - 730	90 - 120	680 - 730
8 x 6	1450 - 1575	100 - 150	1450 - 1575
10 x 6	1450 - 1575	100 - 150	1450 - 1575
12 x 6	1450 - 1575	100 - 150	1450 - 1575

* Heating time cycles are to be used as a guide only. The actual time required to develop adequate melt for joining will depend on temperature and wind conditions. Acceptable visual indicators of adequate melt are required regardless of the timing cycle indicated.

DRISCOPIPE

conducted at ambient temperature and humidity. If the specimen elongates no less than 25 percent or failure initiates outside the joint area, the procedure qualifies for use.

(b) Mechanical joints. Before any written procedure established under §192.273(b) is used for making mechanical plastic pipe joints that are designed to withstand tensile forces, the procedure must be qualified by subjecting 5 specimen joints, made according to the procedure to the following tensile test:

(1) Use an apparatus for the test as specified in ASTM D638-77a (except for conditioning).

(2) The specimen must be such length that the distance between the g rips of the apparatus and the end of the stiffener does not affect the joint strength.

(3) The speed of testing is 5.0 mm (0.20 in) per minute, plus or minus 25 percent.

(4)Pipe specimens less than 102 mm (4 in) in diameter are qualified if the pipe yields to an elongation of no less than 25 percent or failure initiates outside the joint area.

(5) Pipe specimens 102 mm (4 in) and larger in diameter shall be pulled until the pipe is subjected to a tensile stress equal to or greater than the maximum thermal stress that would be produced by a temperature change of 55°C (100°F) or until the pipe is pulled from the fitting. If the pipe pulls from the fitting, the lowest value of the five test results or the manufacturer's rating, whichever is lower must be used in the design calculations for stress.

(6) Each specimen that fails at the grips must be retested using new pipe.

(7) Results obtained pertain only to the specific outside diameter, and material of the pipe tested, except that testing of a heavier wall pipe may be used to qualify pipe of the same material but with a lesser wall thickness.

(c) A copy of each written procedure being used for joining plastic pipe must be available to the persons making and inspecting joints.

(d) Pipe or fittings manufactured before July 1, 1980, may be used in accordance with procedures that the manufacturer certifies will produce a joint as strong as the pipe.

[Amdt. 192-34A, 45 FR 9935, Feb. 14,1980, as amended by Amdt. 192-34B, 46 FR 39, Jan. 2,1981; 47 FR 32720, July 29,1982-1 47 FR 49973, Nov. 4,19821

§192.285 Plastic pipe; Qualifying persons to make joints

(a) No person may make a plastic pipe joint unless that person has been qualified under the applicable joining procedure by:

(1) Appropriate training or experience in the use of the procedure; and

(2) Making a specimen joint from pipe sections joined according to the procedure that passes the inspection and test set forth in paragraph (b) of this section.

(b) The specimen Joint must be:

(1) Visually examined during and after assembly or joining and found to have the same appearance as a joint or photographs of a joint that is acceptable under the procedure; and

(2) In the case of a heat fusion, solvent cement, or adhesive joint:

(i) Tested under any one of the test methods listed under §192.283(a) applicable to the type of joint and material being tested;

(ii) Examined by ultrasonic inspection and found not to contain flaws that would cause failure; or

(iii) Cut into at least 3 longitudinal straps, each of which is:

(A) Visually examined and found not to contain voids or discontinuities on the cut surfaces of the joint area; and

(B) Deformed by bending, torque, or impact, and if failure occurs, it must not initiate in the joint area.

(c) A person must be requalified under an applicable procedure, if during any 12-month period that person:

(1) Does not make any joints under that procedure; or

(2) Has 3 joints or 3 percent of the joints made, whichever, is greater, under that procedure that are found unacceptable by testing under §192.513.

(d) Each operator shall establish a method to determine that each person making joints in plastic pipelines in his system is qualified in accordance with this section.

[Amdt. 192-34A; 45 FR 9935, Feb. 14,1980, as amended by Amdt. 192-34B, 46 FR 39, Jan. 2,1981

§192-287 Plastic pipe: Inspection of joints

No person may carry out the inspection of joints in plastic pipes required by §§192.273(c) and 192.285(b) unless that person has been qualified by appropriate training or experience in evaluating the

FLUOR FERNALD

NONCONFORMANCE REPORT FORM

PROD #7284_Vol 5

ORIGINATOR/ASSESSOR

1	Nonconformance Number/Revision	NCR No.: FY2000-0960 Revision No. 0! MG 7/7/00
	Dates	Date Discovered: 6/26/00 Date NCR Issued: 6/29/00
3	Type of Nonconformance	[x] FINDING [ ] CONCERN
4	Project/Activity @ Fac/Loc/Bldg.	ENHANCED PERMANENT LEACHATE TRANMISSION SYSTEM/ OSDF
5	Hazard Category	Nuclear: [ ] 1 [ ] 2 [ ] 3 Radiological: [ ] Non-Nuclear: [ ] High Hazard [ ] Moderate Hazard [ ] Low Hazard Industrial: [X] Standard Industrial Hazard [ ] Other Industrial Hazard Not Designated [ ] Desktop review, document review, etc.
6	Assessment	[X] Internal [ ] External (OEPA, DOE) [ ] Supplier/Vendor_____
7	Assessment Type	[ ] Audit [ ] Surveillance [ ] Inspection [X] Other NONE
8	Assessment Number	NONE
9	Responsible Division/Vendor	[X] S&WP [ ] SC [ ] SP [ ] DP [ ] WGS [ ] SO&M [ ] ESH&Q [ ] OP [ ]Supplier/Vendor/Subcontractor [ ] Other
10	Responsible Department/Vendor	ARWWP/ STAVER
11	Responsible Team Leader/Coach/Vendor (Print Name)	WILLIE FRAZIER, JACK HUGHS (For Concerns, assign to Division Manager)
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	[X] CM [ ] ED [ ] RD [ ] MS [ ] QA [ ] AC [ ] PM [ ] PI [ ] FM [ ] EP [ ] EW [ ] MT [ ] OP [ ] PT [ ] SE [ ] TR [ ] CT [ ] HR [ ] PC [ ] EM [ ] FP [ ] NS [ ] SH [ ] RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	[ ] 1 Program [ ] 2 Training [ ] 3 Quality Improvement [ ] 4 Document/Records [X] 5 Work process [ ] 6 Design [ ] 7 Procurement [ ] 8 Inspect/Test [ ] 9 Management Assessment [ ] 10 Independent Assessment [ ] Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary.	**Reference Field Installation Manual (Submittal 20111-641-03110-001)** **Specification Section 3110, part 1.04E-5;** states "Submit to the Construction Manager for review resumes of the Installer Superintendent and Quality Control Chief to be assigned to this project". **Specification Section 3110, part 3.06F**; states "From inception of design to completed installation, the concrete protective liner shall be supervised and quality controlled by the approved Manufacturer's installer as specified in this section.
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.	The Bekaplast sump liner was formed into place for Valve House 1 and concrete was placed around this sump on June 26, 2000. The placement of the sump liner was supervised by a Bekaplast representative, however the resume of this person was not approved by Fluor Fernald. Concrete placement was not witnessed or verified by an approved Contractor.
16	Tagging Required / Number of Tags	[ ] Yes [x] No Number of Tags:
17	Originator/Assessor	Name: Michael W. Godber Signature: [signature] Date: 7/7/00

TEAM LEADER'S/COACH'S REVIEW

18	Team Leader/Coach	Name: Frank Thompson Signature: Frank Thompson Date: 7/10/00

19	Response Date From Resp. Organ.	REQUESTED RESPONSE DATE: 7/19/00 (Reply within 20 working days)

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

	Nonconformance Number/Revision	NCR No.: FY2000-0960 Revision No. 1
	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	[ ] YES [X] NO Level 1 Cat.: [ ] 1H (human perf.) [ ] 1E (equip.) [ ] 1N (nat. phenom/sabotage [ ] 1Z (other) [ ] Supplier/Vendor/Subcontractor (root cause per their program) TapRoot Cause Code(s) _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: [X] Accept-as-is [ ] Repair [ ] Rework [ ] Reject Non-Hardware: [ ] Other _____ Attached Corrective Action Plan per QA-0019 [ ] Yes [X] NA The Bekaplast representative's resume was submitted on 6/30/00 and accepted by Fluor Fernald on 7/6/00 (attached) STAVER provided letter (attached) that asserts that concrete placement was according to ACI specifications and liner installation procedure - by experienced personnel with experienced STAVER QA/QC inspection and observation.
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: M.W. Griffin Signature: M.W. Griffin Date: 8-1-00 K. BADU-TWEREBOAH 8-2-00
23	Was a Design Change Notice Required?	[ ] Yes [X] No DCN # Date Issued
24	Was a SBDR Performed? Was a USQD Performed?	[ ] Yes [X] No SBDR # Date Issued [ ] Yes [X] No USQD # Date Issued
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	STAVER letter addresses actions taken. Fluor Fernald project mgmt informed STAVER to ensure that applicable and specified QA/QC is performed on future work.
	Proposed Completion Date For CA	Date: 7/17/00 (Complete)
27	Responsible Team Leader/Coach/Vendor	Name: JACK HUGHES Signature: [signature] Date: 8-2-00

EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR

28	Response Acceptable?	[X] Yes [ ] No
29	Originator's/Assessor's	Name: MIKE GODBER Signature: [signature] Date: 8/3/00

COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION

30	Date Corrective Action Completed	Date: ~~7/17/00~~ 8/03/00 MG 8/3/00
31	Responsible Team Leader/Coach /Vendor	Name: JACK HUGHES Signature: [signature] Date: 8-2-00

VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER

32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	VERIFIED THE RESUME FOR THE INSTALLER REP. WAS SUBMITTED + APPROVED. QA VERIFIED THE INSTALLATION OF THE SUMP.
33	Verifier	Name: MIKE GODBER Signature: [signature] Date: 8/03/00

CLOSURE BY THE VERIFIER'S TEAM LEADER/COACH

	Verifier's Team Leader/Coach (NCR Closed)	Name: FRANK THOMPSON Signature: [signature] Date: 8-3-00

NCR FY2000-0960 [signature] 8-3-00

FLUOR FERNALD

NONCONFORMANCE REPORT FORM

PROD #7284_Vol 5

ORIGINATOR/ASSESSOR

1	Nonconformance Number/Revision	NCR No.: FY2000-0960 Revision No. 0
2	Dates	Date Discovered: 6/26/00 Date NCR Issued: 6/29/00
3	Type of Nonconformance	[x] FINDING [ ] CONCERN
4	Project/Activity @ Fac/Loc/Bldg.	ENHANCED PERMANENT LEACHATE TRANMISSION SYSTEM/ OSDF
5	Hazard Category	Nuclear: [ ] 1 [ ] 2 [ ] 3 Radiological: [ ] Non-Nuclear: [ ] High Hazard [ ] Moderate Hazard [ ] Low Hazard Industrial: [X] Standard Industrial Hazard [ ] Other Industrial Hazard Not Designated [ ] Desktop review, document review, etc.
6	Assessment	[X] Internal [ ] External (OEPA, DOE) [ ] Supplier/Vendor_____
7	Assessment Type	[ ] Audit [ ] Surveillance [ ] Inspection [X] Other NONE
8	Assessment Number	NONE
9	Responsible Division/Vendor	[X] S&WP [ ] SC [ ] SP [ ] DP [ ] WGS [ ] SO&M [ ] ESH&Q [ ] OP [ ]Supplier/Vendor/Subcontractor [ ] Other
10	Responsible Department/Vendor	ARWWT/ STAVER
11	Responsible Team Leader/Coach/Vendor (Print Name)	WILLIE FRAZIER, JACK HUGHS (For Concerns, assign to Division Manager)
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	[X] CM [ ] ED [ ] RD [ ] MS [ ] QA [ ] AC [ ] PM [ ] PI [ ] FM [ ] EP [ ] EW [ ] MT [ ] OP [ ] PT [ ] SE [ ] TR [ ] CT [ ] HR [ ] PC [ ] EM [ ] FP [ ] NS [ ] SH [ ] RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	[ ] 1 Program [ ] 2 Training [ ] 3 Quality Improvement [ ] 4 Document/Records [X] 5 Work process [ ] 6 Design [ ] 7 Procurement [ ] 8 Inspect/Test [ ] 9 Management Assessment [ ] 10 Independent Assessment [ ] Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary.	**Specification Section 3110, part 1.04E-5;** states "Submit to the Construction Manager for review resumes of the Installer Superintendent and Quality Control Chief to be assigned to this project". **Specification Section 3110, part 3.06F**; states "From inception of design to completed installation, the concrete protective liner shall be supervised and quality controlled by the approved Manufacturer's installer as specified in this section. Field Installation QC Manual in submittal 20111-641-03110-001, R0 mwb
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.	The Bekaplast sump liner was formed into place for Valve House 1 and concrete was placed around this sump on June 26, 2000. The QC of placement of the sump liner was supervised by a Bekaplast representative, however the resume of this person was not approved by Fluor Fernald. Concrete placement was not witnessed or verified by an approved Contractor QC. mwb 7/6/00
16	Tagging Required / Number of Tags	[ ] Yes [x] No Number of Tags:
17	Originator/Assessor	Name: Michael W. Godber Signature: [signature] Date: 6/29/00

TEAM LEADER'S/COACH'S REVIEW

18	Team Leader/Coach	Name: VERN TURNER Signature: [signature] Date: 6-29-00
19	Response Date From Resp. Organ.	REQUESTED RESPONSE DATE: 7/19/00 (Reply within 20 working days)

NONCONFORMANCE REPORT FORM

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

	Nonconformance Number/Revision	NCR No.: F-Y2000-0960 Revision No. 0
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	[ ] YES [X] NO Level 1 Cat.: [ ] 1H (human perf.) [ ] 1E (equip.) [ ] 1N (nat. phenom/sabotage [ ] 1Z (other) [ ] Supplier/Vendor/Subcontractor (root cause per their program) TapRoot Cause Code(s) _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: [X] Accept-as-is [ ] Repair [ ] Rework [ ] Reject Non-Hardware: [ ] Other _____ Attached Corrective Action Plan per QA-0019 [ ] Yes [ ] NA An acceptable resume and letter from the manufacturer for the Bekaplast representative was subsequently submitted and approved (20111-641-03110-003, Rev 1). + document CAC + FF + Staver witness of concrete placement VOID MWG 7/6/00
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: MW GRIFFIN Signature: MW Griffin Date: 7/6/2000
23	Was a Design Change Notice Required?	[ ] Yes [X] No DCN # Date Issued
24	Was a SBDR Performed? Was a USQD Performed?	[ ] Yes [X] No SBDR # Date Issued [ ] Yes [X] No USQD # Date Issued
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	Contractor informed to submit documents on schedule and to review for acceptability prior to submittal. letter to STAVER
26	Proposed Completion Date For CA	Date: 7/6/2000 (Complete)
	Responsible Team Leader/Coach/Vendor	Name: _____ Signature: _____ Date: _____

EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR

28	Response Acceptable?	[ ] Yes [ ] No
29	Originator's/Assessor's	Name: _____ Signature: _____ Date: _____

COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION

30	Date Corrective Action Completed	Date: 7/6/2000 MWG
31	Responsible Team Leader/Coach /Vendor	Name: _____ Signature: _____ Date: _____

VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER

32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	
33	Verifier	Name: _____ Signature: _____ Date: _____

CLOSURE BY THE VERIFIER'S TEAM LEADER/COACH

	Verifier's Team Leader/Coach (NCR Closed)	Name: _____ Signature: _____ Date: _____

STAVER
FERNALD JOBSITE
FAX TRANSMITTAL

DATE: 7/19/00 **TO:** Mike

COMPANY: FLUOR **FAX NO.:** X 4029

FROM: DAVID OPALKA

FERNALD FAX: (513) 648 – 4187
PHONE (513) 648 – 4118

NUMBER OF PAGES (including Cover Page): 2

MESSAGE:

Daily Log Entry per your request.

