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OPERABLE UNIT 4 PRELIMINARY DESIGN PACKAGE FOR REMEDIAL DESIGN OF UNDERGROUND UTILITIES/SITE PREPARATION

08/01/95

DOE-1299-95
DOE-FN EPAS
15
DRAWINGS

120

Department of Energy
Fernald Environmental Management Project
P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155

AUG 1 1995

DOE-1299-95

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

OPERABLE UNIT 4 PRELIMINARY DESIGN PACKAGE FOR REMEDIAL DESIGN OF UNDERGROUND UTILITIES/SITE PREPARATION

As discussed in Section 5.3.1 of the Work Plan for the Operable Unit 4 (OU4) Remedial Design, Revision 0, enclosed for your information is the subject preliminary design package. The package consists of the following drawings and specifications:

Drawings:

o	94X-5900-G-00898	Rev. A	Civil - Utility Plans (Master Plan)- Layout of Utilities and Tie-Ins
o	94X-5900-G-00899	Rev. A	Civil - Site Plan - Plant Layout and Access
o	94X-5900-F-00919	Rev. A	Mechanical Process - Utility Flow Diagram
o	94X-5900-N-00920	Rev. A	Mechanical Process - Piping and Instrumentation Diagram (Utilities).
o	94X-5900-N-00921	Rev. A	Mechanical Process - Symbols and Legend Sheet

Specifications:

o	Section 02100	Rev. A	Site Clearing
o	Section 02211	Rev. A	Rough Grading
o	Section 02725	Rev. A	Site Draining and Sewage Piping

Recycled and Recyclable

If you have any questions or comments, please contact Randi Allen at (513) 648-3102.

Johnny Reising

FN:Allen

for Jack R. Craig
Fernald Remedial Action
Project Manager

Enclosures: As Stated

cc w/o encs:

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C. Little, FERMCO
M. Yates, FERMCO
AR Coordinator, FERMCO

SECTION 02100
SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Remove surface debris.

B. Remove paving.

C. Clear and grub site only where construction is affected.

D. Remove fencing.

E. Remove designated portion of K-65 trench.

F. Remove only underground and aboveground utilities as designated.

G. Topsoil excavation.

1.2 RELATED SECTIONS

A. Section 02200 - Earthwork.

B. Section 02831 - Chain Link Fences and Gates.

1.3 QUALITY ASSURANCE

A. Erosion and sedimentation control shall comply with requirements of Section 02000.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that existing utilities designated to remain are staked, flagged, and identified.

3.2 ERECTION/INSTALLATION/APPLICATION

A. Clearing:
1. Clear only areas required for access to site and execution of work. Obtain written approval of clearing limits from FERMCO Construction Manager.
2. Remove K-65 trench as indicated. See details on Drawing 94X-5900-G-00903.
3. Remove trees and shrubs within marked areas indicated.
4. Clear undergrowth and deadwood without disturbing subsoil.
5. Provide dust control using clean potable water to the satisfaction of FERMCO Construction Manager.

B. Removal:
1. Remove debris, rock, and extracted plant life.
2. Remove existing fence to the limits shown on the Site Plan, 94X-5900-G-00899. The requirements of Section 02831 apply. Stockpile chain link in a tied roll, and stack posts in a neat pile at location on site determined by FERMCO Construction Manager.

C. Topsoil Excavation:
1. Excavate topsoil from areas to be excavated or to receive fill.
2. Stockpile in area designated on site to a height not exceeding 8 feet. Protect from erosion. Remove excess topsoil not re-used from the stockpile to a site designated by the FERMCO Construction Manager.

3.3 PROTECTION

A. Locate, identify, and protect from damage all utilities that remain.

B. Protect trees, plant growth, and features designated to remain, as final landscaping.

C. Protect survey benchmarks, monitoring wells, and existing structures from damage or displacement.

D. Construct temporary roads and maintain existing roadways at the construction site, including dust control.

END OF SECTION

SECTION 02211
ROUGH GRADING

PART 1 GENERAL

NOTE: This specification will be incorporated into Section 02200 In Title II.

1.1 SECTION INCLUDES

A. Removal of topsoil and subsoil.

B. Cutting, grading, filling, and rough contouring the site for site structures, building pads, and access roads.

C. Trenching for utilities.

D. Sampling and testing.

E. Soil and aggregate materials.

1.2 RELATED SECTIONS

A. Section 02100 - Site Clearing.

1.3 REFERENCES

A. Site Standard Operating Procedure (SSOP):

1.	SSOP-0044	Management of Soil, Debris, and Waste from a Project.

B. American Society for Testing and Materials (ASTM):

1.	ASTM D698-91	Test Method for Laboratory Compaction Characteristics of Soil using Standard Effort (12,400 ft-lbf/ft 600 KN-m/m).
2.	ASTM D1556-90	Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
3.	ASTM D2922-91	Standard Test Methods for Density of Soil and

6

		Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
	4. ASTM D3017-88	Standard Test Methods for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 SUBMITTALS

A. Accurately record actual locations of utilities remaining, by horizontal dimensions, elevations or inverts, and slope gradients. Submit information on as-built drawings.

B. Test Reports: In accordance with Article 3.3.

1.5 PROJECT CONDITIONS

A. Sampling and testing of earthwork shall be performed by an independent testing laboratory and shall be paid for by the Subcontractor.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: Type S3 as specified in Section 02200.

B. Fill: Type S1 or S2 as specified in Section 02200.

C. Structural Fill: Type A1 as specified in Section 02200.

PART 3 EXECUTION

3.1 EXAMINATION

A. The Subcontractor shall dispose of any contaminated soil or debris encountered in the construction area in accordance with SSOP-0044.

B. The Subcontractor is responsible for all earthwork layout.
   1. The FERMCO Construction Manager will provide horizontal and vertical control points which shall be verified by the Subcontractor prior to starting work.
   2. The Subcontractor shall take necessary precautions to protect control points during the construction period.

C. Identify and flag known utility locations which exist in the construction area.

D. Maintain and protect existing utilities.

E. The Subcontractor shall notify the FERMCO Construction Manager when the prepared subgrade differs in any manner from that specified on the contract drawings or when soft or spongy areas or other unusual soil conditions are encountered. Discontinue affected work until notified by the FERMCO Construction Manager to resume work.

