FENOC
FirstEnergy Nuclear Operating Company

Beaver Valley Power Station
Route 168
P.O. Box 4
Shippingport, PA 15077-0004

August 21, 2014
NPD3NRE:1037

Mr. Christopher J. Kriley, PE
Water Management Section
Pennsylvania Department of Environmental Protection
400 Waterfront Drive
Pittsburgh, Pennsylvania 15222-4745

SUBJECT: FirstEnergy Nuclear Operating Company (FENOC) Beaver Valley Power Station Water Quality Part II Application for a Dechlorination System.

Dear Mr. Christopher J. Kriley, PE:

Please find enclosed a Water Quality Part II permit application for the FENOC Beaver Valley Power Station for an enhanced dechlorination system and a request to increase internal feed of Sodium Hypochlorite to the river water/service water circulating water system to 24 hours a day. Also enclosed is a check in the amount of $500 for the application fee.

The dechlorination system is utilized due to chlorination of the river water/service water circulating water system. A basic dechlorination system utilizing sodium bisulfite has been in place for many years due to chemical additive usage of sodium hypochlorite and sodium bromide in ancillary systems at the station. The attached Part II permit application is for an enhancement of that system. The dechlorination system is to ensure no residual chlorine/bromine discharges beyond limits occur as a result of the increased treatment of the river water/service water circulating water system, or the normal two hour daily chlorination of the cooling tower circulating water system. Please note the river water/service water system is a subset from the cooling tower circulating water system.

The plant has utilized several different chemical additives over the years, and has maintained the chemical additives usage list associated with the NPDES permit. These additives (e.g. quaternary amines) along with the sodium hypochlorite and sodium bromide are approved chemical additives presently in use at the plant. The current level of chlorination/biocide in the river water/service water circulating water system is inadequate to maintain the integrity of the equipment. Due to several repairs to tanks and piping within the system it has been recommended by the Nuclear Regulatory Commission and Institute of Nuclear Power Operations that increased treatment of the river water/service water system circulating water needs to occur in order to maintain

IE25
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the integrity of the equipment. The in-stream chlorine concentration of the river water/service water system is expected to be in the range of 0.1-0.2 mg/l. It is expected that due to the size of the cooling tower circulating water system that virtually all chlorine will be consumed upon re-entry of the river water/service water subsystem back into the cooling towers circulating water system.

However in an abundance of caution the plant has utilized a basic dechlorination system and wishes to continue to use an enhanced dechlorination system.

Outfall 010 is directly influenced by the river water/service water system and will have an enhanced dechlorination system to ensure no residual chlorine/bromine discharges beyond limits occur as a result of the increased treatment.

Though this application asks for increased chlorination time, the result of this change anticipates that less Sodium Hypochlorite overall will be used by reducing the time and/or chemical used in daily additions in the Circulating Water due to the continual chlorination in the Circulating Water make up.

If you have any questions please contact Scott Brown at 330-384-4643 or by e-mail at browns@firstenergycorp.com, or Don Salera at 724-682-4141 and e-mail at salerad@firstenergycorp.com.

Sincerely

Charles V. McFeaters
Director, Site Operations

Enclosure(s):
A. Water Quality Part II Permit Application
B. Check for Application Fee

cc: Document Control Desk US NRC *(Note: No new US NRC commitments are contained in this letter)*
Ms. Amanda Schmidt, PA DEP/Bureau of Water Quality Management

FOR INTERNAL DISTRIBUTION USE ONLY

INTERNAL DISTRIBUTION OF LETTER NPD3NRE:

M. Jirousek
D. J. Salera
S. F. Brown (A-GO-13)
D. K Sullivan w/out attachments
D. J. Weber (A-GO-18)
D. C. Bluedorn (BCCZ)
J. A. Meade
Environmental File
Central File:

1300-PM-BIT0001 5/2012
Form

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

GENERAL INFORMATION FORM – AUTHORIZATION APPLICATION

Before completing this General Information Form (GIF), read the step-by-step instructions provided in this application package. This version of the General Information Form (GIF) must be completed and returned with any program-specific application being submitted to the Department.

Related ID#s (If Known)				DEP USE ONLY
Client ID#	99862	APS ID#		Date Received & General Notes
Site ID#	705550	Auth ID#		
Facility ID#				

CLIENT INFORMATION

DEP Client ID#	Client Type / Code
99862	22/221

Organization Name or Registered Fictitious Name	Employer ID# (EIN)	Dun & Bradstreet ID#
FirstEnergy Nuclear Operating Company (FENOC)	341881483	

Individual Last Name	First Name	MI	Suffix	SSN

Additional Individual Last Name	First Name	MI	Suffix	SSN

Mailing Address Line 1	Mailing Address Line 2
P. O. Box 4 Route 168	

Address Last Line – City	State	ZIP+4	Country
Shippingport	PA	15077-0004	USA

Client Contact Last Name	First Name	MI	Suffix
Brown	Scott	F	

Client Contact Title	Phone	Ext
Senior Engineer	330-384-4643	

Email Address	FAX
browns@firstenergycorp.com	330-384-5433

SITE INFORMATION

DEP Site ID#	Site Name
705550	BVPS - FENOC

EPA ID# 99862 **Estimated Number of Employees to be Present at Site** 625

Description of Site
Nuclear Generating Facility

County Name	Municipality	City	Boro	Twp	State
Beaver	Shippingport	☐	☒	☐	PA
County Name	Municipality	City	Boro	Twp	State
		☐	☐	☐	

Site Location Line 1	Site Location Line 2
100 Technology Boulevard	

Site Location Last Line – City	State	ZIP+4
Shippingport	PA	15077-0004

Detailed Written Directions to Site
Refer to attached directions

Site Contact Last Name	First Name	MI	Suffix
Salera	Donald	J	

Site Contact Title	Site Contact Firm
Chemistry Manager	N/A

Mailing Address Line 1	Mailing Address Line 2
P. O. Box 4 Route 168	

Mailing Address Last Line – City	State	ZIP+4
Shippingport	PA	15077-0004

Phone	Ext	FAX	Email Address
724-682-4141			salerad@firstenergycorp.com

NAICS Codes (Two- & Three-Digit Codes – List All That Apply): 221113

6-Digit Code (Optional): 221121

Client to Site Relationship

FACILITY INFORMATION

Modification of Existing Facility	Yes	No
1. Will this project modify an existing facility, system, or activity?	☒	☐
2. Will this project involve an addition to an existing facility, system, or activity?	☒	☐

If "Yes", check all relevant facility types and provide DEP facility identification numbers below.

	Facility Type	DEP Fac ID#		Facility Type	DEP Fac ID#
☐	Air Emission Plant		☐	Industrial Minerals Mining Operation	
☐	Beneficial Use (water)		☐	Laboratory Location	
☐	Blasting Operation		☐	Land Recycling Cleanup Location	
☐	Captive Hazardous Waste Operation		☐	MineDrainageTrmt/LandRecyProjLocation	
☐	Coal Ash Beneficial Use Operation		☐	Municipal Waste Operation	
☐	Coal Mining Operation		☐	Oil & Gas Encroachment Location	
☐	Coal Pillar Location		☐	Oil & Gas Location	
☐	Commercial Hazardous Waste Operation		☐	Oil & Gas Water Poll Control Facility	
☐	Dam Location		☐	Public Water Supply System	
☐	Deep Mine Safety Operation -Anthracite		☐	Radiation Facility	
☐	Deep Mine Safety Operation -Bituminous		☐	Residual Waste Operation	
☐	Deep Mine Safety Operation -Ind Minerals		☐	Storage Tank Location	
☐	Encroachment Location (water, wetland)		☐	Water Pollution Control Facility	
☐	Erosion & Sediment Control Facility		☐	Water Resource	
☐	Explosive Storage Location		☒	Other: Chlorination/Dechlorination	

Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
	40	37	15	-80	26	6

Horizontal Accuracy Measure: Feet --or-- Meters

Horizontal Reference Datum Code
- ☐ North American Datum of 1927
- ☒ North American Datum of 1983
- ☐ World Geodetic System of 1984

Horizontal Collection Method Code

Reference Point Code

Altitude: Feet 734 --or-- Meters

Altitude Datum Name
- ☐ The National Geodetic Vertical Datum of 1929
- ☒ The North American Vertical Datum of 1988 (NAVD88)

Altitude (Vertical) Location Datum Collection Method Code

Geometric Type Code

Data Collection Date

Source Map Scale Number: Inch(es) = Feet --or-- Centimeter(s) = Meters

PROJECT INFORMATION

Project Name
Beaver Valley Service Water Chemical Treatment Upgrade

Project Description
Continuous low dose chlorination and dechlorination

Project Consultant Last Name	First Name	MI	Suffix
Weaver	Charles	J	

Project Consultant Title	Consulting Firm
Staff Nuclear Specialist	N/A

Mailing Address Line 1	Mailing Address Line 2
P. O. Box 4 Route 168	

Address Last Line – City	State	ZIP+4
Shippingport	PA	15077-0004

Phone	Ext	FAX	Email Address
724-682-4120			cjweaver@firstenergycorp.com

Time Schedules	Project Milestone (Optional)

1. **Have you informed the surrounding community and addressed any concerns prior to submitting the application to the Department?** ☒ Yes ☐ No

2. **Is your project funded by state or federal grants?** ☐ Yes ☒ No
   Note: If "Yes", specify what aspect of the project is related to the grant and provide the grant source, contact person and grant expiration date.
   Aspect of Project Related to Grant
   Grant Source: _____
   Grant Contact Person: _____
   Grant Expiration Date: _____

3. **Is this application for an authorization on Appendix A of the Land Use Policy? (For referenced list, see Appendix A of the Land Use Policy attached to GIF instructions)** ☐ Yes ☒ No
   Note: If "No" to Question 3, the application is not subject to the Land Use Policy.
   If "Yes" to Question 3, the application is subject to this policy and the Applicant should answer the additional questions in the **Land Use Information** section.

LAND USE INFORMATION

Note: Applicants are encouraged to submit copies of local land use approvals or other evidence of compliance with local comprehensive plans and zoning ordinances.

1. **Is there an adopted county or multi-county comprehensive plan?** ☐ Yes ☒ No
2. **Is there an adopted municipal or multi-municipal comprehensive plan?** ☐ Yes ☒ No
3. **Is there an adopted county-wide zoning ordinance, municipal zoning ordinance or joint municipal zoning ordinance?** ☐ Yes ☒ No
   Note: If the Applicant answers "No" to either Questions 1, 2 or 3, the provisions of the PA MPC are not applicable and the Applicant does not need to respond to questions 4 and 5 below.
   If the Applicant answers "Yes" to questions 1, 2 and 3, the Applicant should respond to questions 4 and 5 below.
4. **Does the proposed project meet the provisions of the zoning ordinance or does the proposed project have zoning approval?** If zoning approval has been received, attach documentation. ☐ Yes ☒ No
5. **Have you attached Municipal and County Land Use Letters for the project?** ☐ Yes ☒ No

COORDINATION INFORMATION

Note: The PA Historical and Museum Commission must be notified of proposed projects in accordance with DEP Technical Guidance Document 012-0700-001 and the accompanying Cultural Resource Notice Form.

If the activity will be a mining project (i.e., mining of coal or industrial minerals, coal refuse disposal and/or the operation of a coal or industrial minerals preparation/processing facility), respond to questions 1.0 through 2.5 below.

If the activity will not be a mining project, skip questions 1.0 through 2.5 and begin with question 3.0.

1.0	**Is this a coal mining project?** If "Yes", respond to 1.1-1.6. If "No", skip to Question 2.0.	☐	Yes	☒	No
1.1	**Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be equal to or greater than 200 tons/day?**	☐	Yes	☐	No
1.2	**Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be greater than 50,000 tons/year?**	☐	Yes	☐	No
1.3	**Will this coal mining project involve coal preparation/ processing activities in which thermal coal dryers or pneumatic coal cleaners will be used?**	☐	Yes	☐	No
1.4	**For this coal mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?**	☐	Yes	☐	No
1.5	**Will this coal mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?**	☐	Yes	☐	No
1.6	**Will this coal mining project involve underground coal mining to be conducted within 500 feet of an oil or gas well?**	☐	Yes	☐	No
2.0	**Is this a non-coal (industrial minerals) mining project?** If "Yes", respond to 2.1-2.6. If "No", skip to Question 3.0.	☐	Yes	☒	No
2.1	**Will this non-coal (industrial minerals) mining project involve the crushing and screening of non-coal minerals other than sand and gravel?**	☐	Yes	☐	No
2.2	**Will this non-coal (industrial minerals) mining project involve the crushing and/or screening of sand and gravel with the exception of wet sand and gravel operations (screening only) and dry sand and gravel operations with a capacity of less than 150 tons/hour of unconsolidated materials?**	☐	Yes	☐	No
2.3	**Will this non-coal (industrial minerals) mining project involve the construction, operation and/or modification of a portable non-metallic (i.e., non-coal) minerals processing plant under the authority of the General Permit for Portable Non-metallic Mineral Processing Plants (i.e., BAQ-PGPA/GP-3)?**	☐	Yes	☐	No
2.4	**For this non-coal (industrial minerals) mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?**	☐	Yes	☐	No
2.5	**Will this non-coal (industrial minerals) mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?**	☐	Yes	☐	No

3.0	**Will your project, activity, or authorization have anything to do with a well related to oil or gas production, have construction within 200 feet of, affect an oil or gas well, involve the waste from such a well, or string power lines above an oil or gas well?** If "Yes", respond to 3.1-3.3. If "No", skip to Question 4.0.	☐	Yes	☒	No
3.1	**Does the oil- or gas-related project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)?**	☐	Yes	☐	No
3.2	**Will the oil- or gas-related project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or storm water system?** If "Yes", discuss in *Project Description*.	☐	Yes	☐	No
3.3	**Will the oil- or gas-related project involve the construction and operation of industrial waste treatment facilities?**	☐	Yes	☐	No
4.0	**Will the project involve a construction activity that results in earth disturbance?** If "Yes", specify the total disturbed acreage. **4.0.1 Total Disturbed Acreage**	☐	Yes	☒	No
5.0	**Does the project involve any of the following?** If "Yes", respond to 5.1-5.3. If "No", skip to Question 6.0.	☐	Yes	☒	No
5.1	**Water Obstruction and Encroachment Projects – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water?**	☐	Yes	☐	No
5.2	**Wetland Impacts – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a wetland?**	☐	Yes	☐	No
5.3	**Floodplain Projects by the commonwealth, a Political Subdivision of the commonwealth or a Public Utility – Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a floodplain?**	☐	Yes	☐	No
6.0	**Will the project involve discharge of stormwater or wastewater from an industrial activity to a dry swale, surface water, ground water or an existing sanitary sewer system or separate storm water system?**	☐	Yes	☒	No
7.0	**Will the project involve the construction and operation of industrial waste treatment facilities?**	☒	Yes	☐	No
8.0	**Will the project involve construction of sewage treatment facilities, sanitary sewers, or sewage pumping stations?** If "Yes", indicate estimated proposed flow (gal/day). Also, discuss the sanitary sewer pipe sizes and the number of pumping stations/treatment facilities/name of downstream sewage facilities in the *Project Description*, where applicable. **8.0.1 Estimated Proposed Flow (gal/day)**	☐	Yes	☒	No
9.0	**Will the project involve the subdivision of land, or the generation of 800 gpd or more of sewage on an existing parcel of land or the generation of an additional 400 gpd of sewage on an already-developed parcel, or the generation of 800 gpd or more of industrial wastewater that would be discharged to an existing sanitary sewer system?**	☐	Yes	☒	No
	9.0.1 Was Act 537 sewage facilities planning submitted and approved by DEP? If "Yes" attach the approval letter. Approval required prior to 105/NPDES approval.	☐	Yes	☒	No
10.0	**Is this project for the beneficial use of biosolids for land application within Pennsylvania?** If "Yes" indicate how much (i.e. gallons or dry tons per year). **10.0.1 Gallons Per Year (residential septage)** _____ **10.0.2 Dry Tons Per Year (biosolids)**	☐	Yes	☒	No
11.0	**Does the project involve construction, modification or removal of a dam?** If "Yes", identify the dam. **11.0.1 Dam Name**	☐	Yes	☒	No

12.0	**Will the project interfere with the flow from, or otherwise impact, a dam?** If "Yes", identify the dam.	☐	Yes	☒	No
	12.0.1 Dam Name				
13.0	**Will the project involve operations (excluding during the construction period) that produce air emissions (i.e., NOX, VOC, etc.)?** If "Yes", identify each type of emission followed by the amount of that emission.	☐	Yes	☒	No
	13.0.1 Enter all types & amounts of emissions; separate each set with semicolons.				
14.0	**Does the project include the construction or modification of a drinking water supply to serve 15 or more connections or 25 or more people, at least 60 days out of the year?** If "Yes", check all proposed sub-facilities.	☐	Yes	☒	No
	14.0.1 Number of Persons Served				
	14.0.2 Number of Employee/Guests				
	14.0.3 Number of Connections				
	14.0.4 Sub-Fac: Distribution System	☐	Yes	☐	No
	14.0.5 Sub-Fac: Water Treatment Plant	☐	Yes	☐	No
	14.0.6 Sub-Fac: Source	☐	Yes	☐	No
	14.0.7 Sub-Fac: Pump Station	☐	Yes	☐	No
	14.0.8 Sub Fac: Transmission Main	☐	Yes	☐	No
	14.0.9 Sub-Fac: Storage Facility	☐	Yes	☐	No
15.0	**Will your project include infiltration of storm water or waste water to ground water within one-half mile of a public water supply well, spring or infiltration gallery?**	☐	Yes	☒	No
16.0	**Is your project to be served by an existing public water supply?** If "Yes", indicate name of supplier and attach letter from supplier stating that it will serve the project.	☐	Yes	☒	No
	16.0.1 Supplier's Name				
	16.0.2 Letter of Approval from Supplier is Attached	☐	Yes	☒	No
17.0	**Will this project involve a new or increased drinking water withdrawal from a stream or other water body?** If "Yes", should reference both Water Supply and Watershed Management.	☐	Yes	☒	No
	17.0.1 Stream Name				
18.0	**Will the construction or operation of this project involve treatment, storage, reuse, or disposal of waste?** If "Yes", indicate what type (i.e., hazardous, municipal (including infectious & chemotherapeutic), residual) and the amount to be treated, stored, re-used or disposed.	☐	Yes	☒	No
	18.0.1 Type & Amount				
19.0	**Will your project involve the removal of coal, minerals, etc. as part of any earth disturbance activities?**	☐	Yes	☒	No
20.0	**Does your project involve installation of a field constructed underground storage tank?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit.	☐	Yes	☒	No
	20.0.1 Enter all substances & capacity of each; separate each set with semicolons.				
21.0	**Does your project involve installation of an aboveground storage tank greater than 21,000 gallons capacity at an existing facility?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit.	☐	Yes	☒	No
	21.0.1 Enter all substances & capacity of each; separate each set with semicolons.				

22.0	**Does your project involve installation of a tank greater than 1,100 gallons which will contain a highly hazardous substance as defined in DEP's Regulated Substances List, 2570-BK-DEP2724?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. **22.0.1 Enter all substances & capacity of each; separate each set with semicolons.**	☐	Yes	☒	No
23.0	**Does your project involve installation of a storage tank at a new facility with a total AST capacity greater than 21,000 gallons?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. **23.0.1 Enter all substances & capacity of each; separate each set with semicolons.**	☐	Yes	☒	No
24.0	**Will the intended activity involve the use of a radiation source?**	☐	Yes	☒	No

CERTIFICATION

I certify that I have the authority to submit this application on behalf of the applicant named herein and that the information provided in this application is true and correct to the best of my knowledge and information.

Type or Print Name Donald J. Salera

Signature	Title	Date
Donald J Salera	Chemistry Manager	8-22-14

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

CHECKLIST FOR WATER QUALITY MANAGEMENT PERMIT

APPLICANT'S √ CHECKLIST	
APPLICANT NAME	FENOC Beaver Valley Power Station

Check the following list to make sure that you have included all the required information. Place a checkmark in the column provided for all items completed and/or provided. Failure to provide all of the requested information will delay the processing of the application.

ENCLOSE THIS CHECKLIST WITH YOUR APPLICATION FORM.

		Check √ If Included	DEP Use Only
1.	General Information Form (GIF).	☒	
2.	Appropriate application fee.	☒	
3.	Two (2) copies (original and 1 copy) of application, design module(s), and accompanying drawings and plans.	☒	
	a. Certification and proper signatures.	☒	
	b. Engineer's professional seal.	☒	
	c. *Design Engineer's Report*	☒	
	d. Properly notarized (original).	☒	
	e. Additional copy for Delaware River Basin or Erie and Allegheny counties (if required).	☐	
4.	Supplemental Information:		
	a. General Layout Diagram.	☒	
	b. Sizes, Capacities and Dimensions Diagram.	☒	
5.	Design Modules.	☒	
6.	Topographic map with appropriate details.	☒	
7.	Act 14 Notification.	☒	
8.	Act 537 Approval (if required).	☐	
9.	Acts 67, 68 and 127 Notification (IW and Manure Storage Facilities only).	☐	
10.	Proof of Public Notification (IW and Manure Storage Facilities only)	☐	
11.	DRBC Notification (if required).	☐	
12.	Other (specify): Chemical additive List	☒	

Applicant Name: FirstEnergy Nuclear

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

APPLICATION FOR WATER QUALITY MANAGEMENT PERMIT

Before completing this form, read the step-by-step instructions provided in this application package.

Related ID#s (If Known)				DEP USE ONLY
Client ID#	99862	APS ID#	____	Date Received & General Notes
Site ID#	705550	Auth ID#	____	
Facility ID#	____			

APPLICANT IDENTIFIER

Applicant Name: FirstEnergy Nuclear Operating Company (FENOC)

Current Mailing Address: P.O. Box 4 Route 168, Shippingport, PA 15077

Current Phone Number: (724) 6824141

FACILITY TYPE (Check all appropriate boxes below)

- ☐ Treatment Plant Summary – Module 1
- ☐ Sewer System – Module 2
- ☐ Flow Equalization and Grit Chambers – Module 3
- ☐ Screening and Settling – Module 4
- ☐ Trickling Filters and Aeration – Module 5
- ☒ Chemical Treatment – Module 6
- ☐ Rapid Sand Filters – Module 7
- ☐ Other Filters and Disinfection – Module 8
- ☐ Aerobic Digestion Tanks – Module 9
- ☐ Anaerobic Digestion – Module 10
- ☐ Sludge Filters and Centrifuges – Module 11
- ☐ Sludge Drying Beds – Module 12
- ☐ Stream Encroachment and Crossings – Module 13
- ☐ Spray Irrigation – Module 14
- ☒ Industrial Wastewater Treatment Facility – Module 15
- ☐ Small Flow Treatment Facility – Module 16
- ☐ Sewer Extensions – Module 17
- ☐ Manure Storage Facilities – Module 18
- ☐ Supplementary Geology and Groundwater Information – Module 19
- ☐ Impoundments – Module 20
- ☐ Sequencing Batch Reactor – Module 21
- ☐ Pump Stations – Module 22

COMPLIANCE HISTORY REVIEW

Is/was the facility owner or operator in violation of any DEP regulation, permit, order or schedule of compliance at this or any other facility? ☐ Yes ☒ No

If "Yes," list each permit, order and schedule of compliance and provide compliance status. Use additional sheets to provide information on all permits.

Permit Program	Permit No.
Brief Description of Noncompliance	

Steps Taken to Achieve Compliance	Date(s) Compliance Achieved

Current Compliance Status ☒ In Compliance ☐ In Noncompliance

CERTIFICATION (Check appropriate box below.)

I certify under penalty of law that I

- ☐ am the applicant
- ☒ am an officer or official of the applicant
- ☐ have the authority to make this application (attach delegation of signatory authority) and that the plans, reports and documents designated and attached here with part of the application are true and correct to the best of my knowledge and belief.

Charles McFeaters	**BVPS Director of Site Operations**
Name (type or print legibly)	Official Title
Signature	8/26/14 Date

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
JEANNE C HYNES
Notary Public
MONACA BORO., BEAVER COUNTY
My Commission Expires Apr 29, 2017

professional seal as
priate.)

cribed before me, this 27 day of August 20 14

y Seal

REGISTERED PROFESSIONAL ENGINEER

This is to certify that I have personally reviewed all engineering information contained in the accompanying modules, drawings, specifications and other documents which are part of this application and that I have found it to be of good engineering quality, true and correct, and is in conformance with the requirements of the Department of Environmental Protection (DEP), and it does not, to the best of my knowledge, withhold information that is pertinent to a determination of compliance with the requirements of DEP.

Name of Design Engineer:	James Beninati
Design Firm:	HDR Engineering, Inc.
Mailing Address:	11 Stanwix Street, Suite 800 Pittsburgh, PA 15222
Telephone Number:	(412) 497-6000
E-mail Address:	james.beninati@hdrinc.com

James T. Beninati
Signature of Professional Engineer

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
Professional Seal
JAMES BENINATI
ENGINEER
PE074509

9/19/2014

NOTICE: It is an offense under Pennsylvania Criminal Code to affirm a false statement in documents submitted to DEP.

DEP will consider the registered professional engineer whose seal is affixed to design documents to be fully responsible for the adequacy of all aspects of facility designs. The application and supporting documentation submitted for sewerage projects will be reviewed to ensure general consistency with good engineering practices, and the applicable design guidelines of DEP.

Applicant Name: First Energy Nuclear Operating Co.(FENOC)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

CHEMICAL TREATMENT
MODULE 6

APPLICANT NAME First Energy Nuclear Operating Co.(FENOC)

CHEMICAL TREATMENT PROCESS (Do not use to describe disinfection facilities.)

1. DESCRIBE PROCESS:

   Non-Contact Cooling Water

2. WILL THE PROCESS INCREASE TOTAL SOLIDS? ☐ YES ☒ NO

   IF YES, SPECIFY INCREASE: _____ MILLIGRAMS PER LITER

MIXING AND FLOCCULATION FACILITIES

INDICATE FUNCTION OF EACH UNIT AND FILL IN OR CHECK ALL RELEVANT DATA.		UNIT ☐ Mixing ☐ Quick Mix ☐ Flocculation ☐ Existing ☐ Proposed	UNIT ☐ Mixing ☐ Quick Mix ☐ Flocculation ☐ Existing ☐ Proposed	UNIT ☐ Mixing ☐ Quick Mix ☐ Flocculation ☐ Existing ☐ Proposed
1. CAPACITY	(gal)			
	(cu ft)			
2. DETENTION TIME	(min)			

Applicant Name: FENOC

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

INDUSTRIAL WASTEWATER TREATMENT FACILITY
MODULE 15

APPLICANT NAME	FENOC

Note: A copy of the *Design Engineer's Report* must be attached to this module.

SIC/NAICS CODES

	SIC CODE	NAICS CODE	Corresponding SIC/NAICS Description
1st	____	22111	____
2nd	____	____	____
3rd	____	____	____
4th	____	____	____

GENERAL DESCRIPTION AND NATURE OF BUSINESS

Production of electricity - Nuclear Generated

LIST OF PERMITS (List all NPDES and WQM permits presently held for this facility.)

NPDES Permit # PA0025615

Applicant Name: FENOC

TREATMENT PROCESS CODES

PHYSICAL TREATMENT PROCESSES

Treatment Process	Code
Ammonia Stripping	AS
Dialysis	DIALY
Diatomaceous Earth Filtration	DEF
Electrodialysis	ELECT
Evaporation	EVAP
Flocculation	FLOCC
Flotation	FLOT
Foam Fractionation	FF
Freezing	FREEZ
Gas-Phase Separation (air stripping)	GPS
Grinding	GRIND
Flow Equalization	FE
Eutectic Freezing	EUTEC
Screening	SCRN
Microstraining	MSTRN
Grit Removal	GR
Mixing	MIX
Moving Bed Filters	MBF
Intermittent Sand Filters	ISF
Reverse Osmosis (Hyperfiltration)	RO
Rapid Sand Filtration	RSF
Sedimentation	SEDI
Slow Sand Filtration	SSF
Solvent Extraction	SE
Sorption (not Carbon)	SORPT
Distillation	DISTL
Multimedia Filtration	MF
Filtration	FILTR

DISINFECTION

Hypochlorite	HYPO
Chlorine Gas	CL
Ozone	OZONE
Ultraviolet	UV

BIOLOGICAL TREATMENT PROCESSES

Treatment Process	Code
Activated Sludge	ACTSL
Aerated Lagoons	AERLG
Anaerobic Treatment	ANAE
Nitrification – Denitrification	NIDI
Pre-Aeration	PA
Spray Irrigation/Land Application	SILA
Stabilization Ponds	SP
Rotating Biological Contactors	RBC
Post Aeration	POA
Holding or Detention Pond	HOLD
Treatment by Plain Aeration	PLAIN
Ridge & Furrow Irrigation	RFI
Sheet or Overland Flow Irrigation	SOFI
Surface/Subsurface Injection	SSSI
Sequence Batch Reactor	SBR
Artificial Wetlands	ARTWL
Imhoff Tank	IMHOF
Polishing Lagoons	POL
Biological Hydrolysis	BIOHY
Trickling Filtration	TF

BIOSOLID USE/DISPOSAL

Incineration	INCIN
Land Application	LNDAP
Landfill	LNDFL
Pyrolysis	PYRO

DISPOSAL

Discharge to Surface Water	
Ocean Discharge through Outfall	OCEAN
Reuse/Recycle of Treated Outfall	RCYEF
Underground Injection	UI
Reuse or Sale of Wastewater or Raw Material for Other Processes	REUSE

CHEMICAL TREATMENT AND OTHER PROCESSES

Treatment Process	Code
Carbon Adsorption	CA
Chemical Oxidation	CO
Chemical Precipitation	CP
Chemical Hydrolysis	CH
Coagulation	COAG
Dechlorination	DC
Electrochemical Treatment	ET
Ion Exchange	IE
Neutralization	NEUT
Oxidation	OX
Temperature Control	TEMP
Oil & Grease Removal, Including Skimming & Separators	OGREM
Reduction	RD
Odor Control	OC

BIOSOLID TREATMENT PROCESSES

Aerobic Digestion	AERON
Anaerobic Digestion	ANEDN
Belt Filtration	BELT
Centrifugation	CENT
Conditioning (Chemical, Heat)	COND
Chlorine Treatment	CHTR
Composting	COMP
Drying	DRY
Elutriation	ELU
Flotation Thickening	FLOT
Freezing	FREEZ
Gravity Thickening	GRAV
Sludge Lagoons	SLAG
Vacuum Filtration	VAC
Vibration	VIB
Wet Oxidation	WETOX
Pressure Filtration	PRESS

Applicant Name: FENOC

Summary of Wastewater Source and Treatment Unit Information	1. SOURCE OF WASTE River Water/Service Water /Circulating Water 2. OUTFALL NO. 001/004/010	1. SOURCE OF WASTE Non Conatct Cooling Water 2. OUTFALL NO. 003
3. TYPE(S) OF WASTE (i.e., Sanitary, Process . . .)	Non Contact Cooling Water	Non Contact Cooling Water
4. WASTE FLOW PATTERN	☒ Continuous ☐ Intermittent From (am) To (pm) ☐ Batch	☐ Continuous ☒ Intermittent Usually less than 5 total days per year From (am) To (pm) ☐ Batch
5. DAILY WASTE VOLUME TOTAL	Batches/day Gallons/batch Gallons/day	Batches/day Gallons/batch Gallons/day

6. DESIGN FLOW AVERAGE MAXIMUM General Sequence of Treatment Units (See Treatment Process Code List)	41.7 MGD 73.1 MGD Unit (1)	(Check) Existing	(Check) Proposed	Code for Treatment Unit	0.5 MGD 0.5 MGD Unit (1)	(Check) Existing	(Check) Proposed	Code for Treatment Unit
	Average 001 -35.3 MGD	☒	☒		Average 003 - 0.5 MGD	☐	☒	
	Max 001 -61.8 MGD	☒	☒		Max 003 -0.5 MGD	☐	☒	
	Average 004 -2.8 MGD seasonal	☒	☒			☐	☐	
	Max 004 - 7.7 MGD seasonal	☒	☒			☐	☐	
	Average 010 - 3.6 MGD	☒	☒			☐	☐	
	Max 010 - emergency use only for max	☒	☒			☐	☐	
		☐	☐			☐	☐	
		☐	☐			☐	☐	
		☐	☐			☐	☐	
		☐	☐			☐	☐	

Applicant Name: FENOC

(1) If impoundments are proposed and the wastewater entering the impoundment meets the definition of Residual Waste at Title 25 Pa. Code Chapter 287, the design must be in accordance with Title 25 Pa. Code § 299.144.

Use Additional Sheets If Necessary

WASTE CHARACTERISTICS	OUTFALL 001/004/010/003 SOURCE OF WASTE: River Water/Service Water/Circulating Water System/Non contact Cooling Water	SAMPLING PERIOD: 1-1-13 From 8-31-13 To ☒ Yes ☐ No NPDES Permit application submitted within last 3 years for this outfall.	NAME OF LABORATORY/CONSULTANT FENOC Lab Telephone No.: (724) 682-4883

SAMPLING LOCATION * -- TREATMENT FACILITY INFLUENT						EXISTING TREATMENT FACILITY EFFLUENT				NEW TREATMENT FACILITY EFFLUENT (Expected)				ANALYTICAL METHOD USED (AA, GC/MS, etc.)
PARAMETER	UNITS	MONTHLY AVERAGE	24 HR. MAX.	MIN.	MAX.	MONTHLY AVERAGE	24 HR. MAX.	MIN.	MAX.	MONTHLY AVERAGE	24 HR. MAX.	MIN.	MAX.	
001 TRC	mg/L					<0.1	0.3			0.0-0.5	0.0-1.25			Amperometric, Colorimetric (DPD)
001 FAC	mg/L					<0.1	0.1			0.0-0.2	0.0-0.5			Amperometric, Colorimetric (DPD)
004 TRC	mg/L					<0.1	0.19			0.0-0.5	0.0-1.25			Colorimetric (DPD)
004 FAC	mg/L					<0.1	0.2			0.0-0.2	0.0-0.5			Colorimetric (DPD)
010 TRC	mg/L					<0.1	0.17			0.0-0.5	0.0-1.25			Colorimetric(DPD)
010 FAC	mg/L					<0.1	0.1			0.0-0.2	0.0-0.5			Colorimetric (DPD)
003 TRC	mg/L									0.0-0.5	0.0-1.25			
003 FAC	mg/L									0.0-0.2	0.0-0.5			

***Use Additional Sheets as Necessary**

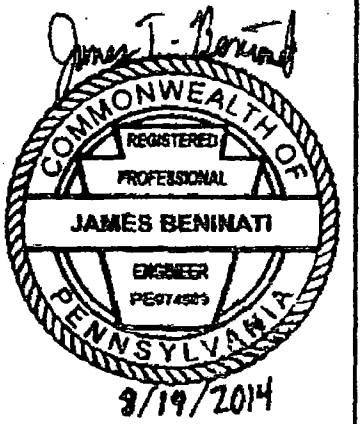
Comments/additional information: Sampling done during chlorination. Outfall 010 and 003 are not currently chlorinated, though outfall 010 is monitored, outfall 003 is not currently monitored for chlorine. Outfall 001 is measured continuously, and measured by hand when instrumentation is not available. There are plans to add continuous analyzers to outfall 010 with this modification, it is currently determined by grab sample. Outfall 004 will continue with grab sample, and outfall 003 will also be determined by grab sample.

Engineers

Report

Beaver Valley Power Station
Unit 1 Reactor Plant and Turbine Plant River Water systems, Unit 2 Service Water systems and Fire Protection Chemical Injection and Dechlorination Upgrade

This document prepared by FENOC under direction and technical review by HDR Engineering. Professional Engineer seal hereby affixed under contract with HDR Engineering per chemical system modifications dated August 2014.



Chemical Treatment Description

1. Site Location and Description

The Beaver Valley Power Station Unit No. 1 (BVPS-1) is located in Shippingport Borough, Beaver County, Pennsylvania, on the south bank of the Ohio River. The site is approximately one mile from Midland, Pennsylvania, five miles from East Liverpool, Ohio, and approximately 25 miles from Pittsburgh, Pennsylvania. The coordinates are 40°37' 18" north and 80°26' 2" west.

Figure 10-1, Site Map depicts the site location and description. The site comprises approximately 453 acres including 26 acres of right of way. Also on the site and immediately to the west of the reactor location is the former site of Shippingport Atomic Power Station (SAPS) which was managed by Duquesne Light Company for the Department of Energy (DOE). The SAPS terminated operations October 1, 1982, and was dismantled by the USDOE. Immediately to the east of the BVPS-1 reactor location, and also onsite is the Beaver Valley Power Station Unit 2 (BVPS-2).

2. Issue and Background

Degradation of the Beaver Valley Power Station Unit 1 River Water (RPRW), Unit 1 Turbine Plant River Water (TPRW) and Unit 2 Service Water System (SWS) has been increasing as evidenced by the increased occurrence of pin-hole leaks and degradation of river and service water cooled heat exchangers and associated piping. Both systems supply cooling water to plant equipment credited for nuclear safety and shutdown of the reactor.

The current chemical treatment strategy has been less than effective at mitigating the degradation due to the limited effect that current treatment chemicals have on the underlying problems of under-deposit corrosion and microbiologically induced corrosion (MIC). Attempts have been made to increase the effectiveness of the treatment scheme, but system limitations due to tank materials, piping materials, and inadequate injection equipment have prevented the use of more effective chemical treatments.

The use of non-oxidizing biocides, while effective on macrobiological organisms such as Asiatic clams and mussels, is less than effective on microbiological organisms conducive to MIC attack of carbon and stainless steel. More robust corrosion inhibitors are available for use, but the current storage tank liners are not currently compatible with the current improved treatment products. A large portion of the Unit 1 Turbine Plant River Water (TPRW) System remains untreated and susceptible to fouling/corrosion. The treatment equipment that feeds treatment chemicals to the TPRW system mid-system is a long standing temporary modification that utilizes a single feed line, causing feed blockages due to mixing of feed chemicals. Silt/sediment buildup within the systems cannot be prevented due to the lack of flexibility in the treatment system to allow for the feed of dedicated dispersant products.

3. Proposed Solution

The new system will consist of treatment chemicals fed from two locations to provide a robust treatment program including oxidizing biocide, improved corrosion inhibitors, and a true dispersant product. Corrosion rate monitoring is planned to be done on the system to determine corrosion rates on the piping and heat exchangers.

The first portion of the treatment system will modify the equipment in the intake structure. The intake structure current chemical storage tanks will be replaced with two (2) new 5300 gallon tanks, TK-1 and TK-2 with liners compatible with a wider range of treatment chemicals.
Tank, TK-2 will supply a robust corrosion inhibitor providing both anodic and cathodic inhibition and tank, TK-1 will supply a dispersant product. The system concentration of these chemicals can be adjusted as conditions change within the Ohio River, to target specific criteria.

Each 5300 gallon tank will supply a pump skid consisting of three (3) pumps. One pump per skid will supply the Unit 1 running Reactor and Turbine Plant River Water Pumps. One pump will supply the running Unit 2 Service Water Pumps with the third pump available as a standby. A one-hundred ten (110) gallon chemical feed tank, TK-3 will be utilized to provide treatment chemical for treating the Fire Protection System main headers. The Fire Protection system will be treated with a separate biocide.

The second portion of the treatment system will be located at the Unit 1 cooling tower. This portion of the system will consist of a sodium hypochlorite (bleach) storage tank, TK-4 with a capacity of approximately 8,700 gallons, sodium bromide storage tank, TK-6 with a capacity of approximately 2,500 gallons, and a clean water system flush tote. The bleach tank and the bromide tank will each supply a separate skid of three (3) pumps similar to the intake structure with one pump being utilized to feed the Unit 1 pumps, one pump to feed the Unit 2 pumps and a standby/swing pump. The bleach and bromide will be mixed in the injection line at the skids and fed together through Chem Proline polyethylene 100 RC double contained piping to the intake structure.

Asiatic clam and mussel treatment will be performed using a tote connection to the system to feed a non-oxidizing biocide (quaternary amine) from a tote through the bleach/bromide lines following a clean water flush of the lines from the flush tote.

Dechlorination will occur at all system discharge points impacted by the chlorinated water to the Ohio River. Principal dechlorination will still occur at the Unit 1 Cooling Tower blow down, and at the Unit 1 Cooling Tower basin overflow Outfall 004. Alternate cooling tower blow down dechlorination will still be available at the Unit 2 cooling tower to allow for treatment when Unit 1 is offline. A new third dechlorination system will be installed at the Emergency Outfall Structure. A new fourth intermittent dechlorination system will be utilized to dechlorinate the River Water flow from the Unit 1 Emergency Diesel Generators during their operation.

All chemical treatment pumps will be operated manually with adjustments made from chemical analysis to determine proper treatment under various conditions.

Additional design safety and reliability components will be integral to the systems. The principal and alternate cooling tower blow down dechlorination systems will be upgraded with redundant pumps and auto dialers to assure dechlorination occurs at all times that chlorination is in service. The Emergency Outfall Dechlorination system will include a pump auto-switch to swap pumps should the primary feed pump trip. An auto-dialer will also be present at the Emergency Outfall system that will dial out to select phone numbers should a loss of dechlorination occur. The chlorination and dechlorination systems will be installed in structures to protect them from the environment.

4. Beaver Valley System Summary Descriptions

4.a Unit 1 Reactor Plant River Water System (RPRW)

The Reactor Plant River Water system (RPRW) supplies water taken from the Ohio River to supply cooling water to reactor plant heat exchangers and other vital reactor plant components. Three (3) Reactor Plant River Water pumps take submerged suction from screened river water in the main intake structure and discharge through two independent supply headers. The Reactor Plant River Water system supplies river water to various reactor plant heat exchangers for cooling during normal operations and to the Containment Recirculation Spray coolers and Diesel Generators during abnormal operations. The system loads have the capability to receive water from either or both of the supply headers. This arrangement provides maximum reliability and conforms to the single failure criteria.

The discharge lines of the Reactor Plant River Water system flow into the circulating water system between the condenser outlet water boxes and the pumping structure which enters the Unit 1 cooling tower basin. Blowdown from the Unit 1 cooling tower basin is discharged back into the Ohio River via Outfall 001. The discharge is currently permitted under Pennsylvania National Pollutant Discharge Elimination System (NPDES) Permit PA0025615.

Each Reactor Plant River Water pump has a capacity of 9,000 gallons per minute. During normal plant operations one (1) Reactor Plant River Water pump is in-service providing flow to primary plant heat exchangers and cooling loads. Total flow is approximately 9,000 gallons per minute.

4.b Unit 1 Turbine Plant River Water System (TPRW)

The Turbine Plant River Water system (TPRW) supplies water taken from the Ohio River for cooling water to the secondary plant heat exchangers and other secondary plant components. Two (2) Raw Water pumps take submerged suction from screened river water in the main intake structure and discharge through two independent supply headers. The Turbine Plant River Water system supplies river water to various secondary plant heat exchangers for cooling during normal operations.

The discharge lines of the Turbine Plant River Water system flow into the Circulating Water system between the condenser outlet water boxes and the pumping structure which enters the Unit 1 cooling tower basin. Blowdown from the Unit 1 cooling tower basin is discharged back into the Ohio River via Outfall 001. The discharge is currently permitted under Pennsylvania National Pollutant Discharge Elimination System (NPDES) Permit PA0025615.

Each Turbine Plant River Water pump has a capacity of 16,000 gallons per minute. During normal plant operations one (1) Turbine Plant River Water pump is in-service providing flow to Secondary Plant heat exchangers and cooling loads. Total flow is approximately 16,000 gallons per minute. Frequently, during late Spring to early Fall two (2) Turbine Plant River Water pumps are in-service providing flow to Secondary Plant heat exchangers and cooling loads. Total flow is approximately 32,000 gallons per minute at those times.

4.c Unit 2 Service Water System

The Service Water System (SWS) supplies water taken from the Ohio River to supply cooling water to reactor plant heat exchangers and secondary plant heat exchangers and other vital reactor plant components. Three (3) Service Water pumps take submerged suction from screened river water in the Main Intake Structure and discharge through two independent supply headers.

The Service Water System supplies river water to various reactor plant and secondary plant heat exchangers for cooling during normal operations and to the Containment Recirculation Spray coolers and Diesel Generators during abnormal operations. The system loads have the capability to receive water from either or both of the supply headers. This arrangement provides maximum reliability and conforms to the single failure criteria.

Two discharge flow paths exist for the primary component cooling heat exchangers. Under normal conditions, the majority of the flow joins the discharge from the secondary component cooling heat exchangers and flows to the suction of the Unit 2 cooling tower pumps. This provides the necessary makeup for the circulating system in order to compensate for drift, blow down and evaporation in the cooling tower. Blowdown from the Unit 2 cooling tower basin is discharged back into the Ohio River via Outfall 001. The discharge is currently permitted under Pennsylvania National Pollutant Discharge Elimination System (NPDES) Permit PA0025615.

The alternate discharge is through two 24 inch lines tying into two 30 inch Service Water lines, which then lead to the Emergency Outfall System (EOS). Discharge from the Emergency Outfall structure flows into the Ohio River via Outfall 010. The discharge is currently permitted under Pennsylvania National Pollutant Discharge Elimination System (NPDES) Permit PA0025615.

Each Service Water pump has a capacity of 14,700 gallons per minute. During normal plant operations two (2) Service Water pumps are in-service providing flow to both secondary plant and primary plant heat exchangers and cooling loads. Total flow is approximately 29,400 gallons per minute.

4.d Unit 1 Circulating Water System

The Unit 1 Circulating Water System is a closed loop cooling system which utilizes a natural draft hyperbolic cooling tower to dissipate rejected turbine plant heat to the atmosphere.

Cooling water from the Unit 1 cooling tower basin flows to the Unit 1 main unit condenser inlet water boxes. The main unit condenser is a conventional twin shell type with two inlet and two outlet water boxes provided on each shell. This design allows either partial or full isolation of the circulating water flow through the condenser. Water leaves the condenser exit water boxes to the cooling tower pump suctions.