Projects (continued)

6-26-2000 81°F
JACK A. ESTES
MFG. REP. FOR ATLAS MINERALS & CHEMICALS
ELPTS PROJECT
VALVE HOUSE 1
SUMP 12"x12"x18'

Sump Formed Acceptably
Jack A. Estes

PROD #7284_Vol 5

Fluor Fernald, Inc.
P.O. Box 538704
Cincinnati, OH 45253-8704

(513)648-3000

FLUOR GLOBAL SERVICES

July 10, 2000

Fernald Environmental Management Project
Letter No. C: SWP(ARWWP):2000-0012

The STAVER Group, Inc.
Attn: Mr. David Opalka
1271 East Second Street
Franklin, OH 45005

Dear Mr. Opalka:

FSC-641, OSDF ENHANCED PERMANENT LEACHATE TRANSMISSION SYSTEM, NONCONFORMANCE REPORT (NCR) NO. FY2000-0960

NCR No. FY2000-0960 (attached) has been initiated due to installation of Valve House 1 concrete protective liner sump and associated concrete placement without acceptable documentation of qualified supervision and quality control personnel.

In order to avoid a directive for "rework", please provide written technical justification that is sufficient for Fluor Fernald and GeoSyntec Consultants to "accept-as-is" the liner sump installation and the associated concrete placement. The justification must include:

a. documentation that provides evidence that the sump was installed correctly within the concrete formwork and that concrete was placed correctly, as per the manufacturer's procedures; and

b. actions taken to prevent recurrence.

Please provide this written technical justification by July 17, 2000.

Sincerely,

Jack R. Hughes
ARWWP Engineering/Construction Manager

JRH
Attachment

c: K. Badu-Tweneboah, GeoSyntec Consultants, ms38
W. Frazier, ms52-5
M. Godber, ms64
M. Griffin, ms52-5
A. Hohnhorst, ms60
J. Jenkins, ms52-5
R. Kneip, ms52-5
S. Wheeler, ms52-5

File Record Subject 20111.641.8.2
Project Number 20111

FLUOR FERNALD NONCONFORMANCE REPORT FORM PROD #7284_Vol 5

ORIGINATOR/ASSESSOR

1	Nonconformance Number/Revision	NCR No.: FY2000-0960 Revision No. ~~0~~ 1 MG 7/7/00
	Dates	Date Discovered: 6/26/00 Date NCR Issued: 6/29/00
3	Type of Nonconformance	[x] FINDING [ ] CONCERN
4	Project/Activity @ Fac/Loc/Bldg.	ENHANCED PERMANENT LEACHATE TRANMISSION SYSTEM/ OSDF
5	Hazard Category	Nuclear: [ ] 1 [ ] 2 [ ] 3 Radiological: [ ] Non-Nuclear: [ ] High Hazard [ ] Moderate Hazard [ ] Low Hazard Industrial: [X] Standard Industrial Hazard [ ] Other Industrial Hazard Not Designated [ ] Desktop review, document review, etc.
6	Assessment	[X] Internal [ ] External (OEPA, DOE) [ ] Supplier/Vendor_____
7	Assessment Type	[ ] Audit [ ] Surveillance [ ] Inspection [X] Other NONE
8	Assessment Number	NONE
9	Responsible Division/Vendor	[X] S&WP [ ] SC [ ] SP [ ] DP [ ] WGS [ ] SO&M [ ] ESH&Q [ ] OP [ ]Supplier/Vendor/Subcontractor [ ] Other
10	Responsible Department/Vendor	ARWWP/ STAVER
11	Responsible Team Leader/Coach/Vendor (Print Name)	WILLIE FRAZIER, JACK HUGHS (For Concerns, assign to Division Manager)
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	[X] CM [ ] ED [ ] RD [ ] MS [ ] QA [ ] AC [ ] PM [ ] PI [ ] FM [ ] EP [ ] EW [ ] MT [ ] OP [ ] PT [ ] SE [ ] TR [ ] CT [ ] HR [ ] PC [ ] EM [ ] FP [ ] NS [ ] SH [ ] RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	[ ] 1 Program [ ] 2 Training [ ] 3 Quality Improvement [ ] 4 Document/Records [X] 5 Work process [ ] 6 Design [ ] 7 Procurement [ ] 8 Inspect/Test [ ] 9 Management Assessment [ ] 10 Independent Assessment [ ] Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary.	**Reference Field Installation Manual (Submittal 20111-641-03110-001)** **Specification Section 3110, part 1.04E-5;** states "Submit to the Construction Manager for review resumes of the Installer Superintendent and Quality Control Chief to be assigned to this project". **Specification Section 3110, part 3.06F;** states "From inception of design to completed installation, the concrete protective liner shall be supervised and quality controlled by the approved Manufacturer's installer as specified in this section.
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.	The Bekaplast sump liner was formed into place for Valve House 1 and concrete was placed around this sump on June 26, 2000. The placement of the sump liner was supervised by a Bekaplast representative, however the resume of this person was not approved by Fluor Fernald. Concrete placement was not witnessed or verified by an approved Contractor.
16	Tagging Required / Number of Tags	[ ] Yes [x] No Number of Tags:
17	Originator/Assessor	Name: Michael W. Godber Signature: [signature] Date: 7/7/00

TEAM LEADER'S/COACH'S REVIEW

18	Team Leader/Coach	Name: Frank Thomoson Signature: [signature] Date: 7/10/00

19	Response Date From Resp. Organ.	REQUESTED RESPONSE DATE: 7/19/00 (Reply within 20 working days)

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

	Nonconformance Number/Revision	NCR No.: FY2000-0960 Revision No. 1
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	[ ] YES [ ] NO Level 1 Cat.: [ ] 1H (human perf.) [ ] 1E (equip.) [ ] 1N (nat. phenom/sabotage [ ] 1Z (other) [ ] Supplier/Vendor/Subcontractor (root cause per their program) TapRoot Cause Code(s) _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: [ ] Accept-as-is [ ] Repair [ ] Rework [ ] Reject Non-Hardware: [ ] Other _____ Attached Corrective Action Plan per QA-0019 [ ] Yes [ ] NA
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: _____ Signature: _____ Date: _____
23	Was a Design Change Notice Required?	[ ] Yes [ ] No DCN # Date Issued
24	Was a SBDR Performed? Was a USQD Performed?	[ ] Yes [ ] No SBDR # Date Issued [ ] Yes [ ] No USQD # Date Issued
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	
	Proposed Completion Date For CA	Date:
27	Responsible Team Leader/Coach/Vendor	Name: _____ Signature: _____ Date: _____

EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR

28	Response Acceptable?	[ ] Yes [ ] No
29	Originator's/Assessor's	Name: _____ Signature: _____ Date: _____

COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION

30	Date Corrective Action Completed	Date:
31	Responsible Team Leader/Coach /Vendor	Name: _____ Signature: _____ Date: _____

VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER

32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	
33	Verifier	Name: _____ Signature: _____ Date: _____

FLUOR FERNALD NONCONFORMANCE REPORT FORM

PROD #7284_Vol 5

ORIGINATOR/ASSESSOR		
1	Nonconformance Number/Revision	NCR No.: FY2000-0960 Revision No. 0
	Dates	Date Discovered: 6/26/00 Date NCR Issued: 6/29/00
3	Type of Nonconformance	[X] FINDING [ ] CONCERN
4	Project/Activity @ Fac/Loc/Bldg.	ENHANCED PERMANENT LEACHATE TRANMISSION SYSTEM/ OSDF
5	Hazard Category	Nuclear: [ ] 1 [ ] 2 [ ] 3 Radiological: [ ] Non-Nuclear: [ ] High Hazard [ ] Moderate Hazard [ ] Low Hazard Industrial: [X] Standard Industrial Hazard [ ] Other Industrial Hazard Not Designated [ ] Desktop review, document review, etc.
6	Assessment	[X] Internal [ ] External (OEPA, DOE) [ ] Supplier/Vendor_____
7	Assessment Type	[ ] Audit [ ] Surveillance [ ] Inspection [X] Other NONE
8	Assessment Number	NONE
9	Responsible Division/Vendor	[X] S&WP [ ] SC [ ] SP [ ] DP [ ] WGS [ ] SO&M [ ] ESH&Q [ ] OP [ ]Supplier/Vendor/Subcontractor [ ] Other
10	Responsible Department/Vendor	ARWWT/ STAVER
11	Responsible Team Leader/Coach/Vendor (Print Name)	WILLIE FRAZIER, JACK HUGHS (For Concerns, assign to Division Manager)
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	[X] CM [ ] ED [ ] RD [ ] MS [ ] QA [ ] AC [ ] PM [ ] PI [ ] FM [ ] EP [ ] EW [ ] MT [ ] OP [ ] PT [ ] SE [ ] TR [ ] CT [ ] HR [ ] PC [ ] EM [ ] FP [ ] NS [ ] SH [ ] RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) not RM-0012 applicable)	[ ] 1 Program [ ] 2 Training [ ] 3 Quality Improvement [ ] 4 Document/Records [X] 5 Work process [ ] 6 Design [ ] 7 Procurement [ ] 8 Inspect/Test [ ] 9 Management Assessment [ ] 10 Independent Assessment [ ] Other
14	Requirement Description *Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document) in which the requirement appears may be attached or added to the NCR file. Use additional or separate sheets as necessary.*	**Specification Section 3110, part 1.04E-5;** states "Submit to the Construction Manager for review resumes of the Installer Superintendent and Quality Control Chief to be assigned to this project". **Specification Section 3110, part 3.06F**; states "From inception of design to completed installation, the concrete protective liner shall be supervised and quality controlled by the approved Manufacturer's installer as specified in this section. Field Installation QC manual in submittal 2011-641-03110-001, R0 mwh
15	Nonconformance Description *Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.*	The Bekaplast sump liner was formed into place for Valve House 1 and concrete was placed around this sump on June 26, 2000. The QC of placement of the sump liner was supervised by a Bekaplast representative, however the resume of this person was not approved by Fluor Fernald. Concrete placement was not verified by an approved Contractor Q.C. witnessed or mwh 7/6/00
16	Tagging Required / Number of Tags	[ ] Yes [X] No Number of Tags:
17	Originator/Assessor	Name: Michael W. Godber Signature: [signature] Date: 6/29/00
TEAM LEADER'S/COACH'S REVIEW		
	Team Leader/Coach	Name: VERN TURNER Signature: [signature] Date: 6-29-00
19	Response Date From Resp. Organ.	REQUESTED RESPONSE DATE: 7/19/00 (Reply within 20 working days)

PROD #7204_Vol 5

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

	Nonconformance Number/Revision	NCR No.: FY2000-0960 Revision No. 0
20	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	[ ] YES [X] NO Level 1 Cat.: [ ] 1H (human perf.) [ ] 1E (equip.) [ ] 1N (nat. phenom/sabotage [ ] 1Z (other) [ ] Supplier/Vendor/Subcontractor (root cause per their program) TapRoot Cause Code(s) _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: [X] Accept-as-is [ ] Repair [ ] Rework [ ] Reject Non-Hardware: [ ] Other _____ Attached Corrective Action Plan per QA-0019 [ ] Yes [ ] NA An acceptable resume and letter from the manufacturer for the Bekaplast representative was subsequently submitted and approved (20111-641-03110-003, Rev 1). + document CAC + FF + Staver witness of concrete placement VOID-MWG 7/6/00
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: MW GRIFFIN Signature: MW Griffin Date: 7/6/2000
23	Was a Design Change Notice Required?	[ ] Yes [X] No DCN # Date Issued
24	Was a SBDR Performed? Was a USQD Performed?	[ ] Yes [X] No SBDR # Date Issued [ ] Yes [X] No USQD # Date Issued
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	Contractor informed to submit documents on schedule and to review for acceptability prior to submittal. letter to STAVER
26	Proposed Completion Date For CA	Date: 7/6/2000 (Complete)
7	Responsible Team Leader/Coach/Vendor	Name: _____ Signature: _____ Date: _____

EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR

28	Response Acceptable?	[ ] Yes [ ] No
29	Originator's/Assessor's	Name: _____ Signature: _____ Date: _____

COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION

30	Date Corrective Action Completed	Date: 7/6/2000 MWG
31	Responsible Team Leader/Coach /Vendor	Name: _____ Signature: _____ Date: _____

VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER

32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	
33	Verifier	Name: _____ Signature: _____ Date: _____

CLOSURE BY THE VERIFIER'S TEAM LEADER/COACH

34	Verifier's Team Leader/Coach (NCR Closed)	Name: _____ Signature: _____ Date: _____

STAVER

Staver Group, Inc.
12. 1 East 2nd St.
Franklin, Ohio 45005

July 17, 2000

Mr. Jack Hughes
Fluor Fernald, Inc.
P.O. Box 538704
Cincinnati, Ohio 45253-8704

Re: NCR No. FY2000 - 0960
Contract No. FSC – 641
OSDF Permanent Leachate
Transmission System Project

Dear Mr. Hughes:

The following is a response to the referenced NCR pertaining to the prefabricated Bekaplast HDPE sump installation for Valve House 1. In an effort to provide justification to the nonconformance descriptions, the following will verify that the sump was installed per the project and manufacturer requirements.