3.2 ERECTION/INSTALLATION/APPLICATION

A. Topsoil Excavation: Perform in accordance with Section 02110.

B. Subsoil Excavation:
   1. Excavate subsoil from areas as shown on construction drawing or designated by the FERMCO Construction Manager.
   2. Stockpile in area designated on site to a height not exceeding 8 feet. Protect from erosion.

C. Proof-roll areas of existing subgrade to identify soft areas with a 20-ton (minimum) pneumatic tired roller. Subgrade to conform to compaction standards specified in Article 3.5.

D. Filling:
   1. Fill areas to contours and elevations as shown on plans.

2. Place fill materials in continuous, level layers and compact each layer in thickness indicated in accordance with schedule in Article 3.5.
3. Unsatisfactory subgrade:
   a. Where compaction test indicates unsatisfactory subsurface conditions (whether existing or in area of backfill) are observed during proof-rolling, excavate unsatisfactory material to satisfactory subgrade.
   b. Backfill with fill material required for specific area. Compact to density required for the area.
4. Maintain optimum moisture content (within 3 percent) of fill materials to attain required compaction density, as determined by ASTM D698.
5. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise.
6. Make grade changes gradual. Blend slope into level areas. Keep excavated and fill areas drained and free of debris.
7. Remove surplus fill materials from site to a location designated by the FERMCO Construction Manager in accordance with SSOP-0044.

E. Dust Control:
   1. Provide dust control using potable water to the satisfaction of FERMCO Construction Manager.

3.3 FIELD QUALITY ASSURANCE

A. Responsibility: Subcontractor shall coordinate and pay for all sampling and testing by an independent testing laboratory.

B. Compaction testing will be performed in accordance with ASTM D1556, ASTM D698, ASTM D2922, and ASTM D3017.

C. If tests indicate work does not meet specified requirements, remove work, replace, and retest at no additional charge to FERMCO.

D. Frequency of Tests:
   1. Frequency of in-place density testing shall be whichever of the following requires the greatest number of tests.
      a. Once each day of work of filling.
      b. Once every layer of fill.
      c. Once every 100 cubic yards of fill.
      d. Every 2,000 square feet under paving or building slab.

E. If during the course of the project a source of supply is changed or has varied, or at the direction of the FERMCO Construction Manager, the applicable testing shall be repeated.

F. All inspection and test reports shall be filed with the FERMCO Construction Manager within 1 week after the test.

G. The Subcontractor shall notify the FERMCO Construction Manager of testing/inspection activities at least 24 hours prior to the start of all tests or inspections.

3.4 ADJUSTING

A. Top Surface of Subgrade: Plus or minus 1/10 foot.

3.5 SCHEDULES

A. Structural Fill:
   1. Fill Type A1: Maximum 8 inches compacted lift thickness.
   2. Compact to minimum 100 percent of Standard Proctor of maximum density (ASTM D698).

B. Subsoil Fill:
   1. Fill Type S1 or S2: Maximum 8 inches compacted lift thickness.
   2. Compact to minimum 95 percent Standard Proctor of maximum density (ASTM D698).

C. Topsoil Fill:
   1. Fill Type S3: Maximum 4 inches compacted depth.
   2. Compact to minimum 90 percent Standard Proctor of maximum density (ASTM D698).

D. Proof-rolled Areas:
   1. Compact to a minimum of 95 percent of Standard Proctor maximum density (ASTM D698).

END OF SECTION

SECTION 02725
SEWAGE PIPING

PART 1 GENERAL

NOTE: This specification will be incorporated into Section 02700 Sanitary in Title II.

1.1 SECTION INCLUDES

A. Pipe and fittings for sewage underground lines.

B. Valves and tap connections.

C. Clean-outs, covers, and frames.

1.2 RELATED SECTIONS

A. Section 02200 - Earthwork.

B. Section 03001 - Concrete.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1.	ASTM D698-91	Test Method for Laboratory Compaction Characteristics of Soil using Standard Effort (12,400 ft-lbf/ft^3 600 kN-m/m^3).
2.	ASTM D2922-91	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
3.	ASTM D3017-88	Standard Test Methods for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
4.	ASTM D3035-93	Standard Specification for Polyethylene (PE) Plastic Pipe

		(DR-PR) Based on Controlled Outside Diameter.
5.	ASTM D3350-93	Standard Specification for Polyethylene Plastic Pipe and Fittings Material.

B. American Water Works Association (AWWA):

1.	AWWA C110/ A21.10-93	Ductile-Iron and Gray-Iron Fittings, 3-Inch through 48-Inch, for Water and Other Liquids.
2.	AWWA C111/ A21.11-90	Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
4.	AWWA C600-93	Installation of Ductile-Iron Water Mains and Their Appurtenances.
5.	AWWA C906-90	Polyethylene (PE) Pressure Pipe and Fittings, 4-Inch through 63-Inch, for Water Distribution.

1.4 SUBMITTALS

A. Product Data: Provide data on all pipe materials, pipe fittings, valves, accessories, the methods and equipment for HDPE fusion welding, HDPE manholes, and manhole frame and cover.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Project Record Documents:
   1. Accurately record actual locations by NAD83 coordinates of all underground utilities, piping mains, valves, connections, and invert elevations, and show on as-built drawings.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

D. As-built drawings.

1.5 QUALITY ASSURANCE

A. Piping and Valves: Manufacturer's name and pressure rating marked on valve body.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to construction site.

B. Deliver and store valves in shipping containers or pallets with labeling in place.

PART 2 PRODUCTS

2.1 MATERIALS

A. Pipe:
   1. High-Density PE Pipe: AWWA C906 (PE 3408), ASTM D3035, SDR 11 for 150 psi pressure rating (150 psi test pressure rating).
      a. Fitting: AWWA C906, molded, butt fusion weld to pipe.
      b. Joints: Butt fusion, flanged gasket joints, and molded adapter pipe at interface connections with ductile iron pipe and valves.
      c. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "sewage service" in large letters.

B. Gate Valves:

1. AWWA C500, iron body, bronze trim, non-rising stem with square nut, single wedge, Class 125 flanged ends, control rod, post indicator or extension box, and valve key.

C. Bedding Materials:
   1. Bedding: Fill Type A3 as specified in Section 02200 of this specification package.

D. Manhole: HDPE, ASTM D3350. Pipe resin is cell classification 3454-34C.

E. Manhole frame and lid shall be heavy-duty cast iron as noted on the drawings.

2.2 ACCESSORIES

A. Concrete: 3,000 psi (minimum) as specified in Section 03001. Poured against undisturbed soil or compacted fill.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions. Bring any discrepancies to the FERMCO Construction Manager for resolution prior to start of work. Any discrepancies should be brought to FERMCO's attention in a written statement immediately upon discovery.