Because of the loss of water from the Circulating Water System due to evaporation and blow down while passing through the cooling tower, a source of makeup water is needed. This need is satisfied by the discharge of the Turbine Plant and Reactor Plant River Water Systems into the Circulating Water System. This constant addition of water to the system adequately replaces the operating water losses, as well as providing

sufficient outflow from the cooling tower basin for blow down purposes. The discharges from the cooling tower pumps are routed up to the top of the cooling tower fill area (upper basin) where it is discharged by the cooling tower distribution system.

Cooling tower blow down is discharged to the Ohio River by a 36 inch underground line via NPDES Outfall 001, Unit 1 and 2 Cooling Tower Blow Down. This blow down is necessary to control the buildup of solids in the Circulating Water System due to evaporation by the tower.

Emergency overflow provisions are provided for the cooling tower. A weir, located opposite the blow down weir structure at the cooling tower discharge flume area, transfers the overflow water into a 54" pipeline that directs the water to the Ohio River via NPDES Outfall 004, Unit 1 Cooling Tower Emergency Overflow.

4.e Unit 2 Circulating Water System

The Unit 2 Circulating Water System is a closed loop cooling system designed to dissipate waste heat to the atmosphere from the main condenser, and provide a normal discharge path for the service water system. The system consists of cooling tower pumps, circulating water piping, a main condenser, a mechanical tube cleaning system, a vacuum priming system, and a natural draft cooling tower.

The natural draft cooling tower is a counterflow tower equipped with an icing control system. Circulating water is gravity fed from the cooling tower through fixed panel screens into two circulating water pipes to the inlet water boxes of the condenser. The water passes through the tubes of the condenser to the outlet water box. Two lines carry condenser discharge cooling water to the pumphouse outside the Turbine Building. The discharge lines of the Service Water System tie into the Circulating Water System between the condenser outlet water boxes and the pumphouse and provide make-up for blow down and evaporation. The four cooling tower pumps, mounted in the pumphouse, pump the water to the top of the cooling tower fill where it is discharged into the cooling tower distribution system. The cooling tower blow down is discharged from the circulating water discharge flume to via NPDES Outfall 001, Unit 1 and 2 Cooling Tower Blowdown.

5. Current Treatment Scheme & System Design

5.a River and Service Water System Treatment

The current primary treatment system is composed of a 3000 Gallon Biocide Tank and metering pump and a 5300 Gal Corrosion Inhibitor Tank and metering pump. The single metering pump is aligned to feed treatment chemicals to the running Reactor Plant River Water Pump and Service Water Pump(s). The biocide is fed for 2 hours per day per unit due to NPDES permit restrictions. Corrosion inhibitor is fed continuously.

Biocide – The current biocide is a non-oxidizing biocide. (H150M)
Corrosion Inhibitor – The current corrosion inhibitor is an anodic protection, polyphosphate based inhibitor. (CL-50)

5.b Turbine Plant River Water System

The Turbine Plant River Water System is currently treated from a long standing temporary modification in the Unit 1 North Yard transformer area. The system is composed of Biocide and Corrosion Inhibitor tanks, each with a metering pump fed through a common supply line to the TPRW system.

Biocide – Non-oxidizing biocide. (Nalco H150M)
Corrosion Inhibitor – Combination Anodic and Cathodic Corrosion Inhibitor and Polymeric Dispersant (Nalco 3DT187)

5.c Main Circulating Water systems

Unit 1 – The current treatment system is composed of Sodium Hypochlorite fed to the system for 2 hours per day. During the summer months, Sodium Bromide is also fed at the same time as the Sodium Hypochlorite. NALCO 3DT121 dispersant is also fed to the system.

Unit 2 - The current treatment system is composed of Sodium Hypochlorite fed to the system for 2 hours per day. Sodium Bromide is also fed at the same time as the Sodium Hypochlorite. Surfactant NALCO 73550 is fed to the system approximately 15 minutes a day during the Hypochlorite treatment. NALCO 3DT121 dispersant is also fed to the system.

5.d Wastewater Dechlorination System

Currently Unit 1 and Unit 2 Circulating Water Systems are dechlorinated with sodium bisulfite. Sodium bisulfite is fed from a storage tank located at the Unit 1 cooling tower and a tote for back up conditions at the Unit 2 cooling tower. Sodium bisulfite is fed to the cooling tower blow down at the Unit 1 cooling tower and Unit 2 cooling tower via a chemical addition pump that takes suction from storage tanks and discharges to the cooling tower blow down. Blow down from the Unit 1 and Unit 2 cooling tower basin is discharged back into the Ohio River via Outfall 001, Cooling Tower Blowdown. Depending on plant conditions, intermittent discharge occurs at the Unit 1 cooling tower emergency overflow and discharges to the Ohio River via Outfall 004, Unit 1 Cooling Tower Emergency Overflow. The discharge is currently permitted under Pennsylvania National Pollutant Discharge Elimination System (NPDES) Permit PA0025615.

5.e Fire Protection System

The Fire Protection System is designed in accordance with the standards of the National Fire Protection Association and is generally based on the recommendations of the Nuclear Energy Property Insurance Association and the Factory Insurance Association.

The Fire Protection System is supplied by two vertical turbine type fire pumps with a capacity of 2500 GPM each. One is electric motor driven, and one is diesel driven. Both pumps and drivers are installed and housed in heated pump rooms in the Main Intake Structure. They take suction from the Ohio River, and discharge to the Fire Protection System.

6. Proposed Wastewater Treatment System Summary Description

The proposed wastewater treatment system is described as follows:

6.a Proposed Unit 1 Dechlorination System

The proposed treatment system is an upgrade to the current dechlorination feed system at the Unit 1 cooling tower. The upgrade will consist of a sodium bisulfite storage tank, TK - 5 increasing the capacity to 2,500 gallons. The current chemical feed pump will be replaced with a

new chemical feed pump skid. The skid consists of two (2) redundant chemical feed pumps that are manually activated and take suction from sodium bisulfite storage tank, TK-5 and discharge sodium bisulfite into the Unit 1 cooling tower blow down for the purposes of dechlorinating discharge to NPDES Outfall 001, Cooling Tower Blowdown. The pumps will be equipped with alarm functionality to notify the operator of a pump failure. Pumps are designed with the capability to be manually swapped in the event of a pump failure to maintain chemical feed.

The sodium bisulfite feed system will also have a second skid of two (2) redundant chemical feed pumps discharging into the Unit 1 Cooling Tower Emergency Overflow for the purposes of dechlorinating discharge to NPDES Outfall 004, Cooling Tower Emergency Overflow. The proposed Unit 1 treatment system is depicted in Figure 10-8.

In the event of an emergency requiring operation of the Unit 1 Emergency Diesel Generators a portable Dechlorination System will be used to dechlorinate discharge to NPDES Outfall 003. The portable system would consist of a sodium bisulfite tote, and a chemical feed pump. Sodium bisulfite would be fed downstream of the diesel heat exchanger cooling water discharge in the Unit 1 Catch Basin system.

6.b Proposed Unit 2 Dechlorination System

The proposed treatment system consists of upgrading the current dechlorination feed system at the Unit 2 Cooling Tower and the addition of a dechlorination system at the Emergency Outfall Structure to dechlorinate Outfall 010.

The upgrade will utilize the current sodium bisulfite storage tote with a capacity of 275 gallons. The current chemical feed pumps will be upgraded with a new chemical feed pump skid. The skid consists of two (2) redundant chemical feed pumps that take suction from a tote containing sodium bisulfite and discharging the sodium bisulfite into the Unit 2 Cooling Tower Blow down for the purposes of dechlorinating discharge to NPDES Outfall 001, Cooling Tower Blowdown. The pumps will be equipped with alarm functionality to notify operator of pump failure. Pumps are designed with the capability to be manually swapped in the event of pump failure to maintain chemical feed.

The new system allows for dechlorination at the Emergency Outfall Structure. The proposed system consists of a sodium bisulfite storage tank, TK-13 located at the Emergency Outfall Structure with a capacity of 1,550 gallons. New chemical feed pumps will be installed with a new chemical feed pump skid. The skid consists of two (2) redundant chemical feed pumps that are manually activated and take suction from sodium bisulfite storage tank, TK-13 and discharge into the Unit 2 Emergency Outfall Structure for the purposes of dechlorinating discharge to NPDES Outfall 010, Unit 2 Emergency Outfall.

The pumps will be equipped with alarm functionality to notify operator of pump failure. Pumps are designed with the capability to be automatically or manually swapped in the event of pump failure to maintain chemical feed. The proposed Unit 2 treatment system is depicted in Figure 10-8.

7. Wastewater Flow and Description

7.a NPDES Outfall 001, Cooling Tower Blowdown

NPDES Outfall 001 discharges to the Ohio River and is currently permitted under NPDES Permit PA0025615. Outfall 001 receives wastewater from Unit 1 and 2 Cooling Tower Blowdown, Unit 1 and 2 Treated Radioactive Liquid Waste, Internal Monitoring Points 301 and 401, Circulating Water Gooseneck, Unit 2 Pumphouse pump seal leak off, Unit 2 chemical sump, and infrequent closed loop cooling water

Discharge occurs 24 hours per day, 7 days per week, 365 days per year. Average discharge flow is 35.3 MGD and maximum flow is 61.8 MGD.

Currently, the following permitted treatment units are permitted under NPDES Permit PA0025615 for Outfall 001. Screening, Disinfection (Chlorine), Disinfection (Other), Dechlorination, Neutralization, Flocculation, Sedimentation, Ion Exchange, Evaporation, and Foam Fractionation.

The proposed wastewater treatment system upgrade will not result in any new source of wastewater to Outfall 001. The proposed wastewater treatment system will not implement any new treatment method or technology. The proposed treatment system will upgrade the existing dechlorination system. The proposed system will introduce a small

hypochlorite residual into the cooling towers continuously, (from the chlorination of the cooling tower make up water) and will also be dechlorinated continuously. The cooling towers will continue with 2 hour hypochlorite treatments daily which will also be dechlorinated.

7.b NPDES Outfall 004

NPDES Outfall 004 discharges to the Ohio River and is currently permitted under NPDES Permit PA0025615. Outfall 004 receives wastewater from Unit 1 Cooling Tower Overflow. When discharging, average discharge flow is 2.8 MGD and maximum flow is 7.7 MGD.

Currently, the following permitted treatment units are permitted under NPDES Permit PA0025615 for Outfall 004. Screening and Foam Fractionation.

The proposed wastewater treatment system upgrade will not result in any new source of wastewater to Outfall 004. The proposed wastewater treatment system will install a dechlorination treatment unit at Outfall 004 as described in Section 6.a. The proposed upgrade will introduce a small hypochlorite residual into the cooling towers continuously, (from the chlorination of the cooling tower make up water) and will also be dechlorinated continuously. The cooling towers will continue with 2 hour hypochlorite treatments daily which will also be dechlorinated.

7.c NPDES Outfall 010

NPDES Outfall 010 discharges to the Ohio River and is currently permitted under NPDES Permit PA0025615. Outfall 010 receives wastewater from Non-Contact Cooling Water from the Unit 2 primary heat exchangers. Discharge occurs 24 hours per day, 7 days per week, 365 days per year. Average discharge flow is 3.63 MGD.

Currently, the following permitted treatment units are permitted under NPDES Permit PA0025615 for Outfall 010. Screening, Disinfection (Chlorine) and Foam Fractionation.

The proposed wastewater treatment system upgrade will not result in any new source of wastewater to Outfall 010. The proposed wastewater treatment system will install a dechlorination treatment unit at Outfall 010

as described in Section 6.b. The proposed will introduce hypochlorite residual into the wastewater from Non-Contact Cooling Water from the Unit 2 primary heat exchangers continuously, and will also be dechlorinated continuously.

7.d NPDES Outfall 003

NPDES Outfall 003 discharges to the Ohio River and is currently permitted under NPDES Permit PA0025615. Outfall 003 receives wastewater from Internal Monitoring Points 103, 303, 403, and 503, non-contact cooling water from Unit 1 diesel generator heat exchangers, and demineralized water storage tanks.

Discharge occurs 24 hours per day, 7 days per week, 365 days per year. Average discharge flow is 0.404 MGD and maximum flow rate of 1.193 MGD.

Currently, the following permitted treatment units are permitted under NPDES Permit PA0025615 for Outfall 003. Flocculation, Coagulation, Sedimentation, Slow Sand Filtration, Reverse Osmosis, Ion Exchange, Grinding, Pre-Aeration, Rotating Biological Contactor, Disinfection (Chlorine), and Oil and Grease Removal

The proposed will introduce a small hypochlorite residual into the water treatment system leading to internal NPDES Outfall 103. Due to this water going through a treatment of clarification, filtration, and eventually reject from a Reverse Osmosis unit prior to discharge, the chlorine residual should be minimal and there are no plans to dechlorinate this outfall.

The proposed wastewater treatment system upgrade will not result in any new source of wastewater to Outfall 003. The proposed wastewater treatment system will install a dechlorination treatment unit at Outfall 003 as described in Section 6.a. When in service, the proposed will introduce a hypochlorite residual into the non-contact cooling water from Unit 1 diesel generator heat exchangers service water, and will be dechlorinated when free chlorine residual is present.

8. **Chemical and Additive Usage Summary**

8.a Sodium Hypochlorite
8.b Sodium Bromide
8.c Sodium Bisulfite
8.d Corrosion Inhibitor (NALCO 3DT177)
8.e Dispersant (NALCO 3DT120)
8.f DBNPA (NALCO 7320)

8.a Sodium Hypochlorite

Currently sodium hypochlorite feed is permitted under the current NPDES Permit PA0025615 and fed for disinfection control to the Unit 1 and Unit 2 circulating water systems, periodic oxidation of hydrazine in chemical waste sump, and condensate blow down. The proposed engineering change will feed sodium hypochlorite tank, TK-4 (8700 gallon capacity) to treat the reactor plant river water, turbine plant river water, and service water systems for microfouling and macrofouling (clams and mussels) control. Chemical additive and usage is summarized in Chemical Additive List, Revision 20.

8.a.1 Usage Rate Calculation - Unit 1 Reactor Plant River Water System:

To achieve a 0.2 mg/L Free Chlorine Residual

Given:

- 5 ppm of product is required to achieve a 0.2 ppm residual of Free Available Chlorine
- Product contains 12.5% weight of Free Available Chlorine
- Density of product is 10.21 lbs/gal
- Flow in Reactor Plant River Water System is 9,000 gpm

m_{Clrprw} = 5 mg/L product x 3.785 L/gal x 9,000 gal/min x 1440 min/day

m_{Clrprw} = 2.45268E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

m_{Clrprw} = 245.3 kg/day product x 2.2 lbs/1 kg x 1 gal/10.21 lbs

m_{Clrprw} = **53 gal/day product**

8.a.2 Usage Rate Calculation - Unit 1 Turbine Plant River Water System:
To achieve a 0.2 ppm Free Chlorine Residual

Given:

- 5 ppm of product is required to achieve a 0.2 ppm residual of Free Available Chlorine
- Product contains 12.5% weight of Free Available Chlorine
- Density of product is 10.21 lbs/gal
- Flow in Turbine Plant River Water System is 16,000 gpm

m_{Cltprw} = 5 mg/L product x 3.785 L/gal x 16,000 gal/min x 1440 min/day

m_{Cltprw} = 4.6302E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

m_{Cltprw} = 436.0 kg/day product x 2.2 lbs/1 kg x 1 gal/10.21 lbs

m_{Cltprw} = **94 gal/day** product - normal operation
188 gal/day product - maximum (2 pumps in summer)

8.a.3 Usage Rate Calculation - Unit 2 Service Water System:

To achieve a 0.2 ppm Free Chlorine Residual

Given:

- 5 ppm of product is required to achieve a 0.2 ppm residual of Free Available Chlorine
- Product contains 12.5% weight of Free Available Chlorine
- Density of product is 10.21 lbs/gal
- Flow in Unit 2 Service Water System is 29,400 gpm

m_{Clsws} = 5 mg/L product x 3.785 L/gal x 29,400 gal/min x 1440 min/day

m_{Clsws} = 8.012088E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

m_{Clsws} = 801.2 kg/day product x 2.2 lbs/1 kg x 1 gal/10.21 lbs

m_{Clsws} = **173 gal/day** product

8.a.4 Usage Rate Calculation – Cooling tower Water System:

Given :

- Current Hypochlorite usage from 2 hour daily treatment of the main circulating water systems is 2.075 million pounds of Sodium Hypochlorite product per year.

Current feed
2,075,000 lbs product/year (2013) divided by 365 days/year =
5685 lbs product/day divided by 10.21 lbs/gal =
557 gal/day product average
420 (winter) - 960 (summer) gal/day product range

Anticipated feed with proposed change

To achieve a 0.5 ppm Free Chlorine Residual for 2 hours a day considering the system will be fed continuously with 0.2 ppm Free Chlorine Residual

Given:

- Anticipated Hypochlorite usage due to treatment with Hypochlorite for the 2 hour daily addition assumes 0.3 ppm Free Chlorine Residual in the Winter months and 0.5 ppm Free Chlorine Residual in the Summer months.
- 7.5 ppm of product is required to achieve an extra 0.3 ppm residual of Free Available Chlorine 12.5 ppm of product is required to achieve an extra 0.5 ppm residual of Free Available Chlorine
- Product contains 12.5% weight of Free Available Chlorine
- Density of product is 10.21 lbs/gal
- Basin Volume is estimated at 26.8 million gals. (13.4 million each)

(Winter)

m_{Clcws} = 7.5 mg/L product x 3.785 L/gal x 26,800,000 gals./day

m_{Clcws} = 7.6E+8 mg/ x 1 g/1000 mg x 1 kg/1000 g

m_{Clcws} = 760 kg/day product x 2.2 lbs/1 kg x 1 gal/10.21 lbs

m_{Clcws} = **164 gal/day** product

(Summer)

m_{Clcws} = 12.5 mg/L product x 3.785 L/gal x 26,800,000 gals./day

m_{Clcws} = 12.7E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

m_{Clcws} = 1270 kg/day product x 2.2 lbs/1 kg x 1 gal/10.21 lbs

m_{Clcws} = **274 gal/day** product

The proposed change will maintain a free chlorine residual of approximately 0.2 ppm in the reactor plant river water, turbine plant river water, and service water systems for disinfection control. Sodium hypochlorite will be fed 24 hours per day, 7 days per week, 365 days per year to reactor plant river water, turbine plant river water, and service water systems for disinfection control. The 2 hour daily treatments on the main circulating water systems will also continue, but at an anticipated reduced rate due to the chlorination of the make-up water.

Total usage per day on the reactor plant river water, turbine plant river water, and service water systems is **320 to 414 gal/day** product.

Total usage per day on the circulating water system is **164 to 274 gal/day** product.

The change as proposed does not increase Sodium Hypochlorite Chemical additive and usage as summarized in Chemical Additive List, Revision 20.

The change anticipates a slight reduction in the use of Hypochlorite overall from the current usage of 557 gal/day product average, (420 (Winter) - 960 (Summer) gal/day product range) to 553 gal/day product average, (484 (Winter) - 688 (Summer) gal/day product range). This assumes daily treatments will continue, but it is possible that daily treatments could be reduced so that there will be an even greater reduction in the overall Hypochlorite usage.

8.b Sodium Bromide

Currently sodium bromide feed is permitted under the current NPDES Permit PA0025615 and fed for disinfection control to the Unit 1 and Unit 2 circulating water systems. The proposed engineering change will feed Sodium Bromide continuously along with the Sodium Hypochlorite in the circulating water systems in Unit 2 and for 6 months a year in Unit 1. The proposed engineering change will also continuously feed sodium bromide to treat the reactor plant river water, turbine plant river water, and service water systems for microfouling control. Chemical additive and usage is summarized in Chemical Additive List, Revision 20.

8.b.1 Usage Rate Calculation

To achieve a 6:1 molar ratio of Sodium Hypochlorite to Sodium Bromide

Given:

- Vendor dosage calculations use 1.125 lbs Control Brom CB 70/gal of 12.5% Sodium Hypochlorite. CB 70 used in the Circulating Water
- Vendor dosage calculations use 0.825 lbs Actibrom 1318/gal of 12.5% Sodium Hypochlorite. Actibrom 1318 used in the reactor plant river water, turbine plant river water, and service water systems.

Unit 1 Reactor Plant River Water System:
53 Gallons/day Sodium Hypochlorite x 0.825 lbs Actibrom 1318 =
44 lbs Actibrom 1318/day

Unit 1 Turbine Plant River Water System:
94 Gallons/day Sodium Hypochlorite x 0.825 lbs Actibrom 1318 =
78 lbs Actibrom 1318/day (approximately 8 months a year)

188 Gallons/day Sodium Hypochlorite x 0.825 lbs Actibrom 1318 =
156 lbs Actibrom 1318/day (approximately 4 months a year)

Unit 2 Service Water System:
173 Gallons/day Sodium Hypochlorite x 0.825 lbs Actibrom 1318 =
143 lbs Actibrom 1318/day

Unit 1 Cooling tower Water System:
82-137 Gals/day Sodium Hypochlorite x 1.125 lbs Control Brom CB 70 = **92-154 lbs** Control Brom CB 70/day

Unit 2 Cooling tower Water System:
82-137 Gal/day Sodium Hypochlorite x 1.125 lbs Control Brom CB 70 = **92-154 lbs** Control Brom CB 70/day

Total:

Anticipated Sodium Bromide daily usage range is **357 to 651 lbs.** Sodium Bromide product per day.

The change as proposed does not increase Sodium Bromide Chemical additive and usage as summarized in Chemical Additive List, Revision 20.

8.c Sodium Bisulfite

Currently, sodium bisulfite feed is permitted and fed for dechlorination control of the Unit 1 and Unit 2 cooling tower blow down discharged to the Ohio River via Outfall 001 and Outfall 004. The proposed engineering change will continue feed at Unit 1 and Unit 2 cooling tower blow down and will add feed at Unit 2 Emergency Outfall Structure to dechlorinate wastewater discharged to the Ohio River via Outfall 010. Additionally, sodium bisulfite feed for dechlorination will be fed to the Unit 1 catch basin system in the event of discharge from Unit 1 emergency diesel generator cooling water which is discharged to the Ohio River via Outfall 003.

Usage Rate Calculations:

8.c.1 Unit 1 Cooling Tower Blowdown, Outfall 001

Using typical maximum blow down flow 5.5E+7 gal/day
Mass of Free Chlorine assuming a 0.25 mg/L free chlorine residual for 2 hours per day per unit (at 0.5 ppm) and maintenance of 0.2 mg/L for 20 hours a day

m_{freeCl} = 0.25 mg/L x 3.785 L/gal x 5.5E+7 gal/day x 1 g/1000 mg x 1 kg/1000 g x 4hrs/24hrs

m_{freeCl} = 8.7 kg Free Chlorine/day 4 hour total added chlorination

m_{freeCl} = 0.2 mg/L x 3.785 L/gal x 5.5E+7 gal/day x 1 g/1000 mg x 1 kg/1000 g x 20hrs/24hrs

m_{freeCl} = 34.7 kg Free Chlorine/day 20 hour maintenance

Total outfall Chlorine = 43.4 kg Free Chlorine/day

On a weight-to-weight basis, approximately 1.45 parts of Sodium Bisulfite are required to dechlorinate 1 part of chlorine.

43.4 kg Free Chlorine needs 62.9 kg Sodium Bisulfite
Nalco Sodium Bisulfite solution is 36% Sodium Bisulfite by weight
36 kg Bisulfite/100 kg Nalco solution x 174.7 kg Nalco solution = 62.9 kg Sodium Bisulfite solid
174.7 kg Nalco solution x 2.2 lbs/1 kg = **384.3 lbs Nalco Sodium Bisulfite solution/day** typical usage

8.c.2 Unit 1 Emergency Overflow, Outfall 004

Flow = 7.7E+6 gal/day estimated maximum

Mass of Free Chlorine assuming a 0.5 mg/L free chlorine residual for 2 hours per day and maintenance of 0.2 mg/L for 20 hours a day

m_{freeCl} = 0.5 mg/L x 3.785 L/gal x 7.7E+6 gal/day x 1 g/1000 mg x 1 kg/1000 g x 2hrs/24hrs

m_{freeCl} = 1.2 kg Free Chlorine/day 4 hour added chlorination

m_{freeCl} = 0.2 mg/L x 3.785 L/gal x 7.7E+6 gal/day x 1 g/1000 mg x 1 kg/1000 g x 22hrs/24hrs

m_{freeCl} = 5.3 kg Free Chlorine/day 20 hour maintenance

Total outfall Chlorine = 6.5 kg Free Chlorine/day

On a weight-to-weight basis, approximately 1.45 parts of Sodium Bisulfite are required to dechlorinate 1 part of chlorine.

6.5 kg Free Chlorine needs 9.4 kg Sodium Bisulfite
Nalco Sodium Bisulfite solution is 36% Sodium Bisulfite by weight
36 kg Bisulfite/100 kg Nalco solution x 26.1 kg Nalco solution = 9.4 kg Sodium Bisulfite solid
26.1 kg Nalco solution x 2.2 lbs/1 kg = **57.4 lbs Nalco Sodium Bisulfite solution/day**

8.c.3 Unit 2 Emergency Outfall Structure, Outfall 010

Estimated Average Flow = 3.63E+6 gal/day
Mass of Free Chlorine assuming maintenance of 0.2 mg/L for 24 hrs/day
m_{freeCl} = 0.2 mg/L x 3.785 L/gal x 3.63E+6 gal/day x 1 g/1000 mg x 1 kg/1000 g
m_{freeCl} = 2.8 kg Free Chlorine/day 24 hour maintenance

Total outfall Chlorine = 2.8 kg Free Chlorine/day

On a weight-to-weight basis, approximately 1.45 parts of Sodium Bisulfite are required to dechlorinate 1 part of chlorine.

2.8 kg Free Chlorine needs 4.1 kg Sodium Bisulfite
Nalco Sodium Bisulfite solution is 36% Sodium Bisulfite by weight
36 kg Bisulfite/100 kg Nalco solution x 11.4 kg Nalco solution = 4.1 kg Sodium Bisulfite solid
11.4 kg Nalco solution x 2.2 lbs/1 kg = **25.1 lbs Nalco Sodium Bisulfite solution/day**

8.c.4 Unit 1, Outfall 003

Estimated Flow when discharging = 350 gal/min x 1440 min/day
Flow = 5.04E+5 gal/day

Mass of Free Chlorine assuming a maintenance of 0.2 mg/L for 24 hrs/day

m_{freeCl} = 0.2 mg/L x 3.785 L/gal x 5.04E+5 gal/day x 1 g/1000 mg x 1 kg/1000 g
m_{freeCl} = 0.4 kg Free Chlorine/day

Total outfall Chlorine = 0.4 kg Free Chlorine/day
On a weight-to-weight basis, approximately 1.45 parts of Sodium Bisulfite are required to dechlorinate 1 part of chlorine.

0.4 kg Free Chlorine needs 0.6 kg Sodium Bisulfite
Nalco Sodium Bisulfite solution is 36% Sodium Bisulfite by weight
36 kg Bisulfite/100 kg Nalco solution x 1.7 kg Nalco solution = 0.6 kg Sodium Bisulfite solid
1.7 kg Nalco solution x 2.2 lbs/1 kg = **3.7 lbs Nalco Sodium Bisulfite solution/day**

The proposed change will maintain a free chlorine residual of approximately 0.2 ppm in the reactor plant river water, turbine plant river, and service water systems for disinfection control. Sodium hypochlorite is planned to be fed 24 hours per day, 7 days per week, 365 days per year, to reactor plant river water, turbine plant river water, and service water systems for disinfection control.

To meet NPDES permit effluent limits for chlorine discharge, it will be necessary to dechlorinate wastewater effluent discharges impacted by the

treated reactor plant river water, turbine plant river water, and service water systems when free chlorine residual is present.

The total estimated feed is **470 lbs** Sodium Bisulfite solution/day.

The change as proposed does not increase Sodium Bisulfite Chemical additive and usage as summarized in Chemical Additive List, Revision 20.

8.d Corrosion Inhibitor (NALCO 3DT177)

Currently corrosion inhibitor is fed for corrosion control to the Unit 1 and Unit 2 circulating water systems, reactor plant river water, turbine plant river water, and service water systems. The proposed engineering change will feed corrosion inhibitor (NALCO 3DT177) to treat the reactor plant river water, turbine plant river water, and service water, for corrosion control.

8.d.1 Usage Rate Calculation - Unit 1 Reactor Plant River Water System:

To achieve a 2.5 ppm 3DT177 product concentration
Given:

- Product Density of product is 11.0 lbs/gal
- Flow in Reactor Plant River Water System is 9,000 gpm

m_{Clrprw} = 2.5 mg/L product x 3.785 L/gal x 9,000 gal/min x 1440 min/day

m_{Clrprw} = 1.22634E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

m_{Clrprw} = 122.6 kg/day product x 2.2 lbs/1 kg x 1 gal/11.0 lbs

m_{Clrprw} = **24.5 gal/day**

8.d.2 Usage Rate Calculation - Unit 1 Turbine Plant River Water System:

To achieve a 2.5 ppm 3DT177 product concentration

Given:

- Product Density is 11.0 lbs/gal
- Flow in Turbine Plant River Water System is 16,000 gpm

m_{Clrprw} = 2.5 mg/L product x 3.785 L/gal x 16,000 gal/min x 1440 min/day

m_{Clrprw} = 2. 18016E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

m_{Clrprw} = 218.0 kg/day product x 2.2 lbs/1 kg x 1 gal/11.0 lbs

m_{Clrprw} = **43.6 gal/day**

8.d.3 Usage Rate Calculation - Unit 2 Service Water System:

To achieve a 2.5 ppm 3DT177 product concentration

Given:

- Product Density of product is 11.0 lbs/gal
- Flow in Service Water System is 29,400 gpm

m_{Clrprw} = 2.5 mg/L product x 3.785 L/gal x 29,400 gal/min x 1440 min/day

m_{Clrprw} = 4.006044E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

m_{Clrprw} = 400.6 kg/day product x 2.2 lbs/1 kg x 1 gal/11.0 lbs

m_{Clrprw} = **80.8 gal/day**

The change as proposed adds the Corrosion inhibitor NALCO 3DT177 to the Chemical Additive List for Outfalls 001, 004, 003, and 010.

8.e Dispersant (NALCO 3DT120)

Currently no dispersant is added to the reactor plant river water, turbine plant river, and service water systems. The proposed engineering change will feed dispersant (NALCO 3DT120) to treat the circulating water, reactor plant river water, turbine plant river water, and service water, for silt and deposition control. NALCO 3DT120 is currently on the Approved Chemical Additive Usage List. The circulating water is currently treated by NALCO 3DT121, which has the same active chemical as NALCO 3DT120.

8.e.1 Usage Rate Calculation - Unit 1 Reactor Plant River Water System:

To achieve a 2.0 ppm 3DT120 product concentration

Given:

- Product Density is 9.51 lbs/gal
- Flow in Reactor Plant River Water System is 9,000 gpm

$m_{3DT120rprw}$ = 2.0 mg/L product x 3.785 L/gal x 9,000 gal/min x 1440 min/day

$m_{3DT120rprw}$ = 9.81072E+7 mg/day x 1 g/1000 mg x 1 kg/1000 g

$m_{3DT120rprw}$ = 98.1 kg/day product x 2.2 lbs/1 kg x 1 gal/9.51 lbs

$m_{3DT120rprw}$ = **22.7 gal/day**

8.e.2 Usage Rate Calculation - Unit 1 Turbine Plant River Water System:

To achieve a 2.0 ppm 3DT120 product concentration

Given:

- Product Density is 9.51 lbs/gal
- Flow in Turbine Plant River Water System is 16,000 gpm

m_{Clrprw} = 2.0 mg/L product x 3.785 L/gal x 16,000 gal/min x 1440 min/day

m_{Clrprw} = 1. 744128E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

m_{Clrprw} = 174.4 kg/day product x 2.2 lbs/1 kg x 1 gal/9.51 lbs

m_{Clrprw} = **40.3 gal/day**

8.e.3 Usage Rate Calculation - Unit 2 Service Water System:

To achieve a 2.0 ppm 3DT120 product concentration

Given:

- Product Density is 9.51 lbs/gal
- Flow in Service Water System is 29,400 gpm

m_{Clrprw} = 2.0 mg/L product x 3.785 L/gal x 29,400 gal/min x 1440 min/day

m_{Clrprw} = 3. 205152E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

m_{Clrprw} = 320.5 kg/day product x 2.2 lbs/1 kg x 1 gal/9.51 lbs

m_{Clrprw} = **74.1 gal/day**

8.e.4 Usage Rate Calculation – Main Cooling Tower Circulating Water Systems:

From past experience the usage rate on the Circulating Water is anticipated to be approximately **700 gal/day NALCO 3DT120.**

8.f 2,2-DIBROMO-3-NITRILOPROPIONAMIDE - DBNPA (NALCO 7320)

Currently a non-oxidizing biocide quaternary amine (NALCO H150M) is added to the Fire Protection System for microbiological control. The biocide is currently permitted under NPDES Permit PA0025615. The proposed engineering change will feed DBNPA (NALCO 7320) to the Fire Protection System for biocide control. Feed will normally occur during performance of Fire Protection Operational Surveillance Testing (OST). Typical OST results in a run of fire pump(s) for approximately sixty (60) minutes. Chemical additive and usage is summarized in Chemical Additive List, Revision 20.

8.f.1 Usage Rate Calculation – Fire Protection System:

To achieve a 30.0 ppm NALCO 7320 product concentration

Given:

- Product Density is 10.4 lbs/gal
- Flow in Fire Protection System is 2,500 gpm
- Assuming 60 minute run time per OST 33.12

$M_{DNBPArprw}$ = 30.0 mg/L product x 3.785 L/gal x 2,500 gal/min x 1440 min/day

$m_{DNBPArprw}$ = 4. 0878E+8 mg/day x 1 g/1000 mg x 1 kg/1000 g

$m_{DNBPArprw}$ = 408.8 kg/day product x 2.2 lbs/1 kg x 1 gal/10.4 lbs

$m_{DNBPArprw}$ = 86.4 gal/day x 1 hr run/ 24 hr/day

$m_{DNBPArprw}$ = **3.63 gal/hr**

9. SUMMARY

The proposed wastewater treatment system upgrade will not result in any new source of wastewater to any Outfalls.

The proposed change will maintain a free chlorine residual of approximately 0.2 ppm in the reactor plant river water, turbine plant river water, and service water systems for disinfection control which is the source of make up for both Circulating water systems.

Sodium Bisulfite will be fed on all the affected outfalls when treated reactor plant river water, turbine plant river water, and service water are present in the outfall.

The plant will continue the 2 hour chlorination daily on the main circulating water as needed for disinfection control, and increased Sodium Bisulfite will be used on the outfalls affected by circulating water during the 2 hour applications.

The result of this modification anticipates that less Sodium Hypochlorite will be used by reducing the time and/or chemical used in daily additions in the Circulating Water due to the continual chlorination in the Circulating Water make up.

PADEP approval needed for treatment change:

1. PADEP approval to add Sodium Hypochlorite/Sodium Bromide from 2 hours daily to continuous chlorination on systems that are make-up to the Circulating water that will affect outfalls 001, 004, 010, and 003.

Key modifications done to allow for PADEP approval:

1. The result of this modification anticipates that less Sodium Hypochlorite will be used by reducing the amount or time and/or chemical used in daily additions in the Circulating Water due to the continual chlorination in the Circulating Water make up.

2. The plant will be adding Sodium Bisulfite to outfalls 001, 004, 010, and 003 when affected water is present to negate the Chlorine residuals.

3. Sodium Bisulfite pumps on outfalls 001, 004, and 010 will be equipped with alarm functionality to notify operator of pump failure. Pumps are designed with the capability to be automatically or manually swapped in the event of pump failure to maintain chemical feed. The principal and alternate cooling tower blow down dechlorination systems will be upgraded with redundant pumps and auto dialers to assure dechlorination occurs at all times that chlorination is in service. The Emergency Outfall Dechlorination system will include a pump auto-switch to swap pumps should the primary feed pump trip. An auto-dialer will also be present at the Emergency Outfall system that will dial out to select phone numbers should a loss of dechlorination occur.

4. The plant will utilize continuous chlorine analyzers at outfalls 001 and 010.

5. Outfall 003 is affected by the treated water very infrequently, and Outfall 004 is seasonal, so there is no plan to have a Chlorine analyzer used on these points, only grab analysis.

6. Tanks TK-4, 5, 6, 7, 8 and 13 installed by this upgrade are double walled. Each SAFE-Tank primary tank and secondary tank are made of a cross-linked polyethylene. The SAFE-Tank is designed to provide a minimum of 110% secondary containment. Each tank has a flexible discharge connection attached to the inner tank to allow the tank to expand and contract and protect from vibrations. Each tank has optical switch leak detection, heat trace and polyfoam insulation.

7. Piping installed by this upgrade containing sodium hypochlorite that is installed outside of the Main Intake Structure and installed underground is double contained Chem Proline polyethylene RC 100 piping.

8. The double contained piping installed underground will have an electronic leak detection system consisting of conductivity probes tied to an alarm.

List of Table and Figures

ATTACHMENT:

