R-009-104.2

4132

DETAIL PLANS OF PROPOSED INSTALLATION OF AN IONICS, INC ELECTRODIALYSIS REVERSAL TRAILER MOUNTED UNIT APPLICATION NO. SW-2496-WS

12/10/92

OEPA/DOE-FN
10
LETTER

OhioEPA
State of Ohio Environmental Protection Agency

P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020
FAX (614) 644-2329

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DEC 14 3 16 PM '92

4132 AR

George V. Voinovich
Governor

Donald R. Schregardus
Director

December 10, 1992

Re: Hamilton County
Crosby Township
Application No. SW-2496-WS
Community Water System, 3136512
Detail Plans of Proposed Installation of an Ionics, Inc. electrodialysis reversal trailer mounted unit
Plans Received July 13, 1992;
Revised Plans Received November 24, 1992
From R.E. Tiller

United States Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, OH 45239-8705

Gentlemen:

The Ohio Environmental Protection Agency has reviewed the enclosed plans submitted pursuant to Ohio Revised Code Sections 6109.07 et. seq. These plans are approved subject to the condition of compliance with all applicable laws, rules, regulations, and standards. Further, all construction must be supervised by a registered engineer, if required by law, or expert qualified in such work.

The enclosed report contains a description of the facilities approved which may include information regarding approved operating rates, capacities, and requirements, and is incorporated herein.

This approval shall apply only to those water supply facilities shown on the plans cited above. Any waste handling facilities shown on these plans must have a separate waste handling approval.

Lead solder and flux that exceeds 0.2 percent lead content and any pipe or pipe fitting that exceeds an 8 percent lead content shall not be used in the installation of the proposed facilities.

The proposed facility may be constructed only in accordance with plans approved by the director of the Ohio Environmental Protection Agency. There may be no deviation from the approved plans without the express, written approval of the agency. Any deviation from the approved plans or the above conditions may lead to denial of a discharge permit or other sanctions and penalties provided under Ohio law. Approval of these plans does not constitute an assurance that the proposed facilities will operate in compliance with all Ohio laws and regulations. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed facilities prove to be inadequate or cannot meet applicable standards.

Should there be any questions regarding the requirements, meaning, or interpretation of any of the above which we may clarify, please contact the Division of Drinking and Ground Waters in the appropriate district office of the Ohio Environmental Protection Agency.

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You are hereby notified that this action of the director is final and may be appealed to the Environmental Board of Review pursuant to Section 3745.04 of the Ohio Revised Code by any person who was a party to this proceeding. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Board of Review within thirty (30) days after notice of the director's action. A copy of the appeal must be served on the director of the Ohio Environmental Protection Agency and the Environmental Enforcement Section of the Office of the Attorney General within three (3) days of filing with the board. An appeal may be filed with the Environmental Board of Review at the following address:

Environmental Board of Review
236 East Town Street, Room 300
Columbus, Ohio 43266-0557

Sincerely,

Donald R. Schregardus

Donald R. Schregardus
Director

DRS/mtk

cc: Southwest District Office
Division of Drinking and Ground Waters, Central Office
Westinghouse Environmental Management Company of Ohio
Fernald Environmental Restoration Management Corporation
Hamilton County Health Department

OhioEPA
State of Ohio Environmental Protection Agency
Southwest District Office
40 South Main Street
Dayton, Ohio 45402-2086
(513) 285-6357
FAX (513) 285-6404

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George V. Voinovich
Governor

REPORT ON DETAILED PLANS OF PROPOSED INSTALLATION OF AN IONICS, INC. ELECTRODIALYSIS REVERSAL TRAILER MOUNTED UNIT AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (FEMP), HAMILTON COUNTY

On July 13, 1992, detail plans of proposed installation of an Ionics, Inc. Electrodialysis Reversal (EDR) Trailer Mounted Unit--Model No. Aquamite XX-8/2, at the Fernald Environmental Management Project were submitted by Mr. R. E. Tiller, Manager, Fernald Environmental Management Project (FEMP), United States Department of Energy (DOE). Additional information was submitted on November 19 and November 24, 1992, by Ellery D. Savage, Manager, Environmental Compliance, Westinghouse Environmental Management Company of Ohio. Westinghouse is the contractor operating FEMP for the Department of Energy. (As of December 1, 1992, Fernald Environmental Restoration Management Corp., a subsidiary of Fluor Daniel, Inc. takes over as the federal contractor.)

PURPOSE

The existing water treatment system consists of lime softening, filtration, and disinfection for potable purposes, with process water taken to a "break tank" through an air gap arrangement for backflow prevention. Because of difficulties in disposal of lime sludge, DOE has decided to cease lime softening and install an electrodialysis system for mineral removal, avoiding the need for sludge generation and disposal. Wastewater streams from the EDR unit will be discharged to the existing wastewater system at FEMP; the discharges have been reviewed by the Division of Water Pollution Control.

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DESIGN BASIS

Water produced by the EDR unit will be used for the drinking water system and as boiler feed water. Current population is 1,500, and the ultimate population to be served is 2,000 expected in 1996.

Estimated water consumption per the application will be:

Average: 0.335 mgd = 0.225 mgd (Drinking) + 0.110 (Boiler)

Peak: 0.516 mgd = 0.300 mgd (Drinking) + 0.216 (Boiler)

The EDR unit itself is rated at 208 gpm to be operated 24 hours per day. Under the condition when boiler make-up is not needed, this flow will be blended with 45 gpm bypassing the EDR, resulting in a total of 253 gpm or 0.364 mgd. When boiler make-up is drawn off (at a rate of 150 gpm), a total of 73 gpm blended EDR product and bypass water is to be produced. Peak demands are to be met by drawing on the system's 750,000 gallon treated water storage tank, 100,000 gallon process water "break tank," and elevated storage.

CONVERSION OF EXISTING TREATMENT

The existing treatment system facility equipment will be retained, but converted for iron removal prior to the EDR unit. The original proposal envisioned the injection of chlorine for iron oxidation prior to the reactivator basins, but this has since been changed to utilization of the existing plant compressed air supply per revised information received November 19, 1992. Air sparger devices will be installed at both reactivator/clarifiers, and will be fed by a one inch line from the existing

plant air system. The existing plant air system consists of pumping compressed air through a filter (Vapoilsorb filter by the C. M. Kemp Manufacturing Co.; utilizes Kemp's Type K-11 Vapoilsorb) to remove any oil or grease that may be present. Silica gel filters provide initial moisture removal, followed by final drying through a steam heater.

The west reactivator will be utilized for iron precipitation, followed by filtration in the existing nine pressure sand filters prior to the EDR unit.

PROPOSED ELECTRODIALYSIS REVERSAL WATER TREATMENT

The application includes a "Report of Water Treatment Replacement Project" prepared by Westinghouse which describes the operation of the EDR unit and related treatment. (The report discusses oxidation of iron with chlorine which, as noted previously, has been changed to air injection.) Section 5.0 of that report is attached here as "Attachment 1." Appendix B of the Westinghouse report is a major components list of the Ionics EDR unit, and is attached here as "Attachment 2."

A water quality summary table is included as Appendix C of the Westinghouse report, but the operating ratio of bypass water to EDR treated water has been changed from what was originally envisioned. "Attachment 3" table is attached here, showing expected water quality at the revised conditions of flow described on drawing no. 92X-5900-F-00020 of the application: (a) all EDR product (210 gpm) being blended with EDR bypass (45 gpm) and pumped to the treated water storage tank, or (b) 150 gpm of EDR

product taken to boiler make-up water supply and the remainder (60 gpm) being blended with EDR bypass (13 gpm) and pumped to the treated water storage tank. Note that under both operating flow conditions, the same product:bypass ratio is maintained, avoiding fluctuations in water quality. Variable speed pumps will be adjusted to maintain the desired flow rate.

BACKFLOW PREVENTION

When the EDR unit is out of service, boiler make-up will be provided from the "break tank" discussed previously. A reduced pressure principle backflow prevention device is incorporated to prevent this water from being pumped back through the EDR unit to the potable supply, since they share a common feed line to the boiler supply. (Note: The backwash pumps to the sand filters also draw from process water as shown on the flow diagram; this set-up is existing and is not part of the present replacement project application; Westinghouse has already been advised by telephone that this is unacceptable and will be expected to be changed; Southwest District will follow up on this issue.)

ESTIMATED COST

The estimated cost of construction of the project is $1,311,000.

RECOMMENDATION

It is recommended that the plans be approved with the usual conditions.

Division of Drinking and Ground Waters
Southwest District

Stephen A. Severyn, P.E.

Michael D. Joseph

klj
11/24/92

ATTACHMENT 1

(The following is Section 5.0 of Westinghouse Environmental Management Company of Ohio's "Report of Water Treatment Replacement Project")

5.0 PROPOSED EDR WATER TREATMENT PROCESS

The proposed EDR facility consists of a pre-manufactured trailer mounted Ionics Model Aquamite XX-8/2 EDR Unit. A list of the major components of the proposed system is attached as Appendix B. This system will be utilized in conjunction with the existing FEMP pressurized sand-filters to treat well water for drinking and boiler feed supplies. A detailed process flow diagram for the proposed facility is included with the plans accompanying this report.

Raw feed water will be pumped from one of the three deep pumping wells to the West Reactivator. Prior to entering the reactivator chlorine gas will be added to aid in the iron oxidation/removal process. The East Reactivator will continue to be maintained as a clarifier for sand filter backwash and will serve as a standby lime-alum softener. From the reactivator clearwell, water will be pumped to the nine pressurized sand filters where turbidity and impurities are to be removed. From this point water will be transferred to the proposed EDR unit. It should be noted that a partial feed of filtered water from the sand filters will be diverted for blending with EDR product water for drinking and process water purposes.

Upon entering the EDR unit, water will undergo media filtration using gravel, garnet, sand, and anthracite at one of two Multi-Media (MM) filter units. The MM filters are equipped with a bypass system, which will be utilized during backwash procedures. Filter backwash will be discharged to the existing wastewater sump on the south side of the Water Plant. EDR feed water will be filtered further the cartridge filter unit. This unit consists of twenty-two, 30 inch standard, 10 micron filter cartridges contained within a fiberglass reinforced shell. After cartridge filtration, water will be pumped to the EDR membrane stacks.

The EDR membrane stacks consist of repeating cation membranes and anion membranes as illustrated in Figure 3. As the water flows across the membrane surfaces, ions are electrically transferred through the membranes from the demineralized stream to the concentrate stream under the influence of a DC potential.

Approximately every 15 minutes, automatically operated valves will switch the two inlets and outlet streams so that the incoming feed water flows into the new demineralizing compartments and the recycled concentrate stream flows into the new concentrating compartments. The effect of this reversal is that the concentrate stream remaining in the stack whose salinity is higher than the feed water, must now be desalted. This creates a brief period of time in which the demineralized stream (product water) salinity is higher than the specified level.

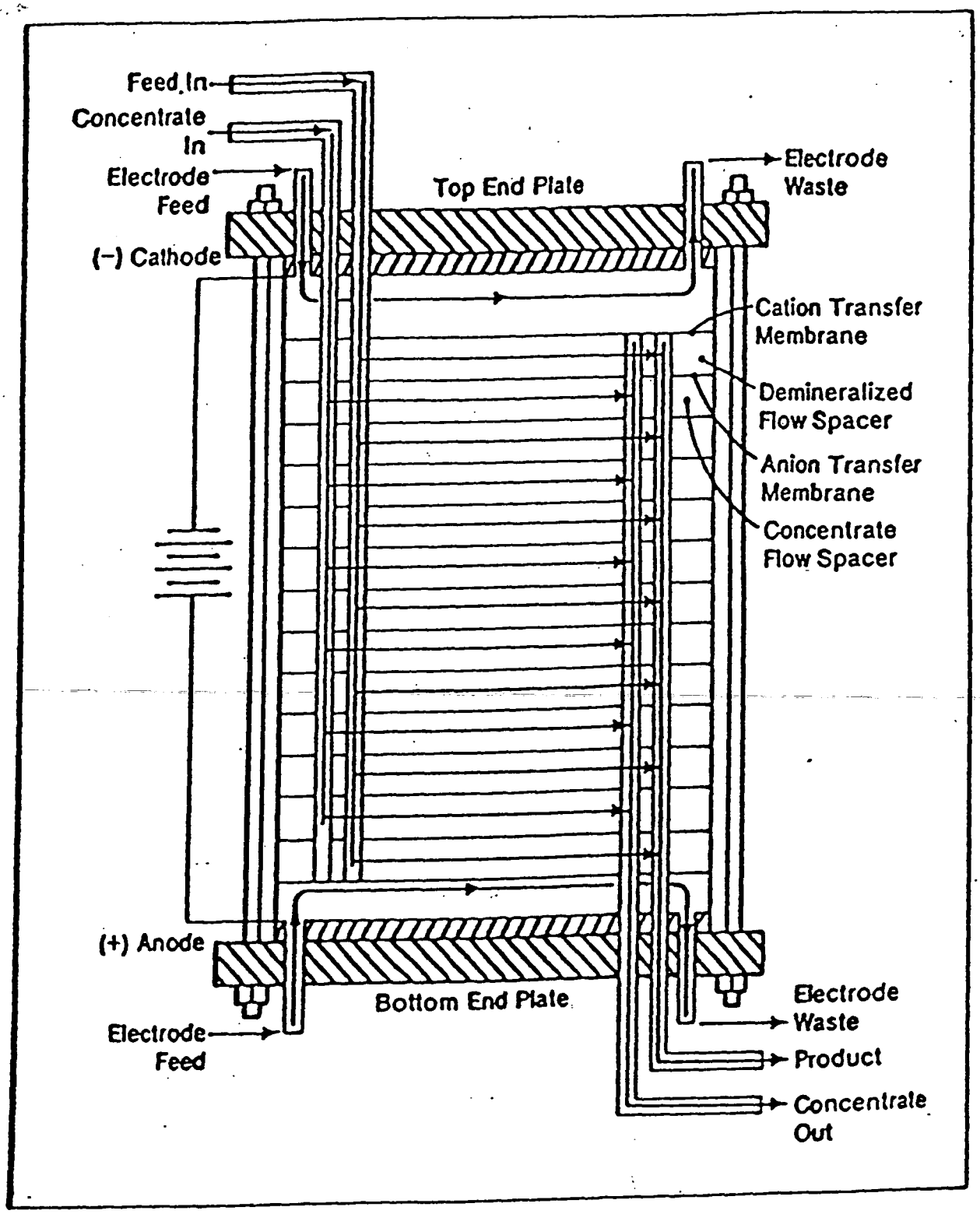


FIGURE 3

STREAM FLOW IN MEMBRANE STACK

This slug of water is known as off-spec product and will be discharged to the existing wastewater sump located on the south side of the Water Plant.

Because of reversal, no flow compartment in the stacks will be exposed to high solution concentrations for more than 15 to 20 minutes at a time. Any build-up of precipitate salts will be quickly dissolved and carried away when the cycle reverses. The EDR unit is also equipped with a Clean-In-Place (CIP) flush system. This system will allow flushing of electrodes and membrane stacks and their associated piping with a 5% HCL solution. Waste streams from this system will be collected in the Gas Separator Tank, where they will be aerated to vent reaction off gases. After aeration the waste stream will be discharged to the existing wastewater sump located on the south side of the Water Plant.

The EDR stacks will produce a concentrated brine solution continuously during normal operation. Approximately half of the concentrated brine produced by the EDR stacks will be recycled back through the system. The remaining brine solution will be discharged to the existing wastewater sump located on the south side of the Water Plant. Water from the sump will be pumped to the non-uranium contaminated side of the General Sump for ultimate discharge to the Great Miami River via Manhole 175 (MH-175). Additional discussion of the EDR waste collection system is provided in Section 6.0.

After passing through the membrane stacks, EDR product water will be collected in the EDR Product Tank. Water from this tank can be pumped either directly to the existing Sodium Zeolite softeners for boiler water make-up or to the 750,000 gallon tank for blending with chlorinated water from the existing sand filters. Two takeoffs from this tank will provide water for cooling water make-up and sanitary water supply.

Water pumped to sanitary water header will be injected with chlorine gas in solution to ensure its disinfection. After chlorination, water from the sanitary header will be split between sanitary drinking and process water distribution supplies. Drinking water will be pumped to the 200,000 gallon east elevated storage tank, while process water will be pumped to the existing 100,000 gallon break tank. This tank will continue to serve as a backflow prevention system to prevent cross connection to the sanitary water distribution system. Water from the break tank will be pumped for plant process water supply. Break tank water will also serve as a backup supply for boiler water feed when the EDR unit is undergoing maintenance.

ATTACHMENT 2

(The following was submitted as Appendix B of the plan approval application.)

IONICS AQUAMITE XX-8/2 EDR UNIT
MAJOR COMPONENTS LIST

EDR FEED PUMP

Worthington Model D-1022 3 x 4-8 316 stainless steel case with 316 stainless steel impeller and trim. Crane type 2 mechanical seal. 30 HP Motor, multivoltage, 50/60 Hz, 30, TEFC, 55 deg. C. Ambient.

BRINE PUMP

Worthington Model D-1022 2 x 3-8, 15 HP Motor, all 316 stainless steel construction.

CARTRIDGE FILTER

Eden filters, Model 66-EFC-3-4C-150; fiberglass/PVC housing.

FILTER CARTRIDGE

Filter Cartridges Ionics #30-10 micron for above filter chamber. Each cartridge to be 30" long and constructed of wound polypropylene with polypropylene core. Cartridge rating - 10 *u*.

FEED: MOTOR-OPERATED VALUE

6" x 4" Hayward ball value, PVC body & ball, teflon seats, EPR seals. Actuator to be complete with auxiliary limit switch, 7.5 second cycle time.

STREAM SWITCHING: MOTOR-OPERATED VALVES

3" Hayward 3-way PVC ball value - motor operated. Value to be flanged with special porting for right or left flow diversion (non-shut-off arrangement). To be mounted with actuator complete with auxiliary limit switch. 7.5 second operating time.

PRODUCT DIVERSION: MOTOR-OPERATED VALVE

3" Hayward 3-way PVC ball value - motor operated. Value to be flanged with special porting for right or left flow diversion (non-shut-off arrangement). To be mounted with actuator complete with auxiliary limit switch. 7.5 second operating time.

PRESSURE REGULATING VALVE

Roll-Seal Model 03-S-NR-65-L-00, 304 Stainless Steel body, natural rubber diaphragm, w/pilot, #110-PR-13.

ELECTRODE STREAM SOLENOID VALVE

GF, 1/2" 2-way solenoid valve, PVC body, Viton seals, normally closed, 50/60 Hz.

PRESSURE SWITCH

United Electric type J-402 Number 555 (0-100 psig range). Two adjustable snap switches. Teflon diaphragm. Weatherproof housing. Electrical requirement to be 110/230 VAC, 50/60 cycle. 225 psig proof pressure.

PRESSURE SWITCH

For Gas Separator, 0.3 to 1.0 inches water range.

Rated pressure 10 psig. Electrical Rating 15 Amps @ 120 Volt.

PRESSURE GAUGE

Helicoid JIL-3-F3-NOD. 4-1/2" diameter face with 1/4" NPT back connection. Dual scale; 0-160 psi and 0-11 Kg/cm sq. Non-metallic case, bronze internals.

PRESSURE GAUGE

Helicoid JIL-3-F3-NOD. 4-1/2" diameter face with 1/4" NPT back connection. Dual scale; 0-100 psi and 0-7 Kg/cm sq. Non-metallic case, bronze internals.

DIFFERENTIAL PRESSURE SWITCH

United Electric 559, type J-400K. Used to indicate need for filter cartridge change.

Differential pressure range 0-100 psig. Teflon diaphragm remaining wetted parts to be stainless steel in weatherproof housing. Electrical requirements 125/250 VAC, 50/60 Hz, 225 psig proof pressure.

PRODUCT CONDUCTIVITY CONTROLLER

Thornton Inst. Model 860-N01. Range 0-2000 Micromhos/cm. Power 110 VAC 50/60 Hz.

PRODUCT CONDUCTIVITY CELL

Thornton Inst. Model 212-412. Cell constant is 10, thermally compensated, 4 pin connector.

PRESSURE DIFFERENTIAL INDICATOR

Conc/Dilute Differential. Meriam Instr. 1124. Indicator with: Dual scale 100"-0-100" and 254cm-0-254cm of water. Dial 4-1/2 flush mounted. Bellows 316 stainless steel. Dual ports 1/2" & 1/4" NPT, 316 stainless steel.

DILUTE FLOW INDICATOR

Meriam Model 1124. Indicator per the following:

4-1/2" dial, dual scale 0--250 gpm and 0-56 cub. m/hr., flush mount, bellows and housing of 316 stainless steel. Dual ports, 1/4" & 1/2" NPT.

The above come with 4" orifice plate 1/8" thick, 316 stainless steel, and set of PVC socket weld 4" orifice plate flanges and gaskets. Orifice compatible with schedule 40 pipe.

BRINE FLOW INDICATOR

Meriam Model 1124 Indicator. Same as above except:

Dual scale: 0-125 gpm and 0-28 cub.m/hr., 2 inch orifice plate bored to suit above conditions with a 2 inch socket weld PVC orifice plate flanges and gaskets. Orifice compatible with schedule 80 pipe.

TEMPERATURE INDICATOR

TEL-TRU #BC-350R, 0-100 deg. C range, 1/2" NPT connection, 3" dial face, bottom connected, 304 stainless steel.

BLOWER

Industrial Plastics Fabricators, Model UF 1-1/4 30 DD. All PVC construction 7-1/2" inlet and outlet. Motor specification: TEFC, 1/2 HP, 460-380V, 3 phase, 50/60 cycle for 55 degree F ambient, continuous operation. 100 C.F.M. @ 1" water @ 1440 RPM.

GAS SEPARATOR TANK

Enclosed - PVC - 4' x 2' x 1' H.

MEMBRANE STACK ASSEMBLY

Ionics Mark III design utilizing 18-inch by 40-inch anion membranes, cation membranes, intermembrane spacers, electrode spacers and platinum-coated electrode plates. The exact type and number of each of these components will depend on the specific application and plant design.

CONTROL PANEL

Ionics control cabinet with conductivity controller, audible alarm unit, cycle indicator lights, main power switch, pump and rectifier switches.

RECTIFIER

Ionics, rectifier rating as required, 3 phase, full wave, silicon diode, 5% ripple (max), class H insulation. Cabinet face includes switch selectable digital readout of DC amps/volts for each stage, and rectifier tap switch controls.

ATTACHMENT 3

ESTIMATED WATER QUALITY SUMMARY
EDR WATER TREATMENT REPLACEMENT PROJECT

ION	EDR BYPASS WATER (a)	EDR PRODUCT	DRINKING WATER BLEND (b)	EDR BRINE
Na	9	2	3	28
Ca	90	10	22	295
Mg	22	3	7	71
K	--	--	--	--
Cl*	45	4	10	151
HCO3	317	43	84	1,021
SO4	11	1	3	37
NO3	--	--	--	--
Fe	<0.30	--	--	--
TDS	494	63	128	1,600
TH (CaCO3)	316	38	80	964
T Alk (CaCO3)	260	35	69	822

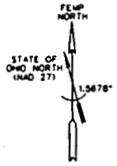
All values in mg/l as the ion unless otherwise stated

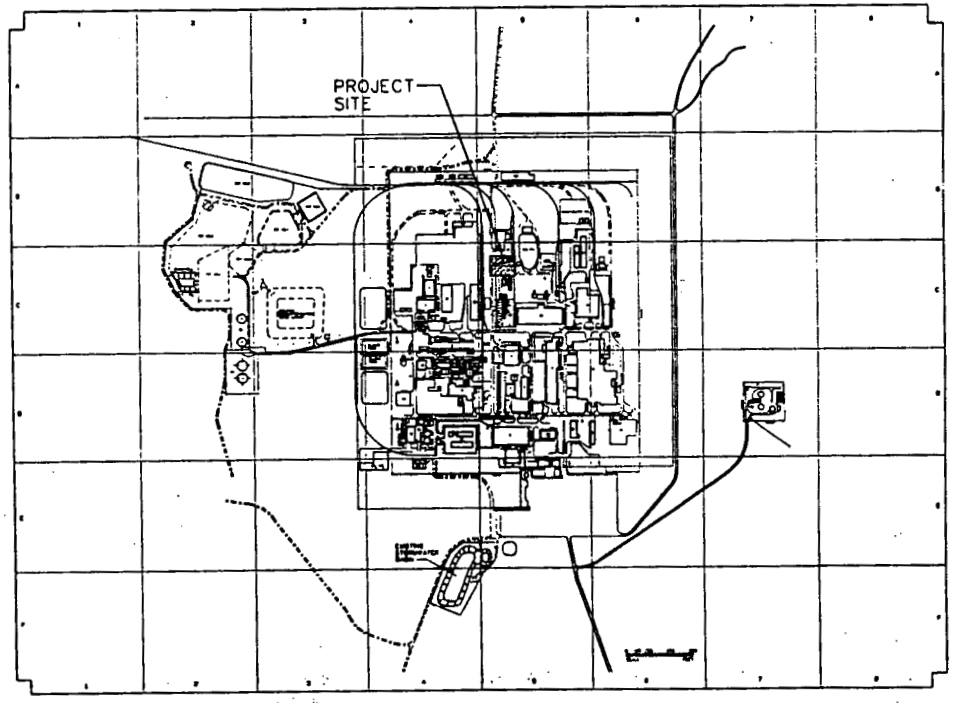
* Thirty (30) ppm of chloride added to balance the feed water ions.

(a) water quality produced by iron oxidation, precipitation and filtration

(b) Blended water at a ratio of 5.66:1 of EDR product to water bypassing EDR; ratio taken from operating flow conditions as shown on Plan Drawing #92X-5900-F-00020; quality of bypass water, EDR product and brine as shown in Appendix C of DOE's July 13, 1992, application.

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FEMP ERA PROJECT
PROJECT ORDER 52
WATER TREATMENT REPLACEMENT PROJECT





PARSONS

The Ralph M. Parsons Company • Chas. T. Main, Inc. • Engineering-Science, Inc.

ARCHITECTS - ENGINEERS
FAIRFIELD, OHIO

NOTES

OHIO EPA
NO. 1992
Drawing Number

PAID

WATER CLUSTER
APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
NOTICE OF APPROVAL

0	CERTIFIED FOR CONSTRUCTION	
NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	SCALE AND DATE

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/PO52

DRAWING TITLE
PROJECT TITLE SHEET

DRAWN BY L.J.GEORGE	DATE 10/25/94	DESIGNED BY	DATE 6/94	CHECKED BY J.PICKERING
PLANT/BLDG NO.		PLANT		SCALE NONE
SUBMITTED FOR APPROVAL		SERVICE ENGINEERING		PROJECT ENGINEER
DATE		DATE		DATE

WBS 1.1.1.2.1.3
00-9C7C1 | 12X-5900-X-00014 | X0001 | 0

INDEX OF DRAWINGS

INDEX CODE NO.	DRAWING NO.	SHEET NO.	REVISION NO.	DRAWING TITLE	REMARKS
	92X-5900-X-00014	X0001	0	PROJECT TITLE SHEET	OHIO EPA SUBMITTAL
	92X-5900-X-00015	X0002	0	DRAWING INDEX	OHIO EPA SUBMITTAL
	92X-5900-X-00016	X0003	0	CIVIL - LEGEND	
	92X-5900-C-00010	C0001	0	CIVIL - PLAN - SITE AND EXISTING UTILITIES	
	92X-5900-C-00011	C0002	0	CIVIL - GRADING PLAN	
	92X-5900-C-00012	C0003	0	CIVIL/STRUCTURAL - SITE DETAILS	OHIO EPA SUBMITTAL
	92X-5900-A-00032	A0001	0	ARCHITECTURAL - PLAN, ELEVATIONS AND SECTIONS - TRAILER STAIRS AND SKIRTING	
	92X-5900-P-00017	P0001	0	PROCESS - EDR PROCESS FLOW DIAGRAM - WATER TREATMENT REPLACEMENT	OHIO EPA SUBMITTAL
	92X-5900-P-00020	P0002	0	PROCESS - FLOW DIAGRAM - WATER TREATMENT EDR INSTALLATION	OHIO EPA SUBMITTAL
	92X-5900-P-00022	P0002	0	PIPING/PLANT DESIGN - PIPING PLAN SHEET 1 - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
	92X-5900-P-00023	P0003	0	PIPING/PLANT DESIGN - PIPING PLAN SHEET 2 - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
	92X-5900-P-00031	P0004	0	PIPING/PLANT DESIGN - PIPING SECTIONS AND DETAILS - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
	92X-5900-P-00034	P0005	0	PIPING/PLANT DESIGN - FIRE PROTECTION PLAN - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
200-1450-E-00016	3000-C-3001-A		6	ELECTRICAL POWER SYSTEM - SINGLE LINE DIAGRAM - WATER TREATMENT PLANT	EXISTING SITE DRAWING
	92X-5900-E-00006	E0005	0	ELECTRICAL - POWER PLAN SECTION & DETAIL	
	92X-5900-E-00007	E0006	0	ELECTRICAL - FIRE ALARM RISER DIAGRAM - WATER PLANT AREA BLDG.	
	92X-5900-E-00021	E0007	0	ELECTRICAL - HEAT TRACE RISER DIAGRAM	
	92X-5900-N-00018	N0001	0	MECHANICAL PROCESS - PIPING AND INSTRUMENTATION DIAGRAM - SYMBOLS AND LEGEND SHEET	OHIO EPA SUBMITTAL
	92X-5900-N-00019	N0002	0	MECHANICAL PROCESS - PIPING AND INSTRUMENTATION DIAGRAM - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
	92X-5900-N-00033	N0003	0	INSTRUMENTATION - LOOP DIAGRAM - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL

NOTES

WATER SUPPLY
APPROVED

0 CERTIFIED FOR CONSTRUCTION

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

WATER TREATMENT REPLACEMENT PROJECT
OU2/PC52

DRAWING INDEX

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00-90701

92X-5900-X-00015 X0002

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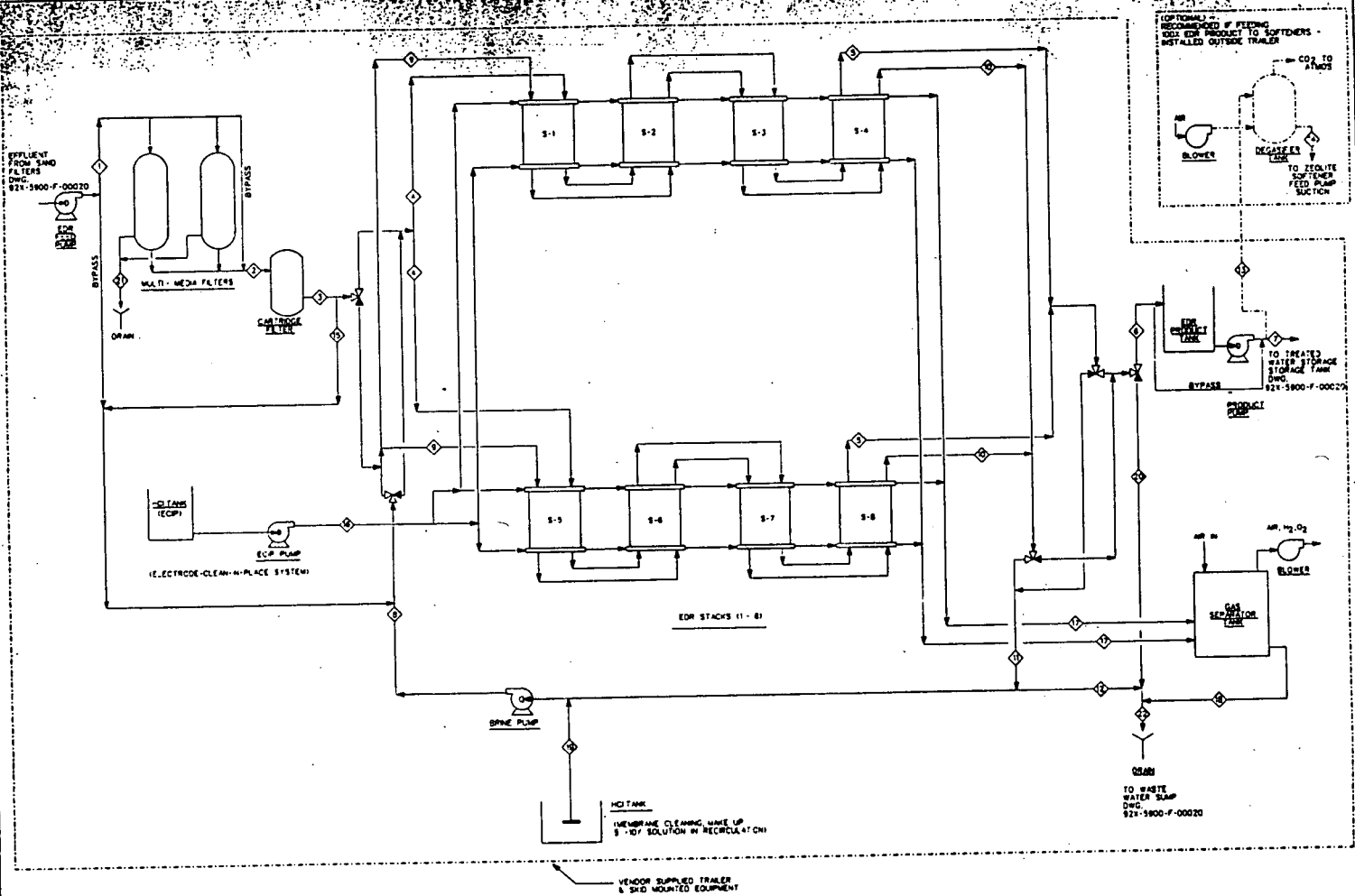


NOTES

1. STACKS UNIT SHALL BE SUPPLIED FOR EACH [illegible] AS INSTALLED OR ON-SHELF STORED.
2. LINE PRESSURES SHOWN ARE ONLY APPROXIMATE. VENDOR [illegible] WILL PROVIDE THE EXACT NUMBERS IN OPERATING PROCEDURES.
3. PRODUCT AND BRINE STREAMS WILL INTERCHANGE (STREAMS 4 WITH 9 AND 5 WITH 10) WHEN 3-WAY VALVES SWITCH AS ELECTRODE POLARITY CHANGES IN THE EDR STACKS.
4. DURING NORMAL OPERATION, 60 GPM GOES TO TREATED WATER STORAGE TANK (TWST) AND 150 GPM GOES TO ZEOLITE FEED. THE FULL FLOW OF 210 GPM GOES TO TWST WHEN THE ZEOLITE FEED IS ZERO.
5. DRAIN DISCHARGES 85 GPM EXCEPT WHEN OFF-SPEC PRODUCT IS DISCHARGED INCREASING THE FLOW TO 295 GPM MAX.
6. FILTERS ARE BACKWASHED AT 180 GPM WHEN THE EDR SYSTEM IS SHUTDOWN.