Installation of the prefabricated sump occurred in two phases: Forming of the prefabricated sump and placement of concrete around the sump. Forming of the Bekaplast sump was conducted according to ACI - 347 and the finished product was observed by the sump inspector as designated by the installer, ISCO Industries, L.L.C. (ISCO). The attached letter from ISCO dated June 23, 2000, provided The STAVER Group, Inc. (STAVER) the required inspection information and since the HDPE liner manufacture and installer are ultimately responsible for the guarantee of this product, STAVER felt we could proceed with the sump installation.

The placement of the concrete was according to ACI specifications. AND LINER INSTALLATION PROCEDURES STAVER's Superintendent placed the concrete according to these ACI specifications ensuring proper vibration and placement around the sump. STAVER's QA/QC Representative also preformed a pre-pour inspection of the sump formwork and observed the placement of concrete. The combined construction knowledge and experience (+ 50 yrs.) of these two individuals verifies that the sump was installed correctly. DRO 7/24/00

In order to prevent recurrence in future sump installations, the proper documentation has been submitted by STAVER and approved by Fluor Fernald, Inc.. STAVER will also continue with the QC field inspections of the sump formwork and concrete placement per contract requirements. These inspections will be documented in the on-site log book.

If you have any questions or required additional information, please contact our field office at (513) 648 - 4118

Sincerely,
The STAVER Group, Inc.

David R. Opalka
Project Manager

cc: file
S. Matson
R. Wood
W. Frazier, Fluor Fernald, Inc.

FDF PROJECT NO: 20111	CONTRACT NO: FSC - 641	SUBMITTAL NO: 03110-003	REV: 1	DATE: 30-Jun-00	PAGE 1 OF 1

PRODUCT #7841 Vol 5

FROM: The [illegible]VER GROUP, Inc.
David R. Opalka
SIGNATURE: David R. Opalka

TO: FDF ENGINEERING/CONSTRUCTION DOCUMENT CONTROL (ECDC), MS 52-7
RECEIVED BY: Erika Barrett DATE: 6/30/00

QTY	DOCUMENT NUMBER	REV	DOCUMENT FAMILY: PRO	H&S	MED	TRG	CON	ENG	QAC	OPER	TITLE/DESCRIPTION	SUBMITTAL TYPE: DRFT	CFC	INF	ASSOCIATED SPECIFICATION	SUBMITTAL ACTION: A	B	C
8	641-03110-003	1						X			QC Inspector - Sumps		X		03110	X		
	parts 1.04.E.5																	

REVIEW DISTRIBUTION

NAME	MS	NAME	MS	NAME	MS
Mike Griffin	525				
Jim Cherry	525				
Jim Jenkins	525				
Mike Godber	64				
Rob Knerp	525				
B. Scott Wheeler	525				
Kwasi Bau Tweneboah	64				

NO COMMENTS: COMMENTS: (PLEASE USE SPACE BELOW FOR COMMENTS OR INDICATE IF ATTACHMENTS)

RECEIVED BY: MW Griffin DATE 7/6/00
(SIGN/DATE AND RETURN A COPY TO ECDC, MS 52-7)

SUBMITTAL TYPE: (BY SUPPLIER)
CFC - CERTIFIED FOR CONSTRUCTION
INF - INFORMATION/RECORD
DRFT - DRAFT/PRELIMINARY

SUBMITTAL ACTION CODE: (BY FDF)
A - Conforms to Subcontract Requirements
B - Minor Comments - Incorporate and Resubmit
C - Revise and Resubmit (SEE COMMENTS)

ORIGINAL

Atlas Minerals & Chemicals, Inc.
♦♦♦
John Flugstad
P.O. Box 54091 ♦ Cincinnati, OH 45254-0091

Fluor Contract FSC-641
OSDF Enhanced Permanent Leachate
Transmission System Project
STAVER # 7052

Submittal # 641: 03110-003
Reviewed By: DRO
Date: 6/30/00

FACSIMILE TRANSMITTAL

June 30, 2000

Mr. David Opalka
Staver Group
1271 East 2nd Street
Franklin, OH 45005

Fax # 513-648-4187

Reference: Fernald-OSDF Leachate Transmission System Project

Re: Background and Personnel Information
Jack Estes

Dear Mr. Opalka:

Atlas Minerals and Chemicals, Inc., confirms that Mr. Estes is qualified to QC the field installation of the Bekaplast prefabricated (preformed) sumps in the Permanent Leachate Transmission System project. Mr. Estes is familiar with the fabrication and installation of Bekaplast systems and understands the requirements of the Bekaplast Field Installation Manual and Quality Control Manual.

Mr. Estes' responsibilities will include the applicable sections contained in Part 16 of the above referenced Bekaplast manuals. The statement contained in the introduction of the Quality Control Manual requiring that the "QC Inspector must have attended the Welder Training Seminar given by Atlas..." refers to QC inspection of field welding procedures and does not apply to the QC procedures that Mr. Estes will be performing.

INFORMATION ONLY

Very truly yours,

John Flugstad,
Regional Sales Manager

Cc ISCO, Louisville
Jack Estes

[X] A - Conforms to the Subcontract Requirements
[ ] B - Minor Comment - Incorporate and Resubmit
[ ] C - Revise and Resubmit
Sig: [illegible] Date: 7/6/00

Atlas Minerals & Chemicals, Inc.
♦♦♦
John Flugstad
P.O. Box 54091 ♦ Cincinnati, OH 45254-0091

Jack Estes
Manufacture Representative

Relative Experience and Background
Atlas Minerals & Chemicals, Inc.

Mr. Estes personal accomplishments and knowledge include the following:

- Mr. Estes has over 10 years experience in the Thermoplastic Industry and has been associated with Atlas Minerals for over 3 years
- Mr. Estes has considerable knowledge in Thermoplastics Linings, Chemical-Bacteria Resistant Floors, and Corrosion Resistant Tanks.
- Mr. Estes is knowledgeable in mist and dust eliminators, tower packing and aerosol separation.
- Mr. Estes is familiar with all pertinent US and Canadian product standards

John A Flugstad

June 23, 2000

Staver
Dave Opalka
1271 East 2nd Street
Franklin OH, 45005
Fax 513-648-4677

Dear Dave

Jack Estes representative for Atlas Minerals & Chemicals, Inc. Will observe the installation of the Bekaplast sump. Jack will QC the bracing and installation of the sump. Field notes will ~~flow.~~ follow.

Sincerely Yours

Richard J. Hart
Regional Sales Manager.

ISCO INDUSTRIES, Inc.
926 Boston Avenue
Box 4545
Louisville, KY 40204
P 502 589 6591
F 502.584 9213
HTTP //www.isco-pipe.com

FORD HUNTER PIPE AND FITTINGS

HOLLOW AREA

CONVEYORS

CONCRETE PIPE AND FITTINGS

Fluor Fernald, Inc.

NONCONFORMANCE REPORT FORM

ORIGINATOR/ASSESSOR

1	Nonconformance Number/Revision	NCR No.: 70 Revision No. Ø
	Dates	Date Discovered: 6/18/01 Date NCR Issued: 6/20/01
3	Type of Nonconformance	[X] FINDING [ ] CONCERN
4	Project/Activity @ Fac/Loc/Bldg.	EPLTS 20111 @ BLDG. 90D6 (VH-6)
5	Hazard Category	Nuclear: [ ] 1 [ ] 2 [ ] 3 Radiological: [ ] Non-Nuclear: [ ] High Hazard [ ] Moderate Hazard [ ] Low Hazard Industrial: [X] Standard Industrial Hazard [ ] Other Industrial Hazard Not Designated [ ] Desktop review, document review, etc.
6	Assessment	[X] Internal [ ] External (OEPA, DOE) [ ] Supplier/Vendor_____
7	Assessment Type	[ ] Audit [ ] Surveillance [ ] Inspection [X] Other WALK THROUGH
8	Assessment Number	N/A
9	Responsible Division/Vendor	[X] S&WP [ ] SC [ ] SP [ ] DP [ ] WGS [ ] SO&M [ ] ESH&Q [ ] OP [ ]Supplier/Vendor/Subcontractor [X] Other (52000D) JAH 6-20-01
10	Responsible Department/Vendor	ARWWP CONSTRUCTION (52000D)
11	Responsible Team Leader/Coach/Vendor (Print Name)	WILLIE FRAZIER (D. BRETT SCHNEIDER) JAH 6 20 01 (For Concerns, assign to Division Manager)
12	Functional Area (NA for Vendors) (choose any that apply) (Ref. RM-0016)	[ ] CM [ ] ED [ ] RD [ ] MS [ ] QA [ ] AC [ ] PM [ ] PI [ ] FM [ ] EP [ ] EW [ ] MT [ ] OP [ ] PT [ ] SE [ ] TR [X] CT [ ] HR [ ] PC [ ] EM [ ] FP [ ] NS [ ] SH [ ] RP
13	QA Criteria (choose one that applies Ref. RM-0012) Other Criteria (CONOPS, etc.) (not RM-0012 applicable)	[ ] 1 Program [ ] 2 Training [ ] 3 Quality Improvement [ ] 4 Document/Records [ ] 5 Work process [ ] 6 Design [ ] 7 Procurement [ ] 8 Inspect/Test [ ] 9 Management Assessment [ ] 10 Independent Assessment [X] Other
14	Requirement Description Cite the requirement (clearly, concisely, and completely) and its source, including document identification number, page and paragraph number. A copy of the document (or page of the document in which the requirement appears) may be attached or added to the NCR file. Use additional or separate sheets as necessary.	20111-TS-0001, SECTION 2605, ITEM 3.02D: The Maximum allowable depth of cuts, gouges, or scratches on the exterior surface of HDPE pipe or fittings is 10 percent of the wall thickness. For SDR 11 10" pipe this is approximately 1/10 (0.1") of an inch.
15	Nonconformance Description Describe the nonconformance. Include details such as supplier names, container numbers, purchase order, work order, or requisition numbers) and clearly describe the deviation from the written requirement. Use additional or separate sheets as necessary.	The section of HDPE pipe from the ILTS system that is being placed into VH-6 as part of the contingency plan has a number of gouges that are a maximum of 3/8" (.375") in depth. This exceeds the allowable amount for this pipe.
16	Tagging Required / Number of Tags	[ ] Yes [X] No Number of Tags: N/A
17	Originator/Assessor	Name: Brian S. Wheeler Signature: [signature] Date: 6/20/01

TEAM LEADER'S/COACH'S REVIEW

18	Team Leader/Coach	Name: FRANK THOMPSON Signature: [signature] Date: 6/20/01
19	Response Date From Resp. Organ.	REQUESTED RESPONSE DATE: 7/24/01 (Reply within 20 working days)

FLUOR FERNALD **NONCONFORMANCE REPORT FORM** PROD #7284_Vol 5

RESPONSIBLE ORGANIZATION'S CORRECTIVE ACTION RESPONSE

	Nonconformance Number/Revision	NCR No.: 70 Revision No. 0
	Root Cause Analysis Provide documentation as attachment. Use additional or separate sheets as necessary	[ ] YES [X] NO Level 1 Cat.: [ ] (human performance.) [ ] (equip.) [ ] (nat. phenom/sabotage [ ] (other) [ ] Supplier/Vendor/Subcontractor (root cause per their program) Cause _____
21	Corrective Action (CA) Description and Disposition Describe the actions necessary to correct the nonconformance. Corrective actions must be detailed and complete. They must be written in a clear, concise, and verifiable manner. The corrective action must also include actions to prevent recurrence. Use additional or separate sheets as necessary. (A disposition of Accept-as-is or Repair REQUIRES a written Technical Concurrence/Justification below)	Hardware: [X] Accept-as-is [ ] Repair [ ] Rework [ ] Reject Non-Hardware: [ ] Other _____ Attached Corrective Action Plan per QA-0019 [ ] Yes [ ] NA Gouges are on exterior of containment pipe. This pipe is typically at atmospheric pressure. Based on this and actual observation of pipe, the gouges are not considered a significant defect. MW Griffin 7/30/01
22	Technical Concurrence/Justification (mark NA if not applicable)	Name: KWASI BADU-T[illegible] Signature: [signature] Date: 8/22/01
23	Was a Design Change Notice Required?	[ ] Yes [X] No DCN # Date Issued
24	Was a SBDR Performed? Was a USQD Performed?	[ ] Yes [X] No SBDR # N/A Date Issued [ ] Yes [X] No USQD # N/A Date Issued
25	Actions taken to Prevent Recurrence Use additional or separate sheets as necessary.	
26	Proposed Completion Date For CA	Date:
	Responsible Team Leader/Coach/Vendor	Name: _____ Signature: _____ Date: _____

EVALUATION OF THE CORRECTIVE ACTION RESPONSE BY THE ORIGINATOR/ASSESSOR

28	Response Acceptable?	[ ] Yes [ ] No
29	Originator's/Assessor's	Name: _____ Signature: _____ Date: _____

COMPLETION OF THE CORRECTIVE ACTIONS BY THE RESPONSIBLE ORGANIZATION

30	Date Corrective Action Completed	Date:
31	Responsible Team Leader/Coach /Vendor	Name: _____ Signature: _____ Date: _____

VERIFICATION OF COMPLETED CORRECTIVE ACTIONS BY THE VERIFIER

32	Verification Action (Describe what objective evidence was examined to verify completion of this action and attach documentation to the NCR)	
33	Verifier	Name: _____ Signature: _____ Date: _____

CLOSURE BY THE VERIFIER'S TEAM LEADER/COACH

	Verifier's Team Leader/Coach (NCR Closed)	Name: _____ Signature: _____ Date: _____

GEOSYNTEC CONSULTANTS

FIGURE 1

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR:	2. TITLE/ORGANIZATION:	3. NCR NUMBER:	4. DATE DISCOVERED
Collin Sukow	Site CQC Manager/GeoSyntec	20111-001	13 July 2000

5. RESPONSIBLE ORGANIZATION/PROJECT:	6. ASSESSMENT ACTIVITY:	7. HOLD TAG:
The STAVER Group/OSDF EPLTS	Valve Houses 1, 2 and 3 Structural Details I and II	( ) YES (☒) NO 8. REMOVED (Initial/Date):

9. REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]):

Note 5 of EPLTS Drawing Nos. 90X-6000-S-00271 and 90X-6000-S-00272 states that: "Steel reinforcement shall have a minimum concrete cover of 3 inches, 2 inches or 1.5 inches as shown". A "1 ½" CLR (TYP)" is shown on the Construction Drawings to be the minimum concrete cover required for the inside wall (i.e., between the concrete protective liner and the reinforcing steel).