B. Verify that building service connection size, location, and invert are as indicated.

3.2 PREPARATION

A. Ream pipe and tube ends and remove burrs.

B. Remove dirt, on inside and outside, before assembly.

C. Excavate pipe trench in accordance with Section 02200 of this specification package for work of this section.

Hand trim excavation for accurate placement of pipe to elevations indicated. Locate all existing utilities in the area and determine if they will interfere with the proposed utility. Notify the FERMCO Construction Manager if there is an interference.

3.3 ERECTION/INSTALLATION/APPLICATION

A. Installation - Pipe: HDPE

1. Maintain separation of water main from sewer piping (10-foot horizontal minimum or 18-inch vertical minimum).
2. Install pipe to indicated elevation to within tolerance of 5/8 inches. Use a common trench for pipes running parallel.
3. Install HDPE piping and fittings to AWWA C906 (by butt weld fusion method).
4. Route pipe in line as shown on drawing.
5. Install pipe to allow for expansion and contraction without stressing pipe or joints as per manufacturer's recommendation.
6. Install access fittings to permit cleanout.
7. Form and place concrete for thrust blocks at each elbow or change of direction of pipe main.
8. Establish elevations of buried piping to ensure not less than 3.5 feet of cover.
9. Install trace wire continuous over top of pipe, buried 6 inches below finish grade, above pipe line; coordinate with Section 02200 of this specification package.
10. Backfill trench in accordance with Section 02200 of this specification package.

C. Bedding:

1. Place bedding material at trench bottom. Level fill materials in one continuous layer not exceeding 6 inches compacted depth. Compact to 95 percent Standard Proctor per ASTM D698.
2. Backfill around sides and to top of pipe with fill, tamped in place and compacted to 95 percent Standard Proctor per ASTM D698.
3. Maintain optimum moisture content of bedding material to attain required compaction density.

FIELD QUALITY ASSURANCE

A. Compaction testing will be performed in accordance with ASTM D698, ASTM D2922, and ASTM D3017.

B. If tests indicate work does not meet specified requirements, remove and replace at no cost to Owner.

C. Perform hydrostatic tests on line in accordance with AWWA C600. Notify the FERMCO Construction Manager at least 24 hours in advance of planned testing. Submit report to the FERMCO Construction Manager within 1 week after completion of test.

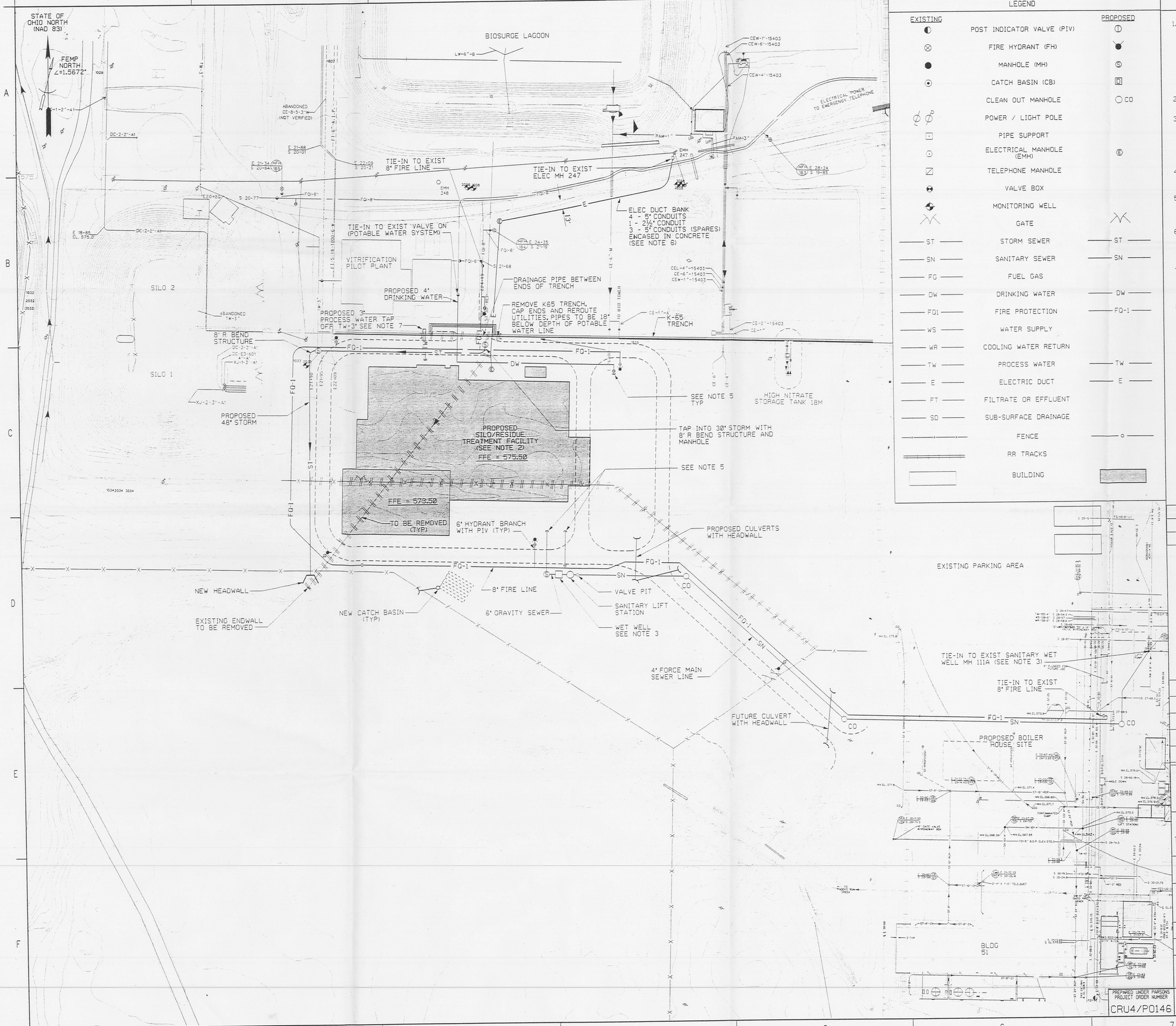
D. The new pipes shall be hydrostatically tested prior to tie-in. This test shall be run at 50 psi above the working pressure of the sewer force main and hold within specifications for 2 hours.

$$\textit{Allowable Leakage} = \frac{LD\sqrt{p}}{498,168}$$

L = Length of Pipe in Test in Feet
D = Diameter of Pipe in Inches
p = Test Pressure (Operating Pressure + 50 psi = 110 psi + 50 psi)

Answer = Allowable Leakage in Cubic Feet over a 2-Hour Period.