Chemical Additive List, Revision 20

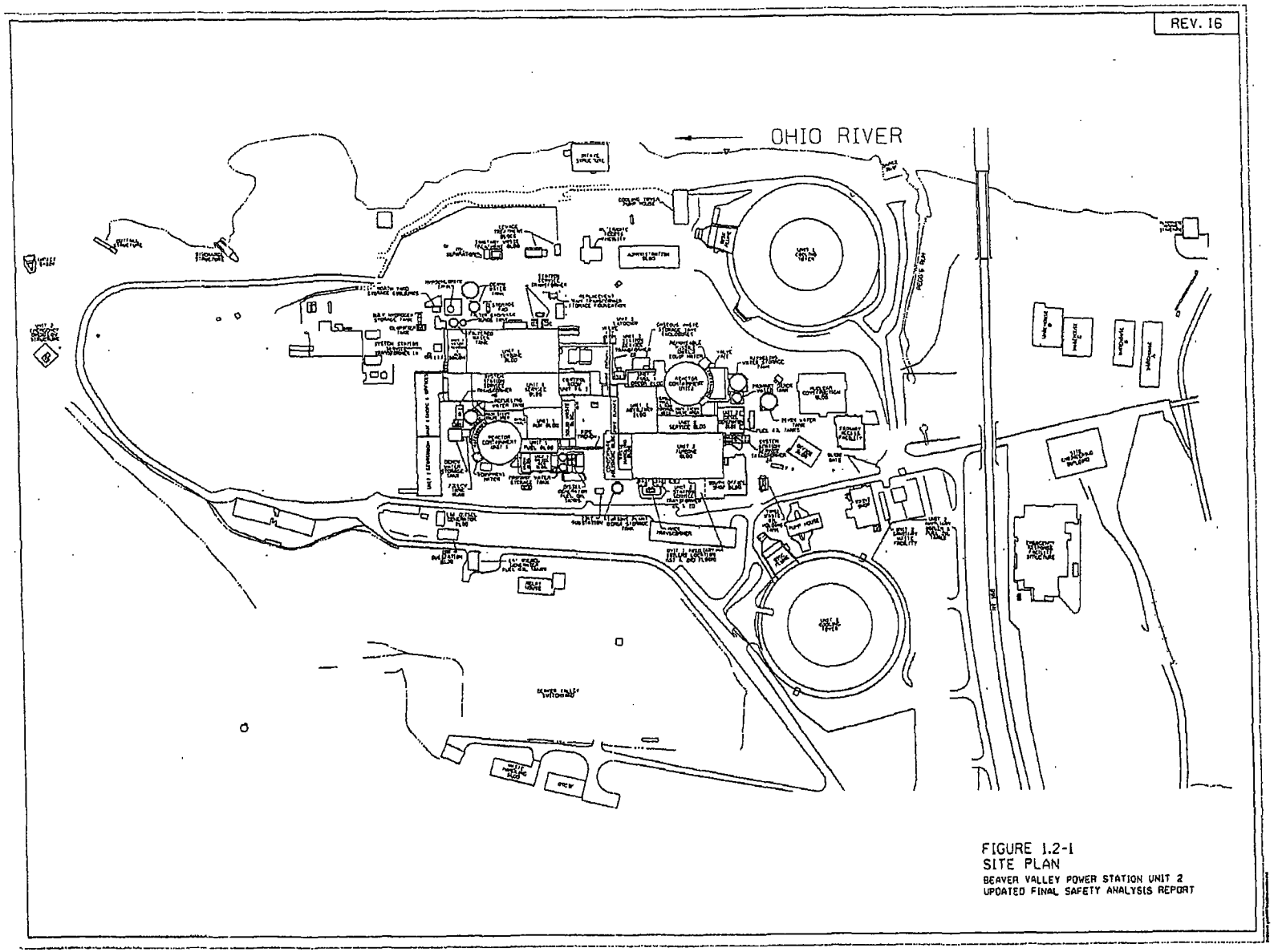


Figure 10-1 Site Map

Figure 10-2, Current Beaver Valley Wastewater Flow Diagram

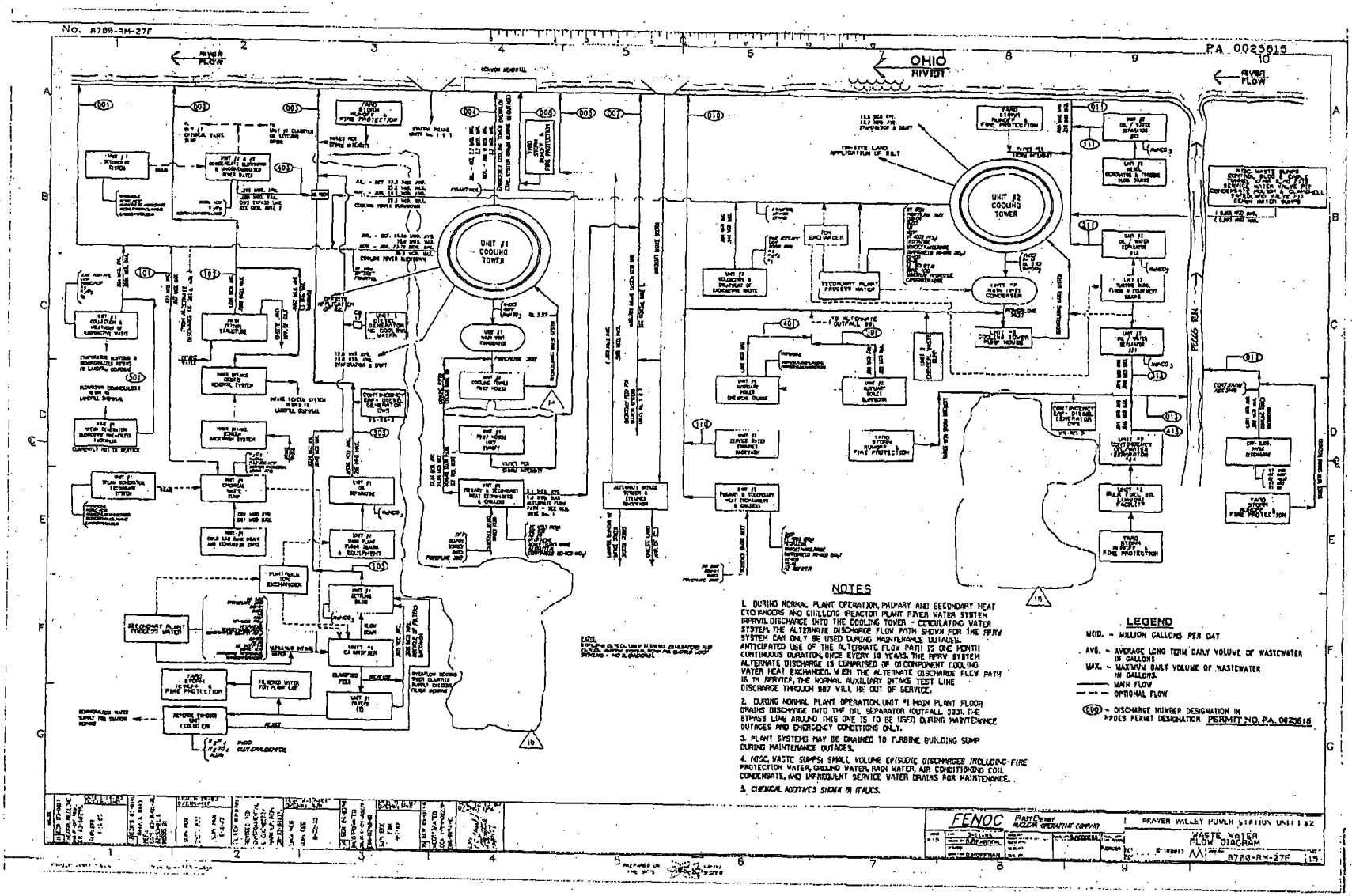


Figure 10-3

Current Unit 1 Circulating Water Treatment Process Flow Diagram

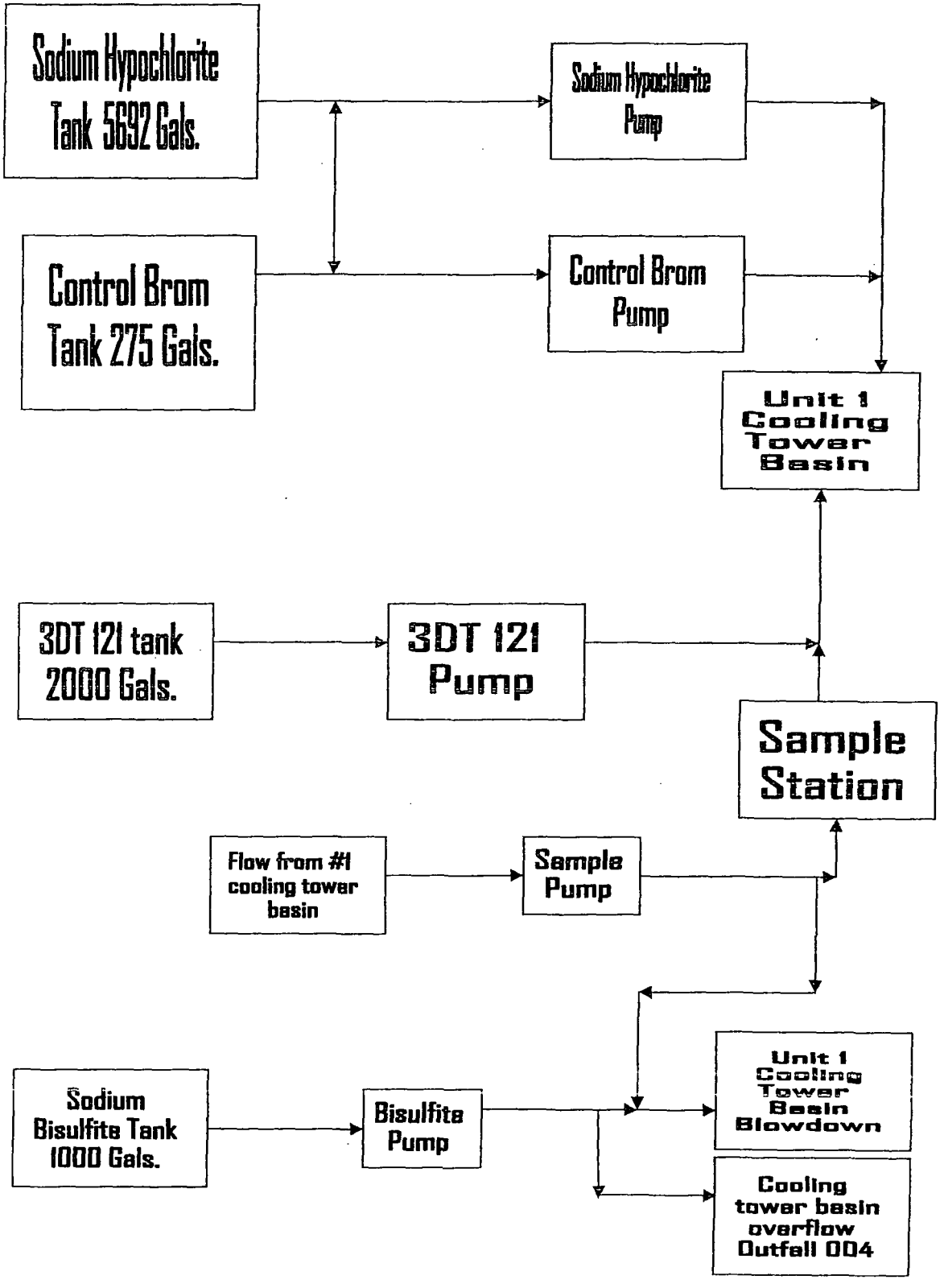


Figure 10-4

Current Unit 2 Circulating Water Treatment Process Flow Diagram

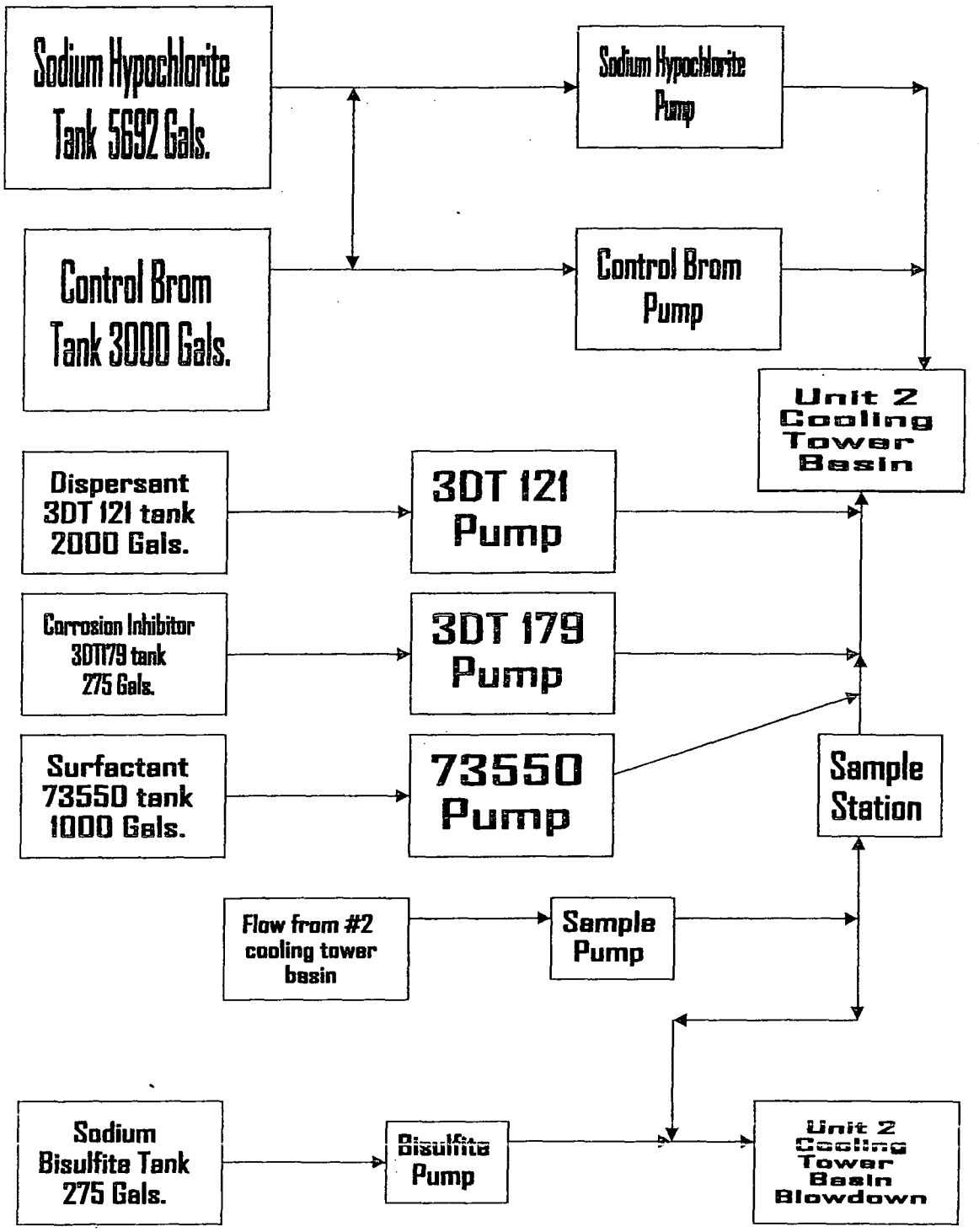


Figure 10-5

Proposed Unit 1 Circulating Water Treatment Process Flow Diagram

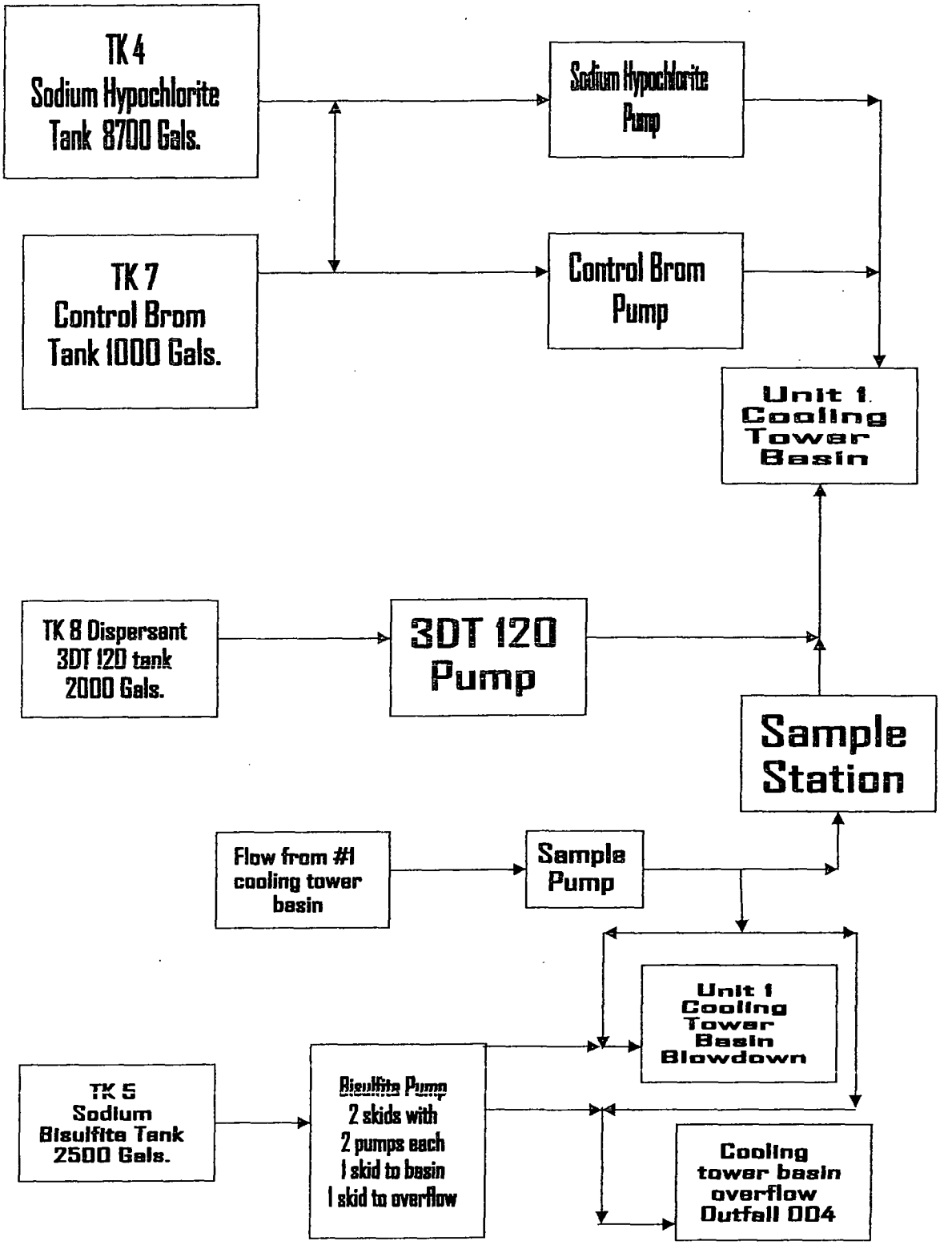


Figure 10-6

Proposed Unit 2 Circulating Water Treatment Process Flow Diagram

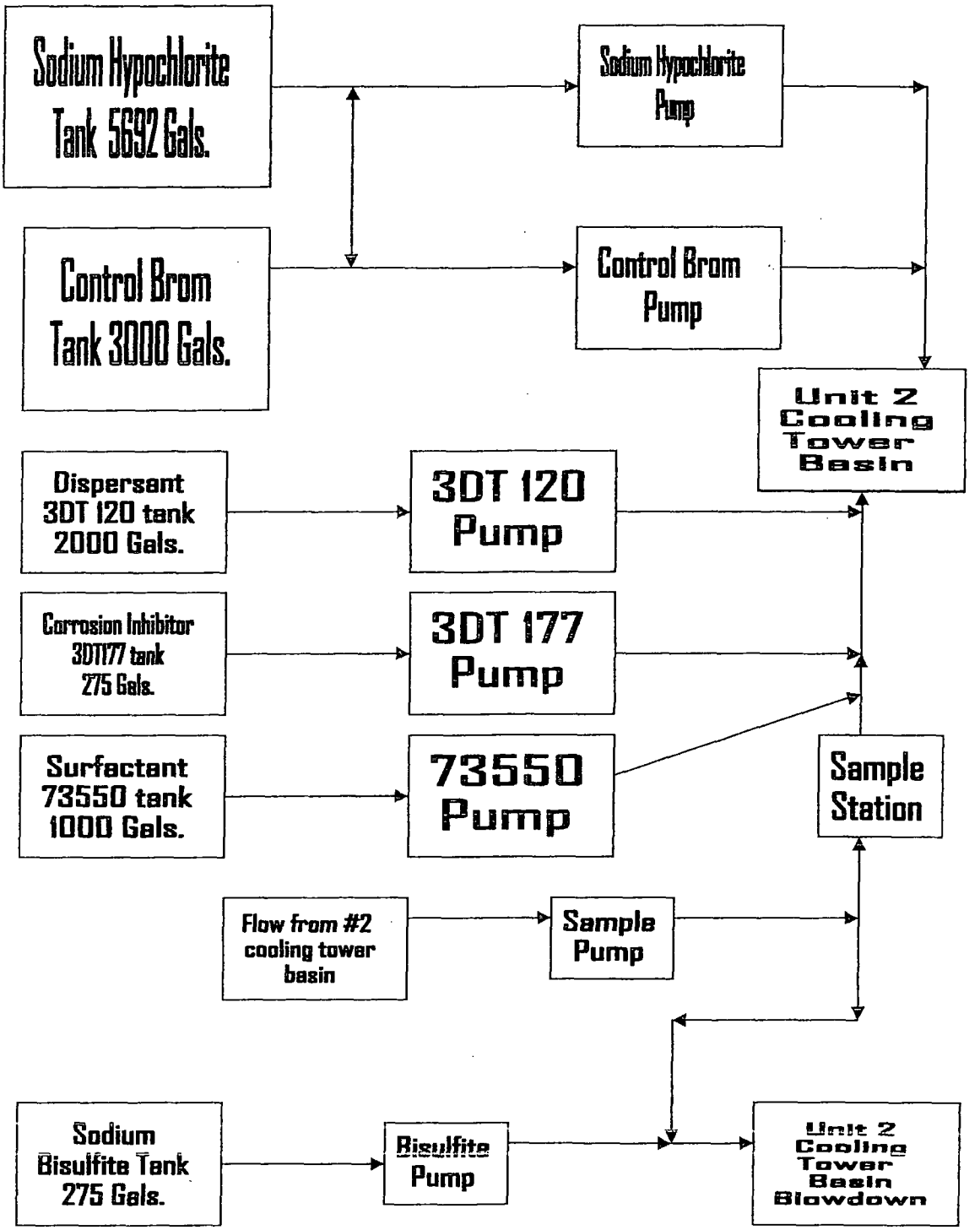


Figure 10-7

Proposed chemical treatment of River Water and Service Water Process Flow Diagram

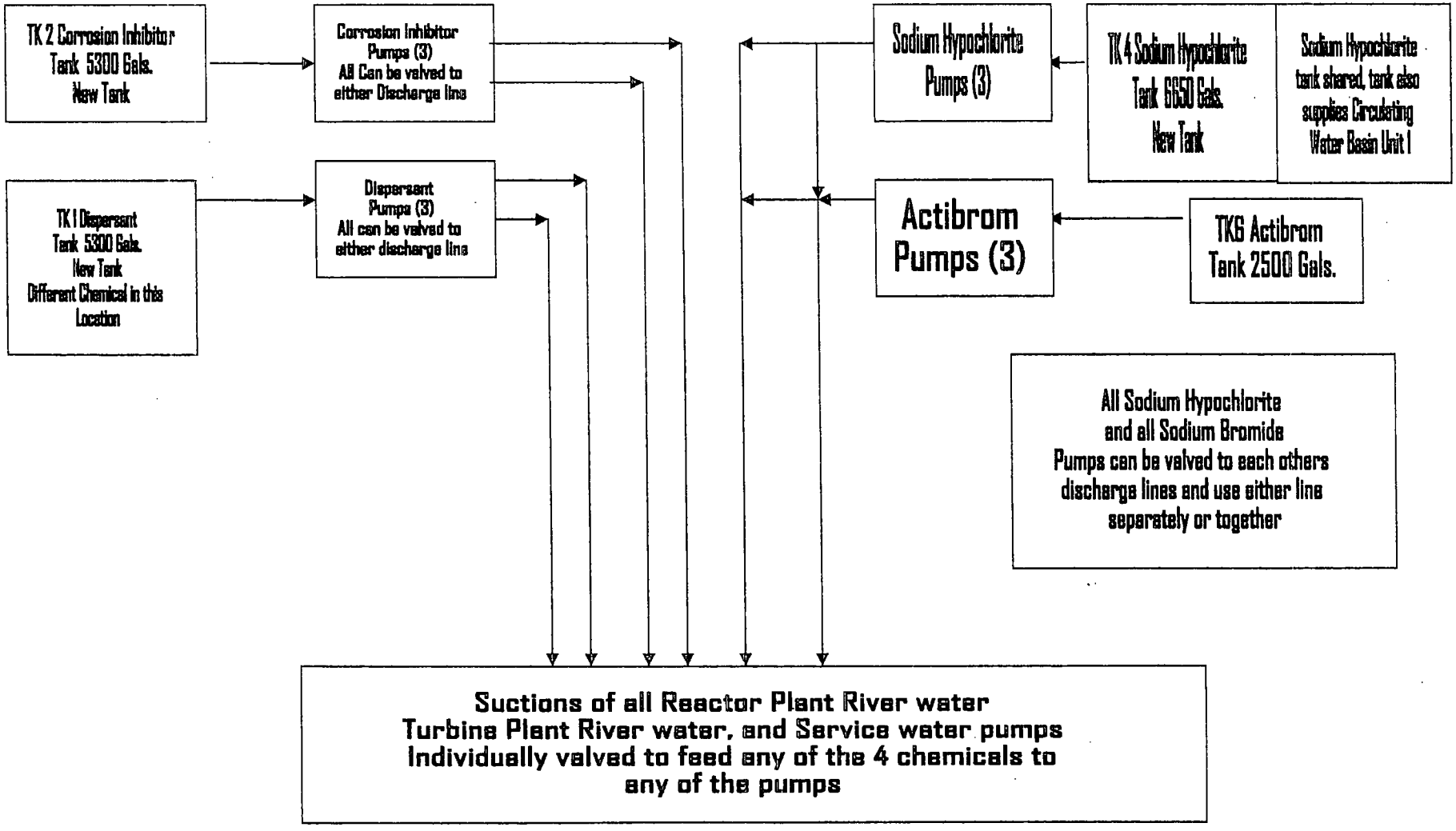
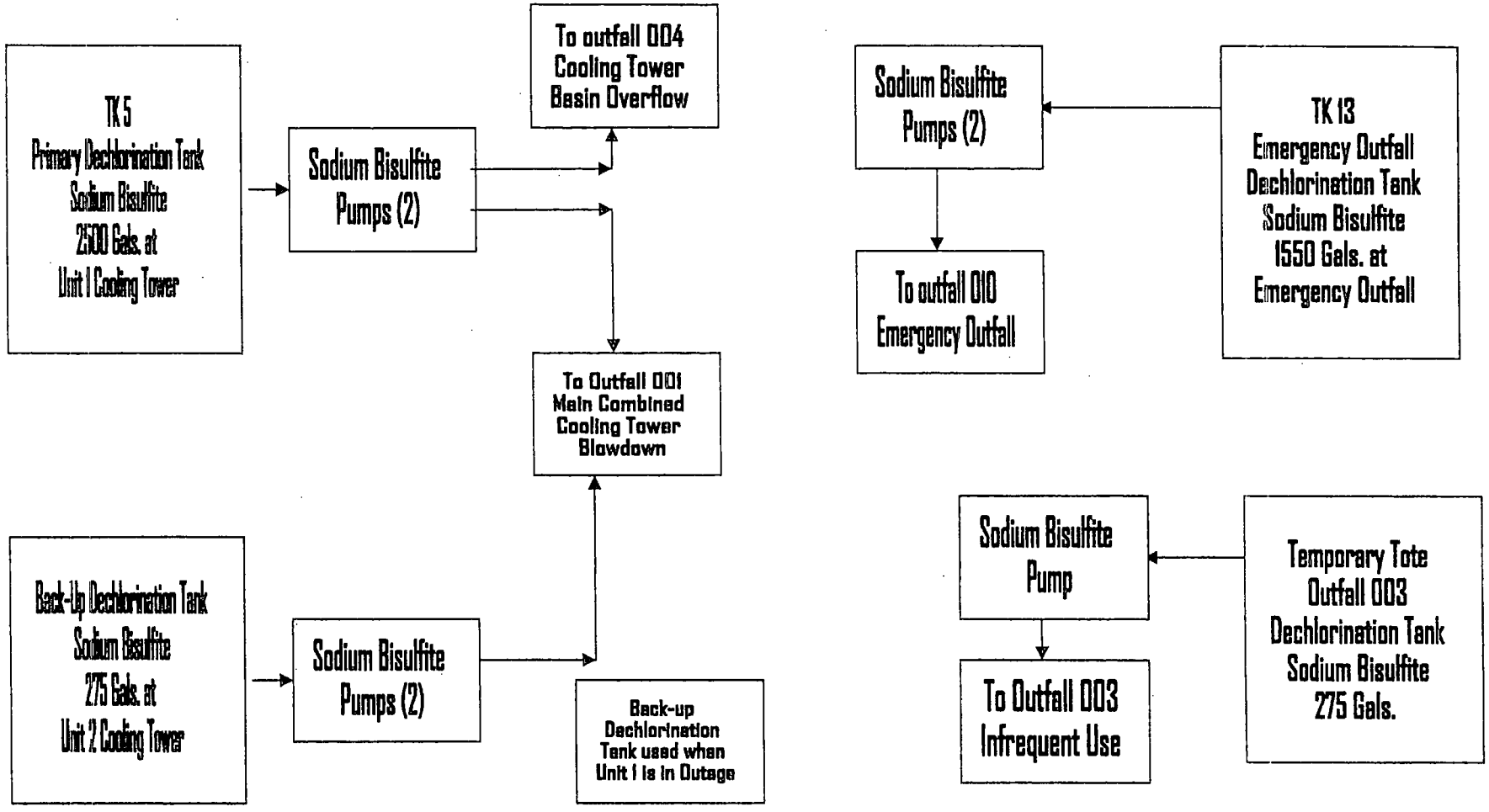


Figure 10-8
Proposed Sodium Bisulfite Dechlorination Treatment Process Flow Diagram



CHEMICAL ADDITIVE LIST

CHEMICAL ADDITIVES UTILIZED	USE/SYSTEM	USAGE RATE	IN-STREAM CONCENTRATION	CONDITIONED WATER DISCHARGE RATE	DISCHARGE OUTFALL NO.
Hydrazine, 35% (e.g. Nalco 19H, GE Betz Control OS5010)	Oxygen control of the secondary system (condensate)	1-40 gallons/day	10-300 ppb	Secondary System capacity 240,000-600,000 gallons (rate varies up to 0.600 MGD)	Periodic draining for maintenance, system leakage; maybe discharged after ion-exchange or neutralization 101/001/004 303/403/003 111/211/011 313/013
	Oxygen control of Chilled Water system and Hot Water Heat systems	<1 gallon/day	0.5-50 ppm	Not normally discharged.	Closed system normally no discharge unless system fails (e.g., tube leakage); periodic drain of system may be discharged after ion-exchange or neutralization 101/001/004 303/403/003 211/011 313/013
	Oxygen control of the Ecolochem reverse osmosis unit	<1 gallon/day	0.0 ppm	0.144 MGD	No un-reacted hydrazine is discharged
	Oxygen control of the steam generators during periods of wet lay-up	1 – 120 gallons/day	0.5 – 5 ppm	Secondary System capacity 240,000-600,000 gallons (rate varies up to 0.600 MGD)	Periodic drain during outages of approximately 30,000 gallons 101/001/004 303/403/003 111/211/011 313/013
	Oxygen control of the Auxiliary boilers also includes periods of wet lay-up	1-120 gallons/day	0 – 200 mg/l	0.002 MGD	301/401/001

CHEMICAL ADDITIVE LIST

CHEMICAL ADDITIVES UTILIZED	USE/SYSTEM	USAGE RATE	IN-STREAM CONCENTRATION	CONDITIONED WATER DISCHARGE RATE	DISCHARGE OUTFALL NO.
Sodium Hydroxide (20-50% Caustic)	pH neutralization for the Unit 1 Chemical Waste Sump	<1 gal/day	5% - 20%	0.252 MGD	101/001/004/003/ 011/013
	Nuclear quench spray system (nuclear safety contingency) Not normally discharged.	<1 gal/day	20 – 26%	Not normally discharged	
	Closed Loop cooling systems for pH control	<1 gal/day	< 1 ppm	Not normally discharged	Closed system normally no discharge unless system has a mechanical failure (e.g., tube leakage) 303/403/003 111/211/011 313/013
Sulfuric Acid	pH neutralization of chemical waste sump	<1 gal/day	2-6%	0.252 MGD	101/001/004
	pH control of the Ecolochem reverse osmosis unit	<1 gal/day	1-5%	0.144 MGD	103/003
Sodium Bisulfite (e.g. Nalco 7408, GE. Betz Spectus DT 1404)	Dechlorinating agent for circulating water system	0-500 pounds/day	0.0 – 5 ppm	40.0 MGD	001/004/010/003
Sodium Bromide (e.g. Nalco Acti-Brom 1318, GE Betz Spectrus OX1201, Nalco ControlBrom CB70)	Biocide for the Circulating Water system	2,275 pounds/day	0.0 – 1.0 ppm	32.36 MGD avg. 61.2 MGD max	001/004/010/003
Aluminum Sulfate	Flocculant for Ecolochem reverse osmosis unit	1 lb/day	1-10 ppm	0.144 MGD	103/003
Cationic Polymer (e.g., Nalco Ultrion 7157	Coagulant (cationic) for the clarifier	100 lbs/day	20 ppm	0.330 MGD	103/003
Anionic Polymer (e.g., Nalco NALCLEAR 7766 Plus)	Flocculent (anionic) for the clarifier	50 lbs/day	10 ppm	0.330 MGD	103/003
Sodium Hypochlorite	Biocide for the circulating water system	0-600 gallons/day (per unit)	0.0-2.0 ppm	40.0 MGD	001/004/010
	Periodic oxidation of hydrazine in chemical waste sump and condensate blowdown	50 gallons/day (during oxidation)	0.0-0.5 ppm	0.252 MGD (Chem Waste Sump 0.488 MGD (SW Circ Pit)	101/001 403/003

CHEMICAL ADDITIVE LIST

CHEMICAL ADDITIVES UTILIZED	USE/SYSTEM	USAGE RATE	IN-STREAM CONCENTRATION	CONDITIONED WATER DISCHARGE RATE	DISCHARGE OUTFALL NO.
Sodium Molybdate (e.g., Nalco LCS1200M, GE Betz Corrshield MD4103, Nalco 7357)	Corrosion control of the primary and secondary (i.e., CCT, CCP, etc.), ERF HVAC, Chilled Water, emergency diesel generator Closed Loop Cooling Systems, and security emergency diesel generator closed loop cooling systems	5000 lbs/year	200-1500 ppm	Not normally discharged.	Closed system normally no discharge unless system has a mechanical failure (e.g., tube leakage) 101/001 303/403/003 111/211/011 313/013
Ethanolamine (e.g. Nalco Pre-Tect PT7000, GE Betz Steamate PWR 1440)	pH control of the Chilled Water and Hot Water Heat systems	<1 gal/day	0.5-50 ppm	Not normally discharged.	Closed system normally no discharge unless system fails (e.g., tube leakage); periodic drain of system may be discharged after ion-exchange or neutralization 101/001/004; 303/403/003 211/011 313/013
	PH control for the steam generators during periods of wet lay-up	1 – 15 gallons/day	0.5 – 5 ppm	Secondary System capacity 240,000-600,000 gallons (rate varies up to 0.600 MGD)	Periodic drain during outages of approximately 30,000 gallons 101/001/004 303/403/003 111/211/011 313/013
	pH and corrosion control of the secondary systems (condensate)	1 – 30 gallons/day	0.5 – 5 ppm	Secondary System capacity 240,000-600,000 gallons (rate varies up to 0.600 MGD)	Periodic draining for maintenance, system leakage; maybe discharged after ion-exchange or neutralization 101/001/004 303/403/003 111/211/011 313/013
	pH control of the Auxiliary boiler – includes periods of wet lay-up.	1 – 30 gallons/day	0.5 – 5 ppm	0.002 MGD	301/401/001

CHEMICAL ADDITIVE LIST

CHEMICAL ADDITIVES UTILIZED	USE/SYSTEM	USAGE RATE	IN-STREAM CONCENTRATION	CONDITIONED WATER DISCHARGE RATE	DISCHARGE OUTFALL NO.
Sodium Nitrite (e.g. Nalco LCS-60, GE Betz Corrshield NT4203, Nalco 73310)	Corrosion control of the primary and secondary (i.e., CCT, CCP, etc.), ERF HVAC, Chilled Water, emergency diesel generator Closed Loop Cooling Systems, and security emergency diesel generator closed loop cooling systems	2,500 lbs/year	200-1500 ppm	Not normally discharged	Closed system normally no discharge unless system has a mechanical failure (e.g., tube leakage) 101/001 303/403/003 111/211/011 313/013
Surfactant (e.g. Nalco 7348 Plus, GE Betz Spectrus BD1500)	Biocide enhancer for microbiological control for the circulating water system	50 gallons/day	40 ppm	40.0 MGD	001/004/010
Non Oxidizing Biocide – Ammonium Chloride (e.g. Nalco H-150M, GE Betz Powerline 3627) – quaternary amine	Biocide for treatment of various river water, service water, and fire protection components and systems. Used for microfouling and macrofouling (clams and mussels) treatments.	25-300 lbs/day Up to 3,000 lbs/day (4 times per subsystem per year)	2-12 ppm	40.0 MGD	001/004/010/003/ 011 Periodic drain of river and service water heat components, and fire protection pipes for maintenance produces discharge at: 303/003 111/211/011 313/013
Non oxidizing biocide - Isothiazolin /BNPD (e.g., Nalco 77352NA, GE Betz Spectrus NX1100)	Corrosion control of the primary and secondary (i.e., CCT, CCP, etc.), ERF HVAC, and emergency diesel generator Closed Loop Cooling Systems	<1 bs/day	15-30 ppm after addition	Not normally discharged	Closed system normally no discharge unless system has a mechanical failure (e.g., tube leakage) 101/001 303/403/003 111/211/011 313/013
Hydrogen Peroxide (H2O2)	Corrosion control for the Reactor Coolant System Neutralization of the chemical waste sump and SW circ pit.	15.8 gal/18 months (10.6 gal/year) < 33 gallons/day	1 ppm < 1 ppm	System capacity 66,371 gal (up to .066 MGD) N/A	Closed loop system no discharge 101/001 403/003
Hypersperse MDC700	Membrane deposit control for water treatment.	0.84 gallons/day	< 13.5 ppm	43 gpm	103/003

CHEMICAL ADDITIVE LIST

CHEMICAL ADDITIVES UTILIZED	USE/SYSTEM	USAGE RATE	IN-STREAM CONCENTRATION	CONDITIONED WATER DISCHARGE RATE	DISCHARGE OUTFALL NO.
Corrosion Inhibitor (e.g., Nalco CL-50, GE Betz Flogard MS6201)	Corrosion inhibitor for the circulating water system and secondary cooling system	600 lbs/day	1.54 ppm	40.0 MGD	001/004/010
Deposit Control Agent (e.g., Nalco 23283, GE Betz Depositrol BL5301, Depositrol BL 5303)	Deposit control inhibitor for the circulating water system	9,951 lbs/day	100 ppm	40.0 MGD	001/004/010
Copper Corrosion Inhibitor (e.g. Nalco 1336, GE Betz Inhibitor AZ8101, Nalco 3DT198)	Corrosion control of the primary and secondary (i.e., CCT, CCP, etc.), ERF HVAC, Chilled Water, and emergency diesel generator Closed Loop Cooling Systems	<55 gallons/day	10-100 ppm	Not normally discharged	Closed system normally no discharge unless system has a mechanical failure (e.g., tube leakage) 101/001 303/403/003 111/211/011 313/013
Bentonite Clay Detoxifying Agent (e.g., Nalco 1315, GE Betz Spectrus DT1401, Spectrus DT 1400, Nalco Coagulant Aid 35, Nalco Coagulant Aid 36)	Detoxifying clay for the biocide used for treating cooling water	21,000 lbs/day	0-35 ppm	40.0 MGD	001/003/004/010/011/
Phosphate Based Corrosion Inhibitor (e.g., Nalco 3D TRASAR 3DT165, GE Betz Continuum AEC3145)	Corrosion inhibitor for the ERF cooling system	10 lbs/day	100 ppm	<0.001 MGD	012
Carbohydrazide (e.g., Nalco 1250 Plus, GE Betz Cortrol OS5613)	Oxygen control for the steam generators during periods of wet lay-up	170 gal/day	75-200 ppm in isolated components during outages	Secondary System capacity 240,000-600,000 gallons (rate varies up to 0.600 MGD)	Periodic drain during outages of approximately 30,000 gallons 101/001/004 303/403/003 111/211/011 313/013
Boric Acid	Neutron moderation through the reactor coolant system (RCS)	60,000 lbs/year	1-2,000 ppm	Closed loop system no discharge	Closed loop system no discharge
	Corrosion inhibitor in the Secondary system steam generators	2,000 lbs/year	1-50 ppm	Secondary System capacity 240,000-600,000 gallons (rate varies up to 0.600 MGD)	Secondary System normal leakage and periodic drains 101/001/004 303/403/003 211/011 313/013
	Reduce pH of condensate drainage	50 lbs/qtr	100-1000 ppm	<0.600 MGD	Secondary System normal leakage and periodic drains 101/001/004 303/403/003 211/011 313/013

CHEMICAL ADDITIVE LIST

CHEMICAL ADDITIVES UTILIZED	USE/SYSTEM	USAGE RATE	IN-STREAM CONCENTRATION	CONDITIONED WATER DISCHARGE RATE	DISCHARGE OUTFALL NO.
Non Oxidizing Biocide (e.g., Nalco Stabrex ST70, GE Betz Spectrus NX118 (MBT))	Microbiological control for emergency diesel generator cooling system and ERF HVAC Closed Loop cooling systems	<1 gal/year	25 – 50 ppm	Not normally discharged	Closed system normally no discharge unless system has a mechanical failure (e.g., tube leakage) 101/001 303/403/003 111/211/011 313/013 012
Ethylene Glycol	Freeze protection for the ERF diesel generator cooling system Glycol heating system, Glycol chilled water, Switchgear Cooling	55 gal/year 330 gal/year	45-70% 45-70%	Not normally discharged (normally recycled offsite) Not normally discharged (normally recycled offsite)	Closed system no discharge Closed system no discharge
Anti-Foam (e.g., Nalco 7468, GE Betz Foamtrol CT, Foam Trol AF1440)	Foam elimination in the liquid waste system and circulating water systems	1,200 lbs/day	2.0 ppm	Variable	001/003/004/010/011/012/013
Ammonium Hydroxide	pH control for the secondary (condensate) system	< 1 gal/day under normal conditions (15 gal to lay-up system)	0.7-2.0 ppm 10-50 ppm	System capacity 240,000-600,000 gal Steam generator capacity 60,000 gal (rate varies up to 0.600 MGD)	Secondary System normal leakage and periodic drains 101/001/004 303/403/003 111/211/011 313/013
Ammonium Chloride	Molar Ratio control of secondary systems	< 1 lb/year	0 – 2.0 ppb	System capacity 240,000-600,000 gal	Secondary System normal leakage and periodic drains 101/001/004 303/403/003 111/211/011 313/013
Lithium Hydroxide (LiOH)	pH control for Reactor Coolant System Tracer for Systems Diagnostics of the primary and secondary (i.e., CCT, CCP, etc.), and emergency diesel generator Closed Loop Cooling Systems	80 lbs/year 10 lbs/year	0.7/4.0 ppm < 200 ppb	Not normally discharged	Closed loop system no discharge Closed system normally no discharge unless system has a mechanical failure (e.g., tube leakage) 101/001 303/403/003 111/211/011 313/013

CHEMICAL ADDITIVE LIST

CHEMICAL ADDITIVES UTILIZED	USE/SYSTEM	USAGE RATE	IN-STREAM CONCENTRATION	CONDITIONED WATER DISCHARGE RATE	DISCHARGE OUTFALL NO.
Zinc Acetate	Radiation dose control for the Reactor Coolant System	0.088 lbs/day (estimated average use rate)	0.035 ppm (estimated average in-stream)	System capacity 66,371 gal (up to .066 MGD)	Closed loop system no discharge
Hydrogen Nitrogen	Oxygen control for the Reactor Coolant System	As needed to maintain 20-30 psig overpressure in the volume control tank	30-40 cc/kg	System capacity 66,371 gal (up to .066 MGD)	Closed loop system no discharge
Potassium Chromate	Corrosion control for the Neutron Shield Tank at Unit 1 and Unit 2	<1 lbs/year	≤ 2,000 ppm	System capacity 20,970 gall (up to .021 MGD)	Closed system no discharge
Potassium Dichromate	pH control of the Neutron Shield Tanks at Unit 1 and Unit 2	<1 lbs/year	≤ 2,000ppm	System capacity 20,970 gall (up to .021 MGD)	Closed system no discharge
Sodium Bicarbonate	pH adjustment of various internal monitoring points.	50-150 lbs/day	10-300 ppm	0.014 MGD (Unit 1) 0.046 MGD (Unit 2)	103/303/003 111/211//011 /313/013/ 114/014
Potassium hydroxide	Corrosion control of the primary and secondary (i.e., CCT, CCP, etc.), and emergency diesel generator Closed Loop Cooling Systems	< 5 pounds/year	As necessary to control pH	Not normally discharged	Closed system normally no discharge unless system has a mechanical failure (e.g., tube leakage) 101/001 303/403/003 111/211/011 313/013
Sodium Tetraborate	Corrosion control of the primary and secondary (i.e., CCT, CCP, etc.), and emergency diesel generator Closed Loop Cooling Systems	< 10 pounds/year	As necessary to control pH	Not normally discharged	Closed system normally no discharge unless system has a mechanical failure (e.g., tube leakage) 101/001 303/403/003 111/211/011 313/013
Dispersant-polymer (e.g. NALCO 3D TRASAR 3DT120, NALCO 3D TRASAR 3DT121)	Dispersant in circulating water.	620,000 pounds/ year	7.0 ppm	3.5 ppm	001, 003, 004, 010, 011
Bio-Detergent (e.g. NALCO 73550)	Cooling water biological growth inhibitor.	150,000 pounds/year	2.5 ppm	1.25 ppm	001, 003, 004, 010, 011
Diagnostic Tracer Chemical (e.g. NALCO TRASAR 23299)	Will be used to monitor the amount of Corrosion Inhibitor in the River Water Systems	930 pounds/year	0.1 ppm	Not normally discharged	001, 003, 004, 010, 011
Corrosion Inhibitor / Dispersant (e.g. NALCO 3D TRASAR 3DT187, NALCO 3D TRASAR 3DT177)	Corrosion control of service and component cooling water.	950,000 pounds/year	4.0ppm	4.0 ppm	001, 003, 004, 010, 011
Nalco 7320	Fire Protection system biocide.	200 Gallons/ year	30.0 ppm	30 ppm	001/004/010/003/011

CHEMICAL ADDITIVE LIST

THE FOLLOWING CHEMICALS ARE USED FOR CORRECTIVE ACTION – NOT FOR NORMAL OPERATIONS

CHEMICAL ADDITIVES UTILIZED	USE/SYSTEM	USAGE RATE	IN-STREAM CONCENTRATION	CONDITIONED WATER DISCHARGE RATE	DISCHARGE OUTFALL NO.
Calcium Hydroxide (Hydrated Lime)	Maintained for emergency adjustments of various outfall pH's	Not normally used- rate dependant on contingency.	Variable	Variable	103/303/003 111/211//011 313/013
Fluorescein Dye	Dye testing	< 1 lbs/day	1000 ppm	<0.060 MGD	001/003/004/010/011/012 /013
Bio-Remedial Cleaner/Degreaser (e.g., Fleetkleen)	Cleaning of transformers and surfaces.	< 50 gallons/year	N/A (not added to any system)	Not normally discharged	001, 003, 011, 013
Citric Acid	Maintained for emergency adjustments of various outfall pH's	Not normally used- rate dependant on contingency. < 200 Lbs/ year	Variable	Variable	103/303/003 111/211//011 313/013

DRAWING INDEX

August 19, 2014

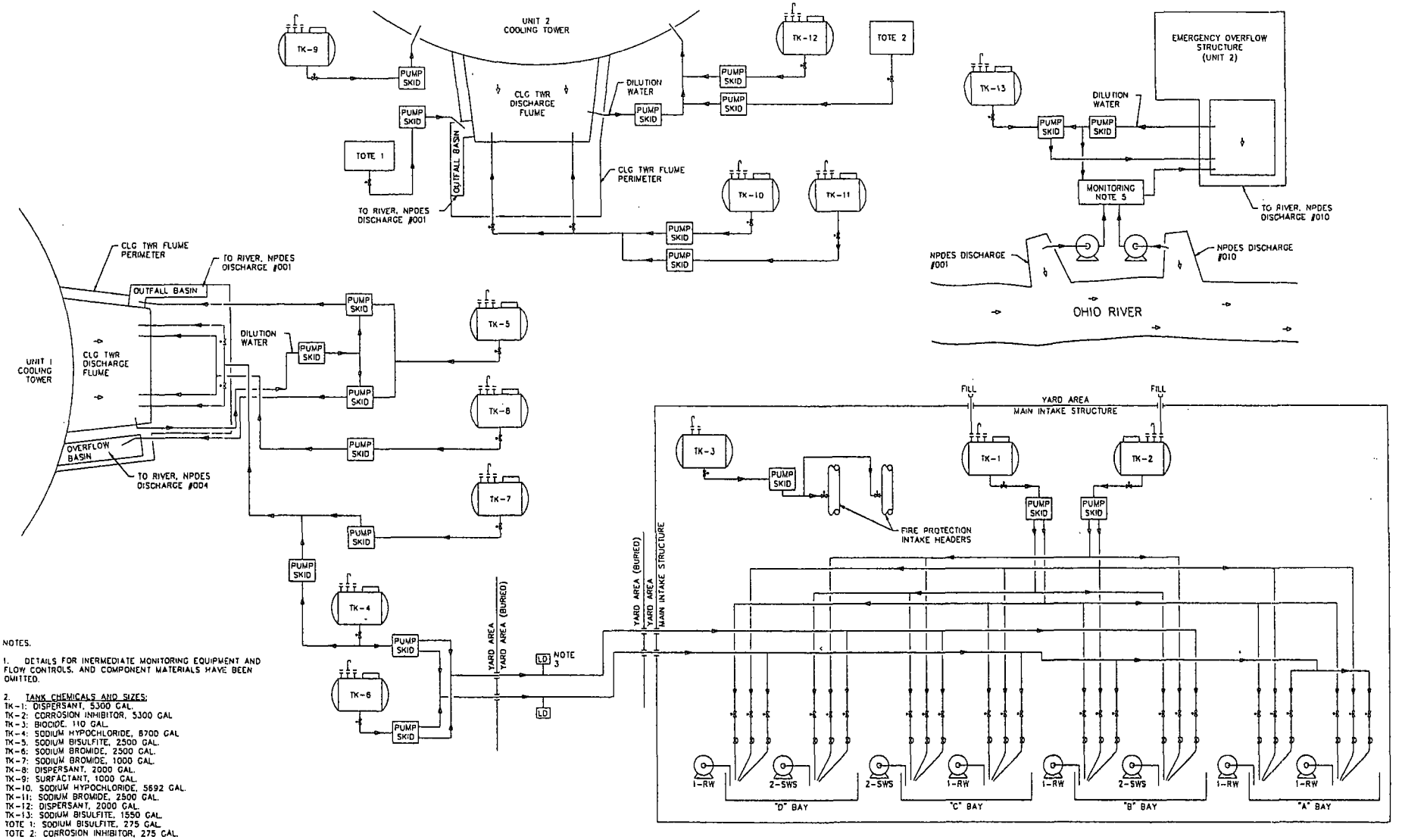
Beaver Valley Power Station
Unit 1 Reactor Plant and Turbine Plant River Water Systems
Unit 2 Service Water Systems and Fire Protection
Chemical Injection and Dechlorination Upgrade

DESIGN DRAWINGS (with P.E. seal)	REFERENCE DRAWINGS (No P.E. seal)
General Arrangement	
· SKETCH 13-0361-SHT-001, Rev. 0 (Composite Flow Diagram)	
· 10080-RY-0002A, Rev. 12 (Site Layout Drawing)	
Sodium Hypochlorite Tank, 1CI-TK-4 and Sodium Bromide Tank, 1CI-TK-6 with piping and pump skid installation from the Unit 1 Cooling Tower to the River Water and Service Water Pumps in each of the Main Intake Structure Bays	
· 8700-RM-0430-007, Rev. 0	· 03.047-0034, Rev. A
· 8700-RM-0430-008, Rev. 0	· 03.047-0035, Rev. A
· 10080-RP-0001V, Rev. 1	· 02.037-0003, Rev. A
· 10080-RP-0001M, Rev. 0	· 02.037-0004, Rev. A
· 10080-RP-0001N, Rev. 0	· 02.037-0005, Rev. A
· 10080-RP-0001P, Rev. 0	
· 10080-RP-0001Q, Rev. 0	
· 10080-RP-0001R, Rev. 0	
· 10080-RP-0001S, Rev. 0	
Dispersant Tank, 1CI-TK-1 and Corrosion Inhibitor Tank, 1CI-TK-2 with piping and pump skid installation in the River Water and Service Water Pumps in each of the Main Intake Structure Bays	
· 8700-RM-0430-006, Rev. 0	· 03.047-0037, Rev. A
	· 03.047-0038, Rev. A
	· 02.037-0001, Rev. A
	· 02.037-0002, Rev. A
Sodium Bisulfite Tank, 1CI-TK-5, Sodium Bromide Tank, 1CI-TK-7 and Dispersant Tank, 1CI-TK-8 (existing) with piping and pump skid installation to the Unit 1 Cooling Tower Discharge Flume, the NPDES Discharge #001 and the NPDES Discharge #004	
· 8700-RM-0431-004, Rev. 0	· 03.047-0034, Rev. A
	· 03.047-0036, Rev. A
	· 02.037-0006, Rev. A
	· 02.037-0007, Rev. A
	· 02.037-0008, Rev. A
Unit 2 Sodium Bisulfite Pump Skid Installation to the Cooling Tower Basin and NPDES Discharge #001	
· 10080-RM-0431-006, Rev. 0	· 2002.371-000-001, Rev. 0
Unit 2 Sodium Bisulfite Tank, 2CIS-TK-13 installation to the NPDES Discharge #010 and installation of the Chlorine Analysis Sample Equipment	
· 10080-RM-0430-006, Rev. 0	· 2003.480-000-001, Rev. A
· 10080-RP-0001T, Rev. 1	· 2002.371-000-002, Rev. A
· 10080-RP-0001U, Rev. 1	· 2002.371-000-003, Rev. A
	· 02.037-0010, Rev. A
Unit 1 NPDES #001 installation of the Chlorine Analysis Sample Equipment	
· 8700-RM-0431-005, Rev. 0	
Biocide Tank, 1CI-TK-3 Installation in the Site Fire Protection System	
· 10080-RM-0433-010, Rev. 0	· 03.047-0039, Rev. A
	· 03.047-0040, Rev. A
	· 02.037-0009, Rev. A

This drawing prepared by FENOC under direction and technical review by HDR Engineering. Professional Engineer seal hereby affixed under contract with HDR Engineering per chemical system modifications dated August 2014.