LEGEND

STREAM NUMBER

3-WAY VALVE (SHADED AREA IS CLOSED PORT)

REFERENCE DWG.*	REFERENCE DWG. TITLE
92X-5900-F-00020	PROCESS FLOW DIAGRAM WATER TREATMENT EDR INSTALLATION

STREAM NO.	40	41	42
DESCRIPTION / LINE NAME	PRODUCT DUMP	FILTER BACKWASH	DRAIN TO WASTE WATER SUMP
FLOWRATE (gpm)	210	180	85 / 295
PRESSURE (psi)	8	60	8
IRON (Fe) (ppm)	0	4.4	16.0
TDS (ppm)	0	250	625
TOTAL ALKALINITY ppm as (CaCO3)	0	310	464
TOTAL HARDNESS ppm as (CaCO3)	0	310	464
NOTES	INTERMITTENT OPERATION APPROX 10 min/1/2 HOUR	INTERMITTENT OPERATION SEE NOTE 6	SEE NOTE 6

STREAM NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
DESCRIPTION / LINE NAME	EDR FEED	FILTERED WATER	POLISHED WATER	STACK FEED	EDR PRODUCT	EDR PRODUCT	EDR PRODUCT TO TWST	BRINE RECYCLE	BRINE FEED	BRINE	BRINE	BRINE WASTE	DEGAS. FEED	ZEOLITE FEED	BRINE MAKE-UP	CLEANING SOLUTION	SPENT CLEANING SOLUTION	SEPARATOR TANK DRAIN	MEMBRANE CLEANING SOLUTION (INTERMITTENT)
FLOWRATE (gpm)	295	295	295	105	105	210	60 / 210	95	95	95	95	95	150 / 0	150 / 0	95	2.6	2.6	2.6	--
PRESSURE (psi)	60	60	60	60	8	8	8	8	60	8	8	8	8	8	60	--	--	--	--
IRON (Fe) (ppm)	4.4	4.4	4.4	4.4	0.1	0.1	0	16.0	16.0	16.0	16.0	16.0	0	0	4.4	--	--	--	--
TDS (ppm)	250	250	250	250	30	30	0	625	625	625	625	625	0	0	250	--	--	--	--
TOTAL ALKALINITY ppm as (CaCO3)	310	310	310	310	30	30	0	464	464	464	464	464	0	0	310	--	--	--	--
TOTAL HARDNESS ppm as (CaCO3)	310	310	310	310	30	30	0	464	464	464	464	464	0	0	310	--	--	--	--
NOTES							SEE NOTE 4						SEE NOTE 4	SEE NOTE 4		52 HCl	52 HCl	52 HCl	1500 mg/l PARTICLES 52 HCl

WATER SUPPLY APPROVED

0 CERTIFIED FOR CONSTRUCTION

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

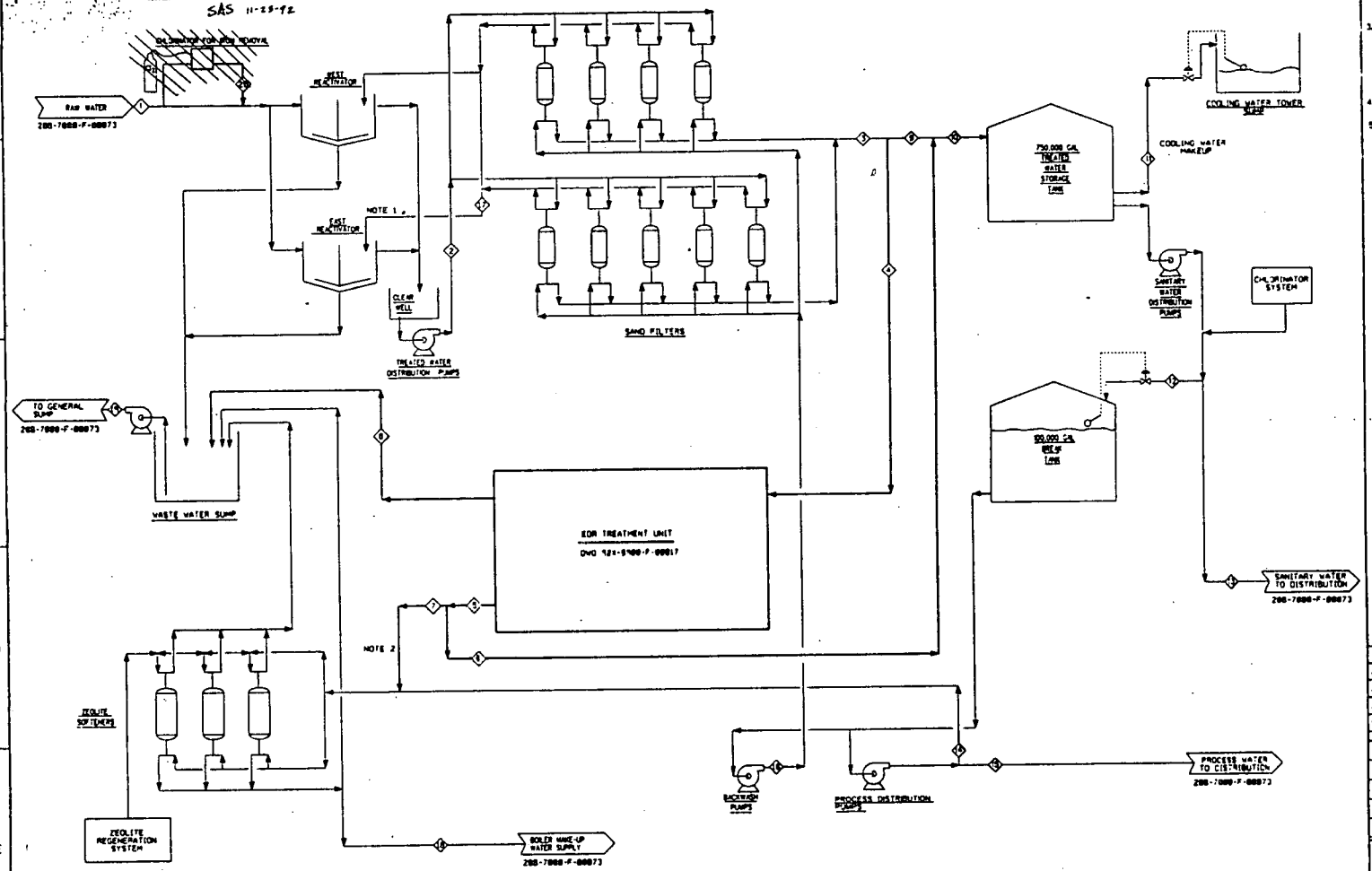
THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/SCH2

DRAWING TITLE
PROCESS
EDR PROCESS FLOW DIAGRAM
WATER TREATMENT REPLACEMENT

WBS 11.1.6.2 CO-9070L 92X-5900-F-00017 F00011 0

016



STREAM NO.	14	15	16	17	18	19	20
DESCRIPTION / LINE NAME	PROCESS WATER TO ZEOLITE	PROCESS WATER TO DIST.	FILTER BACKWASH INLET	FILTER BACKWASH OUTLET	ZEOLITE PRODUCT	WASTE WATER TO GENERAL SUMP	CHLORINE SOLUTION ADDITION
FLOWRATE (GPM)	158 / 8	58	1000	1000	158		18
PRESSURE (psi)							
PH (s.u.)	8	8	8	8			
TDS (ppm)	178	178	178	178	182 / 16		
TOTAL ALKALINITY (ppm as CaCO3)	75	75	75	75	56 / 75		
TOTAL HARDNESS (ppm as CaCO3)	87	87	87	87	63		
NOTES	3		4	4	3	5	

STREAM NO.	1	2	3	4	5	6	7	8	9	10	11	12	13
DESCRIPTION / LINE NAME	RAW WATER FEED	WATER TO SAND FILTERS	FILTERED WATER	WATER TO EDR	EDR PRODUCT	EDR PRODUCT TO BLEND	EDR PRODUCT TO ZEOLITE	EDR BRINE	RAW WATER TO BLEND	BLENDED WATER	COOLING WATER MAKEUP	BLENDED WATER TO BREAK TANK	BLENDED WATER TO SANITARY DIST.
FLOWRATE (GPM)	337 / 305	337 / 305	337 / 305	242	210	210 / 68	8 / 158	82	45 / 13	255 / 73	25	138 / 38	1000
PRESSURE (psi)	—	—	25	25									
PH (s.u.)	8	8	8	8	8	8	8	8	8	8	8	8	8
TDS (ppm)	178	178	178	178	18	18	182	1082	178	148	148	148	148
TOTAL ALKALINITY (ppm as CaCO3)	75	75	75	75	5	5	56	—	75	65	65	65	65
TOTAL HARDNESS (ppm as CaCO3)	316	316	316	316	18	18	63	—	316	87	87	87	87
NOTES										3			

NOTES:

1. THE EAST REACTIVATOR WILL CONTINUE TO BE USED AS A CLARIFIER FOR THE SAND FILTER BACKWASH AND IT WILL ALSO BE KEPT IN STANDBY AS A LIME - ALUM SOFTENER.
2. NEW PIPING AND VALVES WILL ALLOW FEED WATER TO THE ZEOLITE SOFTENER TO BE TAKEN EITHER DIRECTLY FROM THE EDR PRODUCT STREAM OR FROM THE BLENDED WATER IN THE BREAK TANK.
3. FOR STREAMS WHERE TWO NUMBERS ARE SHOWN, THE FIRST NUMBER REPRESENTS THE VALUE UNDER THE CONDITION WHERE THE ENTIRE EDR PRODUCT IS BLENDED WITH RAW WATER AND SENT TO THE TREATED WATER STORAGE TANK (TWST). THE SECOND NUMBER REPRESENTS THE VALUE UNDER THE CONDITION WHEN 158 GPM OF EDR PRODUCT FLOW IS SENT DIRECTLY TO THE ZEOLITE SYSTEM AND 68 GPM IS BLENDED WITH RAW WATER AND SENT TO THE TREATED WATER STORAGE TANK.
4. FILTERS ARE BACKWASHED ON INTERMITTENT SCHEDULE FOR A SHORT PERIOD OF TIME.
5. WATER IS PUMPED FROM THE WASTE WATER SUMP TO THE GENERAL SUMP ON AN AS NEEDED BASIS.

LEGEND

- EXISTING
- NEW
- STREAM NUMBER
- NEW
- EXISTING

REFERENCE DWG.#	REFERENCE DWG. TITLE
200-7000-F-00073	WATER TREATMENT PLANT EXPANSION QUANTITY DIAGRAM
200-7000-F-00071	WATER TREATMENT PLANT EXPANSION FLOW DIAGRAM
200-1450-F-00034	ENGINEERING FLOW DIAGRAM WATER TREATMENT UNIT
92X-5900-F-00017	EDR PROCESS FLOW DIAGRAM

REV.	REVISION PURPOSE - DESCRIPTION	DATE	BY	CHK'D	APPR'D
0	CERTIFIED FOR CONSTRUCTION	12-7-92			

WATER SUPPLY APPROVED
12 DEC 1992
DOH CE

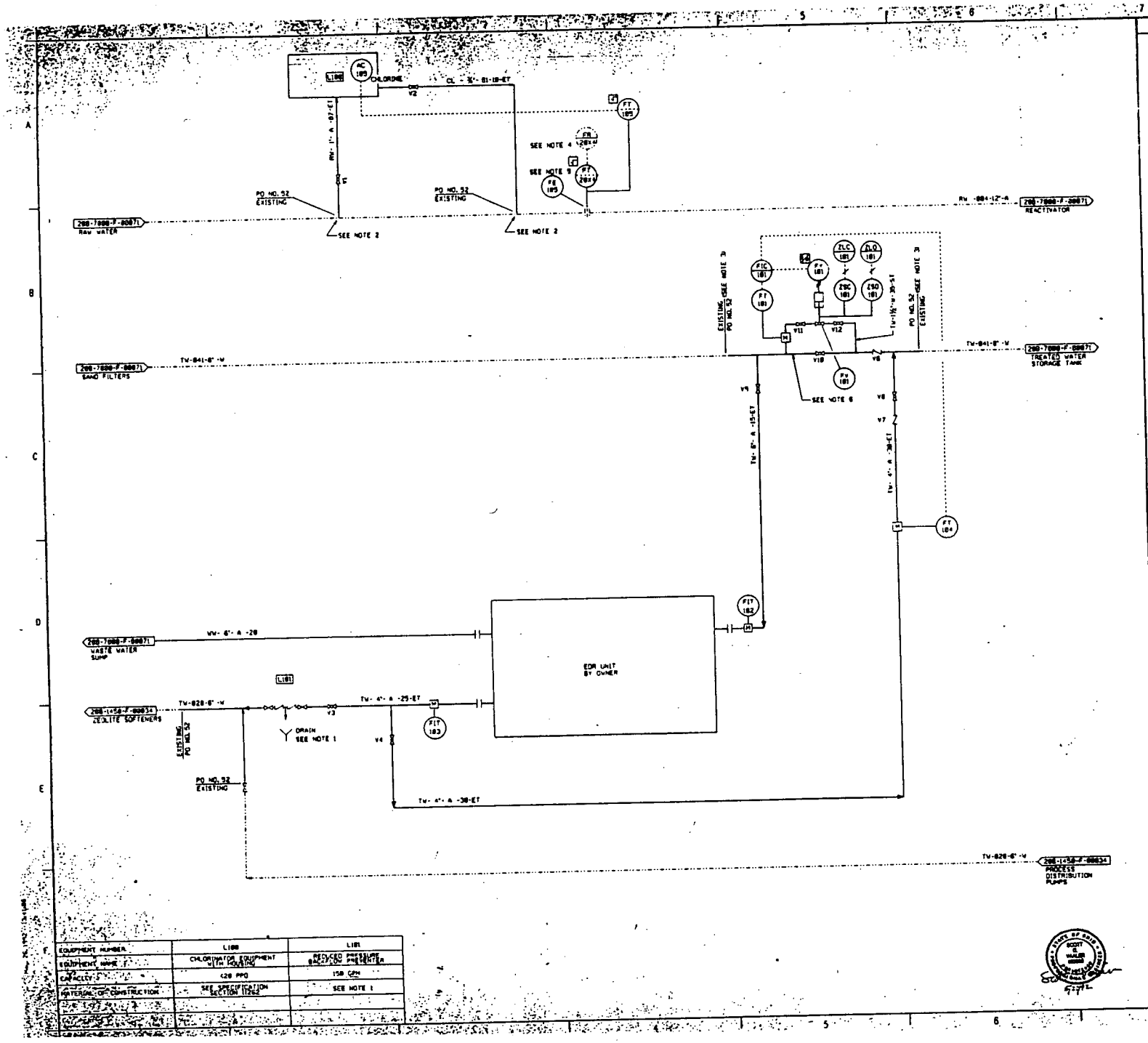
UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PG52

DRAWING TITLE
PROCESS
FLOW DIAGRAM
WATER TREATMENT EDR INSTALLATION

DRAWN BY: R PROKE
DATE: 12-4-92
CHECKED BY: K.L.
DATE: 12-7-92
PROJECT ENGR.
DATE: 12-7-92
SCALE: NONE
SUBMITTED FOR APPROVAL
APPROVAL RECOMMENDED
APPROVED
DATE: 12-7-92
WRS 11/16/93
DD-90701
92X-5900-F-00020 F0002



EQUIPMENT NUMBER	L100	L101
EQUIPMENT NAME	CHLORINATOR EQUIPMENT WITH MOUNTING	REDUCED PRESSURE BACKFLOW PREVENTER
CAPACITY	120 PPD	150 GPM
MATERIAL OF CONSTRUCTION	SEE SPECIFICATION SECTION 11262	SEE NOTE 1

NOTES

1. REDUCED PRESSURE BACKFLOW PREVENTER AND RELIEF DRAIN. MATERIALS OF CONSTRUCTION: FOR APPROVED EPOXY COATED CAST IRON CHECK VALVE BODIES WITH BRONZE SEATS, AND FOR APPROVED EPOXY COATED CAST IRON RELIEF VALVE WITH STAINLESS STEEL TRIM, CAST IRON WEDGE GATE VALVES FOR SHUT OFF.
2. CONTRACTOR SHALL PROVIDE A 1" THREADOLET FOR TIE IN OF RAW WATER TO CHLORINATOR AND A 3/4" THREADOLET FOR TIE IN OF CHLORINE SOLUTION TO RAW WATER LINE.
3. THE EXISTING PROCESS WATER LINE IS INSULATED AND STEAM TRACED. THE NEW SECTION OF THIS LINE AND THE REGULATED BY PASS LINE INCLUDING ALL VALVES SHALL BE INSULATED AND STEAM TRACED.
4. EXISTING INSTRUMENTS.
5. REPLACE EXISTING FLOW TRANSMITTER AND ORIFICE PLATE ASSOCIATED WITH FR-2014, RAW WATER FLOW RECORDER. THEN RECALIBRATE RECORDER.
6. REMOVE EXISTING ORIFICE AND ASSOCIATED INSTRUMENTATION IN THIS AREA AS A PART OF PO NO. 52.

LAST VALVE NUMBER V12

REFERENCE DWG.	REFERENCE DRAWING TITLE
62X-5400-N-00010	SYMBOLS AND LEGEND SHEET
200-1450-F-00034	WATER TREATMENT UNIT
200-7000-F-00071	WATER TREATMENT PLANT EXPANSION

REV. NO.	REVISION	DATE	DRAWN BY	CHECKED BY	PROJECT ENGINEER	PROJECT MANAGER
B	CERTIFIED FOR CONSTRUCTION	6/93				

APPROVED

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PO52

DRAWING TITLE
MECHANICAL PROCESS
PIPING AND INSTRUMENTATION DIAGRAM
EDR PROCESS WATER SYSTEM

DRAWN BY JON LAWSON 6-8-93 | DESIGNED BY 6-8-93 | CHECKED BY DAVID A. TOPE 6-8-93 | SCALE NONE

CONTRACT NO. 04-90701 | DRAWING NO. 62X-5400-N-00019 N00021 | REV. 0

INSTRUMENT & PIPING SYMBOLS

GATE VALVE
GLOBE VALVE
BALL VALVE
PLUG VALVE
BUTTERFLY VALVE
STOP CHECK
NEEDLE VALVE
CHECK VALVE
SLIDING GATE VALVE
BALL CHECK VALVE
REDUCED PRESSURE BACKFLOW PREVENTER
BACKFLOW PREVENTER
DIAPHRAGM VALVE
PINCH VALVE
3 WAY VALVE
3 WAY BALL VALVE
3 WAY PLUG VALVE
ANGLE GATE VALVE
ANGLE GLOBE VALVE
HUB DRAIN OR FUNNEL
DIAPHRAGM
DIAPHRAGM W/ POSITIONER
PISTON
SAFETY RELIEF VALVE
SOLENOID
ROTARY MOTOR
HANDWHEEL
SELF-CONTAINED BACK PRESSURE REGULATING VALVE
2-WAY SOLENOID VALVE
3-WAY SOLENOID VALVE
4-WAY SOLENOID VALVE

STEAM TRAP
HOSE QUICK DISCONNECT
UNION
DRAIN LEG
EXPANSION JOINT
EJECTOR
STRAINER (Y TYPE)
STRAINER (SINGLE BASKET)
STRAINER (DOUBLE BASKET)
STRAINER (CONE TYPE)
MAIN OPERATING LINE
AUXILIARY PROCESS & SERVICE LINE
CONCENTRIC REDUCER
ECCENTRIC REDUCER
ORIFICE PLATE
VENTURI TUBE
SIPHON TUBE
THERMOWELL
FLOW DIRECTION
WELDED CONNECTION
FLANGED CONNECTION
FLEXIBLE HOSE
WELDED PIPE CAP
NEW UNDERGROUND PIPING
EXISTING UNDERGROUND PIPING
EXISTING ABOVE GROUND PIPING
INSULATED PIPING
HEAT TRACED AND INSULATED PIPING

HVAC FAN
PULSATION DAMPENER
AIR FILTER
VACUUM PUMP
AIR OPERATED DIAPHRAGM PUMP
VERTICAL TURBINE PUMP
HORIZONTAL CENTRIFUGAL PUMP
CHEMICAL METERING PUMP
SUBMERSIBLE PUMP (SUMP PUMP)
DAMPER
THERMOSTAT
ORIFICE

VERTICAL CENTRIFUGAL PUMP
AGITATOR (MIXER)
SUBMERSIBLE SUMP PUMP HYDRAULICALLY DRIVEN
EXHAUST FAN W/INLET VANES

ELECTRICAL BINARY SIGNAL
PNEUMATIC BINARY SIGNAL
ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
ELECTROMAGNETIC OR SONIC SIGNAL (NON-GUIDED)
[A] INSTRUMENT/PLANT 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
REAR OF PANEL MOUNTED INSTRUMENT
pH PROBE
RPU SHARED I/O AND CONTROL
OPERATOR CONSOLE SHARED DISPLAY OR KEYBOARD FUNCTION
AIR VENT FILTER
MAGNETIC FLOW METER
POSITIVE DISPLACEMENT FLOW METER
EQUIPMENT NUMBER
ELECTRO-PNEUMATIC SIGNAL CONVERTER
SHIELDED WIRE CUT & TAPE SHIELD

ABBREVIATIONS

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
A/O	AIR TO OPEN
A/C	AIR TO CLOSE
I/A	INSTRUMENT AIR
ET	ELECTRIC TRACED
ST	STEAM TRACED

SPECIAL DESIGNATIONS

DESIGNATION	FUNCTION/ABBREVIATION
Σ/N OR AVG	AVERAGING
± OR BI	BIAS
[illegible] (TYP)	BOOST/GAIN OR ATTENUATE (INPUT/OUTPUT)
Δ 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
I	INTEGRATE (TYPE INTEGRAL)
%	PROPORTIONAL
T	UNDETERMINED COMPUTING RELAY
HOA	HAND-OFF-AUTO
SS	START-STOP
Φ	EXISTING INSTRUMENT TO BE REUSED
Φ	EXISTING INSTRUMENT TO BE RELOCATED
I/P	CURRENT TO PNEUMATIC TRANSDUCER
RUN	RUNNING
HOP	HAND-OFF-CONTROL PANEL
O/C	OPEN-CLOSE
O/A	OFF-AUTO
O/C/A	OPEN-CLOSE-AUTO
I/O	INPUT / OUTPUT

PIPING SPECIFICATIONS

FLOWING MEDIUM	MED. CODE	MAT. CODE
BACK WASH	BW	A
CHILLED WATER	CHS, CHR	A
CHLORINE	CL	B1
CONDENSATE	LC	A
CONDENSER WATER	CWS, CWR	A
COOLING WATER	WS, WR	A
DRAIN	DR	A
EXTRACTION THICKENER OVERFLOW	ETO	A
FILTRATE EFFLUENT	FT	A
FLOCCULANT	FL	A
FLUSH WATER	FWS, FWR	A
FORCE MAIN	FM	H
INSTRUMENT AIR	IA	W
HELIUM OFF-GAS	OGE	A
NITRIC ACID	AN	T1
PERCHED GND WATER	PGW	B
PHOSPHORIC ACID	PAPH	T1
PLANT AIR	PA	W
POLISHED WATER	PW	A
POTABLE WATER	DW	W
PROCESS WATER	TW	A
PROCESS WASTEWATER	CE	A
RAW WATER	RW	A
RECYCLE WATER	RC	A
SCRUBBER RECYCLE	HSL	A
SLURRY	SL	B2
SODIUM CARBONATE	SC	A
SODIUM HYDROXIDE	NA	T
SODIUM SILICATE	SS	A
STORM WATER	ST	A
SULFURIC ACID	SA	T1
SUMP DISCHARGE	SU	A
SUMP DRAIN	SU	B
VACUUM	V	A
VENT LINE	VE	A
WASTE WATER	WW	A

EXAMPLE:

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

A - A53,GR. A, SEAMLESS STEEL PIPE
B - PVC, SCHEDULE 80
B1 - PVDF, SCHEDULE 80
B2 - HDPE, 100 PSI
L - FIBERGLASS REINFORCED PLASTIC
H - DUCTILE IRON, CLASS 50
T - SCH. 40, 304L, STAINLESS STEEL PIPE
T1 - SCH. 40, 316L, STAINLESS STEEL PIPE
W - SCH. 80, A53,GR. A, GALVANIZED STEEL PIPE

GENERAL INSTRUMENT SYMBOLS

FIC 102
- LETTERS OF IDENTIFICATION
- SPECIAL DESIGNATION
- INSTRUMENT TAG NUMBER

LOOP SHEET WIRING LEGEND

——— DENOTES WIRING BY CONTRACTOR.
-·-·- DENOTES WIRING BY CONTROL PANEL VENDOR
(CN) DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.1
(CN2) DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.2

LOOP SHEET CABLE IDENTIFICATION

XX-XXX-XXX
- SEQUENTIAL NUMBER
- TYPE OF CABLE
  - M = MEASUREMENT
  - C = CONTROL
- LOOP NUMBER (030)
- PLANT/BLDG. NUMBER (10)

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	CONDUCTIVITY	CONTROLLER	CONTROLLER
D	DENSITY	DIFFERENTIAL	----
E	VOLTAGE	ELEMENT	ELEMENT
F	FLOW RATE	RATIO (FRACTION)	----
G	GAGING (DIM)	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	RADIOACTIVITY	RECORDER	----
S	SPEED OR FREQUENCY	SAFETY	SWITCH
T	TEMPERATURE	TRANSMITTER	TRANSMITTER
U	USER'S GUIDE	----	MULTIFUNCTION
V	VISCOSITY	----	VENT, VALVE
W	----	----	WELL
X	UNCLASSIFIED	----	UNCLASSIFIED
Y	RELAY	----	----
Z	POSITION	----	----

NOTES

0	CERTIFIED FOR CONSTRUCTION	

WATER SUPPLY
APPROVED

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

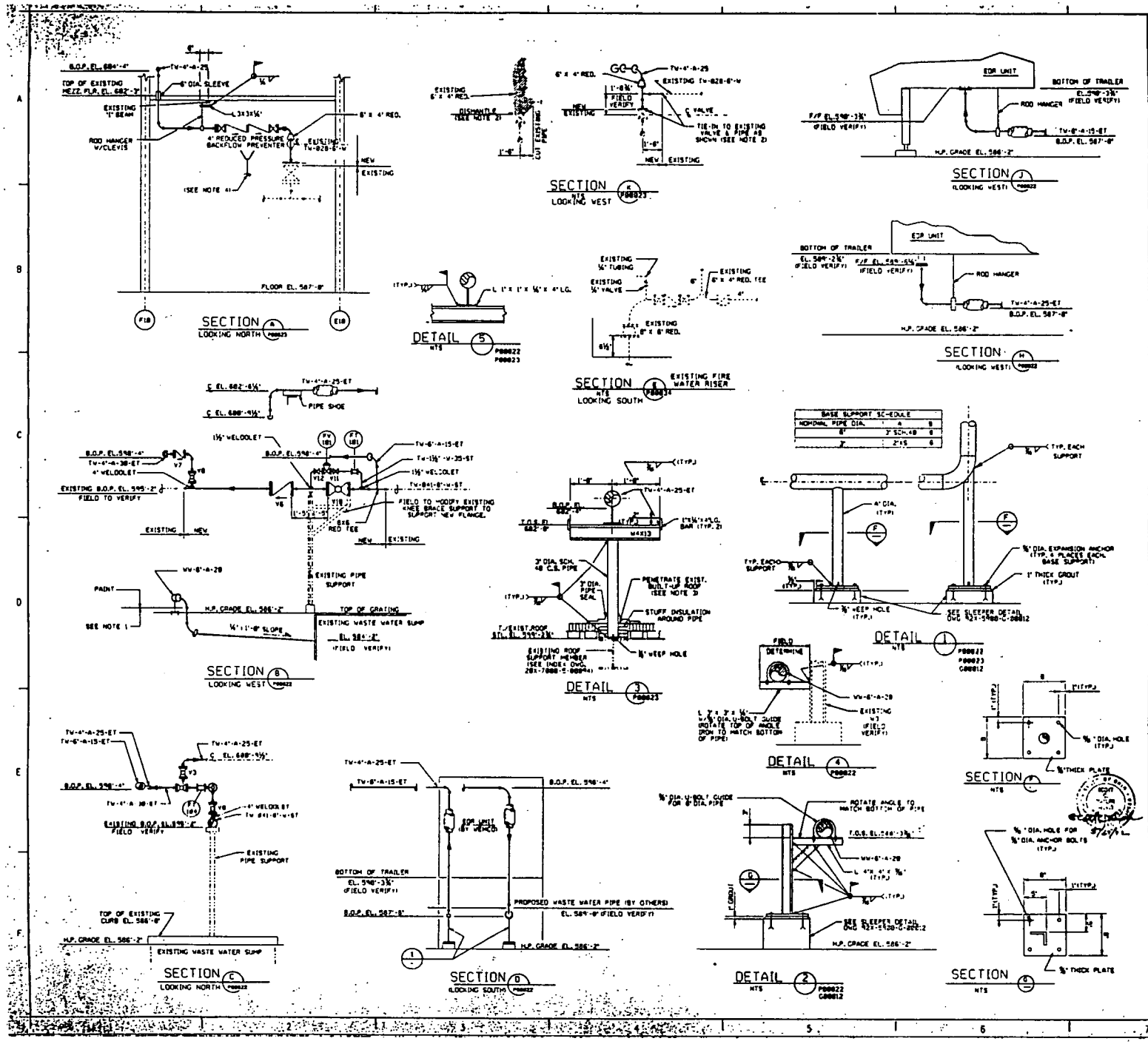
THE DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT TITLE
WATER TREATMENT REPLACEMENT PROJECT
OU2/PCS2

DRAWING TITLE
MECHANICAL PROCESS
PIPING AND INSTRUMENTATION DIAGRAM
SYMBOLS AND LEGEND SHEET

DRAWN BY: JIM LAWSON
DATE: 8-8-93
DATE: 8 JUL 93
SCALE: NONE
SIZE: D

00-00701
92X-5900-N-00018 N0000



NOTES

1. COAT & WRAP PORTION OF 6" DIA. CARBON STEEL LINE LOCATED UNDER SLAB FROM FIRST WELD ABOVE SLAB DOWN.
2. REMOVE EXISTING CORRODED TEE, REDUCER AND FLANGES FROM SYSTEM AND REPLACE WITH NEW MATERIAL. HATCHING INDICATES EXISTING MATERIAL TO BE REMOVED.
3. INSTALL NEOPRENE PIPE SEAL WITH STAINLESS STEEL BAND FOR 3" DIA. PIPE. PATCH ROOF WITH HOT TAR ASPHALT AND COVER WITH SAME BUILT-UP ROOF MATERIAL INCLUDING VAPOR SEAL AT EXISTING ROOF, TO MAKE LEAK PROOF.
4. FIELD TO INSTALL FUNNEL AND 3" DRAIN PIPING. FIELD ROUTE LINE TO NEAREST FLOOR DRAIN AND SUPPORT USING EXISTING STEEL MEMBERS.
5. ALL EXISTING ELEVATIONS, INCLUDING H.P. GRADE ELEVATIONS, ARE FROM REFERENCE DRAWINGS.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-H-00019	PIPING & INSTRUMENTATION DIAGRAM
92X-5900-P-00022	PIPING PLAN SHEET 1
92X-5900-P-00023	PIPING PLAN SHEET 2
92X-5900-P-00034	FIRE PROTECTION PLAN
92X-5900-P-00031	PIPING SECTIONS & DETAILS
92X-5900-C-00012	CIVIL/STRUCTURAL SITE DETAILS
92X-5900-A-00032	ARCHITECTURAL PLAN, ELEVATIONS AND SECTIONS

REV. NO.	REASON FOR REVISION - DESCRIPTION	DRAWN	DATE
0	CERTIFIED FOR CONSTRUCTION		

APPROVED

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

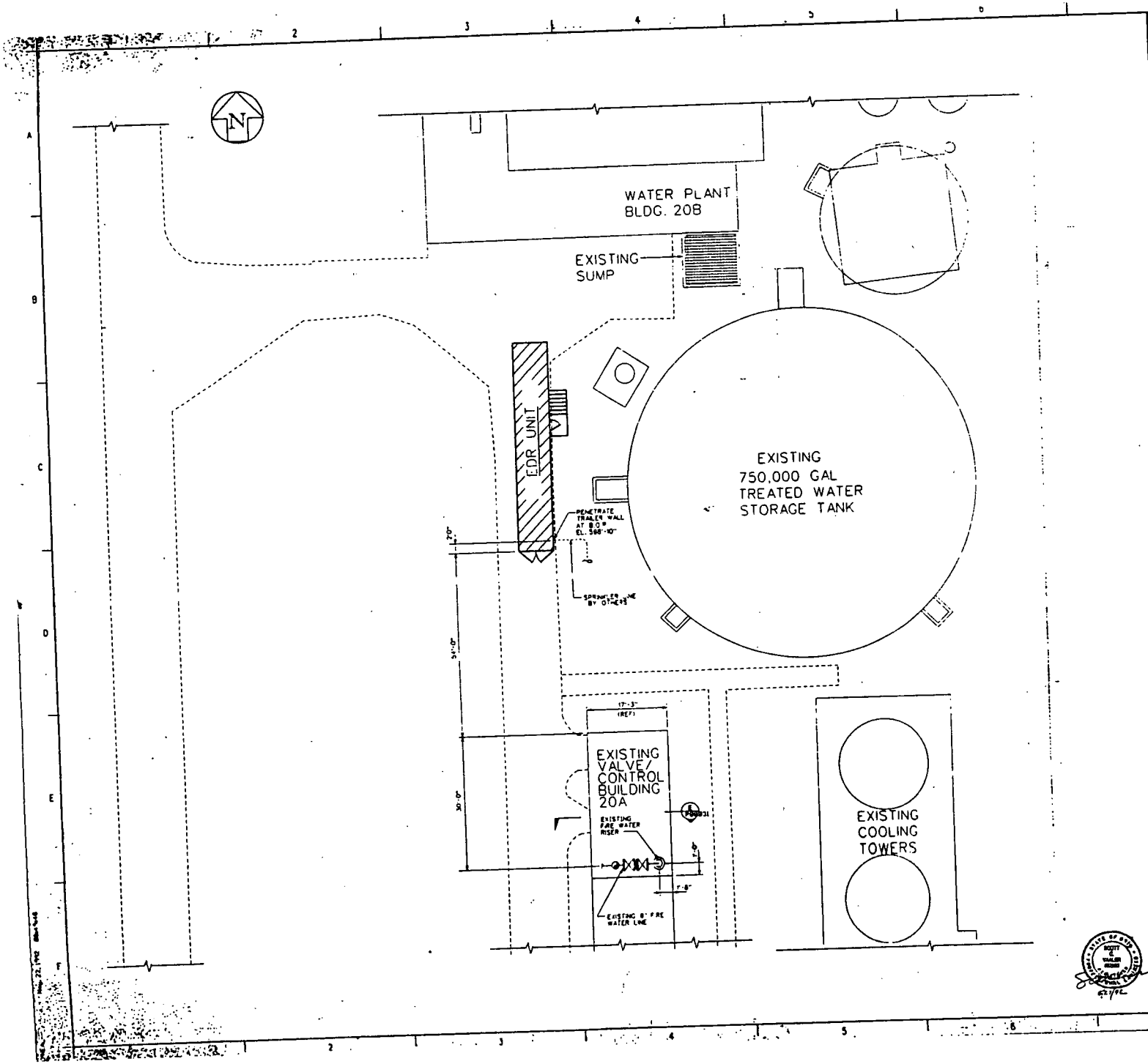
PARSONS
THE RALPH M. PARSONS CO. · CHAS. T. MAIN, INC. · ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME: WATER TREATMENT REPLACEMENT PROJECT OU2/PCS2

DRAWING TITLE: PIPING/PLANT DESIGN
PIPING SECTIONS AND DETAILS
FOR PROCESS WATER SYSTEM

DRAWN BY: J. STEPPE | DATE: 1/3/92 | CHECKED BY: | DATE: 9/27/91 | APPROVED BY: | DATE: 9/27/91

WBS 1.1.6.2.1.3 | 00-90701 | 92X-5900-P-00031 | 00034 | 0



NOTES

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
R2X-5900-C-00018	SITE PLAN AND EXISTING UTILITIES (CIVIL)

REV. NO.	REASON FOR REVISION - DESCRIPTION	DRAWN	CHECKED	DATE
0	CERTIFIED FOR CONSTRUCTION			

WATER SUPPLY
APPROVED
APPROVED
COPY
CF

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

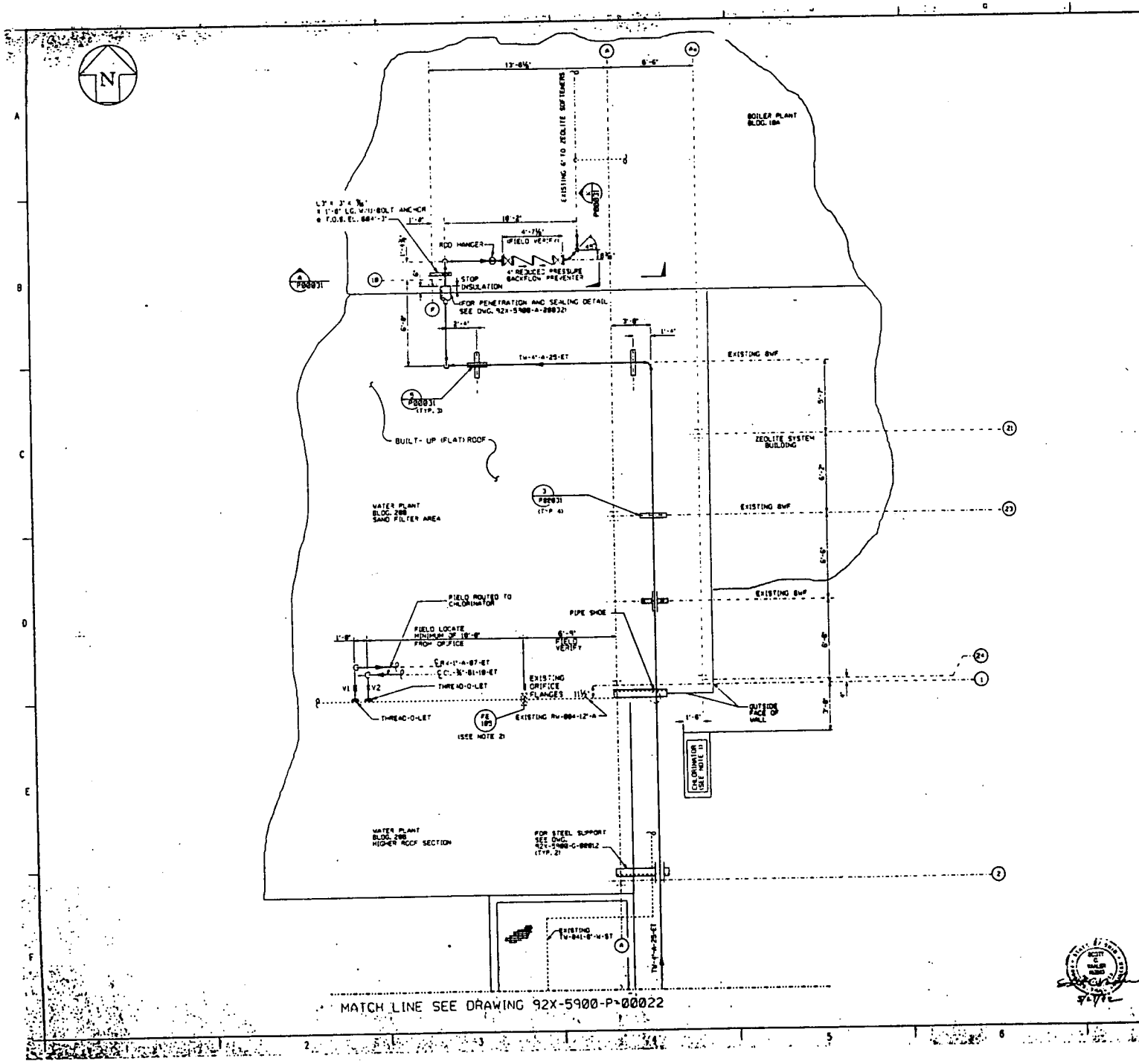
PROJECT TITLE
WATER TREATMENT REPLACEMENT PROJECT
OU2/PG52

DRAWING TITLE
PIPING/PLANT DESIGN
FIRE PROTECTION PLAN
EDR PROCESS WATER SYSTEM

DRAWN BY G. JACKSON DATE 4/1/92
DESIGNED BY DATE 5/7/92
CHECKED BY DATE 6/1/92
SCALE NONE

SUBMITTED FOR APPROVAL
APPROVAL RECOMMENDED
DESIGN APPROVED

NS: L-1.8.2.4.8
CC-90701
R2X-5900-P-00034 P0005 0



NOTES

1. LINES RW-1"-A-37-E1 AND CL-3/4"-B1-18-E1 RUNNING TO AND FROM THE CHLORINATOR SHALL BE ROUTED AND SUPPORTED BY THE CONTRACTOR. REFER TO DRAWING 92X-5900-M-00019.
2. REPLACE THE EXISTING ORIFICE PLATE WITH A NEW ORIFICE PLATE. FIELD TO VERIFY EXISTING ORIFICE PLATE THICKNESS.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-M-00019	PIPING & INSTRUMENTATION DIAGRAM
92X-5900-C-00012	CIVIL/STRUCTURAL SITE DETAILS
92X-5900-P-00022	PIPING PLAN-SHEET 1
92X-5900-P-00031	PIPING SECTIONS AND DETAILS
92X-5900-P-00034	FIRE PROTECTION PLAN
92X-5900-A-00032	ARCHITECTURAL PLAN, ELEVATIONS AND SECTIONS