END OF SECTION



LEGEND

EXISTING		PROPOSED
	POST INDICATOR VALVE (PIV)	
	FIRE HYDRANT (FH)	
	MANHOLE (MH)	
	CATCH BASIN (CB)	
	CLEAN OUT MANHOLE	CO
	POWER / LIGHT POLE	
	PIPE SUPPORT	
	ELECTRICAL MANHOLE (EMH)	
	TELEPHONE MANHOLE	
	VALVE BOX	
	MONITORING WELL	
	GATE	
ST	STORM SEWER	ST
SN	SANITARY SEWER	SN
FG	FUEL GAS	
DW	DRINKING WATER	DW
FQ1	FIRE PROTECTION	FQ-1
WS	WATER SUPPLY	
WR	COOLING WATER RETURN	
TW	PROCESS WATER	TW
E	ELECTRIC DUCT	E
FT	FILTRATE OR EFFLUENT	
SD	SUB-SURFACE DRAINAGE	
	FENCE	
	RR TRACKS	
	BUILDING	

NOTES

1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM FEMP SITE PROVIDED DATA FROM THE DOCUMENTS LISTED BELOW.

   EXISTING SITE DATA SOURCE (IN PLANT FILES)
   PARSONS TOPOGRAPHY, 1992
   FEMP CADD GRID/UTILITY DRAWINGS
   FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS
   FIELD SURVEY OF AREA NOT AVAILABLE. LOCATIONS OF FEATURES ARE APPROXIMATE.
2. FACILITY OUTLINE SHOWN IS TAKEN FROM THE PRELIMINARY GENERAL ARRANGEMENT DIAGRAM.
3. SANITARY WET WELL WITH AGITATOR WILL BE SIZED TO HOLD A 30 MINUTE PEAK DEMAND FLOW (APPROXIMATELY 2000 GALLONS). THE LIFT STATION WILL BE DESIGNED TO METER THE FLOW INTO THE EXISTING SYSTEM AT MANHOLE 111A. LEVELS AND CONTROLS BETWEEN LIFT STATION AND MANHOLE 111A WILL BE NEEDED. PUMP AT LIFT STATION (SMH 111A) WILL NEED TO BE UPGRADED.
4. STORMWATER CONTROL (I.E. DITCHES, CURBS, DETENTION AREA) LOCATIONS WILL BE DETERMINED WHEN FINAL FACILITY ARRANGEMENT SITE GRADING IS ESTABLISHED.
5. END PROPOSED UTILITY LINES AT LOCATIONS SHOWN. UTILITY TIE-IN LOCATIONS TO THE FACILITY WILL BE DETERMINED AS PART OF FACILITY TITLE II DESIGN.
6. THE ARRANGEMENT OF THE ELECTRICAL DUCT BANK IS BASED UPON THE ASSUMPTION THAT THE ELECTRICAL POWER FROM THE FEMP PRIMARY CIRCUITS F1B AND F4B ARE ADEQUATE FOR THE REMEDIATION PLANT ELECTRICAL LOAD.
7. EXISTING 3" TW LINE AT K65 TRENCH IS AT A HIGHER ELEVATION THAN TRENCH BOTTOM AND IS NEXT TO TRENCH. HENCE TAP-IN WILL NEED TO PROCEED NORTH.
8. BELOW IS A SCHEDULE OF PIPING MATERIALS AND MINIMUM DEPTH TO BE USED:

   DW - HDPE SDR9, 42" MINIMUM DEPTH
   FQ - HDPE SDR9, 48" MINIMUM DEPTH
   SN - HDPE SDR15, 36" MINIMUM DEPTH
   ST - REINFORCED CONCRETE PIPE, TO BE DETERMINED. 24" MINIMUM DEPTH
   TW - HDPE SDR9, 36" MINIMUM DEPTH

REF DWG NO.	DRAWING TITLE

PRELIMINARY
NOT FOR CONSTRUCTION

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FERMCO	DATE
A	PREPARED FOR 30% DESIGN REVIEW			

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - PARSONS MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
SITE PREPARATION/UNDERGROUND UTILITIES
TITLE I AND II SOIL RESIDUE /TREATMENT FACILITY

DRAWING TITLE
CIVIL
UTILITY PLAN (MASTER PLAN)
LAYOUT OF UTILITIES AND TIE-INS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
D. BABAYAN	6/14/95				
PLANT/BLDG. NO.		FLOOR		SCALE 1"=50'	CLASS
SUBMITTED FOR APPROVAL		FERMCO CRU APPROVAL			
A-E	DATE		DATE		

DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
PREPARED UNDER PARSONS PROJECT ORDER NUMBER CRU4/PO146	WBS 1.1.1.1.4.3.2 00-90701	94X-5900-G-00898	G0002	A