COMMONWEALTH OF PENNSYLVANIA
JAMES BENHAM
8/11/2014

No. SKETCH 13-0361-SHT-001



NOTES.

1. DETAILS FOR INERMEDIATE MONITORING EQUIPMENT AND FLOW CONTROLS, AND COMPONENT MATERIALS HAVE BEEN OMITTED.

2. TANK CHEMICALS AND SIZES:
TK-1: DISPERSANT, 5300 GAL.
TK-2: CORROSION INHIBITOR, 5300 GAL
TK-3: BIOCIDE, 110 GAL.
TK-4: SODIUM HYPOCHLORIDE, 8700 GAL
TK-5: SODIUM BISULFITE, 2500 GAL.
TK-6: SODIUM BROMIDE, 2500 GAL.
TK-7: SODIUM BROMIDE, 1000 GAL.
TK-8: DISPERSANT, 2000 GAL.
TK-9: SURFACTANT, 1000 GAL.
TK-10: SODIUM HYPOCHLORIDE, 5692 GAL.
TK-11: SODIUM BROMIDE, 2500 GAL.
TK-12: DISPERSANT, 2000 GAL.
TK-13: SODIUM BISULFITE, 1550 GAL.
TOTE 1: SODIUM BISULFITE, 275 GAL.
TOTE 2: CORROSION INHIBITOR, 275 GAL.

3. FOUR LEAK DETECTION POINTS PER LINE INSTALLED ALONG THE BURIED PORTION OF PIPING.

4. UNIT 1 RIVER WATER PUMPS ARE DESIGNATED "1-RW". UNIT 2 SERVICE WATER SYSTEM PUMPS ARE DESIGNATED "2-SWS".

5. MONITORING CONTAINS FREE AND TOTAL CHLORINE ANALYZERS.

REFERENCE DRAWINGS:

8700-RM-0430-006	8700-RM-0433-001
8700-RM-0430-007	8700-RM-0433-010
8700-RM-0430-008	8700-RM-0433-00N
8700-RM-0430-00N	10080-RM-0430-005
8700-RM-0431-004	10080-RM-0430-006
8700-RM-0431-005	10080-RM-0431-005
8700-RM-0431-00N	10080-RM-0431-006

THIS IS NOT AN OFFICIAL DOCUMENT
INTENDED FOR REFERENCE PURPOSES ONLY

FENOC FirstEnergy Nuclear Operating Company

BEAVER VALLEY POWER STATION UNIT NO 1 & 2

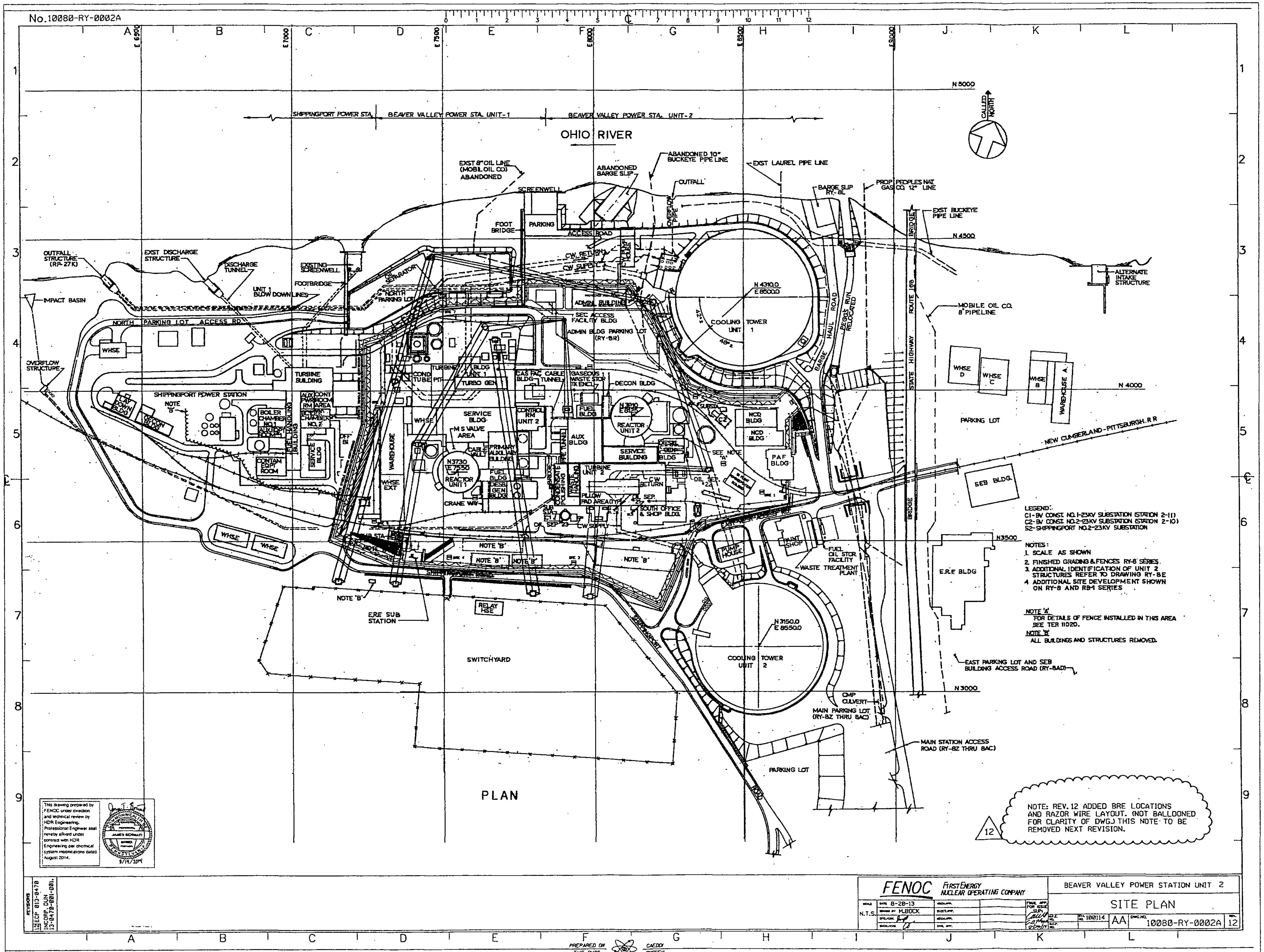
CHEMICAL INJECTION SYSTEM REFERENCE COMPOSITE FLOW DIAGRAM - ECP 13-0361

SCALE NONE	DES. JMP	DRN. D. HOOVER	DATE 7-3-14
			APP. 9-3-14

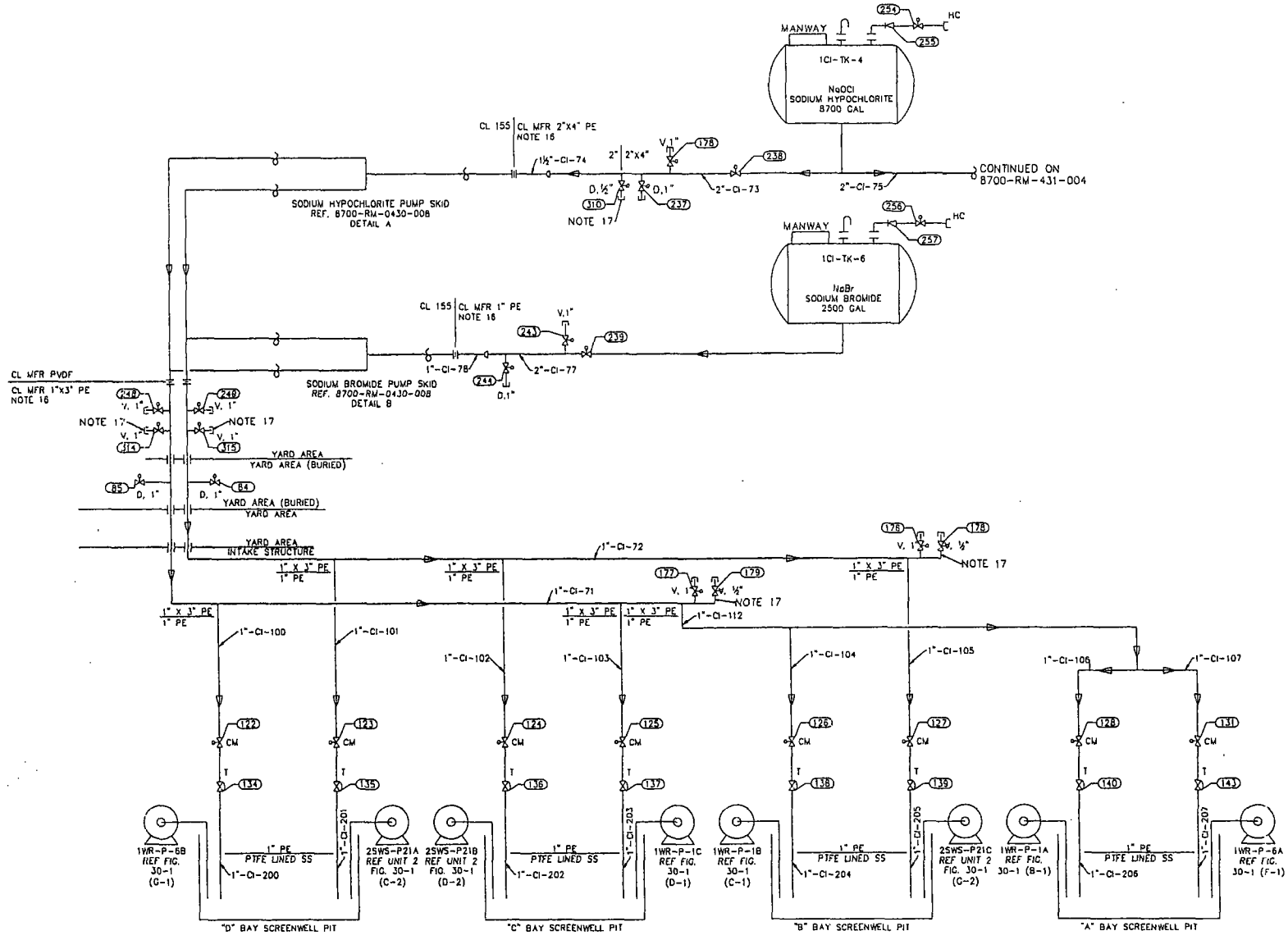
AA SKETCH 13-0361-SHT-001 0

PREPARED ON THE BMS CADD SYSTEM

DATE TIME DESIGN FILE SPECIFICATION


No.10080-RY-0002A
OHIO RIVER
SHIPPINGPORT POWER STA.
BEAVER VALLEY POWER STA. UNIT-1
BEAVER VALLEY POWER STA. UNIT-2
CALLED NORTH
N 5000
N 4500
N 4000
N 3500
N 3000
E 6500
E 7000
E 7500
E 8000
E 8500
E 9000
ABANDONED 10" BUCKEYE PIPE LINE
EXST LAUREL PIPE LINE
EXST 8" OIL LINE (MOBILOIL CO) ABANDONED
ABANDONED BARGE SLIP
OUTFALL
BARGE SLIP RY-8L
PROP PEOPLES NAT GAS CO. 12" LINE
EXST BUCKEYE PIPE LINE
SCREENWELL
FOOT BRIDGE
PARKING
ACCESS ROAD
OUTFALL STRUCTURE (RP-27K)
EXST DISCHARGE STRUCTURE
DISCHARGE TUNNEL
EXISTING SCREENWELL
FOOTBRIDGE
UNIT 1 BLOW DOWN LINES
IMPACT BASIN
NORTH PARKING LOT ACCESS RD.
NORTH PARKING LOT
CW RETURN
CW SUPPLY
ADMIN BUILDING
SEC ACCESS FACILITY BLDG
ADMIN BLDG PARKING LOT (RY-8R)
COOLING TOWER UNIT 1
N 4310.0
E 8500.0
ALTERNATE INTAKE STRUCTURE
MOBILE OIL CO. 8" PIPELINE
BARGE HAUL ROAD
PEGGS RUN RELOCATED
ROUTE 18
STATE HIGHWAY
BRIDGE
WHSE
OVERFLOW STRUCTURE
SHIPPINGPORT POWER STATION
TURBINE BUILDING
TURBINE BLDG
TURBO GEN
GAS FAC BLDG
CABLE TUNNEL
GASEOUS WASTE STOR TK ENCL
DECON BLDG
WHSE D
WHSE C
WHSE B
WAREHOUSE A
PARKING LOT
NEW CUMBERLAND-PITTSBURGH R.R.
SEB BLDG
NCD BLDG
PAF BLDG
NOTE 'B'
SERVICE BLDG
M S VALVE AREA
CONTROL RM UNIT 2
FUEL BLDG
REACTOR UNIT 2
AUX BLDG
SERVICE BUILDING
PRIMARY AUXILIARY BUILDING
CABLE VAULT
N3730
E 7550
REACTOR UNIT 1
FUEL BLDG
DIESEL GEN BLDG
CRANE WAY
WAREHOUSE
WHSE EXT
TURBINE UNIT 2
CW RETURN
OIL SEP
SOUTH OFFICE & SHOP BLDG
CW SUPPLY
PUMP HOUSE
FUEL OIL STOR. FACILITY
WASTE TREATMENT PLANT
E.R.F. BLDG
ERF SUB STATION
RELAY HSE
SWITCHYARD
COOLING TOWER UNIT 2
N 3150.0
E 8550.0
CMP CULVERT
MAIN PARKING LOT (RY-8Z THRU 8AC)
MAIN STATION ACCESS ROAD (RY-8Z THRU 8AC)
EAST PARKING LOT AND SEB BUILDING ACCESS ROAD (RY-8AD)
PARKING LOT
PLAN
LEGEND:
C1-BV CONST. NO.1-23KV SUBSTATION (STATION 2-11)
C2-BV CONST. NO.2-23KV SUBSTATION (STATION 2-10)
S2-SHIPPINGPORT NO.2-23KV SUBSTATION
NOTES:
1. SCALE AS SHOWN
2. FINISHED GRADING & FENCES RY-8 SERIES.
3. ADDITIONAL IDENTIFICATION OF UNIT 2 STRUCTURES REFER TO DRAWING RY-8E
4. ADDITIONAL SITE DEVELOPMENT SHOWN ON RY-8 AND RB-1 SERIES
NOTE 'A'
FOR DETAILS OF FENCE INSTALLED IN THIS AREA SEE TER 11020.
NOTE 'B'
ALL BUILDINGS AND STRUCTURES REMOVED.
NOTE: REV. 12 ADDED BRE LOCATIONS AND RAZOR WIRE LAYOUT. (NOT BALLOONED FOR CLARITY OF DWG.) THIS NOTE TO BE REMOVED NEXT REVISION.
12
This drawing prepared by FENOC under direction and technical review by HDR Engineering. Professional Engineer seal hereby affixed under contract with HDR Engineering per chemical system modifications dated August 2014.
12 ECP 013-0470
FENOC FirstEnergy Nuclear Operating Company
BEAVER VALLEY POWER STATION UNIT 2
SITE PLAN
N.T.S.
DATE 8-20-13
DRAWN BY M.BOCK
AA
10080-RY-0002A
12
PREPARED ON THE BVPS CAEDDI SYSTEM
21-AUG-2013 10:42

No. 8700-RM-0430-007



UNIT 1 RIVER WATER NOTES:
8700-RM-0430-00N

ALL MANUAL VALVE EQUIPMENT IDENTIFICATION NUMBERS ON THIS DIAGRAM ARE PRECEDED BY THE SYSTEM DESIGNATOR "1CI" UNLESS OTHERWISE INDICATED.

OP MANUAL FIG NO 30-7

FENOC FirstEnergy Nuclear Operating Company

BEAVER VALLEY POWER STATION UNIT NO 1

PIPING & INSTRUMENTATION DIAGRAM
RW/SWS CHEMICAL INJECTION SYSTEM

AA 8700-RM-0430-007 0

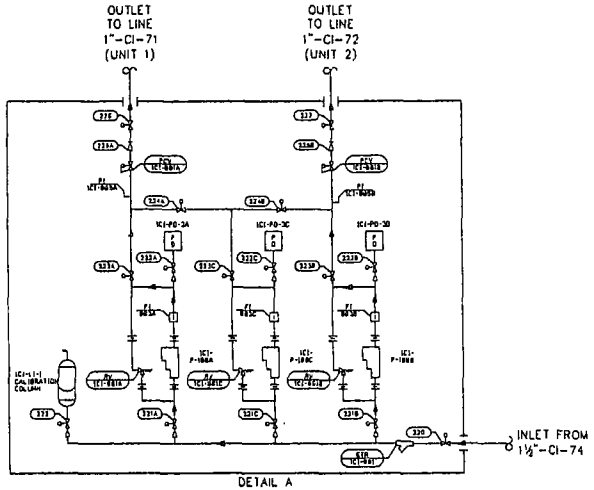
NONE

D. HOOVER

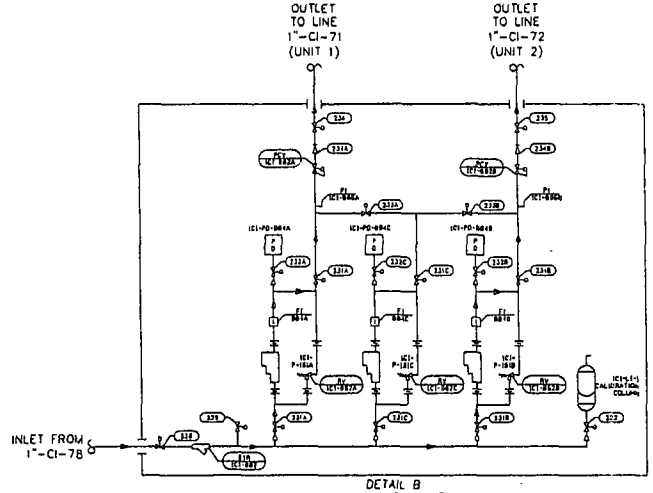
PREPARED ON THE BVPS CHECKS SYSTEM

DATE **TIME** **DESIGN** **FILE** **SPECIFICATION**

No. 8700-RM-0430-008



DETAIL A
SODIUM HYPOCHLORITE
PUMP SKID SCHEMATIC



DETAIL B
SODIUM BROMIDE
PUMP SKID SCHEMATIC

UNIT 1 RIVER WATER NOTES:
8700-RM-0430-00N

ALL MANUAL VALVE EQUIPMENT IDENTIFICATION NUMBERS ON THIS DIAGRAM ARE PRECEDED BY THE SYSTEM DESIGNATOR "ICI" UNLESS OTHERWISE INDICATED.

OP MANUAL FIG NO 30-8

FENOC FirstEnergy Nuclear Operating Company

BEAVER VALLEY POWER STATION UNIT NO 1

PIPING & INSTRUMENTATION DIAGRAM
RW/SWS CHEMICAL INJECTION SYSTEM
CHLORINE/BROMIDE PUMP SKID DETAILS

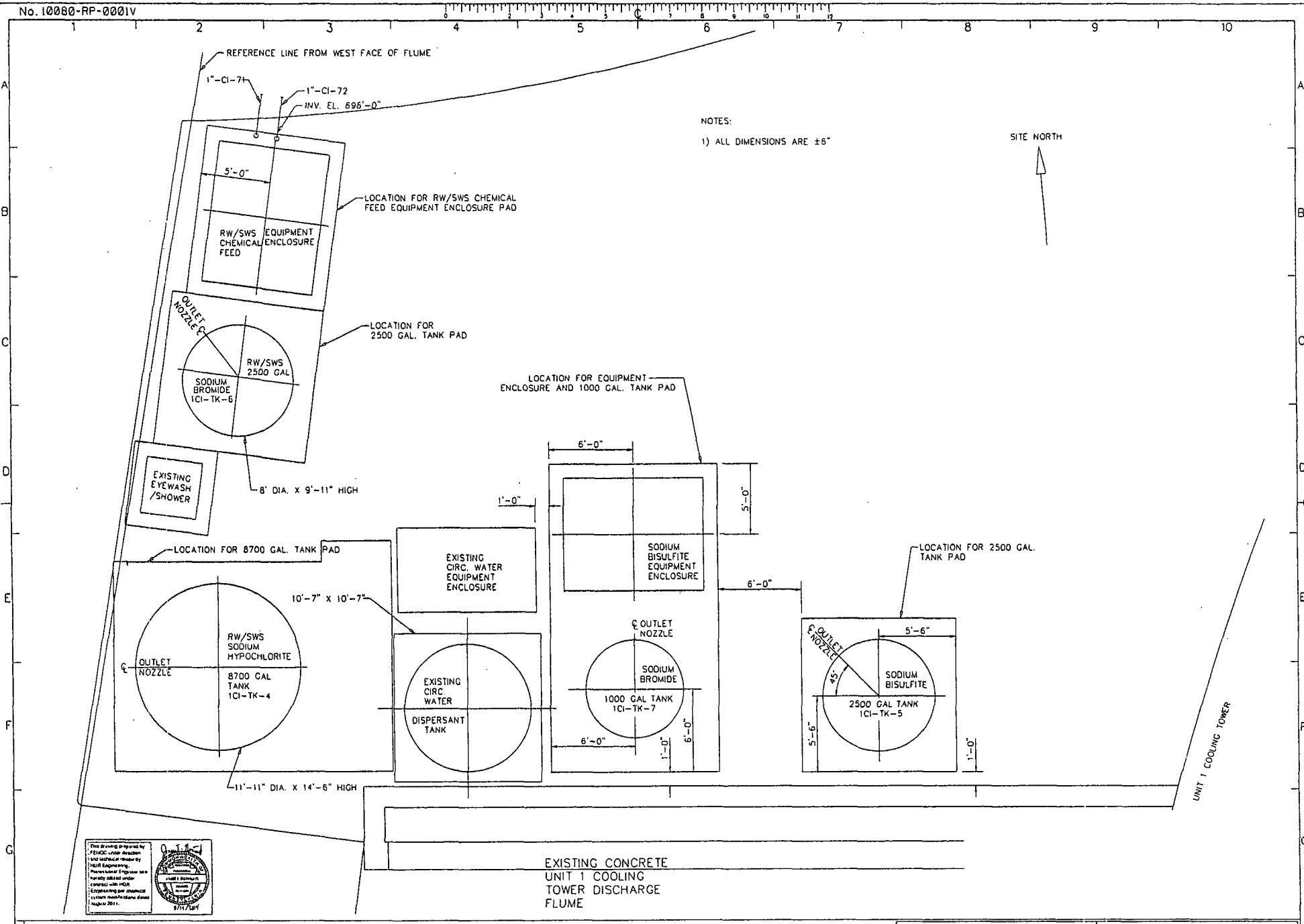
AA | 8700-RM-0430-008 | 0

DATE TIME DESIGN FILE SPECIFICATION

PREPARED ON THE B/PS

EAEDD SYSTEM

No. 10080-RP-0001V



FENOC FirstEnergy Nuclear Operating Company

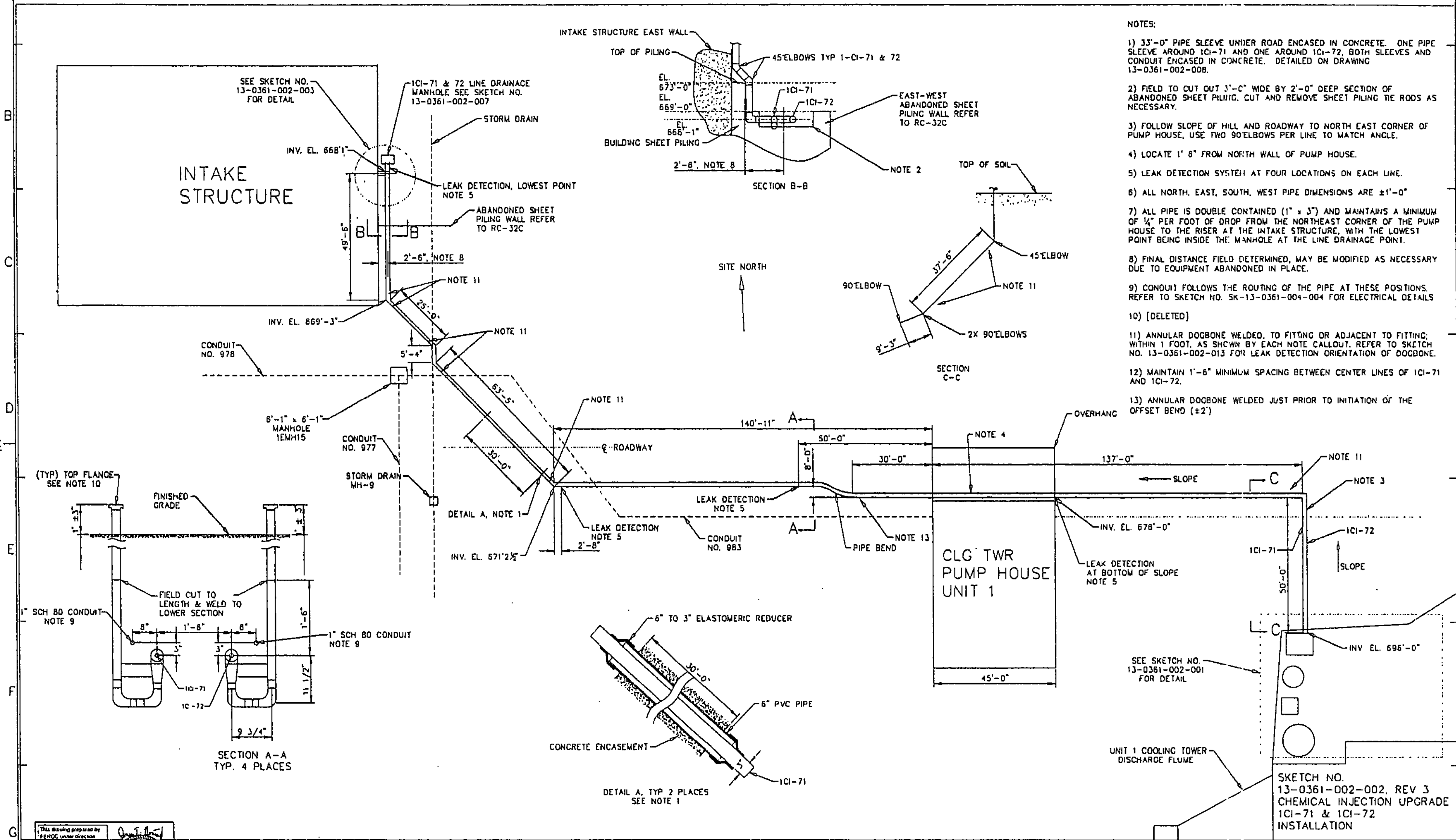
BEAVER VALLEY POWER STATION UNIT 2

UNIT 1 CHEMICAL INJECTION
UNIT 1 COOLING TOWER PLAN VIEW

N.T.S. | DATE 8-11-14 | DESIGN J.M.P. | DRAWN L.A.H. | CHECKED D. HOOVER | AA | 10080-RP-0001V | 1

PREPARED ON THE BVPS CADD SYSTEM

DATE TIME DESIGN FILE SPECIFICATION



NOTES:

1) 33'-0" PIPE SLEEVE UNDER ROAD ENCASED IN CONCRETE. ONE PIPE SLEEVE AROUND 1CI-71 AND ONE AROUND 1CI-72, BOTH SLEEVES AND CONDUIT ENCASED IN CONCRETE. DETAILED ON DRAWING 13-0361-002-008.

2) FIELD TO CUT OUT 3'-0" WIDE BY 2'-0" DEEP SECTION OF ABANDONED SHEET PILING. CUT AND REMOVE SHEET PILING TIE RODS AS NECESSARY.

3) FOLLOW SLOPE OF HILL AND ROADWAY TO NORTH EAST CORNER OF PUMP HOUSE, USE TWO 90°ELBOWS PER LINE TO MATCH ANGLE.

4) LOCATE 1' 6" FROM NORTH WALL OF PUMP HOUSE.

5) LEAK DETECTION SYSTEM AT FOUR LOCATIONS ON EACH LINE.

6) ALL NORTH, EAST, SOUTH, WEST PIPE DIMENSIONS ARE ±1'-0"

7) ALL PIPE IS DOUBLE CONTAINED (1" x 3") AND MAINTAINS A MINIMUM OF ¼" PER FOOT OF DROP FROM THE NORTHEAST CORNER OF THE PUMP HOUSE TO THE RISER AT THE INTAKE STRUCTURE, WITH THE LOWEST POINT BEING INSIDE THE MANHOLE AT THE LINE DRAINAGE POINT.

8) FINAL DISTANCE FIELD DETERMINED, MAY BE MODIFIED AS NECESSARY DUE TO EQUIPMENT ABANDONED IN PLACE.

9) CONDUIT FOLLOWS THE ROUTING OF THE PIPE AT THESE POSITIONS. REFER TO SKETCH NO. SK-13-0361-004-004 FOR ELECTRICAL DETAILS

10) [DELETED]

11) ANNULAR DOGBONE WELDED, TO FITTING OR ADJACENT TO FITTING; WITHIN 1 FOOT, AS SHOWN BY EACH NOTE CALLOUT. REFER TO SKETCH NO. 13-0361-002-013 FOR LEAK DETECTION ORIENTATION OF DOGBONE.

12) MAINTAIN 1'-6" MINIMUM SPACING BETWEEN CENTER LINES OF 1CI-71 AND 1CI-72.

13) ANNULAR DOGBONE WELDED JUST PRIOR TO INITIATION OF THE OFFSET BEND (±2')

NON-SAFETY RELATED
NON SEISMIC

1 ECP 13-0361 ORIGINAL ISSUE INCORP'D DUN 13-0361-XXX-XXX

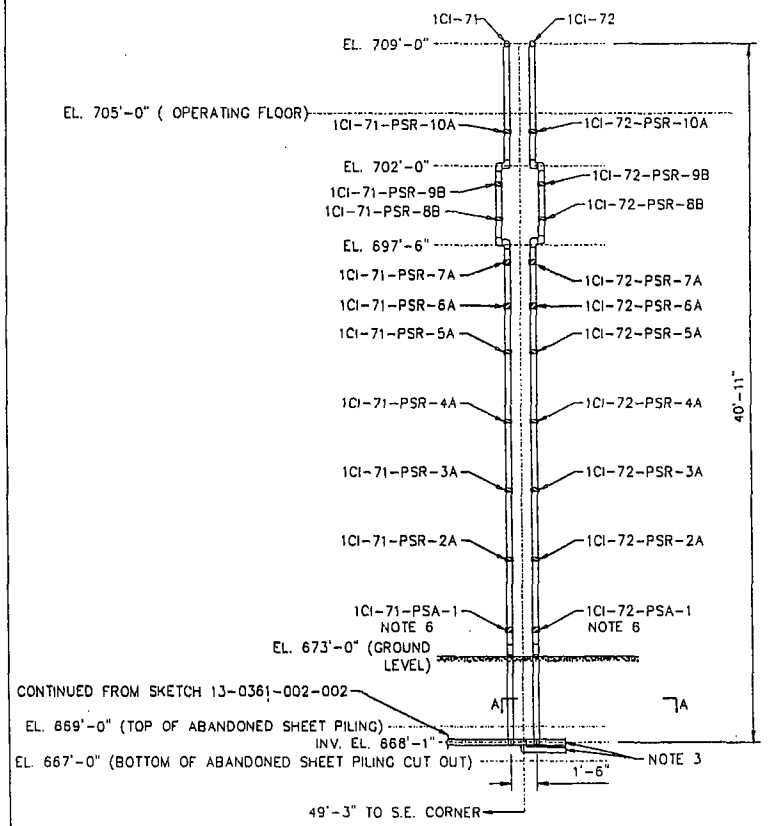
FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT 2

CHEMICAL INJECTION YARD PIPING TO INTAKE STRUCTURE WR & SWS PUMPS

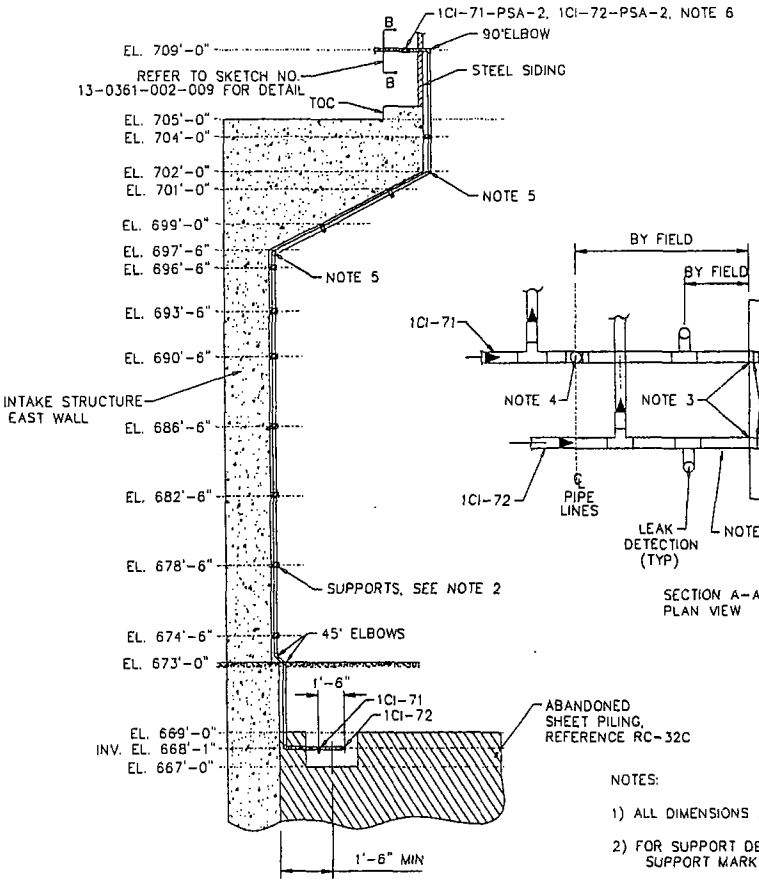
N.T.S. | 8-17-14 | JMP | D. HOOVER | AA | 10080-RP-0001M | 1

PREPARED ON THE BVPS CADD SYSTEM



INTAKE STRUCTURE, EAST WALL
(FACING WEST, WITH FUNCTIONAL LOCATIONS)

1CI-72-PSR-9B	13-0361-002-006
1CI-71-PSR-10A	13-0361-002-005
1CI-72-PSR-10A	13-0361-002-005
1CI-71-PSA-2	13-0361-002-009
1CI-72-PSA-2	13-0361-002-009



INTAKE STRUCTURE, EAST WALL
(FACING NORTH)

SECTION A-A
PLAN VIEW

NOTES:

1) ALL DIMENSIONS ARE ±3" UNLESS OTHERWISE NOTED.

2) FOR SUPPORT DETAILS SEE:

SUPPORT MARK #	SUPPORT SKETCH NO.
1CI-71-PSA-1	13-0361-002-004
1CI-72-PSA-1	13-0361-002-004
1CI-71-PSR-2A	13-0361-002-005
1CI-72-PSR-2A	13-0361-002-005
1CI-71-PSR-3A	13-0361-002-005
1CI-72-PSR-3A	13-0361-002-005
1CI-71-PSR-4A	13-0361-002-005
1CI-72-PSR-4A	13-0361-002-005
1CI-71-PSR-5A	13-0361-002-005
1CI-72-PSR-5A	13-0361-002-005
1CI-71-PSR-6A	13-0361-002-005
1CI-72-PSR-6A	13-0361-002-005
1CI-71-PSR-7A	13-0361-002-005
1CI-72-PSR-7A	13-0361-002-005
1CI-71-PSR-8B	13-0361-002-006
1CI-72-PSR-8B	13-0361-002-006
1CI-71-PSR-9B	13-0361-002-006

6) INSTALL PIPE FITTING SHOWN ON SKETCH 13-0361-002-011 AT SUPPORT ANCHOR LOCATION.

7) USE 45°OR 90°ELBOWS AS NECESSARY TO ROUTE PIPES INTO MANHOLE.

3) LOW POINT DRAINS FOR 1CI-71 & 72 EXTEND INTO MANHOLE FOR DRAINAGE ACCESS, AND TERMINATE WITH A CONTAINED TYPE 21 BALL VALVE (1" DIA, 230PSI) AND PIPE CAP AS DETAILED IN SKETCH NO. 13-0361-002-010. MANHOLE IS DETAILED IN SKETCH NO. 13-0361-002-007.

4) LINE 1CI-71 IS TO BE ROUTED UNDER 1CI-72 LINE AND INTO MANHOLE USING 90° ELBOWS. ROTATE ELBOWS AS NECESSARY TO ENTER MANHOLE SOUTH WALL.

5) USE TWO 90°ELBOWS FOR EACH LINE AT BOTH LOCATIONS TO MATCH THE ANGLE OF THE OVERHANG SUPPORT.

NON-SAFETY RELATED
NON- SEISMIC

SKETCH NO.
13-0361-002-003, REV 5
CHEMICAL INJECTION
UPGRADE
INTAKE STRUCTURE
EAST WALL

ISSUED
IFCP 13-0361
ORIGINAL ISSUE
INCORP'D. DUN
13-0361-XXX-
XXX

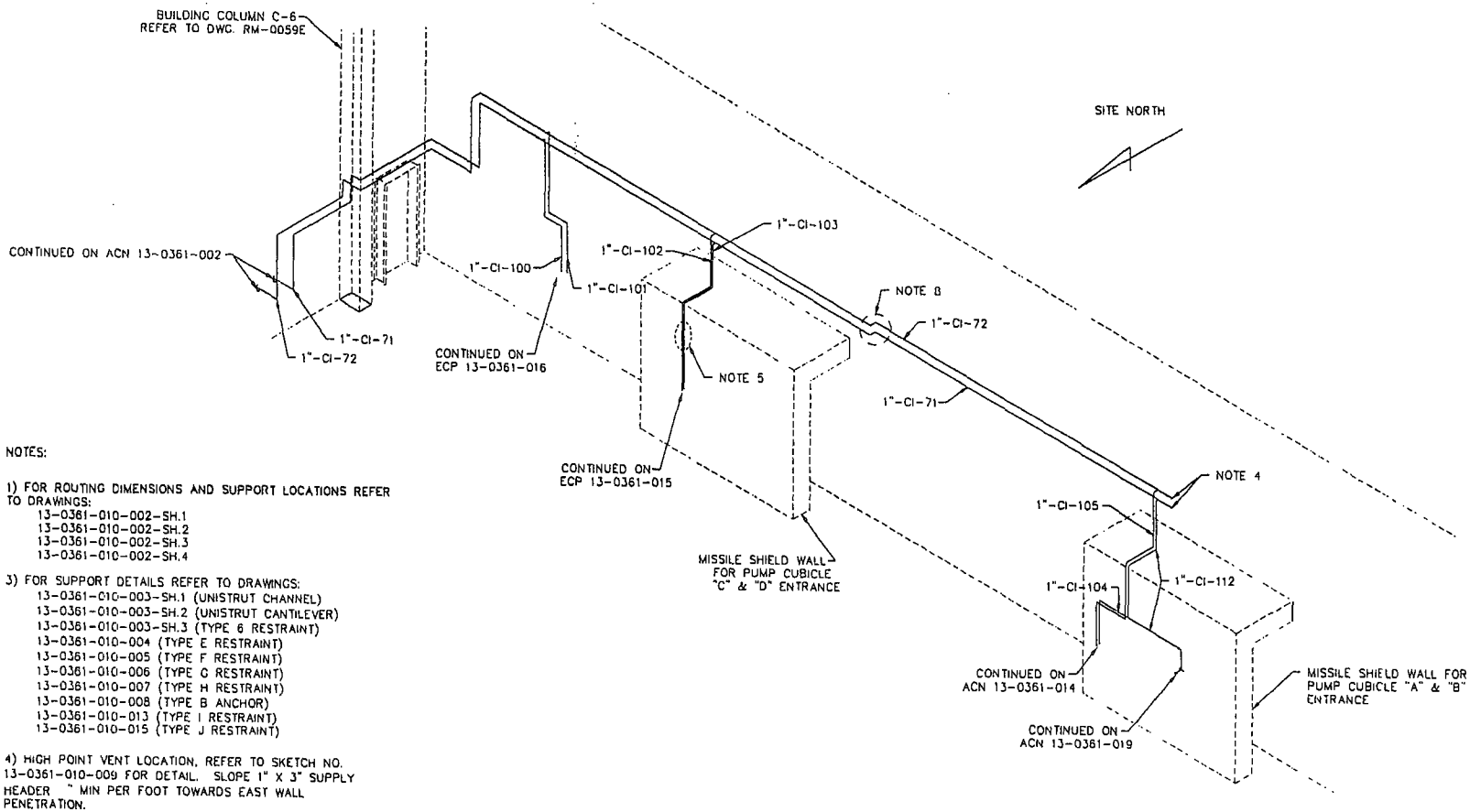
FENOC FirstEnergy Nuclear Operating Company

SCALE N.T.S.	DATE 6-17-14	DRAWN BY JMP	CHECKED BY
APPROVED BY			
ENGINEER D. HOOVER			

BEAVER VALLEY POWER STATION UNIT 2
CHEMICAL INJECTION YARD PIPING TO INTAKE STRUCTURE WR & SWS PUMPS
AA 10080-RP-0001N 1

PREPARED ON THE DMS
CHECK SYSTEM

DATE ***TIME*** ***DESIGN*** ***FILE*** ***SPECIFICATION***



NOTES:

1) FOR ROUTING DIMENSIONS AND SUPPORT LOCATIONS REFER TO DRAWINGS:
   - 13-0361-010-002-SH.1
   - 13-0361-010-002-SH.2
   - 13-0361-010-002-SH.3
   - 13-0361-010-002-SH.4

3) FOR SUPPORT DETAILS REFER TO DRAWINGS:
   - 13-0361-010-003-SH.1 (UNISTRUT CHANNEL)
   - 13-0361-010-003-SH.2 (UNISTRUT CANTILEVER)
   - 13-0361-010-003-SH.3 (TYPE 6 RESTRAINT)
   - 13-0361-010-004 (TYPE E RESTRAINT)
   - 13-0361-010-005 (TYPE F RESTRAINT)
   - 13-0361-010-006 (TYPE G RESTRAINT)
   - 13-0361-010-007 (TYPE H RESTRAINT)
   - 13-0361-010-008 (TYPE B ANCHOR)
   - 13-0361-010-013 (TYPE I RESTRAINT)
   - 13-0361-010-015 (TYPE J RESTRAINT)

4) HIGH POINT VENT LOCATION, REFER TO SKETCH NO. 13-0361-010-009 FOR DETAIL. SLOPE 1" X 3" SUPPLY HEADER " MIN PER FOOT TOWARDS EAST WALL PENETRATION.

5) MOVE EXISTING SPEAKER ±3'0" TO FACILITATE INSTALLATION OF NEW PIPING.

6) ALL 1" DIAMETER DOUBLE CONTAINED PIPE JOINTS ARE BUTT FUSION WELDS.

7) ALL 1" SINGLE WALL THERMOPLASTIC PIPE JOINTS ARE SOCKET FUSION WELDS.

8) USE TWO 45° ELBOWS PER LINE TO RAISE BOTH LINES ABOVE EXISTING CONDUIT.

This drawing prepared by FENOC under direction and technical review by HDR Engineering. Professional Engineer seal hereby placed under contract with HDR Engineering for chemical system modifications dated August 2014.