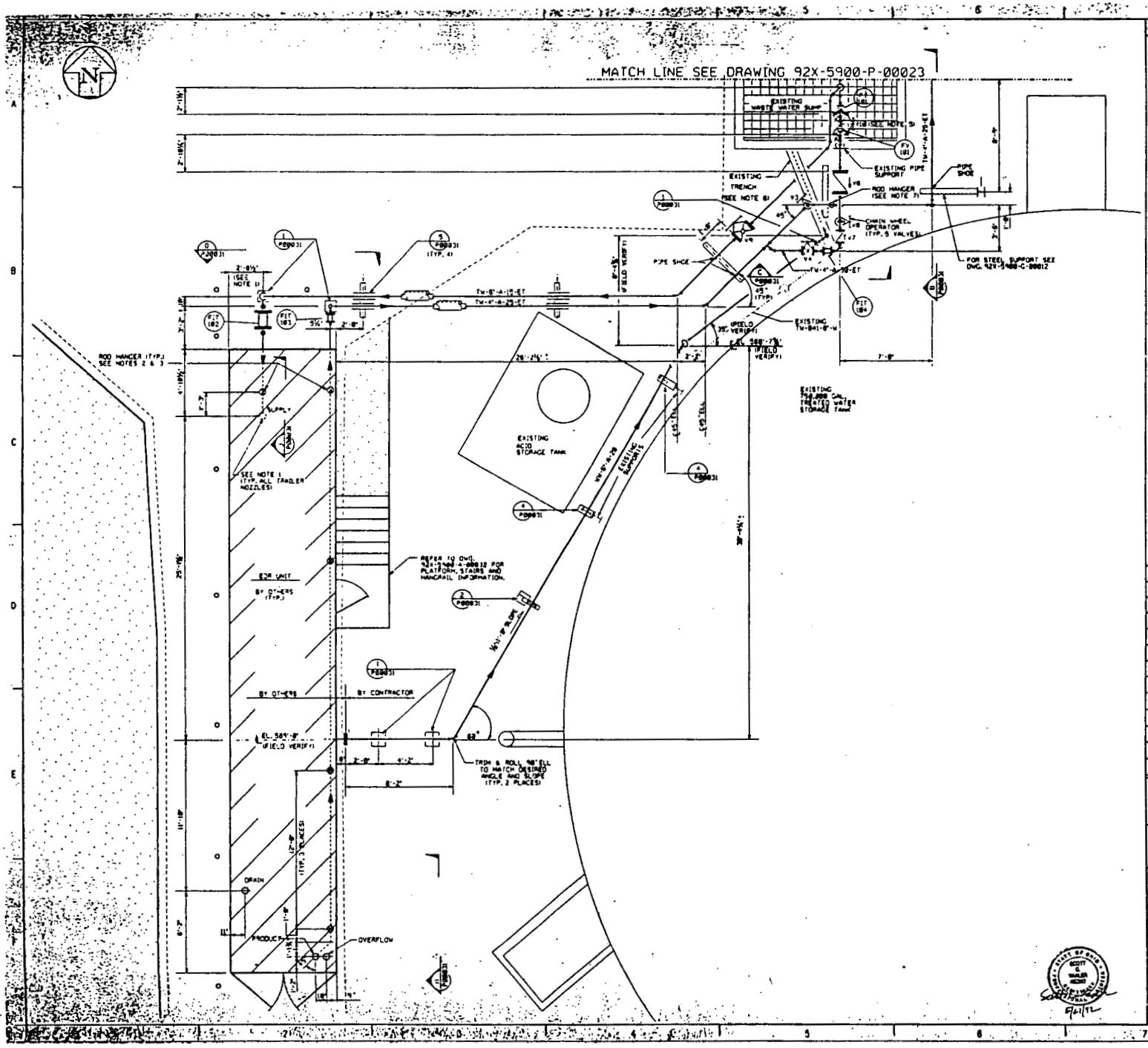
UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

WATER TREATMENT REPLACEMENT PROJECT
OU2/PC52

PIPING/PLANT DESIGN
PIPING PLAN SHEET 2
EOR PROCESS WATER SYSTEM

92X-5900-P-00023



NOTES

1. FIELD TO VERIFY TRAILER NOZZLE LOCATIONS AND CENTERLINE OR FACE OF FLANGE ELEVATIONS.
2. SUPPORT TW-4"-A-25-ET UNDER TRAILER WITH ADJUSTABLE CLEVIS FOR A 4" DIA. INSULATED LINE. USE ½" DIA. ROD ATTACHED TO UNDERSIDE OF TRAILER FLOOR SUPPORTS. ADDITIONAL STEEL MAY HAVE TO BE FASTENED TO THE TRAILER FLOOR SUPPORT MEMBERS TO OBTAIN CORRECT SPACING.
3. SUPPORT TW-8"-A-15-ET UNDER TRAILER WITH ADJUSTABLE CLEVIS FOR A 8" DIA. INSULATED LINE. USE ¾" DIA. ROD ATTACHED TO UNDERSIDE OF TRAILER FLOOR SUPPORTS. ADDITIONAL STEEL MAY HAVE TO BE FASTENED TO THE TRAILER FLOOR SUPPORT MEMBERS.
4. ALL PIPE SUPPORTS, U-BOLTS, SHOES, AND GUIDES, AS WELL AS UNINSULATED PIPING SHALL BE PAINTED IN ACCORDANCE WITH THE PAINTING-PIPE SUPPORTS AND BOLLARDS NOTES ON DRAWING 92X-5900-C-00012.
5. REMOVE FROM SERVICE AN EXISTING SET OF ORIFICE FLANGES WITH ORIFICE PLATE AND INSTRUMENT TUBING LOCATED OVER THE WASTE WATER SUMP ON EXISTING LINE NUMBER TW-8"-A-
6. REMOVE EXISTING DRAIN LINE LOCATED WITHIN THE EXISTING STEMED TRENCH. THE TRENCH HAS A LAYER OF CONCRETE POURED OVER ITS TOP. ADDITIONALLY, EXISTING SUMP WALL PENETRATION AND TRENCH MAY HAVE TO BE ENLARGED TO ACCOMMODATE THE NEW 8" COATED AND WRAPPED PIPE LINE. BACKFILL TRENCH WITH 2500 PSI CONCRETE HAVING ¾" AGGREGATE FOLLOWING INSTALLATION AND TESTING OF NEW PIPELINE. HAND TAMP WITH CARE NOT TO DAMAGE COATING AND WRAPPED PROTECTIVE PIPE COVER.
7. SUPPORT TW-4"-A-25-ET WITH ADJUSTABLE CLEVIS FOR A 4" DIA. INSULATED LINE. USE ½" DIA. ROD AND BEAM CLAMP WITH RETAINING CLIP.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-A-00019	PIPING & INSTRUMENTATION DIAGRAM
92X-5900-C-00012	CIVIL/STRUCTURAL SITE DETAILS
92X-5900-C-00010	SITE PLAN AND EXISTING UTILITIES
92X-5900-P-00023	PIPING PLAN SHEET 2
92X-5900-P-00031	PIPING SECTIONS & DETAILS
92X-5900-P-00034	FIRE PROTECTION PLAN
92X-5900-A-00032	ARCHITECTURAL PLAN ELEVATIONS AND SECTIONS

WATER SUPPLY
APPROVED

0 CERTIFIED FOR CONSTRUCTION

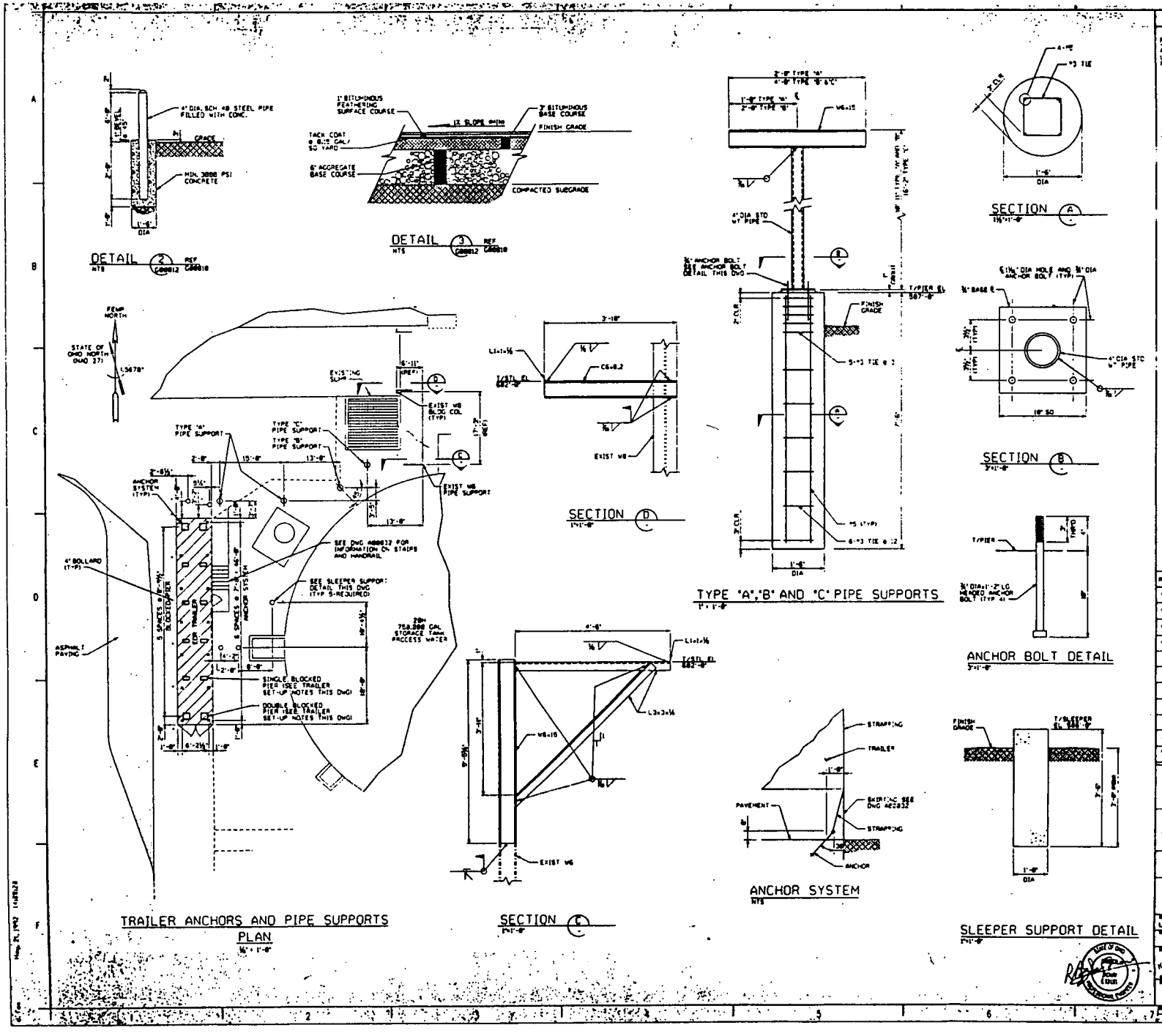
UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

WATER TREATMENT REPLACEMENT PROJECT
OU2/PO52

PIPING/PLANT DESIGN
PIPING PLAN SHEET
EDR PROCESS WATER SYSTEM

92X-5900-P-00022 P0002 0



NOTES

PAINTING - PIPE SUPPORTS AND BOLLARDS

ALL PAINT MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE LATEST STANDARDS (SSPC, VOL. 1 1982 AND SSPC, VOL. 2, 1989)

PAINT AS FOLLOWS:

1. ALL EXPOSED STEEL:
   ONE COAT - HIGH GLOSS, PREMIUM QUALITY, QUICK DRYING ALKYD ENAMEL.
2. COLOR:
   BOLLARDS - SAFETY YELLOW (SOUTHERN COATING #2918 OR APPROVED EQUAL)
   STRUCTURAL STEEL - GRAY (SOUTHERN COATING #2378 OR APPROVED EQUAL)

TRAILER SET-UP NOTES:

1. LOCATE TRAILER AT COORDINATES AS SHOWN ON DRAWING 92X-5900-G-00012.
2. JACK AND LEVEL TRAILER TO FINAL FLOOR ELEVATION AS SHOWN ON DRAWING 92X-5900-A-00032.
3. LOCATE PIERS AS SHOWN ON THIS DRAWING.
4. PROVIDE DOUBLE BLOCKED PIERS AT ENDS OF TRAILER AND SINGLE BLOCKED INTERIOR PIERS AS ILLUSTRATED IN "SITING AND USE OF OFFICE TRAILERS AND OTHER PORTABLE STRUCTURES AT THE FMPC", ATTACHMENT A, HMCS DOCUMENT NO THS-F-086.
5. INSTALL TREATED WOOD CAP PLATE AND DRIVE CEDAR WEDGE SHIM TIGHT.
6. REMOVE WHEELS FROM TRAILER.
7. INSTALL ANCHORS AND TIE - DOWN STRAPPING.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-A-00015	DRAWING INDEX
92X-5900-A-00016	LEGEND
92X-5900-G-00010	PLAN SITE AND EXISTING UTILITIES
92X-5900-A-00032	PLAN, ELEVATIONS AND SECTIONS - TRAILER STAIRS & SKIRTING

0	CERTIFIED FOR CONSTRUCTION			

APPROVED

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

WATER TREATMENT REPLACEMENT PROJECT
OU2/PCE2

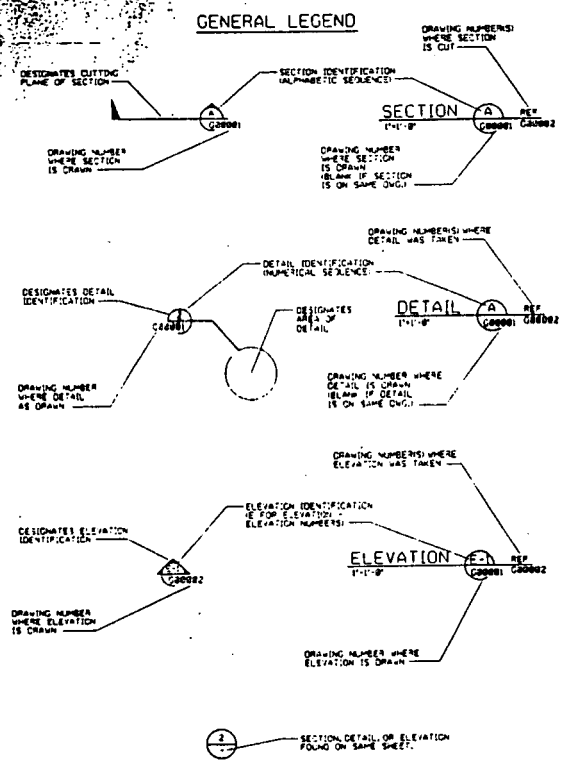
CIVIL/STRUCTURAL
SITE DETAILS

L.J.GEORGE | 3/4/92 | AS NOTED

WS L.1.1.2.1.3
00-90701 | 92X-5900-G-00012 | G0000 | 0

4132

GENERAL LEGEND



NOTE:

ABBREVIATED DRAWING NUMBERS WILL BE USED FOR ALL SECTIONS, DETAILS OR ELEVATIONS I.E.

42X-5900-0-00002 - DRAWING NUMBER
C00002 - ABBREVIATED DRAWING NUMBER

DIMENSIONING:

DIMENSIONS AND /OR ELEVATIONS MARKED THUS(+/-) SHALL BE VERIFIED IN THE FIELD BY CONTRACTOR.

USE DIMENSIONS AS SHOWN. DO NOT SCALE.

NTS (NOT TO SCALE) IS SHOWN ONLY WHERE DIMENSION IS OBVIOUSLY OUT OF SCALE.

BALLOON LEGEND

- PIV — POST INDICATOR VALVE
- CB — STORM SEWER CATCH BASIN
- SMH — SANITARY MANHOLE
- HFH — HIGH PRESSURE FIRE HYDRANT
- EMH — ELECTRICAL MANHOLE
- LFH — LOW PRESSURE FIRE HYDRANT
- THM — TELEPHONE MANHOLE

UTILITY SYMBOLS

EXISTING		PROPOSED
ST	STORM SEWER	ST
SN	SANITARY SEWER	SN
FG	FUEL GAS	FG
DW	DRINKING WATER	DW
FOI	FIRE PROTECTION	FOI
LS	LIVE STEAM	LS
WS	WATER SUPPLY	WS
WR	COOLING WATER RETURN	WR
TW	PROCESS WATER	TW
CE	CONTAMINATE WATER	CE
FT	FILTRATE OR EFFLUENT	FT
DF	DEIONIZED FEED	DF
PW	DEIONIZED WATER	PW
BR	BRINE	BR
RW	RAW WATER	RW
A	ALARM	A
CN	STEAM CONDENSATE	CN
VE	VENT LINES	VE
SD	SUB-SURFACE DRAINAGE	SD
SL	SUMP LIQUOR	SL
E	ELECTRICAL	E
E	OVERHEAD ELECTRICAL	E
T	TELEPHONE	T
G	ELECTRIC GROUND	G
	ABANDONED	

SYMBOLS LEGEND

EXISTING		PROPOSED
	POST INDICATOR VALVE (PIV)	
	FIRE HYDRANT (FH)	
	MANHOLE (MH)	OR
	CATCH BASIN (CB)	
	LIGHT POLE	
	PIPE SUPPORT	
	ELECTRICAL MANHOLE	
	TELEPHONE MANHOLE	
	STREET WASHERS	
	VALVE BOX	
	MONITORING WELL	
	SURFACE DRAINAGE FLOW	
	POWER POLE	
	ROADWAY / DRIVEWAY	
	BUILDING / TRAILER	
	RAILROAD TRACK	

GRADING SYMBOLS

EXISTING		NEW
x 000.00	SPOT ELEVATION	x 000.00
000	CONTOUR	000

NOTES

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
42X-5900-0-00015	DRAWING INDEX

0	CERTIFIED FOR CONSTRUCTION		

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

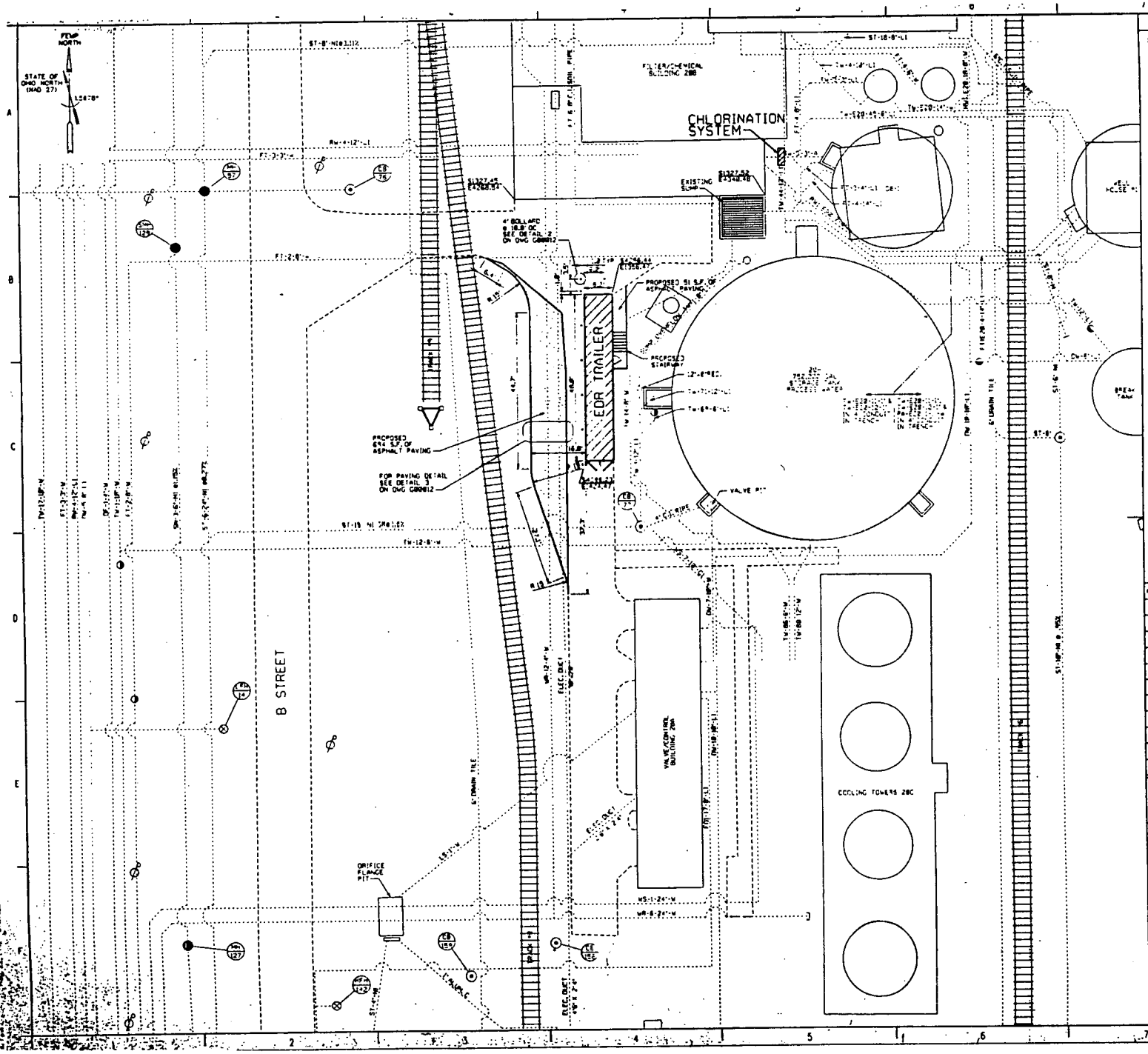
THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/PCS2

DRAWING TITLE
CIVIL
LEGEND

00-907C1 | 42X-5900-X-00016 | X00001 | 0

025



NOTES

1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM SITE PROVIDED DATA FROM THE DOCUMENTS LISTED BELOW. THE CONSTRUCTION MANAGER SHALL CONFIRM THIS INFORMATION BY FIELD VERIFICATION PRIOR TO CONSTRUCTION USE.

   EXISTING SITE DATA SOURCE (IN PLANT FILES):
   WESTON TOPOGRAPHY, 1986
   WESTON TOPOGRAPHY, 1988
   FEMP CADD GRID/UTILITY DRAWINGS
   FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS

2. FIELD VERIFY ACTUAL LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATION. WHEN DRILLING PIER SHAFTS, PROBE AT EVERY 12 INCHES DEPTH TO VERIFY NONINTERFERENCE WITH UNDERGROUND PIPING. NOTIFY CONSTRUCTION MANAGER OF ANY INTERFERENCES OR UNFORESEEN CONDITIONS IMMEDIATELY AND GET APPROVAL BEFORE PROCEEDING WITH THE WORK.

3. EXCAVATED SOIL AND CONSTRUCTION DEBRIS WILL BE DISPOSED OF PER WESTING-HOUSE ENVIRONMENTAL MANAGEMENT COMPANY SITE POLICY AND PROCEDURE, FMPC-728-88 (CONTROL OF CONSTRUCTION WASTE).

4. HORIZONTAL CONTROL IS BASED UPON THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT COORDINATE SYSTEM.

5. BOLLARDS TO BE PLACED AFTER TRAILER IS INSTALLED.

LEGEND (SEE ALSO DWG 92X-5900-X-00016)

PROPOSED PAVEMENT

PROPOSED TRAILER

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-X-00015	DRAWING INDEX
92X-5900-X-00016	LEGEND
92X-5900-G-00012	SITE DETAILS

REV.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DRAWN	DATE
0	CERTIFIED FOR CONSTRUCTION		

APPROVED

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

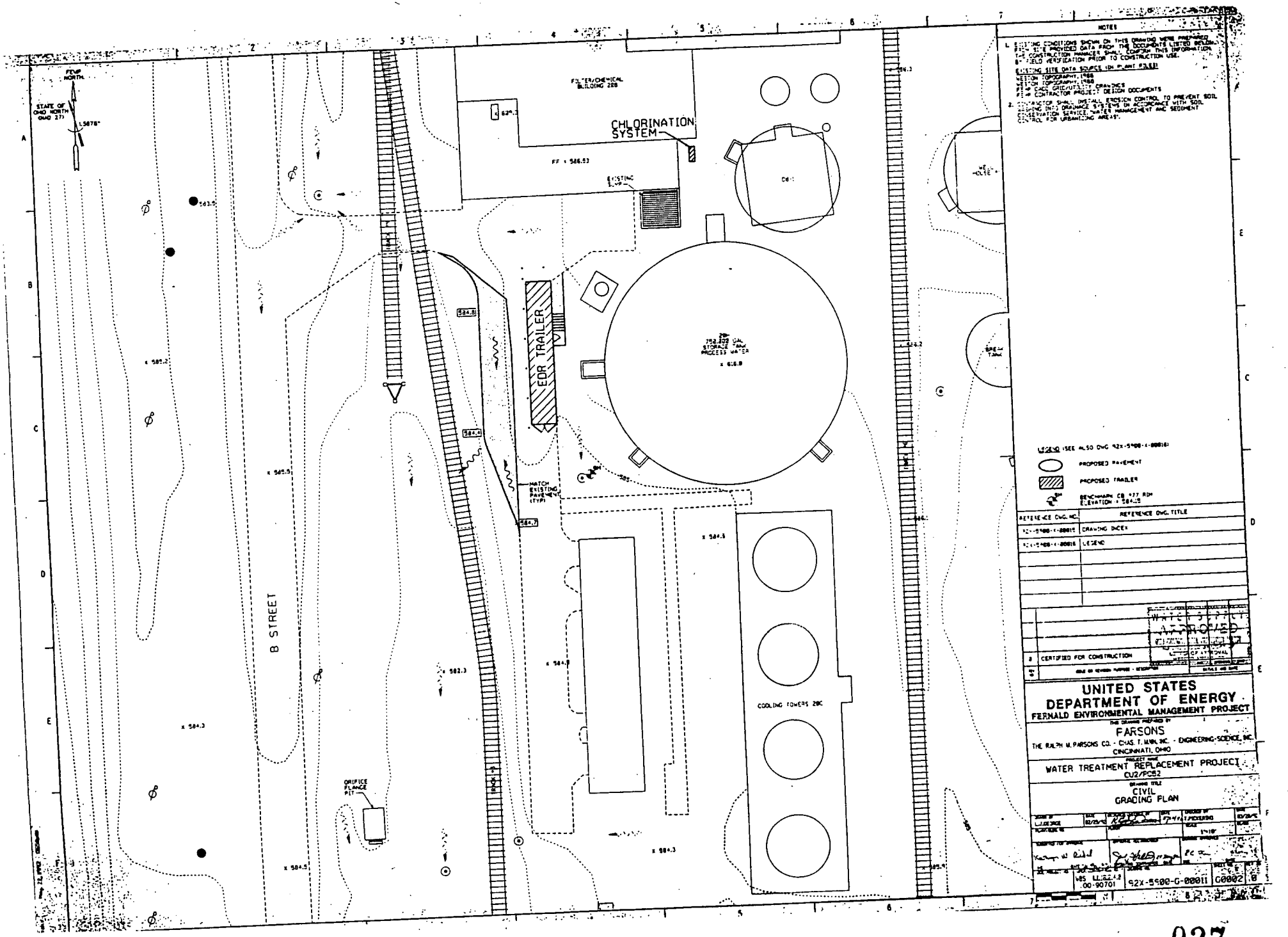
THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

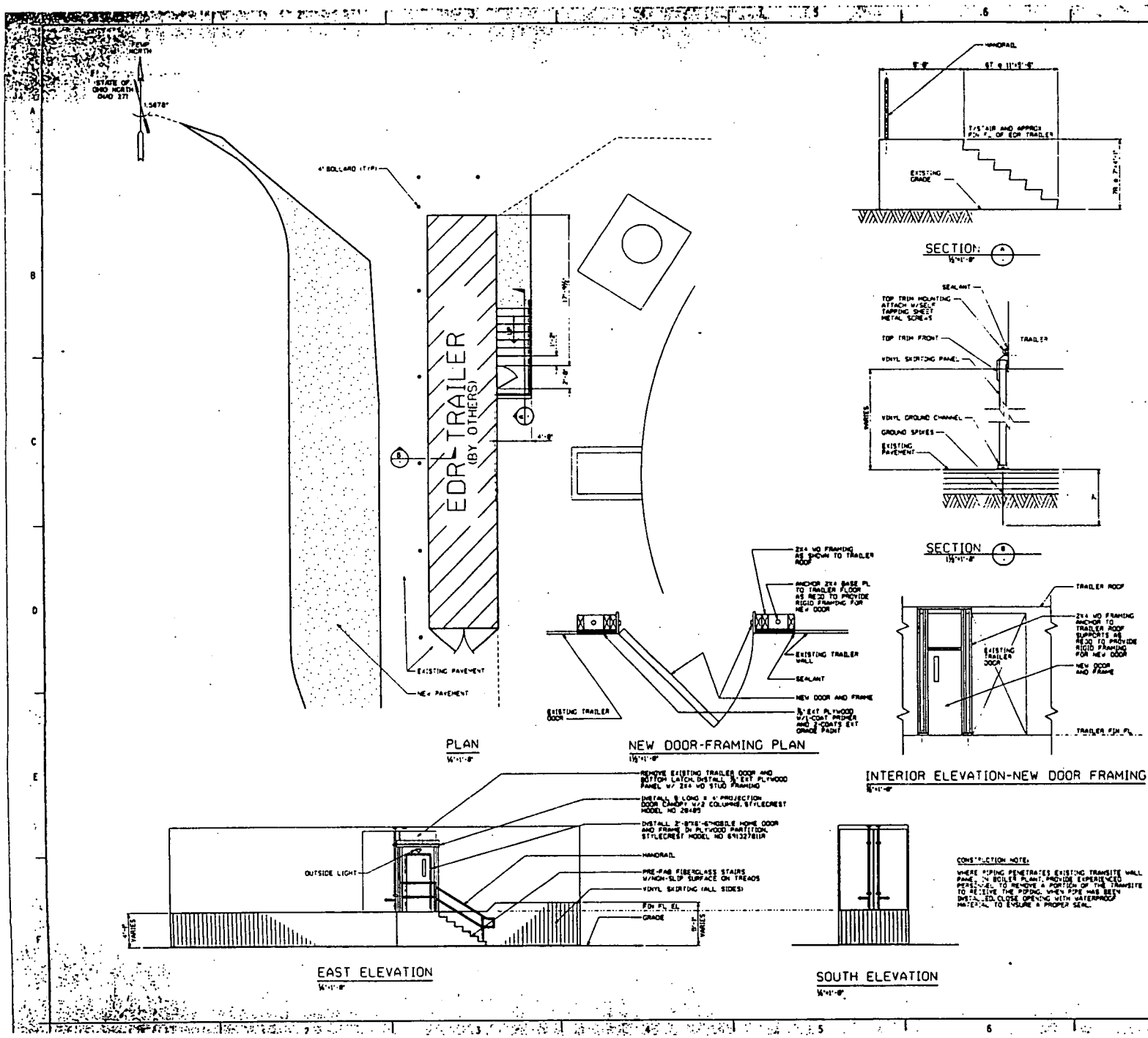
PROJECT TITLE
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

DRAWING TITLE
CIVIL
PLAN
SITE AND EXISTING UTILITIES

DRAWN BY L.GEORGE DATE 02/25/92
CHECKED BY L.PECKERING DATE 02/28/92
SCALE 1"=50'

SUBMITTED FOR APPROVAL
APPROVAL RECOMMENDED
PC 7
DATE
PROJECT ID WBS 1.1.16.2.4.8 00-90701
DRAWING NO. 92X-5900-G-00010 G00001
REV. 0


FILTER/CHEMICAL BUILDING 28B
CHLORINATION SYSTEM
EDR TRAILER
B STREET
COOLING TOWERS 28C
ORIFICE FLANGE PIT
MATCH EXISTING PAVEMENT (TYP)
NOTES
LEGEND
PROPOSED PAVEMENT
PROPOSED TRAILER
REFERENCE DWG. NO.
REFERENCE DWG. TITLE
DRAWING INDEX
LEGEND
CERTIFIED FOR CONSTRUCTION
UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO
WATER TREATMENT REPLACEMENT PROJECT
CU2/PC62
CIVIL
GRADING PLAN
92X-5900-G-00011
C0002



NOTES

PREFABRICATED STAIR SPECIFICATIONS

1. ALL STAIRS SHALL BE CONSTRUCTED TO MEET BOTH NFPA 101 AND OHIO BOCA CODE 1996.
2. STAIRS SHALL BE CONSTRUCTED OF A LAMINATED FIBERGLASS COATING. THIS COATING SHALL BE STURDY ENOUGH TO RESIST CRACKS OR CHIPS AND RESIST NORMAL WEAR.
3. ALL LUMBER SHALL BE PRESSURE TREATED, REINFORCED EXTERIOR GRADE.
4. THE PLATFORM AND STAIR TREADS SHALL BE SUBSTANTIALLY LEVEL AND MAY SLOPE A MAXIMUM OF ¼ INCH PER FOOT.
5. THERE SHALL BE NO VARIATION EXCEEDING ⅜ INCH IN THE DEPTH OF ADJACENT TREADS OR IN THE HEIGHT OF ADJACENT RISER, AND THE TOLERANCE BETWEEN THE LARGEST AND SMALLEST RISER OR BETWEEN THE LARGEST AND SMALLEST TREAD SHALL NOT EXCEED ⅜ INCH IN ANY FLIGHT.
6. ALL WALKING SURFACES SHALL BE PROTECTED BY A PERMANENT SLIP RESISTANT TYPE CONSTRUCTION CONSISTING OF A HEAVY GRIT TYPE SURFACE.
7. ALL STEPS SHALL HAVE COMPLETE HAND RAILS ON ALL OPEN SIDES. THE HANDRAILS SHALL BE NOT LESS THAN 34 INCHES NOR MORE THAN 38 INCHES ABOVE THE TREAD MEASURED VERTICALLY TO THE TOP OF THE RAIL FROM THE TREAD AT THE LEADING EDGE. HANDRAILS SHALL BE DESIGNED AND CONSTRUCTED FOR A CONCENTRATED LOAD OF 200 POUNDS APPLIED AT ANY POINT AND IN ANY DIRECTION.
8. HANDRAILS ON THE TOP PLATFORM SHALL BE 42 INCHES FROM THE WALKING PLATFORM. PROVIDE A HIGHRAIL HEIGHT OF 31 INCHES, OR OTHER RAILING(S) SUCH THAT A SPHERE WITH A DIAMETER OF 8 INCHES CANNOT PASS THROUGH ANY OPENING IS REQUIRED.
9. HANDRAILS SHALL NOT BE MADE OF WOOD OR ANY OTHER MATERIAL THAT MAY SPLINTER, CAUSING A HAND INJURY.
10. THE MAXIMUM DISTANCE BETWEEN THE LOWEST STAIR AND THE GROUND LANDING SHALL BE 7 INCHES.
11. STAIRS SHALL BE MANUFACTURED BY STYLE CREST FIBERGLASS DELUXE STEPS, FREMONT, OHIO, OR APPROVED EQUAL.
12. MANUFACTURER SHALL PROVIDE A LIMITED 5 YEAR WARRANTY, ON PLATFORM AND STAIRWAY.

VINYL SKIRTING SPECIFICATION

1. SKIRTING SHALL BE 7-LOK VINYL SKIRT AS MANUFACTURED BY ALCOA BUILDING PRODUCTS, MANUFACTURED HOUSING PRODUCTS DIVISION, SIDNEY, OH OR APPROVED EQUAL.
2. VERIFY ALL DIMENSIONS IN FIELD BEFORE FABRICATION.
3. PROVIDE ACCESS PANELS AS REQUIRED FOR ACCESS TO PIPING, ETC.
4. PROVIDE GROUND SPIKES AND WIND STAY RODS AS REQUIRED.
5. MANUFACTURER SHALL PROVIDE A LIMITED 15 YEAR WARRANTY ON SKIRTING.