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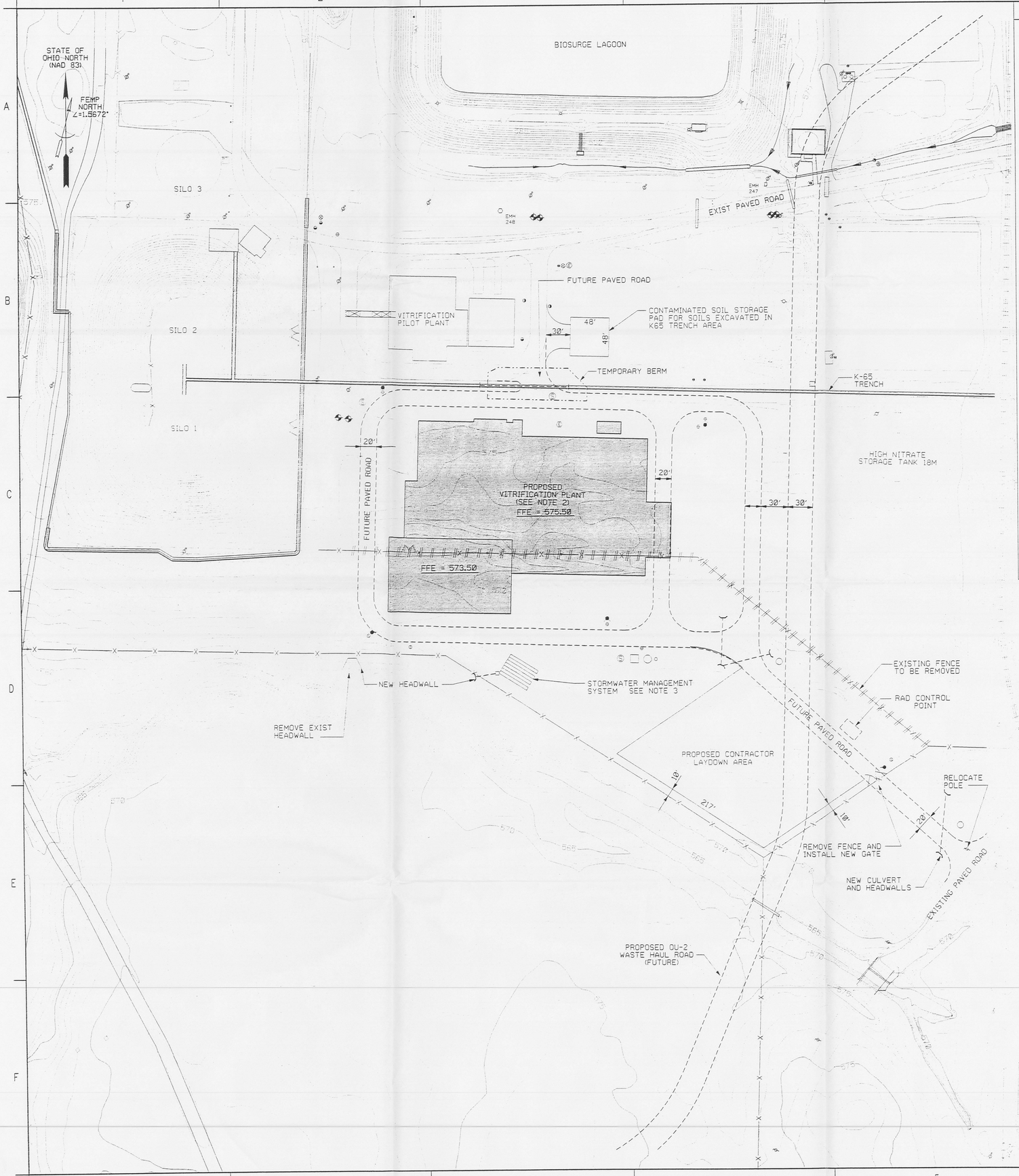

LEGEND

EXISTING		PROPOSED
	POST INDICATOR VALVE (PIV)	
	FIRE HYDRANT (FH)	
	MANHOLE (MH)	
	CATCH BASIN (CB)	
	POWER / LIGHT POLE	
	PIPE SUPPORT	
	ELECTRICAL MANHOLE (EMH)	
	TELEPHONE MANHOLE	
	VALVE BOX	
	MONITORING WELL	
	GATE	
	DRAINAGE SWALE	
	FENCE	
	ABANDONED	
	RR TRACKS	
	BUILDING	
	TO BE REMOVED	

NOTES

1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM FEMP SITE PROVIDED DATA FROM THE DOCUMENTS LISTED BELOW.

   EXISTING SITE DATA SOURCE (IN PLANT FILES)
   PARSONS TOPOGRAPHY, 1992
   FEMP CADD GRID/UTILITY DRAWINGS
   FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS
   FIELD SURVEY OF AREA NOT AVAILABLE. LOCATIONS OF FEATURES ARE APPROXIMATE.
2. FACILITY OUTLINE SHOWN IS TAKEN FROM THE GENERAL ARRANGEMENT DIAGRAM, DRAWING 94X-5900-M-00844.
3. STORMWATER MANAGEMENT WILL BE USED TO CONTROL THE INCREASE IN RATE OF STORMWATER DISCHARGE FROM THE PROJECT AREA. AN UNDERGROUND METAL PIPE STORAGE SYSTEM SHALL BE CONSIDERED.
4. SEE DRAWING 94X-5900-G-00865 FOR REMOVAL AND RELOCATION OF UNDERGROUND UTILITIES.

REF DWG NO.	DRAWING TITLE
94X-5900-G-00898	LAYOUT OF UTILITIES AND TIE-INS
94X-5900-G-00906	GRADING AND DRAINAGE PLAN

PRELIMINARY
NOT FOR CONSTRUCTION

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FERMCO	DATE
A	PREPARED FOR 30% DESIGN REVIEW			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - PARSONS MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
SITE PREPARATION/UNDERGROUND UTILITIES
TITLE I AND II SILO RESIDUE/TREATMENT FACILITY

DRAWING TITLE
CIVIL
SITE PLAN
PLANT LAYOUT AND ACCESS

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
Ø. BABAYAN	6/14/95				
PLANT/BLDG. NO.		FLOOR		SCALE 1"=50'	CLASS
SUBMITTED FOR APPROVAL		FERMCO CRU APPROVAL			
A-E	DATE		DATE		

PREPARED UNDER PARSONS PROJECT ORDER NUMBER	DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
CRU4/P0146		WBS 1.1.1.1.4.3.2 00-90701	94X-5900-G-00899	G0001	A