9/19/2014

NON-SAFETY RELATED
NON-SEISMIC

SKETCH NO.
13-0361-010-001-SH.1, REV 3
CHEMICAL INJECTION UPGRADE
INTAKE STRUCTURE, PLASTIC PIPE ARRANGEMENT
CHLORINE/BROMIDE PIPING ABOVE EL. 705'

ISSUES	
3	ECP 13-0361
2	ORIGINAL ISSUE
1	INCORPD DUN-0361-XXX-

FENOC FirstEnergy Nuclear Operating Company

BEAVER VALLEY POWER STATION UNIT 2

CHEMICAL INJECTION YARD PIPING TO INTAKE STRUCTURE WA & SWS PIPING

DATE	6-17-14
DRAWN BY	JMP
CHECKED BY	
APPROVED BY	D.HOOVER
N.T.S.	
SIZE	AA
DWG NO.	10080-RP-0001P
REV	3

PREPARED ON THE BIAS — CADD SYSTEM

DATE **TIME** **DESIGN** **FILE** **SPECIFICATION**

NOTES:

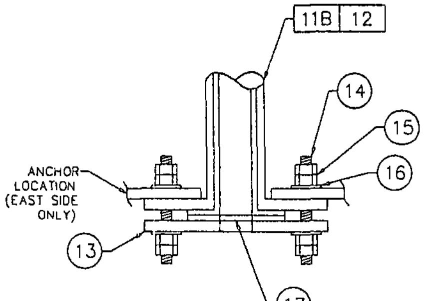
1) ALL FLANGED 1" PIPE SPOOLS LABELED ACCORDINGLY

2) FOR ROUTING DIMENSIONS AND SUPPORT LOCATIONS REFERENCE DRAWINGS:
- 13-0361-014-002A-SH.1
- 13-0361-014-002A-SH.2
- 13-0361-014-002A-SH.3
- 13-0361-014-002B-SH.1
- 13-0361-014-002C-SH.1

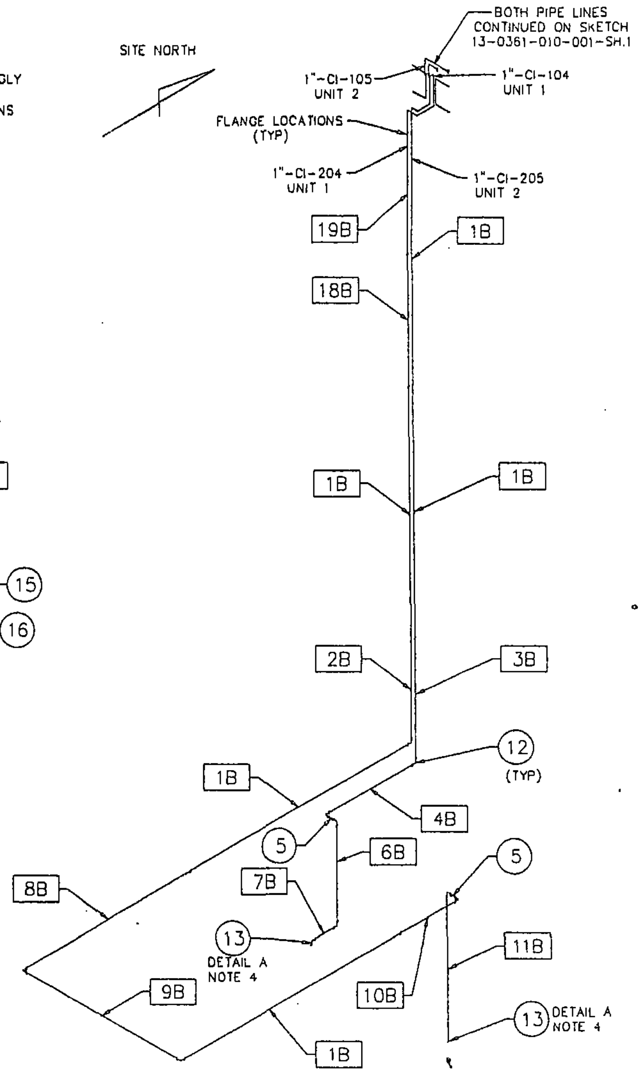
3) FOR SUPPORT DETAILS REFERENCE DRAWINGS:
- 13-0361-014-003 (TYPE 1 ANCHOR)
- 13-0361-014-004 (TYPE 1 RESTRAINT)
- 13-0361-014-005 (TYPE 2 RESTRAINT)
- 13-0361-014-006 (TYPE 5 RESTRAINT)
- 13-0361-014-007 (TYPE 6 RESTRAINT)
- 13-0361-014-008 (TYPE 5 ANCHOR)

4) ATTACH ITEM 13 TO ITEM 11B ON LINE 204 AND ITEM 12 ON LINE 205 AT TERMINATION LOCATION AS PICTURED IN DETAIL A.

5) ALL FLANGED CONNECTIONS TO USE ITEMS 14, 15, AND 16. ITEM 14 FIELD CUT TO LENGTH.



DETAIL A
(TYP)



BILL OF MATERIAL				
ITEM	SIZE	QTY.	DESCRIPTION	CLASS
1B	1"	5 EA	PIPE SPOOL 20'0" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
2B	1"	1 EA	PIPE SPOOL 8'8 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
3B	1"	1 EA	PIPE SPOOL 9'8 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
4B	1"	1 EA	PIPE SPOOL 7'8 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
5	1"	2 EA	4" SPACER SOLID PTFE, 150# FULL FACE FLANGE	
6B	1"	1 EA	PIPE SPOOL 7'7" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
7B	1"	1 EA	PIPE SPOOL 1'3" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
8B	1"	1 EA	PIPE SPOOL 15'4 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
9B	1"	1 EA	PIPE SPOOL 13'11 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
10B	1"	1 EA	PIPE SPOOL 5'1" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
11B	1"	1 EA	PIPE SPOOL 10'8 ½" LENGTH 316L SS, SCH 40S 150# FLG WITH PTFE LINING	
12	1"	10 EA	90°ELBOW 316L SS, 150# FLG. WITH PTFE LINING	
13	1"	2 EA	BLIND FLANGE WITH 1.06" I.D. CENTER HOLE,316L SS, 150#, NO PTFE LINING	
14	½"	52 LF	½"-13 THREADED ROD, ASTM A193 GRADE B8M	
15	½"	560 EA	½"-13 HEX NUT, ASTM A194 8M	
16	½"	280 EA	½" DIA. FLAT WASHER, TYPE 316L SS	
17	1"	2 EA	1" DIA. X ⅛" THICK GORE UNIVERSAL PIPE GASKET, 150# STYLE 800	
18B	1"	1 EA	PIPE SPOOL 10'5" LENGTH 316L SS, SCH 40S 150# FLG WITH PTFE LINING	
19B	1"	1 EA	PIPE SPOOL 9'5" LENGTH 316L SS, SCH 40S 150# FLG WITH PTFE LINING	

This drawing prepared by FENOC under direction and technical review by HDR Engineering. Professional Engineer seal hereby placed under contract with HDR Engineering per chemical system [illegible] dated August 2014

NON-SAFETY RELATED
SEISMICALLY MOUNTED

SKETCH NO.
13-0361-014-001-SH.1, REV 2
CHEMICAL INJECTION UPGRADE
INTAKE STRUCTURE, BAY B ARRANGEMENT
CHLORINE/BROMIDE PIPING BELOW EL. 705'

1 ECP 13-0361 ORIGINAL ISSUE INCORP. D. DUN 13-0361-XXX-XXX

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT 2

CHEMICAL INJECTION INTAKE STRUCTURE PIPING TO 'B' BAY

N.T.S. 6-17-14 JMP D. HOOVER

AA 10080-RP-00010 1

PREPARED ON THE BVPS CADD SYSTEM

DATE*TIME*** **DESIGN**FILE**SPECIFICATION**

NOTES:

1) ALL FLANGED 1" PIPE SPOOLS LABELED ACCORDINGLY

2) FOR ROUTING DIMENSIONS AND SUPPORT LOCATIONS REFERENCE DRAWINGS:
13-0361-015-002A-SH.1
13-0361-015-002A-SH.2
13-0361-015-002B-SH.1
13-0361-015-002C-SH.1

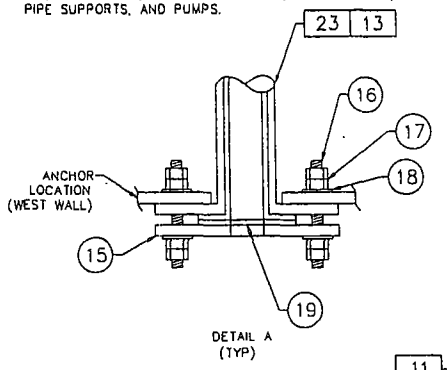
3) FOR SUPPORT DETAILS REFERENCE DRAWINGS:
13-0361-015-003 (TYPE 1 ANCHOR)
13-0361-015-004 (TYPE 1 RESTRAINT)
13-0361-015-005 (TYPE 2 RESTRAINT)
13-0361-015-007 (TYPE 5 RESTRAINT)
13-0361-015-008 (TYPE 6 RESTRAINT)
13-0361-015-009 (TYPE 5 ANCHOR)

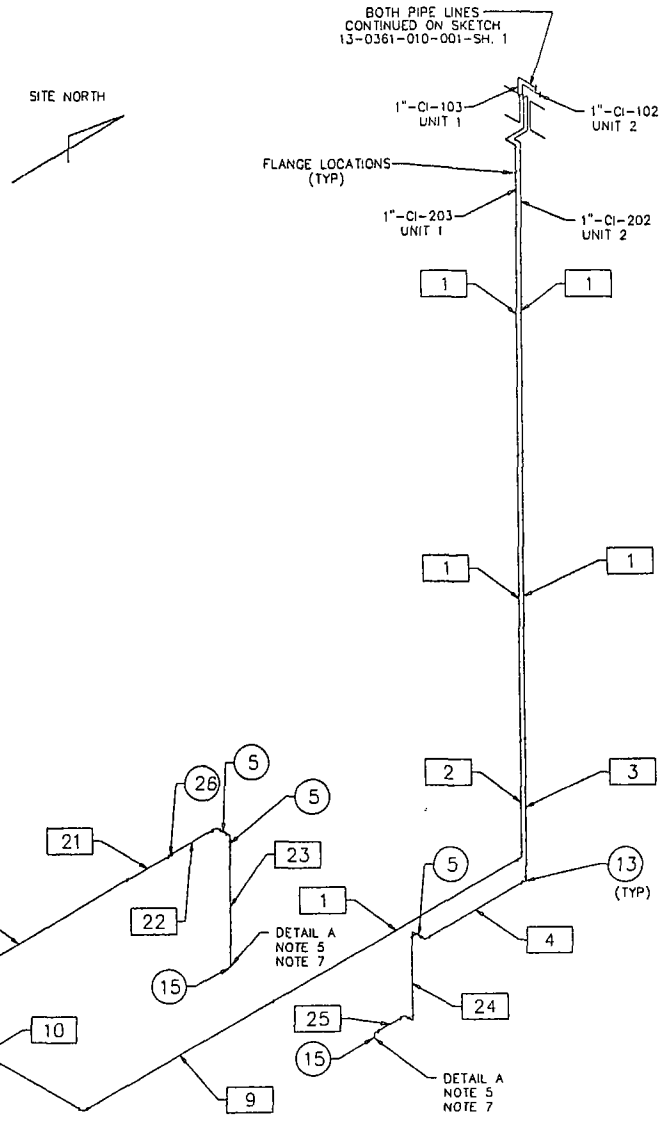
4) [DELETED]

5) ATTACH ITEM 15 TO ITEM 13 ON LINE 202 AND ITEM 23 ON LINE 203 AT TERMINATION LOCATION AS PICTURED IN DETAIL A.

6) ALL FLANGED CONNECTIONS TO USE ITEMS 16, 17, AND 18. ITEM 16 FIELD CUT TO LENGTH.

7) MAINTAIN 2" MINIMUM SEISMIC CLEARANCE IN VERTICAL AND HORIZONTAL DIRECTIONS BETWEEN PIPE, PIPE SUPPORTS, AND PUMPS.





BILL OF MATERIAL

ITEM	SIZE	QTY.	DESCRIPTION	CLASS
1	1"	5	PIPE SPOOL 20'0" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
2	1"	1	PIPE SPOOL 8'8½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
3	1"	1	PIPE SPOOL 9'8 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
4	1"	1	PIPE SPOOL 7'8 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
5	1"	3	4" SPACER SOLID PTFE, 150# FULL FACE FLANGE	
6	--	--	[DELETED]	
7	--	--	[DELETED]	
8	--	--	[DELETED]	
9	1"	1	PIPE SPOOL 15'4 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
10	1"	1	PIPE SPOOL 13'11 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
11	1"	1	PIPE SPOOL 18'1" LENGTH 316L SS, SCH 40S 150# FLG WITH PTFE LINING	
12	--	--	[DELETED]	
13	1"	11	90°ELBOW 316L SS, 150# FLG. WITH PTFE LINING	
14	--	--	[DELETED]	--
15	1"	2	BLIND FLANGE WITH 1.06" I.D. CENTER HOLE, 316L SS, 150#, NO PTFE LINING	
16	½"	52 LF	½"-13 THREADED ROD, ASTM A193 GRADE B8M	
17	½"	560 EA.	½"-13 HEX NUT, ASTM A194 8M	
18	½"	280 EA.	½" DIA., FLAT WASHER, TYPE 316L SS	
19	1"	2 EA.	1" DIA. X ⅛" THICK GORE UNIVERSAL PIPE GASKET, 150# STYLE 800	
20	--	--	[DELETED]	--
21	1"	1	PIPE SPOOL 3'5" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
22	1"	1	PIPE SPOOL 3'4" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
23	1"	1	PIPE SPOOL 8'5" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
24	1"	1	PIPE SPOOL 5'7" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
25	1"	1	PIPE SPOOL 1'8½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
26	1"	1	3" SPACER SOLID PTFE, 150# FULL FACE FLANGE	

NON-SAFETY RELATED SEISMICALLY MOUNTED

SKETCH NO.
13-0361-015-001--SH.1, REV 4
CHEMICAL INJECTION UPGRADE
INTAKE STRUCTURE, BAY C ARRANGEMENT
CHLORINE/BROMINE PIPING BELOW EL. 705'

DECP 13-0361 ORIGINAL ISSUE INCORP'D. DUN 13-0361-XXX-XXX

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT 2

CHEMICAL INJECTION INTAKE STRUCTURE PIPING TO 'C' BAY

N.T.S. | 6-17-14 | J.M.P. | D. HOOVER | AA | 10080-RP-0001R | 1

PREPARED ON THE BMS CADDS SYSTEM

DATE ***TIME*** ***DESIGN*** ***FILE*** ***SPECIFICATION***

No. 10080-RP-0001S

NOTES:

1) ALL FLANGED 1" PIPE SPOOLS LABELED ACCORDINGLY

2) FOR ROUTING DIMENSIONS AND SUPPORT LOCATIONS REFERENCE DRAWINGS:
- 13-0361-016-001-SH.2
- 13-0361-016-002A-SH.1
- 13-0361-016-0028-SH.1
- 13-0361-016-003-SH.1

3) FOR SEISMIC SUPPORT DETAILS REFERENCE DRAWINGS:
- 13-0361-016-004 (TYPE 2 RESTRAINT)
- 13-0361-016-005 (TYPE 3 RESTRAINT)
- 13-0361-016-011 (TYPE 4 RESTRAINT)
- 13-0361-016-006 (TYPE 1 ANCHOR)
- 13-0361-016-007 (TYPE 2 ANCHOR)
- 13-0361-016-008 (TYPE 3 ANCHOR)
- 13-0361-016-009 (TYPE 4 ANCHOR)

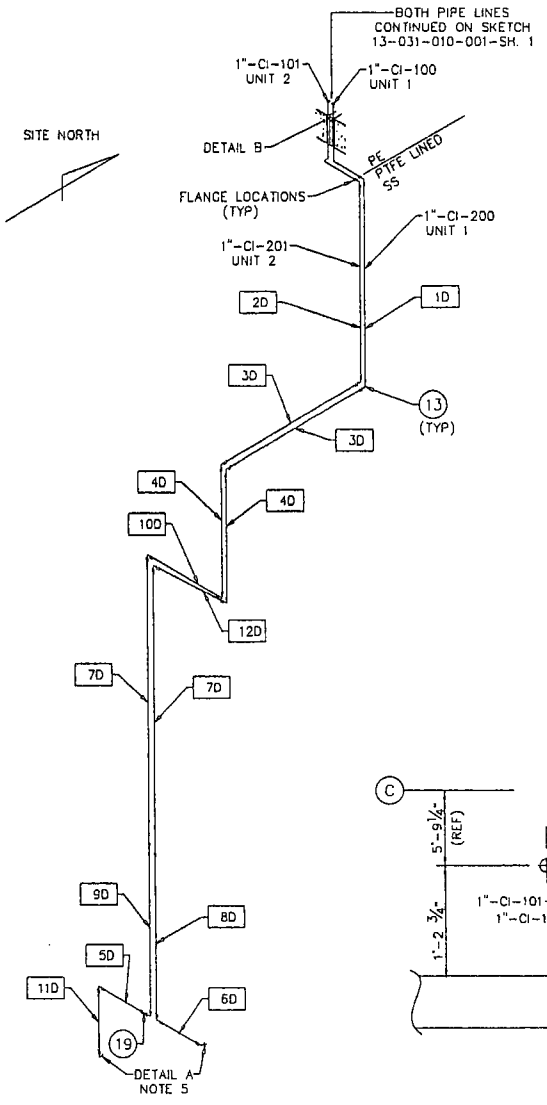
FOR NON-SEISMIC SUPPORT DETAILS REFERENCE DRAWINGS:
- 13-0361-016-012-SH.1 (UNISTRUT CHANNEL)
- 13-0361-016-012-SH.2 (TYPE 6 RESTRAINT)
- 13-0361-016-012-SH.3 (TYPE 5 ANCHOR)
- 13-0361-016-012-SH.4 (TYPE 1 TUBE RESTRAINT)
- 13-0361-016-012-SH.5 (TYPE 2 TUBE RESTRAINT)

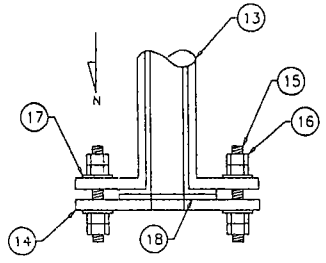
4) ADDITIONAL REFERENCE DRAWINGS:
- 13-0361-016-010 (PE ANCHOR RESTRAINT FITTING)

5) BOTH LINES TO TERMINATE AT THEIR RESPECTIVE ELEVATIONS BY ATTACHING ITEM 14 TO ITEM 13 AS PICTURED IN DETAIL A.

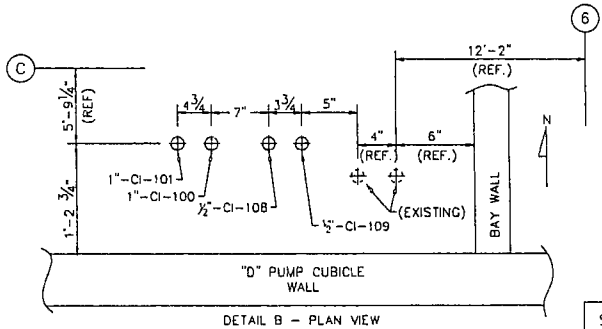
6) ALL FLANGED CONNECTIONS TO USE ITEMS 15, 16, AND 17. ITEM 15 FIELD CUT TO LENGTH.

7) NUCLEAR SAFETY-RELATED: DRILL (4) 2" DIA HOLES FOR 1"-CI-100, 1"-CI-101, ½"-CI-108, AND ½"-CI-109 LINES. FINAL POSITION DETERMINED BY EMBEDDED REBAR. AS-BUILT DIMENSIONS SHOWN, TOLERANCES ±1".





DETAIL A
(TYP 2 PLCS)



DETAIL B – PLAN VIEW
(FLOOR EL. 705'-0" REF.)
NOTE 7
NUCLEAR SAFETY RELATED

NON-SAFETY RELATED
SEISMICALLY MOUNTED

BILL OF MATERIAL

ITEM	SIZE	QTY.	DESCRIPTION	CLASS
1D	1"	1	PIPE SPOOL 13'11½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
2D	1"	1	PIPE SPOOL 13'5" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
3D	1"	2	PIPE SPOOL 10'11" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
4D	1"	2	PIPE SPOOL 8'10" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
5D	1"	1	PIPE SPOOL 3'4" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
6D	1"	1	PIPE SPOOL 2'10" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
7D	1"	2	PIPE SPOOL 20'0" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
8D	1"	1	PIPE SPOOL 11'5 ½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
9D	1"	1	PIPE SPOOL 12'0" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
10D	1"	1	PIPE SPOOL 5'7" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
11D	1"	1	PIPE SPOOL 4'5" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
12D	1"	1	PIPE SPOOL 5'½" LENGTH 316L SS, SCH 40S, 150# FLG WITH PTFE LINING	
13	1"	15	90°ELBOW 316L SS, 150# FLG WITH PTFE LINING	
14	1"	2	BLIND FLANGE WITH 1.06" I.D. CENTER HOLE, NO PTFE LINING	
15	½"	50 LF	½"-13 THREADED ROD, ASTM A193 GRADE B8M	
16	½"	512	½"-13 HEX NUT, ASTM A194 8M	
17	½"	256	½" DIA., FLAT WASHER, TYPE 316 SS	
18	1"	2	1" DIA, GORE UNIVERSAL PIPE GASKET, 150# STYLE 800	
19	1"	1	4" SPACER SOLID PTFE, 150# FULL FACED FLANGE	

SKETCH NO.
13-0361-016-001-SH.1, REV 3
CHEMICAL INJECTION UPGRADE
INTAKE STRUCTURE, BAY D ARRANGEMENT
CHLORINE/BROMINE PIPING BELOW EL. 705'

ISSUED
3 ECP 13-0361
ORIGINAL ISSUE
INCORP'D. DUN
13-0361-XXX-
XXY

FENOC FirstEnergy Nuclear Operating Company

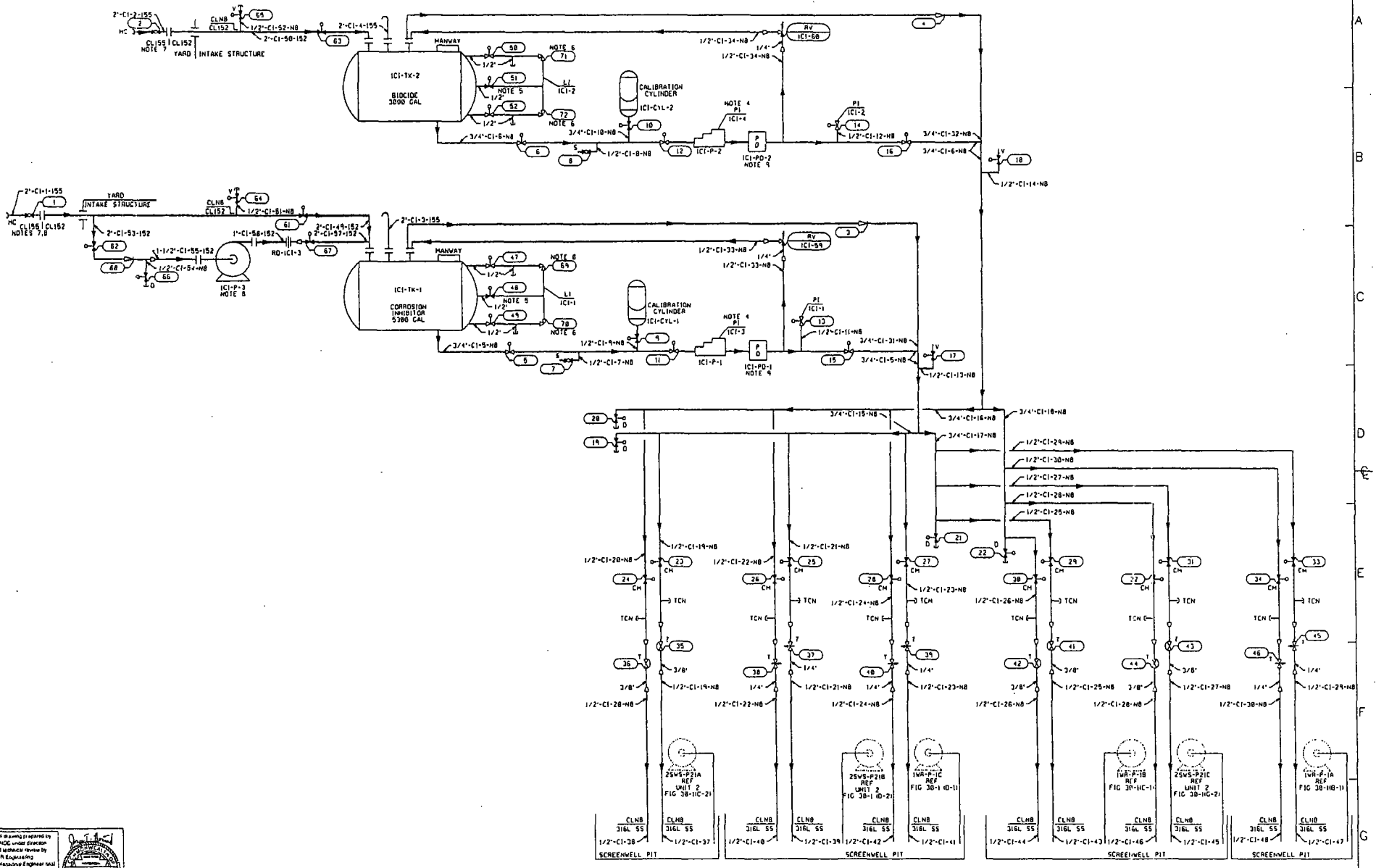
N.T.S.	DES. 6-17-14		
	DRWN. JMP		
	CHK'D.		
	ENGR'G D. HOOVER		

BEAVER VALLEY POWER STATION UNIT 2
CHEMICAL INJECTION INTAKE STRUCTURE PIPING TO 'D' BAY
SIZE D | FSCM NO. AA | DWG NO. 10080-RP-0001S | REV. 1

PREPARED ON THE BMPS | CHECK SYSTEM

DATE **TIME** **DESIGN\FILE\SPECIFICATION**

No. 8700-RM-0430-006



ALL MANUAL VALVE EQUIPMENT IDENTIFICATION NUMBERS ON THIS DIAGRAM ARE PRECEDED BY THE SYSTEM DESIGNATOR 1CI UNLESS OTHERWISE INDICATED.

OP MANUAL FIG NO 30-6

REVISION 5 INCORPORATED DUN 13-8361-009-015 SATISFIED ECP 09-0197

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT NO 1

PIPING & INSTRUMENTATION DIAGRAM AW/SWS CHEMICAL INJECTION SYSTEM

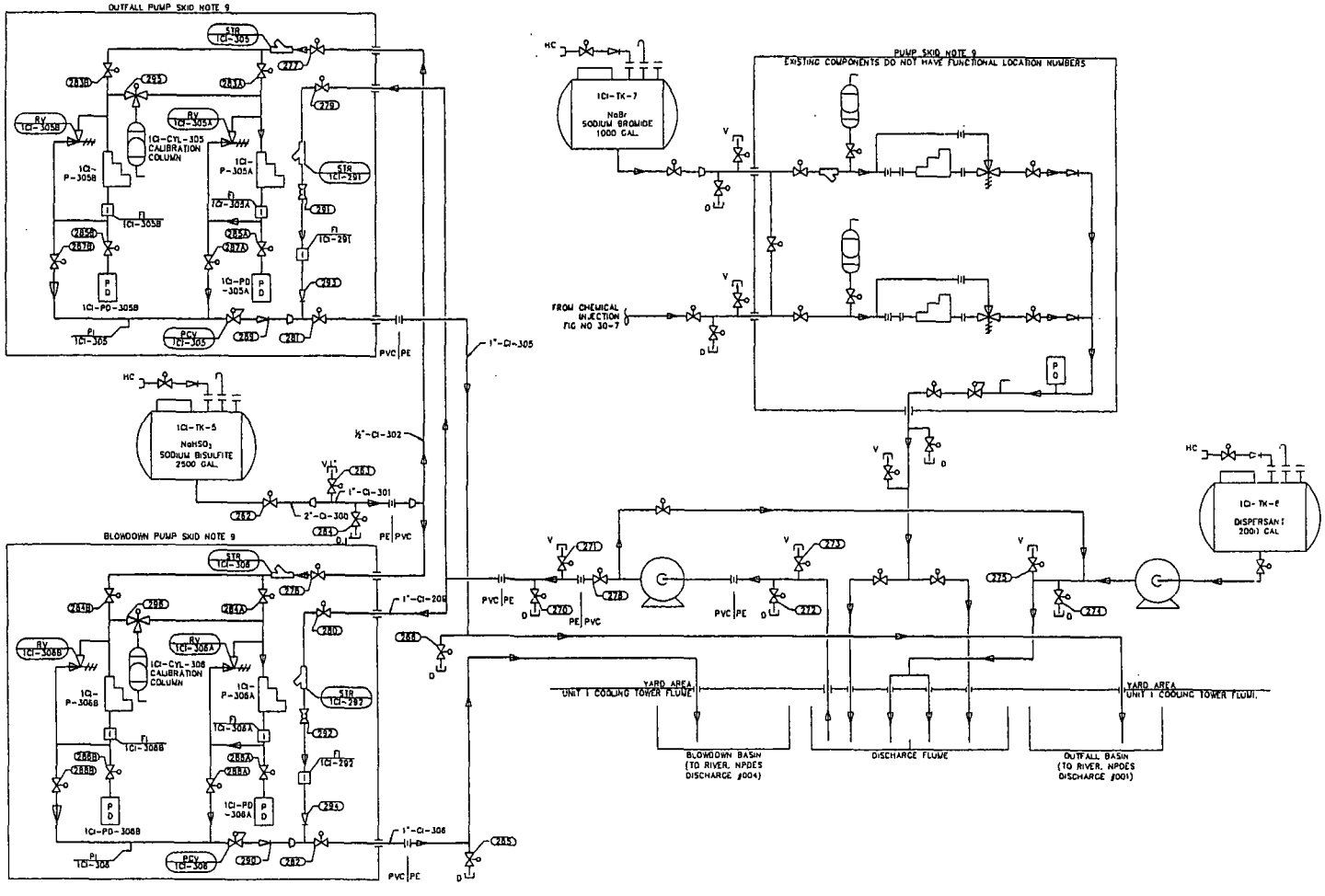
DRAWN	DATE	CHECKED	DATE
NONE	5/15/14	D. HOOVER	

AA | DWG NO 8700-RM-0430-006 | REV 5

PREPARED ON THE DEPS CADD SYSTEM

$$DATE,$$ $$TIME$$ $$DESIGN$$ FILE $$SPECIFICATION$$

No. 8700-RM-0431-004



UNIT 1 CIRC. WATER NOTES:
8700-RM-0431-00N

ALL MANUAL VALVE EQUIPMENT IDENTIFICATION NUMBERS ON THIS DIAGRAM ARE PRECEDED BY THE SYSTEM DESIGNATOR "1CI" UNLESS OTHERWISE INDICATED.

OP MANUAL FIG. NO. 31-4

SCALE: NONE	DATE: 7-3-14				
	DRAWN BY: JMP				
	CHECKED BY: D. HOOVER				

FENOC FirstEnergy Nuclear Operating Company

BEAVER VALLEY POWER STATION UNIT NO 1

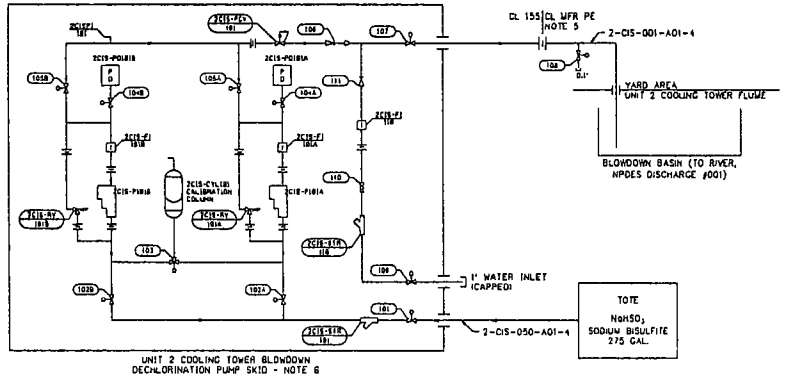
PIPING & INSTRUMENTATION DIAGRAM
RW/SWS CHEMICAL INJECTION SYSTEM

DWG NO 8700-RM-0431-004 | REV AA | REV 0

PREPARED ON THE UNIX CADDY SYSTEM

DATE ***TIME*** *DESIGN* *FILE* *SPECIFICATION*

No. 10080-RM-0431-006



UNIT 2 CIRC WATER NOTES.
10080-RM-431-005

ALL MANUAL VALVE EQUIPMENT IDENTIFICATION NUMBERS ON THIS DIAGRAM ARE PRECEDED BY THE SYSTEM DESIGNATOR "2CIS" UNLESS OTHERWISE INDICATED

OP MANUAL FIG NO 31-6

FENOC FirstEnergy Nuclear Operating Company

BEAVER VALLEY POWER STATION UNIT NO 2

VALVE OPER NO DIAGRAM
SWS CHEMICAL INJECTION SYSTEM

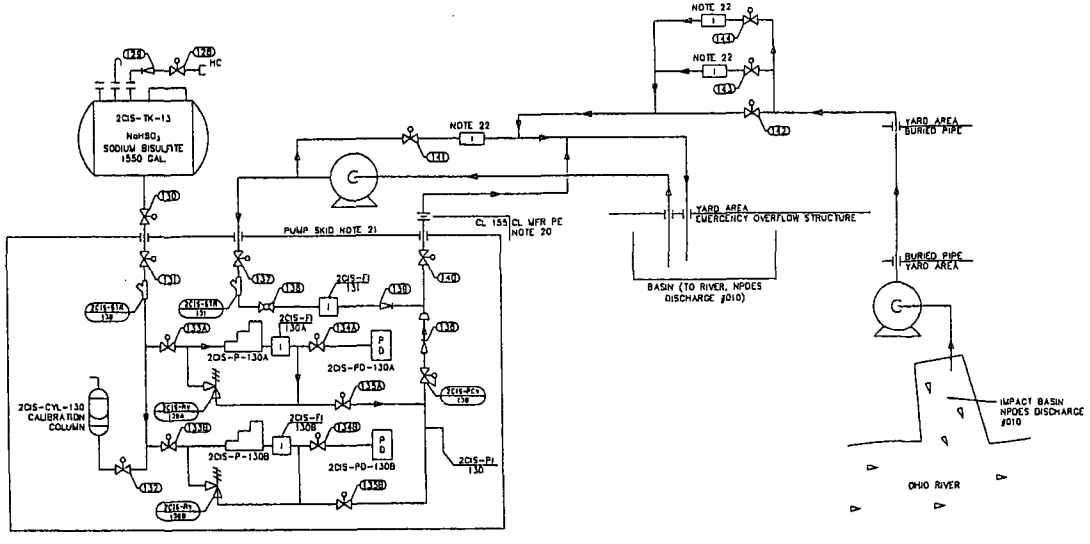
AA | 10080-RM-0431-006 | 0

DATE: 7-3-14 | DRAWN BY: JMP | CHECKED BY: D. HOOVER | NONE

PREPARED ON THE BVPS CADD SYSTEM

DATE ***TIME*** **DESIGN**FILE**SPECIFICATION**

No. 10080-RM-0430-006



UNIT 2 SERVICE WATER NOTES:
10080-RM-430-005

ALL MANUAL VALVE EQUIPMENT IDENTIFICATION NUMBERS ON THIS DIAGRAM ARE PRECEDED BY THE SYSTEM DESIGNATOR "2CIS" UNLESS OTHERWISE INDICATED.

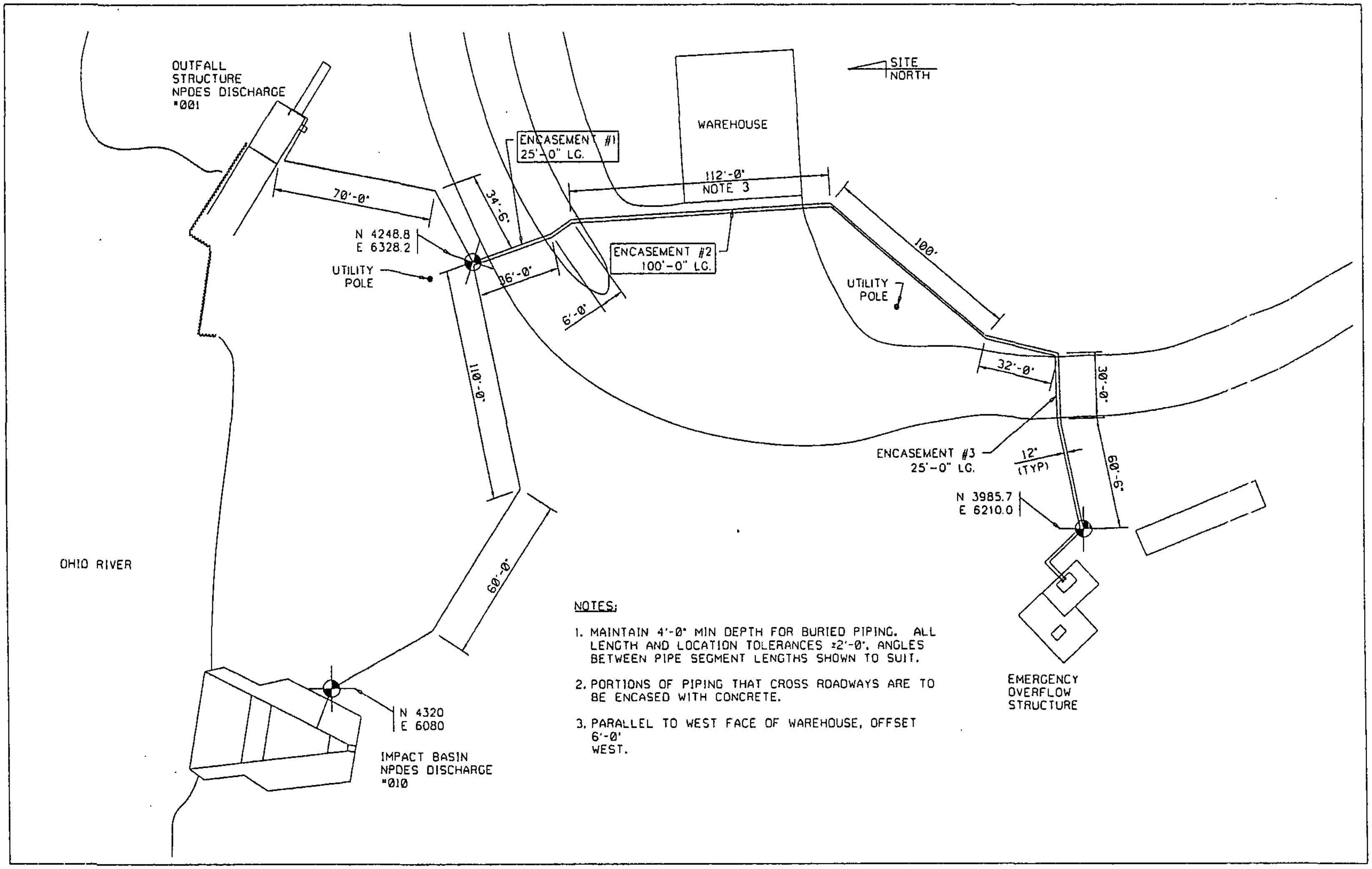
OP MANUAL FIG NO 30-6

FENOC FirstEnergy Nuclear Operating Company	BEAVER VALLEY POWER STATION UNIT NO 2	
	VALVE OPER NO DIAGRAM SWS CHEMICAL INJECTION SYSTEM	
	AA 10080-RM-0430-006	0

PREPARED ON THE BIPS — CHECKED SYSTEM

##DATE### ##TIME### ##DESIGN## FILE## SPECIFICATION##

No. 10080-RP-0001T



NOTES:

1. MAINTAIN 4'-0" MIN DEPTH FOR BURIED PIPING. ALL LENGTH AND LOCATION TOLERANCES ±2'-0". ANGLES BETWEEN PIPE SEGMENT LENGTHS SHOWN TO SUIT.
2. PORTIONS OF PIPING THAT CROSS ROADWAYS ARE TO BE ENCASED WITH CONCRETE.
3. PARALLEL TO WEST FACE OF WAREHOUSE, OFFSET 6'-0" WEST.

This drawing prepared by FENOC under direction and technical review by HDR Engineering. Professional Engineer and hereby affixed under contract with HDR Engineering per chemical system modifications dated August 2014

FENOC FirstEnergy Nuclear Operating Company

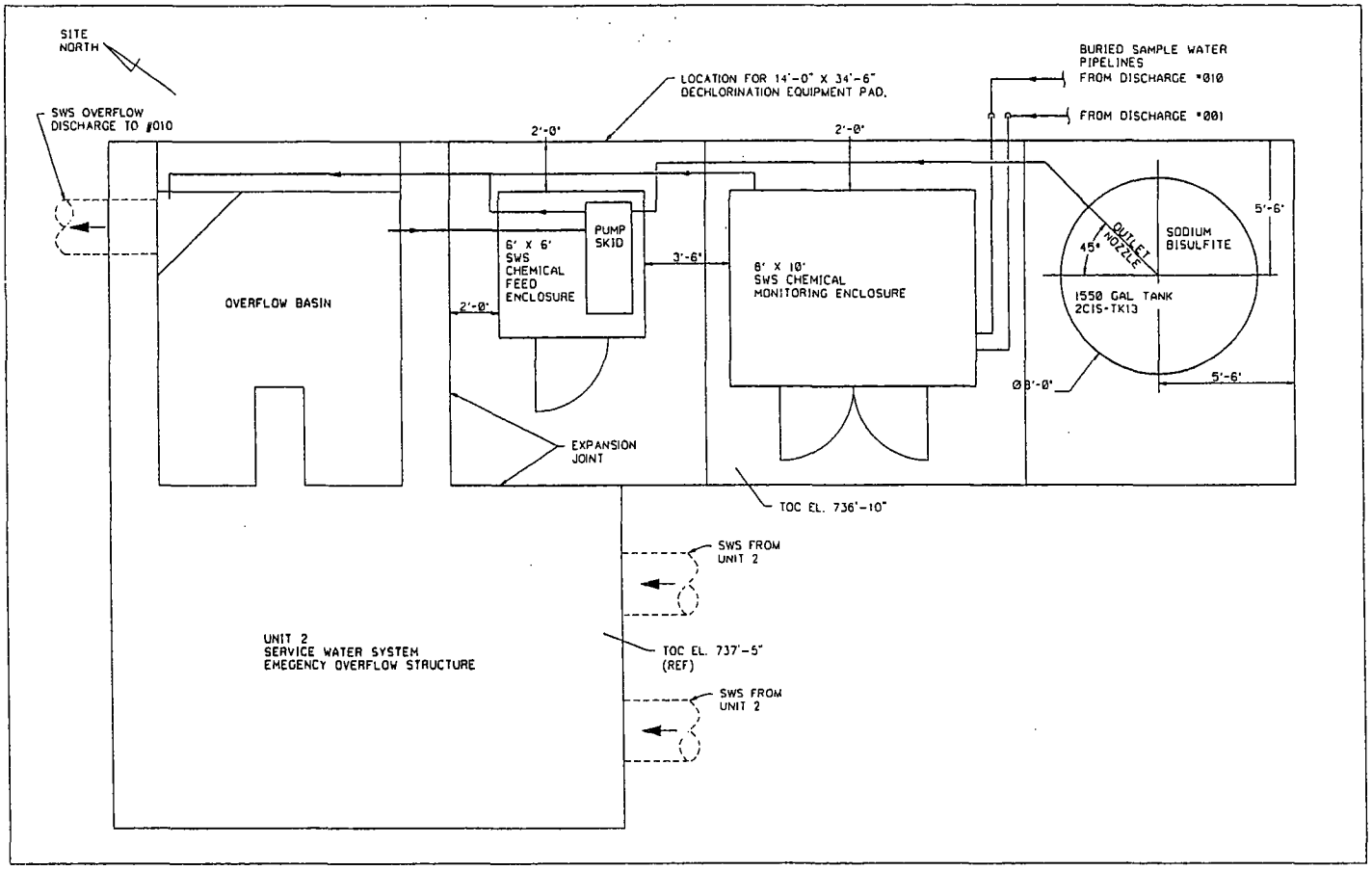
BEAVER VALLEY POWER STATION UNIT 2

UNIT 2 CHEMICAL INJECTION DISCHARGE ANALYZER SAMPLE PLAN VIEW

N.T.S. 8-11-14 JMP LRH D. HOOVER

AA 10080-RP-0001T 1

No. 10080-RP-0001U



FENOC FirstEnergy Nuclear Operating Company

BEAVER VALLEY POWER STATION UNIT 2

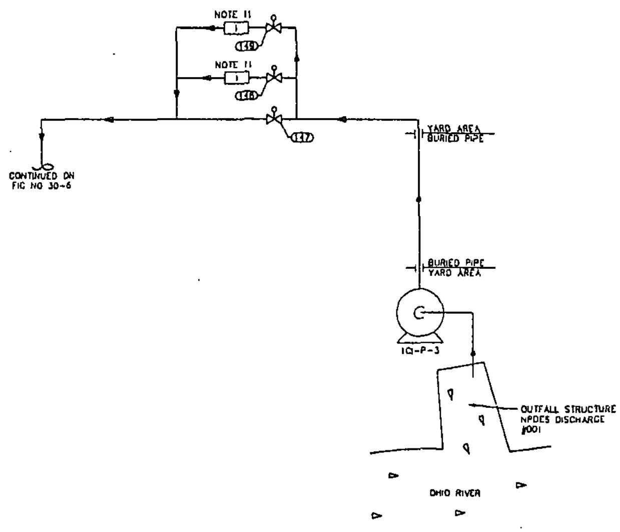
UNIT 2 CHEMICAL INJECTION SERVICE WATER EMERGENCY OVERFLOW PLAN VIEW

DATE	8-11-14
DRAWN BY	JHP
CHECKED BY	LAH
APPROVED BY	D. HOOVER
N.T.S	
SIZE	AA
DRAWING NO	10080-RP-0001U
REV	1

PREPARED ON THE WPS — CHECK SYSTEM

\\DATE\\TIME\\ \\DESIGN\\FILE\\SPECIFICATION\\

No. 8700-RM-0431-005



UNIT 2 SERVICE WATER NOTES:
10080-RM-431-00N

ALL MANUAL VALVE EQUIPMENT IDENTIFICATION NUMBERS ON THIS DIAGRAM ARE PRECEDED BY THE SYSTEM DESIGNATOR "1CI" UNLESS OTHERWISE INDICATED

OP MANUAL FIG NO 31-5

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

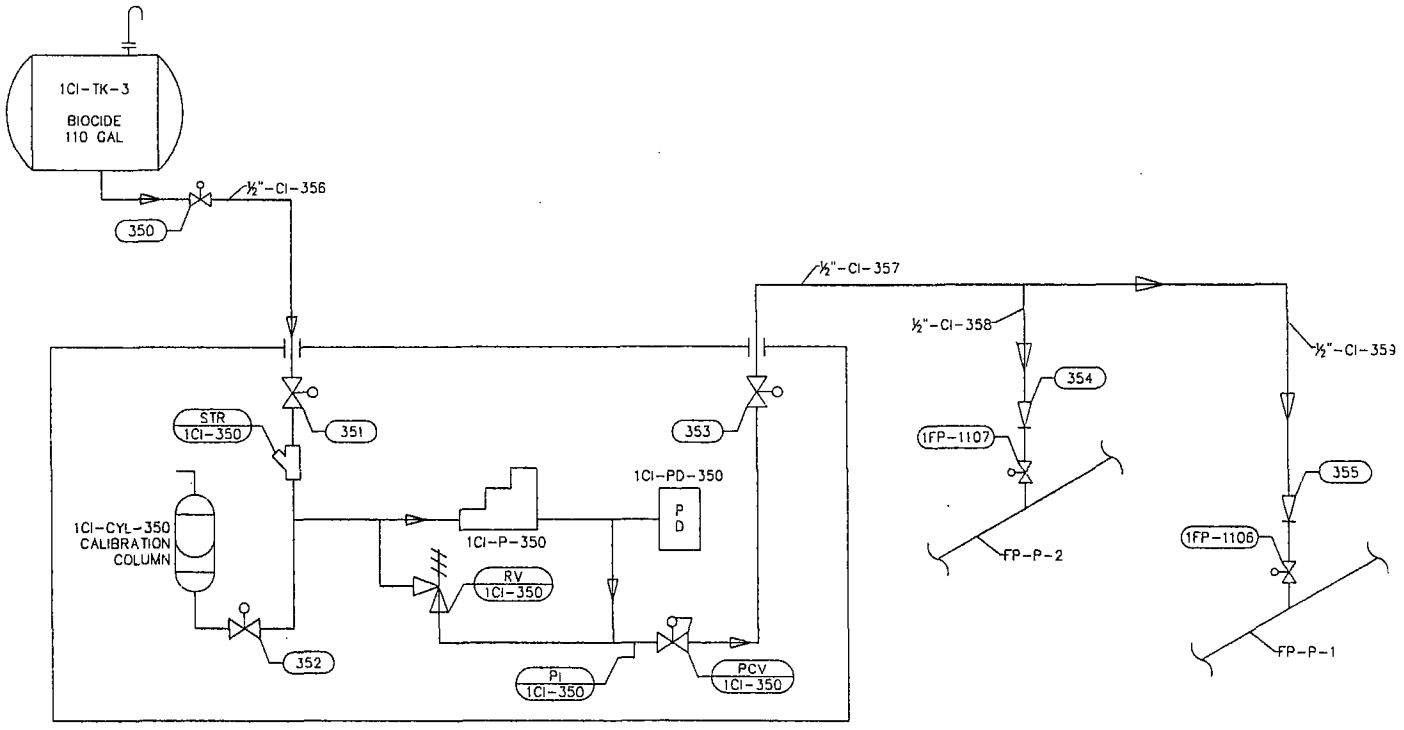
BEAVER VALLEY POWER STATION UNIT NO 1

VALVE OPER NO DIAGRAM
CWS CHEMICAL INJECTION SYSTEM

SCALE	NONE
DATE	7-3-14
DRAWN BY	JMP
	D. HOOVER

AA 8700- RM-0431-005 0

No. 8700-RM-0433-010



UNIT 1 FIRE PROTECTION NOTES:
8700-RM-433-00N

ALL COMPONENTS ON THIS DRAWING ARE PRECEDED BY THE SYSTEM DESIGNATOR "1CI" UNLESS OTHERWISE INDICATED.