SHOP DRAWING REQUIREMENTS

1. VENDOR TO PROVIDE 18 COPIES AND 1 REPRODUCIBLE OF EACH PRODUCT SUPPLIED.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5980-A-00015	DRAWING INDEX

B	CERTIFIED FOR CONSTRUCTION	
A	ISSUED FOR REVIEW PURPOSES - SUBMITTAL	

WATER SUPPLY APPROVED

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/FPS2

DRAWING TITLE
ARCHITECTURAL
PLAN, ELEVATIONS AND SECTIONS
TRAILER STAIRS AND SKIRTING

DRAWN BY: K.A. BARRETT
DATE: 1/99
CHECKED BY:
DATE:
PROJECT MGR:
DATE:
SCALE: AS NOTED
SUBMITTED FOR APPROVAL:
APPROVED BY:
WO: 11.62.48
00-30701
92X-5980-A-00032
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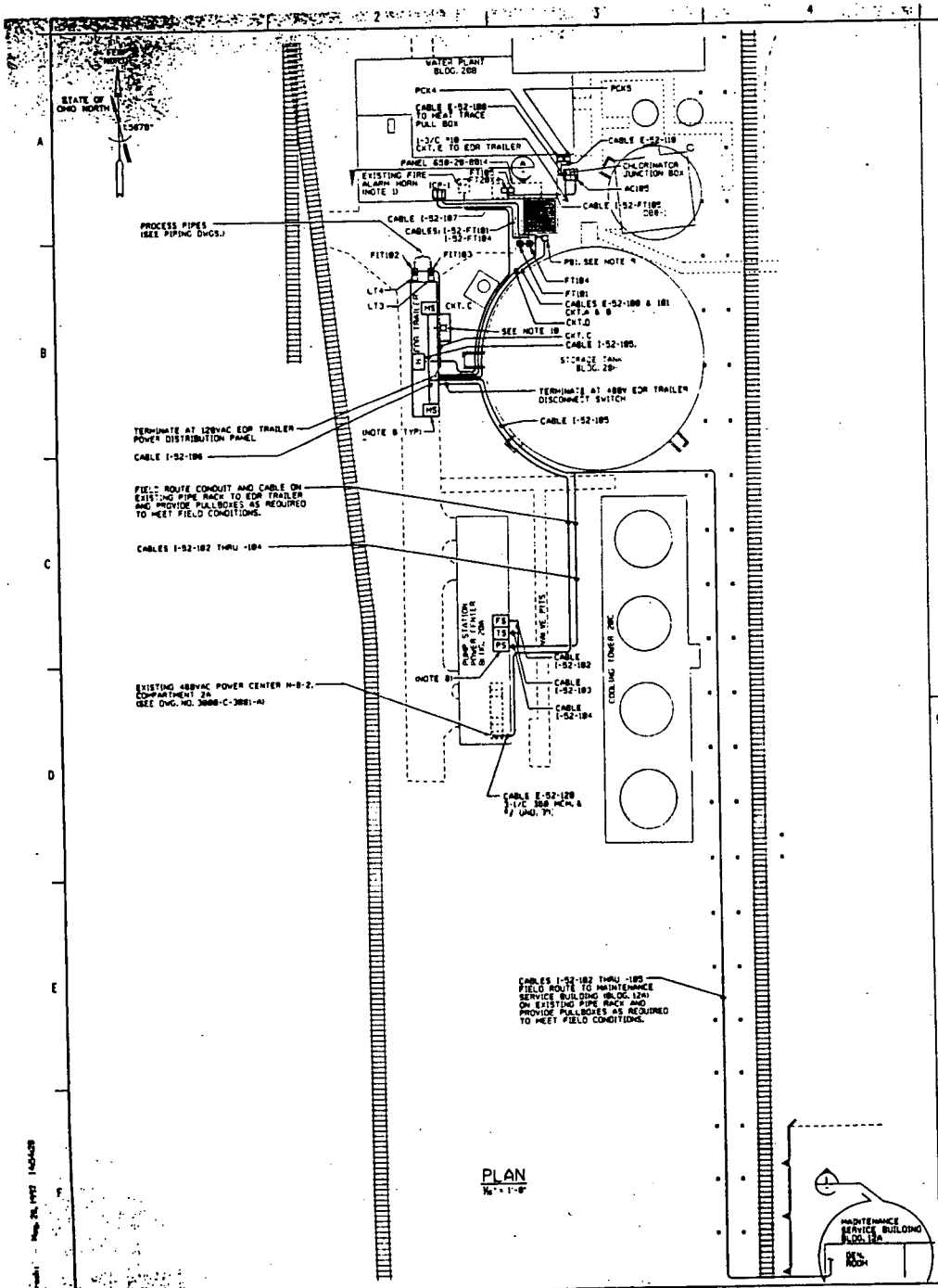
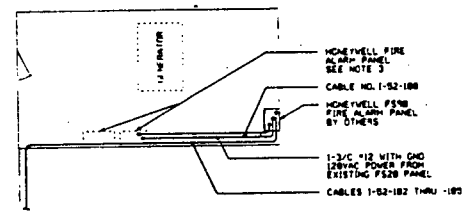
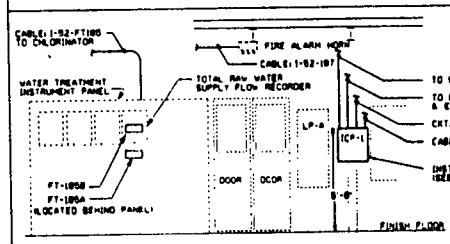




DETAIL 1 REF
NTS



SECTION A REF
NTS

NOTES

1. CONNECT EDR TRAILER FIRE ALARM HORN TO EXISTING FIRE ALARM HORN LOCATED OVERHEAD AT THE WATER TREATMENT CONTROL SOUTH DOOR ENTRYWAY.
2. SEE PIPING DRAWINGS FOR FLOW INDICATOR TRANSMITTERS & FLOW TRANSMITTERS. VERIFY LOCATION AND FIELD ROUTE & CONDUIT TO TRANSMITTERS.
3. FIELD SHALL VERIFY LOCATION OF FIRE ALARM EQUIPMENT, CABLES AND CONDUITS. FIELD SHALL CONNECT AND VERIFY PROPER TERMINATIONS TO NEW EQUIPMENT.
4. ALL CONDUIT SHALL BE FIELD ROUTED. ROUTING AND EQUIPMENT LOCATIONS SHALL BE APPROVED BY THE CONSTRUCTION MANAGER.
5. FIELD SHALL PROVIDE 120VAC POWER FROM EDR TRAILER FOR THE FOLLOWING CIRCUITS:
   - CKT. A - 30A, SP - HEAT TRACE POWER FEEDER
   - CKT. B - 15A, SP - HEAT TRACE POWER FEEDER
   - CKT. C - 15A, SP - FLOW TRANSMITTER FT102 & FT103 POWER FEEDER
   - CKT. D - 15A, SP - FLOW TRANSMITTER FT101, FT104, AND INSTRUMENT PANEL POWER FEEDER
   - CKT. E - 20A, DP - CHLORINATOR POWER FEEDER
6. FIELD ROUTE CONDUIT TO POWER DISTRIBUTION PANEL IN EDR TRAILER.
7. ALL CONDUIT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
8. FIRE ALARM DEVICES ARE NOT TO SCALE. EXACT LOCATION TO BE DETERMINED BY FIELD.
9. PB1 - 10"x8"x4"D, NEMA 4X, FIELD SUPPLIED & MOUNTED.
10. PROVIDE AND INSTALL OUTDOOR LIGHTING FIXTURE WITH PHOTOCELL AT TRAILER DOOR. (CROUSE-HINDS CAT# HPL1-50 120V-LL-PCL) WIRE TO TRAILER EXISTING LIGHTING CIRCUIT.

LEGEND:

- ——— NEW ELECTRICAL & INSTRUMENT EQUIPMENT OUTLINE
- ------ EXISTING ELECTRICAL & INSTRUMENT EQUIPMENT OUTLINE (SECTIONS & DETAILS)
- - - - UNDERGROUND FEATURES (PLAN)
- ——— INSTRUMENT AIR LINE
- I-52-105 - INSTRUMENT CABLE NUMBER
- E-52-120 - ELECTRICAL CABLE NUMBER

REFERENCE DWG.*	REFERENCE DWG. TITLE
3000-C-3001-A	ELECTRICAL POWER SYSTEM SINGLE LINE DIAGRAM
42X-5900-E-00021	HEAT TRACING RISER DIAGRAM
42X-5900-E-00007	FIRE ALARM RISER DIAGRAM
42X-5900-S-00010	SITE PLAN AND EXISTING UTILITIES
42X-5900-N-00018	PIPING & INSTRUMENTATION SYMBOLS & LEGENDS
42X-5900-N-00019	PIPING & INSTRUMENT DIAGRAM
42X-5900-N-00033	INSTRUMENT LOOP DIAGRAM
42X-5900-P-00022	PIPING PLAN SHEET 1
42X-5900-P-00023	PIPING PLAN SHEET 2

REV	REVISION PURPOSE - DESCRIPTION	DATE
0	CERTIFIED FOR CONSTRUCTION	

AS-BUILT

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

WATER TREATMENT REPLACEMENT PROJECT

ELECTRICAL
POWER PLAN, SECTION, & DETAIL

DRAWN BY E.P. LAWRENCE
DATE 01/07/92
DESIGNED BY
CHECKED BY
SCALE AS SHOWN
SUBMITTED FOR APPROVAL
APPROVAL RECOMMENDED
APPROVED FOR CONSTRUCTION
WBS 1.1.1.8.2.1.0
00-00701
52X-5900-E-00006 E00005 0

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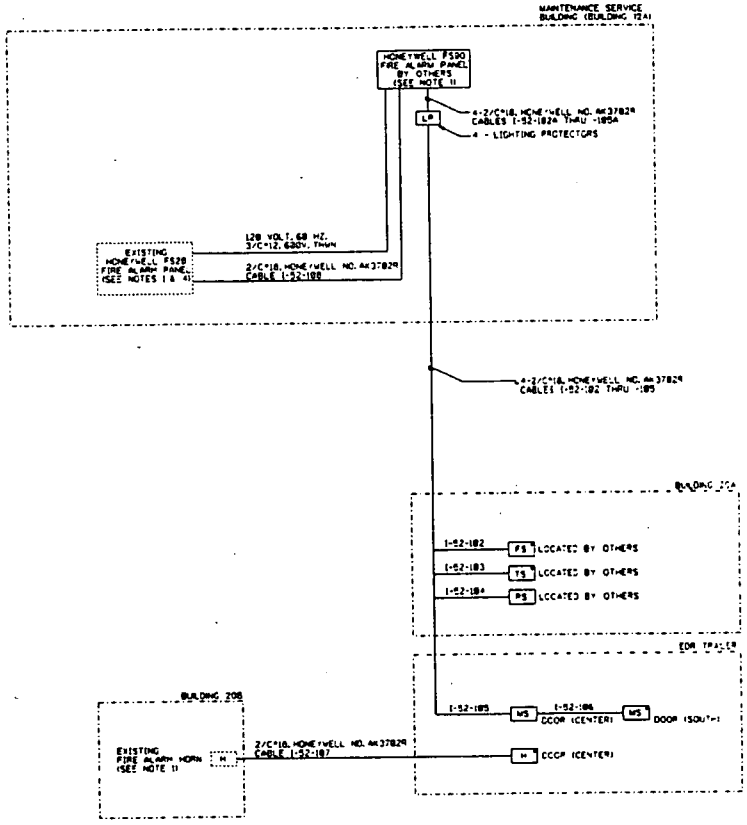


NOTES

1. ALL FIRE ALARM SYSTEM MODIFICATIONS IN EXISTING EQUIPMENT SHALL BE BY OTHERS.
2. THE APPROPRIATE HONEYWELL LIGHTNING PROTECTOR EXTENSION "-XXX" SHALL BE DETERMINED BY HONEYWELL.
3. IN ORDER TO INSURE COMPATABILITY WITH EXISTING PLANT EQUIPMENT, ALL NEW FIRE SYSTEM EQUIPMENT SHALL BE HONEYWELL NO SUBSTITUTIONS SHALL BE ALLOWED.
4. CONNECT TO SPARE INPUT LOCATED ON EXISTING HONEYWELL FS20 FIRE ALARM PANEL. SEE DWG. 92X-5900-E-00008

HONEYWELL FS90 BILL OF MATERIAL (NOTE 3)

ITEM	QTY.	HONEYWELL CAT. NO.	DESCRIPTION
1	1	M5C9108-001	"MAT" INITIATING FUNCTION BOARD FOUR, TWO WIRE ZONES
2	1	M5C9110-002	"BF" INDICATING FUNCTION BOARD TWO ZONE, TWO WIRE, TWO RELAY
3	1	M5C9104-005	"CAT" CONTROL FUNCTION BOARD
4	1	M5C9109-001	"HFT" 8 WIRE COMMUNICATIONS FUNCTION BOARD
5	1	M5C9402-002	MOTHERBOARD ASSEMBLY
6	1	M5C9143-001	POWER SUPPLY
7	1	M5C9121-007	SINGLE ENCLOSURE
8	1	M5C9258-001	BATTERIES
9	1	M5C9159-001	TAMPER SWITCH ASSEMBLY
10	1	VCNV8000-H	HEATER & THERMOSTAT ASSEMBLY
11	1	VCNV8000-B	BLOWER & THERMOSTAT ASSEMBLY
12	4	M5C9100-001	1.6W OHM RESISTOR

LEGEND:

- H — FIRE ALARM HORN - HONEYWELL NO SC8064A1046
- LP — LIGHTING PROTECTOR - HONEYWELL NO. M5C9412-XXX (SEE NOTE 2)
- PS — PRESSURE SWITCH - POTTER NO PS4C PROVIDED BY OTHERS
- WS — MANUAL PULL STATION - HONEYWELL NO S464A1102
- TS — POST INDICATOR VALVE TAMPER SWITCH POTTER NO OS-SU-A PROVIDED BY OTHERS
- FS — FLOW SWITCH - POTTER NO WFS4C PROVIDED BY OTHERS
- * — REQUIRES 1.6W OHM, 1/2 WATT RESISTOR (END-OF-LINE)
- ····· EXISTING EQUIPMENT

REFERENCE DWG #	REFERENCE DWG TITLE
92X-5900-E-00008	ELECTRICAL POWER PLAN

REV. NO.	DESCRIPTION	DRAWN	CHECKED	DATE
0	CERTIFIED FOR CONSTRUCTION			

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

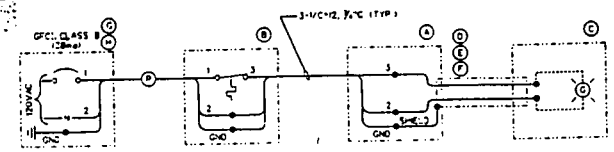
PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PORS2

DRAWING TITLE
ELECTRICAL
FIRE ALARM RISER DIAGRAM
WATER PLANT AREA BLDG.

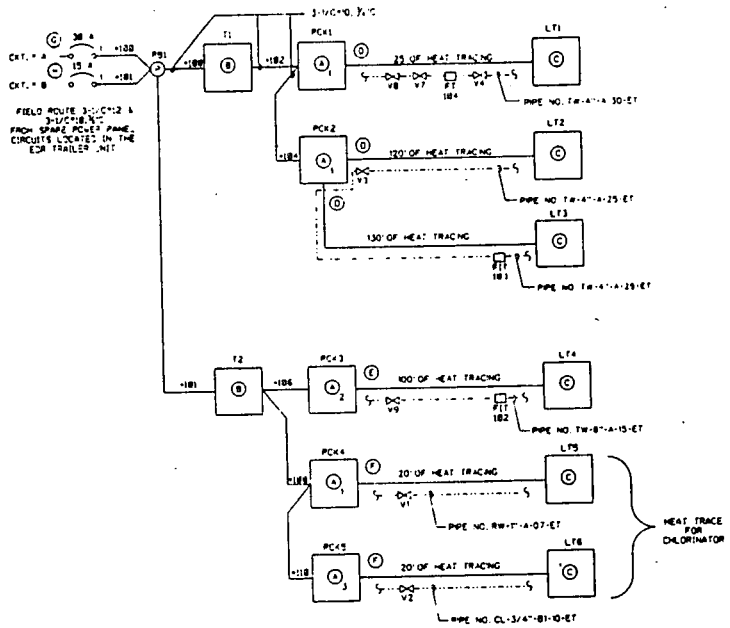
DRAWN BY B. JASPER
SUBMITTED FOR APPROVAL Katherine W. Rudel
APPROVED BY
CHECKED BY R.J. YUSKO
SUBMITTED FOR APPROVAL
APPROVED BY

WBS 1.1.8.2.4.8
DD-00701
92X-5900-E-00007 E00006 0

4132-



TYPICAL WIRING DIAGRAM FOR HEAT TRACING SYSTEM



LEGEND:

- (P) - PULL BOX
- ⋈ - VALVE
- □ - FLOW INDICATOR TRANSMITTER (FIT)
- * - ALL CABLE NO.'S PREFIXED WITH E-52-. EXAMPLE E-52-102
  USED CABLE NO.'S 100 THRU 102,104,106,109,110 ;
  UNUSED CABLE NO.'S 103,105,107,108,111 THRU 119
- GFCI - GROUND FAULT CIRCUIT INTERRUPTER

NOTES

1. HEAT TRACING SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS
2. HEAT TRACING SYSTEMS SHALL BE MARKED CONSPICUOUSLY WITH WARNING SIGNS (AVAILABLE FROM CHEMELEX) AT 10'-0" (NOMINAL) INTERVALS
3. FASTEN HEAT TRACE CABLE TO PIPE LINES USING ADHESIVE TAPE, CHEMELEX CAT NO. CT-56 OR EQUAL
4. INSTALL HEAT TRACE CABLE ON FITTINGS, VALVES, ETC. SO THAT HEAT TRACE CAN BE READILY MOVED ASIDE WHEN MAINTENANCE IS REQUIRED
5. PROVIDE STAINLESS STEEL IDENTIFICATION TAGS AT ALL DEVICES AND MARK ASSEMBLY WITH CIRCUIT NUMBER.
6. CONNECT GROUND WIRE TO GROUND TERMINATIONS PROVIDED IN POWER CONNECTION BOXES
7. HEAT TRACE INSULATION SHALL HAVE A WEATHER-PROOF ALUMINUM OUTER METAL COVERING
8. WEATHER-PROOF OUTER METAL COVERING SHALL BE SECURED WITH STAINLESS STEEL BANDS. SCREWS SHALL NOT BE USED TO SECURE THE WEATHER-PROOF OUTER COVERING.
9. WEATHER-PROOF OUTER METAL COVERING JOINTS SHALL BE SEALED WITH SILICONE SEALANT
10. HEAT TRACE CABLE LENGTHS INDICATED ARE ESTIMATED. ACTUAL LENGTHS MAY VARY WITH FIELD INSTALLATION
11. PILOT LIGHTS SHALL BE INSTALLED AT THE END OF HEAT TRACE CIRCUIT AND SHALL BE LOCATED SO AS TO BE EASILY VISIBLE

BILL OF MATERIAL

ITEM	QUANTITY	DESCRIPTION
(A) 1	3	RAYCHEM POWER CONNECTION KIT, CHEMELEX CAT NO PWC-JLP-3 (PCK1, PCK2, & PCK4)
(A) 2	1	RAYCHEM POWER CONNECTION KIT, CHEMELEX CAT NO. PWC-JLP-C (PCK3)
(A) 3	1	RAYCHEM POWER CONNECTION KIT, CHEMELEX CAT NO. PWC-JLP-1 (PCK5)
(B)	2	RAYCHEM THERMOSTAT, CHEMELEX TYPE AMC-1A-(UL), SINGLE POLE DOUBLE THROW, NEMA 4X, 22 AMP, 120 VOLT (T1 & T2)
(C)	6	RAYCHEM PILOT LIGHT CONNECTION KIT, CHEMELEX CAT NO NMC-BLK & NML-W (LT1 THRU LT6)
(D)	275 FT	RAYCHEM AUTO-TRACE SELF REGULATING, CAT NO 5BTV-CR (5 WATTS/FT).
(E)	100 FT	RAYCHEM AUTO-TRACE SELF REGULATING, CAT. NO. 8BTV-CR (8 WATTS/FT).
(F)	40 FT	RAYCHEM AUTO-TRACE SELF REGULATING, CAT. NO. 10BTV-CR (10 WATTS/FT).
(G)	1	WESTINGHOUSE, 30A, GFCI, CLASS B, 1 POLE, CAT. NO. GFEM30
(H)	1	WESTINGHOUSE, 15A, GFCI, CLASS B, 1 POLE, CAT. NO. GFEM15

REFERENCE DWG.*	REFERENCE DWG. TITLE
92X-5900-P-00022	PIPING PLAN SHEET 1
92X-5900-P-00023	PIPING PLAN SHEET 2
92X-5900-E-00006	ELECTRICAL POWER PLAN
92X-5900-M-00019	PIPING AND INSTRUMENTATION DIAGRAM
92X-5900-F-00020	PROCESS FLOW DIAGRAM

REV.	DESCRIPTION	DATE	SCALE AND DATE
0	CERTIFIED FOR CONSTRUCTION		

WATER SUPPLY APPROVED

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PCS2

DRAWING TITLE
ELECTRICAL
HEAT TRACE RISER DIAGRAM

DRAWN BY	DATE	REVIEWED BY	DATE	CHECKED BY	DATE
E. R. LOWRIE	8/11/92			R. J. TUSKO	8/11/92

SUBMITTED FOR APPROVAL	APPROVED RECOMMENDED	DRAWING APPROVED

PROJECT NO.	DOCUMENT NO.	SHEET NO.	REV. NO.
WBS 1.1.6.2.1.8 00-90701	92X-5900-E-00021	E0007	0

031

INSTRUMENT & PIPING SYMBOLS

GATE VALVE
GLOBE VALVE
BALL VALVE
PLUG VALVE
BUTTERFLY VALVE
STOP CHECK
NEEDLE VALVE
CHECK VALVE
SLIDING GATE VALVE
BALL CHECK VALVE
REDUCED PRESSURE BACKFLOW PREVENTER
BACKFLOW PREVENTER
DIAPHRAGH VALVE
PINCH VALVE
3 WAY VALVE
3 WAY BALL VALVE
3 WAY PLUG VALVE
ANGLE GATE VALVE
ANGLE GLOBE VALVE
HUB DRAIN OR FUNNEL
DIAPHRAGH
DIAPHRAGH W/ POSITIONER
PISTON
SAFETY RELIEF VALVE
SOLENOID
ROTARY MOTOR
HANDWHEEL
SELF-CONTAINED BACK PRESSURE REGULATING VALVE
2-WAY SOLENOID VALVE
3-WAY SOLENOID VALVE
4-WAY SOLENOID VALVE

STEAM TRAP
HOSE QUICK DISCONNECT
UNION
DRAIN LEG
EXPANSION JOINT
EJECTOR
STRAINER (Y TYPE)
STRAINER (SINGLE BASKET)
STRAINER (DOUBLE BASKET)
STRAINER (CONE TYPE)
MAIN OPERATING LINE
AUXILIARY PROCESS & SERVICE LINE
CONCENTRIC REDUCER
ECCENTRIC REDUCER
ORIFICE PLATE
VENTURI TUBE
SIPHON TUBE
THERMOWELL
FLOW DIRECTION
WELDED CONNECTION
FLANGED CONNECTION
FLEXIBLE HOSE
WELDED PIPE CAP
NEW UNDERGROUND PIPING
EXISTING UNDERGROUND PIPING
EXISTING ABOVE GROUND PIPING
INSULATED PIPING
HEAT TRACED AND INSULATED PIPING

HVAC FAN
PULSATION DAMPENER
AIR FILTER
VACUUM PUMP
AIR OPERATED DIAPHRAGH PUMP
VERTICAL TURBINE PUMP
HORIZONTAL CENTRIFUGAL PUMP
CHEMICAL METERING PUMP
SUBMERSIBLE PUMP (SUMP PUMP)
DAMPER
THERMOSTAT
ORIFICE

VERTICAL CENTRIFUGAL PUMP
AGITATOR (MIXER)
SUBMERSIBLE SUMP PUMP (HYDRAULICALLY DRIVEN)
EXHAUST FAN W/INLET VANES

ELECTRICAL BINARY SIGNAL
PNEUMATIC BINARY SIGNAL
ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
ELECTROMAGNETIC OR SONIC SIGNAL (NON-GUIDED)
(A) INSTRUMENT/PLANT AIR SUPPLY
ELECTRICAL SIGNAL
DATA HIGHWAY
CAPILLARY
HYDRAULIC SIGNAL LINE
PNEUMATIC OR VACUUM SIGNAL LINE
INTERLOCK
DIAPHRAGH SEAL
ROTAMETER
SIGHT GLASS
LOCAL MOUNTED INSTRUMENT

FRONT OF PANEL MOUNTED INSTRUMENT
REAR OF PANEL MOUNTED INSTRUMENT
pH PROBE
RPU SHARED I/O AND CONTROL
OPERATOR CONSOLE SHARED DISPLAY OR KEYBOARD FUNCTION
AIR VENT FILTER
MAGNETIC FLOW METER
POSITIVE DISPLACEMENT FLOW METER
EQUIPMENT NUMBER
ELECTRO-PNEUMATIC SIGNAL CONVERTER
SHIELDED WIRE CUT & TAPE SHIELD

ABBREVIATIONS

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
A/O	AIR TO OPEN
A/C	AIR TO CLOSE
I/A	INSTRUMENT AIR
EE	ELECTRIC TRACED
ST	STEAM TRACED

SPECIAL DESIGNATIONS

DESIGNATION	FUNCTION/ABBREVIATION
Σ/N OR AVG	AVERAGING
± OR BI	BIAS
[1,1,1,2,3] (TYP)	BOOST,GAIN OR ATTENUATE (INPUT,OUTPUT)
Δ OR DIF	DIFFERENTIAL
÷ OR DIV	DIVIDE
√ OR SQ.RT.	EXTRACT SQUARE ROOT
X OR MUL	MULTIPLY
↑	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)
X	PROPORTIONAL
Y	UNDETERMINED COMPUTING RELAY
HOA	HAND-OFF-AUTO
SS	START-STOP
⊕	EXISTING INSTRUMENT TO BE REUSED
⊕	EXISTING INSTRUMENT TO BE RELOCATED
I/P	CURRENT TO PNEUMATIC TRANSDUCER
RUN	RUNNING
HOP	HAND-OFF CONTROL PANEL
O/C	OPEN-CLOSE
O/A	OFF-AUTO
O/C/A	OPEN-CLOSE-AUTO
I/O	INPUT / OUTPUT

PIPING SPECIFICATIONS

FLOWING MEDIUM	MED. CODE	MAT. CODE
BACK WASH	BW	A
CHILLED WATER	CHS, CHR	A
CHLORINE	CL	B1
CONDENSATE	LC	A
CONDENSER WATER	CWS, CWR	A
COOLING WATER	WS, WR	A
DRAIN	DR	A
EXTRACTION THICKENER OVERFLOW	ETO	A
FILTRATE EFFLUENT	FT	A
FLOCCULANT	FL	A
FLUSH WATER	FWS, FWR	A
FORCE MAIN	FM	H
INSTRUMENT AIR	IA	W
MELTER OFF-GAS	OGE	A
NITRIC ACID	AN	T1
PERCHED GND WATER	PGW	B
PHOSPHORIC ACID	PAPH	T1
PLANT AIR	PA	W
POLISHED WATER	PW	A
POTABLE WATER	DW	W
PROCESS WATER	TW	A
PROCESS WASTEWATER	CE	A
RAW WATER	RW	A
RECYCLE WATER	RC	A
SCRUBBER RECYCLE	RSL	A
SLURRY	SL	B2
SODIUM CARBONATE	SC	A
SODIUM HYDROXIDE	NH	T
SODIUM SILICATE	SS	A
STORM WATER	ST	A
SULFURIC ACID	SA	T1
SUMP DISCHARGE	SU	A
SUMP DRAIN	SU	B
VACUUM	V	A
VENT LINE	VE	A
WASTE WATER	WW	A

EXAMPLE:

CE-2"-A-100-BT

- MEDIUM CODE
- NOMINAL PIPE SIZE
- MATERIAL CODE
- LINE NUMBER
- HEAT TRACING AND INSULATION

A - A53,GR.A, SEAMLESS STEEL PIPE
B - PVC, SCHEDULE 80
B1 - PVCP, SCHEDULE 80
B2 - HDPE, 100 PSI
L - FIBERGLASS REINFORCED PLASTIC
H - DUCTILE IRON, CLASS 50
T - SCH. 40,304L, STAINLESS STEEL PIPE
T1 - SCH. 40, 316L, STAINLESS STEEL PIPE
W - SCH. 80,A53,GR. A, GALVANIZED STEEL PIPE

GENERAL INSTRUMENT SYMBOLS

FIC 102
- LETTERS OF IDENTIFICATION
- SPECIAL DESIGNATION
- INSTRUMENT TAG NUMBER

LOOP SHEET WIRING LEGEND

——— DENOTES WIRING BY CONTRACTOR
- - - - DENOTES WIRING BY CONTROL PANEL VENDOR
(C1) DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.1
(C2) DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.2

LOOP SHEET CABLE IDENTIFICATION

XX-XXX-XXX
- SEQUENTIAL NUMBER
- TYPE OF CABLE
  - M = MEASUREMENT
  - C = CONTROL
- LOOP NUMBER (030)
- PLANT/BLDG. NUMBER (01)

LETTERS OF INSTRUMENT IDENTIFICATION

LETTER	FIRST LETTER	2ND LETTER	3RD OR 4TH LETTER
	MEASURED OR INITIATING VARIABLE	MODIFIER	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	GAGING (DIM)	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	RADIOACTIVITY	RECORDER	----
S	SPEED OR FREQUENCY	SAFETY	SWITCH
T	TEMPERATURE	TRANSMITTER	TRANSMITTER
U	USER'S GUIDE	----	MULTIFUNCTION
V	VISCOSITY	----	VENT, VALVE
W	----	----	WELL
X	UNCLASSIFIED	----	UNCLASSIFIED
Y	RELAY	----	----
Z	POSITION	----	----

NOTES

B	CERTIFIED FOR CONSTRUCTION	
REV		

WATER SUPPLY
APPROVED
AS PER DEC BY COPY OF

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

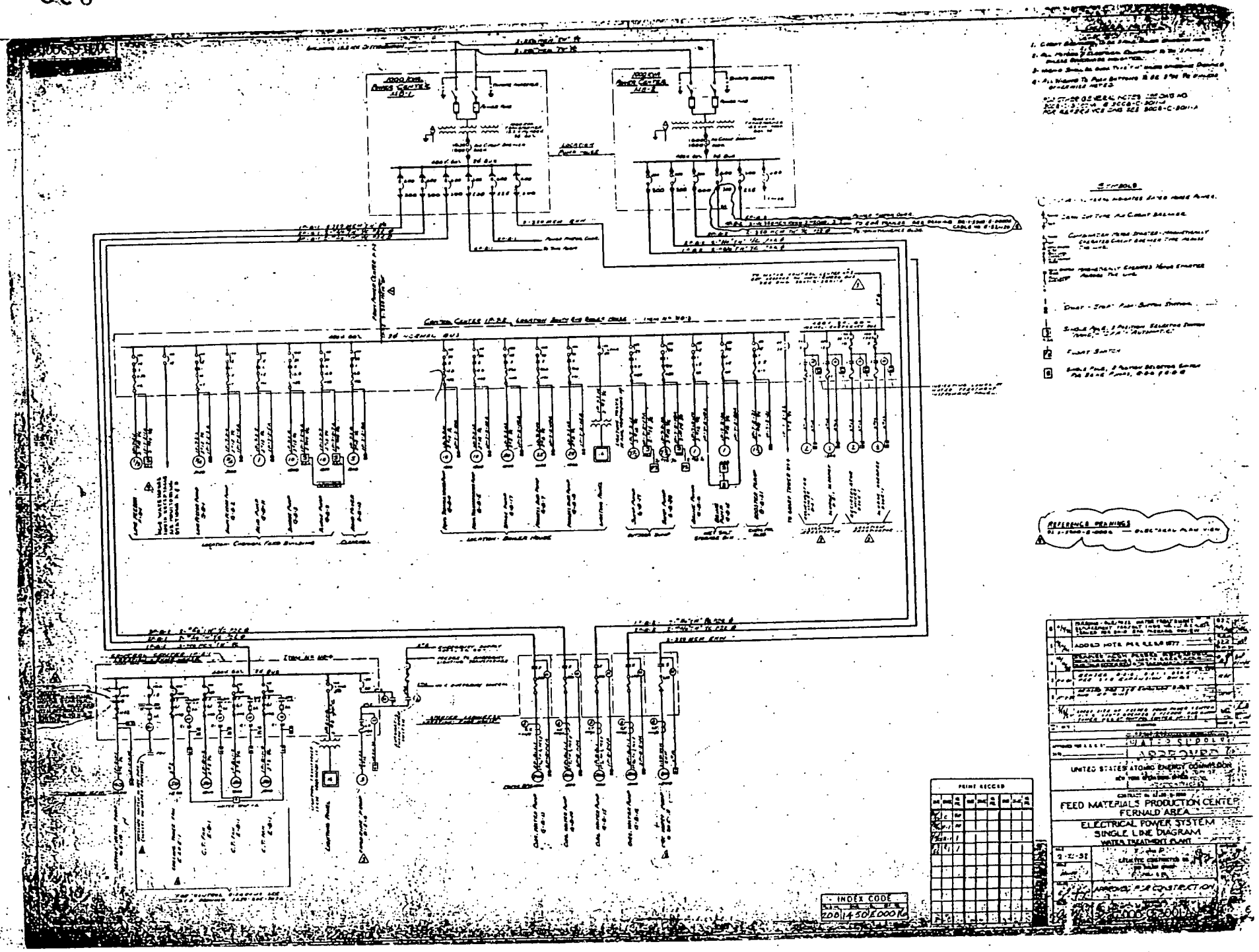
THE DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

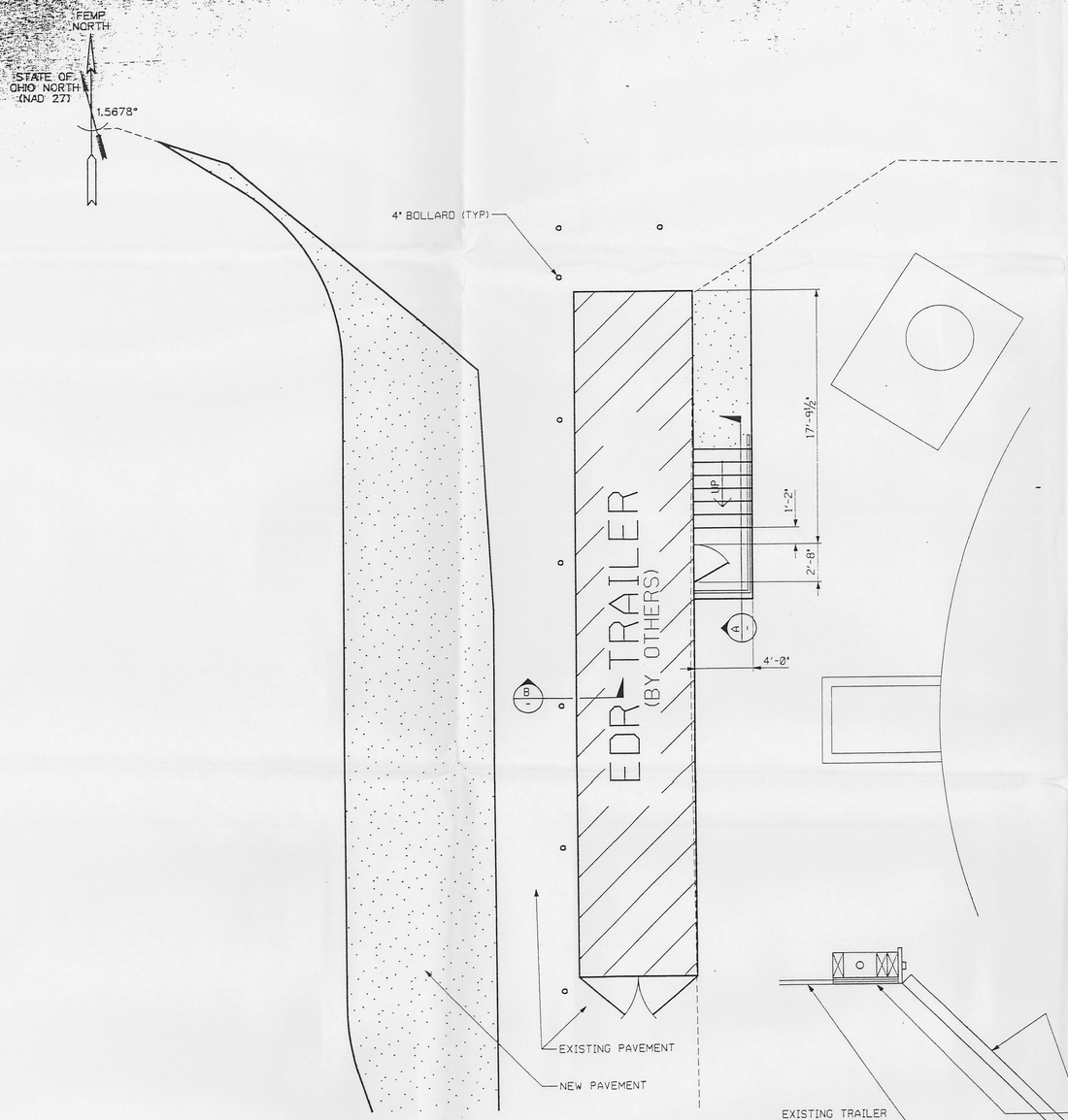
PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PC-2

DRAWING TITLE
MECHANICAL PROCESS
PIPING AND INSTRUMENTATION DIAGRAM
SYMBOLS AND LEGEND SHEET

DRAWN BY JIM LAWSON
CHECKED BY DAVID A. TOPE
SCALE NONE

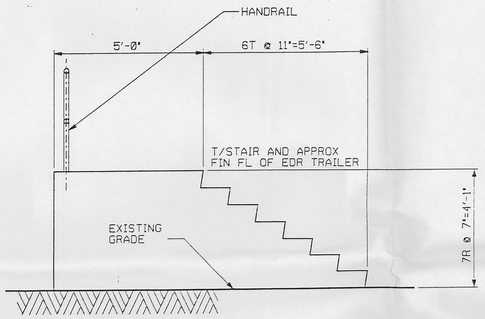
MBS 1116243
00-90701
92X-5900-N-00018.N2000


SYMBOLS
REFERENCE DRAWINGS
APPROVED
UNITED STATES ATOMIC ENERGY COMMISSION
FEED MATERIALS PRODUCTION CENTER
FERNALD AREA
ELECTRICAL POWER SYSTEM
SINGLE LINE DIAGRAM
WATER TREATMENT PLANT
APPROVED FOR CONSTRUCTION
PRINT RECORD
INDEX CODE



PLAN

¼"=1'-0"



SECTION A

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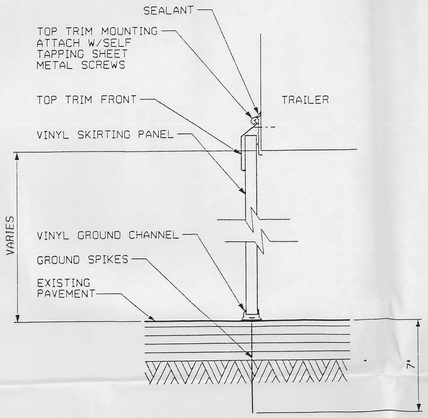

SECTION B

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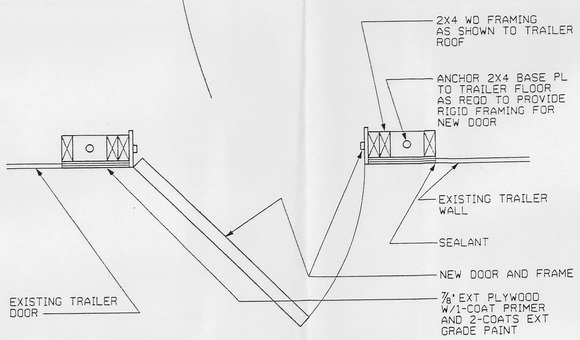
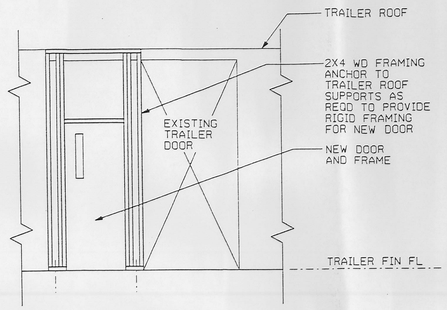


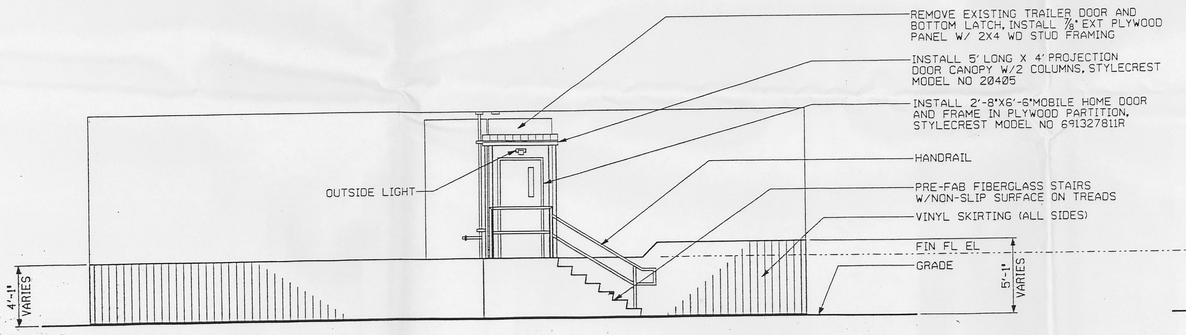
NEW DOOR-FRAMING PLAN

1½"=1'-0"



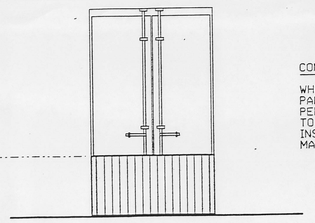
INTERIOR ELEVATION-NEW DOOR FRAMING

⅜"=1'-0"



EAST ELEVATION

¼"=1'-0"



SOUTH ELEVATION

¼"=1'-0"

CONSTRUCTION NOTE:

WHERE PIPING PENETRATES EXISTING TRANSITE WALL PANEL IN BOILER PLANT, PROVIDE EXPERIENCED PERSONNEL TO REMOVE A PORTION OF THE TRANSITE TO RECEIVE THE PIPING. WHEN PIPE HAS BEEN INSTALLED, CLOSE OPENING WITH WATERPROOF MATERIAL TO ENSURE A PROPER SEAL.