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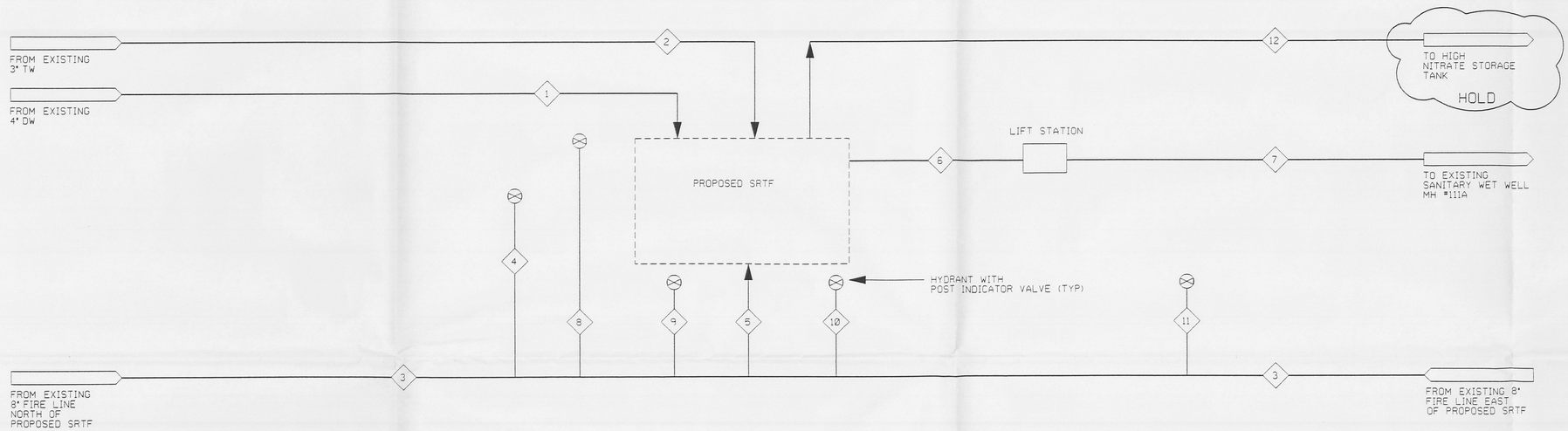

STREAM NO.	1	2	3	4	5	6	7	8	9	10	11	12
COMPONENT	DOMESTIC WATER	PROCESS WATER	FIRE PROTECT. (TOTAL)	HYDRANT FLOW	FIRE PROTECT. TO SR/TF	SANITARY GRAVITY FLOW	SANITARY FORCE MAIN	HYDRANT FLOW	HYDRANT FLOW	HYDRANT FLOW	HYDRANT FLOW	PROCESS WASTE WATER
OPERATING HR/DAY	24	24	INTERMIT	INTERMIT	INTERMIT	INTERMIT	INTERMIT	INTERMIT	INTERMIT	INTERMIT	INTERMIT	24
SOLIDS (LBS/HR)												
WATER (LBS/HR)												
AIR (GAS) (LBS/HR)												
ADDITIVES (LBS/HR)												
TOTAL (LBS/HR)												
SPECIFIC GRAVITY - DRY SOLIDS												
SPECIFIC GRAVITY - SLURRIES												
RADON (uCi/L)												
SOLIDS FLOW (CFM)												
LIQUID FLOW (GPM)	55	150		1000		55	55	1000	1000	1000	1000	150
GAS FLOW (SCFM)												
TEMPERATURE (DEG F)												
PRESSURE (PSIG)	60	60		20 (MIN)				20 (MIN)	20 (MIN)	20(MIN)	20 (MIN)	
NOTES	1	1	1	1	1	1	1	1	1	1	1	

NOTES

1. FLOWS SHALL BE DETERMINED WHEN THE THROUGHPUT OF THE PROPOSED SRTF IS KNOWN.

120

REF DWG NO.	DRAWING TITLE

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	FERMCO	DATE
A	ISSUED FOR 30% TITLE I REVIEW			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY

PARSONS

THE RALPH M. PARSONS CO. - PARSONS MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
SITE PREPARATION/UNDERGROUND UTILITIES
FOR SILO RESIDUE/TREATMENT FACILITY

DRAWING TITLE
MECHANICAL PROCESS
UTILITY FLOW DIAGRAM
UNDERGROUND UTILITIES FOR SRTF

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
P. A. WILSON	6/22/95			D. CARLSON	6/26/95

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
		NONE	

SUBMITTED FOR APPROVAL	FERMCO CRU APPROVAL	CERTIFIED FOR CONSTRUCTION
A-E DATE	DATE	CRU DIRECTOR DATE

PREPARED UNDER PARSONS PROJECT ORDER NUMBER	DOE PROJECT NO.	FEMP PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
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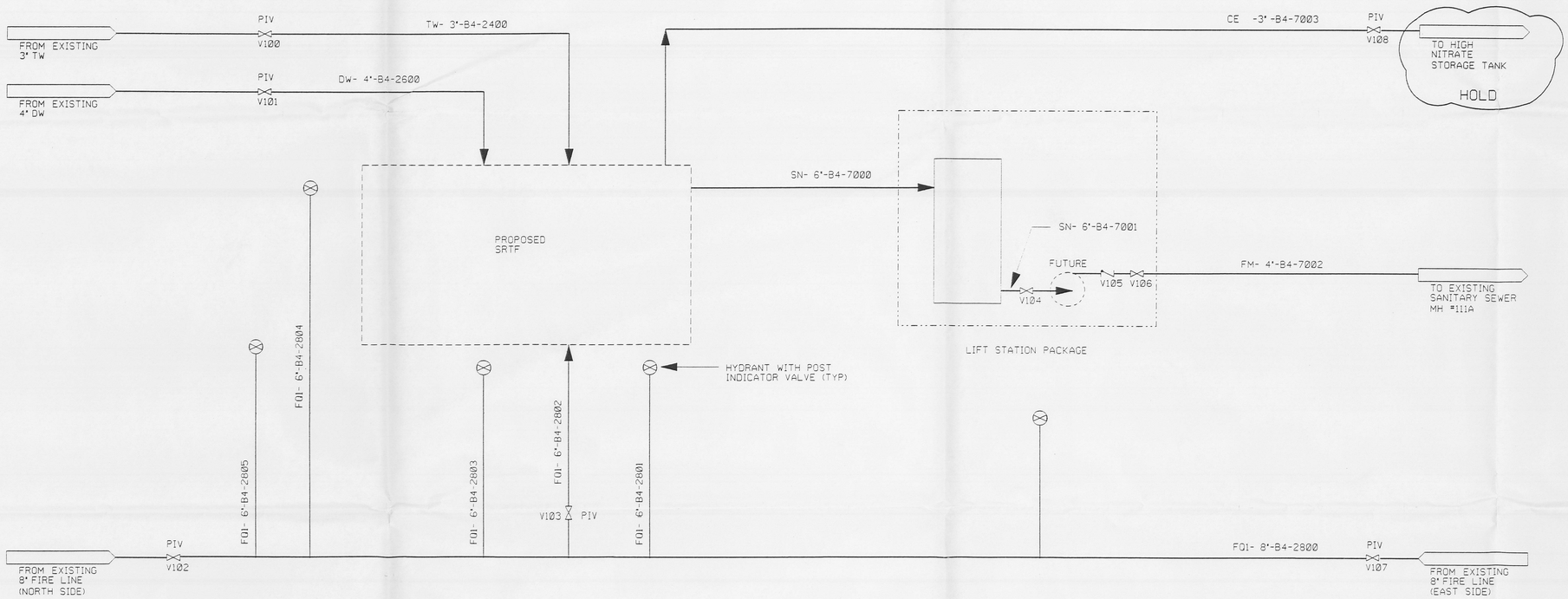