OP MANUAL FIG NO 33-10

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT NO 1

VALVE OPER NO DIAGRAM
FIRE PROTECTION - CHEM INJ SYSTEM

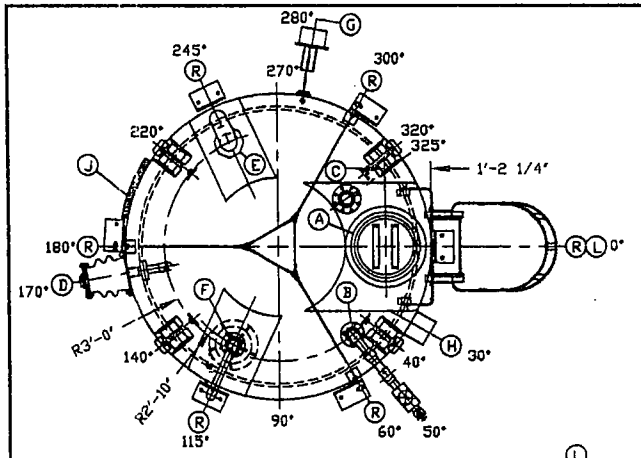
AA 8700- RM-0433-010 0

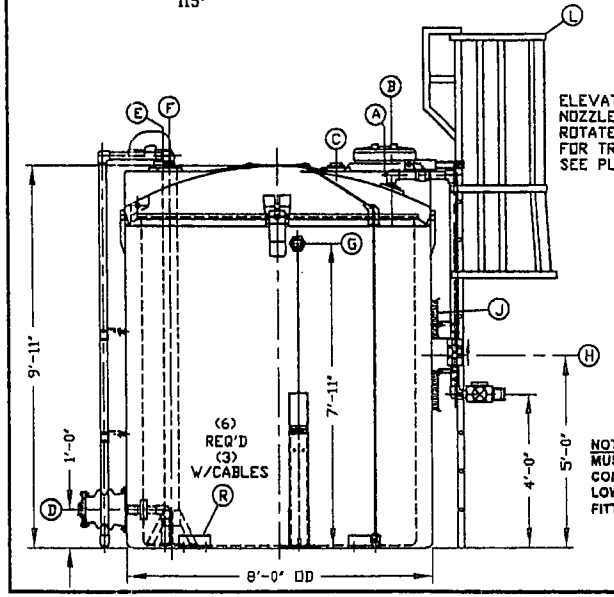
D. HOOVER

PREPARED ON THE DMS CADD SYSTEM

GATETIME** **DESIGN**FILE**SPECIFICATION**

No. 03.047-0034





ELEVATIONS ONLY--
NOZZLES & ACCESSORIES
ROTATED INTO VIEW--
FOR TRUE ORIENTATION
SEE PLAN VIEW

NOTE:
MUST USE FLEXIBLE
CONNECTIONS ALL
LOWER SIDEWALL
FITTINGS

CALCULATED CAPACITIES/ VOLUME IN U.S. GALLONS			
TANK	DESIGN CAP	DOME VOL	TOTAL VOL
INNER	2517	246	2763
OUTER	3125	N/A	3125

A

NOZZLE SCHEDULE & ACCESSORIES

					INNER TANK		OUTER TANK	
SERVICE	MK	STOCK NO	SIZE	FITTING	DEG	ELEV	DEG	ELEV
CAP	A	4558/6767	17"	CAP 17" BUTTRESS THREAD BLK PE W/GSKT/PE	0°	DOME	--	--
FILL	B	3163	2"	DROP PIPE 2" EXT PVC	50°	DOME	--	--
		2818		UBD FTG 2" FLG STYLE PVC/SS/LV				
		3198/2759		(2) SUPPORT VERT EXT PIPE SS W/GSKT/LV				
		3190/3191		QUICK ADPT 2" MNPT BLK PP W/QUICK CAP BLK PP				
		9080		VALVE 2" BALL SPEARS TRUE/UN PVC W/VITON				
		4566		VALVE 2" CHECK SPEARS TRUE/UN PVC W/VITON				
LEVEL	C	2838	3"	UBD FTG 3" FLG STYLE PVC/SS/LV	325°	DOME	--	--
DRAIN	D	9744	2"	B.O.S.S. FITTING 2" ASMLY PE/PVC/SS/LV	170°	1'-0"	--	--
		3127		SIPHON LEG 2" FN BHF PVC				
		9755	2"	TRNS FTG 2" BELLOW STYLE II PVC/LV/SS W/EXP JNT PTFE	--	--	170°	1'-0"
VENT	E	3275/2705	4"	U-VENT 4" PVC W/GSKT/LV	245°	DOME	--	--
		9071		SCREEN F/4" VENT PE MESH				
LEVEL GAUGE	F	3356	--	LEVEL GAGE LRG FLT TYPE PVC	115°	DOME	--	--
		2818	2"	UBD FTG 2" FLG STYLE PVC/SS/LV				
		3198/2759		(2) SUPPORT VERT EXT PIPE SS W/GSKT/LV				
		GAL TAPE		REVERSE GALLONAGE TAPE				
		10346		PIPE SUPPORT 4" INTERNAL PVC/PE				
LEAK DETECTION	G	7469		LEAK DETECTION PKG OPTIC SWITCH PP	--	--	280°	7'-11"
		7117	2"	BHF ASMLY 2" SXT H'WARD PVC/EPDM				
		7456	1/2"	BUSH 2" X 1/2" TXT PVC 80				
		7589		STAND F/LEAK DETECT BOX MACROPOXY BLUE				
HEATER	H	6784	--	HEATER SYSTEM NON-HAZ (2)SP420-16	--	--	30°	5'-0"
INSULATION	J	6974	--	INSULATION POLYFOAM 300 2" THK W/MASTIC COATING	ALL	DOME	ALL	SDWL
LADDER	L	5747	10'	LADDER 10' W/RTN & CAGE FRP W/3 FT 6 IN WALK THRU	0°	SDWL	--	--
		7684		LADDER ATTCH BRKT F/LUGS MACROPOXY BLUE				
RESTRAINT	R	RGS02500LO	--	REST GALV 2500 SAFE STD OUTDOOR LA	60°	DOME	0°	SDWL
					120°		60°	
					300°		120°	
							180°	
							240°	
							300°	

NOTES:
1. THIS IS A COMPUTER GENERATED DWG. DO NOT REVISE BY HAND.
2. DIMENSIONS WILL VARY ±3% DUE TO VARIATIONS IN MULTIPLE MOLDS & CONDITIONS PREVALENT DURING MANUFACTURE & USAGE.
3. TANKS DESIGNED FOR 1.9 SpG MAT'L @ 100°F/ATMOS PRESSURE

REV "A" MARK C RELOCATED BY:JB 12/5/13 CK:JBI

DWG TITLE
(2) 2500 GALLON SAFE-TANK ASSEMBLY

1.9 SpG/XLPE/NATURAL
TK-5 SERVICE: SODIUM BISULFITE | TK-6 SERVICE: SODIUM BROMIDE
INNER STOCK NO. 42002500410
OUTER STOCK NO. 42103100410

SCALE: 3/8"=1'-0" | DR: J. BRANTLEY
DATE: 11/6/13 | CK: J. BENNETT

POLYPROCESSING SOLUTIONS, SIMPLIFIED.

Central Region

NALCO PO #4502482360
FOR: FIRST ENERGY CORP/
BEAVER VALLEY NUCLEAR

SHEET: 1 OF 1 | COMPUTER FILE: NLC2360B | REV: A

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL PROVIDED FOR WQM PERMIT.
TANK CERTIFICATION DOCUMENTS FOR THIS TANK FILED SEPARATELY.

REVISIONS

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14		
DRAWN BY	L.R.HAMIL		
DESIGN	JMP		
EMPLOYEE	DMH		

FINAL APP. FOR ISSUE INIT: D.P.PRUCE 7-3-14

BEAVER VALLEY POWER STATION UNIT NO. 1

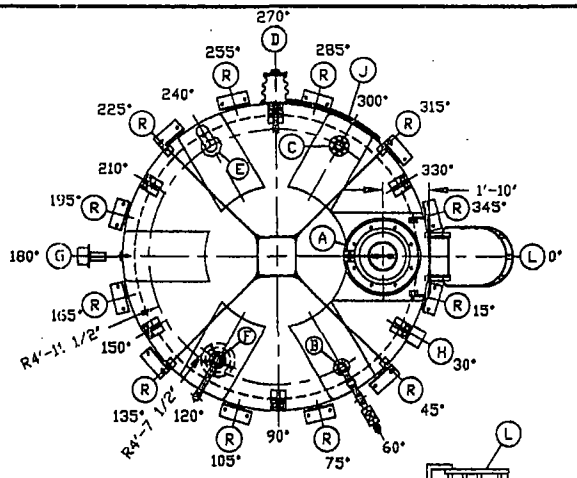
VENDOR DRAWING NO.: NLC2360B
REV.: A | REV DATE: 12-5-13
VENDOR COMPANY NAME: POLY PROCESSING

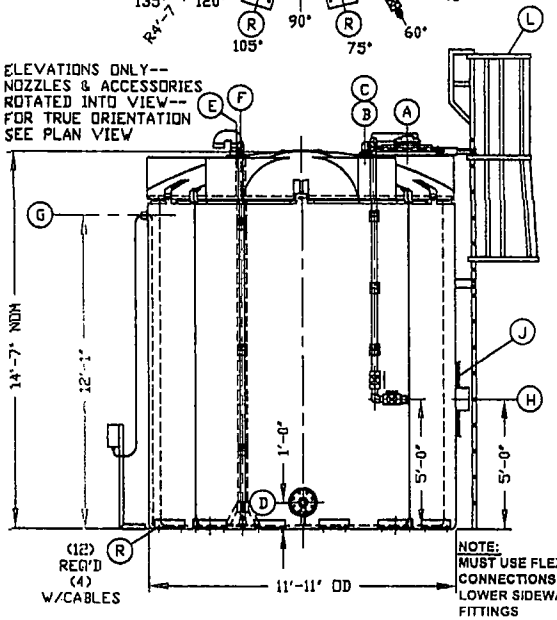
DRAWING TITLE: CHEMICAL INJECTION WR/SWS 2500 GALLON STORAGE TANK ASSEMBLY DRAWING

A | FENOC DRAWING NO.: 03.047-0034 | REV.: A

PREPARED ON THE BVPS CADDI SYSTEM

No. 03.047-0035





NOTES:
1. THIS IS A COMPUTER GENERATED DWG. DO NOT REVISE BY HAND.
2. DIMENSIONS WILL VARY ±3% DUE TO VARIATIONS IN MULTIPLE MOLDS & CONDITIONS PREVALENT DURING MANUFACTURE & USAGE.
3. OVERALL HEIGHT DIMENSION WILL VARY WITH THE PENETRATION OF THE INSIDE TANK INTO THE OUTSIDE TANK.
4. TANKS DESIGNED FOR 1.9 SpG MAT'L @ 100°F/ATMOS PRESSURE

NOZZLE SCHEDULE & ACCESSORIES

	SERVICE	MK	STOCK NO	SIZE	FITTING	INNER TANK DEG	INNER TANK ELEV	OUTER TANK DEG	OUTER TANK ELEV
	MANWAY	A	8340/3228	24"	CVR ASMLY 24" SAFE-SURGE W/GSKT/PE	0°	DOME	--	--
	FILL	B	3163	2"	DROP PIPE 2" EXT PVC	60°	DOME	--	--
			2828		UBD FTG 2" FLG STYLE PVC/TITAN/LV				
			3204/2759		(3) SUPPORT VERT EXT PIPE TITANIUM W/GSKT/LV				
			3190/3191		QUICK ADPT 2" MNPT BLK PP W/QUICK CAP BLK PP				
			9080		VALVE 2" BALL SPEARS TRUE/UN PVC W/VITON				
			4566		VALVE 2" CHECK SPEARS TRUE/UN PVC W/VITON				
A	LEVEL	C	2848	3"	UBD FTG 3" FLG STYLE PVC/TITAN/LV	300°	DOME	--	--
	DRAIN	D	9743	2"	B.O.S.S. FITTING 2" ASMLY PE/PVC/TITAN/LV	270°	1'-0"	--	--
			3127		SIPHON LEG 2" FN BHF PVC				
			9756		TRNS FTG 2" BELLOW STYLE II PVC/LV/TITAN W/EXP JNT PTFE	--	--	270°	1'-0"
	VENT	E	3275/9071	4"	U-VENT 4" PVC W/SCREEN PE MESH	240°	DOME	--	--
			2705		GSKT 4" BHF H'WARD 1/4" LV				
	LEVEL GAUGE	F	3356	--	LEVEL GAGE LRG FLT TYPE PVC	120°	DOME	--	--
			2828	2"	UBD FTG 2" FLG STYLE PVC/TITAN/LV				
			3204/2759		(3) SUPPORT VERT EXT PIPE TITANIUM W/GSKT/LV				
			GAL TAPE		REVERSE GALLONAGE TAPE				
			10346		PIPE SUPPORT 4" INTERNAL PVC/PE				
A	LEAK DETECTION	G	7469		LEAK DETECTION PKG OPTIC SWITCH PP	--	--	180°	12'-1"
			7117	2"	BHF ASMLY 2" SXT H'WARD PVC/EPOM				
			7456		BUSH 2" X 1/2" TXT PVC 80				
			7589		STAND F/LEAK DETECT BOX MACROPOXY BLUE				
	HEATER	H	6791	--	HEATER SYSTEM NON-HAZ (5)SP420-16	--	--	30°	5'-0"
	INSULATION	J	7000	--	INSULATION POLYFOAM 650 2" THK W/MASTIC COATING	ALL	DOME	ALL	SDWL
	LADDER	L	5752	15'	LADDER 15' W/RTN & CAGE W/BRKT W/3 FT 6 IN WALK THRU FRP	0°	DOME	--	--
			7684		LADDER ATTCH BRKT F/LUGS MACROPOXY BLUE				
	RESTRAINT	R	RGS08700LO	--	REST GALV 8700 SAFE STD OUTDOOR LA	45°	DOME	15°	SDWL
						135°		45°	
						225°		75°	
						315°		105°	
								135°	
								165°	
								195°	
								225°	
								255°	
								285°	
								315°	
								345°	

CALCULATED CAPACITIES/ VOLUME IN U.S. GALLONS

TANK	DESIGN CAP	DOME VOL	TOTAL VOL
INNER	8727	675	9402
OUTER	10174	N/A	10174

REV 'A' MARK C, D, & G RELOCATED BY:JB 12/5/13 CK:JB1

DWG TITLE: 8700 GALLON SAFE-TANK ASSEMBLY

TK-4
SERVICE:
SODIUM HYPOCHLORITE

INNER: 1.9 SpG/XLPE/WHT W/OR1000
STOCK NO. 42008700448
OUTER: 1.9 SpG/XLPE/WHT
STOCK NO. 42110150418

SCALE: 1/4"=1'-0"
DATE: 11/6/13

PolyProcessing
Central Region

DR: J. BRANTLEY
CK: J. BENNETT

NALCO PO #4502482360
FOR: FIRST ENERGY CORP/
BEAVER VALLEY NUCLEAR

SHEET: 1 OF 1
COMPUTER FILE: NLC2360C
REV: A

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL PROVIDED FOR WQM PERMIT.
TANK CERTIFICATION DOCUMENTS FOR THIS TANK FILED SEPARATELY.

REVISIONS

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	FINAL APP. FOR ISSUE SUP.:	D.P.PRICE 7-3-14
DRAWN BY	L.R.HAMIL		
CHECKED	JMP		
APPROVED	DMH		

BEAVER VALLEY POWER STATION UNIT NO. 1

VENDOR DRAWING NO.: NLC2360C
REV.: A
REV. DATE: 12-5-13
VENDOR COMPANY NAME: POLY PROCESSING

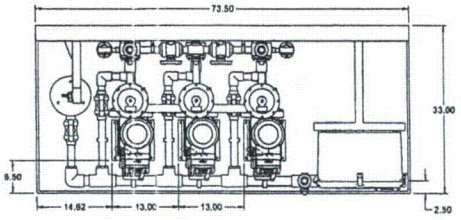
DRAWING TITLE: CHEMICAL INJECTION WR/SWS 8700 GALLON STORAGE TANK ASSEMBLY DRAWING

A
FENOC DRAWING NO.: 03.047-0035
REV.: A

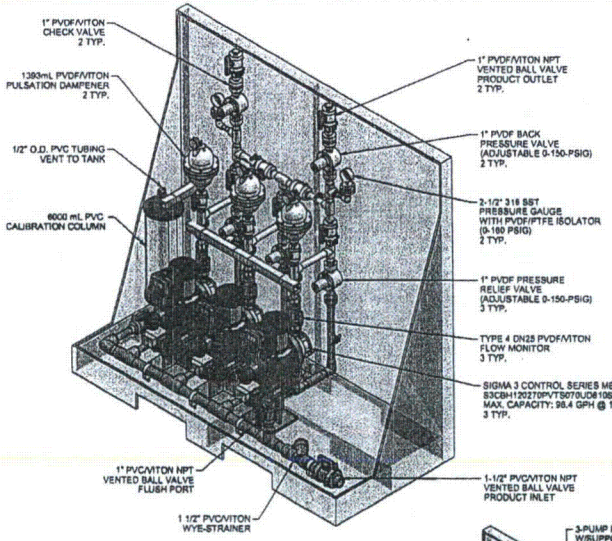
PREPARED ON THE DMPS CADDI SYSTEM

No. 02.037-0003

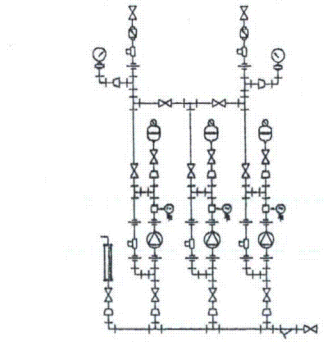
DWG No	REV
2013601025-202	B



PLAN VIEW



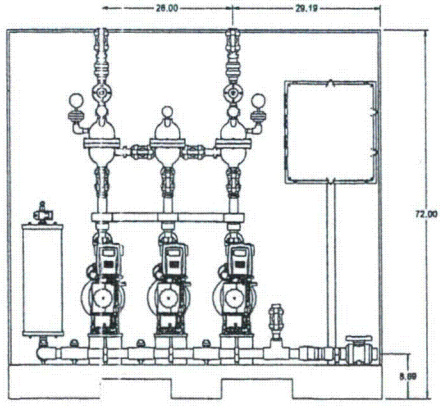
ISOMETRIC VIEW



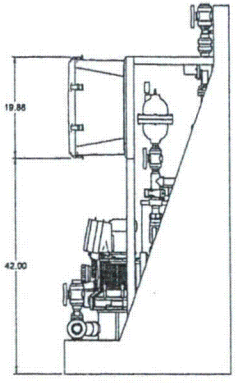
PIPING SCHEMATIC

NOTES:

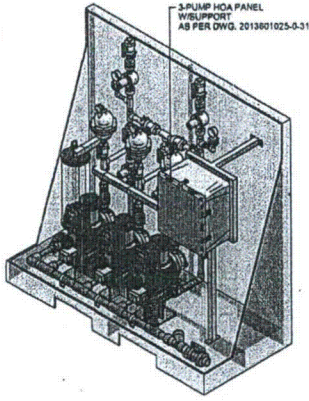
1. ALL SUCTION PIPING AND FITTINGS SHALL BE 1" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. ALL DISCHARGE PIPING AND FITTINGS SHALL BE 1" PVDF (32MM) FUSION WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
3. SUCTION HEADER PIPING AND FITTINGS SHALL BE 1-1/2" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS
4. ALL BALL VALVES TO BE VENTED.
5. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



FRONT VIEW



SIDE VIEW



ISOMETRIC VIEW SHOWING ELEC. ENCLOSURE

REV	DATE	DESCRIPTION	BY	APP'D/REV'D
B	01/22/14	ADDED CHECK VALVES	JDB	
A	12/16/13	PER CUSTOMER COMMENTS	JDB	
0	11/25/13	FIRST ISSUE	JDB	

REVISIONS

CUSTOMER: NALCO COMPANY
(FIRST ENERGY BEAVER VALLY NUCLEAR)

JOB No: 2013601025 | PURCHASE ORDER No: 4502483123

TITLE: P3_S3CB_PVC/VITON_PVDF_INTAKE CHLORINATION BLEACH
GENERAL ARRANGEMENT
TANK TK-4

ENGINEERS SEAL

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THE PROMINENT GROUP OF COMPANIES

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TEL 519 836 3492 FAX 519 836 3229
PROMINENT FLUID CONTROLS INC.
RIDC PARK WEST
136 INDUSTRY DRIVE
PITTSBURGH P.A., USA, 15275
TEL 412 787 2484 FAX 412 787 6784

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/25/13

MAXIMUM TESTING PRESSURE =	150 PSI	DWG No: 2013601025-202	REV: B
MAXIMUM OPERATING PRESSURE =	145 PSI		PAGE: 1/1
CHEMICAL SERVICE = BLEACH			

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

REVISIONS

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT NO. 1

DATE	6-24-14	FINAL APP. FOR ISSUE SUP:	
DRAWN BY	L.R.HAMIL		
REVIEW	JMP	D.P.PRICE 7-3-14	
ENGR/QA	DMH		

VENDOR DRAWING NO.: 2013601025-202
REV.: B | REV. DATE: 1-22-14
VENDOR COMPANY NAME: PROMINENT (PFC)

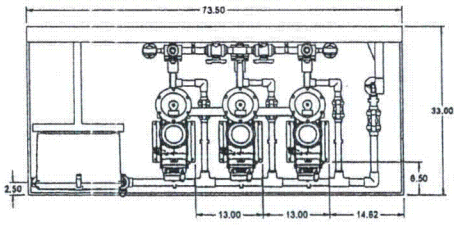
DRAWING TITLE: CHEMICAL INJECTION WR/SWS SODIUM HYPOCHLORITE PUMP SKID ARRANGEMENT

A | FENOC DRAWING NO.: 02.037-0003 | REV.: A

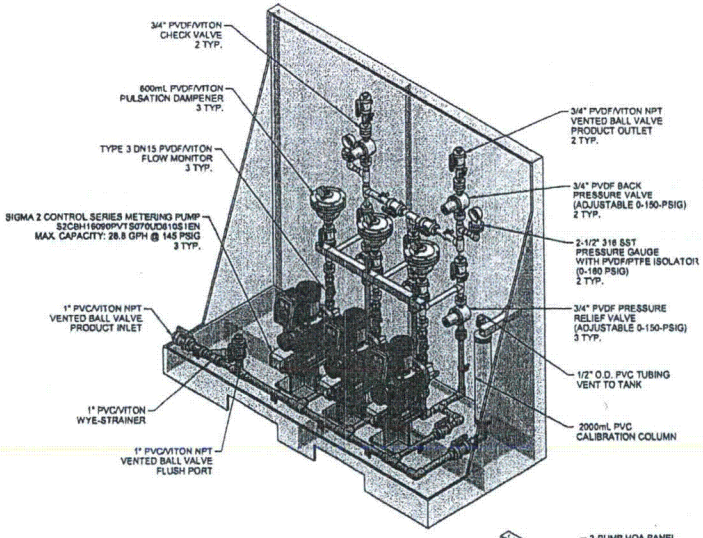
PREPARED ON THE BVPS CAEDDI SYSTEM

No. 02.037-0004

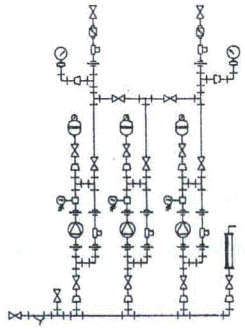
DWG No	REV
2013601025-203	B



PLAN VIEW



ISOMETRIC VIEW



PIPING SCHEMATIC

NOTES:

1. ALL SUCTION PIPING AND FITTINGS SHALL BE 3/4" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. ALL DISCHARGE PIPING AND FITTINGS SHALL BE 3/4" PVDF (32MM) FUSION WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
3. SUCTION HEADER PIPING AND FITTINGS SHALL BE 1" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS
4. ALL BALL VALVES TO BE VENTED.
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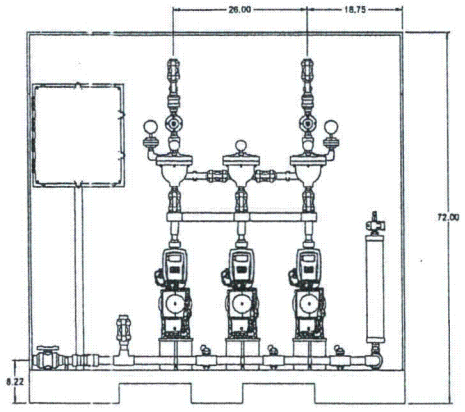
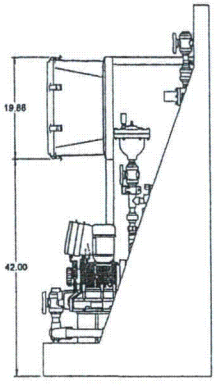
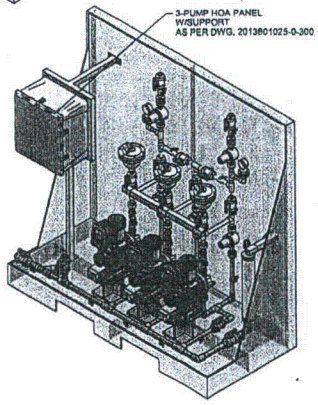


FRONT VIEW



SIDE VIEW



ISOMETRIC VIEW SHOWING ELEC. ENCLOSURE

MAXIMUM TESTING PRESSURE =	150 PSI
MAXIMUM OPERATING PRESSURE =	145 PSI
CHEMICAL SERVICE = BROMINE	

REV	DATE	DESCRIPTION	BY	APPD	REVD
B	01/22/14	ADDED CHECK VALVES	JDB		
A	12/16/13	PER CUSTOMER COMMENTS	JDB		
0	11/25/13	FIRST ISSUE	JDB		

REVISIONS

CUSTOMER: NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)

JOB No: 2013601025 PURCHASE ORDER No: 4502483123

TITLE: P3_S3CB_PVC/VITON_PVDF_INTAKE CHLORINATION BROMINE GENERAL ARRANGEMENT TANK TK-6

ENGINEERS SEAL

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PROMINENT FLUID CONTROLS INC. RIDC PARK WEST 136 INDUSTRY DRIVE. PITTSBURGH P.A., USA 15275 TEL 412 787 2484 FAX 412 787 2561

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/25/13

DWG No	REV	PAGE
2013601025-203	B	1/1

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	FINAL APP. FOR ISSUE SUP:	D.P.PRICE 7-3-14
DRAWN BY	L.R.HAMIL		
SPEC./CHK	JMP		
ENGR./CHK	DMH		

BEAVER VALLEY POWER STATION UNIT NO. 1

VENDOR DRAWING NO. 2013601025-203 REV. B REV. DATE 1-22-14

VENDOR COMPANY NAME: PROMINENT (PFC)

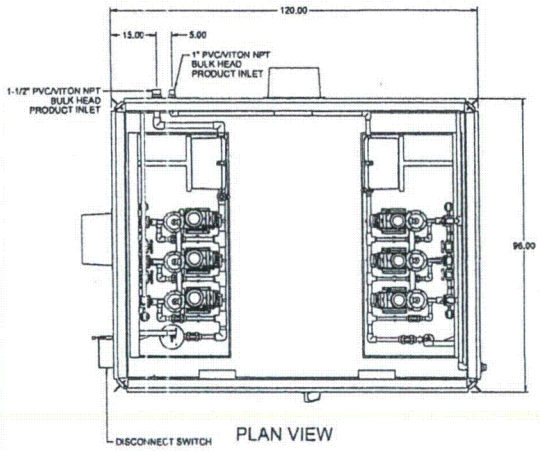
DRAWING TITLE: CHEMICAL INJECTION WR/SWS SODIUM BROMIDE PUMP SKID ARRANGEMENT

A FENOC DRAWING NO. 02.037-0004 REV. A

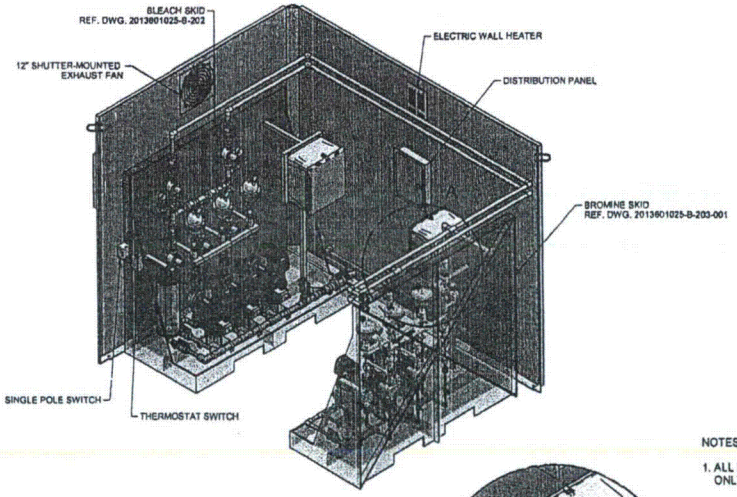
PREPARED ON THE BVPS CAEDDI SYSTEM

No. 02.037-0005

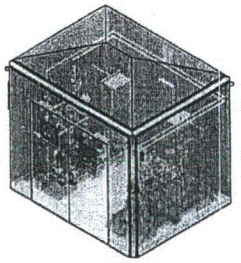
DWG No 2013601025-207 | REV B



PLAN VIEW



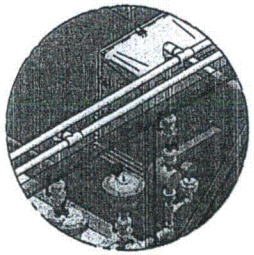
ISOMETRIC VIEW



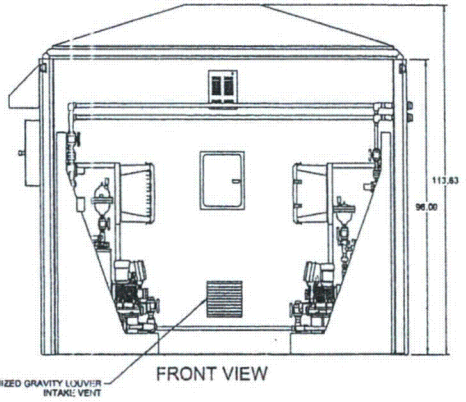
ISOMETRIC VIEW SHOWING ENCLOSURE

NOTES:

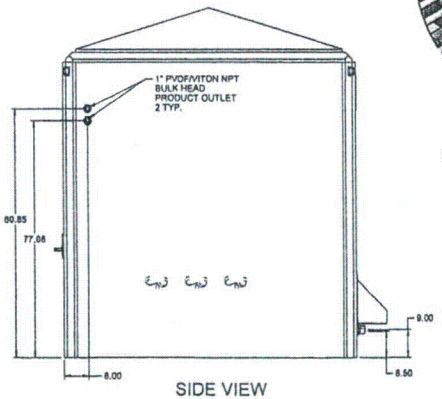
1. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



DETAIL A
BROMINE MEETS BLEACH DISCHARGE PIPING DETAIL



FRONT VIEW



SIDE VIEW

REV	DATE	DESCRIPTION	BY	APPD	REVD
B	01/22/14	PER CUSTOMER COMMENTS	JDB		
A	12/20/13	PER CUSTOMER COMMENTS	JDB		
0	11/26/13	FIRST ISSUE	JDB		

REVISIONS

CUSTOMER: NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)

JOB No 2013601025 | PURCHASE ORDER No 4502483123

TITLE: BLEACH SKIDS W/ENCLOSURE GENERAL ARRANGEMENT

ENGINEERS SEAL

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PROMINENT FLUID CONTROLS INC. RIDC PARK WEST 135 INDUSTRY DRIVE, PITTSBURGH P.A., USA. 15275 TEL. 412 787 2484 FAX. 412 787 8704

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/26/13

DWG No 2013601025-207 | REV B | PAGE 1/1

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	FINAL APP. FOR ISSUE SUPT. D.P.PRICE 7-3-14
DRAWN BY	L.R.HAMIL	
DESIGN	JMP	
ENGINEER	DMH	

BEAVER VALLEY POWER STATION UNIT NO. 1

VENDOR DRAWING NO. 2013601025-207 | REV. B | REV. DATE 1-22-14

VENDOR COMPANY NAME: PROMINENT (PFC)

DRAWING TITLE: CCHEMICAL INJECTION WR/SWS SODIUM HYPOCHLORITE/SODIUM BROMIDE PUMP ENCLOSURE ARRANGEMENT

FENOC DRAWING NO. 02.037-0005 | REV. A

$$DATE$$ $$TIME$$ $$DESIGN$$ $$FILE$$ $$SPECIFICATION$$

PREPARED ON THE BMPS CADDS SYSTEM

No. 03.047-0037

REVISIONS

TOUCH UP OF FINISHED PAINT IS REQUIRED BY INSTALLATION CONTRACTOR. TOUCH UP PAINT SHIPPED WITH TANK.

MANUFACTURER REFERENCE DRAWING: NO P.E. SEAL PROVIDED FOR WQM PERMIT.
TANK CERTIFICATION DOCUMENTS FOR THIS TANK FILED SEPARATELY.

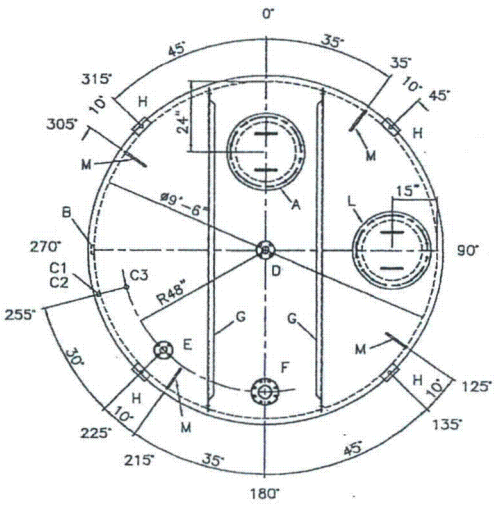
PREPARED ON THE BWPS CAEDDY SYSTEM

NOTES

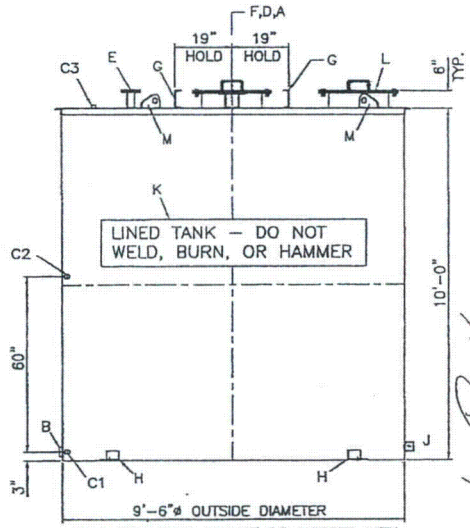
1. SEE PLAN VIEW FOR TRUE ORIENTATION AND LOCATION OF FITTING
2. LIFTING LUGS FOR UNLOADING UNIT & STANDING UNIT UPRIGHT TO BE PLACED AS NEEDED BY FABRICATION SHOP
3. A 3x3x¼" STEEL GROUNDING LUG WITH A ⅝"ø HOLE IN CENTER TO BE PLACED ON SHELL AT BOTTOM OF TANK IN LINE WITH LIFTING LUGS

SHIPPING LUGS AS NEEDED

APPROX. EMPTY TANK WEIGHT: 6,050 POUNDS



PLAN VIEW



NOTE, THIS TANK CANNOT BE SHIPPED WITH SHELL LIFTING LUGS, THEY WILL INTERFERE WITH CUSTOMER'S CONCRETE.

ELEVATION VIEW

REF DRAWINGS:
89315 – TANK 1CI–TK–1
89317 – TANK 1CI–TK–2
89318 – NAME PLATE & JOINT DETAIL
89476 – ROOF MANWAY DETAIL
89547 – ROOF SUPPORT & LIFTING CHANNEL

DESIGN DATA

CAPACITY	5,300 GALLONS
TYPE	SINGLE WALL ABOVEGROUND VERTICAL
NO. REQ.	ONE
OPERATING PRESSURE	ATMOSPHERIC
SPECIFIC GRAVITY	1.113–1.149
TANK MATERIAL	A–516–70 UNLESS NOTED
THICKNESS – TOP:	1/4 FLAT
THICKNESS – BOTTOM:	1/4" FLAT PER DETAIL
THICKNESS – SHELL:	1/4"
CONSTRUCTION	BUTT WELD PER DWG 89318 ASME QUALIFIED WELDERS INTERIOR WELDS GROUND TO ⅛" RADIUS
RADIOGRAPHY	SPOT (85% JOINT EFFICIENCY)
TANK TEST	2 PSIG
INT. FINISH	SP10 BLAST, 35–45 MILS PLASITE 4300
EXT. FINISH	SP6 BLAST, 3–5 MILS CARBOGUARD 893, 5–7 MILS CARBOGUARD 890 – WHITE
LABEL	API–650 APPENDIX J

LEGEND

A	20" API ROOF MANWAY w/ ⅛" POLYETHYLENE GASKET MATERIAL PER DWG 89476, SA–516–70
B	2" 3000# FULL COUPLING (304 S.S.)
C1	1/2" 3000# FULL COUPLING (304 S.S.)
C2	1/2" 3000# FULL COUPLING (304 S.S.)
C3	1/2" 3000# FULL COUPLING (304 S.S.)
D	2" 150# FFSO FLANGE (304 S.S.)
E	2" 150# FFSO FLANGE (304 S.S.)
F	4" 150# FFSO FLANGE & BLIND FLANGE (304 S.S.)
G	C6 x 8.2# LIFTING CHANNELS SEE DWG 89547 FOR DETAILS
H	HOLD DOWN LUG SEE DRAWING 89318 FOR DETAILS, SA–36
J	GROUNDING LUG WITH 5/8"ø HOLE, SA–36
K	VINYL LABEL WITH 4" HIGH RED OR BLACK LETTERING "LINED TANK – DO NOT WELD, BURN, OR HAMMER"
L	20" API ROOF MANWAY w/ ⅛" POLYETHYLENE GASKET MATERIAL PER DWG 89476, SA–516–70
M	LIFTING LUG LOCATION

NOTES:
1) ALL FLANGE BOLTS STRADDLE TANK CENTERLINE.
2) SNOW LOAD: 40 PSF.
3) WIND LOAD: 30 PSF PROJECTED AREA.
4) GASKET MATERIAL TO BE POLYETHLENE (HIGH DENSITY CROSS LINKED).
5) COUPLING & FLANGE MAT: A–182 F 304
6) NOZZLE NECKS MAT: A–312 TP 304.
7) MANWAY NECK, FLANGE, & COVER PLATE MATERIAL: A–516–70.
8) BOLTS AND HARDWARE MAT: A307 GR B.
9) NOTE, GANTRY PER DRAWING 8700–RS–32K & SKETCH MUST BE USED TO LIFT THIS TANK.

APPROVED BY: [signature] DATE: 7-22-14

APPROVED TO BEGIN FABRICATION

5	ROTATE HTM LIFTING LUG 5°	7/22/14	003
4	CHANGE LIFTING BACK TO REV 2 C6 CUSTOMER DESIGN	7/22/14	003
3	CHANGE TO HTM LIFTING LUGS	7/16/14	003
2	⅛" GASKETS	7/9/14	003
1	MOVE SHELL MANWAY TO ROOF, REVISE TOP CHANNEL, REVISE TANK HOLD DOWNS	6/23/14	003

Highland Tank

5,300 GAL 114"ø SW API–650–J
DISPERSANT STORAGE TANK: 1CI–TK–1

CUSTOMER: FIRST ENERGY
PROJECT: BEAVER VALLEY NUCLEAR PLNT
QUOTE NO: 336499

SCALE	DATE	DWG. BY	DWG. NO
3/8" = 1'2"	6/5/14	003	89316

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

DRAWN BY	L.R.HANIL	6-24-14
ENGINEER	DMH	
PROJECT MGR.	JMP	
PREPARED BY	D.P.PRUCE	7-3-14

VENDOR DRAWING NO. 89316
REV. 5 REV. DATE 7-22-14
VENDOR COMPANY NAME HIGHLAND TANK & MFG. CO.

BEAVER VALLEY POWER STATION UNIT NO. 1
DRAWING TITLE
CHEMICAL INJECTION WR/SWS 5300 GALLON STORAGE TANK ASSEMBLY DRAWING
TANK DRAWING NO. 03.047-0037 REV. A

No. 03.047-0038

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL PROVIDED FOR WQM PERMIT.
TANK CERTIFICATION DOCUMENTS FOR THIS TANK FILED SEPARATELY.

PREPARED ON THE BWS CAEDD SYSTEM

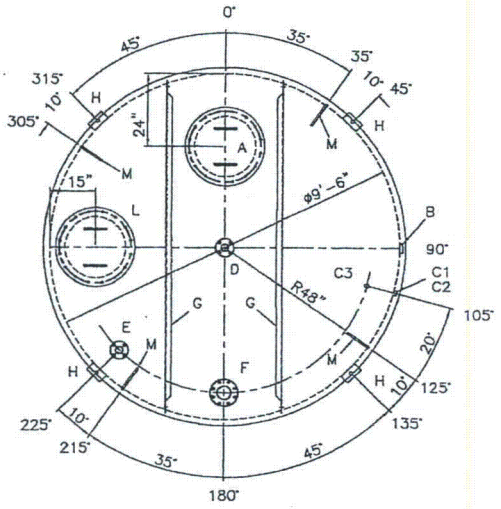
TOUCH UP OF FINISHED PAINT IS REQUIRED BY INSTALLATION CONTRACTOR. TOUCH UP PAINT SHIPPED WITH TANK.

NOTES

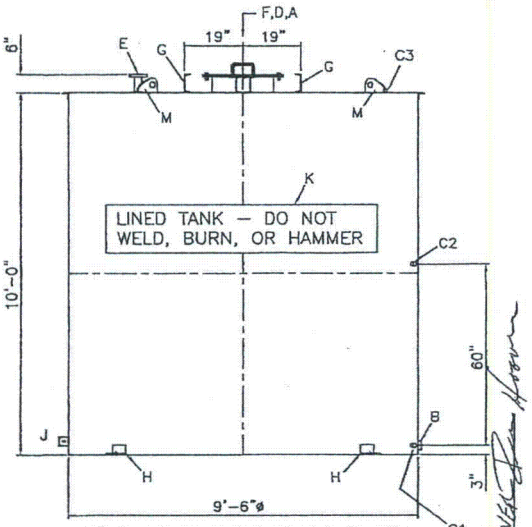
1. SEE PLAN VIEW FOR TRUE ORIENTATION AND LOCATION OF FITTING
2. LIFTING LUGS FOR UNLOADING UNIT & STANDING UNIT UPRIGHT TO BE PLACED AS NEEDED BY FABRICATION SHOP
3. A 3x3x¼" STEEL GROUNDING LUG WITH A ⅝"ø HOLE IN CENTER TO BE PLACED ON SHELL AT BOTTOM OF TANK IN LINE WITH LIFTING LUGS

SHIPPING LUGS AS NEEDED

APPROX. EMPTY TANK WEIGHT: 6,050 POUNDS



PLAN VIEW



NOTE, THIS TANK CANNOT BE SHIPPED WITH SHELL LIFTING LUGS, THEY WILL INTERFERE WITH CUSTOMER'S CONCRETE.