NOTES

PREFABRICATED STAIR SPECIFICATIONS

1. ALL STAIRS SHALL BE CONSTRUCTED TO MEET BOTH NFPA 101 AND OHIO BOCA CODE 1989.
2. STAIRS SHALL BE CONSTRUCTED OF A LAMINATED FIBERGLASS COATING. THIS COATING SHALL BE STURDY ENOUGH TO RESIST CRACKS OR CHIPS AND RESIST NORMAL WEAR.
3. ALL LUMBER SHALL BE PRESSURE TREATED, REINFORCED EXTERIOR GRADE.
4. THE PLATFORM AND STAIR TREADS SHALL BE SUBSTANTIALLY LEVEL AND MAY SLOPE A MAXIMUM OF ¼ INCH PER FOOT.
5. THERE SHALL BE NO VARIATION EXCEEDING 3/16 INCH IN THE DEPTH OF ADJACENT TREADS OR IN THE HEIGHT OF ADJACENT RISER, AND THE TOLERANCE BETWEEN THE LARGEST AND SMALLEST RISER OR BETWEEN THE LARGEST AND SMALLEST TREAD SHALL NOT EXCEED ⅜ INCH IN ANY FLIGHT.
6. ALL WALKING SURFACES SHALL BE PROTECTED BY A PERMANENT SLIP RESISTANT TYPE CONSTRUCTION CONSISTING OF A HEAVY GRIT TYPE SURFACE.
7. ALL STEPS SHALL HAVE COMPLETE HAND RAILS ON ALL OPEN SIDES. THE HANDRAILS SHALL BE NOT LESS THAN 34 INCHES NOR MORE THAN 38 INCHES ABOVE THE TREAD, MEASURED VERTICALLY TO THE TOP OF THE RAIL FROM THE TREAD AT THE LEADING EDGE. HANDRAILS SHALL BE DESIGNED AND CONSTRUCTED FOR A CONCENTRATED LOAD OF 200 POUNDS APPLIED AT ANY POINT AND IN ANY DIRECTION.
8. HANDRAILS ON THE TOP PLATFORM SHALL BE 42 INCHES FROM THE WALKING PLATFORM. PROVIDE A MIDRAIL HEIGHT OF 21 INCHES, OR OTHER RAILING(S) SUCH THAT A SPHERE WITH A DIAMETER OF 6 INCHES CANNOT PASS THROUGH ANY OPENING IS REQUIRED.
9. HANDRAILS SHALL NOT BE MADE OF WOOD OR ANY OTHER MATERIAL THAT MAY SPLINTER, CAUSING A HAND INJURY.
10. THE MAXIMUM DISTANCE BETWEEN THE LOWEST STAIR AND THE GROUND LANDING SHALL BE 7 INCHES.
11. STAIRS SHALL BE MANUFACTURED BY STYLE CREST FIBERGLASS DELUXE STEPS, FREMONT, OHIO, OR APPROVED EQUAL.
12. MANUFACTURER SHALL PROVIDE A LIMITED 5 YEAR WARRANTY, ON PLATFORM AND STAIRWAY.

VINYL SKIRTING SPECIFICATION

1. SKIRTING SHALL BE T-LOK VINYL SKIRT AS MANUFACTURED BY ALCOA BUILDING PRODUCTS, MANUFACTURED HOUSING PRODUCTS DIVISION, SIDNEY, OH OR APPROVED EQUAL.
2. VERIFY ALL DIMENSIONS IN FIELD BEFORE FABRICATION.
3. PROVIDE ACCESS PANELS AS REQUIRED FOR ACCESS TO PIPING, ETC.
4. PROVIDE GROUND SPIKES AND WIND STAY RODS AS REQUIRED.
5. MANUFACTURER SHALL PROVIDE A LIMITED 15 YEAR WARRANTY ON SKIRTING.

SHOP DRAWING REQUIREMENTS

1. VENDOR TO PROVIDE 10 COPIES AND 1 REPRODUCIBLE OF EACH PRODUCT SUPPLIED.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-X-00015	DRAWING INDEX

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	APPROVAL LETTER OF APPROVAL MERETO ATTACHED	OPERATOR INITIALS AND DATE	DOE
0	CERTIFIED FOR CONSTRUCTION	WATER SUPPLY APPROVED AS EVIDENCED BY COPY OF ENVIRONMENTAL PROTECTION AGENCY		

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

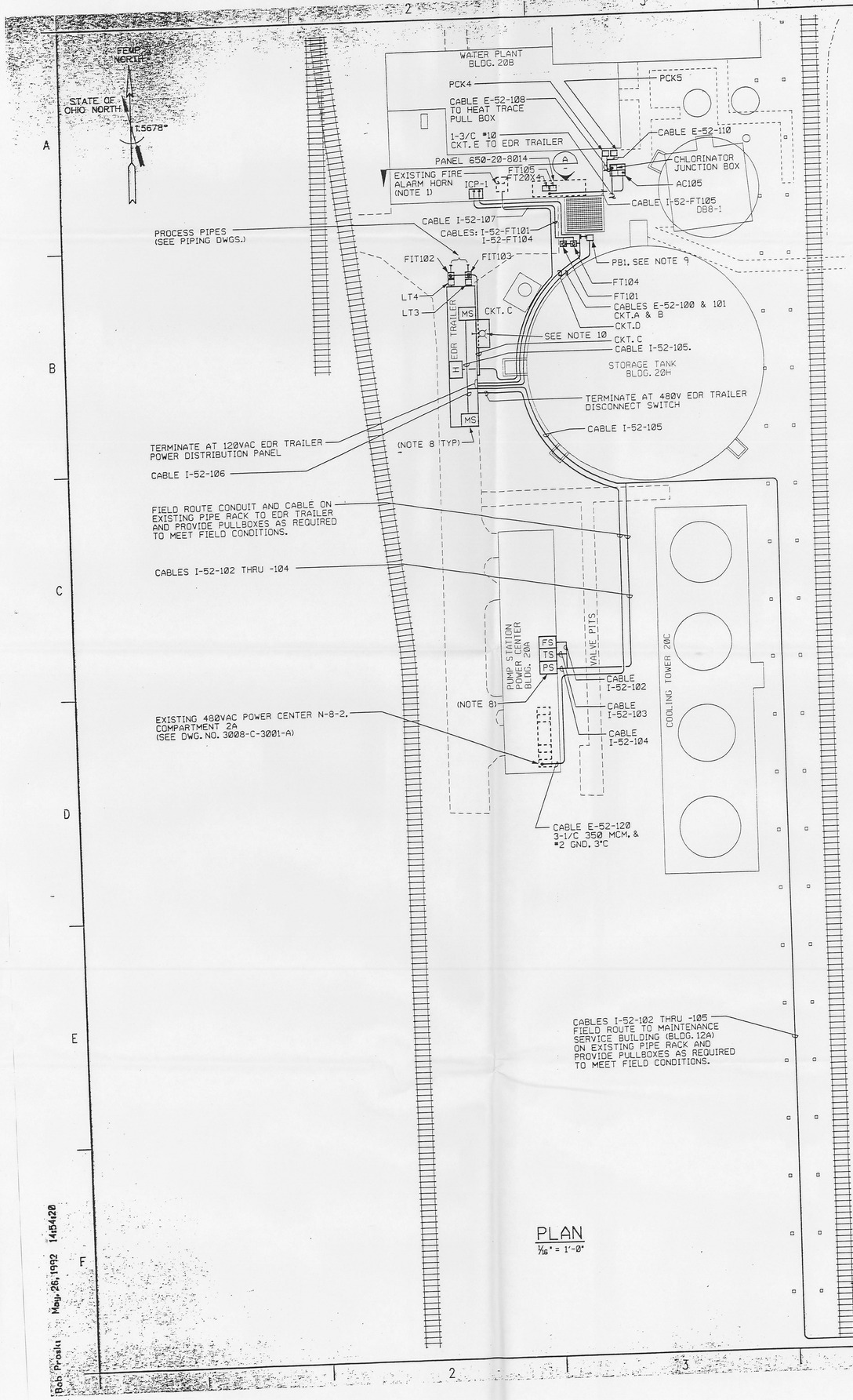
PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

DRAWING TITLE
ARCHITECTURAL
PLAN, ELEVATIONS AND SECTIONS
TRAILER STAIRS AND SKIRTING

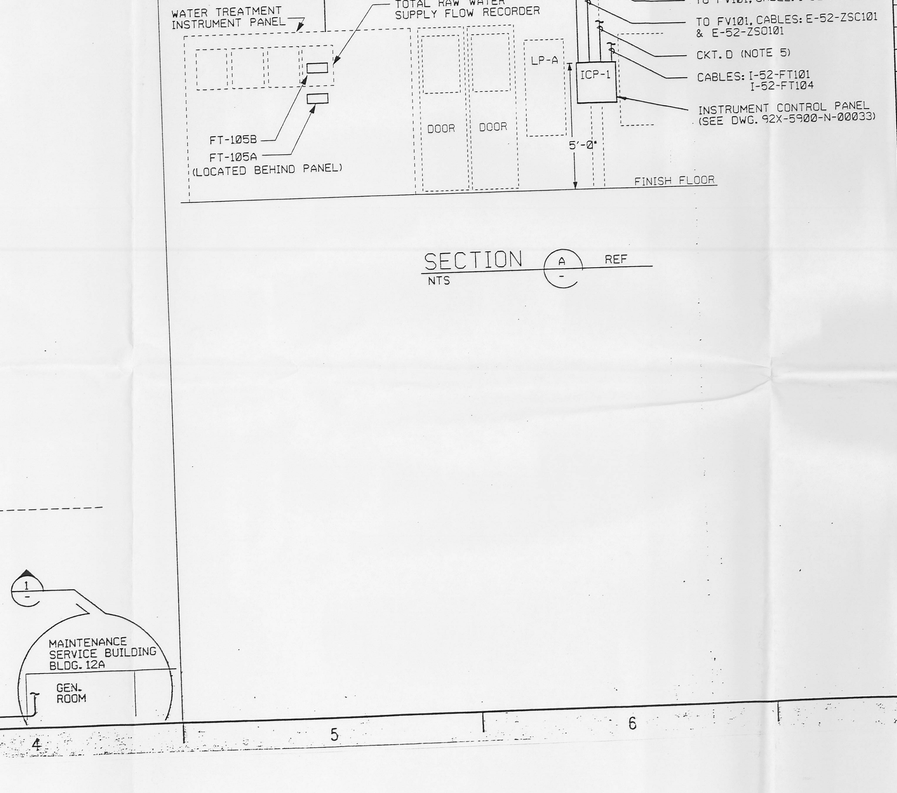
DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
K.L.RABBITT	3/9/92			A.W.SCHATZ	3/25/92
PLANT/BLDG. NO.		FLOOR		SCALE AS NOTED	

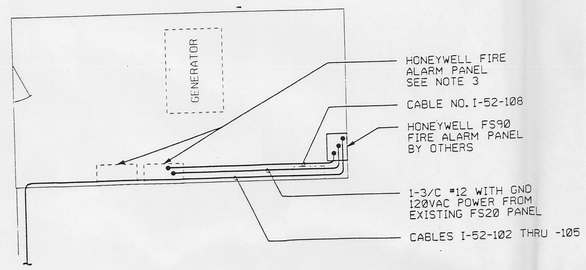
SUBMITTED FOR APPROVAL — A-E — DATE 7-14-92
APPROVAL RECOMMENDED — OPERATING CONTRACTOR — DATE
DRAWING APPROVED — DOE — DATE

DOE PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.6.2.4.0 00-90701	92X-5900-A-00032		0

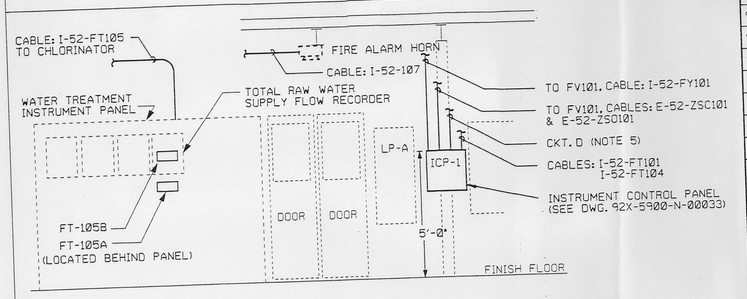


PLAN
1/16" = 1'-0"





DETAIL 1 REF
NTS



SECTION A REF
NTS

1. CONNECT EDR TRAILER FIRE ALARM HORN TO EXISTING FIRE ALARM HORN LOCATED OVERHEAD AT THE WATER TREATMENT CONTROL SOUTH ROOM ENTRYWAY.
2. SEE PIPING DRAWINGS FOR FLOW INDICATOR TRANSMITTERS & FLOW TRANSMITTERS. VERIFY LOCATION AND FIELD ROUTE ¾" CONDUIT TO TRANSMITTERS.
3. FIELD SHALL VERIFY LOCATION OF FIRE ALARM EQUIPMENT, CABLES AND CONDUITS. FIELD SHALL CONNECT AND VERIFY PROPER TERMINATIONS TO NEW EQUIPMENT.
4. ALL CONDUIT SHALL BE FIELD ROUTED. ROUTING AND EQUIPMENT LOCATIONS SHALL BE APPROVED BY THE CONSTRUCTION MANAGER.
5. FIELD SHALL PROVIDE 120VAC POWER FROM EDR TRAILER FOR THE FOLLOWING CIRCUITS.
   - CKT. A - 30A, SP - HEAT TRACE POWER FEEDER
   - CKT. B - 15A, SP - HEAT TRACE POWER FEEDER
   - CKT. C - 15A, SP - FLOW TRANSMITTER FIT102 & FIT103 POWER FEEDER
   - CKT. D - 15A, SP - FLOW TRANSMITTER FT101, FT104, AND INSTRUMENT PANEL POWER FEEDER
   - CKT. E - 30A, DP - CHLORINATOR POWER FEEDER
6. FIELD ROUTE CONDUIT TO POWER DISTRUBTION PANEL IN EDR TRAILER.
7. ALL CONDUIT SHALL BE ¾" UNLESS OTHERWISE NOTED.
8. FIRE ALARM DEVICES ARE NOT TO SCALE. EXACT LOCATION TO BE DETERMINED BY FIELD.
9. PB1 - 10"H x 8"W x 4"D, NEMA 4X. FIELD SUPPLIED & MOUNTED.
10. PROVIDE AND INSTALL OUTDOOR LIGHTING FIXTURE WITH PHOTOCELL AT TRAILER DOOR. (CROUSE-HINDS CAT# HPCT-50 120V-LL-PC). WIRE TO TRAILER EXISTING LIGHTING CIRCUIT.

LEGEND:

- NEW ELECTRICAL & INSTRUMENT EQUIPMENT OUTLINE
- EXISTING ELECTRICAL & INSTRUMENT EQUIPMENT OUTLINE (SECTIONS & DETAILS)
- UNDERGROUND FEATURES (PLAN)
- INSTRUMENT AIR LINE
- I-52-105 - INSTRUMENT CABLE NUMBER
- E-52-120 - ELECTRICAL CABLE NUMBER

REFERENCE DWG.*	REFERENCE DWG. TITLE
3008-C-3001-A	ELECTRICAL POWER SYSTEM SINGLE LINE DIAGRAM
92X-5900-E-00021	HEAT TRACING RISER DIAGRAM
92X-5900-E-00007	FIRE ALARM RISER DIAGRAM
92X-5900-G-00010	SITE PLAN AND EXISTING UTILITIES
92X-5900-N-00018	PIPING & INSTRUMENTATION SYMBOLS & LEGENDS
92X-5900-N-00019	PIPING & INSTRUMENT DIAGRAM
92X-5900-N-00033	INSTRUMENT LOOP DIAGRAM
92X-5900-P-00022	PIPING PLAN SHEET 1
92X-5900-P-00023	PIPING PLAN SHEET 2

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	INITIALS AND DATE
0	CERTIFIED FOR CONSTRUCTION	

WATER QUALITY / APPROVED / OHIO ENVIRONMENTAL PROTECTION AGENCY / AS EVIDENCED BY COPY OF LETTER OF APPROVAL LETTER ATTACHED / DATE / OPERATOR / DOE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PO52

DRAWING TITLE
ELECTRICAL
POWER PLAN, SECTION, & DETAIL

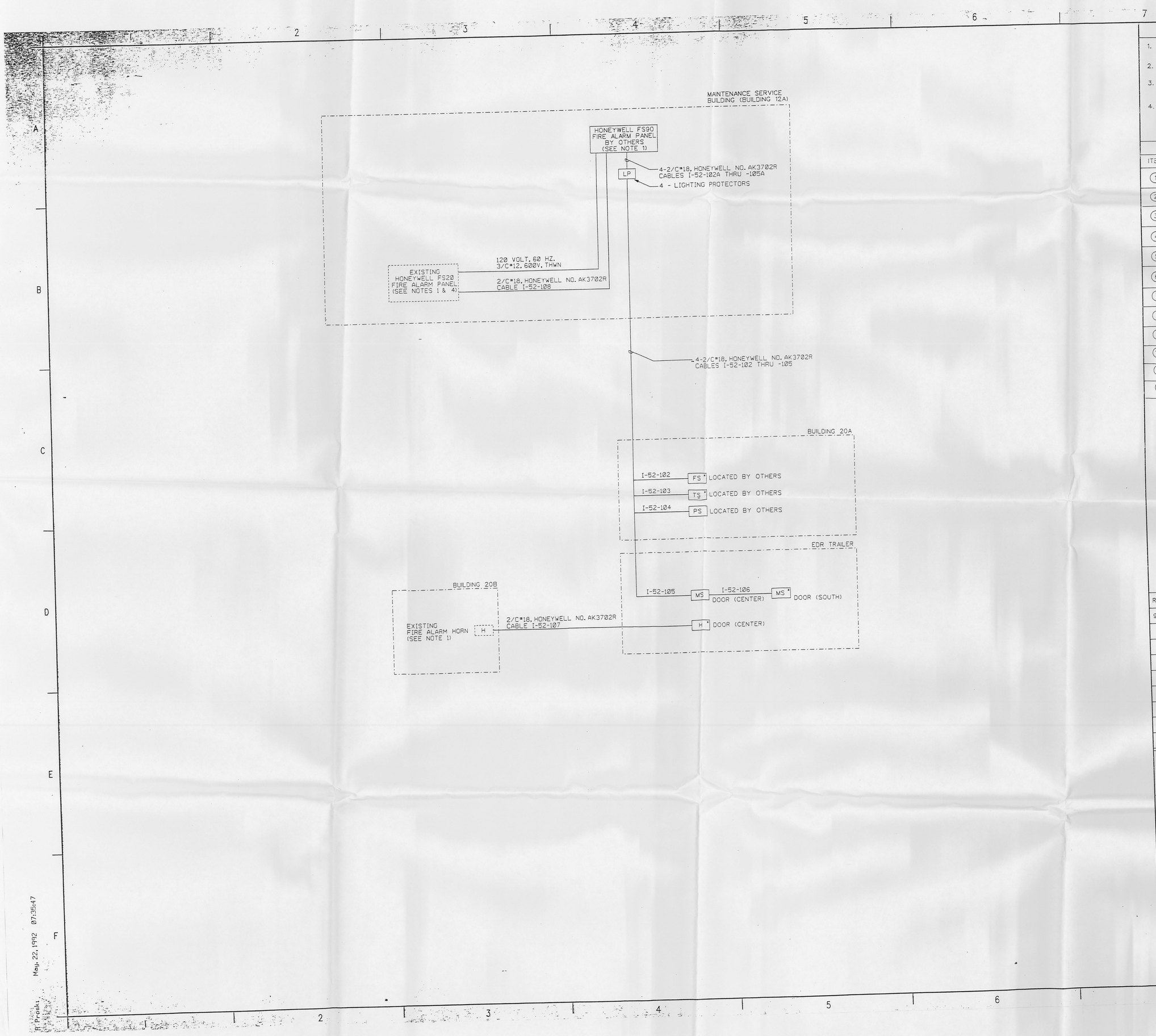
DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
E.R.LAWRENCE	03/03/92	James E Cooper	12 MAY 92	R.J.YUSKO	04/07/92

PLANT/BLDG. NO. — FLOOR — SCALE: AS SHOWN — CLASS

SUBMITTED FOR APPROVAL: Kathryn W. Riedel — DATE 26 May 92
APPROVAL RECOMMENDED: OPERATING CONTRACTOR — DATE 27 May 92
DRAWING APPROVED: DOE — DATE 27 May 92

A-E — DOE PROJECT NO. — OPER. CONTR. PROJ. NO. WBS 1.1.1.6.2.4.0 00-90701 — DRAWING NO. 92X-5900-E-00006 — SHEET NO. E0005 — REV. NO. 0

Bob Proalt May 26, 1992 14:54:28



NOTES

1. ALL FIRE ALARM SYSTEM TERMINATIONS IN EXISTING EQUIPMENT SHALL BE BY OTHERS.
2. THE APPROPRIATE HONEYWELL LIGHTNING PROTECTOR EXTENSION "-XXX" SHALL BE DETERMINED BY HONEYWELL.
3. IN ORDER TO INSURE COMPATABILITY WITH EXISTING PLANT EQUIPMENT, ALL NEW FIRE SYSTEM EQUIPMENT SHALL BE HONEYWELL. NO SUBSTITUTIONS SHALL BE ALLOWED.
4. CONNECT TO SPARE INPUT LOCATED ON EXISTING HONEYWELL FS20 FIRE ALARM PANEL SEE DWG. 92X-5900-E-00006.

HONEYWELL FS90 BILL OF MATERIAL (NOTE 3)

ITEM	QTY.	HONEYWELL CAT. NO.	DESCRIPTION
1	1	14505106-001	"AA" INITATING FUNCTION BOARD FOUR, TWO WIRE ZONES
2	1	14505110-002	"BF" INDICATING FUNCTION BOARD TWO ZONE, TWO WIRE, TWO RELAY
3	1	14505104-005	"CA" CONTROL FUNCTION BOARD
4	1	14505128-002	"LE" 8 WIRE COMMUNICATIONS FUNCTION BOARD
5	1	14505102-002	MOTHERBOARD ASSEMBLY
6	1	14505148-001	POWER SUPPLY
7	1	14505151-007	SINGLE ENCLOSURE
8	1	14506056-001	BATTERIES
9	1	14505159-001	TAMPER SWITCH ASSEMBLY
10	1	VCNV8000HH	HEATER & THERMOSTAT ASSEMBLY
11	1	VCNV8000HB	BLOWER & THERMOSTAT ASSEMBLY
12	4	14501600-001	1.91K OHM RESISTOR

LEGEND:

- H — FIRE ALARM HORN - HONEYWELL NO. SC806A1046
- LP — LIGHTNING PROTECTOR - HONEYWELL NO. 14502412-XXX (SEE NOTE 2)
- PS — PRESSURE SWITCH - POTTER NO. PS40, PROVIDED BY OTHERS
- MS — MANUAL PULL STATION - HONEYWELL NO. S464A1102
- TS — POST INDICATOR VALVE TAMPER SWITCH POTTER NO. OSYSU-A, PROVIDED BY OTHERS
- FS — FLOW SWITCH - POTTER NO. WFSRC PROVIDED BY OTHERS
- * REQUIRES 1.91KOHM, 1/2 WATT RESISTOR (END-OF-LINE)
- ------ EXISTING EQUIPMENT

REFERENCE DWG.*	REFERENCE DWG. TITLE
92X-5900-E-00006	ELECTRICAL POWER PLAN

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	INITIALS AND DATE
Ø	CERTIFIED FOR CONSTRUCTION	

WATER SUPPLY APPROVED AS EVIDENCED BY COPY OF LETTER OF APPROVAL

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PO52

DRAWING TITLE
ELECTRICAL
FIRE ALARM RISER DIAGRAM
WATER PLANT AREA BLDG.

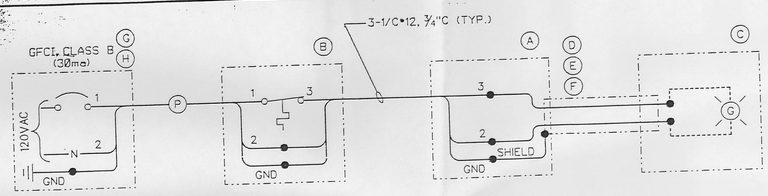
DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
B. JASPER	02/24/92		26 MAY 92	R.J. YUSKO	04/07/92

PLANT/BLDG. NO. | FLOOR | SCALE | CLASS

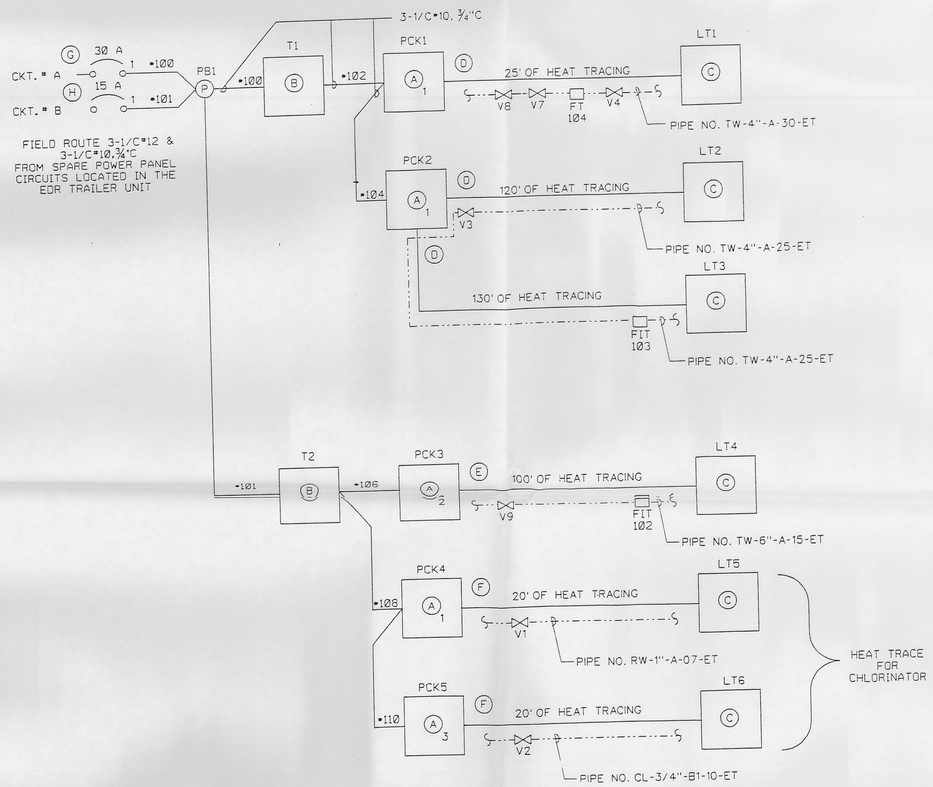
SUBMITTED FOR APPROVAL: Kathryn W. Rudel, A-E, DATE 26 May 92
APPROVAL RECOMMENDED: OPERATING CONTRACTOR, DATE 27 May 92
DRAWING APPROVED: DOE, DATE 27 May 92

DOE PROJECT NO. | OPER. CONTR. PROJ. NO. WBS 1.1.1.6.2.4.0 00-90701 | DRAWING NO. 92X-5900-E-00007 | SHEET NO. E0006 | REV. NO. Ø

May. 22, 1992 07:35:47
R. Proaks



TYPICAL WIRING DIAGRAM FOR HEAT TRACING SYSTEM



LEGEND:

- (P) - PULL BOX
- ⋈ - VALVE
- □ - FLOW INDICATOR TRANSMITTER (FIT)
- • - ALL CABLE NO.'S PREFIXED WITH E-52-• EXAMPLE E-52-102
  USED CABLE NO.'S 100 THRU 102,104,106,108,110
  UNUSED CABLE NO.'S 103,105,107,109,111 THRU 115
- GFCI - GROUND FAULT CIRCUIT INTERRUPTER

NOTES

1. HEAT TRACING SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
2. HEAT TRACING SYSTEMS SHALL BE MARKED CONSPICUOUSLY WITH WARNING SIGNS (AVAILABLE FROM CHEMELEX) AT 10'-0" (NOMINAL) INTERVALS.
3. FASTEN HEAT TRACE CABLE TO PIPE LINES USING ADHESIVE TAPE, CHEMELEX CAT. NO. GT-66 OR EQUAL.
4. INSTALL HEAT TRACE CABLE ON FITTINGS, VALVES, ETC. SO THAT HEAT TRACE CAN BE READILY MOVED ASIDE WHEN MAINTENANCE IS REQUIRED.
5. PROVIDE STAINLESS STEEL IDENTIFICATION TAGS AT ALL DEVICES AND MARK ASSEMBLY WITH CIRCUIT NUMBER.
6. CONNECT GROUND WIRE TO GROUND TERMINATIONS PROVIDED IN POWER CONNECTION BOXES.
7. HEAT TRACE INSULATION SHALL HAVE A WEATHER-PROOF ALUMINUM OUTER METAL COVERING.
8. WEATHER-PROOF OUTER METAL COVERING SHALL BE SECURED WITH STAINLESS STEEL BANDS. SCREWS SHALL NOT BE USED TO SECURE THE WEATHER-PROOF OUTER COVERING.
9. WEATHER-PROOF OUTER METAL COVERING JOINTS SHALL BE SEALED WITH SILICONE SEALANT.
10. HEAT TRACE CABLE LENGTHS INDICATED ARE ESTIMATED, ACTUAL LENGTHS MAY VARY WITH FIELD INSTALLATION.
11. PILOT LIGHTS SHALL BE INSTALLED AT THE END OF HEAT TRACE CIRCUIT AND SHALL BE LOCATED SO AS TO BE EASILY VISIBLE.

BILL OF MATERIAL

ITEM	QUANTITY	DESCRIPTION
(A)1	3	RAYCHEM POWER CONNECTION KIT,CHEMELEX CAT. NO. PMKG-JLP-3. (PCK1, PCK2, & PCK4)
(A)2	1	RAYCHEM POWER CONNECTION KIT,CHEMELEX CAT. NO. PMKG-JLP-10. (PCK3)
(A)3	1	RAYCHEM POWER CONNECTION KIT,CHEMELEX CAT. NO. PMKG-JLP-1. (PCK5)
(B)	2	RAYCHEM THERMOSTAT,CHEMELEX TYPE AMC-1A-(UE), SINGLE POLE,DOUBLE THROW, NEMA 4X, 22 AMP, 120 VOLT. (T1 &T2)
(C)	6	RAYCHEM PILOT LIGHT CONNECTION KIT,CHEMELEX CAT.NO.AMG-BCII & AML-1N. (LT1 THRU LT6)
(D)	275 FT	RAYCHEM AUTO-TRACE,SELF REGULATING,CAT. NO. 5BTV1-CR (5 WATTS/FT).
(E)	100 FT	RAYCHEM AUTO-TRACE,SELF REGULATING,CAT. NO. 8BTV1-CR (8 WATTS/FT).
(F)	40 FT	RAYCHEM AUTO-TRACE,SELF REGULATING,CAT. NO. 3BTV1-CR (3 WATTS/FT).
(G)	1	WESTINGHOUSE, 30A, GFCI, CLASS B, 1 POLE, CAT. NO. GFEF130
(H)	1	WESTINGHOUSE, 15A, GFCI, CLASS B, 1 POLE, CAT. NO. GFEF115

REFERENCE DWG.#	REFERENCE DWG. TITLE
92X-5900-P-00022	PIPING PLAN SHEET 1
92X-5900-P-00023	PIPING PLAN SHEET 2
92X-5900-E-00006	ELECTRICAL POWER PLAN
92X-5900-N-00019	PIPING AND INSTRUMENTATION DIAGRAM
92X-5900-F-00020	PROCESS FLOW DIAGRAM

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	INITIALS AND DATE
0	CERTIFIED FOR CONSTRUCTION	

WATER SUPPLY ADEQUATE AS EVIDENCED BY COPY OF LETTER OF APPROVAL OHIO ENVIRONMENTAL PROTECTION AGENCY

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PO52

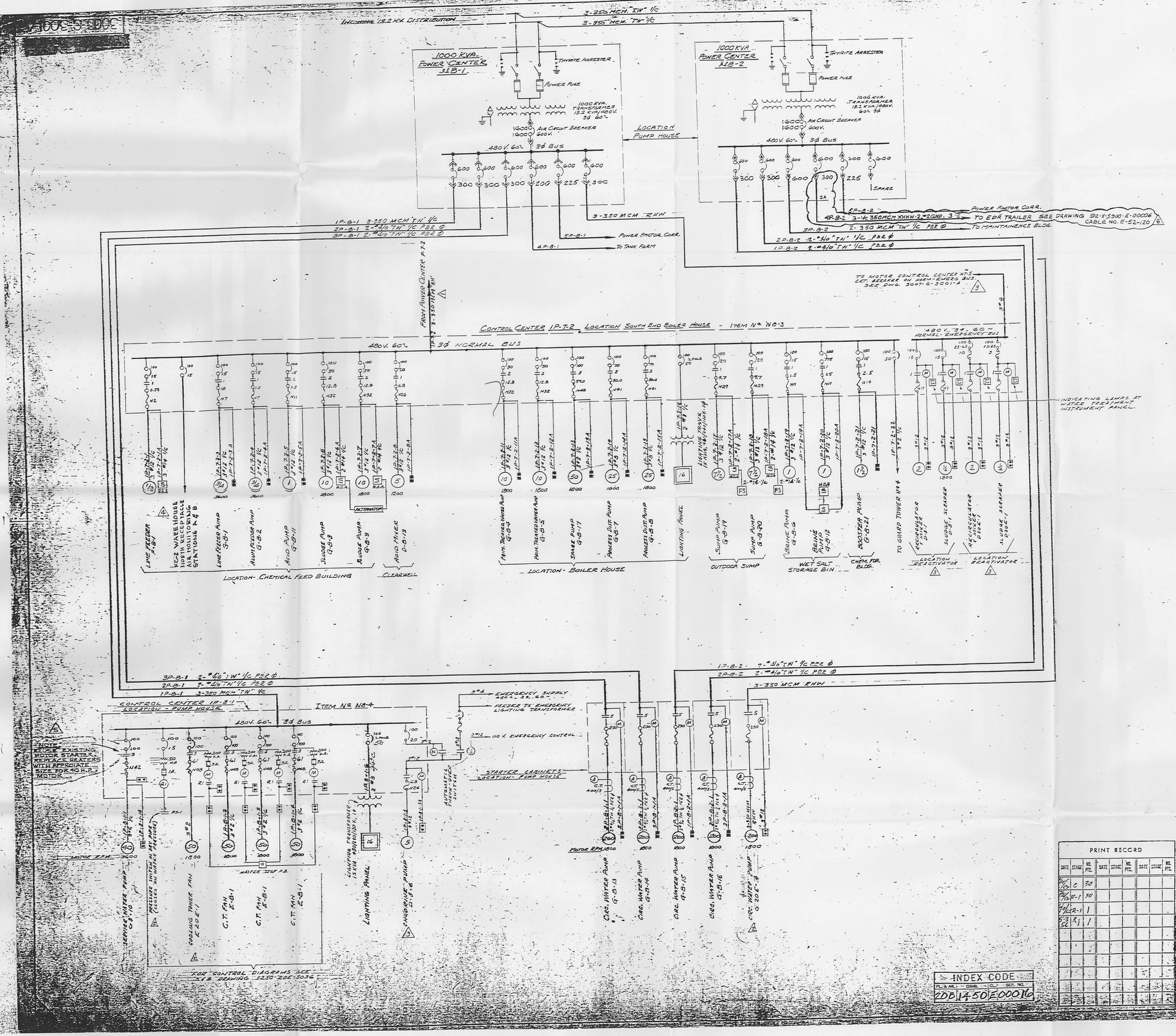
DRAWING TITLE
ELECTRICAL
HEAT TRACE RISER DIAGRAM

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
E. R. LAWRENCE	03/17/92	James L Cooper	26 MAY 92	R.J. YUSKO	04/07/92

PLANT/BLDG. NO. | FLOOR | SCALE | CLASS

SUBMITTED FOR APPROVAL: Kathryn W. Riedel, 29 May 92 (A-E) | APPROVAL RECOMMENDED: 27 May 92 (OPERATING CONTRACTOR) | DRAWING APPROVED: R C Im, 27 May 92 (DOE)

DOE PROJECT NO. | OPER. CONTR. PROJ. NO. WBS 1.1.1.6.2.4.0 00-90701 | DRAWING NO. 92X-5900-E-00021 | SHEET NO. E0007 | REV. NO. 0



GENERAL NOTES

1. CIRCUIT BRK. WIRES TO BE 3 PHASE UNLESS OTHERWISE NOTED.
2. ALL MOTORS & ELECTRICAL EQUIPMENT TO BE 3 PHASE UNLESS OTHERWISE INDICATED.
3. WIRING SHALL BE 600V. TYPE TW UNLESS OTHERWISE SPECIFIED
4. ALL WIRING TO PUSH BUTTONS TO BE 3 #14 1/C UNLESS OTHERWISE NOTED.