10. NONCONFORMANCE TYPE: Construction Nonconformance (X) Material Deviation ( )

11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required):

The clearance between the reinforcing steel and the concrete protective liner along the west section of Valve House No.1 was measured to be less than 1 ½ inches, with a minimum of ¾ inches in some locations.

12. ORIGINATOR'S SIGNATURE: Collin P. Sukow

13. DATE PROVIDED TO RESPONSIBLE MANAGER: 20 July 2000

14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is (x) Reject ( ) Other ( ) Repair ( ) Rework ( )

The ¾-in. clearance is less than the 1 ½ in. indicated on the Construction Drawings; however, it meets the ¾ in. minimum clearance recommended by the ACI Building Code (Section 7.7.1 of the ACI Standard /Committee Report). Therefore use as-is.

15. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION):

Kwasi Badu-Tweneboah, Certifying Engineer, GeoSyntec

16. RESPONSIBLE MANAGER'S SIGNATURE:	17. PROPOSED COMPLETION DATE:	18. DATE FORWARDED TO APPROVAL AUTHORITY:
		7/20/00

FIGURE 2

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

19. EVALUATION OF PROPOSED CORRECTIVE ACTION: Accept ( ) Reject ( )
Comments ( )

20. APPROVAL AUTHORITY SIGNATURE:	21. DATE:
7/20/00	

22. VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

VERIFIER'S SIGNATURE:	24. DATE:
23. APPROVAL AUTHORITY SIGNATURE:	26. DATE CLOSED:

27. CONTINUATION FROM BLOCK 14:

CODE

7.6.6 — Bundled bars

7.6.6.1 — Groups of parallel reinforcing bars bundled in contact to act as a unit shall be limited to four in any one bundle.

7.6.6.2 — Bundled bars shall be enclosed within stirrups or ties.

7.6.6.3 — Bars larger than No. 11 shall not be bundled in beams.

7.6.6.4 — Individual bars within a bundle terminated within the span of flexural members shall terminate at different points with at least $40d_b$ stagger.

7.6.6.5 — Where spacing limitations and minimum concrete cover are based on bar diameter d_b, a unit of bundled bars shall be treated as a single bar of a diameter derived from the equivalent total area.

7.6.7 — Prestressing tendons and ducts

7.6.7.1 — Clear distance between pretensioning tendons at each end of a member shall be not less than $4d_b$ for wire, nor $3d_b$ for strands. See also 3.3.2. Closer vertical spacing and bundling of tendons shall be permitted in the middle portion of a span.

7.6.7.2 — Bundling of post-tensioning ducts shall be permitted if shown that concrete can be satisfactorily placed and if provision is made to prevent the tendons, when tensioned, from breaking through the duct.

7.7 — Concrete protection for reinforcement

7.7.1 — Cast-in-place concrete (nonprestressed)

The following minimum concrete cover shall be provided for reinforcement:

	Minimum cover, in.
(a) Concrete cast against and permanently exposed to earth	3
(b) Concrete exposed to earth or weather:	

COMMENTARY

R7.6.6 — Bundled bars

Bond research[7.7] showed that bar cutoffs within bundles should be staggered. Bundled bars should be tied, wired, or otherwise fastened together to ensure remaining in position whether vertical or horizontal.

A limitation that bars larger than No. 11 not be bundled in beams or girders is a practical limit for application to building size members. (The "Standard Specifications for Highway Bridges"[7.8] permits two-bar bundles for No. 14 and No. 18 bars in bridge girders.) Conformance to the crack control requirements of 10.6 will effectively preclude bundling of bars larger than No. 11 as tensile reinforcement. The code phrasing "bundled in contact to act as a unit," is intended to preclude bundling more than two bars in the same plane. Typical bundle shapes are triangular, square, or L-shaped patterns for three- or four-bar bundles. As a practical caution, bundles more than one bar deep in the plane of bending may not be hooked or bent as a unit. Where end hooks are required, it is preferable to stagger the individual bar hooks within a bundle.

R7.6.7 — Prestressing tendons and ducts

R7.6.7.2 — When ducts for post-tensioning tendons in a beam are arranged closely together vertically, provision must be made to prevent the tendons, when tensioned, from breaking through the duct. Horizontal disposition of ducts must allow proper placement of concrete. Generally a clear spacing of one and one-third times the size of the coarse aggregate, but not less than 1 in., has proven satisfactory. Where concentration of tendons or ducts tends to create a weakened plane in the concrete cover, reinforcement should be provided to control cracking.

R7.7 — Concrete protection for reinforcement

Concrete cover as protection of reinforcement against weather and other effects is measured from the concrete surface to the outermost surface of the steel to which the cover requirement applies. Where minimum cover is prescribed for a class of structural member, it is measured to the outer edge of stirrups, ties, or spirals if transverse reinforcement encloses main bars; to the outermost layer of bars if more than one layer is used without stirrups or ties; to the metal end fitting or duct on post-tensioned prestressing steel.

The condition "concrete surfaces exposed to the weather" refers to direct exposure to moisture changes and not just to

CODE

Minimum cover, in.

No. 6 through No. 18 bars 2
No. 5 bar, W31 or D31 wire, and smaller ..... $1^1/_2$

(c) Concrete not exposed to weather or in contact with ground:

Slabs, walls, joists:
No. 14 and No. 18 bars ..... $1^1/_2$
No. 11 bar and smaller ..... $^3/_4$

Beams, columns:
Primary reinforcement, ties, stirrups, spirals ..... $1^1/_2$

Shells, folded plate members:
No. 6 bar and larger ..... $^3/_4$
No. 5 bar, W31 or D31 wire, and smaller ..... $^1/_2$

7.7.2 — Precast concrete (manufactured under plant control conditions)

The following minimum concrete cover shall be provided for reinforcement:

(a) Concrete exposed to earth or weather:

Wall panels:
No. 14 and No. 18 bars ..... $1^1/_2$
No. 11 bar and smaller ..... $^3/_4$

Other members:
No. 14 and No. 18 bars 2
No. 6 through No. 11 bars ..... $1^1/_2$
No. 5 bar, W31 or D31 wire, and smaller ..... $1^1/_4$

(b) Concrete not exposed to weather or in contact with ground:

Slabs, walls, joists:
No. 14 and No. 18 bars ..... $1^1/_4$
No. 11 bar and smaller ..... $^5/_8$

Beams, columns:
Primary reinforcement ..... d_b but not less than $^5/_8$ and need not exceed $1^1/_2$
Ties, stirrups, spirals ..... $^3/_8$

Shells, folded plate members:
No. 6 bar and larger ..... $^5/_8$
No. 5 bar, W31 or D31 wire, and smaller ..... $^3/_8$

7.7.3 — Prestressed concrete

7.7.3.1 — The following minimum concrete cover shall be provided for prestressed and nonprestressed reinforcement, ducts, and end fittings, except as provided in 7.7.3.2 and 7.7.3.3:

COMMENTARY

temperature changes. Slab or thin shell soffits are not usually considered directly "exposed" unless subject to alternate wetting and drying, including that due to condensation conditions or direct leakage from exposed top surface, run off, or similar effects.

Alternative methods of protecting the reinforcement from weather may be provided if they are equivalent to the additional concrete cover required by the code. When approved by the building official under the provisions of 1.4, reinforcement with alternative protection from the weather may have concrete cover not less than the cover required for reinforcement not exposed to weather.

The development lengths given in Chapter 12 are now a function of the bar cover. As a result, it may be desirable to use larger than minimum cover in some cases.

R7.7.2 — Precast concrete (manufactured under plant control conditions)

The lesser thicknesses for precast construction reflect the greater convenience of control for proportioning, placing, and curing inherent in precasting. The term "manufactured under plant controlled conditions" does not specifically imply that precast members must be manufactured in a plant. Structural elements precast at the job site will also qualify under this section if the control of form dimensions, placing of reinforcement, quality control of concrete, and curing procedure are equal to that normally expected in a plant.

FIGURE 1

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR:	2. TITLE/ORGANIZATION:	3. NCR NUMBER:	4. DATE DISCOVERED
Collin Sukow	Site CQC Manager/GeoSyntec	20111-001	13 July 2000

5. RESPONSIBLE ORGANIZATION/PROJECT:	6. ASSESSMENT ACTIVITY:	7. HOLD TAG:
The STAVER Group/OSDF EPLTS	Valve Houses 1, 2 and 3 Structural Details I and II	( ) YES (☒) NO 8. REMOVED (Initial/Date):

9. REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]):

Note 5 of EPLTS Drawing Nos. 90X-6000-S-00271 and 90X-6000-S-00272 states that: "Steel reinforcement shall have a minimum concrete cover of 3 inches, 2 inches or 1.5 inches as shown". A "1 ½" CLR (TYP)" is shown on the Construction Drawings to be the minimum concrete cover required for the inside wall (i.e., between the concrete protective liner and the reinforcing steel).

10. NONCONFORMANCE TYPE: Construction Nonconformance (X) Material Deviation ( )

11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required):

The clearance between the reinforcing steel and the concrete protective liner along the west section of Valve house No.1 was measured to be less than 1 ½ inches, with a minimum of ¾ inches in some locations.

12. ORIGINATOR'S SIGNATURE: Collin P. Sukow

13. DATE PROVIDED TO RESPONSIBLE MANAGER: 20 July 2000

14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is (×) Reject ( ) Other ( ) Repair ( ) Rework ( )

The ¾-in. clearance is less than the 1 ½ in. indicated on the Construction Drawings; however, it meets the ¾ in. minimum clearance recommended by the ACI Building Code (Section 7.7.1 of the ACI Standard /Committee Report). Therefore use as-is.

15. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION):

Kwasi Badu-Tweneboah, Certifying Engineer, GeoSyntec

16. RESPONSIBLE MANAGER'S SIGNATURE:	17. PROPOSED COMPLETION DATE:	18. DATE FORWARDED TO APPROVAL AUTHORITY:
		7/20/00

FIGURE 2

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

19. EVALUATION OF PROPOSED CORRECTIVE ACTION: Accept (X) Reject ( )
Comments ( )

20. APPROVAL AUTHORITY SIGNATURE: Michael Walker 7/20/00 MW Griffin 7/20/00

21. DATE:

22. VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

VERIFIER'S SIGNATURE:

24. DATE:

25. APPROVAL AUTHORITY SIGNATURE: [illegible]

26. DATE CLOSED: 7/20/00

27. CONTINUATION FROM BLOCK 14:

CODE

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7.6.6.3 — Bars larger than No. 11 shall not be bundled in beams.

7.6.6.4 — Individual bars within a bundle terminated within the span of flexural members shall terminate at different points with at least $40d_b$ stagger.

7.6.6.5 — Where spacing limitations and minimum concrete cover are based on bar diameter d_b, a unit of bundled bars shall be treated as a single bar of a diameter derived from the equivalent total area.

7.6.7 — Prestressing tendons and ducts

7.6.7.1 — Clear distance between pretensioning tendons at each end of a member shall be not less than $4d_b$ for wire, nor $3d_b$ for strands. See also 3.3.2. Closer vertical spacing and bundling of tendons shall be permitted in the middle portion of a span.

7.6.7.2 — Bundling of post-tensioning ducts shall be permitted if shown that concrete can be satisfactorily placed and if provision is made to prevent the tendons, when tensioned, from breaking through the duct.

7.7 — Concrete protection for reinforcement

7.7.1 — Cast-in-place concrete (nonprestressed)

The following minimum concrete cover shall be provided for reinforcement:

	Minimum cover, in.
(a) Concrete cast against and permanently exposed to earth	3
(b) Concrete exposed to earth or weather:	

COMMENTARY

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R7.7 — Concrete protection for reinforcement

Concrete cover as protection of reinforcement against weather and other effects is measured from the concrete surface to the outermost surface of the steel to which the cover requirement applies. Where minimum cover is prescribed for a class of structural member, it is measured to the outer edge of stirrups, ties, or spirals if transverse reinforcement encloses main bars; to the outermost layer of bars if more than one layer is used without stirrups or ties; to the metal end fitting or duct on post-tensioned prestressing steel.