ELEVATION VIEW

REF DRAWINGS:
89316 – TANK 1CI–TK–1
89317 – TANK 1CI–TK–2
89318 – NAME PLATE & JOINT DETAIL
89476 – ROOF MANWAY DETAIL
89547 – ROOF SUPPORT & LIFTING CHANNEL

DESIGN DATA

CAPACITY	5,300 GALLONS
TYPE	SINGLE WALL ABOVEGROUND VERTICAL
NO. REQ.	ONE
OPERATING PRESSURE	ATMOSPHERIC
SPECIFIC GRAVITY	1.32
TANK MATERIAL	A–516–70 UNLESS NOTED
THICKNESS – TOP:	1/4 FLAT
THICKNESS – BOTTOM:	1/4" FLAT PER DETAIL
THICKNESS – SHELL:	1/4"
CONSTRUCTION	BUTT WELD PER DWG 89318 ASME QUALIFIED WELDERS INTERIOR WELDS GROUND TO ⅛" RADIUS
RADIOGRAPHY	SPOT (85% JOINT EFFICIENCY)
TANK TEST	2 PSIG
INT. FINISH	SP10 BLAST, 35–45 MILS PLASITE 4300
EXT. FINISH	SP6 BLAST, 3–5 MILS CARBOGUARD 893, 5–7 MILS CARBOGUARD 890 – WHITE
LABEL	API–650 APPENDIX J

LEGEND

A	20" API ROOF MANWAY w/ ⅛" POLYETHYLENE GASKET MATERIAL PER DRAWING 89476, SA–516–70
B	2" 3000# FULL COUPLING (304 S.S.)
C1	1/2" 3000# FULL COUPLING (304 S.S.)
C2	1/2" 3000# FULL COUPLING (304 S.S.)
C3	1/2" 3000# FULL COUPLING (304 S.S.)
D	2" 150# FFSO FLANGE (304 S.S.)
E	2" 150# FFSO FLANGE (304 S.S.)
F	4" 150# FFSO FLANGE & BLIND FLANGE (304 S.S.)
G	C6 x 8.2# LIFTING CHANNELS SEE DWG 89547 FOR DETAILS
H	HOLD DOWN LUG SEE DRAWING 89318 FOR DETAILS, SA–36
J	GROUNDING LUG WITH 5/8"ø HOLE, SA–36
K	VINYL LABEL WITH 4" HIGH RED OR BLACK LETTERING "LINED TANK – DO NOT WELD, BURN, OR HAMMER"
L	20" API ROOF MANWAY w/ ⅛" POLYETHYLENE GASKET MATERIAL PER DRAWING 89476, SA–516–70
M	LIFTING LUG LOCATION

NOTES:
1) ALL FLANGE BOLTS STRADDLE TANK CENTERLINE.
2) SNOW LOAD: 40 PSF.
3) WIND LOAD: 30 PSF PROJECTED AREA.
4) GASKET MATERIAL TO BE POLYETHLENE (HIGH DENSITY CROSS LINKED).
5) COUPLING & FLANGE MAT: A–182 F 304
6) NOZZLE NECKS MAT: A–312 TP 304.
7) MANWAY NECK, FLANGE, & COVER PLATE MATERIAL: A–516–70.
8) BOLTS AND HARDWARE MAT: A307 GR B.
9) NOTE, GANTRY PER DRAWING 8700–RS–32K & SKETCH MUST BE USED TO LIFT THIS TANK.

5	ROTATE HTM LIFTING LUGS 5°	7/22/14	003
4	CHANGE LIFTING BACK TO REV 2 C6 CUSTOMER DESIGN	7/22/14	003
3	CHANGE TO HTM LIFTING LUGS	7/16/14	003
2	⅛" THK. GASKETS	7/9/14	003
1	MOVE SHELL MANWAY TO ROOF, REVISE TOP CHANNEL REVISE TANK HOLD DOWNS	6/23/14	003

APPROVED BY: Dean Howell for Kevin Hamm
DATE: 7-22-14
APPROVED TO BEGIN FABRICATION

Highland Tank

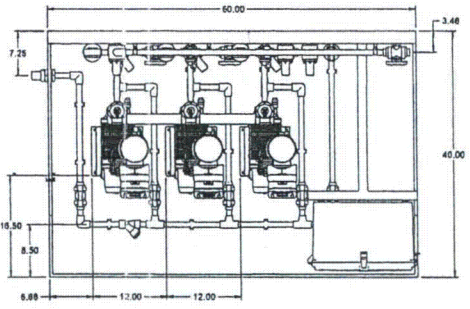
5,300 GAL 114"ø SW API–650–J
CORROSION INHIBITOR STORAGE TANK: 1CI–TK–2

CUSTOMER: FIRST ENERGY
PROJECT: BEAVER VALLEY NUCLEAR PLNT
QUOTE NO: 336499
CHK'D BY:
SCALE: 1/8" = 1'-0" | DATE: 6/5/14 | DWG. BY: 003 | DWG. NO: 89317

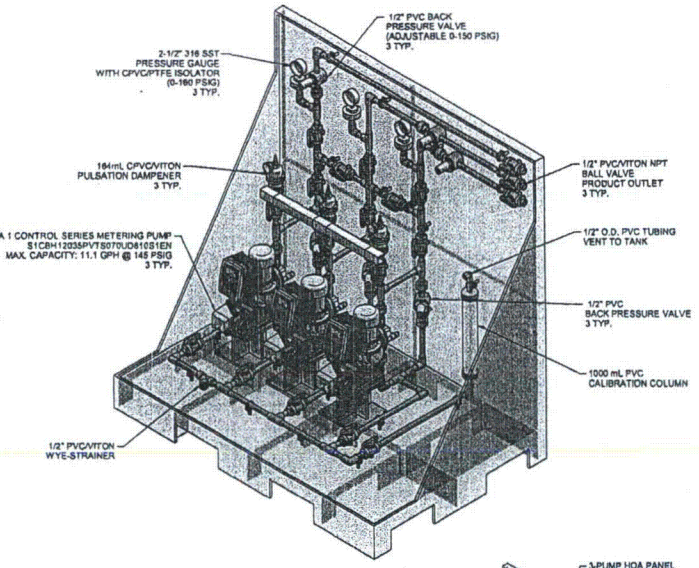
FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY
DATE: 6-24-14 | DRAWN BY: L.R.HAMIL | ENGR: JMP | CHK'D: DMH
D.P. PRUCE 7-3-14 FINAL APP. DATE
VENDOR DRAWING NO. 89317 | REV. 5 | REV. DATE 7-22-14
VENDOR COMPANY NAME: HIGHLAND TANK & MFG. CO.
BEAVER VALLEY POWER STATION UNIT NO. 1
DRAWING TITLE: CHEMICAL INJECTION WR/SWS 5300 GALLON STORAGE TANK ASSEMBLY DRAWING
FENOC DRAWING NO. 03.047-0038 | REV. A

No. 02.037-0001

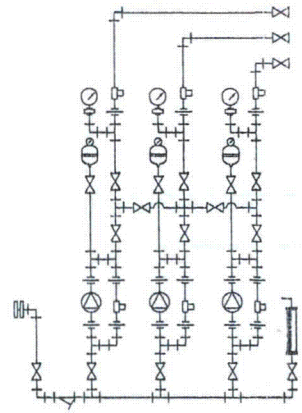
DWG No	REV
2013601025-200	A



PLAN VIEW



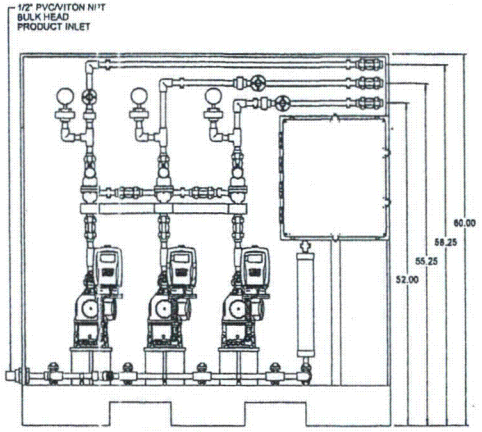
ISOMETRIC VIEW



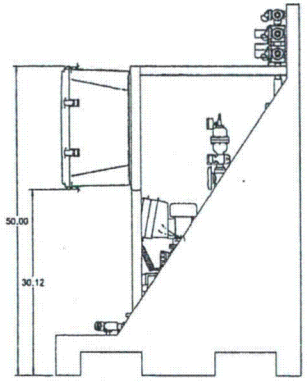
PIPING SCHEMATIC

NOTES:

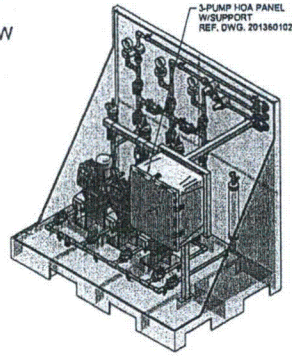
1. ALL PIPING AND FITTINGS SHALL BE 1/2" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



FRONT VIEW



SIDE VIEW



ISOMETRIC VIEW SHOWING ELEC. ENCLOSURE

REV	DATE	DESCRIPTION	BY	APPD	REVD
A	12/16/13	PER CUSTOMER COMMENTS	JDB		
0	11/25/13	FIRST ISSUE	JDB		

REVISIONS

CUSTOMER: NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)

JOB No: 2013601025 PURCHASE ORDER No: 4502483123

TITLE: P3_S1CB_PVC/VITON_3DT120 INTAKE STRUCTURE DISPERSANT GENERAL ARRANGEMENT

TANK TK-1

ENGINEERS SEAL

ProMinent®
THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA WWW.PROMINENT.US

PROMINENT FLUID CONTROLS LTD
490 SOUTHGATE DRIVE,
GUELPH, ONTARIO, CANADA
N1H 6J3
TEL 519 836 7892 FAX 519 836 5225

PROMINENT FLUID CONTROLS INC.
RIDC PARK WEST
136 INDUSTRY DRIVE,
PITTSBURGH P.A., USA 15275
TEL 412 787 2484 FAX 412 787 6724

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/25/13

MAXIMUM TESTING PRESSURE =	150 PSI	DWG No: 2013601025-200	REV: A
MAXIMUM OPERATING PRESSURE =	145 PSI		PAGE: 1/1
CHEMICAL SERVICE =	INTAKE STRUCTURE DISPERSANT		

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	
DRAWN BY	L.R.HAMIL	
DES/CHK	JMP	
ENGR/CHK	DMH	

FINAL APP. FOR ISSUE SUP: D.P.PRICE 7-3-14

BEAVER VALLEY POWER STATION UNIT NO. 1

VENDOR DRAWING NO. 2013601025-200 REV. A REV. DATE 12-16-13

VENDOR COMPANY NAME: PROMINENT (PFC)

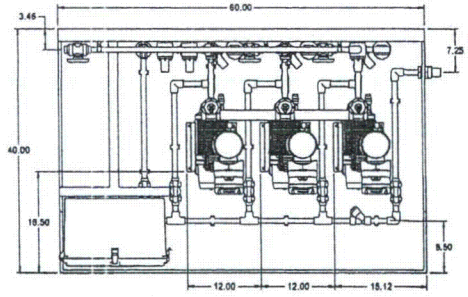
DRAWING TITLE: CHEMICAL INJECTION WR/SWS INTAKE STRUCTURE DISPERSANT PUMP SKID ARRANGEMENT

A FENOC DRAWING NO. 02.037-0001 REV. A

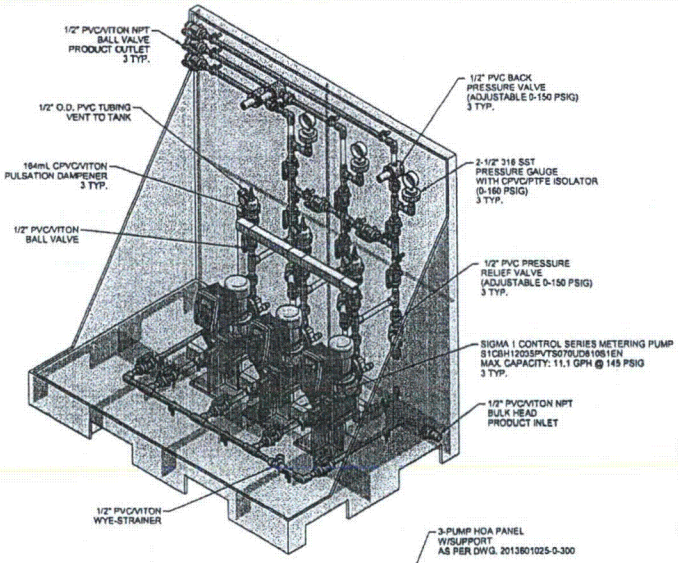
PREPARED ON THE BVPS CAEDDI SYSTEM

No. 02.037-0002

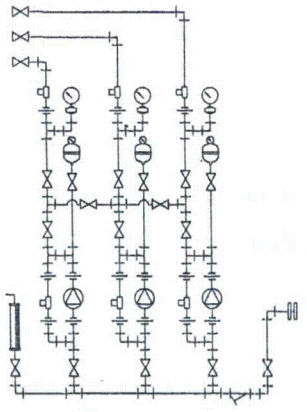
DWG No	REV
2013601025-201	A



PLAN VIEW



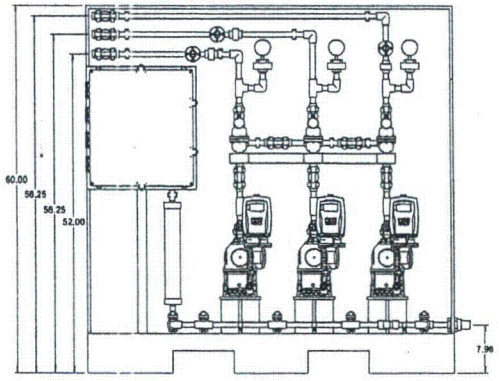
ISOMETRIC VIEW



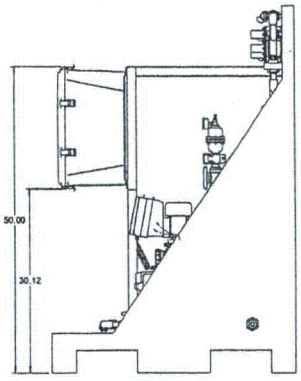
PIPING SCHEMATIC

NOTES:

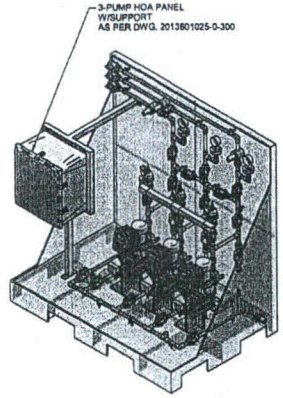
1. ALL PIPING AND FITTINGS SHALL BE 1/2" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



FRONT VIEW



SIDE VIEW



ISOMETRIC VIEW SHOWING ELEC. ENCLOSURE

REV	DATE	DESCRIPTION	BY	APPD
A	12/16/13	PER CUSTOMER COMMENTS	JDB	
0	11/25/13	FIRST ISSUE	JDB	

REVISIONS

CUSTOMER	NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)
JOB No	2013601025
PURCHASE ORDER No	4502483123
TITLE	P3_S1CB_PVC/VITON_3DT177 INTAKE STRUCTURE CORR INHIBITOR TANK TK-2 GENERAL ARRANGEMENT

ENGINEERS SEAL

ProMinent®
THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA — WWW.PROMINENT.US

PROMINENT FLUID CONTROLS LTD.
490 SOUTHGATE DRIVE
GUELPH, ONTARIO, CANADA
N1H 6J3
TEL 519 836 8592 FAX 519 836 5229

PROMINENT FLUID CONTROLS INC.
RIDC PARK WEST
136 INDUSTRY DRIVE.
PITTSBURGH P.A., USA. 15275
TEL 412 787 2450 FAX 412 787 0704

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/25/13

MAXIMUM TESTING PRESSURE =	150 PSI
MAXIMUM OPERATING PRESSURE =	145 PSI
CHEMICAL SERVICE =	CORROSION INHIBITOR

DWG No	REV	PAGE
2013601025-201	A	1/1

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	FINAL APP. FOR ISSUE SUP:	D.P.PRICE 7-3-14
DRAWN BY	L.R.HAMIL		
PROJECT	JMP		
CHECKED	DMH		

BEAVER VALLEY POWER STATION UNIT NO. 1

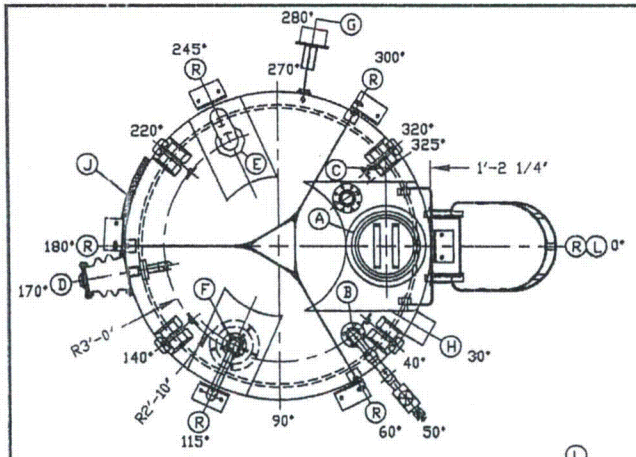
VENDOR DRAWING NO.	2013601025-201	REV.	A
REV. DATE	12-16-13	VENDOR COMPANY NAME	PROMINENT (PFC)

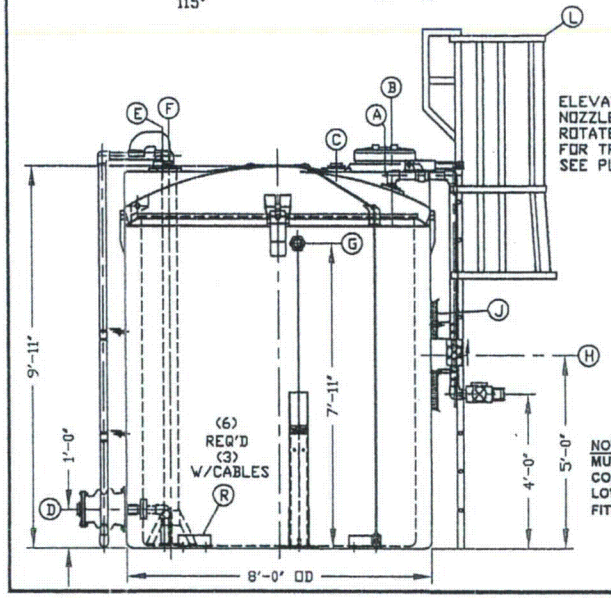
DRAWING TITLE: CHEMICAL INJECTION WR/SWS INTAKE STRUCTURE CORROSION INHIBITOR PUMP SKID ARRANGEMENT

A	FENOC DRAWING NO.	02.037-0002	REV. A

PREPARED ON THE B/PS CAEDDY SYSTEM

No. 03.047-0034





ELEVATIONS ONLY--
NOZZLES & ACCESSORIES
ROTATED INTO VIEW--
FOR TRUE ORIENTATION
SEE PLAN VIEW

NOTE:
MUST USE FLEXIBLE
CONNECTIONS ALL
LOWER SIDEWALL
FITTINGS

CALCULATED CAPACITIES/ VOLUME IN U.S. GALLONS			
TANK	DESIGN CAP	DOME VOL	TOTAL VOL
INNER	2517	246	2763
OUTER	3125	N/A	3125

NOZZLE SCHEDULE & ACCESSORIES

					INNER TANK		OUTER TANK	
SERVICE	MK	STOCK NO	SIZE	FITTING	DEG	ELEV	DEG	ELEV
CAP	A	4558/6767	17"	CAP 17" BUTTRESS THREAD BLK PE W/GSKT/PE	0°	DOME	--	--
FILL	B	3163	2"	DROP PIPE 2" EXT PVC	50°	DOME	--	--
		2818		UBD FTG 2" FLG STYLE PVC/SS/LV				
		3198/2759		(2) SUPPORT VERT EXT PIPE SS W/GSKT/LV				
		3190/3191		QUICK ADPT 2" MNPT BLK PP W/QUICK CAP BLK PP				
		9080		VALVE 2" BALL SPEARS TRUE/UN PVC W/VITON				
		4566		VALVE 2" CHECK SPEARS TRUE/UN PVC W/VITON				
LEVEL	C	2838	3"	UBD FTG 3" FLG STYLE PVC/SS/LV	325°	DOME	--	--
DRAIN	D	9744	2"	B.O.S.S. FITTING 2" ASMLY PE/PVC/SS/LV	170°	1'-0"	--	--
		3127		SIPHON LEG 2" FN BHF PVC				
		9755	2"	TRNS FTG 2" BELLOW STYLE II PVC/LV/SS W/EXP JNT PTFE	--	--	170°	1'-0"
VENT	E	3275/2705	4"	U-VENT 4" PVC W/GSKT/LV	245°	DOME	--	--
		9071		SCREEN F/4" VENT PE MESH				
LEVEL GAUGE	F	3356	--	LEVEL GAGE LRG FLT TYPE PVC	115°	DOME	--	--
		2818	2"	UBD FTG 2" FLG STYLE PVC/SS/LV				
		3198/2759		(2) SUPPORT VERT EXT PIPE SS W/GSKT/LV				
		GAL.TAPE		REVERSE GALLONAGE TAPE				
		10346		PIPE SUPPORT 4" INTERNAL PVC/PE				
LEAK DETECTION	G	7469		LEAK DETECTION PKG OPTIC SWITCH PP	--	--	280°	7'-11"
		7117	2"	BHF ASMLY 2" SXT H'WARD PVC/EPDM				
		7456	1/2"	BUSH 2" X 1/2" TXT PVC 80				
		7589		STAND F/LEAK DETECT BOX MACROPOXY BLUE				
HEATER	H	6784	--	HEATER SYSTEM NON-HAZ (2)SP420-16	--	--	30°	5'-0"
INSULATION	J	6974	--	INSULATION POLYFOAM 300 2" THK W/MASTIC COATING	ALL	DOME	ALL	SDWL
LADDER	L	5747	10'	LADDER 10' W/RTN & CAGE FRP W/3 FT 6 IN WALK THRU	0°	SDWL	--	--
		7684		LADDER ATTCH BRKT F/LUGS MACROPOXY BLUE				
RESTRAINT	R	RGS02500LO	--	REST GALV 2500 SAFE STD OUTDOOR LA	60°	DOME	0°	SDWL
					120°		60°	
					300°		120°	
							180°	
							240°	
							300°	

NOTES:
1. THIS IS A COMPUTER GENERATED DWG. DO NOT REVISE BY HAND.
2. DIMENSIONS WILL VARY ±3% DUE TO VARIATIONS IN MULTIPLE MOLDS & CONDITIONS PREVALENT DURING MANUFACTURE & USAGE.
3. TANKS DESIGNED FOR 1.9 SpG MAT'L @ 100°F/ATMOS PRESSURE

REV 'A' MARK C RELOCATED BY:JB 12/5/13 CK:JB1

DWG TITLE
(2) 2500 GALLON SAFE-TANK ASSEMBLY

TK-5 SERVICE: SODIUM BISULFITE
TK-6 SERVICE: SODIUM BROMIDE
1.9 SpG/XLPE/NATURAL
INNER STOCK NO. 42002500410
OUTER STOCK NO. 42103100410

SCALE: 3/8"=1'-0"
DATE: 11/6/13
POLYPROCESSING SOLUTIONS, SIMPLIFIED.
Central Region
DR: J. BRANTLEY
CK: J. BENNETT

NALCO PO #4502482360
FOR: FIRST ENERGY CORP/ BEAVER VALLEY NUCLEAR

SHEET	COMPUTER FILE	REV
1 OF 1	NLC2360B	A

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL PROVIDED FOR WQM PERMIT.
TANK CERTIFICATION DOCUMENTS FOR THIS TANK FILED SEPARATELY.

REVISIONS

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	
DRAWN BY	L.R.HAMIL	
DESIGN	JMP	
ENGINEER	DMH	

FINAL APP. FOR ISSUE SUP: D.P.PRICE 7-3-14

BEAVER VALLEY POWER STATION UNIT NO. 1

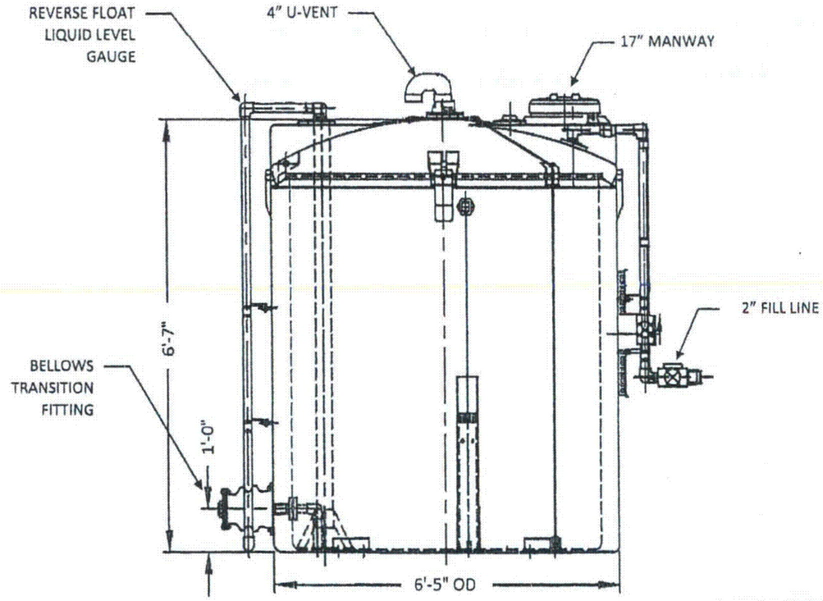
VENDOR DRAWING NO. NLC2360B
REV. A
REV. DATE 12-5-13
VENDOR COMPANY NAME: POLY PROCESSING

DRAWING TITLE: CHEMICAL INJECTION WR/SWS 2500 GALLON STORAGE TANK ASSEMBLY DRAWING

A | FENOC DRAWING NO. 03.047-0034 | REV. A

PREPARED ON THE BVPS CAEDDI SYSTEM

No. 03.047-0036



PolyProcessing
Central Region

ECP 13-0361-011
TANK TK-7
SERVICE: SODIUM BROMIDE
EXISTING 1000-GALLON SAFE-TANK ASSEMBLY

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL PROVIDED FOR WQM PERMIT.
TANK CERTIFICATION DOCUMENTS FOR THIS TANK FILED SEPARATELY.

FENOC FIRST ENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT NO. 1

DATE	6-24-14
DRAWN BY	L.R.HAMIL
DFG/CHK	JMP
ENGR/DM	DMH

FINAL APP. FOR ISSUE SUP: D.P.PRICE 7-3-14

VENDOR DRAWING NO. N/A
REV. N/A REV. DATE N/A
VENDOR COMPANY NAME: POLY PROCESSING

DRAWING TITLE: CHEMICAL INJECTION WR/SWS 1000 GALLON STORAGE TANK DRAWING

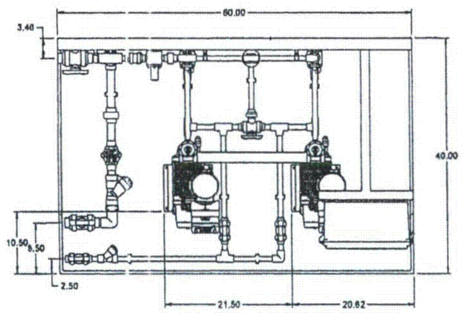
A

FENOC DRAWING NO. 03.047-0036 REV. A

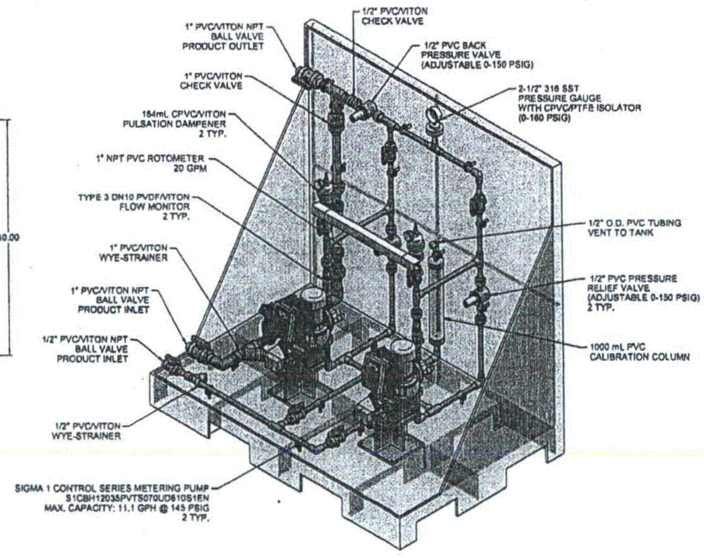
PREPARED ON THE BVPS CAEDDI SYSTEM

No. 02.037-0006

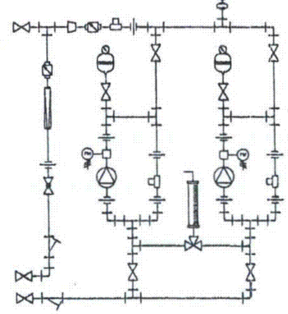
DWG No	REV
2013601025-206	A



PLAN VIEW



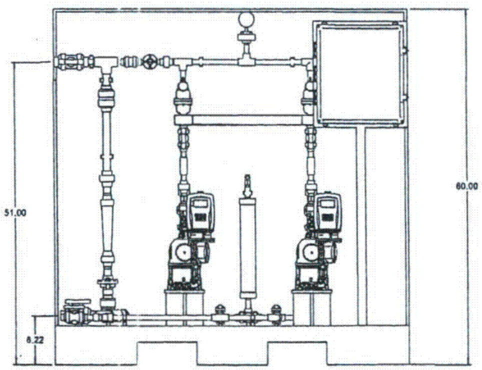
ISOMETRIC VIEW



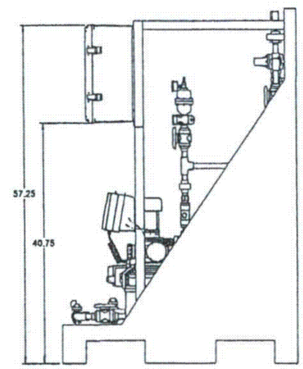
PIPING SCHEMATIC

NOTES:

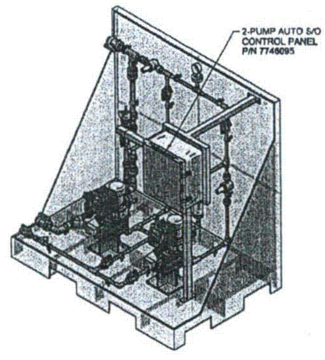
1. ALL PIPING AND FITTINGS SHALL BE 1/2" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. ALL WATER DILUTION PIPING AND FITTINGS SHALL BE 1" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
3. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



FRONT VIEW



SIDE VIEW



ISOMETRIC VIEW SHOWING ELEC. ENCLOSURE

REV	DATE	DESCRIPTION	BY	APPD	REVD
A	12/17/13	PER CUSTOMER COMMENTS	JDB		
0	11/25/13	FIRST ISSUE	JDB		

REVISIONS

CUSTOMER: NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)

JOB No 2013601025 PURCHASE ORDER No 4502483123

TITLE P2_S1CB_PVC/VITON_DILUTION WATER_OUTFALL 001 DECHLOR TANK TK-5

GENERAL ARRANGEMENT

ENGINEERS SEAL

ProMinent® THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA WWW.PROMINENT.US

PROMINENT FLUID CONTROLS LTD. 490 SOUTHGATE DRIVE GUELPH, ONTARIO, CANADA N1H 6J3

PROMINENT FLUID CONTROLS INC. RIDC PARK WEST 136 INDUSTRY DRIVE PITTSBURGH P.A., USA. 15275

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/25/13

MAXIMUM TESTING PRESSURE =	150 PSI
MAXIMUM OPERATING PRESSURE =	145 PSI
CHEMICAL SERVICE = DECHLOR	

DWG No	REV	PAGE
2013601025-206	A	1/2

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT NO. 1

DATE	6-24-14
DRAWN BY	L.R.HAMIL
	JMP
	DMH

FINAL APP. FOR ISSUE SUP: D.P.PRICE 7-3-14

VENDOR DRAWING NO. 2013601025-206 SH.1 OF 2

REV. A REV. DATE 12-17-13

VENDOR COMPANY NAME PROMINENT (PFC)

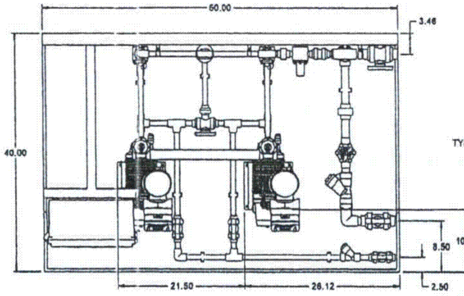
DRAWING TITLE CHEMICAL INJECTION CIRCULATING WATER SODIUM BISULFITE PUMP SKID ARRANGEMENT

A FENOC DRAWING NO. 02.037-0006 REV. A

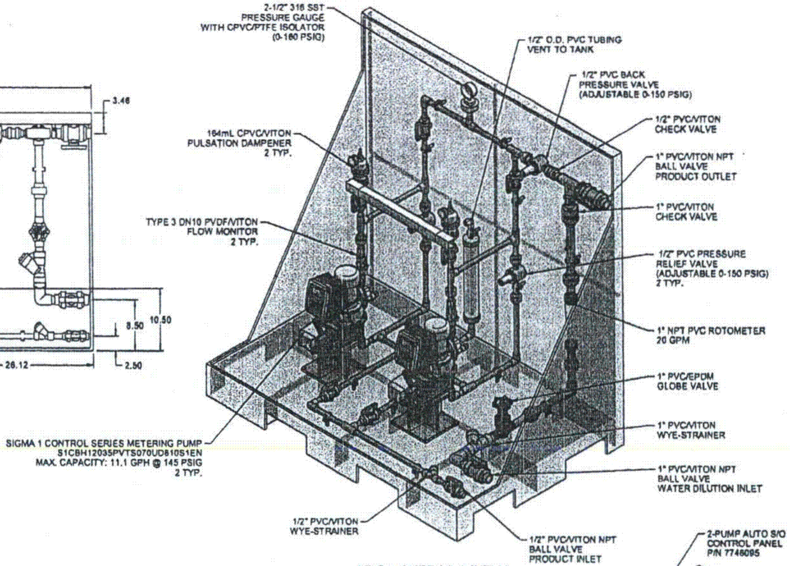
PREPARED ON THE BVPS CAEDDI SYSTEM

No. 02.037-0007

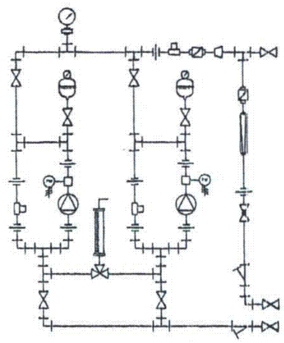
DWG No	REV
2013601025-206	A



PLAN VIEW



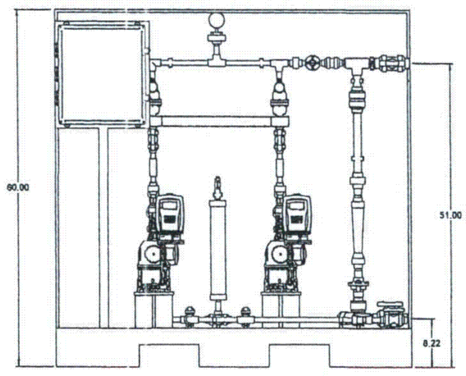
ISOMETRIC VIEW



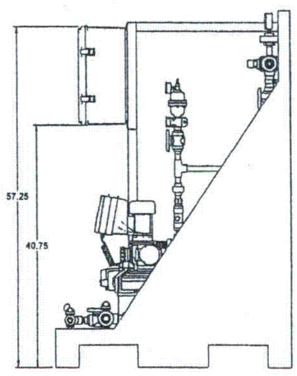
PIPING SCHEMATIC

NOTES:

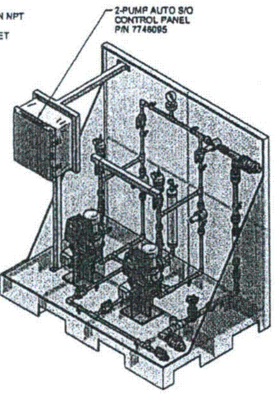
1. ALL PIPING AND FITTINGS SHALL BE 1/2" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. ALL WATER DILUTION PIPING AND FITTINGS SHALL BE 1" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
3. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



FRONT VIEW



SIDE VIEW



ISOMETRIC VIEW SHOWING ELEC. ENCLOSURE

REV	DATE	DESCRIPTION	BY	APPD	REVD
A	12/17/13	PER CUSTOMER COMMENTS	JDB		
0	11/25/13	FIRST ISSUE	JDB		

REVISIONS

CUSTOMER: NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)

JOB No 2013601025 — PURCHASE ORDER No 4502483123

TITLE P2_S1CB_PVC/VITON_DILUTION WATER_OUTFALL 001 DECHLOR TANK TK-5 GENERAL ARRANGEMENT

ENGINEERS SEAL

ProMinent® THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA — WWW.PROMINENT.US

PROMINENT FLUID CONTROLS LTD
490 SOUTHGATE DRIVE
GUELPH, ONTARIO, CANADA
N1H 6J3

PROMINENT FLUID CONTROLS INC
RIDC PARK WEST
136 INDUSTRY DRIVE
PITTSBURGH P.A., USA 15275

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/25/13

MAXIMUM TESTING PRESSURE =	150 PSI
MAXIMUM OPERATING PRESSURE =	145 PSI
CHEMICAL SERVICE = DECHLOR	

DWG No	REV	PAGE
2013601025-206	A	2/2

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

DATE	6-24-14	
DRAWN BY	L.R.HAMIL	
DFG/CHK	JMP	FINAL APP. FOR ISSUE SUP: D.P.PRICE 7-3-14
ENGR/CHK	DMH	

BEAVER VALLEY POWER STATION UNIT NO. 1

VENDOR DRAWING NO. 2013601025-206 SH.2 OF 2 — REV. A — REV. DATE 12-17-13

VENDOR COMPANY NAME: PROMINENT (PFC)

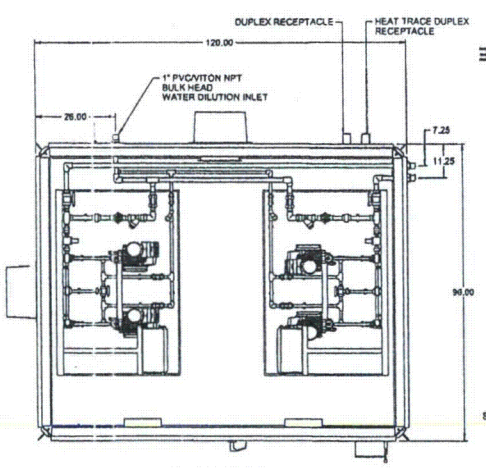
DRAWING TITLE: CHEMICAL INJECTION CIRCULATING WATER SODIUM BISULFITE PUMP SKID ARRANGEMENT

A — FENOC DRAWING NO. 02.037-0007 — REV. A

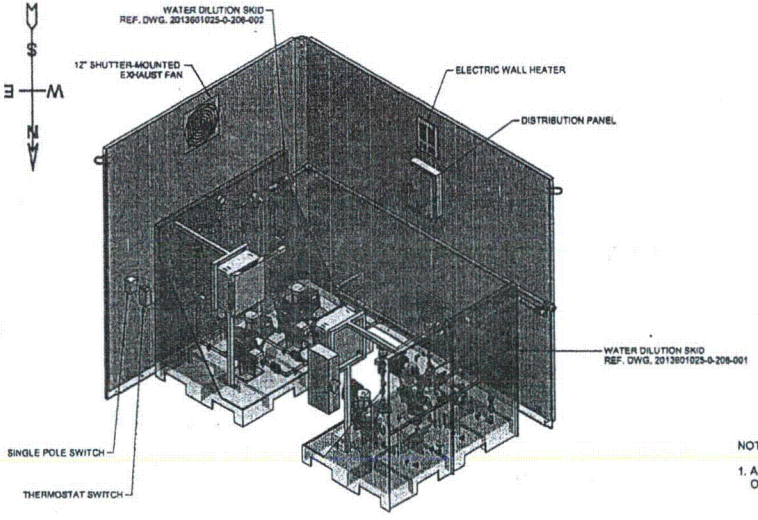
PREPARED ON THE BVPS CAEDDI SYSTEM

No. 02.037-0008

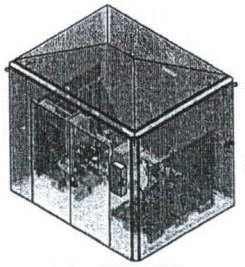
DWG No 2013601025-209 | REV 0



PLAN VIEW



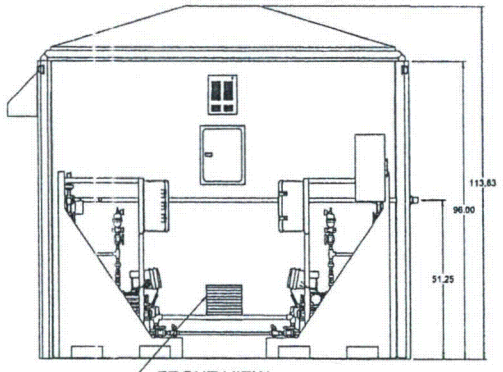
ISOMETRIC VIEW



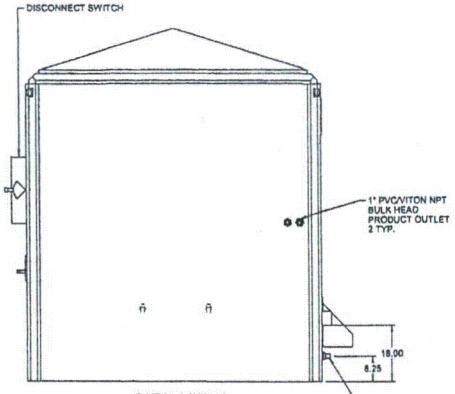
ISOMETRIC VIEW SHOWING ENCLOSURE

NOTES:

1. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



FRONT VIEW



SIDE VIEW

REV	DATE	DESCRIPTION	BY	APP'D
A	12/20/13	PER CUSTOMER COMMENTS	JDB	
0	11/26/13	FIRST ISSUE	JDB	

REVISIONS

CUSTOMER: NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)

JOB No 2013601025 | PURCHASE ORDER No 4502483123

TITLE: WATER DILUTION SKIDS W/ENCLOSURE GENERAL ARRANGEMENT

ENGINEERS SEAL

ProMinent® THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA — WWW.PROMINENT.US

PROMINENT FLUID CONTROLS LTD. 490 SOUTHGATE DRIVE. GUELPH, ONTARIO, CANADA N1H 6J3 TEL: 519 836 9601 FAX: 519 836 2226

PROMINENT FLUID CONTROLS INC RIDC PARK WEST 136 INDUSTRY DRIVE PITTSBURGH P.A., USA 15275 TEL: 412 787 2484 FAX: 412 787 2641

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/26/13

DWG No 2013601025-209 | REV A | PAGE 1/1

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	
DRAWN BY	L.R.HAMIL	
DES./ENG	JMP	
ENGR./CHK	DMH	

FINAL APP. FOR ISSUE SUP: D.P.PRICE 7-3-14

BEAVER VALLEY POWER STATION UNIT NO. 1

VENDOR DRAWING NO. 2013601025-209 | REV. A | REV. DATE 12-20-13

VENDOR COMPANY NAME: PROMINENT (PFC)

DRAWING TITLE: CHEMICAL INJECTION CIRCULATING WATER SODIUM BISULFITE/SODIUM BROMIDE PUMP ENCLOSURE ARRANGEMENT

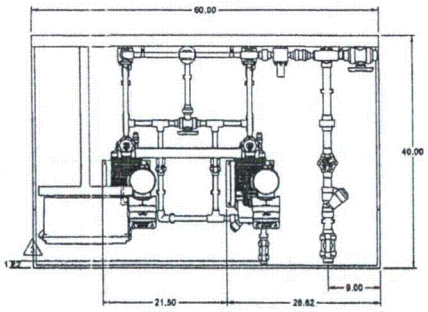
A | FENOC DRAWING NO. 02.037-0008 | REV. A

$$DATE$$ $$TIME$$ $$DESIGN$$ $$FILE$$ $$SPECIFICATION$$

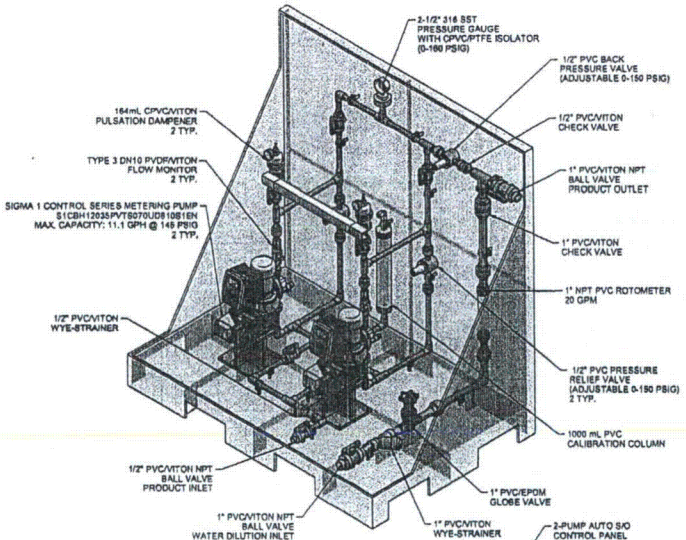
PREPARED ON THE BVPS CAEDDI SYSTEM

No. 2002.371-000-001

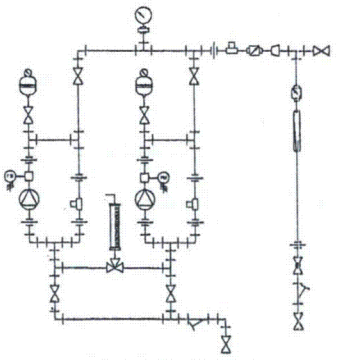
DWG No	REV
2013601025-205	B



PLAN VIEW



ISOMETRIC VIEW



PIPING SCHEMATIC

NOTES:

1. ALL PIPING AND FITTINGS SHALL BE 1/2" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. ALL WATER DILUTION PIPING AND FITTINGS SHALL BE 1" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
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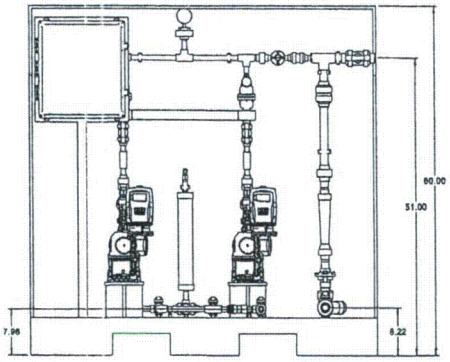
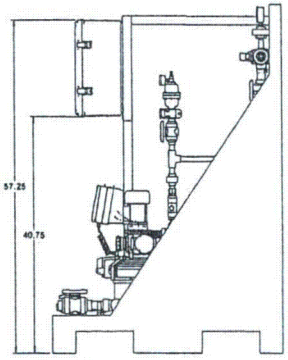
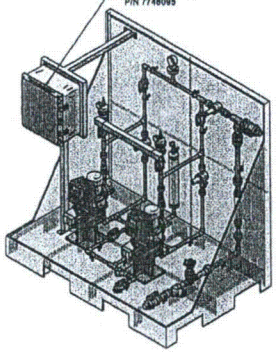


FRONT VIEW



SIDE VIEW



ISOMETRIC VIEW SHOWING ELEC. ENCLOSURE

REV	DATE	DESCRIPTION	BY	APPD	REVD
		REVISIONS			
B	01/22/14	PER CUSTOMER COMMENTS	JDB		
A	12/17/13	PER CUSTOMER COMMENTS	JDB		
0	11/25/13	FIRST ISSUE	JDB		

CUSTOMER	NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)
JOB No	2013601025
PURCHASE ORDER No	4502483123
TITLE	P2_S1CB_PVC/VITON_DILUTION WATER DECHLOR UNIT #2 GENERAL ARRANGEMENT
TOTE 1	

ENGINEERS SEAL

ProMinent®
THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA	WWW.PROMINENT.US
PROMINENT FLUID CONTROLS LTD 490 SOUTHGATE DRIVE, GUELPH, ONTARIO, CANADA N1H 6J3 TEL 519 836 2492 FAX 519 836 5126	PROMINENT FLUID CONTROLS INC RIDC PARK WEST 136 INDUSTRY DRIVE, PITTSBURGH P.A., USA 15275 TEL 412 787 2484 FAX 412 787 8164

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/25/13

MAXIMUM TESTING PRESSURE =	150 PSI
MAXIMUM OPERATING PRESSURE =	145 PSI
CHEMICAL SERVICE =	DECHLOR

DWG No	REV	PAGE
2013601025-205	B	1/1

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

DATE	6-24-14	FINAL APP. FOR ISSUE SUP.	D.P.PRICE 7-3-14
DRAWN BY	L.R.HAMIL		
DES./ENG.	JMP		
ENG./CH.	DMH		

BEAVER VALLEY POWER STATION UNIT NO. 2

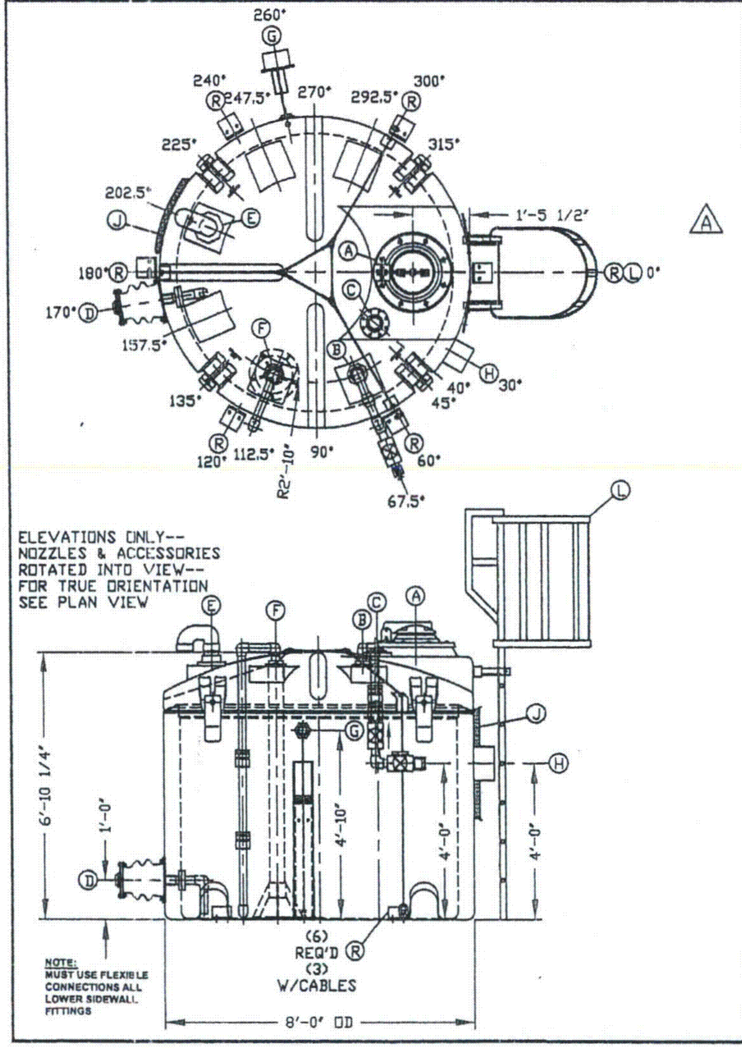
VENDOR DRAWING NO.	REV.	REV. DATE
2013601025-205	B	1-22-14

VENDOR COMPANY NAME: PROMINENT (PFC)

DRAWING TITLE: CHEMICAL INJECTION CIRCULATING WATER SODIUM BISULFITE PUMP SKID ARRANGEMENT DRAWING

FENCE DRAWING NO.	REV.
A 2002.371-000-001	A

PREPARED ON THE BVPS CADDI SYSTEM



NOZZLE SCHEDULE & ACCESSORIES								
					INNER TANK		OUTER TANK	
SERVICE	MK	STOCK NO	SIZE	FITTING	DEG	ELEV	DEG	ELEV
MANWAY	A	8529/3224	19"	CVR ASMLY 19" SAFE-SURGE W/GSKT/PE	0°	DOME	--	--
FILL	B	3163	2"	DROP PIPE 2" EXT PVC	67.5°	DOME	--	--
		2785		UBD FTG 2" BHF STYLE PVC/EPDM				
		3198/3209		(2) SUPPORT VERT EXT PIPE SS W/GSKT/EPDM				
		10284		VALVE 2" BALL TXT SPEARS COMPACT PVC W/EPDM				
		3190/3191		QUICK ADPT 2" MNPT BLK PP W/QUICK CAP BLK PP				
		10287		VALVE 2" CHECK SPEARS TRUE/UN PVC W/EPDM				
LEVEL	C	2835	3"	UBD FTG 3" FLG STYLE PVC/SS/EPDM	40°	DOME	--	--
DRAIN	D	9741	2"	B.O.S.S. FITTING 2" ASMLY PE/PVC/SS/EPDM	170°	1'-0"	--	--
		3127		SIPHON LEG 2" FN BHF PVC				
		9752		TRNS FTG 2" BELLOW STYLE II PVC/EPDM/SS W/EXP JNT PTFE	--	--	170°	1'-0"
VENT	E	3275/9071	4"	U-VENT 4" PVC W/SCREEN/PE MESH	202.5°	DOME	--	--
LEVEL GAUGE	F	4089	--	LEVEL GAGE SML FLT TYPE PVC	112.5°	DOME	--	--
		2785	2"	UBD FTG 2" BHF STYLE PVC/EPDM				
		3198/3209		(2) SUPPORT VERT EXT PIPE SS W/GSKT/EPDM				
		GAL.TAPE		REVERSE GALLONAGE TAPE				
		10346		PIPE SUPPORT 4" INTERNAL PVC/PE				
LEAK DETECTION	G	7469		LEAK DETECTION PKG OPTIC SWITCH PP	--	--	260°	4'-10"
		7117	2"	BHF ASMLY 2" SXT H'WARD PVC/EPDM				
		7456	1/2"	BUSH 2" X 1/2" TXT PVC 80				
		7589		STAND F/LEAK DETECT BOX MS DM BLUE				
HEATER	H	6784	--	HEATER SYSTEM NON-HAZ (2)SP420-16	--	--	30°	4'-0"
INSULATION	J	6967	--	INSULATION POLYFOAM 230 2" THK W/MASTIC COATING	ALL	DOME	ALL	SDWL
LADDER	L	5744	7'	LADDER 7' W/RTN & CAGE FRP W/3 FT 6 IN WALK THRU	0°	SDWL	--	--
		10159		LADDER ATTCH BRKT SIDEWALL ASM MS DM BLUE/SS/EPDM				
RESTRAINT	R	RGS01550VO	--	REST GALV 1550 SAFE STD OUTDOOR VA	60° 180° 300°	DOME	0° 60° 120° 180° 240° 300°	SDWL

NOTES:
1. THIS IS A COMPUTER GENERATED DWG. DO NOT REVISE BY HAND.
2. DIMENSIONS WILL VARY ±3% DUE TO VARIATIONS IN MULTIPLE MOLDS & CONDITIONS PREVALENT DURING MANUFACTURE & USAGE.
3. TANKS DESIGNED FOR 1.9 SpG MAT'L @ 100°F/ATMOS PRESSURE

CALCULATED CAPACITIES/ VOLUME IN U.S. GALLONS			
TANK	DESIGN CAP	DOME VOL	TOTAL VOL
INNER	1586	204	1790
OUTER	1954	N/A	1954

REV 'A' MARK C RELOCATED BY: JB 12/5/13 CK: JB1

DWG TITLE: 1550 GALLON SAFE-TANK ASSEMBLY

1.9 SpG/XLPE/NATURAL
TK-13
INNER STOCK NO. 72001550410
SERVICE: SODIUM BISULFITE
OUTER STOCK NO. 72101950410

SCALE: 3/8" = 1'-0"
DATE: 11/6/13
POLYPROCESSING
Central Region
DR: J. BRANTLEY
CK: J. BENNETT

NALCO PO #4502482360
FOR: FIRST ENERGY CORP/
BEAVER VALLEY NUCLEAR
SHEET: 1 OF 1
COMPUTER FILE: NLC2360A
REV: A

REVISIONS

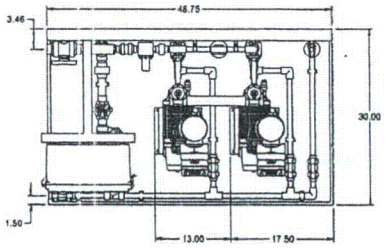
MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL PROVIDED FOR WQM PERMIT.
TANK CERTIFICATION DOCUMENTS FOR THIS TANK FILED SEPARATELY.

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY
DATE: 6-24-14
DRAWN BY: L.R.HAMIL
DESIGN: JMP
ENGR: DMH
FINAL APP. FOR ISSUE SUP: D.P.PRICE 7-3-14
VENDOR DRAWING NO.: NLC2360A
REV.: A
REV. DATE: 12-5-13
VENDOR COMPANY NAME: POLY PROCESSING
BEAVER VALLEY POWER STATION UNIT NO. 2
DRAWING TITLE: CHEMICAL INJECTION OVERFLOW STRUCTURE 1550 GALLON STORAGE TANK ASSEMBLY DRAWING
A
FENOC DRAWING NO.: 2003.480-000-001
REV.: A

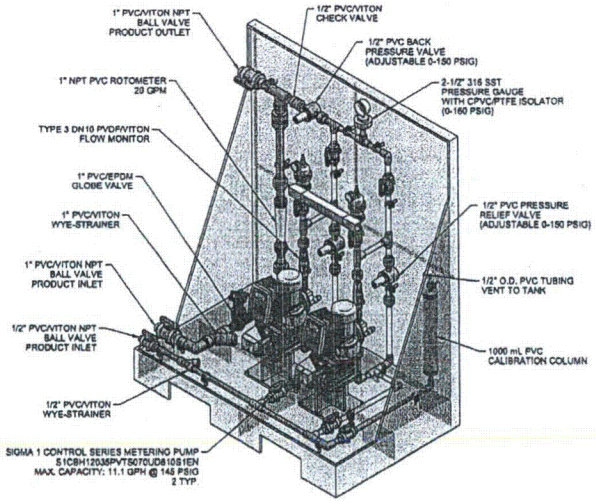
PREPARED ON THE BVPS CAEDDI SYSTEM

No. 2002.371-000-002

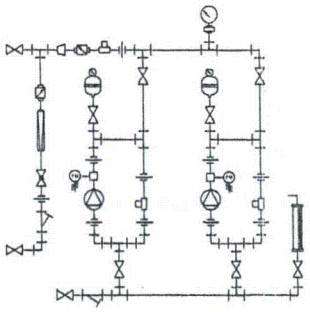
DWG No	REV
2013601025-204	A



PLAN VIEW



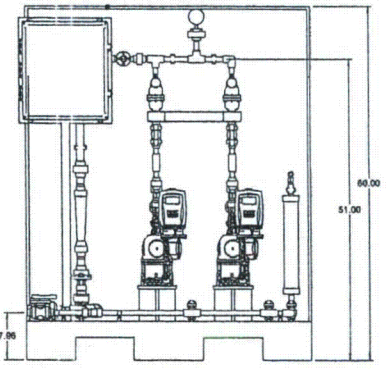
ISOMETRIC VIEW



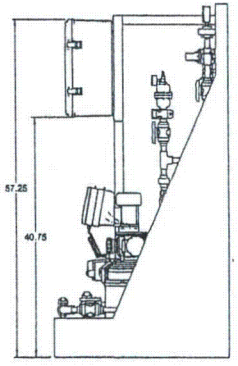
PIPING SCHEMATIC

NOTES:

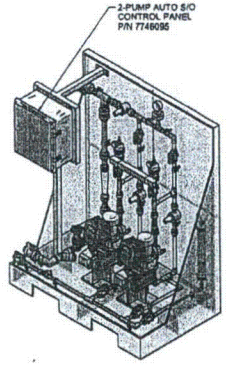
1. ALL PIPING AND FITTINGS SHALL BE 1/2" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. ALL WATER DILUTION PIPING AND FITTINGS SHALL BE 1" SCH. 80 PVC SOCKET WELD WITH VITON SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
3. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



FRONT VIEW



SIDE VIEW



ISOMETRIC VIEW SHOWING ELEC. ENCLOSURE

ATTACHMENT 8, SH. 1 OF 1
ECP 13-0361-013
UNIT 2 EMERGENCY OVERFLOW STRUCTURE
SODIUM BISULFITE PUMP SKID

CUSTOMER	NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)
JOB No	2013601025
PURCHASE ORDER No	4502483123
TITLE	P2_S1CB_PVC/VITON_DILUTION WATER_7408 GENERAL ARRANGEMENT
TANK TK-13	

ENGINEERS SEAL

ProMinent®
THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA	WWW.PROMINENT.US
PROMINENT FLUID CONTROLS LTD. 490 SOUTHGATE DRIVE, GUELPH, ONTARIO, CANADA N1H 6J3 TEL 519 836 7922 FAX 519 836 1291	PROMINENT FLUID CONTROLS INC. RIDC PARK WEST 136 INDUSTRY DRIVE, PITTSBURGH P.A., USA. 15275 TEL 412 787 2484 FAX 412 787 4704

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/25/13

MAXIMUM TESTING PRESSURE =	150 PSI
MAXIMUM OPERATING PRESSURE =	145 PSI
CHEMICAL SERVICE =	DILUTION WATER

DWG No	REV	PAGE
2013601025-204	A	1/1

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	FINAL APP. PDS ISSUE SUP: D.P.PRICE 7-3-14
DRAWN BY	L.R.HAMIL	
DES/CK'D	JMP	
ENG/APP'D	DMH	

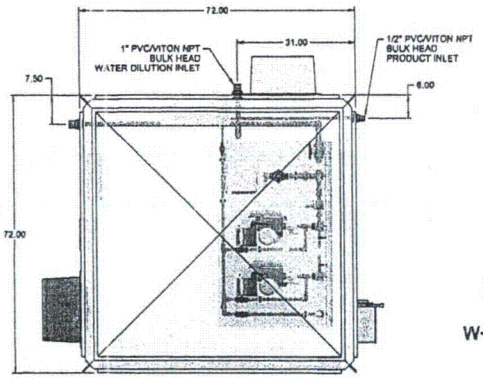
BEAVER VALLEY POWER STATION UNIT NO. 2

VENDOR DRAWING NO.	2013601025-204	DRAWING TITLE	CHEMICAL INJECTION SERVICE WATER EMERGENCY OVERFLOW STRUCTURE PUMP SKID ARRANGEMENT
REV.	A	REV. DATE	12-19-13
VENDOR COMPANY NAME	PROMINENT (PFC)	A	FENOC DRAWING NO. 2002.371-000-002 REV. A

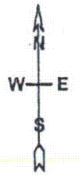
PREPARED ON THE BVPS CAEDD SYSTEM

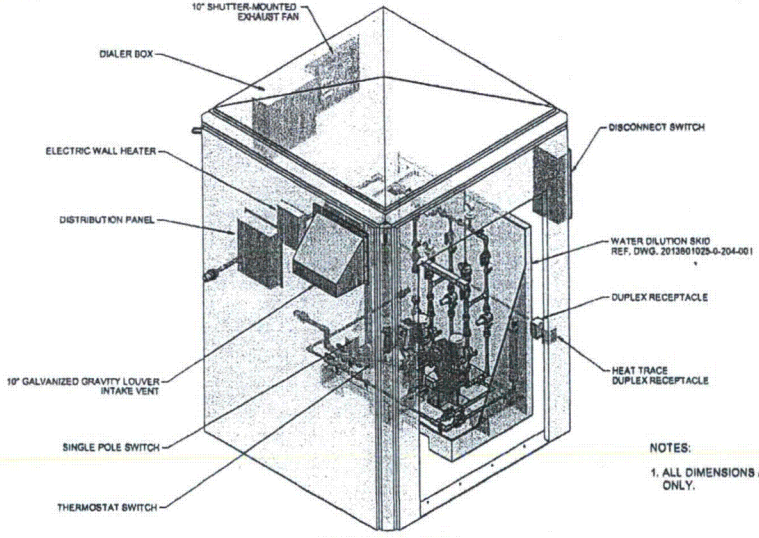
No. 2002.371-000-003

DWG No	REV
2013601025-208	B



PLAN VIEW

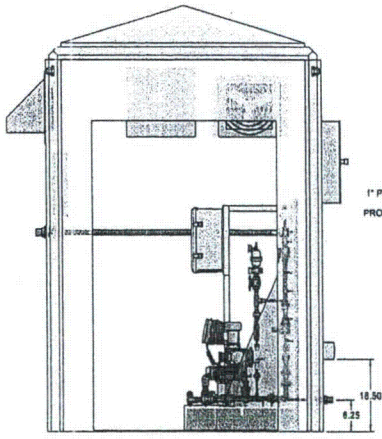




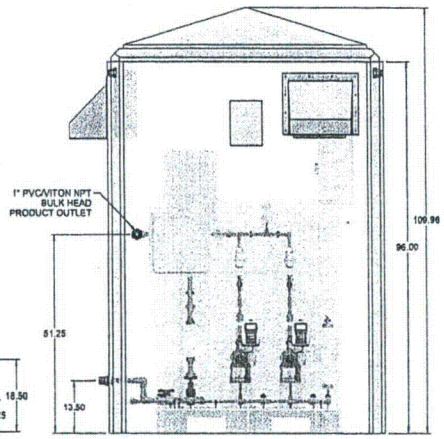
ISOMETRIC VIEW

NOTES:

1. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



FRONT VIEW



SIDE VIEW

REV	DATE	DESCRIPTION	BY	APP'D	REV'D
B	01/23/14	PER CUSTOMER COMMENTS	JDB		
A	12/20/13	PER CUSTOMER COMMENTS	JDB		
0	11/26/13	FIRST ISSUE	JDB		

REVISIONS

CUSTOMER: NALCO COMPANY (FIRST ENERGY BEAVER VALLY NUCLEAR)

JOB No: 2013601025 | PURCHASE ORDER No: 4502483123

TITLE: WATER DILUTION SKID W/ENCLOSURE GENERAL ARRANGEMENT

ENGINEERS SEAL

ProMinent®
THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA WWW.PROMINENT.US

PROMINENT FLUID CONTROLS LTD
490 SOUTHGATE DRIVE
GUELPH, ONTARIO, CANADA
N1H 8J3
TEL 519 836 7555 FAX 519 836 7228

PROMINENT FLUID CONTROLS INC.
RIDC PARK WEST
136 INDUSTRY DRIVE,
PITTSBURGH P A., USA 15275
TEL 412 787 2484 FAX 412 787 8764

DESIGNED	JDB	APPROVED	XXX
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	11/26/13

DWG No	REV	PAGE
2013601025-208	B	1/1

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT NO. 2

DATE	6-24-14	FINAL APP. FOR ISSUE BY:	
DRAWN BY	L.R.HAMIL		
DESIGN	JMP	D.P.PRICE 7-3-14	
ENGINEER	DMH		

VENDOR DRAWING NO.: 2013601025-208 REV. B REV. DATE 1-23-14

VENDOR COMPANY NAME: PROMINENT (PFC)

DRAWING TITLE: CHEMICAL INJECTION SERVICE WATER EMERGENCY OVERFLOW STRUCTURE PUMP ENCLOSURE ARRANGEMENT

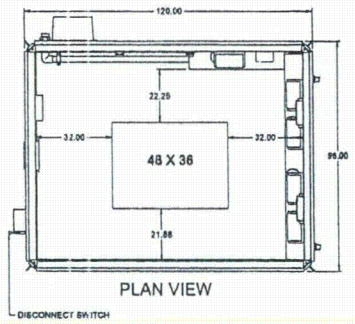
A | FENOC DRAWING NO.: 2002.371-000-003 | REV. A

$$$DATE$$$TIME$$$ $$DESIGN$$FILE$$SPECIFICATION$$

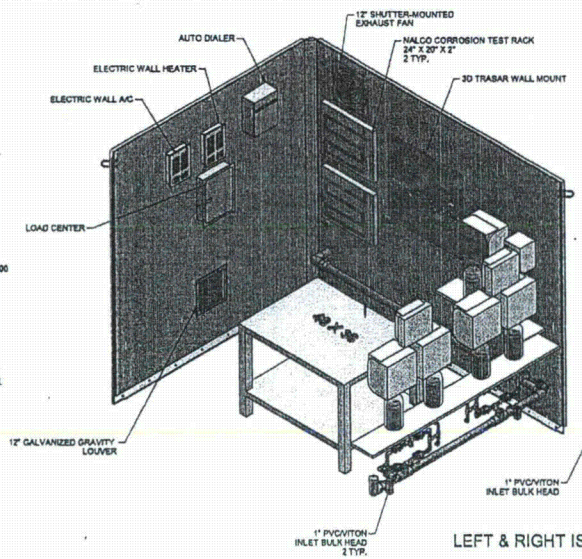
PREPARED ON THE BIPS CADDI SYSTEM

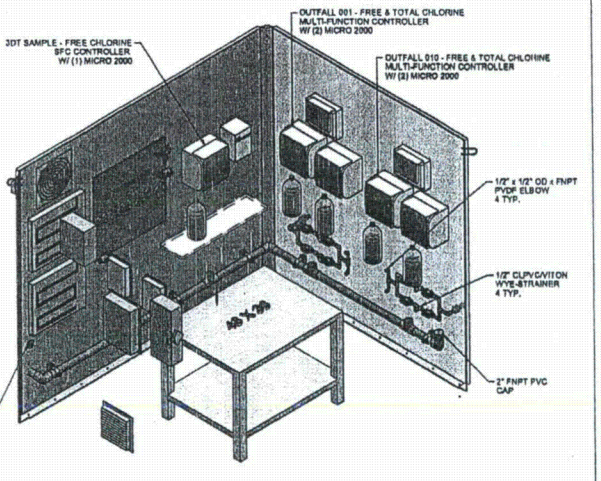
No. 02.037-0010

DWG No SK_2013601025-210 REV C



PLAN VIEW



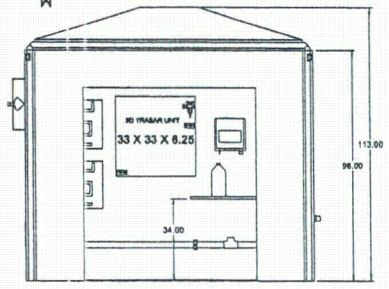


LEFT & RIGHT ISOMETRIC VIEW

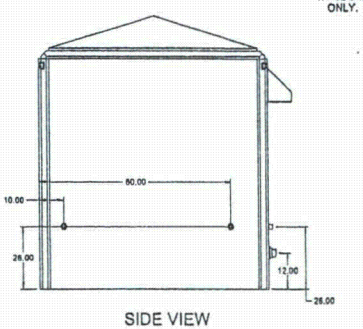
N W E S

SHELTER WORKS NOTES:

1. EAST WALL SHELF RUNS FULL LENGTH OF WALL
2. NORTH WALL SHELF IS TO BE 48" IN LENGTH MEASURING FROM EAST WALL AND NORTH WALL CORNER.



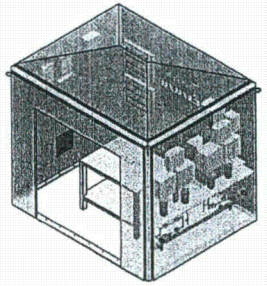
FRONT VIEW



SIDE VIEW

NOTES:

1. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



ISOMETRIC VIEW

REV	DATE	DESCRIPTION	BY	APPD	REVD
C	07/30/14	UPDATED PROPOSED LAYOUT	JDB		
B	07/11/14	UPDATED PROPOSED LAYOUT	JDB		
A	06/12/14	ADDED COUPON RACK	JDB		
0	05/21/14	FIRST ISSUE	JDB		

REVISIONS

CUSTOMER: NALCO COMPANY (BEAVER VALLEY NUCLEAR)

JOB No: 2013601025 PURCHASE ORDER No:

TITLE: CONCEPTUAL ANALYZER BLDG. LAYOUT GENERAL ARRANGEMENT

ENGINEERS SEAL

pfc ProMinent® THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA WWW.PROMINENT.US

PROMINENT FLUID CONTROLS LTD
490 SOUTHGATE DRIVE
GUELPH, ONTARIO, CANADA
N1H 8J9
TEL 519 836 8492 FAX 519 836 8493

PROMINENT FLUID CONTROLS INC
1900 PARK WEST
136 INDUSTRY DRIVE
PITTSBURGH PA., USA. 15275
TEL 412 787 2481 FAX 412 787 8164

DESIGNED	JDB	APPROVED	
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	05/21/14

DWG No SK_2013601025-210 REV C PAGE 1/1

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

REVISIONS

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

DATE	8-7-14	
DRAWN BY	J.M.POPE	
APPROVED	MGB	
ENGINEER	DMH	

FINAL APP. FOR ISSUE SUP: D.P.PRICE 8-7-14

BEAVER VALLEY POWER STATION UNIT NO. 2

VENDOR DRAWING NO. SK_2013601025-210 REV. C REV. DATE 7-30-14

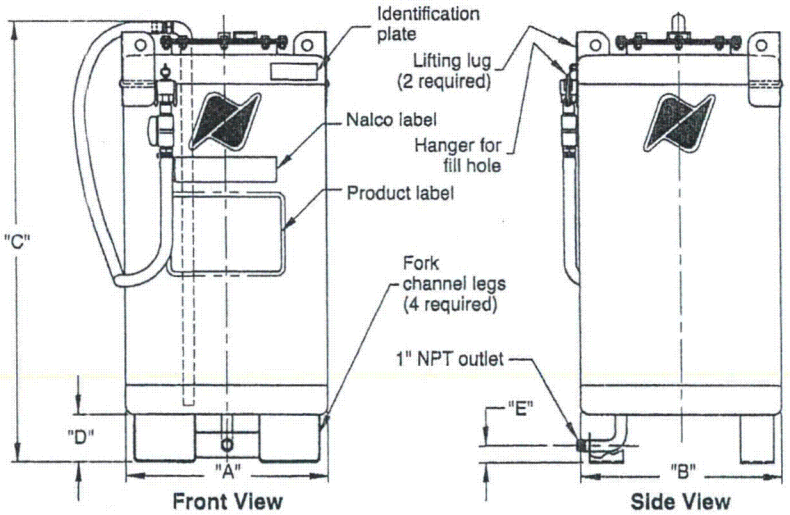
VENDOR COMPANY NAME: PROMINENT (PFC)

DRAWING TITLE: UNIT 2 CHEMICAL INJECTION EMERGENCY OVERFLOW ANALYZER BUILDING

A FENOC DRAWING NO. 02.037-0010 REV. A

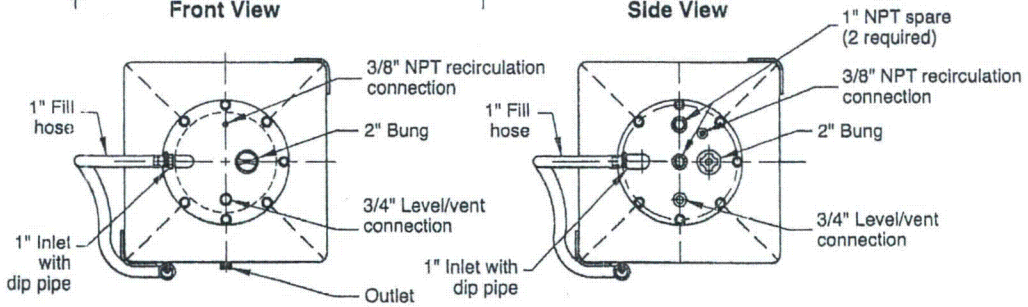
PREPARED ON THE BVPS CAEDDI SYSTEM

No. 03.047-0039



Front View

Side View



Plan View - Standard Unit

Plan View - P. E. Lined Unit

Design Specifications		
	Standard Unit	P. E. Lined Unit
Dimension "A"	24 inches	24 inches
Dimension "B"	24 inches	24 inches
Dimension "C"	52 13/16 inches	54 3/16 inches
Dimension "D"	5 3/4 inches	5 3/4 inches
Dimension "E"	2 1/16 inches	2 1/16 inches
Weight (empty)	124 lb	159 lb
Volume capacity (nominal)	100 gallons	100 gallons
Typical refill	55 gallons	55 gallons

Materials of construction:
- 304 Stainless steel
- 304 Stainless steel with PEL (polyethylene lined)
- 316L Stainless steel

Accessories for feeding, inventory control and transfilling are available from Nalco's Equipment Solutions group.

Notes:
1. Front and side views show standard unit. P. E. lined unit varies slightly.
2. Materials and fittings on dedicated units may vary.

NALCO PORTA-FEED® Mini Plus Base Tank
Sustainable Packaging Systems

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	FINAL APP. FOR ISSUE SUP:	D.P.PRICE 7-3-14
DRAWN BY	L.R.HAMIL		
DESIGN	JMP		
CHK'D/DN	DMH		

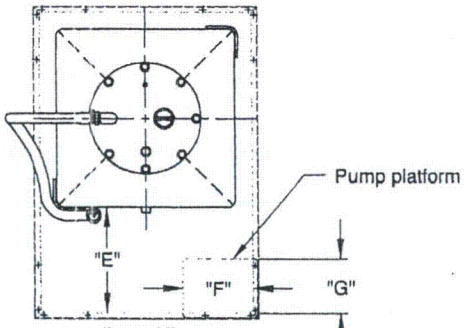
BEAVER VALLEY POWER STATION UNIT NO. 1

VENDOR DRAWING NO. N/A
REV. N/A REV. DATE N/A
VENDOR COMPANY NAME NALCO CO.

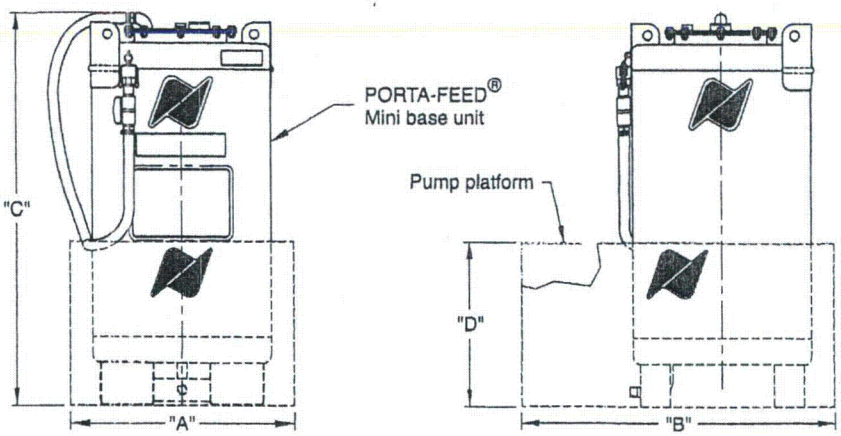
DRAWING TITLE: CHEMICAL INJECTION FIRE PROTECTION 110 GALLON STORAGE TANK ASSEMBLY DRAWING

A | FENOC DRAWING NO. 03.047-0039 | REV. A

PREPARED ON THE BVPS CAEDDI SYSTEM



Plan View



Front View

Side View

Design Specifications		
	Standard Basin	P. E. Lined Basin
Dimension "A"	30 1/8 inches	30 1/8 inches
Dimension "B"	42 1/8 inches	42 1/8 inches
Dimension "C"	52 7/8 inches	54 3/8 inches
Dimension "D"	22 1/8 inches	22 1/8 inches
Dimension "E" (recommended)	14 1/4 inches	14 1/4 inches
Dimension "F"	9 3/8 inches	9 3/8 inches
Dimension "G"	7 3/8 inches	7 3/8 inches
Basin weight (empty)	64 lb	87 lb
Basin volume capacity	120 gallons	118 gallons
Basin stainless steel wall thickness	14 gauge	14 gauge□

Materials of construction:
- 304 Stainless steel
- 304 Stainless steel with PEL (polyethylene lined)

Accessories for feeding, inventory control and transfilling are available from Nalco's Equipment Solutions group.

Notes:
1. Standard unit shown. P. E. lined unit varies slightly.
2. Materials and fittings on dedicated units may vary.

NALCO PORTA-FEED® Mini Plus Base Tank
Sustainable Packaging Systems

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FirstEnergy Nuclear Operating Company

DATE	6-24-14	FINAL APP. FOR ISSUE SUP:	D.P.PRICE 7-3-14
DRAWN BY	L.R.HAMIL		
SPEC/CHK	JMP		
ENGR/CHK	DMH		

BEAVER VALLEY POWER STATION UNIT NO. 1

VENDOR DRAWING NO. N/A
REV. N/A REV. DATE N/A
VENDOR COMPANY NAME NALCO CO.

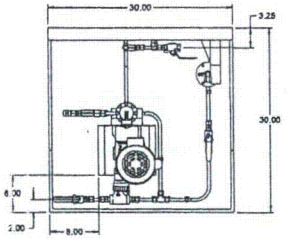
DRAWING TITLE
CHEMICAL INJECTION FIRE PROTECTION
110 GALLON STORAGE TANK
ASSEMBLY DRAWING

A | FENOC DRAWING NO. 03.047-0040 | REV. A

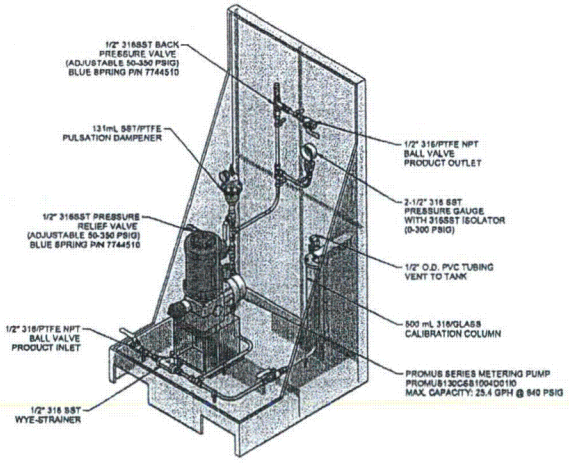
PREPARED ON THE BVPS CAEDDY SYSTEM

No. 02.037-0009

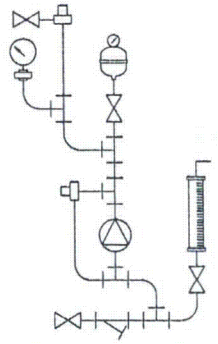
DWG No	REV
3014800347-200	0



PLAN VIEW



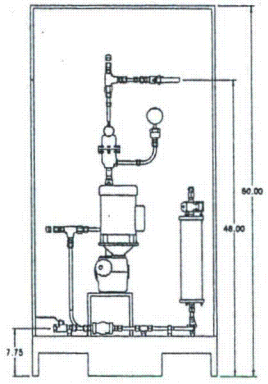
ISOMETRIC VIEW



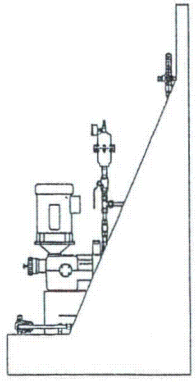
PIPING SCHEMATIC

NOTES:

1. ALL PIPING AND FITTINGS SHALL BE 1/2" O.D 316SST TUBING AND COMPRESSION FITTINGS WITH PTFE SEALS UNLESS OTHERWISE REQUIRED BY COMPONENTS.
2. ALL DIMENSIONS ARE IN INCHES AND ARE SHOWN FOR REFERENCE ONLY.



FRONT VIEW



SIDE VIEW

REV	DATE	DESCRIPTION	BY	APPD
0	07/15/14	RELEASE FOR PRODUCTION	JDB	

REVISIONS

CUSTOMER: NALCO COMPANY (BEAVER VALLEY FPS SKID)

JOB No: 3014800347 | PURCHASE ORDER No: LOI-NALCO BEAVER V

TITLE: MS1A-A050_FLOOR_SST/TFE_PD GENERAL ARRANGEMENT

ENGINEERS SEAL

ProMinent® THE PROMINENT GROUP OF COMPANIES

PITTSBURGH, PA USA — WWW.PROMINENT.US

PROMINENT FLUID CONTROLS LTD. 490 SOUTHGATE DRIVE GUELPH, ONTARIO CANADA N1H 6J3 TEL 519 836 0410 FAX 519 836 2329

PROMINENT FLUID CONTROLS INC RIDC PARK WEST 136 INDUSTRY DRIVE PITTSBURGH P.A. USA 15275 TEL 412 787 2484 FAX 412 787 0704

DESIGNED	JDB	APPROVED	KBP
DRAWN	JDB	SCALE	N.T.S.
CHECKED	KBP	DATE	07/15/14

MAXIMUM TESTING PRESSURE =	150 PSI
MAXIMUM OPERATING PRESSURE =	640 PSI
CHEMICAL SERVICE =	NA

DWG No	REV	PAGE
3014800347-200	0	1/1

REVISIONS

MANUFACTURER REFERENCE DRAWING; NO P.E. SEAL REQUIRED.

FENOC FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION UNIT NO. 1

DATE	6-24-14		
DRAWN BY	L.R.HAMIL		
CHECKED	JMP	FINAL APP. FOR ISSUE SUP:	D.P.PRICE 7-3-14
ENGR/DES	DMH		

VENDOR DRAWING NO.: 3014800347-200 | REV. 0 | REV. DATE 7-16-14

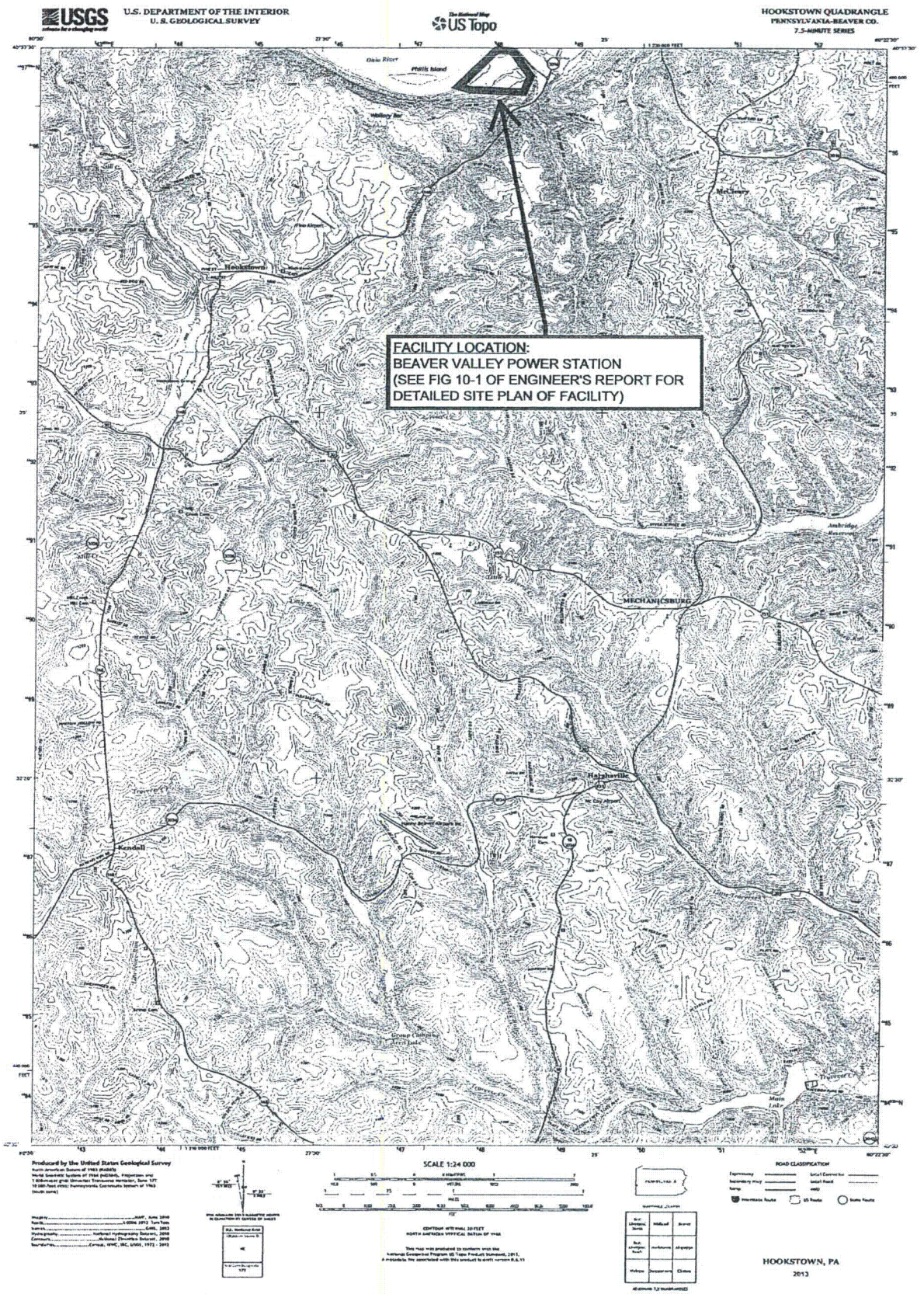
VENDOR COMPANY NAME: PROMINENT (PFC)

DRAWING TITLE: CHEMICAL INJECTION FIRE PROTECTION PUMP SKID ARRANGEMENT

A | FENOC DRAWING NO. 02.037-0009 | REV. A

PREPARED ON THE BVPS CAEDDI SYSTEM

TOPOGRAPHIC / LOCATION MAP



FENOC™
FirstEnergy Nuclear Operating Company

76 South Main Street
Akron, Ohio 44308-1890

April 10, 2013

Shippingport Borough of Supervisors
164 State Route 3016
Shippingport, Pennsylvania 15077

Dear Supervisors:

Re: FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Water Quality Management (WQM) Part II Permit Application

In accordance with Act 14, P.L. 834, this notice is to inform you of FirstEnergy Nuclear Operating Company's (FENOC's) intent to submit to the Pennsylvania Department of Environmental Protection (PADEP) a WQM Part II Permit Application. The application is for a dechlorination system associated with the power station's river water/service water circulating water system.

If you have any questions regarding this WQM Part II application, please call me at 330 384-4643 or by email at browns@firstenergycorp.com.

Sincerely,

Scott F. Brown
Senior Engineer

By UPS Ground

FENOC™
FirstEnergy Nuclear Operating Company

76 South Main Street
Akron, Ohio 44308-1890

April 10, 2013

Mr. Tony Amadio, Chairman
Board of Commissioners
Beaver County Court House
810 Third Street
Beaver, Pennsylvania 15009

Dear Mr. Amadio:

Re: FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Water Quality Management (WQM) Part II Permit Application

In accordance with Act 14, P.L. 834, this notice is to inform you of FirstEnergy Nuclear Operating Company's (FENOC's) intent to submit to the Pennsylvania Department of Environmental Protection (PADEP) a WQM Part II Permit Application. The application is for a dechlorination system associated with the power station's river water/service water circulating water system.

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Sincerely,

Scott F. Brown
Senior Engineer

By UPS Ground