FOR OTHER GENERAL NOTES SEE DWG NO. 3008-C-3-123-A & 3008-C-3011-A
FOR REFERENCE DWG. SEE 3008-C-3011-A

SYMBOLS

- MOTOR - NUMERAL INDICATES RATED HORSE POWER.
- FRAME, TYPE, SIZE, CATALOG — DRAW OUT TYPE AIR CIRCUIT BREAKER.
- FRAME, TYPE, NEMA STARTER SIZE, FULL LOAD CURRENT, 49/3 HEATER SIZE — COMBINATION MOTOR-STARTER-MAGNETICALLY OPERATED CIRCUIT BREAKER. TYPE ACROSS THE LINE.
- NEMA STARTER SIZE, FULL LOAD CURRENT — MAGNETICALLY OPERATED MOTOR STARTER ACROSS THE LINE.
- "START - STOP" PUSH-BUTTON STATION.
- S — SINGLE POLE, 3 POSITION SELECTOR SWITCH "HAND" - "OFF" - AUTOMATIC.
- FS — FLOAT SWITCH
- S — SINGLE POLE, 2 POSITION SELECTOR SWITCH - FOR BRINE PUMPS, G-B-6 & G-B-12

REFERENCE DRAWINGS
92 X-5900-E-00006 — ELECTRICAL PLAN VIEW

REV. NO.	DATE	DESCRIPTION	DRAWN BY	APP'D
6	4/7/92	PARSONS - DU2/PO52 WATER TREATMENT REPLACEMENT PROJECT (WBS NO. DU.02.2.0) ISSUED FOR OHIO EPA PACKAGE REVIEW	BJJ	GLC
5	4/10/91	ADDED NOTE PER R.E.S.# 1577	RGH	GLC
4	10/14/85	REMOVED ALUM FEEDER F-B-14 ADDED CHEM WAREHOUSE, WATER RECEIVER, AIR HOUSE, BOILER HOUSE STATIONS A & B	DJ	BJP
3	4-11-60	REVISED D-B-6 D-B-1 & D-B-6 PER SKB EXPANSION DWGS	RW	
2	11-13-59	REVISED PER SKB EXPANSION DWGS AND EP 6-117	RW	
1	3/9/59	ADDED SIZE OF FEEDER FROM POWER CENTER P-T-2 ADDED BREAKER & FEEDER FOR GUARD TOWER Nº4 AT CONTROL CENTER 1P-T-2	MC	

REVISIONS

APPROVED FOR A. E. C. BY: WATER SUPPLY
DATE: APPROVED

UNITED STATES ATOMIC ENERGY COMMISSION
AS PARTIALLY EXPANDED BY COPY OF
NEW YORK OPERATIONS OFFICE PROVAL
HERETO ATTACHED

CONTRACT No. AT(30-1)-1068

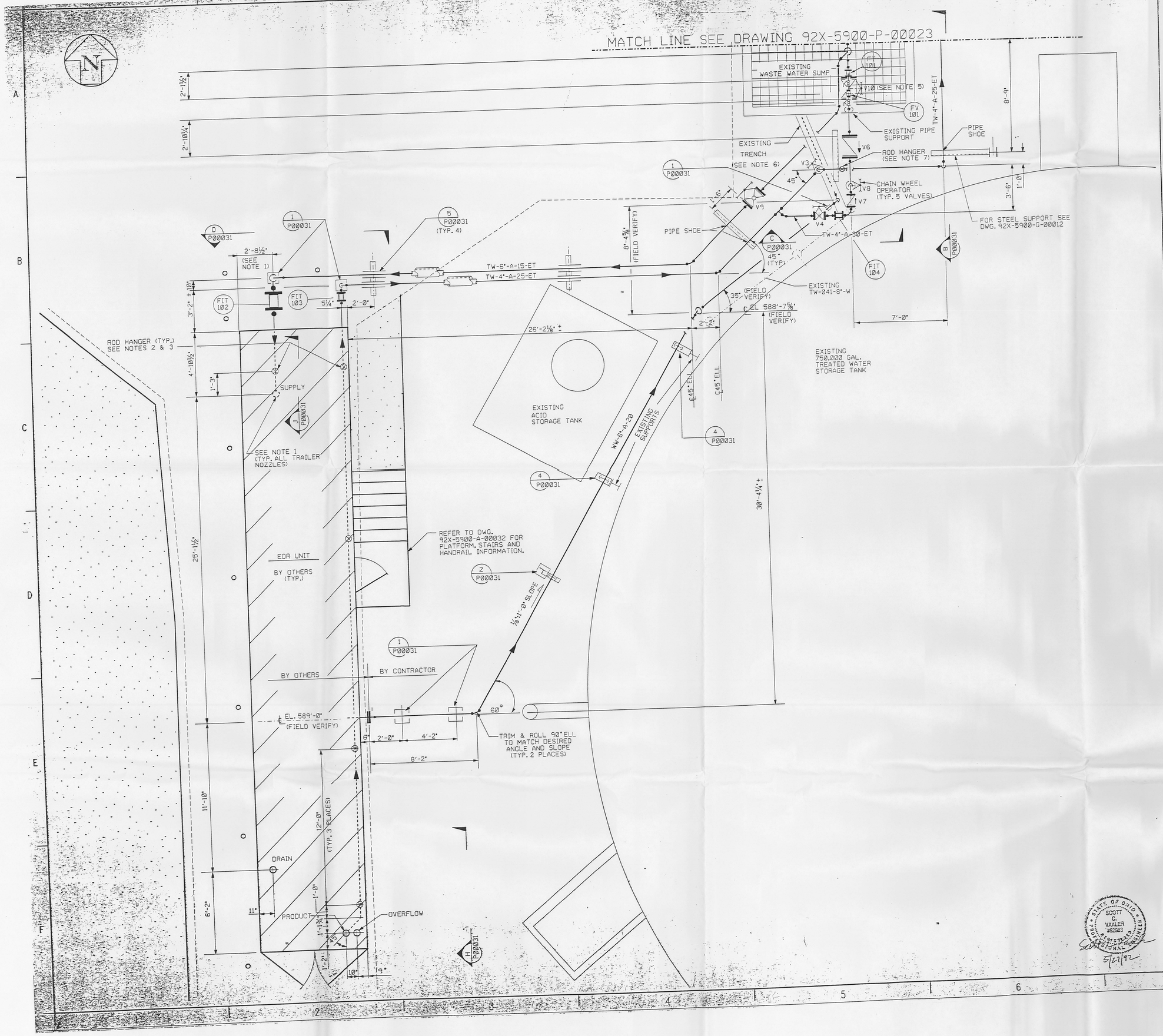
FEED MATERIALS PRODUCTION CENTER
FERNALD AREA

ELECTRICAL POWER SYSTEM
SINGLE LINE DIAGRAM
WATER TREATMENT PLANT

DATE 2-21-57
SCALE Non-to
DRAWN
CATALYTIC CONSTRUCTION CO.
1500 WALNUT STREET
PHILA. 2, PA.
APPROVED FOR CONSTRUCTION
DRAWING NO. 3008-C-3001-A

PRINT RECORD

DATE	STAGE	NO. PTS.	DATE	STAGE	NO. PTS.	DATE	STAGE	NO. PTS.
2/6/92	C	30						
2/6/92-1		30						
4/7/92-1		1						
4/23/92	R1	1						



1. FIELD TO VERIFY TRAILER NOZZLE LOCATIONS AND CENTERLINE OR FACE OF FLANGE ELEVATIONS.

2. SUPPORT TW-4"-A-25-ET UNDER TRAILER WITH ADJUSTABLE CLEVIS FOR A 4" DIA. INSULATED LINE. USE ½" DIA. ROD ATTACHED TO UNDERSIDE OF TRAILER FLOOR SUPPORTS. (ADDITIONAL STEEL MAY HAVE TO BE FASTENED TO THE TRAILER FLOOR SUPPORT MEMBERS TO OBTAIN CORRECT SPACING.)

3. SUPPORT TW-6"-A-15-ET UNDER TRAILER WITH ADJUSTABLE CLEVIS FOR A 6" DIA. INSULATED LINE. USE ¾" DIA. ROD ATTACHED TO UNDERSIDE OF TRAILER FLOOR SUPPORTS. (ADDITIONAL STEEL MAY HAVE TO BE FASTENED TO THE TRAILER FLOOR SUPPORT MEMBERS.)

4. ALL PIPE SUPPORTS, U-BOLTS, SHOES, AND GUIDES, AS WELL AS, UNINSULATED PIPING SHALL BE PAINTED IN ACCORDANCE WITH THE PAINTING-PIPE SUPPORTS AND BOLLARDS NOTES ON DRAWING: 92X-5900-G-00012.

5. REMOVE FROM SERVICE AN EXISTING SET OF ORIFICE FLANGES WITH ORIFICE PLATE AND INSTUMENT TUBING LOCATED OVER THE WASTE WATER SUMP ON EXISTING LINE NUMBER TW-041-8"-W.

6. REMOVE EXISTING DRAIN LINE LOCATED WITHIN THE EXISTING COVERED TRENCH. THE TRENCH HAS A LAYER OF CONCRETE POURED OVER ITS TOP. ADDITIONALLY, EXISTING SUMP WALL PENETRATION AND TRENCH MAY HAVE TO BE ENLARGED TO ACCOMMODATE THE NEW 6" COATED AND WRAPPED PIPE LINE. BACKFILL TRENCH WITH 2500 PSI CONCRETE HAVING ⅜" AGGREGATE. FOLLOWING INSTALLATION AND TESTING OF NEW PIPELINE, HAND TAMP WITH CARE NOT TO DAMAGE COATING AND WRAPPED PROTECTIVE PIPE COVER.

7. SUPPORT TW-4"-A-25-ET WITH ADJUSTABLE CLEVIS FOR A 4" DIA. INSULATED LINE. USE ½" DIA. ROD AND BEAM CLAMP WITH RETAINING CLIP.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-N-00019	PIPING & INSTRUMENTATION DIAGRAM
92X-5900-G-00012	CIVIL/STRUCTURAL SITE DETAILS
92X-5900-G-00010	SITE PLAN AND EXISTING UTILITIES
92X-5900-P-00023	PIPING PLAN SHEET 2
92X-5900-P-00031	PIPING SECTIONS & DETAILS
92X-5900-P-00034	FIRE PROTECTION PLAN
92X-5900-A-00032	ARCHITECTURAL PLAN, ELEVATIONS AND SECTIONS

WATER SUPPLY APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
AS EVIDENCED BY COPY OF LETTER OF APPROVAL HERETO ATTACHED

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A/E	OPERATOR	DOE
0	CERTIFIED ROR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/P052

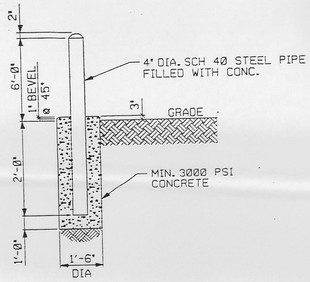
DRAWING TITLE
PIPING/PLANT DESIGN
PIPING PLAN SHEET 1
EDR PROCESS WATER SYSTEM

DRAWN BY	DATE	DESIGNED/CHECKED BY	DATE	CHECKED BY	DATE
J.STEMPA	3/3/92		5-22-92	J.A.TABB	4/7/92

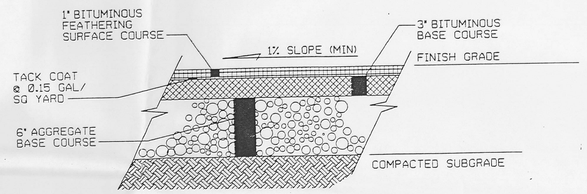
PLANT/BLDG. NO. | SCALE ⅜" = 1'-0" | CLASS

SUBMITTED FOR APPROVAL | APPROVAL RECOMMENDED | DRAWING APPROVED
A/E DATE | OPERATING CONTRACTOR DATE | DOE DATE

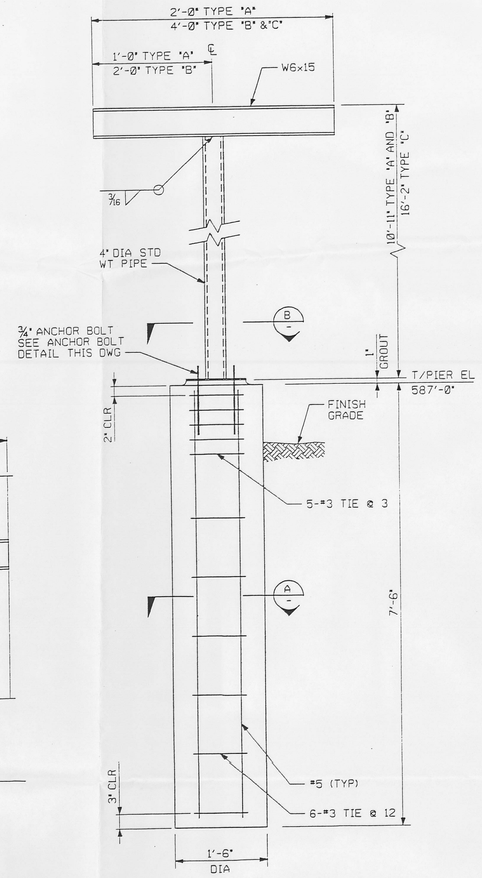
DOE PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.6.2.4.0 .OC-9C701	92X-5900-P-00022	P0002	0



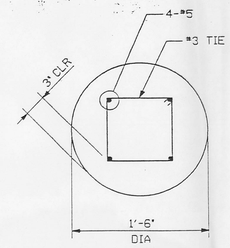
DETAIL 2 (NTS) REF G00012 G00010



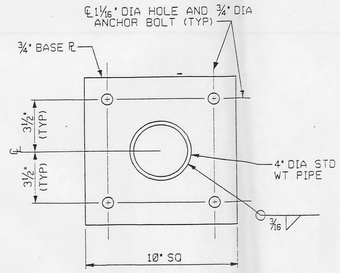
DETAIL 3 (NTS) REF G00012 G00010



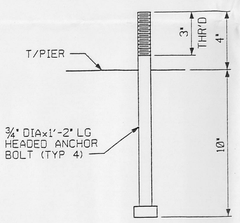
TYPE "A", "B" AND "C" PIPE SUPPORTS
1" = 1'-0"



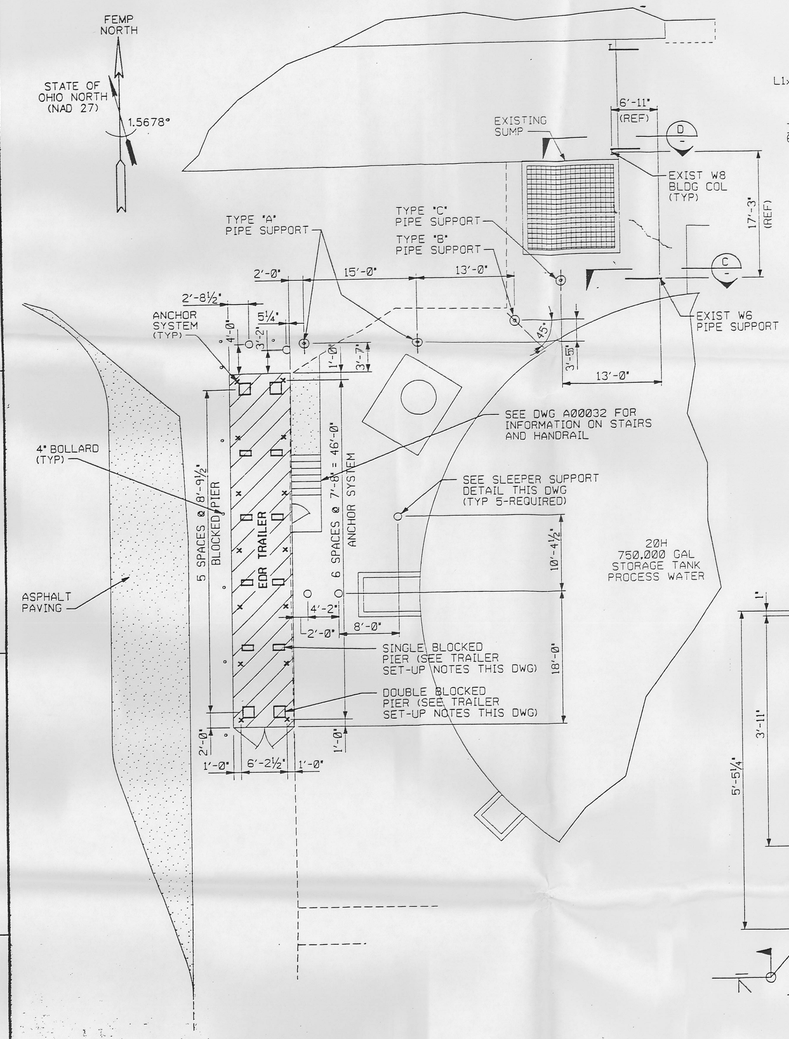
SECTION A (1½"=1'-0")



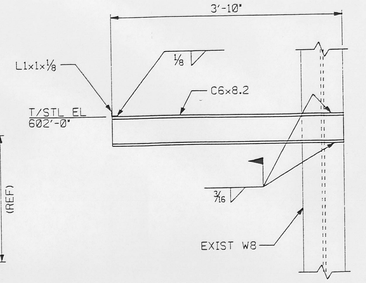
SECTION B (3"=1'-0")



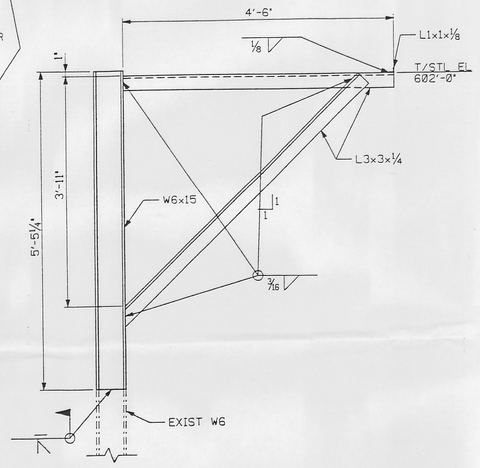
ANCHOR BOLT DETAIL
3"=1'-0"



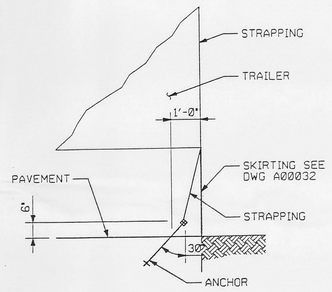
TRAILER ANCHORS AND PIPE SUPPORTS
PLAN
⅛" = 1'-0"



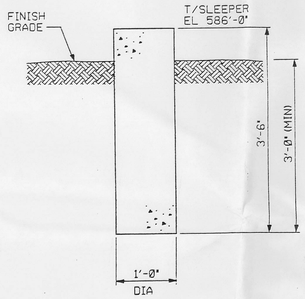
SECTION D
1"=1'-0"



SECTION C
1"=1'-0"



ANCHOR SYSTEM
NTS



SLEEPER SUPPORT DETAIL
1"=1'-0"

NOTES

PAINTING - PIPE SUPPORTS AND BOLLARDS

ALL PAINT MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE LATEST STANDARDS : SSPC. VOL 1. 1982 AND SSPC. VOL 2. 1989
PAINT AS FOLLOWS:

1. ALL EXPOSED STEEL-
   ONE COAT - HIGH GLOSS. PREMIUM QUALITY, QUICK DRYING ALKYD ENAMEL
2. COLOR-
   BOLLARDS - SAFETY YELLOW (SOUTHERN COATING #2910 OR APPROVED EQUAL)
   STRUCTURAL STEEL - GRAY (SOUTHERN COATING #8378 OR APPROVED EQUAL)

TRAILER SET-UP NOTES:

1. LOCATE TRAILER AT COORDINATES AS SHOWN ON DRAWING 92X-5900-G-00010.
2. JACK AND LEVEL TRAILER TO FINAL FLOOR ELEVATION AS SHOWN ON DRAWING 92X-5900-A-00032.
3. LOCATE PIERS AS SHOWN ON THIS DRAWING.
4. PROVIDE DOUBLE BLOCKED PIERS AT ENDS OF TRAILER AND SINGLE BLOCKED INTERIOR PIERS AS ILLUSTRATED IN "SITING AND USE OF OFFICE TRAILERS AND OTHER PORTABLE STRUCTURES AT THE FMPC", ATTACHMENT A, WMCO DOCUMENT NO IHS-F-06.
5. INSTALL TREATED WOOD CAP PLATE AND DRIVE CEDAR WEDGE SHIMS TIGHTLY.
6. REMOVE WHEELS FROM TRAILER.
7. INSTALL ANCHORS AND TIE - DOWN STRAPPING.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-X-00015	DRAWING INDEX
92X-5900-X-00016	LEGEND
92X-5900-G-00010	PLAN SITE AND EXISTING UTILITIES
92X-5900-A-00032	PLAN, ELEVATIONS AND SECTIONS - TRAILER STAIRS & SKIRTING

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION			

WATER SUPPLY
APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
LETTER OF APPROVAL ATTACHED AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

DRAWING TITLE
CIVIL/STRUCTURAL SITE DETAILS

DRAWN BY	DATE	DESIGNED/CHECKED BY	DATE	CHECKED BY	DATE
L.J.GEORGE	03/03/92		5/27/92	W.KAO	03/20/92

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
		AS NOTED	

SUBMITTED FOR APPROVAL: Kathryn W. Riedel — A-E — DATE 24-Mar-92
APPROVAL RECOMMENDED: — OPERATING CONTRACTOR — DATE 27-May-92
DRAWING APPROVED: RC — DOE — DATE

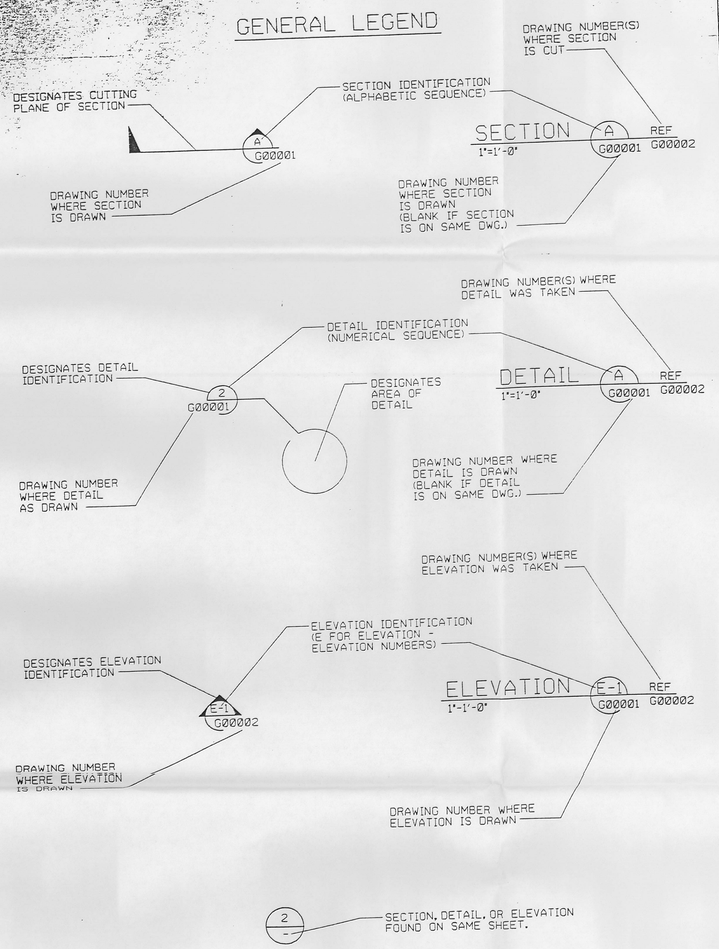
DOE PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.5.2.4.8 00-90701	92X-5900-G-00012	G00003	0

STATE OF OHIO — RAYMOND J. JACHAY — E-53181 — PROFESSIONAL ENGINEER

May. 21, 1992 14:18:28
d. Fox

075

GENERAL LEGEND



NOTE:

ABBREVIATED DRAWING NUMBERS WILL BE USED FOR ALL SECTIONS, DETAILS OR ELEVATIONS I.E.

95X-5900-G-00002 - DRAWING NUMBER
G00002 - ABBREVIATED DRAWING NUMBER

DIMENSIONING:

DIMENSIONS AND /OR ELEVATIONS MARKED THUS(+/-) SHALL BE VERIFIED IN THE FIELD BY CONTRACTOR.

USE DIMENSIONS AS SHOWN, DO NOT SCALE.

NTS (NOT TO SCALE) IS SHOWN ONLY WHERE DIMENSION IS OBVIOUSLY OUT OF SCALE.

BALLOON LEGEND

PIV	POST INDICATOR VALVE	CB	STORM SEWER CATCH BASIN
SMH	SANITARY MANHOLE	HFH	HIGH PRESSURE FIRE HYDRANT
EMH	ELECTRICAL MANHOLE	LFH	LOW PRESSURE FIRE HYDRANT
TMH	TELEPHONE MANHOLE		

UTILITY SYMBOLS

EXISTING		PROPOSED
----- ST -----	STORM SEWER	—— ST ——
----- SN -----	SANITARY SEWER	—— SN ——
----- FG -----	FUEL GAS	—— FG ——
----- DW -----	DRINKING WATER	—— DW ——
----- FQI -----	FIRE PROTECTION	—— FQI ——
----- LS -----	LIVE STEAM	—— LS ——
----- WS -----	WATER SUPPLY	—— WS ——
----- WR -----	COOLING WATER RETURN	—— WR ——
----- TW -----	PROCESS WATER	—— TW ——
----- CE -----	CONTAMINATE WATER	—— CE ——
----- FT -----	FILTRATE OR EFFLUENT	—— FT ——
----- DF -----	DEIONIZED FEED	—— DF ——
----- PW -----	DEIONIZED WATER	—— PW ——
----- BR -----	BRINE	—— BR ——
----- RW -----	RAW WATER	—— RW ——
----- A -----	ALARM	—— A ——
----- CN -----	STEAM CONDENSATE	—— CN ——
----- VE -----	VENT LINES	—— VE ——
----- SD -----	SUB-SURFACE DRAINAGE	—— SD ——
----- SL -----	SUMP LIQUOR	—— SL ——
----- E -----	ELECTRICAL	—— E ——
----- E --◇--	OVERHEAD ELECTRICAL	—— E —●—
----- T -----	TELEPHONE	—— T ——
----- G -----	ELECTRIC GROUND	—— G ——
.....	ABANDONED	

SYMBOLS LEGEND

EXISTING		PROPOSED
	POST INDICATOR VALVE (PIV)	
	FIRE HYDRANT (FH)	
	MANHOLE (MH)	Ⓢ OR Ⓓ
	CATCH BASIN (CB)	D
	LIGHT POLE	
	PIPE SUPPORT	
	ELECTRICAL MANHOLE	E
	TELEPHONE MANHOLE	T
	STREET WASHERS	
	VALVE BOX	
	MONTORING WELL	
	SURFACE DRAINAGE FLOW	
	POWER POLE	
	ROADWAY / DRIVEWAY	
	BUILDING / TRAILER	
	RAILROAD TRACK	

GRADING SYMBOLS

EXISTING		NEW
X 000.00	SPOT ELEVATION	X 000.00
------ 000 ------	CONTOUR	—— 000 ——

NOTES

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-X-00015	DRAWING INDEX

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A/E	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION			

WATER SUPPL ADDRESSED AS ENVIRONMENTAL PROTECTION AGENCY AS APPROVED BY COPY OF LETTER OF APPROVAL

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/PO52

DRAWING TITLE
CIVIL
LEGEND

DRAWN BY	DATE	DESIGNED/CHECKED BY	DATE	CHECKED BY	DATE
L.J.GEORGE	02/25/92		5/2/92	T.PICKERING	03/28/92

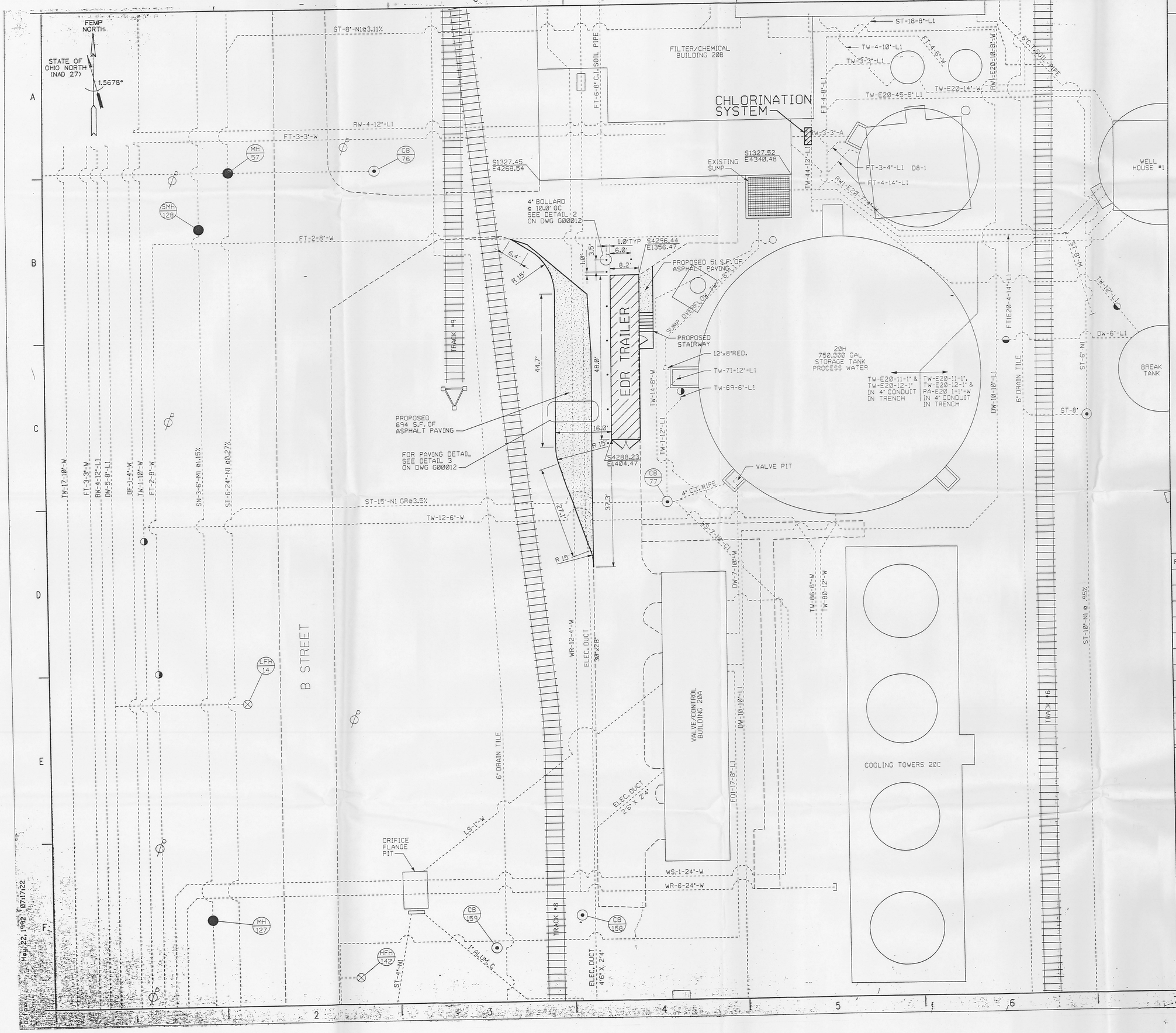
PLANT/BLDG. NO. | FLOOR | SCALE: NONE | CLASS

SUBMITTED FOR APPROVAL | APPROVAL RECOMMENDED | DRAWING APPROVED

A-E | DATE | OPERATING CONTRACTOR | DATE | DOE | DATE

DOE PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.6.2.4.3 .00-90701	92X-5900-X-00016	X0003	0

May, 21, 1992 10:20:57



NOTES

1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM SITE PROVIDED DATA FROM THE DOCUMENTS LISTED BELOW. THE CONSTRUCTION MANAGER SHALL CONFIRM THIS INFORMATION BY FIELD VERIFICATION PRIOR TO CONSTRUCTION USE.

   EXISTING SITE DATA SOURCE (IN PLANT FILES)

   WESTON TOPOGRAPHY, 1986
   WESTON TOPOGRAPHY, 1988
   FEMP CADD GRID/UTILITY DRAWINGS
   FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS

2. FIELD VERIFY ACTUAL LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATION. WHEN DRILLING PIER SHAFTS, PROBE AT EVERY 12 INCHES DEPTH TO VERIFY NONINTERFERENCE WITH UNDERGROUND PIPING. NOTIFY CONSTRUCTION MANAGER OF ANY INTERFERENCES OR UNFORESEEN CONDITIONS IMMEDIATELY AND GET APPROVAL BEFORE PROCEEDING WITH THE WORK.

3. EXCAVATED SOIL AND CONSTRUCTION DEBRIS WILL BE DISPOSED OF PER WESTINGHOUSE ENVIRONMENTAL MANAGEMENT COMPANY SITE POLICY AND PROCEDURE, FMPC-720-88 (CONTROL OF CONSTRUCTION WASTE).

4. HORIZONTAL CONTROL IS BASED UPON THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT COORDINATE SYSTEM.

5. BOLLARDS TO BE PLACED AFTER TRAILER IS INSTALLED.

LEGEND (SEE ALSO DWG 92X-5900-X-00016)

PROPOSED PAVEMENT

PROPOSED TRAILER

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-X-00015	DRAWING INDEX
92X-5900-X-00016	LEGEND
92X-5900-G-00012	SITE DETAILS

WATER SUPPLY APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
AS SUBMITTED BY COPY OF LETTER OF APPROVAL HERETO ATTACHED

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

DRAWING TITLE
CIVIL
PLAN
SITE AND EXISTING UTILITIES

DRAWN BY	DATE	DESIGNED/CHECKED BY	DATE	CHECKED BY	DATE
L.J.GEORGE	02/25/92		5/2/92	T.PICKERING	03/28/92

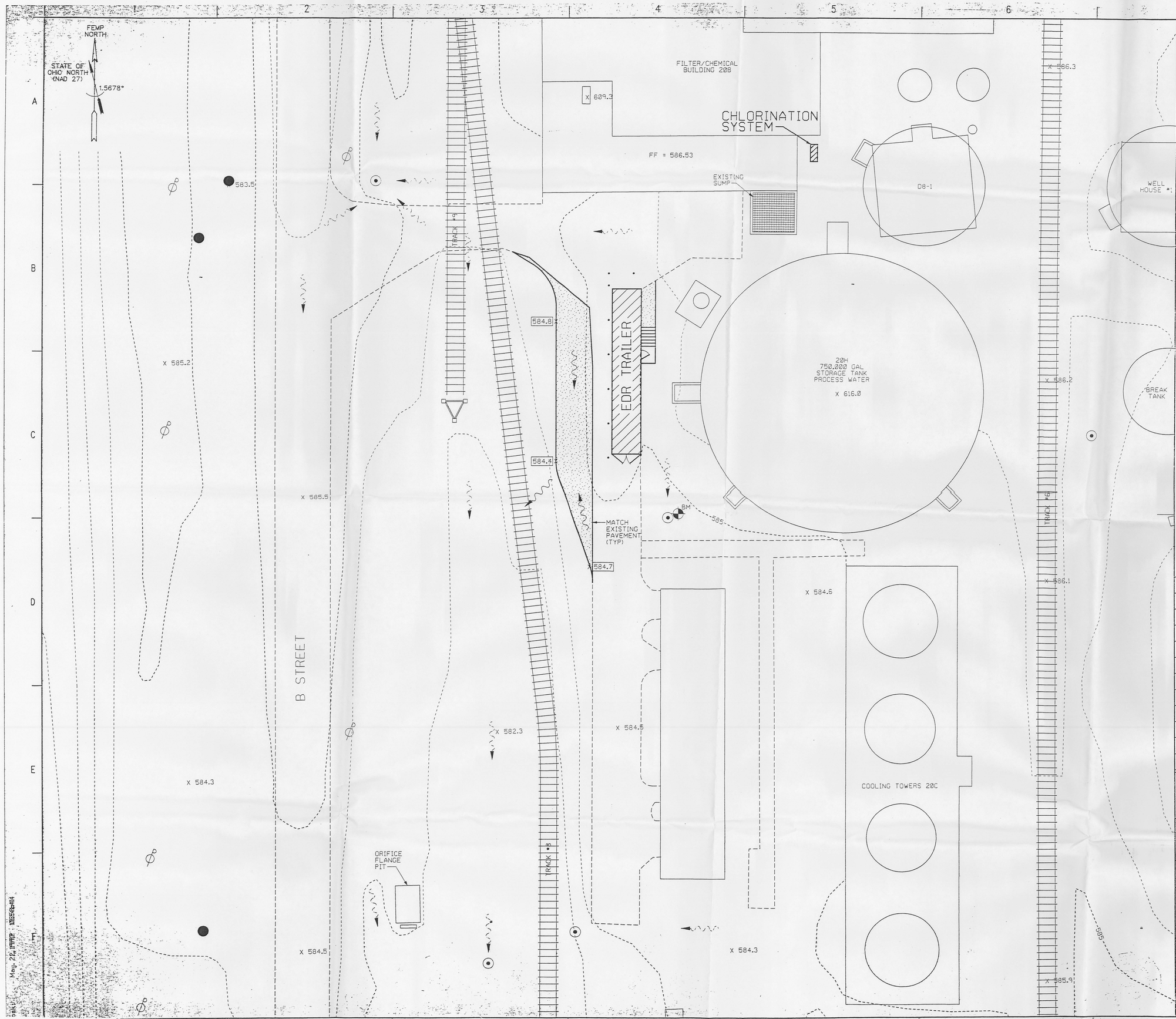
PLANT/BLDG. NO. | FLOOR | SCALE 1"=10' | CLASS

SUBMITTED FOR APPROVAL | APPROVAL RECOMMENDED | DRAWING APPROVED

A-E DATE | OPERATING CONTRACTOR DATE | DOE DATE

DOE PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS: 1.1.16.2.4.0 00-90701	92X-5900-G-00010	G00001	0

Mar 22, 1992 07:17:22



NOTES

1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM SITE PROVIDED DATA FROM THE DOCUMENTS LISTED BELOW. THE CONSTRUCTION MANAGER SHALL CONFIRM THIS INFORMATION BY FIELD VERIFICATION PRIOR TO CONSTRUCTION USE.