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CODE

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7.7.1 — Cast-in-place concrete (nonprestressed)

The following minimum concrete cover shall be provided for reinforcement:

	Minimum cover, in.
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(b) Concrete exposed to earth or weather:	

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Concrete cover as protection of reinforcement against weather and other effects is measured from the concrete surface to the outermost surface of the steel to which the cover requirement applies. Where minimum cover is prescribed for a class of structural member, it is measured to the outer edge of stirrups, ties, or spirals if transverse reinforcement encloses main bars; to the outermost layer of bars if more than one layer is used without stirrups or ties; to the metal end fitting or duct on post-tensioned prestressing steel.

The condition "concrete surfaces exposed to the weather" refers to direct exposure to moisture changes and not just to

CODE

Minimum cover, in.

No. 6 through No. 18 bars 2
No. 5 bar, W31 or D31 wire, and smaller ..... $1\frac{1}{2}$

(c) Concrete not exposed to weather or in contact with ground:

Slabs, walls, joists:
No. 14 and No. 18 bars ..... $1\frac{1}{2}$
No. 11 bar and smaller ..... $\frac{3}{4}$

Beams, columns:
Primary reinforcement, ties, stirrups, spirals ..... $1\frac{1}{2}$

Shells, folded plate members:
No. 6 bar and larger ..... $\frac{3}{4}$
No. 5 bar, W31 or D31 wire, and smaller ..... $\frac{1}{2}$

7.7.2 — Precast concrete (manufactured under plant control conditions)

The following minimum concrete cover shall be provided for reinforcement:

(a) Concrete exposed to earth or weather:

Wall panels:
No. 14 and No. 18 bars ..... $1\frac{1}{2}$
No. 11 bar and smaller ..... $\frac{3}{4}$

Other members:
No. 14 and No. 18 bars 2
No. 6 through No. 11 bars ..... $1\frac{1}{2}$
No. 5 bar, W31 or D31 wire, and smaller ..... $1\frac{1}{4}$

(b) Concrete not exposed to weather or in contact with ground:

Slabs, walls, joists:
No. 14 and No. 18 bars ..... $1\frac{1}{4}$
No. 11 bar and smaller ..... $\frac{5}{8}$

Beams, columns:
Primary reinforcement ..... d_b but not less than $\frac{5}{8}$ and need not exceed $1\frac{1}{2}$
Ties, stirrups, spirals ..... $\frac{3}{8}$

Shells, folded plate members:
No. 6 bar and larger ..... $\frac{5}{8}$
No. 5 bar, W31 or D31 wire, and smaller ..... $\frac{3}{8}$

7.7.3 — Prestressed concrete

7.7.3.1 — The following minimum concrete cover shall be provided for prestressed and nonprestressed reinforcement, ducts, and end fittings, except as provided in 7.7.3.2 and 7.7.3.3:

COMMENTARY

temperature changes. Slab or thin shell soffits are not usually considered directly "exposed" unless subject to alternate wetting and drying, including that due to condensation conditions or direct leakage from exposed top surface, run off, or similar effects.

Alternative methods of protecting the reinforcement from weather may be provided if they are equivalent to the additional concrete cover required by the code. When approved by the building official under the provisions of 1.4, reinforcement with alternative protection from the weather may have concrete cover not less than the cover required for reinforcement not exposed to weather.

The development lengths given in Chapter 12 are now a function of the bar cover. As a result, it may be desirable to use larger than minimum cover in some cases.

R7.7.2 — Precast concrete (manufactured under plant control conditions)

The lesser thicknesses for precast construction reflect the greater convenience of control for proportioning, placing, and curing inherent in precasting. The term "manufactured under plant controlled conditions" does not specifically imply that precast members must be manufactured in a plant. Structural elements precast at the job site will also qualify under this section if the control of form dimensions, placing of reinforcement, quality control of concrete, and curing procedure are equal to that normally expected in a plant.

FIGURE 1

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR:	2. TITLE/ORGANIZATION:	3. NCR NUMBER: 20111-002	4. DATE DISCOVERED

5. RESPONSIBLE ORGANIZATION/PROJECT: 6. ASSESSMENT ACTIVITY: 7. HOLD TAG: ( ) YES (☒) NO

8. REMOVED (Initial/Date):

9. REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]):

NUMBER NOT USED - VOID

10. NONCONFORMANCE TYPE: Construction Nonconformance ( ) Material Deviation ( )

11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required):

12. ORIGINATOR'S SIGNATURE: 13. DATE PROVIDED TO RESPONSIBLE MANAGER:

14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is ( ) Reject ( ) Other ( ) Repair ( ) Rework ( )

15. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION):

16. RESPONSIBLE MANAGER'S SIGNATURE: 17. PROPOSED COMPLETION DATE: 18. DATE FORWARDED TO APPROVAL AUTHORITY:

FIGURE 2

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

19. EVALUATION OF PROPOSED CORRECTIVE ACTION: Accept ( ) Reject ( )
Comments ( )

20. APPROVAL AUTHORITY SIGNATURE:	21. DATE:

22. VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

VERIFIER'S SIGNATURE:	24. DATE:
25. APPROVAL AUTHORITY SIGNATURE:	26. DATE CLOSED:

27. CONTINUATION FROM BLOCK 14:

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR:	2. TITLE/ORGANIZATION:	3. NCR NUMBER:	4. DATE DISCOVERED
K. Badu-Tweneboah	Certifying Engineer/GeoSyntec	20111-003	15 September 2000

5. RESPONSIBLE ORGANIZATION/PROJECT:	6. ASSESSMENT ACTIVITY:	7. HOLD TAG:
The STAVER Group/OSDF EPLTS	As-Built Top of Pipe Elevations From Valve House (VH-) 2 to VH-3	( ) YES (☒) NO 8. REMOVED (Initial/Date):

9. REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]):

Section 02605, Part 3.07.B of the Technical Specifications states that: " Survey the top of HDPE containment pipe on no greater than 25-foot centers..." Part 3.08, Section 02605 also states that: "Install HDPE pipes to within 0.1 feet of bottom of pipe elevations of the containment pipes as indicated on the Construction Drawings.

10. NONCONFORMANCE TYPE: Construction Nonconformance (X) Material Deviation ( )

11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required):

The surveyed data for the leachate transmission system (LTS) pipe between VH-2 and VH-3 ranged from 0.125 to .3 feet above the design elevations indicated on the Construction Drawings. These exceed the ± 0.1 feet tolerance of the Technical Specifications.

12. ORIGINATOR'S SIGNATURE: KBadu-Tweneboah

13. DATE PROVIDED TO RESPONSIBLE MANAGER: 16 October 2000

14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is (×) Reject ( ) Other ( ) Repair ( ) Rework ( )

The as-built top of pipe elevations exceed the design elevations; however, the average pipe slope between VH-2 and VH-3 was calculated to be 0.83 percent, which is within the 10 percent tolerance of the 0.79 percent slope shown on the Construction Drawings. Since the pipe was installed with a positive drainage from VH-2 to VH-3 and within the 10 percent slope tolerance, it is suggested to accept as-is.

15. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION):

Kwasi Badu-Tweneboah, Certifying Engineer, GeoSyntec

RESPONSIBLE MANAGER'S SIGNATURE:	17. PROPOSED COMPLETION DATE:	18. DATE FORWARDED TO APPROVAL AUTHORITY:
KBadu-Tweneboah	17/10/00	16/10/00

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

19. EVALUATION OF PROPOSED CORRECTIVE ACTION: Accept (X) Reject ( )
Comments ( )

THIS NCR WAS CLOSED IN FEBRUARY, HOWEVER THE ORIGINAL WAS MISPLACED. THIS SIGNED NCR WILL REPLACE THE MISSING DOCUMENT.

20. APPROVAL AUTHORITY SIGNATURE:	21. DATE:
	3/21/01

22. VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

.RIFIER'S SIGNATURE:	24. DATE:

25. APPROVAL AUTHORITY SIGNATURE:	26. DATE CLOSED:
	3/21/01

27. CONTINUATION FROM BLOCK 14:

5901 Peachtree-Dunwoody Road, N.E.
Atlanta, 30328-5548

Fri, Sep 29, 2000

~~BCH~~ HCH No. 2011-003
Pg 3 of 6

PROD #72

STAKEOUT REPORT
Design Area File: C:\staver\0120-25.are
Staking Job File: C:\staver\0929AB1.job
==========
2ND AS-BUILT TOP OF PIPE BETWEEN VH2 & VH3
BAUMANN ENGINEERING
THOMAS P. BAUMANN PS
==========

(4B-1)

593.94

Point No.	STA No.	Design Northing	Design Easting	Design Elevation	Proposed Top of Pipe Elev.	Staked Elevation	DIFF	Delta North	Delta East	Cut	Fill
792	4+25	482549.805	1350639.075	~~593.090~~	594.23	595.092	0.26	0.000	0.110	1.202	
Point No.		Design Northing	Design Easting	Design Elevation		Staked Elevation		Delta North	Delta East	Cut	Fill
793	4+50	482524.807	1350638.770	593.740	594.69	594.922	0.29	-0.050	0.020	1.182	
Point No.		Design Northing	Design Easting	Design Elevation		Staked Elevation		Delta North	Delta East	Cut	Fill
794		482499.808	1350638.464	593.540	594.44	594.794	0.36	0.030	0.050	1.254	
Point No.		Design Northing	Design Easting	Design Elevation		Staked Elevation		Delta North	Delta East	Cut	Fill
795	5+00	482474.810	1350638.159	593.350	594.396	594.718	0.32	-0.060	0.230	1.368	
Point No.		Design Northing	Design Easting	Design Elevation		Staked Elevation		Delta North	Delta East	Cut	Fill
796		482449.812	1350637.853	593.150	594.05	594.471	0.43	0.060	0.200	1.321	
Point No.		Design Northing	Design Easting	Design Elevation		Staked Elevation		Delta North	Delta East	Cut	Fill
797	5+50	482424.814	1350637.548	592.950	593.84	594.355	0.51	0.050	0.170	1.405	
Point No.		Design Northing	Design Easting	Design Elevation		Staked Elevation		Delta North	Delta East	Cut	Fill
798		482399.816	1350637.242	592.750	593.646	594.257	0.61	-0.040	-0.040	1.507	
Point No.		Design Northing	Design Easting	Design Elevation		Staked Elevation		Delta North	Delta East	Cut	Fill
799	6+00	482374.818	1350636.936	592.550	593.446	594.079	0.63	0.020	-0.060	1.529	
Point		Design	Design	Design		Staked		Delta	Delta		

PROD #7284

Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
			592.550	593.593	0.050	-0.040	1.535	
801 6+95	482324.822	1350636.325	592.160	593.631	0.050	0.090	1.471	
802	482299.823	1350636.020	591.960	593.383	-0.050	0.040	1.423	
803 7+00	482274.825	1350635.714	591.760	593.223	-0.010	-0.070	1.463	
804	482249.827	1350635.409	591.560	592.845	0.010	0.010	1.285	
805 7+50	482224.829	1350635.103	591.360	592.727	-0.060	-0.010	1.367	
806 7+75	482199.831	1350634.798	~~591.280~~ 591.16 EBT	592.183	-0.070	0.070	0.983	

Length of pipe from STA 4+25 to STA 7+75

= 345 ft

Elevation Difference = 592.18 − 590.392 = 1.789

% slope = $\frac{1.789}{345} \times 100$

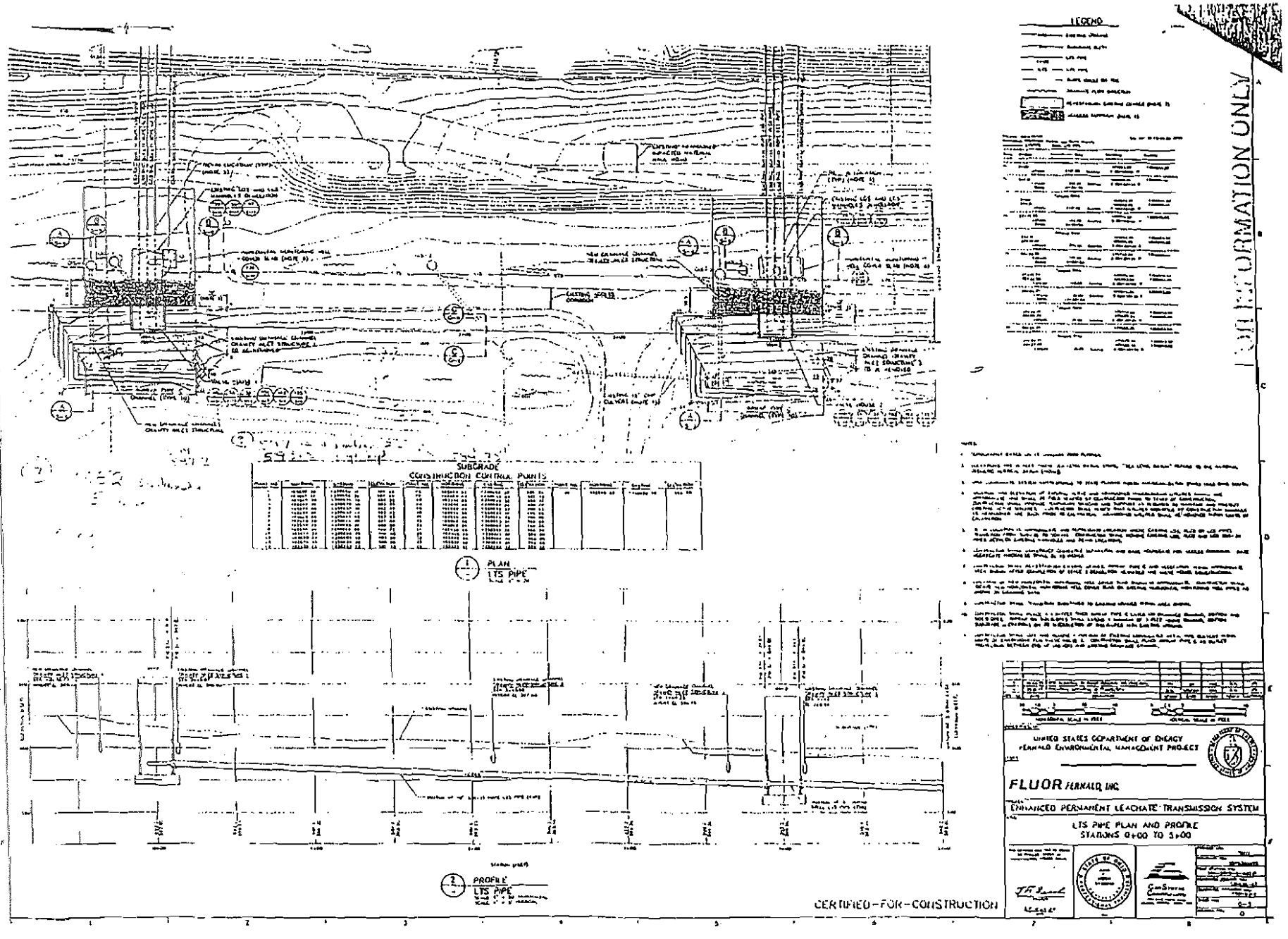
= −0.83 %

Design slope is −0.79 % ± 10 %

= −0.71 to −0.87 %; therefore OK.