NOTES

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LAST VALVE NO.	V108

REFER DWG NO.	REFERENCE DWG TITLE
94X-5900-N-00921	SYMBOLS AND LEGEND SHEET

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SITE PREPARATION/UNDERGROUND UTILITIES
FOR SILO RESIDUE/TREATMENT FACILITY

DRAWING TITLE

MECHANICAL PROCESS
PIPING AND INSTRUMENTATION DIAGRAM
UNDERGROUND UTILITIES FOR SRTF

DRAWN BY	DATE	LEAD ENGINEER	DATE	CHECKED BY	DATE
P. A. WILSON	6/22/95			O. CARLSON	6/26/95

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
		NONE	

SUBMITTED FOR APPROVAL — A-E — DATE

FERMCO CRU APPROVAL — DATE

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PIPING SYMBOLS

- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- PLUG VALVE
- BUTTERFLY VALVE/DAMPER
- STOP CHECK
- NEEDLE VALVE
- CHECK VALVE
- SLIDING GATE VALVE
- BALL CHECK VALVE
- BACKFLOW PREVENTER
- DIAPHRAGM VALVE
- PINCH VALVE
- 3 WAY VALVE
- 3 WAY BALL VALVE
- 3 WAY PLUG VALVE
- ANGLE GATE VALVE
- ANGLE GLOBE VALVE
- FOOT VALVE
- MOTOR OPERATOR
- DIAPHRAGM OPERATOR
- DIAPHRAGM W/ POSITIONER
- PISTON OPERATOR
- SAFETY RELIEF VALVE
- SOLENOID OPERATOR
- SELF-CONTAINED BACK PRESSURE REGULATING VALVE
- 2-WAY SOLENOID VALVE
- 3-WAY SOLENOID VALVE INDICATES DEENERGIZED POSITION
- 4-WAY SOLENOID VALVE
- VALVE WITH OPERATOR (VALVE TYPE UNDEFINED)
- FIRE HYDRANT
- STEAM TRAP
- HOSE QUICK COUPLING
- UNION
- DRAIN LEG
- EXPANSION JOINT
- HANDWHEEL
- EJECTOR
- STRAINER (Y TYPE)
- STRAINER (SINGLE BASKET)
- STRAINER (DOUBLE BASKET)
- STRAINER (CONE TYPE)
- STRAINER (SUCTION TYPE)
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- ORIFICE
- VENTURI TUBE
- SIPHON TUBE
- HUB DRAIN OR FUNNEL
- THERMOWELL
- FLOW DIRECTION
- WELDED CONNECTION
- FLANGED CONNECTION
- FLEXIBLE HOSE
- PIPE CAP
- TIE/IN MARK
- PRIMARY (UNDERGROUND)
- SECONDARY
- EXISTING PIPING OR EQUIPMENT
- FUTURE PIPING OR EQUIPMENT
- PERFORMANCE GRADE EQUIPMENT OR PIPING
- PACKAGED SYSTEM
- PULSATION DAMPENER
- AIR FILTER
- FILTER LUBRICATOR REGULATOR
- AIR OPERATED DIAPHRAGM PUMP
- HORIZONTAL CENTRIFUGAL PUMP
- VERTICAL CENTRIFUGAL PUMP
- SUBMERSIBLE SUMP PUMP
- CHEMICAL METERING PUMP
- ROTARY SCREW AIR COMPRESSOR
- GEAR PUMP
- FLOW NOZZLE
- SELF - CONTAINED FLOW REGULATED VALVE
- AGITATOR (MIXER)

INSTRUMENT SYMBOLS

- ELECTRICAL BINARY SIGNAL
- PNEUMATIC BINARY SIGNAL
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ELECTROMAGNETIC OR SONIC SIGNAL (NON-GUIDED)
- INSTRUMENT AIR SUPPLY
- ELECTRICAL SIGNAL
- DATA HIGHWAY
- CAPILLARY
- HYDRAULIC SIGNAL LINE
- PNEUMATIC OR VACUUM SIGNAL LINE
- INTERLOCK
- DIAPHRAGM SEAL
- ROTAMETER
- SIGHT GLASS
- LOCAL MOUNTED INSTRUMENT
- FRONT OF PANEL MOUNTED INSTRUMENT
- FRONT OF PANEL MOUNTED INSTRUMENT AUXILLIARY LOCATION
- REAR OF PANEL MOUNTED INSTRUMENT
- REAR OF PANEL MOUNTED INSTRUMENT AUXILLIARY LOCATION
- SHARED DISPLAY COMPUTER CONTROL NOT NORMALLY ACCESSIBLE TO OPERATOR.
- SHARED CONTROL AUXILIARY LOCATION
- SHARED DISPLAY COMPUTER CONTROL AND OPERATOR INTERFACE
- AIR VENT FILTER
- MAGNETIC FLOW METER
- POSITIVE DISPLACEMENT FLOW METER
- EQUIPMENT NUMBER
- ELECTRO-PNEUMATIC SIGNAL CONVERTER
- SHIELDED WIRE CUT & TAPE SHIELD
- AVERAGING PITOT TUBE

TYPICAL CALLOUT

FY 102/A
- LETTERS OF IDENTIFICATION
- SPECIAL DESIGNATION
- INSTRUMENT TAG NUMBER

LOOP SHEET WIRING LEGEND

——— DENOTES FIELD WIRING

- - - - DENOTES PANEL WIRING

ICN1 DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.1

ICN2 DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.2

LOOP SHEET CABLE IDENTIFICATION

XXXI
- CABLE DESIGNATION

ABBREVIATIONS

AO	AIR TO OPEN
AC	AIR TO CLOSE
BTU	BRITISH THERMAL UNIT
CU FT	CUBIC FEET
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
KW	KILOWATT
LB/HR	POUNDS PER HOUR
SCFM	STD. CUBIC FT/MINUTE
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
FO	FAIL OPEN
FC	FAIL CLOSED
IA	INSTRUMENT AIR
ET	ELECTRIC TRACED AND INSULATED
ST	STEAM TRACED AND INSULATED
EF	EXHAUST FAN
GV	GRAVITY VENTILATOR
UH	UNIT HEATER
RED	REDUCER
ECC	ECCENTRIC
TBD	TO BE DETERMINED
TF	TOP FLAT
TYP	TYPICAL
MATL	MATERIAL
MED	MEDIUM
CO	CARBON MONOXIDE
RH	RELATIVE HUMIDITY
I	INSULATION ONLY
P	PERSONNEL PROTECTION
CFM	CUBIC FEET/MINUTE
PG	PERFORMANCE GRADE
LH	LOW HAZARD
MH	MEDIUM HAZARD
HH	HIGH HAZARD
HC	HAZARD CLASSIFICATION
SIH	STANDARD INDUSTRIAL HAZARD
SSC	STRUCTURES, SYSTEMS OR COMPONENTS
PIV	POST INDICATOR VALVE