   EXISTING SITE DATA SOURCE (IN PLANT FILES)

   WESTON TOPOGRAPHY, 1986
   WESTON TOPOGRAPHY, 1988
   FEMP CADD GRID/UTILITY DRAWINGS
   FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS

2. CONTRACTOR SHALL INSTALL EROSION CONTROL TO PREVENT SOIL WASHING INTO DRAINAGE SYSTEMS IN ACCORDANCE WITH SOIL CONSERVATION SERVICE, "WATER MANAGEMENT AND SEDIMENT CONTROL FOR URBANIZING AREAS".

LEGEND (SEE ALSO DWG 92X-5900-X-00016)

PROPOSED PAVEMENT

PROPOSED TRAILER

BM — BENCHMARK CB #77 RIM ELEVATION = 584.15

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-X-00015	DRAWING INDEX
92X-5900-X-00016	LEGEND

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	INITIALS AND DATE
0	CERTIFIED FOR CONSTRUCTION	

WATER SUPPLY
APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
AS CERTIFIED BY COPY OF LETTER OF APPROVAL

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

DRAWING TITLE
CIVIL
GRADING PLAN

DRAWN BY	DATE	DESIGNED/CHECKED BY	DATE	CHECKED BY	DATE
L.J.GEORGE	02/25/92		5/21/92	T.PICKERING	03/28/92

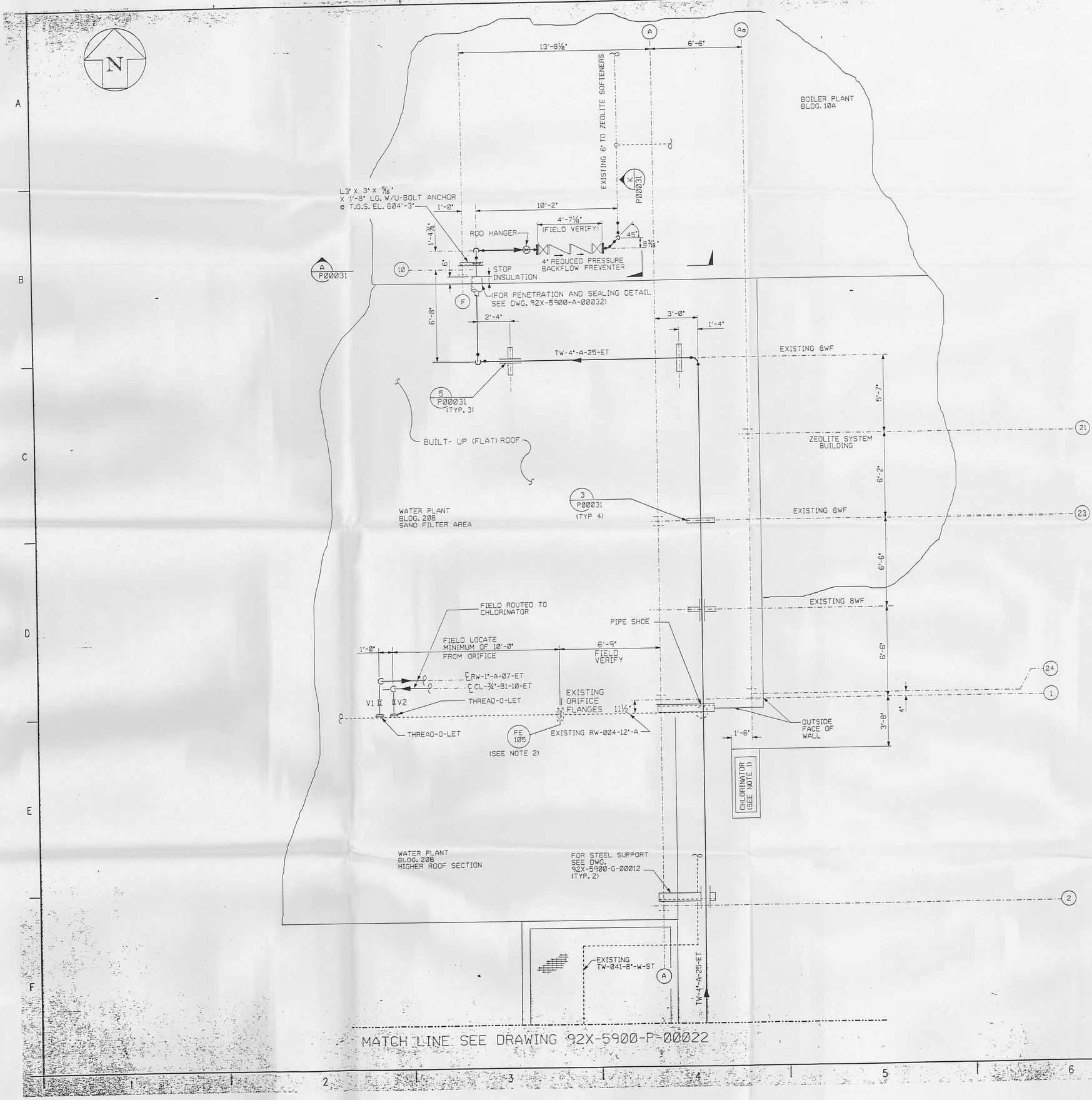
PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
		1"=10'	

SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
Kathryn W. Riedel		
A-E DATE	OPERATING CONTRACTOR DATE	DOE DATE

DOE PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.16.2.4.8 .00-90701	92X-5900-G-00011	G0002	0

REF DRAWING

May. 28, 1992 10:56:04



NOTES

1. LINES RW-1"-A-07-ET AND CL-¾"-B1-10-ET RUNNING TO AND FROM THE CHLORINATOR SHALL BE ROUTED AND SUPPORTED BY THE CONTRACTOR. REFER TO DRAWING 92X-5900-N-00019.
2. REPLACE THE EXISTING ORIFICE PLATE WITH A NEW ORIFICE PLATE. FIELD TO VERIFY EXISTING ORIFICE PLATE THICKNESS.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-N-00019	PIPING & INSTRUMENTATION DIAGRAM
92X-5900-G-00012	CIVIL/STRUCTURAL SITE DETAILS
92X-5900-P-00022	PIPING PLAN-SHEET 1
92X-5900-P-00031	PIPING SECTIONS AND DETAILS
92X-5900-P-00034	FIRE PROTECTION PLAN
92X-5900-A-00032	ARCHITECTURAL PLAN, ELEVATIONS AND SECTIONS

WATER SUPPLY
APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
AS EVIDENCED BY COPY OF
LETTER OF APPROVAL
HERETO ATTACHED

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PC52

DRAWING TITLE
PIPING/PLANT DESIGN
PIPING PLAN SHEET 2
EDR PROCESS WATER SYSTEM

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
J.STEMPA	3/3/92		5-27-92	J.A. TABB	4/7/92

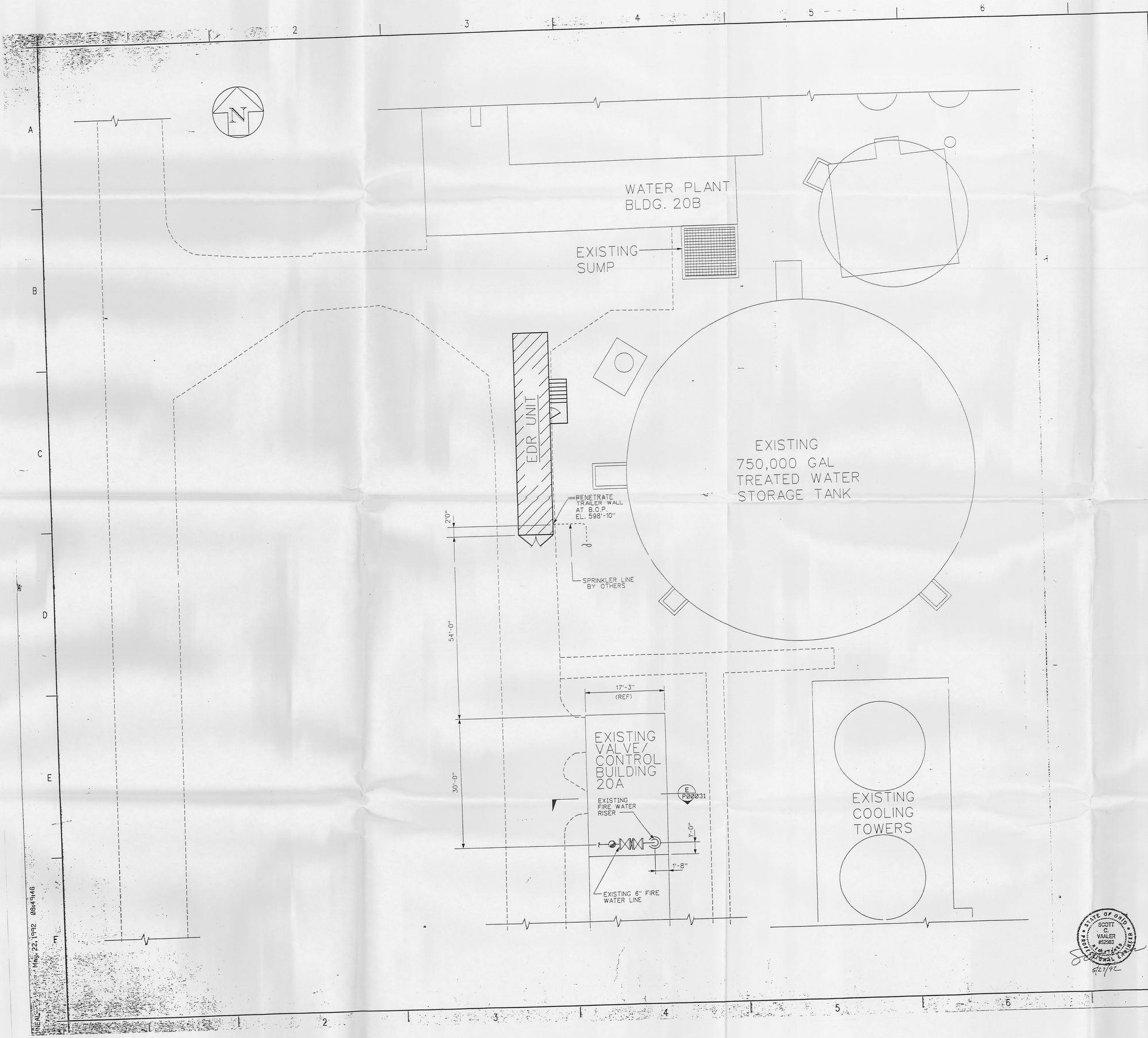
PLANT/BLDG. NO. | SCALE ⅜" = 1'-0" | CLASS

SUBMITTED FOR APPROVAL | APPROVAL RECOMMENDED | DRAWING APPROVED

A-E DATE | OPERATING CONTRACTOR DATE | DOE DATE

DOE PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.5.2.4.8 .00-90701	92X-5900-P-00023	P0003	0

STATE OF OHIO
SCOTT C. VAALER
PROFESSIONAL ENGINEER
5/27/92



NOTES

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-G-00010	SITE PLAN AND EXISTING UTILITIES (CIVIL)

WATER SUPPLY
APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
DRINKING WATER PROGRAM
AS EVIDENCED BY COPY OF
LETTER OF APPROVAL
HERETO ATTACHED

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/P052

DRAWING TITLE
PIPING/PLANT DESIGN
FIRE PROTECTION PLAN
EDR PROCESS WATER SYSTEM

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
D. JACKSON	4/1/92		5-27-92	J.A.TABB	4/7/92

PLANT/BLDG. NO. 20B/O — SCALE: NONE — CLASS:

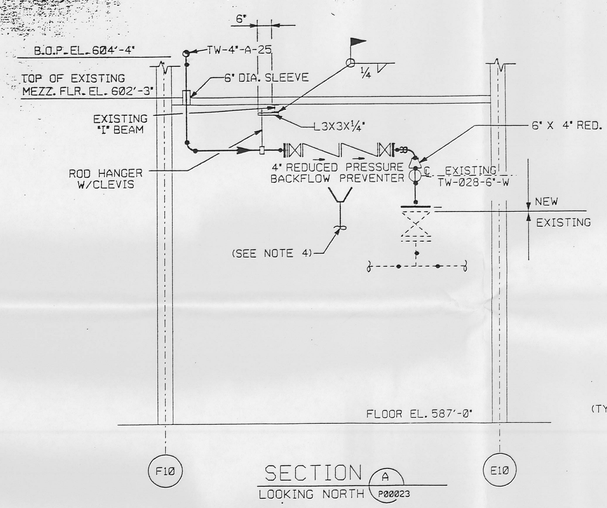
SUBMITTED FOR APPROVAL: Kathryn W. Reidel — DATE 27-May-92
APPROVAL RECOMMENDED: 27-May-92 — OPERATING CONTRACTOR — DATE
DRAWING APPROVED: R C Stein 27-May-92 — DOE — DATE

PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.6.2.4.B CC-90701	92X-5900-P-00034	P0005	0

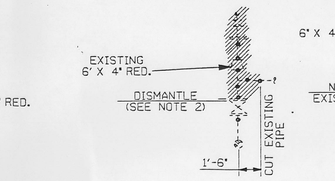
STATE OF OHIO — SCOTT C. VAALER #52583 — PROFESSIONAL ENGINEER — 5/27/92

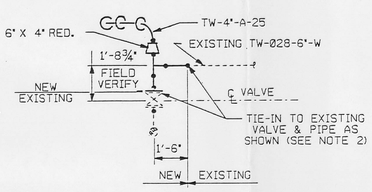
O'NEAL May 22, 1992 08:49:46

022

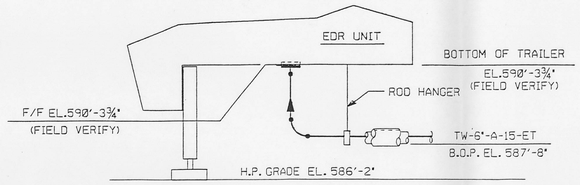


SECTION A
LOOKING NORTH P00023

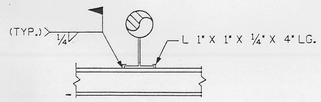




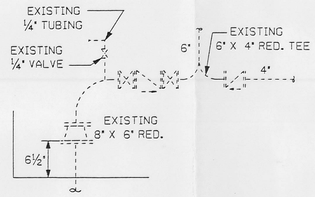
SECTION K
NTS
LOOKING WEST P00023



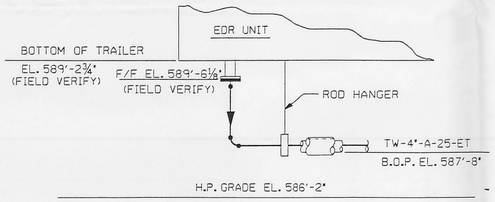
SECTION J
(LOOKING WEST) P00022



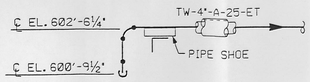
DETAIL 5
NTS
P00022
P00023

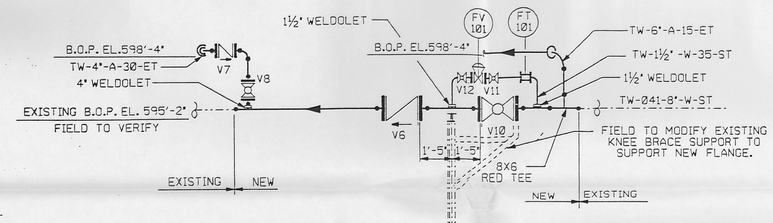


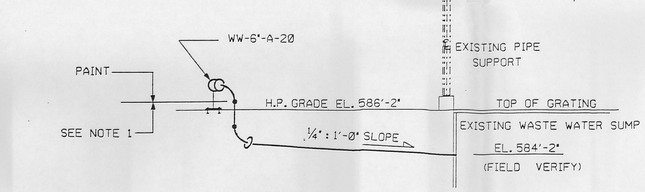
SECTION E
NTS
LOOKING SOUTH P00034
EXISTING FIRE WATER RISER



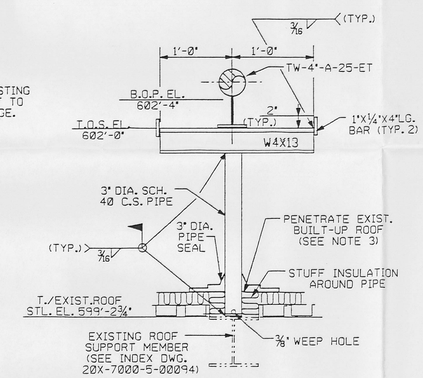
SECTION H
(LOOKING WEST) P00022



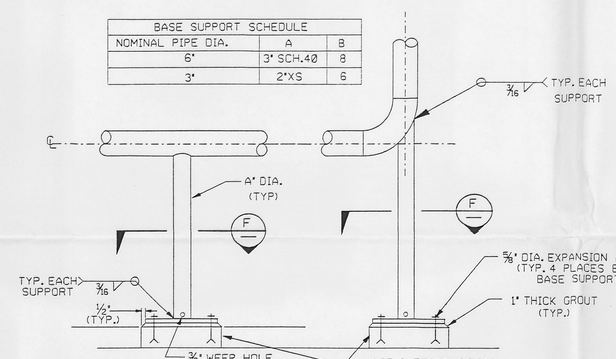




SECTION B
LOOKING WEST P00022

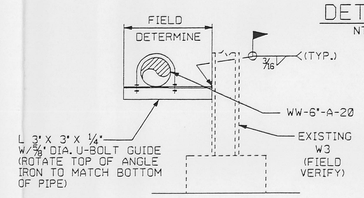


DETAIL 3
NTS
P00023



BASE SUPPORT SCHEDULE		
NOMINAL PIPE DIA.	A	B
6"	3" SCH.40	8
3"	2"XS	6

DETAIL 1
NTS
P00022
P00023
G00012



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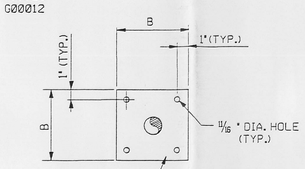
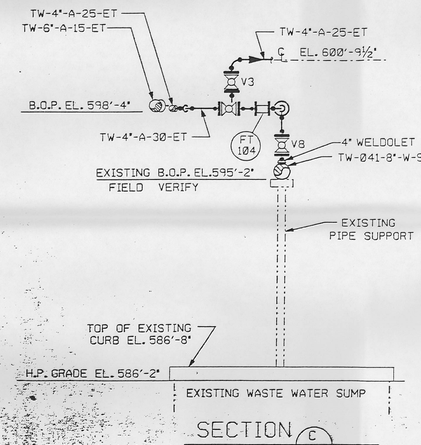
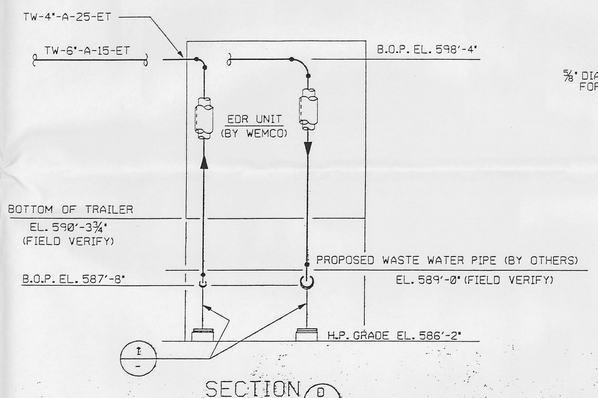
P00022



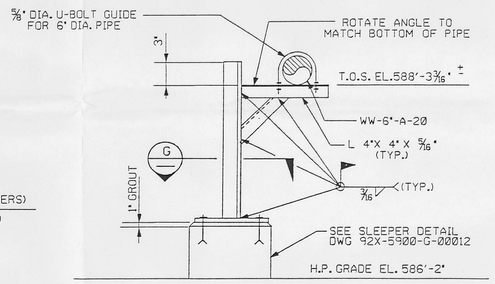
SECTION F
NTS



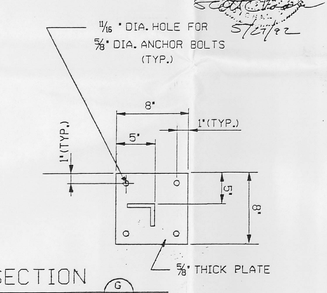
SECTION C
LOOKING NORTH P00022



SECTION D
(LOOKING SOUTH) P00022



DETAIL 2
NTS
P00022
G00012



SECTION G
NTS

NOTES

1. COAT & WRAP PORTION OF 6" DIA. CARBON STEEL LINE LOCATED UNDER SLAB FROM FIRST WELD ABOVE SLAB DOWN.
2. REMOVE EXISTING CORRODED TEE, REDUCER AND FLANGES FROM SYSTEM AND REPLACE WITH NEW MATERIAL. HATCHING INDICATES EXISTING MATERIAL TO BE REMOVED.
3. INSTALL NEOPRENE PIPE SEAL WITH STAINLESS STEEL BAND FOR 3" DIA. PIPE. PATCH ROOF WITH HOT TAR ASPHALT AND COVER WITH SAME BUILT-UP ROOF MATERIAL INCLUDING VAPOR SEAL AS EXISTING ROOF, TO MAKE LEAK PROOF.
4. FIELD TO INSTALL FUNNEL AND 3" DRAIN PIPING. FIELD ROUTE LINE TO NEAREST FLOOR DRAIN AND SUPPORT USING EXISTING STEEL MEMBERS.
5. ALL EXISTING ELEVATIONS, INCLUDING H.P. GRADE ELEVATIONS, ARE FROM REFERENCE DRAWINGS.

REFERENCE DWG. NO.	REFERENCE DWG. TITLE
92X-5900-N-00019	PIPING & INSTRUMENTATION DIAGRAM
92X-5900-P-00022	PIPING PLAN SHEET 1
92X-5900-P-00023	PIPING PLAN SHEET 2
92X-5900-P-00034	FIRE PROTECTION PLAN
92X-5900-P-00031	PIPING SECTIONS & DETAILS
92X-5900-G-00012	CIVIL/STRUCTURAL SITE DETAILS
92X-5900-A-00032	ARCHITECTURAL PLAN, ELEVATIONS AND SECTIONS

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A/E	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION			

WATER SUPPLY APPROVED — OHIO ENVIRONMENTAL PROTECTION AGENCY — ACCEPTED BY COPY OF LETTER OF APPROVAL WRITTEN ATTACHED — INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

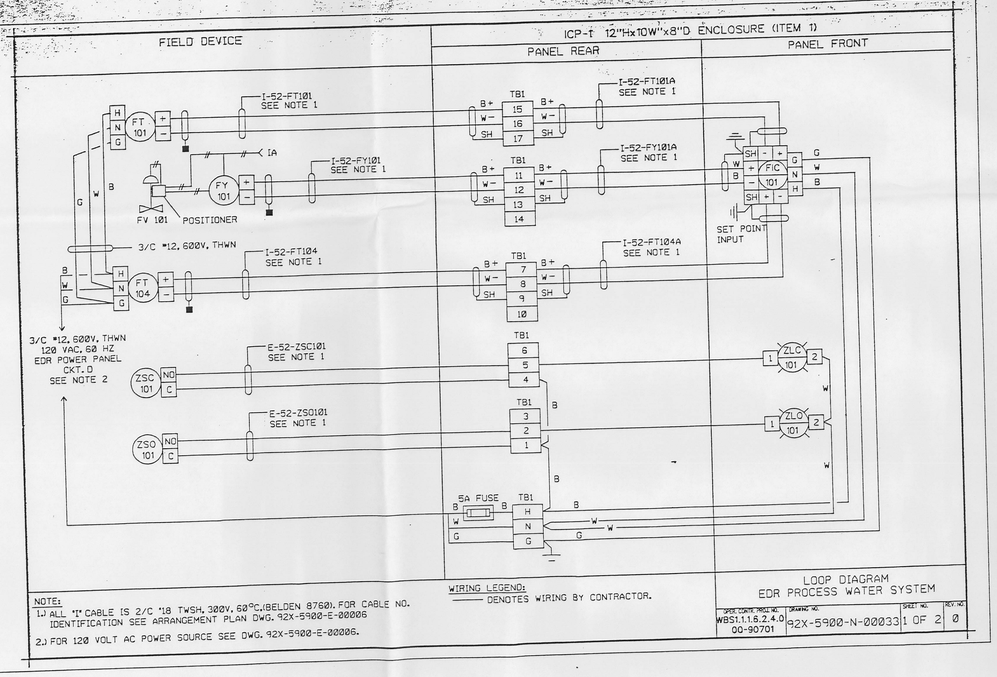
PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
OU2/PO52

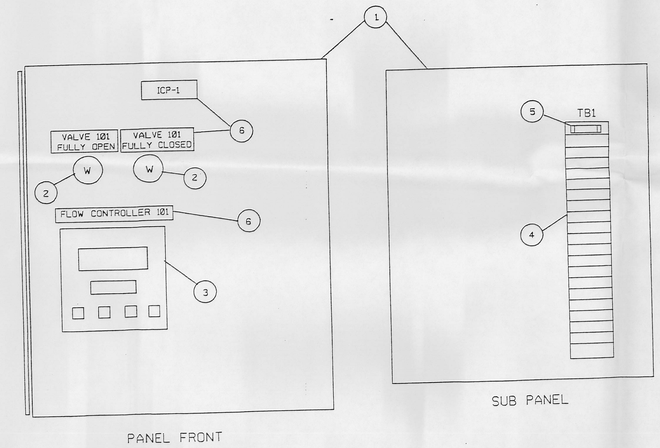
DRAWING TITLE
PIPING/PLANT DESIGN
PIPING SECTIONS AND DETAILS
EDR PROCESS WATER SYSTEM

DRAWN BY	DATE	DESIGNED, CHECKED, BY	DATE	CHECKED BY	DATE
J. STEMPA	3/12/92		5-27-92	J.A. TABB	6/7/92
PLANT/BLDG. NO.		FLOOR		SCALE ⅜" = 1'-0"	CLASS

SUBMITTED FOR APPROVAL — A/E — DATE 27 May 92
APPROVAL RECOMMENDED — OPERATING CONTRACTOR — DATE
DRAWING APPROVED — DOE — DATE 27 May 92

DOE PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.6.2.4.3 00-90701	92X-5900-P-00031	P00004	0





INSTRUMENT CONTROL PANEL ICP-1

SEE BILL OF MATERIALS FOR ITEM, QUANTITY, AND DESCRIPTION.

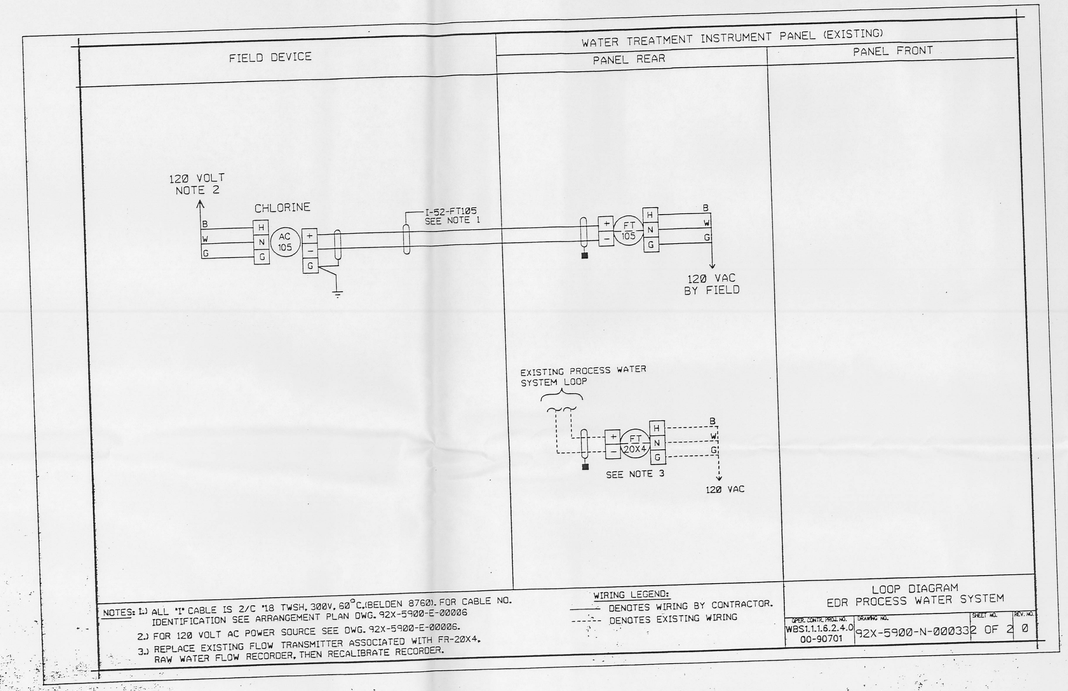
NOTES:

A. INSTRUMENT CONTROL PANEL ICP-1 TO BE FIELD MOUNTED ON SOUTH WALL IN WATER TREATMENT BUILDING 208.

BILL OF MATERIALS

ITEM	QUANTITY	DESCRIPTION
1	1	PANEL ENCLOSURE - NEMA 12:12"H x 10"W x 8"D - HOFFMAN CAT # D-12108DLB WITH A-12P10 SUB PANEL
2	2	INDICATING LIGHT (WHITE) A-B CAT #800H-PR16W
3	1	FLOW CONTROLLER (FIC-101) PER SPECIFICATION #13320
4	20	TERMINAL BLOCKS
5	1	FUSE HOLDER WITH 5 AMP FUSE
6	AS REQ'D	NAMETAGS AS SHOWN.- WHITE LAMACOID WITH 3/16" BLACK LETTERING

REFERENCE DWG.#	REFERENCE DWG. TITLE
92X-5900-E-00006	POWER PLAN AND SECTIONS
92X-5900-N-00019	P & I D



REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	INITIALS AND DATE
0	CERTIFIED FOR CONSTRUCTION	

WATER SUPPLY APPROVED OHIO ENVIRONMENTAL PROTECTION AGENCY AS EVIDENCED BY COPY OF LETTER OF APPROVAL

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

DRAWING TITLE
INSTRUMENTATION
LOOP DIAGRAM
EDR PROCESS WATER SYSTEM

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
C. LINHAROT	3-30-92	James C. Cooper	26 MAY 92	B. Taylor	5/26/92

PLANT/BLDG. NO. | FLOOR | SCALE | CLASS.