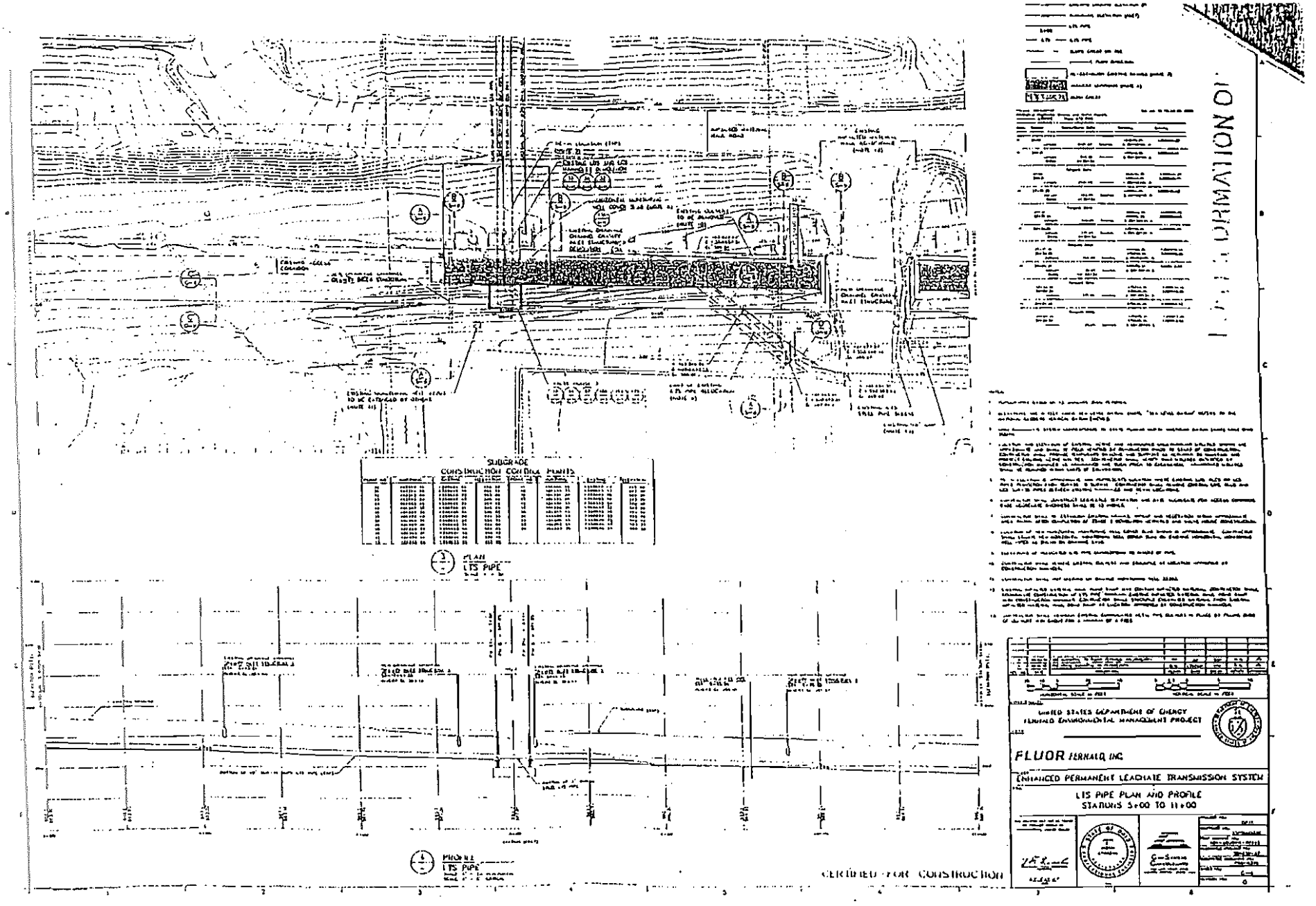
WCR No. 2411-003

Pg 4 of 6



WCR No. 2011-003
Pg 5 of 6

PROD #7284_Vol 5



Work No. 20111-003
Pg 6 of 6

PROD #7284_Vol 5

FIGURE 1

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR:	2. TITLE/ORGANIZATION:	3. NCR NUMBER:	4. DATE DISCOVERED
K. Badu-Tweneboah	Certifying Engineer/GeoSyntec	20111-003	15 September 2000

5. RESPONSIBLE ORGANIZATION/PROJECT:	6. ASSESSMENT ACTIVITY:	7. HOLD TAG:
The STAVER Group/OSDF EPLTS	As-Built Top of Pipe Elevations From Valve House (VH-) 2 to VH-3	( ) YES (☒) NO 8. REMOVED (Initial/Date):

9. REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]):

Section 02605, Part 3.07.B of the Technical Specifications states that: " Survey the top of HDPE containment pipe on no greater than 25-foot centers..." Part 3.08, Section 02605 also states that: "Install HDPE pipes to within 0.1 feet of bottom of pipe elevations of the containment pipes as indicated on the Construction Drawings.

10. NONCONFORMANCE TYPE: Construction Nonconformance (x) Material Deviation ( )

11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required):

The surveyed data for the leachate transmission system (LTS) pipe between VH-2 and VH-3 ranged from 0.125 to 33 feet above the design elevations indicated on the Construction Drawings. These exceed the ± 0.1 feet tolerance of the Technical Specifications.

12. ORIGINATOR'S SIGNATURE:	13. DATE PROVIDED TO RESPONSIBLE MANAGER:
K Badu-Tweneboah	16 October 2000

14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is (x) Reject ( ) Other ( ) Repair ( ) Rework ( )

The as-built top of pipe elevations exceed the design elevations; however, the average pipe slope between VH-2 and VH-3 was calculated to be 0.83 percent, which is within the 10 percent tolerance of the 0.79 percent slope shown on the Construction Drawings. Since the pipe was installed with a positive drainage from VH-2 to VH-3 and within the 10 percent slope tolerance, it is suggested to accept as-is.

15. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION):

Kwasi Badu-Tweneboah, Certifying Engineer, GeoSyntec

16. RESPONSIBLE MANAGER'S SIGNATURE:	17. PROPOSED COMPLETION DATE:	18. DATE FORWARDED TO APPROVAL AUTHORITY:
K Badu-Tweneboah	12/10/00	10/10/00

FIGURE 2

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

19. EVALUATION OF PROPOSED CORRECTIVE ACTION: Accept ( ) Reject ( )
Comments ( )

20. APPROVAL AUTHORITY SIGNATURE:	21. DATE:

22. VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

VERIFIER'S SIGNATURE:	24. DATE:
25. APPROVAL AUTHORITY SIGNATURE:	26. DATE CLOSED:

27. CONTINUATION FROM BLOCK 14:

5901 Pea ree-Dunwoody Road, N.E.
Atlanta . 30328-5548

Fri, Sep 29, 2000

EBT
~~BCH~~
Exh No. 2011-003
Pg 3 of 6

STAKEOUT REPORT
Design Area File: C:\staver\0120-25.are
Staking Job File: C:\staver\0929AB1.job

==========

2ND AS-BUILT TOP OF PIPE BETWEEN VH2 & VH3
BAUMANN ENGINEERING
THOMAS P. BAUMANN PS

==========

(ABT)

593.94

Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
792 4+25	482549.805	1350639.075	~~593.890~~ 594.83	595.092 0.26	0.000	0.110	1.202	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
793 4+50	482524.807	1350638.770	593.740 594.64	594.922 0.29	-0.050	0.020	1.182	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
794	482499.808	1350638.464	593.540 594.44	594.794 0.36	0.030	0.050	1.254	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
795 5+00	482474.810	1350638.159	593.350 594.396	594.718 0.32	-0.060	0.230	1.368	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
796	482449.812	1350637.853	593.150 594.05	594.471 0.43	0.060	0.200	1.321	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
797 5+50	482424.814	1350637.548	592.950 593.846	594.355 0.51	0.050	0.170	1.405	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
798	482399.816	1350637.242	592.750 593.646	594.257 0.611	-0.040	-0.040	1.507	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
799 6+00	482374.818	1350636.936	592.550 593.446	594.079 0.633	0.020	-0.060	1.529	
Point	Design	Design	Design	Staked	Delta	Delta		

800	482349.820	1350636.631	592.350 593.246	593.633 0.633	0.050	-0.040	1.535		
Point No.	Design Northing	Design Easting	Design Elevation	St Elevation	Delta North	Delta East	Cut	Fill	
801 6+50	482324.822	1350636.325	592.160 593.056	593.631 0.575	0.040	0.090	1.471		
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill	
802	482299.823	1350636.020	591.960 592.856	593.383 0.527	-0.050	0.040	1.423		
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill	
803 7+00	482274.825	1350635.714	591.760 592.656	593.223 0.567	-0.010	-0.070	1.463		
Point No.	Design Northing	Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill	
804	482249.827	1350635.409	591.560 592.456	592.845 0.389	0.010	0.010	1.285		
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill	
805 7+50	482224.829	1350635.103	591.360 592.256	592.727 0.471	-0.060	-0.010	1.367		
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill	
806 7+75	482199.831	1350634.798	~~591.800~~ 592.058	592.183 0.125	-0.070	-0.070	0.983		

591.16 (EBT)

Length of Pipe from STA 4+25 to STA 7+75
= 350 ft

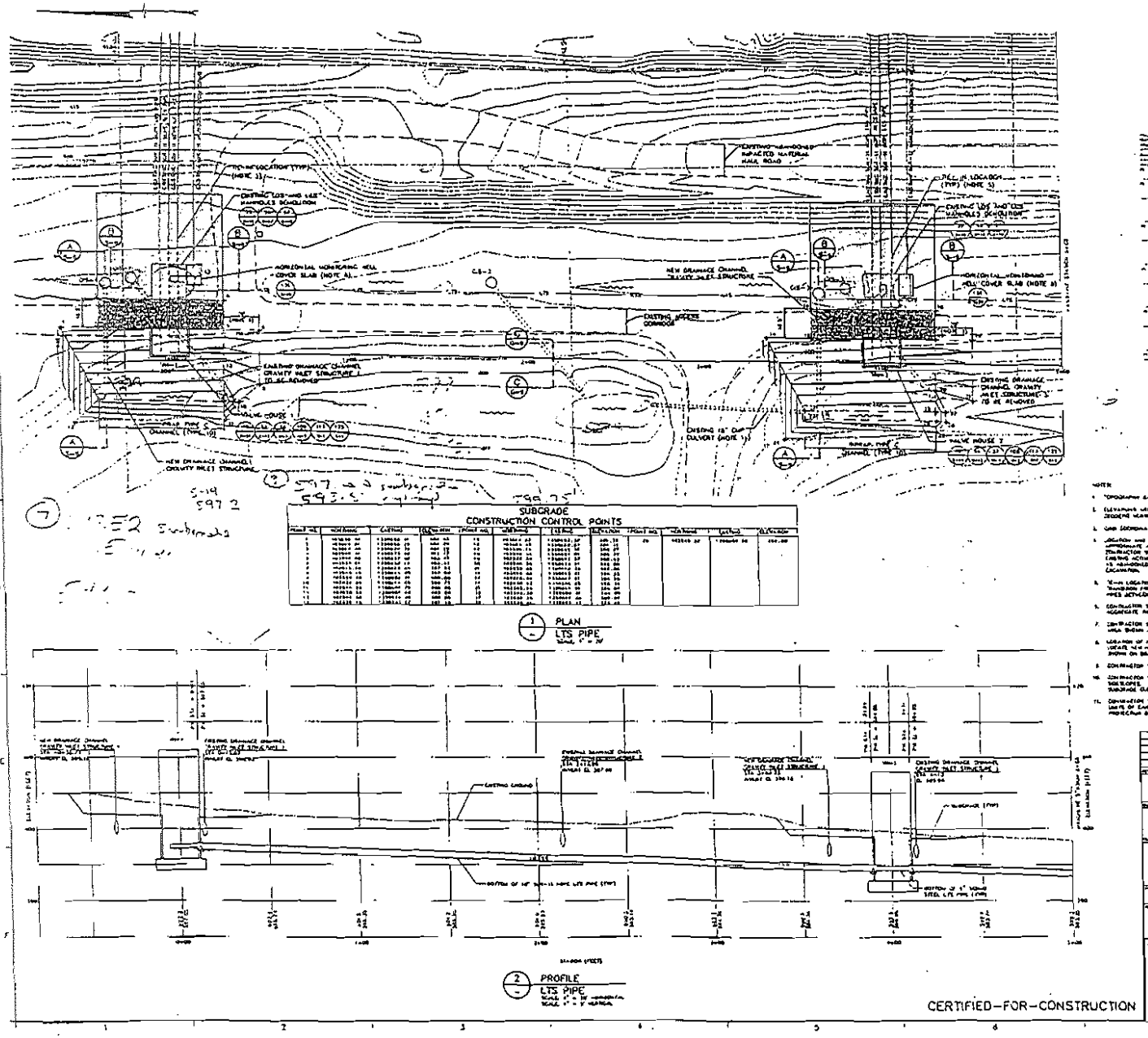
Elevation Difference = 592.183 − 595.092 = −2.909