INSTRUMENTATION SPECIAL DESIGNATIONS

DESIGNATION	FUNCTION/ABBREVATION
Σ/N OR AVG	AVERAGING
± OR BI	BIAS
1:1.1:3.2:1 (TYP)	BOOST,GAIN OR ATTENUATE (INPUT:OUTPUT)
△ OR DIF	DIFFERENTIAL
÷ OR DIV	DIVIDE
√‾ OR SQ.RT.	EXTRACT SQUARE ROOT
X OR MUL	MULTIPLY
N	RAISE TO POWER
REV	REVERSING
Σ OR SUM	SUMMING
L	LOW
LL	LOW LOW
H	HIGH
HH	HIGH HIGH
HL	HIGH LOW
∫	INTEGRATE (TIME INTEGRAL)
%	PROPORTIONAL
Y	UNDETERMINED COMPUTING RELAY
HOA	HAND-OFF-AUTO
SS	START-STOP
≡	EXISTING INSTRUMENT TO BE RELOCATED
I/P	CURRENT TO PNEUMATIC TRANSDUCER
RUN	RUNNING
OA	OFF-AUTO
OCA	OPEN-CLOSE-AUTO
I/O	INPUT / OUTPUT
O	OPEN
C	CLOSE
*	INSTRUMENT PROVIDED WITH ASSOCIATED EQUIPMENT
R/L	RAISE / LOWER

PIPING SPECIFICATIONS

FLOWING MEDIUM	MED CODE	MATL CODE
BOILER FEEDWATER	BF	A4
BACK WASH	BW	T
BRINE	BR	T
CHLORINE	CL	B1
CONDENSATE	CN	A4
POTABLE WATER	DW	B4
CHEMICAL FEED	CF	T
COOLING WATER	WS. WR	A
DRAIN	DR	A4
THICKENER OVERFLOW	TO	A
NATURAL GAS	FG	A4
FIRE PROTECTION	FQ1	B4
FLUSH WATER	FW	A
FORCE MAIN	FM	B4
INSTRUMENT AIR	IA	W
MELTER OFF-GAS	OG	T, A
METAL OXIDE	MO	A
NITROGEN	NG	A4
PERCHED GND WATER	PGW	B
PHOSPHORIC ACID	PAPH	T1
PLANT AIR	PA	W
POLISHED WATER	PW	A
PROCESS WATER	TW	B4
PROCESS WASTEWATER	CE	B4
RAW WATER	RW	A
RECYCLE WATER	RC	A, A2
STEAM	LS	A4
SOFTENER WATER	TW	A4
SANITARY SEWER	SN	B4
SODIUM HYDROXIDE	NA	A
SODIUM SILICATE	SS	A
STORM WATER	ST	A
SULFURIC ACID	SB	T1
SUMP DISCHARGE	SU	A
VACUUM	V	A
VENT	VE	A4
WASTE WATER	WW	A

EXAMPLE:

CE-2"-A-100-ET/PG
- MEDIUM CODE
- NOMINAL PIPE SIZE
- MATERIAL CODE
- LINE NUMBER
- HEAT TRACING AND INSULATION
- PERFORMANCE GRADE

A -CLASS 150, CARBON STEEL
A1 -CLASS 150, CARBON STEEL
A4 -CLASS 150, CARBON STEEL
B -CLASS 150, PVC
B1 -PVDF
B2 -PVDF, 100 PSI
B3 -CLASS 150, CPVC
B4 -HDPE
C -CLASS 150, COPPER TUBING
L -CLASS 150, FRP
M -CLASS 125, DUCTILE IRON
T -CLASS 150, 304L STAINLESS STEEL
T1 -CLASS 150, 316L STAINLESS STEEL
T2 -CLASS 300, 304L STAINLESS STEEL PIPE
T3 -CLASS 150, 304L STAINLESS STEEL PIPE
W -CLASS 150, GALVANIZED STEEL

LETTERS OF INSTRUMENT IDENTIFICATION

LETTER	FIRST LETTER: MEASURED OR INITIATING VARIABLE	2ND LETTER: MODIFIER	3RD OR 4TH LETTER: READ OUT OR PASSIVE FUNCTION
A	ANALYSIS	ALARM	ALARM
B	BURNER FLAME	----	----
C	CAMERA	CONTROLLER	CONTROLLER
D	DENSITY	DIFFERENTIAL	----
E	VOLTAGE	ELEMENT	ELEMENT
F	FLOW RATE	RATIO (FRACTION)	----
G	----	VIEWING DEVICE	GLASS
H	HAND (MANUAL)	----	HIGH
I	CURRENT (ELECT)	INDICATE	INDICATE
J	POWER	SCAN	----
K	TIME	----	----
L	LEVEL	LIGHT	LOW
M	MOIST OR HUMIDITY	----	----
N	----	----	----
O	OBSERVATION	----	ORIFICE
P	PRESSURE OR VACUUM	----	POINT (TEST)
Q	QUANTITY OR EVENT	TOTALIZER	----
R	RADIATION	RECORDER	RECORDER
S	SPEED OR FREQUENCY	SAFETY/SWITCH	SWITCH
T	TEMPERATURE	TRANSMITTER	TRANSMITTER
U	USER'S GUIDE	----	MULTIFUNCTION
V	VIBRATION	VALVE	VALVE
W	WEIGHT OR FORCE	WELL	----
X	CONTROL	----	UNCLASSIFIED
Y	RELAY	RELAY	----
Z	POSITION	----	----

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Jan. 2, 1992 13:50:14

IM LAWSON

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