SUBMITTED FOR APPROVAL: Kathryn W. Riedel — DATE 27 May 92
APPROVAL RECOMMENDED: for my ... — OPERATING CONTRACTOR — DATE
DRAWING APPROVED: R.C. Fox — DOE — DATE 27 May 92

DOE PROJECT NO.	GREEN CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.6.2.4.0 00-90701	92X-5900-N-00033	N0003	0

STATE OF OHIO SCOTT C. VAALER 39083 REGISTERED PROFESSIONAL ENGINEER
5/27/92

May 26, 1992 14:48:36

INSTRUMENT & PIPING SYMBOLS

- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- PLUG VALVE
- BUTTERFLY VALVE
- STOP CHECK
- NEEDLE VALVE
- CHECK VALVE
- SLIDING GATE VALVE
- BALL CHECK VALVE
- REDUCED PRESSURE BACKFLOW PREVENTER
- BACKFLOW PREVENTER
- DIAPHRAGM VALVE
- PINCH VALVE
- 3 WAY VALVE
- 3 WAY BALL VALVE
- 3 WAY PLUG VALVE
- ANGLE GATE VALVE
- ANGLE GLOBE VALVE
- HUB DRAIN OR FUNNEL
- DIAPHRAGM
- DIAPHRAGM W/ POSITIONER
- PISTON
- SAFETY RELIEF VALVE
- SOLENOID
- ROTARY MOTOR
- HANDWHEEL
- SELF-CONTAINED BACK PRESSURE REGULATING VALVE
- 2-WAY SOLENOID VALVE
- 3-WAY SOLENOID VALVE
- 4-WAY SOLENOID VALVE

- STEAM TRAP
- HOSE QUICK DISCONNECT
- UNION
- DRAIN LEG
- EXPANSION JOINT
- EJECTOR
- STRAINER (Y TYPE)
- STRAINER (SINGLE BASKET)
- STRAINER (DOUBLE BASKET)
- STRAINER (CONE TYPE)
- MAIN OPERATING LINE
- AUXILIARY PROCESS & SERVICE LINE
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- ORIFICE PLATE
- VENTURI TUBE
- SIPHON TUBE
- THERMOWELL
- FLOW DIRECTION
- WELDED CONNECTION
- FLANGED CONNECTION
- FLEXIBLE HOSE
- WELDED PIPE CAP
- NEW UNDERGROUND PIPING
- EXISTING UNDERGROUND PIPING
- EXISTING ABOVE GROUND PIPING
- INSULATED PIPING
- HEAT TRACED AND INSULATED PIPING

- HVAC FAN
- PULSATION DAMPENER
- AIR FILTER
- VACUUM PUMP
- AIR OPERATED DIAPHRAGM PUMP
- VERTICAL TURBINE PUMP
- HORIZONTAL CENTRIFUGAL PUMP
- CHEMICAL METERING PUMP
- SUBMERSIBLE PUMP (SUMP PUMP)
- DAMPER
- THERMOSTAT
- ORIFICE

- VERTICAL CENTRIFUGAL PUMP
- AGITATOR (MIXER)
- SUBMERSIBLE SUMP PUMP (HYDRAULICALLY DRIVEN)
- EXHAUST FAN W/INLET VANES

- ELECTRICAL BINARY SIGNAL
- PNEUMATIC BINARY SIGNAL
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ELECTROMAGNETIC OR SONIC SIGNAL (NON-GUIDED)
- IA — INSTRUMENT/PLANT AIR SUPPLY
- ELECTRICAL SIGNAL
- DATA HIGHWAY
- CAPILLARY
- HYDRAULIC SIGNAL LINE
- PNEUMATIC OR VACUUM SIGNAL LINE
- I — INTERLOCK
- DIAPHRAGM SEAL
- FI — ROTAMETER
- FI — SIGHT GLASS
- LOCAL MOUNTED INSTRUMENT

- FRONT OF PANEL MOUNTED INSTRUMENT
- REAR OF PANEL MOUNTED INSTRUMENT
- pH PROBE
- RPU SHARED I/O AND CONTROL
- OPERATOR CONSOLE SHARED DISPLAY OR KEYBOARD FUNCTION
- F — AIR VENT FILTER
- M — MAGNETIC FLOW METER
- POSITIVE DISPLACEMENT FLOW METER
- A••• — EQUIPMENT NUMBER
- I/P — ELECTRO-PNEUMATIC SIGNAL CONVERTER
- SHIELDED WIRE CUT & TAPE SHIELD

ABBREVIATIONS

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
A/O	AIR TO OPEN
A/C	AIR TO CLOSE
I/A	INSTRUMENT AIR
ET	ELECTRIC TRACED
ST	STEAM TRACED

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)
½	PROPORTIONAL
Y	UNDETERMINED COMPUTING RELAY
HOA	HAND-OFF-AUTO
SS	START-STOP
*	EXISTING INSTRUMENT TO BE REUSED
‡	EXISTING INSTRUMENT TO BE RELOCATED
I/P	CURRENT TO PNEUMATIC TRANSDUCER
RUN	RUNNING
HOP	HAND-OFF-CONTROL PANEL
O/C	OPEN-CLOSE
O/A	OFF-AUTO
O/C/A	OPEN-CLOSE-AUTO
I/O	INPUT / OUTPUT

PIPING SPECIFICATIONS

FLOWING MEDIUM	MED. CODE	MAT. CODE
BACK WASH	BW	A
CHILLED WATER	CHS, CHR	A
CHLORINE	CL	B1
CONDENSATE	LC	A
CONDENSER WATER	CWS, CWR	A
COOLING WATER	WS, WR	A
DRAIN	DR	A
EXTRACTION THICKENER OVERFLOW	ETO	A
FILTRATE EFFLUENT	FT	A
FLOCCULANT	FL	A
FLUSH WATER	FWS, FWR	A
FORCE MAIN	FM	M
INSTRUMENT AIR	IA	W
MELTER OFF-GAS	OGE	A
NITRIC ACID	AN	T1
PERCHED GND WATER	PGW	B
PHOSPHORIC ACID	PAPH	T1
PLANT AIR	PA	W
POLISHED WATER	PW	A
POTABLE WATER	DW	W
PROCESS WATER	TW	A
PROCESS WASTEWATER	CE	A
RAW WATER	RW	A
RECYCLE WATER	RC	A
SCRUBBER RECYCLE	RSL	A
SLURRY	SL	B2
SODIUM CARBONATE	SC	A
SODIUM HYDROXIDE	NA	T
SODIUM SILICATE	SS	A
STORM WATER	ST	A
SULFURIC ACID	SB	T1
SUMP DISCHARGE	SU	A
SUMP DRAIN	SU	B
VACUUM	V	A
VENT LINE	VE	A
WASTE WATER	WW	A

EXAMPLE:

CE-2"-A-100-ET

- MEDIUM CODE
- NOMINAL PIPE SIZE
- MATERIAL CODE
- LINE NUMBER
- HEAT TRACING AND INSULATION

A - A53,GR. A, SEAMLESS STEEL PIPE
B - PVC, SCHEDULE 80
B1 - PVDF, SCHEDULE 80
B2 - HDPE, 100 PSI
L - FIBERGLASS REINFORCED PLASTIC
M - DUCTILE IRON, CLASS 50
T - SCH. 40,304L, STAINLESS STEEL PIPE
T1 - SCH. 40, 316L, STAINLESS STEEL PIPE
W - SCH. 80,A53,GR. A, GALVANIZED STEEL PIPE

GENERAL INSTRUMENT SYMBOLS

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

LOOP SHEET WIRING LEGEND

——— DENOTES WIRING BY CONTRACTOR.
-·-·- DENOTES WIRING BY CONTROL PANEL VENDOR
ICN1 DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.1
ICN2 DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.2

LOOP SHEET CABLE IDENTIFICATION

XX-XXX-XXX
- SEQUENTIAL NUMBER
- TYPE OF CABLE
  - M = MEASUREMENT
  - C = CONTROL
- LOOP NUMBER (030)
- PLANT/BLDG. NUMBER (18)

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	GAGING (DIM)	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	RADIOACTIVITY	RECORDER	----
S	SPEED OR FREQUENCY	SAFETY	SWITCH
T	TEMPERATURE	TRANSMITTER	TRANSMITTER
U	USER'S GUIDE	----	MULTIFUNCTION
V	VISCOSITY	----	VENT, VALVE
W	----	----	WELL
X	UNCLASSIFIED	----	UNCLASSIFIED
Y	RELAY	----	----
Z	POSITION	----	----

NOTES

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DRAWN	CHECK	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION				

WATER SUPPLY
APPROVED
AS EVIDENCED BY COPY OF LETTER DATED
INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME: WATER TREATMENT REPLACEMENT PROJECT CU2/PC52

DRAWING TITLE: MECHANICAL PROCESS PIPING AND INSTRUMENTATION DIAGRAM SYMBOLS AND LEGEND SHEET -

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
JIM LAWSON	03-18-92	Selim Chantaev	5-26-92	DAVID A. TOPE	05-15-92

PLANT/BLDG. NO. | FLOOR | SCALE: NONE | CLASS

SUBMITTED FOR APPROVAL | APPROVAL RECOMMENDED | DRAWING APPROVED

A-E | DATE 22 May 92 | OPERATING CONTRACTOR | DATE | DOE | DATE

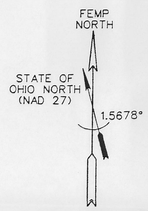
DOE PROJECT NO. | OPER. CONTR. PROJ. NO. WBS 1.1.1.6.2.4.3 00-90701 | DRAWING NO. 92X-5900-N-00018 | SHEET NO. N000

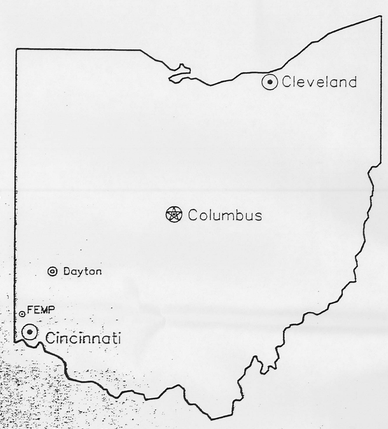
Mon Mar 26, 1992 13:44:15

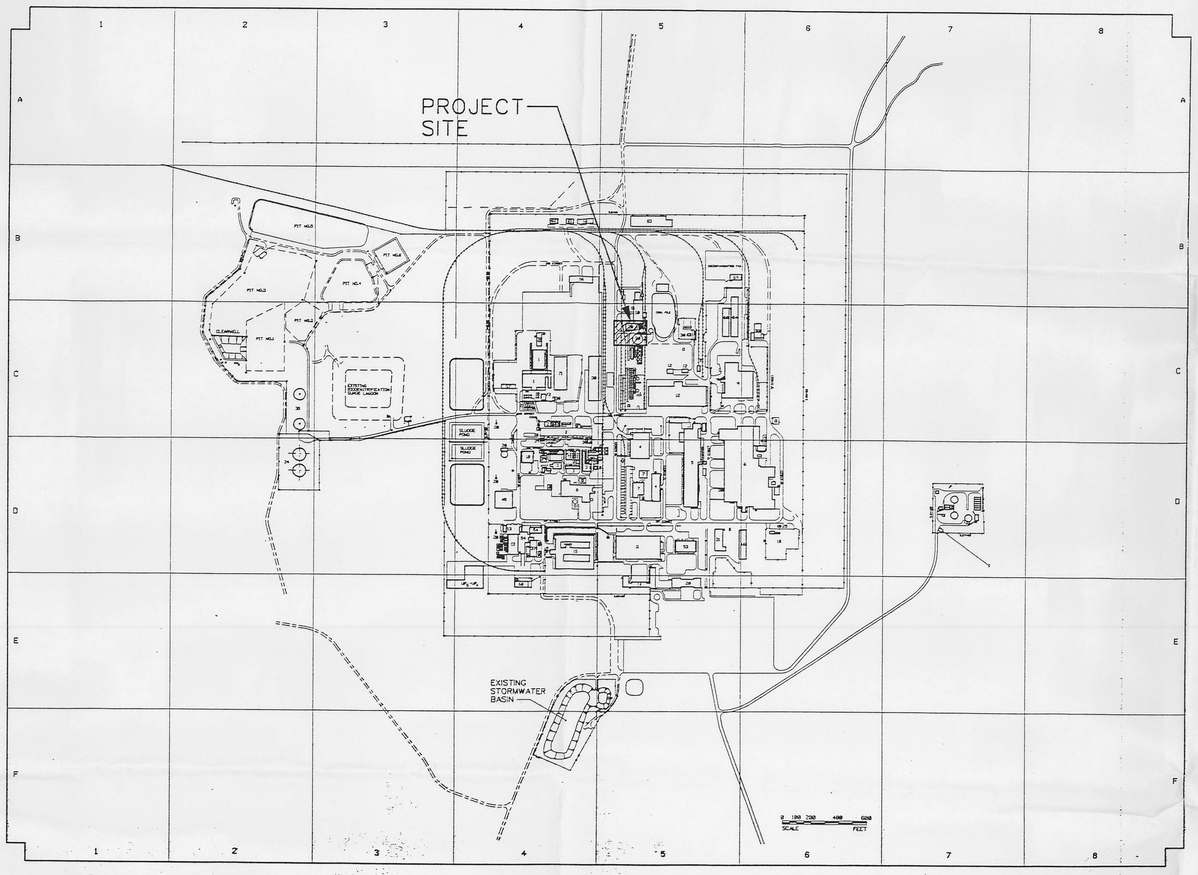
UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

FEMP ERA PROJECT

PROJECT ORDER 52
WATER TREATMENT REPLACEMENT PROJECT







PARSONS

The Ralph M. Parsons Company × Chas. T. Main, Inc. × Engineering-Science, Inc.

ARCHITECTS - ENGINEERS
FAIRFIELD, OHIO

NOTES

OHIO EPA
NOV 30 1992
Drinking Water

SW-2496-WS
PAID
Amount 202.00 Date 7-13-92
Check # 12361 Date 6-3-92

WATER SUPPLY
APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
AS EVIDENCED BY COPY OF
LETTER OF APPROVAL
HERETO ATTACHED

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION			
		INITIALS AND DATE		

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

RECEIVED
OHIO EPA
JUL 09 1992
SOUTHWEST

DRAWING TITLE
PROJECT TITLE SHEET

DRAWN BY	DATE	DESIGNED (CHECKED) BY	DATE	CHECKED BY	DATE
L.J.GEORGE	02/25/92	[illegible]	5/22/92	T.PICKERING	03/02/92

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS
		NONE	

SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
Kathryn W. Rudel	[illegible] 23 Mar 92	[illegible] 7-8-92
A-E DATE 23 Mar 92	CONTRACTOR DATE	DOE DATE

STATE OF OHIO
RALPH
PATRICK
BISSIGI
PROFESSIONAL ENGINEER

DOE PROJECT NO.	OPER. CONTR. PROJ.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.5.2.4.8 00-90701	S2X-5900-X-00014	X0001	0

INDEX OF DRAWINGS

INDEX CODE NO.	DRAWING NO.	SHEET NO.	REVISION NO.	DRAWING TITLE	REMARKS
	92X-5900-X-00014	X0001	0	PROJECT TITLE SHEET	OHIO EPA SUBMITTAL
	92X-5900-X-00015	X0002	0	DRAWING INDEX	OHIO EPA SUBMITTAL
	92X-5900-X-00016	X0003	0	CIVIL - LEGEND	
	92X-5900-G-00010	G0001	0	CIVIL - PLAN - SITE AND EXISTING UTILITIES	
	92X-5900-G-00011	G0002	0	CIVIL - GRADING PLAN	
	92X-5900-G-00012	G0003	0	CIVIL/STRUCTURAL - SITE DETAILS	OHIO EPA SUBMITTAL
	92X-5900-A-00032	A0001	0	ARCHITECTURAL - PLAN, ELEVATIONS AND SECTIONS - TRAILER STAIRS AND SKIRTING	
	92X-5900-F-00017	F0001	0	PROCESS - EDR PROCESS FLOW DIAGRAM - WATER TREATMENT REPLACEMENT	OHIO EPA SUBMITTAL
	92X-5900-F-00020	F0002	0	PROCESS - FLOW DIAGRAM - WATER TREATMENT EDR INSTALLATION	OHIO EPA SUBMITTAL
	92X-5900-P-00022	P0002	0	PIPING/PLANT DESIGN - PIPING PLAN SHEET 1 - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
	92X-5900-P-00023	P0003	0	PIPING/PLANT DESIGN - PIPING PLAN SHEET 2 - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
	92X-5900-P-00031	P0004	0	PIPING/PLANT DESIGN - PIPING SECTIONS AND DETAILS - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
	92X-5900-P-00034	P0005	0	PIPING/PLANT DESIGN - FIRE PROTECTION PLAN - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
20B-1450-E-00016	3008-C-3001-A		6	ELECTRICAL POWER SYSTEM - SINGLE LINE DIAGRAM - WATER TREATMENT PLANT	EXISTING SITE DRAWING
	92X-5900-E-00006	E0005	0	ELECTRICAL - POWER PLAN, SECTION & DETAIL	
	92X-5900-E-00007	E0006	0	ELECTRICAL - FIRE ALARM RISER DIAGRAM - WATER PLANT AREA BLDG.	
	92X-5900-E-00021	E0007	0	ELECTRICAL - HEAT TRACE RISER DIAGRAM	
	92X-5900-N-00018	N0001	0	MECHANICAL PROCESS - PIPING AND INSTRUMENTATION DIAGRAM - SYMBOLS AND LEGEND SHEET	OHIO EPA SUBMITTAL
	92X-5900-N-00019	N0002	0	MECHANICAL PROCESS - PIPING AND INSTRUMENTATION DIAGRAM - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL
	92X-5900-N-00033	N0003	0	INSTRUMENTATION - LOOP DIAGRAM - EDR PROCESS WATER SYSTEM	OHIO EPA SUBMITTAL

NOTES

WATER SUPPLY
APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
AS EVIDENCED BY COPY OF
LETTER OF APPROVAL
HERETO ATTACHED

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION			

INITIALS AND DATE

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

DRAWING TITLE
DRAWING INDEX

DRAWN BY	DATE	DESIGNED CHECKED BY	DATE	CHECKED BY	DATE
L.J.GEORGE	02/25/92		5/22/92	T.PICKERING	03/28/92

PLANT/BLDG. NO.	FLOOR	SCALE	CLASS. NO.

SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
A-E	OPERATING CONTRACTOR	DOE
DATE 23 May 92	DATE 27 May 92	DATE

STATE OF OHIO RAMESH MALIK E63191 PROFESSIONAL ENGINEER

DOE PROJECT NO.	OPER. CONTR. PROJ. NO.	DRAWING NO.	SHEET NO.	REV. NO.
	WBS 1.1.1.5.2.4.0 00-90701	92X-5900-X-00015	X0002	0

Plot Date: May 22, 1992 10:28:07 AM

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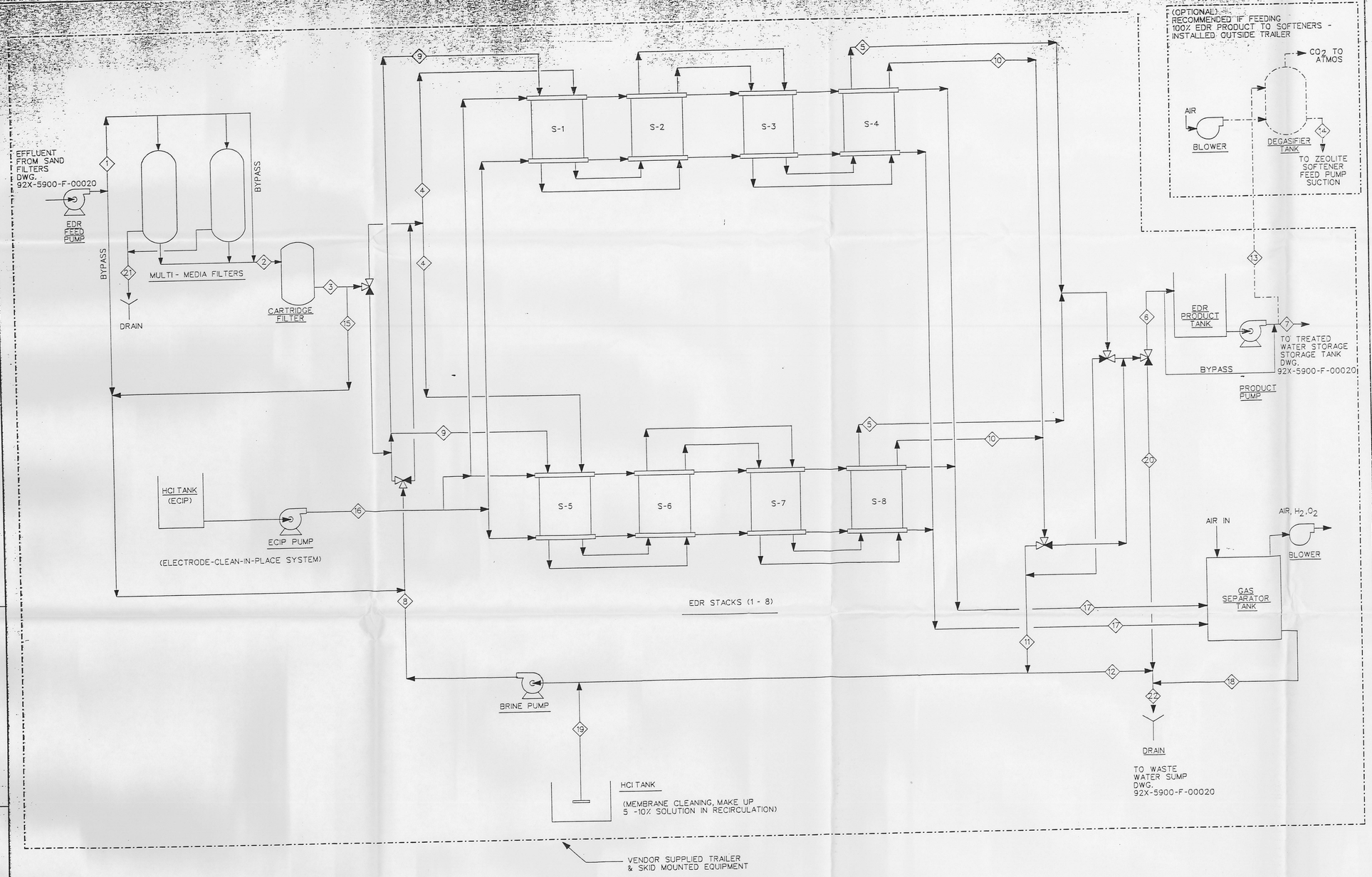


NOTES

1. STANDBY UNIT SHALL BE SUPPLIED FOR EACH PUMP AS INSTALLED OR ON-SHELF STORED.
2. LINE PRESSURES SHOWN ARE ONLY APPROXIMATE. VENDER WILL PROVIDE THE EXACT NUMBERS IN OPERATING PROCEDURES.
3. PRODUCT AND BRINE STREAMS WILL INTERCHANGE (STREAMS 4 WITH 9 AND 5 WITH 10) WHEN 3-WAY VALVES SWITCH AS ELECTRODE POLARITY CHANGES IN THE EDR STACKS.
4. DURING NORMAL OPERATION, 60 GPM GOES TO TREATED WATER STORAGE TANK (TWST) AND 150 GPM GOES TO ZEOLITE FEED. THE FULL FLOW OF 210 GPM GOES TO TWST WHEN THE ZEOLITE FEED IS ZERO.
5. DRAIN DISCHARGES 85 GPM EXCEPT WHEN OFF-SPEC PRODUCT IS DISCHARGED INCREASING THE FLOW TO 295 GPM MAX.
6. FILTERS ARE BACKWASHED AT 180 GPM WHEN THE EDR SYSTEM IS SHUTDOWN.

LEGEND:

9 STREAM NUMBER

3-WAY VALVE (SHADED AREA IS CLOSED PORT)

REFERENCE DWG.#	REFERENCE DWG. TITLE
92X-5900-F-00020	PROCESS FLOW DIAGRAM WATER TREATMENT EDR INSTALLATION

STREAM NO.	20	21	22
LINE NAME / DESCRIPTION	PRODUCT DUMP	FILTER BACKWASH	DRAIN TO WASTE WATER SUMP
FLOWRATE (gpm)	210	180	85 / 295
PRESSURE (psi)	10	60	2
IRON, (Fe) (ppm)	0	0	0
TDS (ppm)	63	494	1600
TOTAL ALKALINITY ppm as ($CaCO_3$)	35	260	822
TOTAL HARDNESS ppm as ($CaCO_3$)	38	316	964
NOTES	INTERMITTENT	INTERMITTENT	
	APPROX. 3MIN/1/2 HOUR	20 MIN/WEEK SEE NOTE 6	SEE NOTE 5

STREAM NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
LINE NAME / DESCRIPTION	EDR FEED	FILTERED WATER	POLISHED WATER	STACK FEED	EDR PRODUCT	EDR PRODUCT	EDR PRODUCT TO TWST	BRINE RECYCLE	BRINE FEED	BRINE	BRINE	BRINE WASTE	DEGAS. FEED	ZEOLITE FEED	BRINE MAKE-UP	CLEANING SOLUTION	SPENT CLEANING SOLUTION	SEPARATOR TANK DRAIN	MEMBRANE CLEANING SOLUTION
FLOWRATE (gpm)	292	292	292	105	105	210	60 /210	82	82	82	164	82	150 / 0	150 / 0	82	2.8	1.4	2.8	INTERMITTENT
PRESSURE (psi)	80	65	55	50	10	10	25	55	50	2	2	2	25	--	55	--	--	--	--
IRON, (Fe) (ppm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
TDS (ppm)	494	494	494	494	63	63	63	1600	1047	1600	1600	1600	63	63	494	--	--	--	--
TOTAL ALKALINITY ppm as ($CaCO_3$)	260	260	260	260	35	35	35	822	822	822	822	822	35	29	260	--	--	--	--
TOTAL HARDNESS ppm as ($CaCO_3$)	316	316	316	316	38	38	38	964	964	964	964	964	38	38	316	--	--	--	--
NOTES							SEE NOTE 4						SEE NOTE 4	SEE NOTE 4		5% HCl	5% HCl	5% HCl	1300 gal MONTHLY
																			5% HCl

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	INITIALS AND DATE	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION			

WATER SUPPLY
APPROVED
OHIO ENVIRONMENTAL PROTECTION AGENCY
AS SUBMITTED BY COPY OF
LETTER OF APPROVAL A-E
HERETO ATTACHED

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/PO52

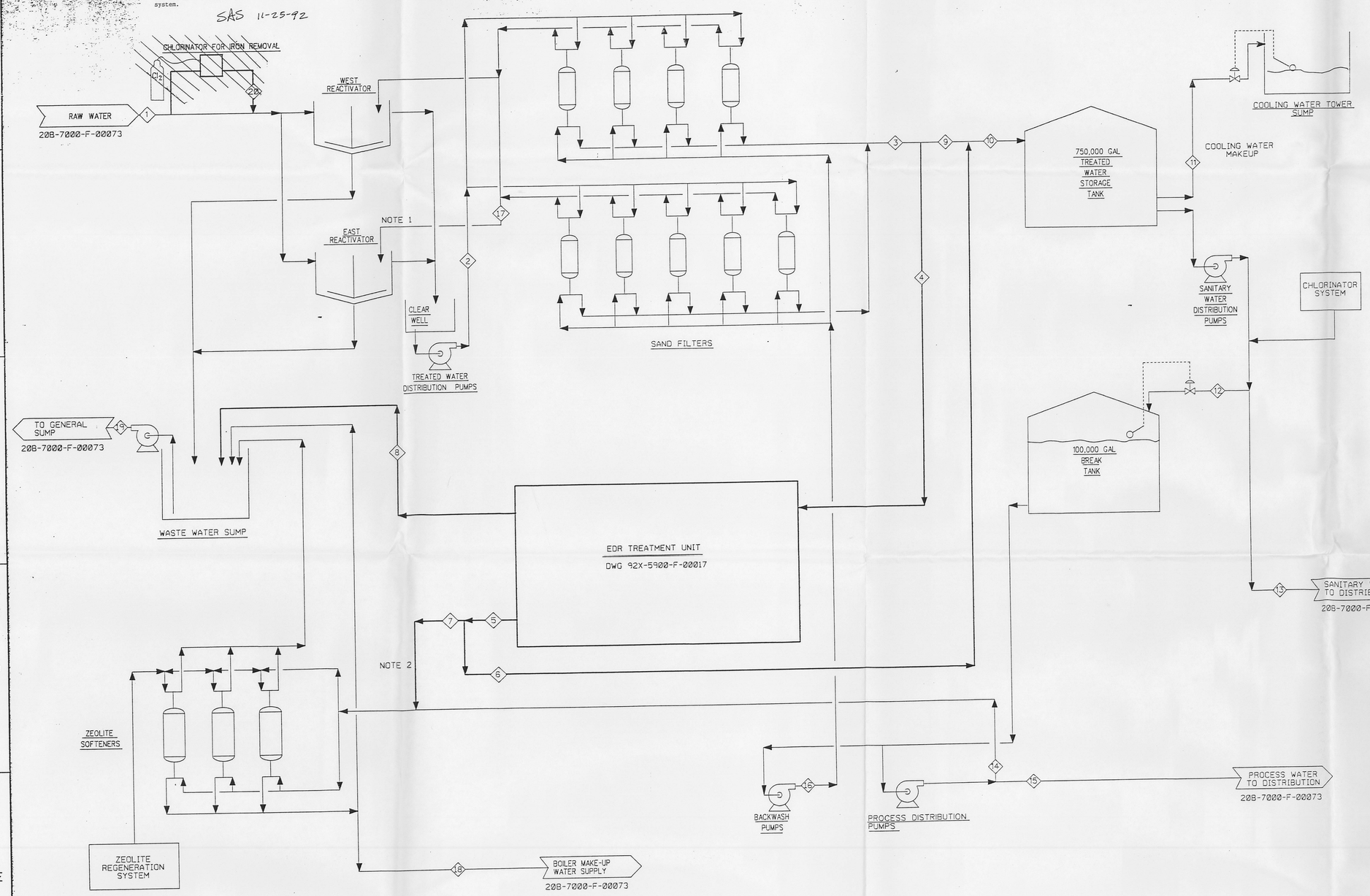
DRAWING TITLE
PROCESS
EDR PROCESS FLOW DIAGRAM
WATER TREATMENT REPLACEMENT

DRAWN BY: R. PROSKI — DATE: 02-26-92
DESIGNED, CHECKED BY — DATE
CHECKED BY: S.C. Vaeler — DATE: 5/29/92
PLANT/BLDG. NO. — FLOOR — SCALE: NONE — CLASS:
SUBMITTED FOR APPROVAL: Kathryn W. Riedel — A-E — DATE 2-Mar-92
APPROVAL RECOMMENDED — OPERATING CONTRACTOR — DATE
DRAWING APPROVED — DOE — DATE
DOE PROJECT NO. — OPER. CONT. PROJ. NO. — DRAWING NO. — SHEET NO. — REV. NO.
WBS 1.1.1.6.2 00-90701 — 92X-5900-F-00017-F0001 — 0

STATE OF OHIO — SCOTT C. VAELER #52363 — PROFESSIONAL ENGINEER — 5/29/92

Revised to iron oxidation by air injection per WEMCO submittal dated 11-16-92; sparger to be installed in each reactivator/clarifier and fed from existing plant compressed air system.

SAS 11-25-92



STREAM NO.	14	15	16	17	18	19	20
LINE NAME / DESCRIPTION	PROCESS WATER TO ZEOLITE	PROCESS WATER TO DIST.	FILTER BACKWASH INLET	FILTER BACKWASH OUTLET	ZEOLITE PRODUCT	WASTE WATER TO GENERAL SUMP	CHLORINE SOLUTION ADDITION
FLOWRATE (GPM)	150 / 0	30	1000	1000	150		10
PRESSURE (psi)							
IRON, (Fe) (ppm)	0	0	0	0	--	--	
TDS (ppm)	140	140	140	140	102 / 46		
TOTAL ALKALINITY (ppm as $CaCO_3$)	75	75	75	75	56 / 28		
TOTAL HARDNESS (ppm as $CaCO_3$)	87	87	87	87	0.1		
NOTES	3		4	4	3	5	

STREAM NO.	1	2	3	4	5	6	7	8	9	10	11	12	13
LINE NAME / DESCRIPTION	RAW WATER FEED	WATER TO SAND FILTERS	FILTERED WATER	WATER TO EDR	EDR PRODUCT	EDR PRODUCT TO BLEND	EDR PRODUCT TO ZEOLITE	EDR BRINE	RAW WATER TO BLEND	BLENDED WATER	COOLING WATER MAKEUP	BLENDED WATER TO BREAK TANK	BLENDED WATER TO SANITARY DIST.
FLOWRATE (GPM)	337 / 305	337 / 305	337 / 305	292	210	210 / 60	0 / 150	82	45 / 13	255 / 73	25	130 / 30	100
PRESSURE (psi)	--	--	25	25						0	0	0	0
IRON, (Fe) (ppm)	1.2	0	0	0	0	0	0	0	0	140	140	140	140
TDS (ppm)	494	494	494	494	63	63	63	1602	494	75	75	75	75
TOTAL ALKALINITY (ppm as $CaCO_3$)	260	260	260	260	35	35	35	--	260	87	87	87	87
TOTAL HARDNESS (ppm as $CaCO_3$)	316	316	316	316	38	38	38	--	316				
NOTES	3	3	3	3		3	3		3			3	

NOTES

1. THE EAST REACTIVATOR WILL CONTINUE TO BE USED AS A CLARIFIER FOR THE SAND FILTER BACKWASH AND IT WILL ALSO BE KEPT IN STANDBY AS A LIME - ALUM SOFTENER.
2. NEW PIPING AND VALVES WILL ALLOW FEED WATER TO THE ZEOLITE SOFTENER TO BE TAKEN EITHER DIRECTLY FROM THE EDR PRODUCT STREAM OR FROM THE BLENDED WATER IN THE BREAK TANK.
3. FOR STREAMS WHERE TWO NUMBERS ARE SHOWN, THE FIRST NUMBER REPRESENTS THE VALUE UNDER THE CONDITION WHERE THE ENTIRE EDR PRODUCT IS BLENDED WITH RAW WATER AND SENT TO THE TREATED WATER STORAGE TANK (TWST). THE SECOND NUMBER REPRESENTS THE VALUE UNDER THE CONDITION WHEN 150 GPM OF EDR PRODUCT FLOW IS SENT DIRECTLY TO THE ZEOLITE SYSTEM AND 60 GPM IS BLENDED WITH RAW WATER AND SENT TO THE TREATED WATER STORAGE TANK.
4. FILTERS ARE BACKWASHED ON INTERMITTENT SCHEDULE FOR A SHORT PERIOD OF TIME.
5. WATER IS PUMPED FROM THE WASTE WATER SUMP TO THE GENERAL SUMP ON AN AS NEEDED BASIS.

LEGEND

- EXISTING
- NEW
- STREAM NUMBER
- NEW
- EXISTING

REFERENCE DWG.#	REFERENCE DWG. TITLE
20B-7000-F-00073	WATER TREATMENT PLANT EXPANSION QUANTITY DIAGRAM
20B-7000-F-00071	WATER TREATMENT PLANT EXPANSION FLOW DIAGRAM
20B-1450-F-00034	ENGINEERING FLOW DIAGRAM WATER TREATMENT UNIT
92X-5900-F-00017	EDR PROCESS FLOW DIAGRAM

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION		

WATER SUPPLY APPROVED AS EVIDENCED BY COPY OF HERETO ATTACHED APPROVAL

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

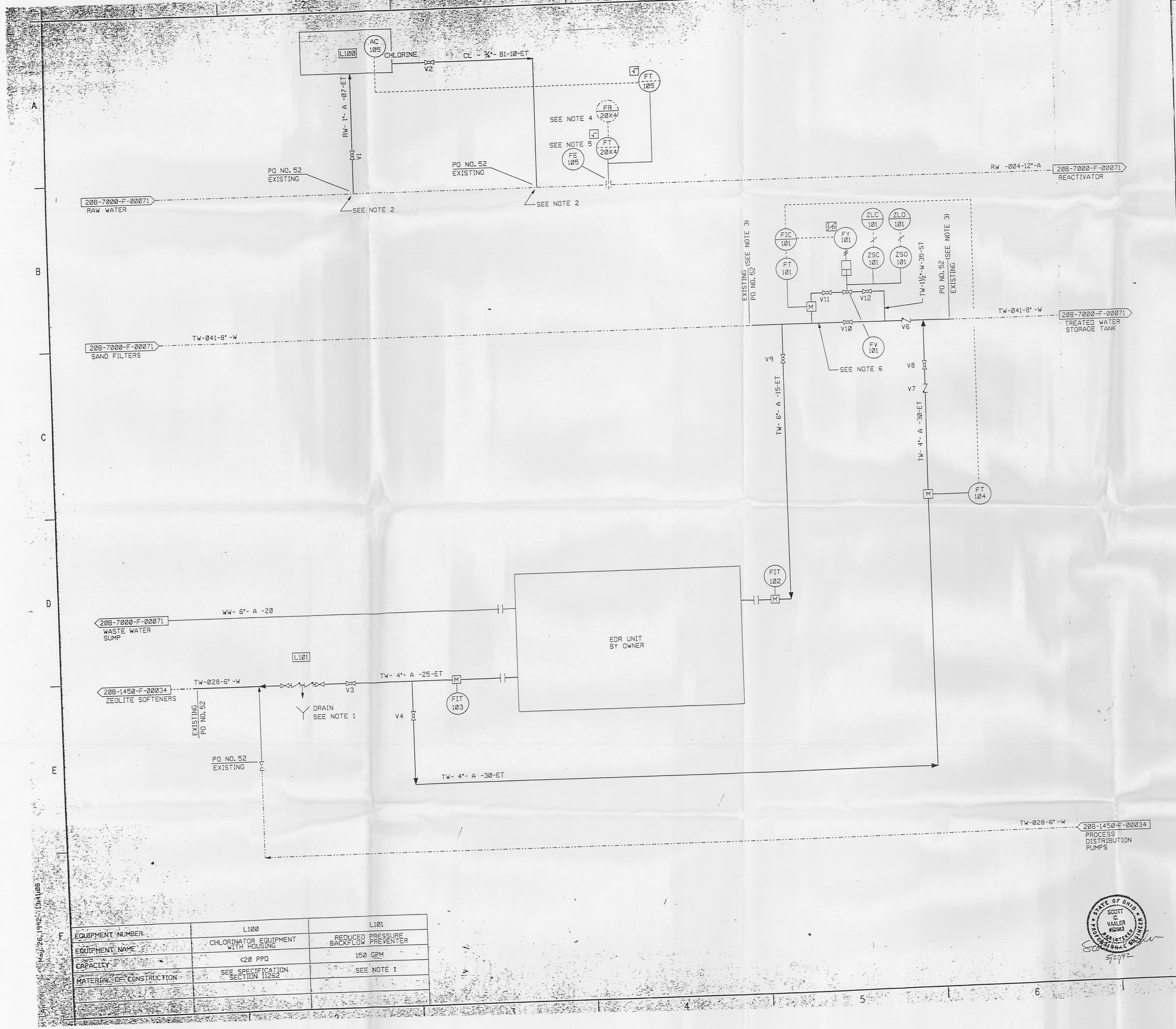
DRAWING TITLE
PROCESS FLOW DIAGRAM
WATER TREATMENT EDR INSTALLATION

DRAWN BY R PROSKI — DATE 2-24-92 — DESIGNED, CHECKED BY — DATE — CHECKED BY — DATE 04072
PLNT/BLDG. NO. — FLOOR 1 — SCALE NONE — CLASS
SUBMITTED FOR APPROVAL — APPROVAL RECOMMENDED — DRAWING APPROVED
DATE 27 Mar 92 — OPERATING CONTRACTOR — DATE — DOE — DATE
DOE PROJECT NO. — UPDATE CONTRL PROJ. NO. WBS 1.1.1.6.2.4.3 OD-90701 — DRAWING NO. 92X-5900-F-00020 F0002 — SHEET NO. — REV. NO. 0

STATE OF OHIO SCOTT C. MAILER #52983 PROFESSIONAL ENGINEER 5/27/92

Scott C. Mailer 5/27/92

Mar 26, 1992 14:13:18



NOTES

1. REDUCED PRESSURE BACKFLOW PREVENTER AND RELIEF DRAIN. MATERIALS OF CONSTRUCTION: FDA APPROVED EPOXY COATED CAST IRON CHECK VALVE BODIES WITH BRONZE SEATS, AND FDA APPROVED EPOXY COATED CAST IRON RELIEF VALVE WITH STAINLESS STEEL TRIM. CAST IRON WEDGE GATE VALVES FOR SHUT OFF.
2. CONTRACTOR SHALL PROVIDE A 1" THREADOLET FOR TIE IN OF RAW WATER TO CHLORINATOR AND A ¾" THREADOLET FOR TIE IN OF CHLORINE SOLUTION TO RAW WATER LINE.
3. THE EXISTING PROCESS WATER LINE IS INSULATED AND STEAM TRACED. THE NEW SECTION OF THIS LINE AND THE REGULATED BY PASS LINE INCLUDING ALL VALVES SHALL BE INSULATED AND STEAM TRACED.
4. EXISTING INSTRUMENTS.
5. REPLACE EXISTING FLOW TRANSMITTER AND ORIFICE PLATE ASSOCIATED WITH FR-20X4, RAW WATER FLOW RECORDER. THEN RECALIBRATE RECORDER.
6. REMOVE EXISTING ORIFICE AND ASSOCIATED INSTRUMENTATION IN THIS AREA AS A PART OF PO NO. 52.

LAST VALVE NUMBER V12

REFERENCE DWG.	REFERENCE DRAWING TITLE
92X-5900-N-00018	SYMBOLS AND LEGEND SHEET
20B-1450-F-00034	WATER TREATMENT UNIT
20B-7000-F-00071	WATER TREATMENT PLANT EXPANSION

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	APPROV. OPERATOR	DOE
0	CERTIFIED FOR CONSTRUCTION		

WATER SUPPLY APPROVED — ENVIRONMENTAL PROTECTION AGENCY — REFER TO ATTACHED COPY OF LETTER OF APPROVAL HERETO ATTACHED — INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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

PROJECT NAME
WATER TREATMENT REPLACEMENT PROJECT
CU2/P052

DRAWING TITLE
MECHANICAL PROCESS
PIPING AND INSTRUMENTATION DIAGRAM
EDR PROCESS WATER SYSTEM

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
JIM LAWSON	02-26-92		5-26-92	DAVID A. TOPE	05-15-92
PLANT/BLDG. NO.		FLOOR		SCALE: NONE	CLASS

SUBMITTED FOR APPROVAL: Kathryn W. Riedel — DATE 22 May 92
APPROVAL RECOMMENDED: — OPERATING CONTRACTOR — DATE 22 May 92
DRAWING APPROVED: — DOE — DATE 27 May 92
A/E — DOE PROJECT NO. — OPER. CONTR. PROJ. NO. WBS 1.1.1.5.2.4.0 00-90701 — DRAWING NO. 92X-5900-N-00019 — SHEET NO. N00021 — REV. NO. 0

STATE OF OHIO — SCOTT C. VAALER #52963 — REGISTERED PROFESSIONAL ENGINEER — 5/27/92

EQUIPMENT NUMBER	L100	L101
EQUIPMENT NAME	CHLORINATOR EQUIPMENT WITH HOUSING	REDUCED PRESSURE BACKFLOW PREVENTER
CAPACITY	<20 PPD	150 GPM
MATERIAL OF CONSTRUCTION	SEE SPECIFICATION SECTION 11262	SEE NOTE 1