% slope = $\frac{-2.909}{350} \times 100$

= −0.83 %

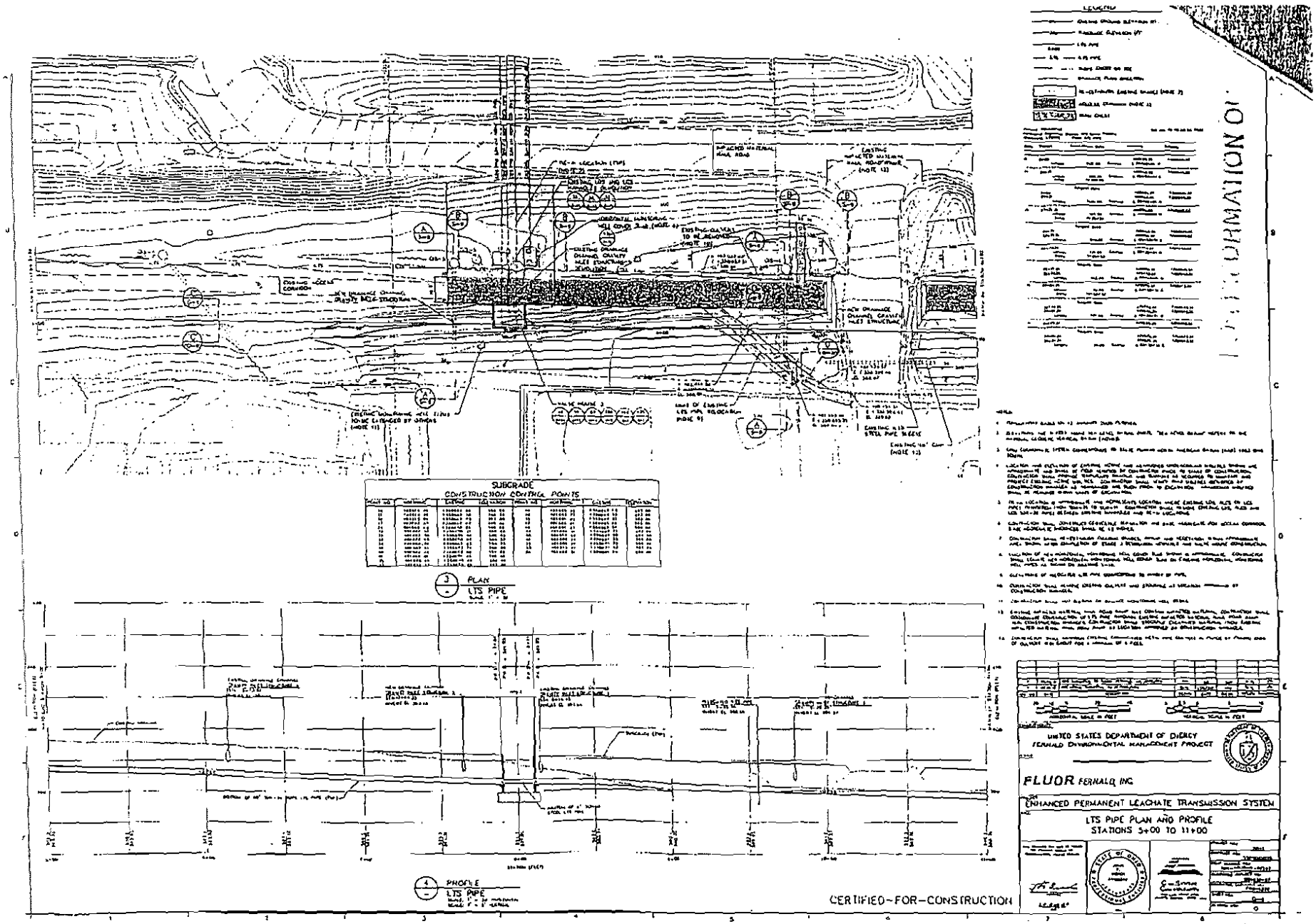
Design slope is −0.79 % ± 10 %
= −0.71 to −0.87 %; Therefore OK.

NCR No. 241103
Pg 4 of 5



WCR No. 20111-003
Pg 5 of 6

PROD #7284_Vol 5



HCA No. 20111-003
Pg 6 of 6

PROD #7284_Vol 5

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR:	2. TITLE/ORGANIZATION:	3. NCR NUMBER:	4. DATE DISCOVERED
K. Badu-Tweneboah	Certifying Engineer/GeoSyntec	20111-004	11 October 2000

5. RESPONSIBLE ORGANIZATION/PROJECT: The STAVER Group/OSDF EPLTS

6. ASSESSMENT ACTIVITY: As-Built Top of Pipe Elevations From Valve House (VH-) 3 to VH-4

7. HOLD TAG: ( ) YES (☒) NO

8. REMOVED (Initial/Date):

9. REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]):

Section 02605, Part 3.07.B of the Technical Specifications states that: " Survey the top of HDPE containment pipe on no greater than 25-foot centers..." Part 3.08, Section 02605 also states that: "Install HDPE pipes to within 0.1 feet of bottom of pipe elevations of the containment pipes as indicated on the Construction Drawings.

10. NONCONFORMANCE TYPE: Construction Nonconformance (X) Material Deviation ( )

11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required):

Some of the surveyed data for the leachate transmission system (LTS) pipe between VH-3 and VH-4 ranged from ...06 to 0.241 feet above the design elevations indicated on the Construction Drawings. These exceed the ± 0.1 feet tolerance of the Technical Specifications.

12. ORIGINATOR'S SIGNATURE: K. Badu-Tweneboah

13. DATE PROVIDED TO RESPONSIBLE MANAGER: 16 October 2000

14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is (x) Reject ( ) Other ( ) Repair ( ) Rework ( )

The as-built top of pipe elevations exceed the design elevations; however, the average pipe slope between VH-3 and VH-4 was calculated to be 0.84 percent, which is within the 10 percent tolerance of the 0.79 percent slope shown on the Construction Drawings. Since the pipe was installed with a positive drainage from VH-3 to VH-4 and within the 10 percent slope tolerance, it is suggested to accept as-is.

15. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION):

Kwasi Badu-Tweneboah, Certifying Engineer, GeoSyntec

16. RESPONSIBLE MANAGER'S SIGNATURE: K. Badu-Tweneboah

17. PROPOSED COMPLETION DATE: 17/10/00

18. DATE FORWARDED TO APPROVAL AUTHORITY: 16/10/00

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

19. EVALUATION OF PROPOSED CORRECTIVE ACTION: Accept (X) Reject ( )
Comments ( )

THIS NCR WAS CLOSED IN FEBRUARY, HOWEVER THE ORIGINAL FORM IS MISSING. THIS SIGNED FORM WILL REPLACE THE MISSING DOCUMENT.

20. APPROVAL AUTHORITY SIGNATURE: James C. Jenkins

21. DATE: 3/21/01

22. VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

23. VERIFIER'S SIGNATURE:

24. DATE:

25. APPROVAL AUTHORITY SIGNATURE: K Bandhauer

26. DATE CLOSED: 3/21/01

27. CONTINUATION FROM BLOCK 14:

5901 Pe. ree-Dunwoody Road, N.E.
Atlanta, 30328-5548

Wed, Oct 04, 2000

NC & No. 2911-004

Pg 3 of 6

PROD#7284

STAKEOUT REPORT
Design Area File: C:\staver\0120-25.are
Staking Job File: C:\staver\1004AB.job

AS-BUILT TOP PIPE VH-3 TO VH-4 NORTH AND SOUTH OF HAUL ROAD
BAUMANN ENGINEERING
THOMAS P. BAUMANN 10-4-00

590.94

Proposed top of Pipe Elev.

Diff

STA No.	Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
8+25	808	482149.835	1350634.187	~~590.890~~ 591.833	591.939	0.106	0.030	0.190	1.049
8+50	809	482124.836	1350633.881	590.740 591.64	591.777	0.141	0.010	-0.020	1.037
	810	482099.838	1350633.576	590.540 591.436	591.624	0.188	-0.040	-0.170	1.084
9+00	811	482074.840	1350633.270	590.350 591.246	591.487	0.241	0.030	0.140	1.137
	812	482049.842	1350632.965	590.150 591.046	591.244	0.198	0.040	0.180	1.094
9+50	813	482024.844	1350632.659	589.950 590.846	590.976	0.130	-0.030	-0.110	1.026
	814	481999.846	1350632.354	589.750 590.646	590.803	0.157	-0.060	-0.090	1.053
10+00	815	481974.848	1350632.048	589.550 590.446	590.540	0.094	-0.010	0.040	0.990
	Point	Design	Design	Design	Staked	Delta	Delta		

Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
819 11+	481874.855	1350630.826	588.760 589.656	589.792 0.136	-0.080	-0.080	1.032	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
820	481849.857	1350630.521	588.560 589.456	589.660 0.204	-0.070	-0.210	1.100	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
821 11+50	481824.859	1350630.215	588.360 589.256	589.416 0.160	-0.030	-0.160	1.056	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
822 11+75	481799.861	1350629.909	588.16 589.058	589.000 0.058	0.040	0.100	0.840	

Length = 11.175 — 8.125 = 350

Elevation Difference = 589.058 — 591.997

= -2.939

% Average Slope = $\frac{-2.939}{350} \times 100$

= -0.840 %

Design slope is -0.79 to 1.0 %

= -0.71 to -0.87 %, OK.

WCR No. 2011-004
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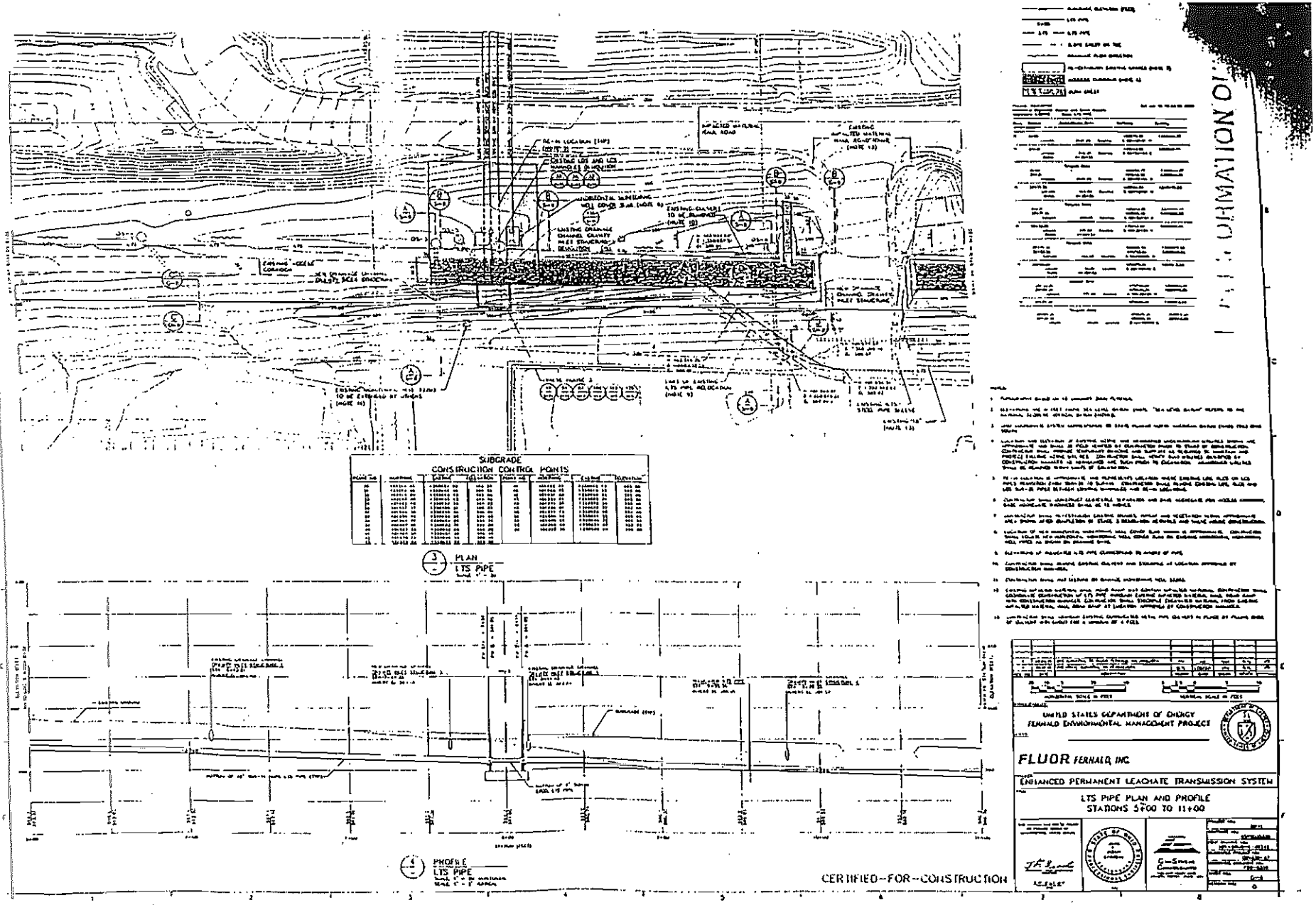

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FIGURE 1

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

1. ORIGINATOR:	2. TITLE/ORGANIZATION:	3. NCR NUMBER:	4. DATE DISCOVERED
K. Badu-Tweneboah	Certifying Engineer/GeoSyntec	20111-004	11 October 2000

5. RESPONSIBLE ORGANIZATION/PROJECT:	6. ASSESSMENT ACTIVITY:	7. HOLD TAG:
The STAVER Group/OSDF EPLTS	As-Built Top of Pipe Elevations From Valve House (VH-) 3 to VH-4	( ) YES (☒) NO 8. REMOVED (Initial/Date):

9. REQUIREMENTS (Identify requirement from document [e.g., CQA plan, specification, drawing, etc.]):

Section 02605, Part 3.07.B of the Technical Specifications states that: " Survey the top of HDPE containment pipe on no greater than 25-foot centers..." Part 3.08, Section 02605 also states that: "Install HDPE pipes to within 0.1 feet of bottom of pipe elevations of the containment pipes as indicated on the Construction Drawings.

10. NONCONFORMANCE TYPE: Construction Nonconformance (X) Material Deviation ( )

11. NONCONFORMANCE (Fully describe as it relates to requirements. Use supplemental sheets as required):

Some of the surveyed data for the leachate transmission system (LTS) pipe between VH-3 and VH-4 ranged from 06 to 0.241 feet above the design elevations indicated on the Construction Drawings. These exceed the ± 0.1 feet tolerance of the Technical Specifications.

12. ORIGINATOR'S SIGNATURE:	13. DATE PROVIDED TO RESPONSIBLE MANAGER:
K. Badu-Tweneboah	16 October 2000

14. RESPONSIBLE MANAGER'S PROPOSED CORRECTIVE ACTION: Use As-Is (×) Reject ( ) Other ( ) Repair ( ) Rework ( )

The as-built top of pipe elevations exceed the design elevations; however, the average pipe slope between VH-3 and VH-4 was calculated to be 0.84 percent, which is within the 10 percent tolerance of the 0.79 percent slope shown on the Construction Drawings. Since the pipe was installed with a positive drainage from VH-3 to VH-4 and within the 10 percent slope tolerance, it is suggested to accept as-is.

15. RESPONSIBLE MANAGER (NAME, TITLE, ORGANIZATION):

Kwasi Badu-Tweneboah, Certifying Engineer, GeoSyntec

16. RESPONSIBLE MANAGER'S SIGNATURE:	17. PROPOSED COMPLETION DATE:	18. DATE FORWARDED TO APPROVAL AUTHORITY:
K. Badu-Tweneboah	17/10/00	16/10/00

FIGURE 2

GeoSyntec Consultants

CONSTRUCTION NONCONFORMANCE REPORT

19. EVALUATION OF PROPOSED CORRECTIVE ACTION: Accept ( ) Reject ( )
Comments ( )

20. APPROVAL AUTHORITY SIGNATURE:	21. DATE:

22. VERIFICATION OF CORRECTIVE ACTION (Describe who, what, when, where):

23. VERIFIER'S SIGNATURE:	24. DATE:
25. APPROVAL AUTHORITY SIGNATURE:	26. DATE CLOSED:

27. CONTINUATION FROM BLOCK 14:

Spectra Precision Software, Inc.
5901 Peachtree-Dunwoody Road, N.E.
Atlanta, GA 30328-5548

Wed, Oct 04, 2000

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STAKEOUT REPORT
Design Area File: C:\staver\0120-25.are
Staking Job File: C:\staver\1004AB.job

AS-BUILT TOP PIPE VH-3 TO VH-4 NORTH AND SOUTH OF HAUL ROAD
BAUMANN ENGINEERING
THOMAS P. BAUMANN 10-4-00

590.94

Proposed Top of Pipe Elev.

Diff

Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
808 8+25	482149.835	1350634.187	~~590.890~~ 591.833	591.939	0.106	0.030	0.190	1.049
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
809 8+50	482124.836	1350633.881	590.740 591.664	591.777	0.141	0.010	-0.020	1.037
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
810	482099.838	1350633.576	590.540 591.436	591.624	0.188	-0.040	-0.170	1.084
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
811 9+00	482074.840	1350633.270	590.350 591.246	591.487	0.241	0.030	0.140	1.137
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
812	482049.842	1350632.965	590.150 591.046	591.244	0.198	0.040	0.180	1.094
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
813 9+50	482024.844	1350632.659	589.950 590.846	590.976	0.130	-0.030	-0.110	1.026
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
814	481999.846	1350632.354	589.750 590.646	590.803	0.157	-0.060	-0.090	1.053
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation	Delta North	Delta East	Cut	Fill
815 10+00	481974.848	1350632.048	589.550 590.446	590.540	0.094	-0.010	0.040	0.990
Point	Design	Design	Design	Staked	Delta	Delta		

818	481899.853	1350631.132	588.960	589.8565	410.085	-0.040	-0.090	0.981	
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation		Delta North	Delta East	Cut	Fill
819 11+00	481874.855	1350630.826	588.760	589.656	589.792	0.136	-0.080	-0.080	1.032
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation		Delta North	Delta East	Cut	Fill
820	481849.857	1350630.521	588.560	589.456	589.660	0.204	-0.070	-0.210	1.100
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation		Delta North	Delta East	Cut	Fill
821 11+50	481824.859	1350630.215	588.360	589.256	589.416	0.160	-0.030	-0.160	1.056
Point No.	Design Northing	Design Easting	Design Elevation	Staked Elevation		Delta North	Delta East	Cut	Fill
822 11+75	481799.861	1350629.909	588.16	589.058	589.000	0.058	0.040	0.100	0.840

Length = 11+75 — 8+25 = 350

Elevation Difference = 589.00 — 591.939

= -2.939

% Average Slope = $\frac{-2.939}{350} \times 100$

= -0.840 %

Designed slope is -0.79 ± 10 %

= -0.71 to -0.87 %, OK.

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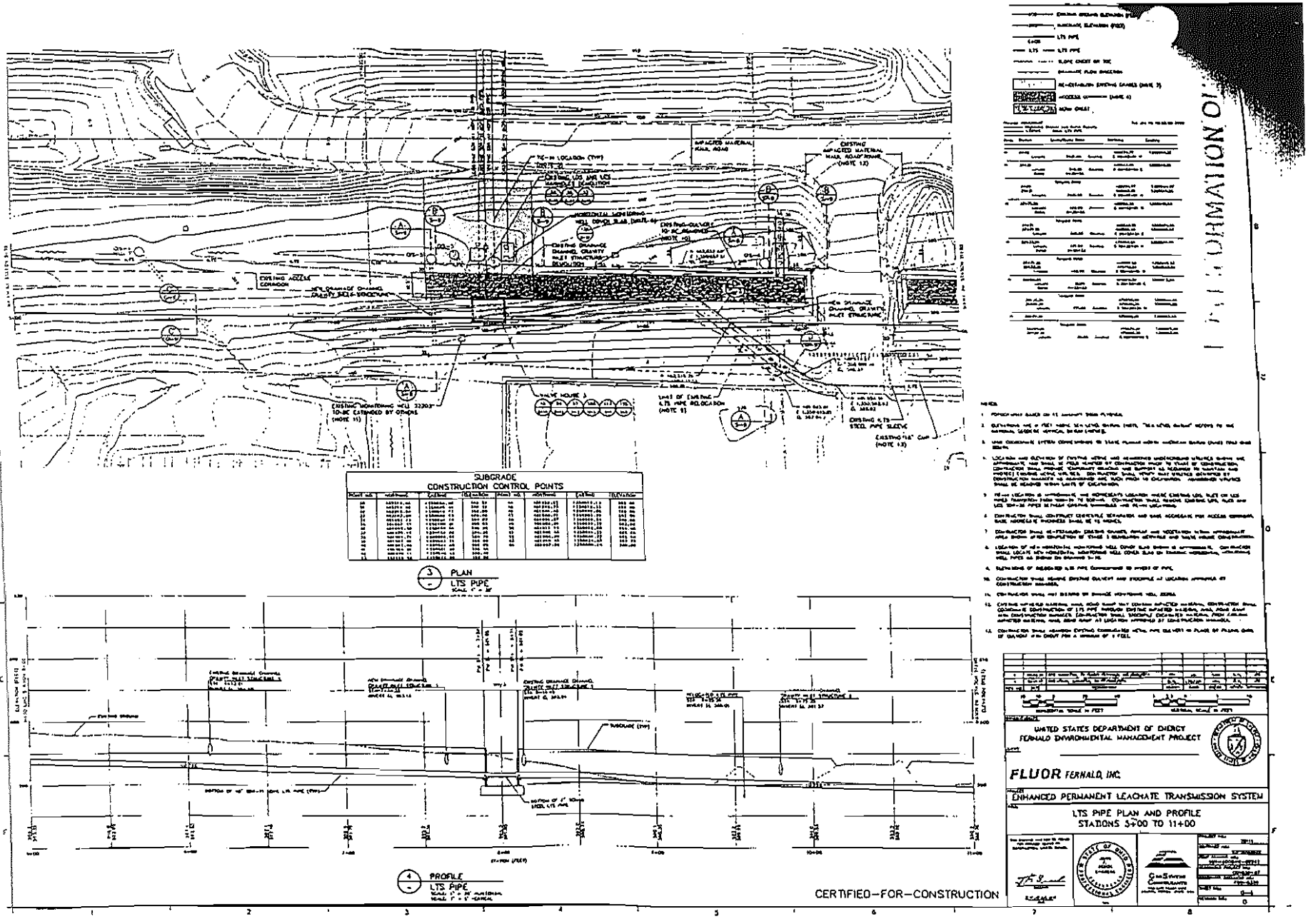

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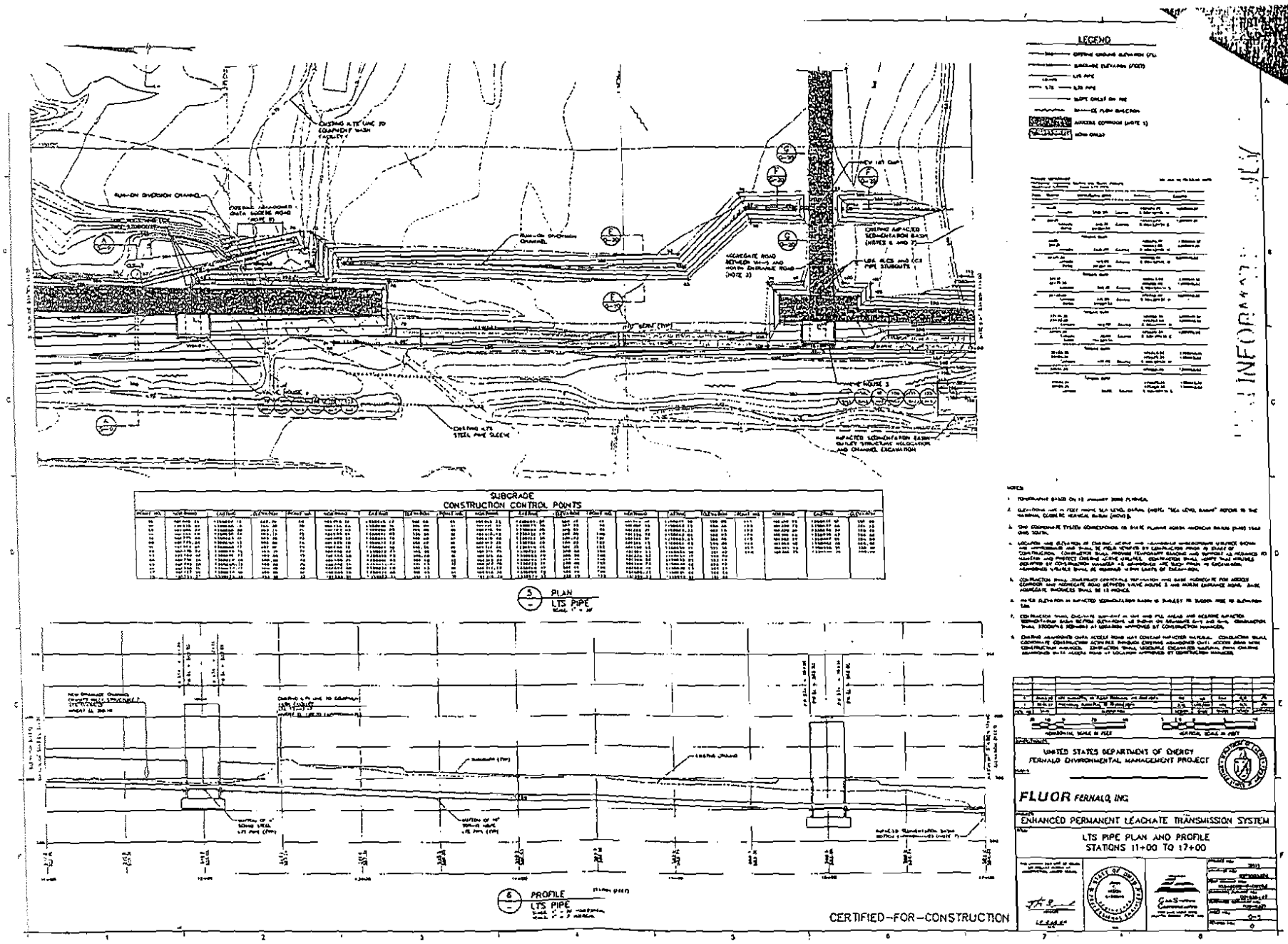

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CONTRACTOR

ORIGINAL

STAVER NONCONFORMANCE REPORT FORM

Project Title:	NCR No.:	Rev.:
Enhanced Permanent Leachate Transmission System	7052-NCR-01	0

FDF Project No.:	Contract No.:	Date:
20111	*FSC-641*	7/13/00

Requirement Description:

Reference
RCI - 20111-006R
DCN - 20111-015
"Revise Table 03100-01: "Slump - ASTM C143
5" ± 2"
Specification section 03100 - Table 03100-01 Air content
5% ± 1%

Nonconformance Description:

Slump as tested 7 3/8"
Air content as tested 3.75%

Corrective Action:

Notify Miami Valley Ready Mix
Monitor 2 & 7 Day Breaks

- ☐ Accept-As-Is
- ☐ Repair
- ☐ Rework

Staver QA Engineer Signature:	Date:
R. Wood	7/13/00
FF QA Concurrence:	Date:
FF Construction Contracts Manager Concurrence:	Date:
Engineering Concurrence:	Date: