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50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylva 05000388
AUTH. NAME AUTHOR AFFILIATION
FIELDS, J. S. Pennsylvania Power & Light Co.
RECIP. NAME RECIPIENT AFFILIATION
LABUZ, J. P. Pennsylvania, Commonwealth of

SUBJECT: Forwards application for public water supply permit. Station utilizes Susquehanna River water to supply domestic water treatment sys. Fee paid.

DISTRIBUTION CODE: C001D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 71
TITLE: Licensing Submittal: Environmental Rept Amdt & Related Correspondence

NOTES: 1cy NMSS/FCAF/PM. LPDR 2cys Transcripts. 05000387
OL: 07/17/82
1cy NMSS/FCAF/PM. LPDR 2cys Transcripts. 05000388
OL: 03/23/84

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	ELD/HDS4		1	0	NRR BWR ADTS		1	1
	NRR PWR-A ADTS		1	1	NRR PWR-B ADTS		1	1
	REG FILE		1	1	RGN1		1	1
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NOTES:			3	3				

TOTAL NUMBER OF COPIES REQUIRED: LTTR 24 ENCL 22

PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

December 6, 1985

Mr. James P. LaBuz
Water Supply Engineer
Bureau of Community Environmental Control
Pennsylvania Department of Environmental Resources
90 East Union Street, Second Floor
Wilkes-Barre, PA 18702-3296

SUSQUEHANNA STEAM ELECTRIC STATION
DRINKING WATER PERMIT APPLICATION-SURFACE SOURCE
CCN 741326 FILE 012-3
PLE-7838

Dear Mr. LaBuz:

Enclosed are two copies of the public water supply permit application for the Susquehanna Steam Electric Station. The Station utilizes Susquehanna River water to supply the domestic water treatment system. Following treatment, the potable water is distributed to buildings located within the site boundary. The surface water source provides a majority of the domestic water needs on site. A well water system provides water to a small number of isolated buildings. A short descriptive form for the wells has been submitted under separate cover.

A $750 check payable to the Commonwealth of Pennsylvania is also included with this package. The check is intended to cover the permit fee as required by the Pa DER Safe Drinking Water Regulations.

If you have any questions regarding the information contained in this permit application package, I can be reached at (215) 770-7889.

Respectfully yours,

Jerome S. Fields

Jerome S. Fields
Senior Environmental Scientist-Nuclear

JSF/amc

chs1tk004309c

Attachment

cc: Ms. E. Adensam NRC, w/a

Cool

ER-CCE-41: 4/81

Date Prepared
11/27/85

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF COMMUNITY ENVIRONMENTAL CONTROL

APPLICATION FOR PUBLIC WATER SUPPLY PERMIT

FOR DEPARTMENT USE ONLY

A. APPLICANT (Name and Address of Water Company)

Pennsylvania Power & Light Company
Susquehanna Steam Electric Station
P. O. Box 467
Berwick, PA 18603 (see attachment)

TELEPHONE NO. (717) 542-3800

B. PROJECT LOCATION

Serving Water to the Public within:
Municipality: Salem Township

County: Luzerne

C. HEREBY APPLIES FOR APPROVAL OF PLANS AND PERMIT OF THE FOLLOWING:

FOR: 1. ☐ Use as Source of Supply ☐ Construction ☒ Operation

4. SOURCE

☐ Well(s) ☐ Spring(s)
☒ Stream ☐ Lake

Known As: Susquehanna River

5. FACILITIES

☐ Impoundment
☒ Settling
☒ Filtration
☐ Iron Removal
☐ Softening
☒ Disinfection
☒ Pump Station(s)
☐ Transmission Lines
☒ Distribution Storage
☒ Distribution System

I hereby certify that the completeness report and all plans, modules, and documents designated therein are attached to this application, and made a part hereof.

H. W. Keiser
Name of Responsible Water Company Official

Name of Responsible Water Company Official	Title	Date of Application
H. W. Keiser	Vice Pres.-Nuclear Operations	12-6-85

Address
Pennsylvania Power & Light Company (A6-1)
Two North Ninth Street, Allentown, PA 18101-1179

AFFIDAVIT

Commonwealth of Pennsylvania, County Of Lehigh

I, H. W. Keiser, being duly sworn, according to law, depose and say that I (am the applicant) (am an officer or official of the applicant) (have the authority to make this application) and that the plans, reports and documents submitted as part of the application are true and correct to the best of my knowledge and belief.

Sworn and Subscribed to before me this 6th Day of December 19 85

CHERYL R. COHEN, Notary Public
Allentown, Lehigh County, Pa.
My Commission Expires Feb. 6, 1989

Cheryl R. Cohen
Notary Public

H. W. Keiser
Name of Responsible Water Company Official

THE SECTION BELOW IS TO BE COMPLETED BY THE DESIGN ENGINEER AUTHORIZED BY THE APPLICANT TO PREPARE THIS APPLICATION

Name of Design Engineer and Firm
Douglas H. Gordon, F&M Associates, Inc.

Mailing Address: 1132 Hamilton St., Allentown, PA 18101

Telephone Number: 215/432-4531

Agreement Date: 11/27/85

Signature of Design Engineer: Douglas H. Gordon

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEERS
DOUGLAS H. GORDON
SEAL
ENGINEER
No. 498-K

APPLICATION FOR PUBLIC WATER SUPPLY PERMIT

The Susquehanna Steam Electric Station is wholly owned through a cooperative agreement where Pennsylvania Power and Light Company retains 90 percent ownership and Allegheny Electric Cooperative Inc. retains 10 percent ownership.

Pennsylvania Power & Light Company
Two North Ninth Street
Allentown, PA 18101-1179
(215) 770-5151

Allegheny Electric Cooperative Inc.
212 Locust Street
P. O. Box 1266
Harrisburg, PA 17108-1266
(717) 233-5704

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DATE PREPARED 11/27/85

DATE REVISED

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY
MODULE 1 – COMPLETENESS REPORT

For Department Use Only

DESIGN ENGINEER AND FIRM: Mr. Jack Weyandt, Project Engineer
Bechtel Power Corp., San Francisco, CA

ADDRESS: P. O. Box 3965 ZIP CODE: 94119 TELEPHONE: 415/768-2753

NAME OF WATER WORKS: Susquehanna Steam Electric Station Domestic Water System

LOCATION OF PROJECT: MUNICIPALITY: Salem Township COUNTY: Luzerne

DESCRIPTION OF PROJECT: The surface water supply is used both for circulating and drinking water systems for the Susquehanna Steam Electric Station. Surface water is used for drinking in main plant buildings and some additional site buildings. All other site buildings use well water or bottled water. Brief permits are being submitted separately for the well water sources.

A. DOCUMENTATION REQUIRED

1. HAS APPLICATION FORM BEEN SUBMITTED? [X] Yes [ ] No

2. DOES THE APPLICATION INCLUDE 2 COPIES OF EACH OF THE FOLLOWING APPLICABLE MODULES (OR 3 COPIES, IF UNDER JURISDICTION OF THE DELAWARE RIVER BASIN COMMISSION):

MODULE NUMBER	TITLE	NUMBER OF PAGES	
1	COMPLETENESS REPORT	4	[X] Yes
2	GENERAL DESIGN DATA	10	[X] Yes
3	WELLS	6	[ ] Yes
4	PRETREATMENT	6	[ ] Yes
5	SUSPENDED SOLIDS CONTACT UNITS	3	[X] Yes
6	SOFTENING	4	[ ] Yes
7	FILTERS	5	[X] Yes
8	DISINFECTION	4	[X] Yes
9	IRON AND MANGANESE REMOVAL	4	[ ] Yes
10	CORROSION CONTROL	1	[ ] Yes
11	TASTE AND ODOR CONTROL	3	[ ] Yes
12	FLUORIDATION	5	[ ] Yes
13	PUMPING STATIONS	9	[X] Yes

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY
MODULE 1 – COMPLETENESS REPORT

For Department Use Only

A. DOCUMENTATION REQUIRED – CONTINUED

MODULE NUMBER	TITLE	NUMBER OF PAGES	
14	RESERVOIRS, ELEVATED TANKS, STANDPIPES AND PRESSURE TANKS	4	[X] Yes
15	DISTRIBUTION SYSTEMS	4	[X] Yes
			[ ] Yes
16	OTHER _____		

B. REQUIRED GRAPHIC DATA

1. HAVE 2 COPIES (3 IF UNDER JURISDICTION OF DELAWARE RIVER BASIN COMMISSION) OF THE DESIGNER'S PLANS AND SPECIFICATIONS BEEN SUBMITTED? [X] Yes [ ] No

2. DOES THE FRONT COVER OR FLYLEAF OF EACH SET OF DRAWINGS AND SPECIFICATIONS BEAR THE SIGNATURE AND SEAL OF THE REGISTERED PROFESSIONAL ENGINEER BY OR UNDER WHOM PREPARED? [ ] Yes [X] No

3. DOES EACH DRAWING BEAR AN IMPRINT OR REASONABLE FACSIMILE OF SUCH SEAL? [ ] Yes [X] No

4. DO THE PLANS INCLUDE THE FOLLOWING:

   A. TOPOGRAPHIC MAPS? [X] Yes [ ] No

   B. GENERAL LAYOUTS? [X] Yes [ ] No

   C. PLAN VIEWS? [X] Yes [ ] No

   D. ELEVATIONS? [X] Yes [ ] No

   E. SECTIONS AND SUPPLEMENTARY VIEWS? [X] Yes [ ] No

   F. LOCATIONS OF EXISTING AND POTENTIAL SOURCES OF POLLUTION FOR:

      (1) SEWAGE? [X] Yes [ ] No [ ] N/A

      (2) INDUSTRIAL WASTE? [X] Yes [ ] No [ ] N/A

      (3) MINE DRAINAGE? [X] Yes [ ] No [ ] N/A

      (4) SUBSURFACE DISPOSAL UNITS? [ ] Yes [ ] No [X] N/A

   G. DATUM USED? [X] Yes [ ] No

   H. NORTH POINT? [X] Yes [ ] No

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY
MODULE 1 – COMPLETENESS REPORT

For Department Use Only

B. REQUIRED GRAPHIC DATA – CONTINUED

I. BOUNDARIES OF MUNICIPALITIES? Site boundaries	[X] Yes	[ ] No		
J. WATER DISTRICTS AND AREAS TO BE SERVED?	[X] Yes	[ ] No		
K. COMPLETE TOPOGRAPHY OF DRAINAGE AREA AND SITES?	[X] Yes	[ ] No		
L. LOCATIONS, DIMENSIONS AND ELEVATIONS OF STRUCTURES AND PIPING?	[X] Yes	[ ] No		
M. LOCATIONS AND OUTLINE FORM OF EQUIPMENT?	[X] Yes	[ ] No		
N. WATER LEVELS AND FLOOD LEVELS? Drawing #E162155, Sh. 3	[X] Yes	[ ] No		
O. LOCATIONS AND LOGS OF TEST BORINGS AND WELLS?	[ ] Yes	[ ] No	[X]	N/A
P. DIAMETER AND DEPTH OF WELL CASING AND LINER?	[ ] Yes	[ ] No	[X]	N/A
Q. GRAPHIC SCALE IN FEET?	[X] Yes	[ ] No		
R. SUITABLE TITLE OF APPLICANT, INCLUDING DATE?	[X] Yes	[ ] No		

5. ARE THE PLANS:

A. CLEAR, LEGIBLE, AND DRAWN TO SCALE?	[X] Yes	[ ] No		
B. WITHIN MAXIMUM SIZE OF 36 INCHES BY 50 INCHES? List of references is attached.	[X] Yes	[ ] No		

C. SPECIFICATIONS

1. ARE COMPLETE DETAILED SPECIFICATIONS SUPPLIED FOR THE PROPOSED PROJECT?	[X] Yes	[ ] No		
2. DO THE SPECIFICATIONS INCLUDE A PROGRAM FOR KEEPING EXISTING WATER WORKS FACILITIES IN OPERATION TO PROVIDE A SAFE, POTABLE WATER SUPPLY AT ALL TIMES?	[ ] Yes	[ ] No	[X]	N/A

D. CODES

1. WILL THE PROPOSED FACILITIES MEET THE RELEVANT REQUIREMENTS OF GOOD PRACTICES CODES AS LISTED IN THE PENNSYLVANIA PUBLIC WATER SUPPLY MANUAL? Except as noted in this application.	[X] Yes	[ ] No		

E. BEGINNING OPERATION

1. WILL THE DEPARTMENT OF ENVIRONMENTAL RESOURCES BE NOTIFIED BY THE APPLICANT OR HIS REPRESENTATIVE BEFORE WATER SUPPLIES OR ADDITIONS/MAJOR ALTERATIONS TO EXISTING SUPPLIES ARE PLACED IN OPERATION? Already in operation. The Pa. DER will be notified of any major additions or alterations.	[X] Yes	[ ] No		

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11/27/85
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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY
MODULE 1 – COMPLETENESS REPORT

For Department Use Only

F. LABORATORY ANALYSES

1. WILL ALL FUTURE OPERATIONAL BACTERIOLOGICAL AND CHEMICAL LABORATORY ANALYSES BE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER," 12TH EDITION, AMERICAN PUBLIC HEALTH ASSOCIATION? [X] Yes [ ] No

Latest or 16th Edition.

G. OTHER STATE APPROVALS

1. HAS APPLICATION BEEN MADE:

A. TO THE DEPARTMENT FOR ALLOCATION OF WATER OR FOR CHANGE OF NATURAL STREAM CONDITIONS? [X] Yes [ ] No [ ] N/A

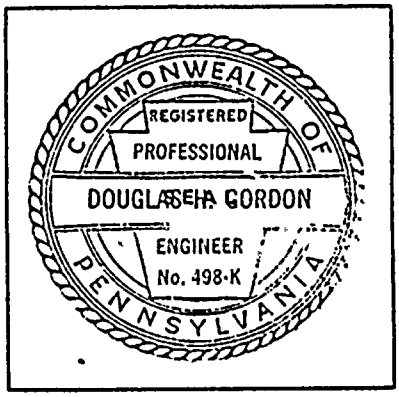
B. TO THE PUBLIC UTILITY COMMISSION FOR A CERTIFICATE OF PUBLIC CONVENIENCE? [ ] Yes [ ] No [X] N/A

C. TO THE DEPARTMENT FOR AN INDUSTRIAL WASTE PERMIT? [X] Yes [ ] No [ ] N/A

H. SEAL AND SIGNATURE OF PROFESSIONAL ENGINEER

1. SIGNATURE OF PROFESSIONAL ENGINEER Douglas H. Gordon

2. PROFESSIONAL ENGINEER REGISTRATION SEAL



List of References

Drawings

E-105151	Plant Location Site Plan
E-105941-11	Existing Ground Elevations
E-105181-1	Fencing General Layout
E-105082-1	River Intake Structure-Pre-engineered Building
E-105082-2	River Intake Structure Details
E-162155-1	River Intake Structure Area 57, Plan of EL 472' - 0"
SH-2	River Intake Structure Area 57, Plan of EL 526' - 0"
SH-3	River Intake Structure Area 57, Section A-A
SH-4	River Intake Structure Area 57, Miscellaneous Sections
E-162156-1	River Intake Structure Area 58, Plan of EL 526' - 0"
SH-2	River Intake Structure Area 58, Miscellaneous Sections
E-106315	River Intake Structure, Equipment Location
E-105816-1	River Intake Structure Area Finish Grades
SH-2	River Intake Structure Area Finish Grades
SH-3	River Intake Structure Area Finish Grades
E-106205-1	P&ID Legend and Symbols
SH-2	P&ID Legend and Symbols
SH-3	P&ID Legend and Symbols
E-106286	River Intake Structure P&ID Air Flow Diagram
E-106686	River Intake Structure HVAC Control Diagrams
8856-M-53-1	River Intake Structure Make-up Water Pump Data Sheet
E-106233	Make-up Water Supply, P&ID
E-162378	Make-up Water Supply Scoping Document

Drawings Continued

E-105194-1	Make-up Water Pipe, Plan and Profile
SH-2	Make-up Water Pipe, Plan and Profile
SH-3	Make-up Water Pipe, Plan and Profile
SH-4	Make-up Water Pipe, Plan and Profile Finish Grades
E-105196	Make-up Water Pipe, Plan and Profile Details
E-105814-1	Deicing and Make-up Water Pipe Details
E-106201-1	Water Treatment Building Area 54, Plan of EL 661' - 0"
SH-2	Water Treatment Building Area 54, Plan of EL 676' - 0"
SH-3	Water Treatment Building Area 54, Plan of EL 693' - 0"
SH-4	Water Treatment Building Area 54, Section A-A
SH-5	Water Treatment Building Area 54, Miscellaneous Sections
E-106337-1	Water Treatment Building Equipment Location EL 661' - 0"
SH-2	Water Treatment Building Equipment Location EL 676' - 0"
SH-3	Water Treatment Building Sections A-A, B-B and C-C
E-106222-1	Raw Water Treatment, PI&D
SH-2	Raw Water Treatment, PI&D
E-162368-1	Raw Water Treatment PI&D, PI&D Document
SH-2	Raw Water Treatment PI&D Scoping Document
FF105810-0501	Reactivator with Clearwell, Internal Assembly
SH-0701	Chemical Feed Tanks and Pumps, Skid Assembly
SH-0401	Monovalve Filters, Assembly
SH-0801	Layout, Inter Connecting Piping
SH-4901	Automatic Hypocholorinators, Installation
SH-0301	Domestic Water Storage Tank
E-105794	Clarified Water Tank Foundation
E-105178-1	Finish Grades and Yard Piping, On Site
thru SH-14	Finish Grades and Yard Piping, On Site

List of References

Specifications

Civil and Structural Design Criteria for the Susquehanna Steam Electric Station

8856-C-27	Technical Specification, Field Erected Steel Tanks
8856-C-32	Technical Specification, Installation and Testing of Utility Pipe and Fitting
8856-C-33	Technical Specification Installation and Testing, Make-up Water Pipe
8856-E-75	Technical Specification, Completion of River Intake Structure
8856-M-18	Technical Specification, Miscellaneous Process Pump
8856-M-31	Technical Specification, Raw Water Treatment System
8856-M-35	Technical Specification, Intake Structure Screens
8856-M-37	Technical Specification, Rotary Strainers
8856-M-43	Technical Specification, Miscellaneous Tanks
8856-M-53	Technical Specification, Make-up and Screenwash Pumps
8856-M-351	Technical Specification, Plumbing and Drainage System

Water Quality Analysis

Lancaster Laboratory - Raw Susquehanna River Water Analysis

ER-BWQ-238.2

DATE PREPARED 11/27/85

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY

MODULE 2 – GENERAL DESIGN DATA

For Department Use Only

A. DESIGN DATA

TABLE I

Names Of Municipalities Served	POPULATION				
	Municipality	Presently Served	Proposed Or Additional	System Design	Design Year
Susquehanna SES (Salem Township)	--	1000-1500	None	1100	1975
TOTAL	--	1000-1500	None	1100	1975

TABLE II RELEVANT PERMITS, DECREES AND ORDERS ISSUED BY THE DEPARTMENT

Number Of Permit, Etc.	Date Of Issuance	Substance Of Permit, Order Or Decree
2400998	1980	U.S. EPA PWS ID No.

GIVE BRIEF NARRATIVE DESCRIPTION OF THE PROJECT.

Surface water from the Susquehanna River is treated by a treatment plant located in the Susquehanna SES's circulating water pumphouse and supplies non-community water to major buildings (Reactor, Radwaste, Turbine, Service and Administration, etc.) onsite. The system incorporates chemical addition, sedimentation, and filtration to remove impurities and suspended solids from the water. Disinfection and maintenance of a chlorine residual is achieved by adding hypochlorite solution to the raw and finished water.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY

MODULE 2 – GENERAL DESIGN DATA

For Department Use Only

A. DESIGN DATA – CONTINUED

TABLE III LIST ALL EXISTING AND PROPOSED FACILITIES (If More Space Is Needed, Use Additional Sheets)

To Be Discontinued	To Be Retained	New Or Additional	Type Facility	Name	Disinfection Provided
			SPRINGS		☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A
			WELLS		☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A
			RAW WATER RESERVOIRS		☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A
	X		INTAKES	Susquehanna SES river water intake structure	☐ Yes ☐ No ☒ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A
	X		RAW WATER PUMP STATIONS	Makeup water pumps	☐ Yes ☐ No ☒ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A
	X		TRANSMISSION LINES	Intake structure to Susquehanna SES-Makeup water piping	☐ Yes ☐ No ☒ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY
MODULE 2 – GENERAL DESIGN DATA

For Department Use Only

A. DESIGN DATA – CONTINUED

TABLE III LIST ALL EXISTING AND PROPOSED FACILITIES (If More Space Is Needed, Use Additional Sheets)

To Be Discontinued	To Be Retained	New Or Additional	Type Facility	Name	Disinfection Provided
	X		WATER TREATMENT PLANTS	Raw water treatment system (located in circulating water pumphouse, on-site).	[X] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A
	X		DISINFECTION FACILITIES	A) At entrance to clarifier B) At entrance to domestic water chlorine contact tank.	
	X		DISTRIBUTION SYSTEMS	Susquehanna SES on-site buildings	[X] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A
	X		DISTRIBUTION STORAGE	Clarified water storage tank Chlorine residual of 0.1 mg/l remains after clarification filtration	[ ] Yes [ ] No [X] N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A
	X		DISTRIBUTION PUMP STATIONS	Clarified water pumps	[X] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A
			OTHER		[ ] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ] No [ ] N/A

ER-BWQ-238.2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY
MODULE 2 – GENERAL DESIGN DATA

DATE PREPARED 11/27/85
DATE REVISED

For Department Use Only

B. GENERAL

TABLE IV

SOURCES					EXISTING AND PROPOSED WATER SOURCES	LOCATION BY LATITUDE AND LONGITUDE IN DEGREES, MINUTES AND SECONDS	CAPACITY OF FACILITIES **	YIELD (Mgd)	
Existing	Proposed	Type *	Primary	Secondary	NAME			Average Annual	Safe
X		6	X		Susquehanna River	41° 05' 30" North Latitude * and 76° 07' 45" West Longitude	29,000 gpm	*	*

DESCRIBE TOPOGRAPHY OF DRAINAGE BASINS FOR PROPOSED SOURCES. (Use Additional Sheets If Necessary)

The Susquehanna River is the principal hydrologic feature in the vicinity of the Susquehanna SES. The Susquehanna River Drainage Basin lies in the Northeastern portion of the United States, east of the Mississippi River, generally between latitudes 39° 30'N to 43° 00'N and longitudes 74° 30'W to 79° 00'W. The basin is the largest on the Atlantic seaboard of the United States and drains directly into Chesapeake Bay. The length of the Susquehanna Basin is about 250 miles (403 km) and its greatest width is about 170 miles (274 km). The total drainage area is 27,510 square miles (71,251 km^2) of which 6,270 (16239 km^2) are in south central New York, 20,950 (54,261 km^2) in central Pennsylvania, and 290 (751 km^2) in northeastern Maryland. The total drainage area upstream of the site is about 10,240 square miles (26,522 km^2). The basin is bounded by the drainage basins of Lake Ontario and the Mohawk River on the north, the Delaware River on the east, the Potomac River on the south, and the Genesee River and the Ohio River on the west.

Major tributaries upstream of the station include the Lackawanna and Chemung Rivers. The West Branch Susquehanna and the Juniata Rivers are the only major tributaries between the station and the river mouth at the head of Chesapeake Bay.

* INSERT APPROPRIATE NUMBER: 1 – Well 2 – Spring 3 – Infiltration 4 – Natural Lake 5 – Artificial Impoundment 6 – Flowing Stream
** SPECIFY Mgd, Gpd, or Gpm.

* See attachment

The 29,000 gpm is makeup water pumping capacity. Only a maximum of 300 gpm enters the raw water treatment system and the design peak flow to the domestic water system is 50 gpm.

The Susquehanna Steam Electric Station draws its domestic water needs from the makeup line which supplies cooling water to the power plant from the Susquehanna River. The average flow in the river at the site is 13,650 cubic feet per second (cfs). The design pumping capacity from the river water intake structure to the plant is 29,000 gpm (65 cfs). The raw water treatment system attains a maximum of 300 gpm of raw water from this flow when the treatment system is operating at full capacity.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY

MODULE 2 – GENERAL DESIGN DATA

For Department Use Only

C. QUANTITY OF ALL WATER SOURCES

TABLE V — DESIGN YEAR

Total Water Needs And Capacities	Quantity (Mgd) Existing	Quantity (Mgd) Design
WATER DEMAND, AVERAGE	0.025	0.036
WATER DEMAND, MAXIMUM	0.10	N/A
DESIGN CAPACITY	N/A	.072 mgd

1. ARE PERTINENT STREAM FLOW AND WEATHER RECORDS USED IN ESTIMATING THE SAFE YIELD OF THE SOURCE? [X] Yes [ ] No [ ] N/A

2. HAS EACH SOURCE BEEN TESTED FOR YIELD? [X] Yes [ ] No [ ] N/A

3. DISCUSS CONSIDERATION GIVEN TO THE PAST WATER USAGE, POPULATION GROWTH, TYPE AND GROWTH OF INDUSTRY, FIRE PROTECTION, INCREASING WATER USES, METERING PRACTICES, SEWAGE, COST OF WATER, WATER QUALITY, WATER LOSSES IN THE MAINS AND OTHER APPROPRIATE ITEMS.

The Susquehanna Steam Electric Station normally has 1100 working on shift each day. Current water usage is estimated by information gathered from monitors at the sewage treatment plant and from flow indicators in the domestic water treatment system. Present flow averages 25,000 gpd with peak daily flows of 100,000 gpd. The largest work force expected to use this system would be 2500 persons during power plant outages when more work is scheduled. The design flow of 72,000 gal. per day from the domestic water system is more than adequate to meet the demands.

A fire protection system reserves 300,000 gals. of water in the 500,000 gal. clarified water storage tank. Use of this water for fire fighting purposes will leave adequate reserve of water for domestic use.

(Continued)

4. IS THE QUANTITY OF WATER AT THE SOURCE OR SOURCES ADEQUATE TO SUPPLY THE WATER DEMAND OF THE SERVICE AREA, WITHOUT MAJOR ADDITIONS, FOR THE DESIGN YEAR? [X] Yes [ ] No

5. IS CAPACITY PROVIDED FOR MEETING THE MAXIMUM DAILY AND HOURLY DEMANDS FOR THE DESIGN YEAR? [X] Yes [ ] No

ER-BWQ-238.2

DATE PREPARED 11/27/85

DATE REVISED

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY
MODULE 2 – GENERAL DESIGN DATA

For Department Use Only

D. SANITARY SURVEY OF WATER SUPPLY SOURCES

TABLE VI

SOURCES OF POLLUTION ON DRAINAGE BASINS
(Including Drainage Basins Of Wells And Springs)

Existing	Potential	Proposed Water Sources	POLLUTION ON THE DRAINAGE BASINS OF THE PROPOSED WATER SOURCES					
			Surface	Subsurface	Sources Of Pollution	Location And Distance From Water Source	Type (Describe)	Quantity (Mgd)
X		Susquehanna River	X		Domestic Sewage Treatment Plant Outfalls	Many outfalls upstream closest 4 miles upstream	Domestic sewage primary secondary treatment chlorine	N/A
X		Susquehanna River	X		Acid Mine Drainage	Lackawanna River confluence to site	See attachment	Non-point source
X		Susquehanna River	X		Hunlock Creek Fossil Plant	9 miles upstream	See attachment	--
X		Susquehanna River	X		Butler Mine Tunnel	30 miles upstream 150 yards north of northbridge Pittston PA	One-time spill Sept. 28, waste oil	See attachment

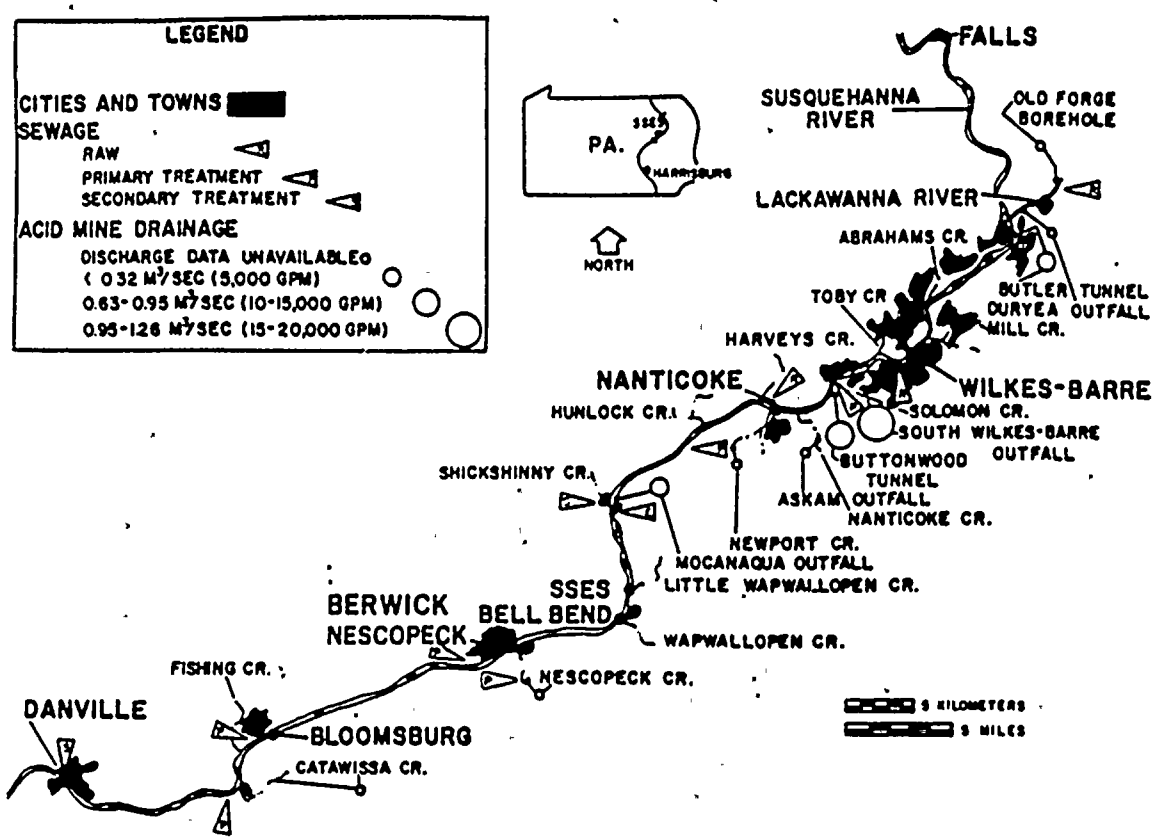
Use Additional Sheets If Necessary

Question 3:

Water quality can be maintained through the use of the raw water treatment system. The system is designed to provide water meeting regulatory requirements throughout the range of river water conditions expected at normal, low, and high flows in the river channel.

Water losses from system piping are minimal. All potable water lines were tested during installation as specified by AWWA-C-600. All leaks found were repaired at that time. Lines will be maintained as necessary to insure the integrity of the water distribution system.

Section D
Table 4



Location of existing and potential sources of pollution.

Table VI

- Domestic Sewage and Acid Mine Drainage

  The Susquehanna River in the general vicinity of the site can generally be described as acceptable for most uses although the stream is obviously degraded by acid mine drainage and sewage effluents. The stream normally meets all of the water quality criteria specified by the Pennsylvania Department of Environmental Resources except in the case of total iron, where the in-stream concentration is 3.42 mg/l average. In general, the site is located within a 30-mile (48.3 km) reach extending downstream of the Lackawanna River confluence which receives almost 50% of the total acid drainage within the Susquehanna basin. Water quality sampling indicates the quality of the water upstream of the Lackawanna River to be excellent with rapid deterioration beginning at the confluence.

- Hunlock Creek Fossil Plant

  The Luzerne Electric Company operates a 50 megawatt anthracite fired steam electric station approximately nine miles upstream of the Susquehanna intake structure. The average 75 cfs cooling water flow receives chlorination two hours a day at maximum residual of 0.2 mg/l. This low level chlorine residual has dissipated before reaching the site.

  Runoff from their coal ash basin amounts to 0.5-0.75 mgd. This flow may add small amounts of suspended solids to the river. A small sewage treatment plant (.003 mgd) discharges into the river after tertiary treatment and disinfection with chlorine.

Table VI

- Butler Mine Tunnel

The Butler Mine Tunnel incident of September 28, 1985 was blamed on high surface water flows from hurricane Gloria washing wastes from the tunnel into the river. The spill consisted mostly of waste oil contaminated with the chemical dioctylphthalate entering the river at the tunnel exit. The EPA indicated the water at the SSES site was safe to drink. In addition, the submerged pump intake at the river intake structure precluded the entrance of oil into the drinking water system.

The spill was temporary and would be a potential threat to the drinking water source only during major storm events comparable to hurricane Gloria. A PP&L official will be informed in any event of possible drinking water contamination by the Luzerne County Emergency Management Agency.

D. QUALITY OF WATER SUPPLY SOURCES – CONTINUED

1. DESCRIBE THE TRAVEL OF THE POLLUTION AND THE EFFECTS OF THE POLLUTION ON THE WATER SOURCES.

Discharges of acid mine drainage into the river had been pumped from deep coal mines and the inflow of organic wastes originating in the Lackawanna River Basin were probably the main causal factors for the chemically degraded waters of the Susquehanna River in the general site area. It has been determined by the U.S. Army Corps of Engineers that the chemical degradation due to acid mine drainage extends downstream as far as Berwick, Pennsylvania, but that the organic degradation of the water has significantly improved at Nanticoke, Pennsylvania eight miles (12.9 km) upstream of the site.

The mine discharge and organics appears to have a significant effect on water quality at the site. The pH and dissolved oxygen levels fluctuate as a result of river flows. The high contamination of iron from the acid mine drainage has the greatest impact on river ecology. Fluctuation in flow of the Susquehanna River has close correlation with total alkalinity, total hardness, and other pollutants. Increasing concentrations of these parameters are observed simultaneously with decreasing flows.

The water quality of the Susquehanna River in the general site vicinity normally meets Commonwealth of Pennsylvania Water Quality Criteria, and is considered acceptable for warm water aquatic life. A section of the river is subjected to acid mine drainage which affects the pH and ferric iron concentrations. Nutrients are present in concentrations that are sufficient to support plankton populations. Temperature and dissolved oxygen are within the range to support aquatic life.

2. DOES THE SANITARY SURVEY INCLUDE ALL OF THE EXISTING AND POTENTIAL SOURCES OF POLLUTION, BOTH NATURAL AND MAN-MADE, WHICH MAY AFFECT THE WATER SOURCES? [X] Yes [ ] No

3. IS THE POLLUTION AMENABLE TO THE TREATMENT PROVIDED, TO THE EXTENT THAT THE TREATMENT WILL RESULT IN A FINISHED WATER QUALITY MEETING AT ALL TIMES THE REQUIREMENTS CONTAINED IN THE 1962 EDITION OF "DRINKING WATER STANDARDS" PUBLISHED BY THE UNITED STATES PUBLIC HEALTH SERVICE? [X] Yes [ ] No

4. WILL THESE WATER SOURCES, OF ALL FEASIBLE SOURCES, PROVIDE THE BEST QUALITY WATER IN THE EVENT OF ANY FAILURE IN WATER TREATMENT? [ ] Yes [X] No

In the event of any failure in water treatment, the plant can switch to well water supply. The wells can be used for emergency drinking water only, as they normally would not supply the quantity of water needed.

DATE PREPARED	DATE REVISED
11/27/85	

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY

MODULE 2 – GENERAL DESIGN DATA

For Department Use Only

E. ANALYSES OF PROPOSED SOURCES

TABLE VII

ANALYSES OF RAW WATER SAMPLES	Total Coliforms No./100 Ml	Color Units	Threshold Odor No.	Turbidity Units (NTU)	Solids Total Mg/L	pH	Alkalinity Mg/L $CaCo_3$	Ammonia Nitrogen Mg/L	Albuminoid Nitrogen Mg/L	Nitrite Nitrogen Mg/L	Nitrate Nitrogen Mg/L	Chloride Mg/L	Fluoride Mg/L	Hardness Mg/L $CaCo_3$	Manganese Mg/L tot / Diss	Sulfate Mg/L	Iron Mg/L tot / Diss		
SAMPLING POINT DATE 9/5/85															0.54		2.12		
* LOCATION North Branch & Dock				10	265	7.4	50	0.12			0.46	31.6		148.4	0.16	92.6	0.05		
S.P. DT. 9/9/85																			
LOC. North Branch & Dock	16																		
S.P. DT. 10/7/85															0.36		2.12		
LOC. North Branch & Dock				10	152	7.2	37	0.33			0.93	12.7		85.1	0.33	44.6	0.77		
S.P. DT. 11/11/85															0.22		1.54		
LOC. North Branch & Dock				4	205	7.3	59	0.27			0.72	18.2		1103	0.20		0.33		
S.P. DT.																			
LOC.																			
S.P. DT.																			
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S.P. DT.																			
LOC.																			

Use Additional Sheets If Necessary

* River water samples are collected each month, analysis is completed by PP&L's Hazleton Chemistry Lab.

Lancaster Laboratories INCORPORATED

LLI Sample No. PW 1030222

PP&L Company - Berwick
Susquehanna S E S
P. O. Box 467
Berwick, PA 18603

RECEIVED
DEC 05 1985
Nuclear Dept.

Date Reported 12/ 4/85
Date Submitted 11/14/85
Discard Date 12/11/85
Collected by S&G
P.O. 4-49677-5
Rel.

#2400998 Raw Susquehanna River Intake Water Sample
Collected on 11/13/85 at 1447 by S&G Sub 0906

ANALYSIS	RESULT AS RECEIVED		LIMIT OF DETECTION	LAB CODE
pH	6.51			020000400
Phenolphthalein Alk.	< 1.	mg/l	1.	020100500
Total Alkalinity	67.	mg/l	1.	020200400
Total Dissolved Solids	156.	mg/l	5.	021201100
Total solids is a measure of the residue remaining when a water sample is evaporated. The Environmental Protection Agency (EPA) has established a secondary guideline of 500 mg/l total dissolved solids for drinking water.				
Nitrite Nitrogen	0.01	mg/l	0.01	021900700
Nitrate Nitrogen	0.56	mg/l	0.02	022000800
Nitrate Nitrogen value is within the limits for drinking water recommended by the U. S. Public Health Service and the Environmental Protection Agency (EPA).				
Chloride	20.	mg/l	4.	022401000
The Environmenal Protection Agency (EPA) has established a secondary guideline of 250 mg/l for chloride in drinking water. This parameter does not pose a direct health hazard at these levels. Elevated chloride levels can sometimes indicate contamination from water softener backwash waste.				
M. B. A. S.	< 0.1	mg/l	0.1	022502500
MBAS is a measure of foaming agents (detergent) in the water. The Environmental Protection Agency (EPA) has established a secondary guideline of 0.5 mg/l for drinking water. The presence of detergent in a water supply could indicate a contamination from domestic sewage.				
Sulfate	50.	mg/l	10.	022801300
The Environmental Protection Agency (EPA) has established a secondary guideline of 250 mg/l for sulfate in drinking water. Sulfate levels in excess of this guideline can have a laxative effect.				
Arsenic	< 0.004	mg/l	0.004	024502000
Barium	< 0.1	mg/l	0.1	024601200
Cadmium	< 0.005	mg/l	0.005	024901200
Calcium	26.5	mg/l	0.05	025001200
Chromium	< 0.05	mg/l	0.05	025101200
Copper	< 0.03	mg/l	0.03	025301200
Iron	1.15	mg/l	0.05	025401200
Lead	< 0.05	mg/l	0.05	025501200
Manganese	0.20	mg/l	0.01	025801200

SEE REVERSE SIDE FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS

Respectfully Submitted
Lancaster Laboratories, Inc.

Reviewed and Approved by:
Lee A. Seats, B.S. Group Ldr
Inorganic Analysis

The American Association for Laboratory Accreditation
Chemical & Biological Fields of Testing

MAIN LABORATORY
2425 New Holland Pike Lancaster Pa 17601 • (717) 656-2301

FRANKLIN DIVISION
5424 Buchanan Trail East Waynesboro Pa 17268 • (717) 762-9127

Member American Council of Independent Laboratories Inc

Lancaster Laboratories INCORPORATED

LLI Sample No. PW 1030222

PP&L Company - Berwick
Susquehanna S E S
P. O. Box 467
Berwick, PA 18603

Date Reported 12/ 4/85
Date Submitted 11/14/85
Discard Date 12/11/85
Collected by S&G
P.O. 4-49677-5
Rel.

#2400998 Raw Susquehanna River Intake Water Sample
Collected on 11/13/85 at 1447 by S&G Sub 0906

ANALYSIS	RESULT AS RECEIVED		LIMIT OF DETECTION	LAB CODE
Mercury	< 0.001	mg/l	0.001	025902000
Fluoride	< 0.1	mg/l	0.1	026301200
Selenium	< 0.004	mg/l	0.004	026402000
Silver	< 0.01	mg/l	0.01	026601200
Sodium	12.8	mg/l	0.05	026701200
Zinc	< 0.01	mg/l	0.01	027201200
Color	45.	C P units	5.	027701100
Color reported is the TRUE color. Comparison was done on the filtered sample.				
Turbidity	4.	N T U	1.	027900600
Endrin	< 0.01	ppb	0.01	028401500
Lindane	< 0.01	ppb	0.01	028501500
Methoxychlor	< 0.2	ppb	0.2	028601500
Toxaphene	< 1.	ppb	1.	028701500
2 4-D	< 1.	ppb	1.	028803000
2 4 5-TP	< 1.	ppb	1.	028903000
Volatiles in Groundwater		attached		051510000
Total Trihalomethanes	4.	ppb		900100500
p-Dichlorobenzene	< 1.0	ppb		900200500
Langelier Index (9.5C)	-2.15			900300300
Odor	2.4	T.O.N.		900405000
Total Coliform Ext. rng. MPN	> 2,400.	/100ml		900502500

The total coliform analysis was performed by Multitube Fermentation MPN.

The Langelier Index was calculated assuming a water temperature of 4 deg C. since no field temperature was supplied.

Lancaster Laboratories is certified by Pennsylvania Department of Environmental Resources (#36-037) for water testing.

2 COPIES TO PP&L Company ATTN: Curtis H. Saxton

SEE REVERSE SIDE FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS

02290 0.00 061600

Respectfully Submitted
Lancaster Laboratories, Inc.
Reviewed and Approved by:

Lee A. Seats, B.S. Group Ldr.
Inorganic Analysis

MAIN LABORATORY
2425 New Holland Pike Lancaster Pa 17601 • (717) 656-2301

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5424 Buchanan Trail East Waynesboro Pa 17268 • (717) 762-9127

Lancaster Laboratories INCORPORATED

LLI Sample No. PW 1030222

PP&L Company - Berwick
Susquehanna S E S
P. O. Box 467
Berwick, PA 18603

Date Reported 12/ 4/85
Date Submitted 11/14/85
Discard Date 12/11/85
Collected by S&G
P.O. 4-49677-5
Rel.

#2400998 Raw Susquehanna River Intake Water Sample
Collected on 11/13/85 at 1447 by S&G Sub 0906

Volatiles in Groundwater	RESULT AS RECEIVED		LIMIT OF DETECTION	LAB CODE
Benzene	< 1.	ppb	1.	07030000N
Toluene	< 1.	ppb	1.	07040000N
Chlorobenzene	< 1.	ppb	1.	07050000N
Ethylbenzene	< 1.	ppb	1.	07060000N
Chloromethane	< 5.	ppb	5.	07110000N
Bromomethane	< 5.	ppb	5.	07120000N
2-Chloroethylvinyl ether	< 10.	ppb	10.	07130000N
Vinyl chloride	< 1.	ppb	1.	07140000N
Chloroethane	< 1.	ppb	1.	07150000N
Methylene chloride	< 1.	ppb	1.	07160000N
1,1-Dichloroethene	< 1.	ppb	1.	07170000N
1,1-Dichloroethane	< 1.	ppb	1.	07180000N
trans-1,2-Dichloroethene	< 1.	ppb	1.	07190000N
Chloroform	< 1.	ppb	1.	07200000N
1,2-Dichloroethane	< 1.	ppb	1.	07210000N
1,1,1-Trichloroethane	< 1.	ppb	1.	07220000N
Carbon tetrachloride	< 1.	ppb	1.	07230000N
Dichlorobromomethane	< 1.	ppb	1.	07240000N
1,2-Dichloropropane	< 1.	ppb	1.	07250000N
trans-1,3-Dichloropropene	< 1.	ppb	1.	07260000N
Trichloroethene	< 1.	ppb	1.	07270000N
Dibromochloromethane	< 1.	ppb	1.	07280000N
1,1,2-Trichloroethane	< 1.	ppb	1.	07290000N
cis-1,3-Dichloropropene	< 1.	ppb	1.	07300000N
Bromoform	< 2.	ppb	2.	07310000N
1,1,2,2-Tetrachloroethane	< 2.	ppb	2.	07320000N
Tetrachloroethene	< 1.	ppb	1.	07330000N

2 COPIES TO PP&L Company ATTN: Curtis H. Saxton

SEE REVERSE SIDE FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS

Respectfully Submitted
Lancaster Laboratories, Inc.
Reviewed and Approved by:

Richard C. Entz, B.A.
Group Leader, Organic Analysi

MAIN LABORATORY
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5424 Buchanan Trail East Waynesboro Pa 17268 • (717) 762-9127

TELEDYNE ISOTOPES
50 Van Buren Ave., Westwood, New Jersey 07675
Phone: 201-664-7070 Telex 134474

TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 11/06/85

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE
3-3579	4-33046-5	10/09/85	11/11/85	1

DR BERNARD W GRAHAM
PENNSYLVANIA POWER & LIGHT CO
TWO NORTH NINTH STREET
ALLENTOWN PA 18101

WATER - SURFACE

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
42196	6S6	6S6	09/09	1420	10/07	0920	✓GR-A	L.T. 1. E 00		10/22			3
							✓GR-B	4.1 +-1.0 E 00		10/22			3
							I-131	L.T. 9. E-02		10/14			3
							BE-7	L.T. 3. E 01		10/16			4
							K-40	L.T. 5. E 01		10/16			4
							MN-54	L.T. 4. E 00		10/16			4
							CO-58	L.T. 4. E 00		10/16			4
							FE-59	L.T. 8. E 00		10/16			4
							CO-60	L.T. 4. E 00		10/16			4
							ZN-65	L.T. 7. E 00		10/16			4
							ZR-95	L.T. 7. E 00		10/16			4
							NB-95	L.T. 4. E 00		10/16			4
							RU-103	L.T. 4. E 00		10/16			4
							RU-106	L.T. 3. E 01		10/16			4
							I-131	L.T. 8. E 00		10/16			4
							CS-134	L.T. 4. E 00		10/16			4
							CS-137	L.T. 3. E 00		10/16			4
							BA-140	L.T. 1. E 01		10/16			4
							LA-140	L.T. 5. E 00		10/16			4
							CE-141	L.T. 8. E 00		10/16			4
							CE-144	L.T. 3. E 01		10/16			4
							✓RA-226	L.T. 9. E 01		10/16			4
							✓TH-228	L.T. 8. E 00		10/16			4
							✓H-3	9.3 +-4.7 E 01		11/01			5

One Month Composite Sample of River Intake Water

TELEDYNE ISOTOPES
50 Van Buren Ave., Westwood, New Jersey 07675
Phone: 201-664-7070 Telex 134474

TELEDYNE ISOTOPES

REPORT OF ANALYSIS

RUN DATE 12/03/85

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE
3-4205	4-33046-5	11/05/85	12/08/85	1

DR BERNARD M GRAHAM
PENNSYLVANIA POWER & LIGHT CO
TWO NORTH NINTH STREET
ALLENTOWN PA 18101

WATER - SURFACE

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (+-PCI/LITER)	NUCL-UNIT-(U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-(*	LAB.
42196	6S6	6S6	09/09	1420	10/07	0920	✓SR-90	L.T. 3. E-01		11/24			3

One Month Composite Sample of River Intake Water

LAST PAGE OF REPORT

APPROVED BY H. KING 12/03/85

SEND 2 COPIES TO PE463S DR BERNARD M GRAHAM

2 - GAS LAB. 3 - RADIO CHEMISTRY LAB. 4 - GE(LI) GAMMA SPEC LAB. 5 - TRITIUM GAS/L.S. LAB.

2-8e

RADIOLOGICAL ANALYSIS

ER-BWQ-238.2

DATE PREPARED 11/27/85

DATE REVISED

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY

MODULE 2 – GENERAL DESIGN DATA

For Department Use Only

E. ANALYSES OF PROPOSED SOURCES – CONTINUED

1. HAVE SUFFICIENT ANALYSES BEEN MADE TO SHOW THE RANGE AND DURATION OF CHEMICAL AND BACTERIOLOGICAL QUALITY OF THE RAW WATER, BUT NOT LESS THAN:

   A. FOR SURFACE WATER SOURCES: ☐ N/A

      (1) CHEMICAL ANALYSES:

         (A) ONE SAMPLE DURING HIGH FLOW? ☒ Yes ☐ No

         (B) ONE SAMPLE DURING AVERAGE FLOW? ☒ Yes ☐ No

         (C) ONE SAMPLE DURING LOW FLOW? ☒ Yes ☐ No

      (2) BACTERIOLOGICAL ANALYSES FOR COLIFORM ORGANISMS:

         (A) THREE SAMPLES EACH MONTH FOR ONE YEAR SO SPACED THAT THE HIGH AND LOW FLOWS ARE SAMPLED? ☐ Yes ☒ No

   B. FOR GROUND WATER SOURCES: ☒ N/A

      (1) CHEMICAL ANALYSES:

         (A) ONE SAMPLE? ☐ Yes ☐ No

      (2) BACTERIOLOGICAL ANALYSES FOR COLIFORM ORGANISMS:

         (A) FIVE SAMPLES TAKEN AT NOT LESS THAN 15 MINUTE INTERVALS? ☐ Yes ☐ No

2. HAVE ALL BACTERIOLOGICAL ANALYSES BEEN PERFORMED BY LABORATORIES APPROVED BY THE PENNSYLVANIA DEPARTMENT OF HEALTH AND IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE WATER," 12TH EDITION, AMERICAN PUBLIC HEALTH ASSOCIATION? ☒ Yes ☐ No

3. HAVE ALL CHEMICAL ANALYSES BEEN PERFORMED IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE WATER," 12TH EDITION, AMERICAN PUBLIC HEALTH ASSOCIATION? ☒ Yes ☐ No

   Latest or 16th Edition.

4. NAME OF LABORATORY WHICH MADE THE:

   A. CHEMICAL ANALYSES Lancaster Laboratories

   B. BACTERIOLOGICAL ANALYSES Lancaster Laboratories

   Radiological analysis Teledyne Isotopes

5. MAY THE QUALITY OF THE SURFACE WATER SOURCE VARY AT DIFFERENT DEPTHS? ☐ Yes ☒ No ☐ N/A

   A. IF SO, WILL THE INTAKE STRUCTURE PERMIT WITHDRAWAL OF WATER FROM MORE THAN ONE LEVEL? ☐ Yes ☐ No ☒ N/A

   B. ARE SEPARATE FACILITIES PROVIDED TO PERMIT RELEASE OF THE LESS DESIRABLE WATER HELD IN STORAGE? ☐ Yes ☐ No ☒ N/A

ER-BWQ-238.2

DATE PREPARED
11/27/85
DATE REVISED

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY

MODULE 2 – GENERAL DESIGN DATA

For Department Use Only

E. ANALYSES OF PROPOSED SOURCES – CONTINUED

6. IS STORAGE PROVIDED WHERE FEASIBLE AS A MEANS OF PREPARING THE WATER FOR SUBSEQUENT TREATMENT? ☐ Yes ☐ No ☒ N/A

F. DISCUSSION

1. DISCUSS HOW, CONSIDERING THE SANITARY SURVEY AND WATER QUALITY DATA, THE PROPOSED FACILITIES WILL PROVIDE A WATER QUALITY MEETING THE REGULATIONS OF THE DEPARTMENT.

Although wide fluctuations in the physicochemical analysis of the raw river water source have been observed, the raw water treatment system has sufficient capacity to produce a finished water meeting all of the drinking water maximum contaminant levels given by the Pa. DER.

The water treatment system utilizes chemical addition and clarification in a "reactivator"unit, filtering through monovalve gravity filter, storage in a clarified water storage tank, and final chlorination before entering a domestic water storage tank of minimum 35 minute detention time. (Continued)

2. DISCUSS HOW THE PROPOSED FACILITIES WILL MEET THE REGULATIONS OF THE DEPARTMENT REGARDING WATER QUANTITY AND PRESSURE, MAINTENANCE AND OPERATION, DISINFECTION, PROTECTION OF SOURCE AND PROTECTION AGAINST UNSAFE CONNECTIONS, AND WILL PROTECT THE PUBLIC HEALTH?

The raw water treatment facility will provide treated water at a rate to meet peak hourly demand of all domestic water needs.

Three sequentially started clarified water pumps are utilized to transfer water from the clarified water tank to the domestic water storage tank and maintain 85 psi pressure in the distribution system. The water is chlorinated by two, 100 percent capacity rate proportioning pumps prior to entering the domestic water storage tank. A chlorine residual of 0.2-2.0 parts per million is established in the finished water with a minimum hold-up time in the domestic tank of at least 35 minutes.

The system will be maintained as part of the plant maintenance information system which provides for preventative maintenance of all mechanical equipment onsite. Operators will be familiar with the system and will have access to all system description and operating procedures maintained for the water treatment facility. (Continued)

Question 1 (Continued)

There are four water treatment chemicals added to the raw water as it enters the reactivator: Alum, sodium hypochlorite, soda ash, and a polymeric coagulant aid.

The Alum is used as a coagulant. Color and turbidity in natural water are usually present in solution and colloidal dispersion. Alum will chemical react with these impurities, causing them to coagulate into larger particles which will then settle out easily.

The purpose of the coagulant aid is to speed up the process of coagulation.

The third chemical is an alkali (sodium carbonate). This is used to soften the water by precipitating out mineral salts such as iron, calcium, and magnesium, and to increase the pH lowered by the alum.

Sodium hypochlorite is used to chlorinate the water to prevent the growth of microorganisms which can lead to algae, slime, or fungi growth. One of the design features of the reactivator is that raw water must have at least a two-hour holdup or delay time before it leaves the unit. This is not only to ensure maximum contact time for coagulation, but also for the benefit of chlorination.

Iron is removed from the water by the combined processes of chemical oxidation, precipitation, softening and sedimentation.

After clarification, the processed water passes through monovalve gravity filters which further reduces suspended solids, turbidity, and iron levels. The filtered water is stored in a clarified water storage tank. Finally, the water is again chlorinated and pumped into the domestic water chlorine contact tank where it is held until final distribution in the domestic water system.

Question 2 (Continued)

The Susquehanna River provides adequate flow to allow removal of domestic water needs and will not be significantly impacted at normal or low flow conditions.

Contamination of the potable water system are prevented by a combination of air gaps, vacuum breakers, and backflow preventers of the reduced pressure zone type.

Management of the system and testing of the potable water has been completed to protect all users of the drinking water at this facility.

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MODULE 5 – SUSPENDED SOLIDS CONTACT UNITS

For Department Use Only

TABLE I Type Of Units	Number Of Units	Volume (Gal)
Sludge Recirculating type Clarifier (Reactivator)	1	300gpm 2hr(36,000) E
	Total	

A. GENERAL FEATURES OF DESIGN

1. HAS DATA BEEN SUBMITTED ON ENGINEERING STUDIES INCLUDING PILOT PLANT-TREATMENT DURING PERIODS OF MAXIMUM VARIATIONS IN THE RAW WATER QUALITY AND FLOW WHICH INDICATE THE ADEQUACY AND SUITABILITY OF THE SUSPENDED SOLIDS CONTACT UNITS FOR FLOCCULATION AND SEDIMENTATION PRIOR TO FILTRATION FOR TURBIDITY AND BACTERIAL REMOVAL? ☐ Yes ☒ No
See attachment

B. INSTALLATION OF EQUIPMENT

1. DO THE SPECIFICATIONS REQUIRE THAT THE INSTALLATION AND INITIAL OPERATION OF ALL MECHANICAL EQUIPMENT WILL BE SUPERVISED BY A REPRESENTATIVE OF THE MANUFACTURER? ☒ Yes ☐ No
System was initially started up by the manufacturer.

C. OPERATING EQUIPMENT

1. ARE AT LEAST TWO UNITS PROVIDED? ☐ Yes ☒ No

2. FOR SURFACE WATERS WHICH ARE DIFFICULT TO TREAT, HAS PROVISION BEEN MADE FOR EITHER PRE-TREATMENT OR POST-TREATMENT BY CONVENTIONAL METHODS? ☐ Yes ☐ No ☒ N/A

3. DO THE SPECIFICATIONS INCLUDE A COMPLETE LIST OF MAINTENANCE TOOLS, ACCESSORIES, AND NECESSARY LABORATORY EQUIPMENT? ☒ Yes ☐ No

4. DO THE UNITS PROVIDE FOR ADEQUATE PIPING WITH SUITABLE FAUCETS SO LOCATED AS TO PERMIT THE COLLECTION OF SAMPLES OF WATER AND SLUDGE FROM CRITICAL AREAS OF THE UNITS? ☒ Yes ☐ No

D. CHEMICAL FEED

1. ARE CHEMICALS APPLIED TO THE WATER AT SUCH POINTS, AND BY SUCH MEANS, AS TO ASSURE SATISFACTORY MIXING OF THE CHEMICALS WITH THE WATER? ☒ Yes ☐ No

E. FLOCCULATION (SLOW MIXING)

1. IS THE EQUIPMENT ADJUSTABLE? ☒ Yes ☐ No

2. ARE ALL MIXING DEVICES EMPLOYED, SO DESIGNED AND CONSTRUCTED AS TO CONTROL DEPOSITING OF SOLIDS IN THE MIXING ZONE AND TO PREVENT FLOC DESTRUCTION? ☒ Yes ☐ No

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F. SLUDGE CONCENTRATORS

1.	DOES THE EQUIPMENT PROVIDE EITHER INTERNAL OR EXTERNAL CONCENTRATORS?	[X] Yes	[ ] No	

G. SLUDGE WITHDRAWAL

1.	IS THE SIZE OF SLUDGE PIPES AT LEAST 3 INCHES IN DIAMETER?	[ ] Yes	[X] No	See attachment
2.	IS THE PIPING SO ARRANGED AS TO FACILITATE CLEANING?	[X] Yes	[ ] No	
3.	IS THE ENTRANCE TO SLUDGE WITHDRAWAL PIPING SO DESIGNED AS TO PREVENT CLOGGING?	[X] Yes	[ ] No	
4.	ARE VALVES LOCATED OUTSIDE THE TANK FOR ACCESSIBILITY?	[X] Yes	[ ] No	

H. UNIFORMITY OF FLOW

1.	ARE THE UNITS DESIGNED TO OPERATE AT THE MAXIMUM UNIFORM RATE?	[X] Yes	[ ] No	
2.	ARE THEY ADJUSTABLE FOR ABRUPT CHANGES IN FLOW WHICH ARE LESS THAN THE DESIGNED RATE OF FLOW?	[X] Yes	[ ] No	

I. CROSS-CONNECTIONS

1.	DOES THE INSTALLATION EXCLUDE CROSS-CONNECTIONS?	[X] Yes	[ ] No	

J. SUSPENDED SOLIDS CONTACT SOFTENERS

1.	WHEN USED IN THE SOFTENING PROCESS, IS THE DETENTION TIME, BASED ON DESIGN FLOW, AT LEAST 1 HOUR?	[X] Yes	[ ] No	
2.	IS THE TOTAL WATER LOSS 3% OR LESS?	[X] Yes	[ ] No	
3.	IS THE SOLIDS CONCENTRATION OF SLUDGE BLED TO WASTE AT LEAST 5% BY WEIGHT?	[ ] Yes	[X] No	See attachment
4.	ARE WEIRS EQUIVALENT IN LENGTH TO AT LEAST THE ENTIRE PERIMETER OF THE TANK?	[X] Yes	[ ] No	
5.	ARE WEIR LOADINGS 30,000 GALLONS OR LESS PER DAY PER FOOT OF WEIR LENGTH?	[X] Yes	[ ] No	
6.	WHEN ORIFICES ARE USED, WILL THEY PRODUCE UNIFORM RISING RATES OVER THE AREA OF THE TANK?	[X] Yes	[ ] No	[ ] N/A
7.	ARE THE UPFLOW RATES 3,300 GALLONS OR LESS PER DAY PER SQUARE FOOT OF SURFACE AREA AT THE SLURRY SEPARATION LINE?	[X] Yes	[ ] No	

K. SUSPENDED SOLIDS CONTACT CLARIFIERS [ ] N/A

1	WHEN USED FOR TURBIDITY AND BACTERIAL REMOVAL, IS THE SETTLING DETENTION TIME, BASED ON DESIGN FLOW RATE, AT LEAST 2 HOURS?	[X] Yes	[ ] No	

Module 5 - Suspended Solids Contact Units

Section A

Question 1

Six years of testing of Susquehanna River water was completed prior to issuing specifications for the design of the raw water treatment system. The following analysis resulted which was used for design of the reactivator units.

River Water Condition

	Average	Maximum
Sodium (as $CaCO_3$)	6 ppm	20 ppm
Calcium (as $CaCO_3$)	82 ppm	164 ppm
Magnesium (as $CaCO_3$)	39 ppm	89 ppm
Chloride (as $CaCO_3$)	16 ppm	29.7 ppm
Sulfate (as $CaCO_3$)	63 ppm	168 ppm
Bicarbonate (as $CaCO_3$)	46 ppm	72 ppm
Nitrate (as $CaCO_3$)	2 ppm	3.3 ppm
Total Iron as Fe	0.4 ppm	1.72 ppm
Aluminum as Al	0.1 ppm	0.56 ppm
Silica, ppm SiO_2	3.4 ppm	5.1 ppm
Suspended Solids, ppm	76 ppm	900 ppm
Totally dissolved solids	175 ppm	372 ppm
pH	6.5 -	8.0
Temperature range	32°F -	87°F

The river water turbidity is reduced in the clarifier by the addition of chemicals. Design flow through the clarifier is 300 gpm. The expected normal flow during station operation is 120 to 150 gpm. The flow through the clarifier is controlled by a flow modulating valve on the clarifier inlet which is regulated by a clearwell level controller and clarifier inlet flow controller. The opening of this valve is limited to prevent the maximum design flow rate from being exceeded.

The clarifier is a positive internal recirculation upflow unit. All chemical addition shall be in proportion to the inlet flow to the clarifier. An inlet flow recorder with totalizer is used to pace the chemical feed utilizing timers. Backflushing and sludge blowdown from the clarifier is automatic and controlled in proportion to inlet flow. The sludge is directed to the clarifier sludge holdup sump for disposal.

Question 1 (continued)

The effluent flow from the clarifier should have a quality not to exceed 10 Nephelometric Turbidity Units (NTU). Effluent from the two filters which follow, the clarifier will reduce turbidity to less than 0.2 NTU at 2 gpm/sq. ft. loading and less than 0.5 NTU at 4 gpm/sq. ft. flow rate.

Since the plant has been in operation (eight years), monthly samples of raw river water have shown water treatability to have remained consistent with original design values excepting that iron content has declined measurably.

Module 5 - Suspended Solids Contact Unit

Section G

Question 1

The automatic sludge waste line is two inches. There is a manual sludge waste line in place which is three inches which can be manually utilized in the event of a blockage in the automatic waste line.

Section J

Question 3

Sludge is wasted by an automatic system consisting of a series of counters and timers. Solid content in the sludge varies between 0.3-4.0 percent depending on the amount of solids in the raw water.

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K. SUSPENDED SOLIDS CONTACT CLARIFIERS – CONTINUED

2.	ARE THE UNITS PROVIDED WITH CONTINUOUS SLUDGE WITHDRAWAL, INTERMITTENT AUTOMATIC MECHANISM, OR MANUAL CONTROL?	[X] Yes	[ ] No
3.	IS THE TOTAL WATER LOSS 5% OR LESS?	[X] Yes	[ ] No
4.	IS THE SOLIDS CONCENTRATIONS OF SLUDGE BLED TO WASTE AT LEAST 3% BY WEIGHT?	[ ] Yes	[X] No
	Reference Section J Question 3		
5.	ARE WEIRS EQUIVALENT IN LENGTH TO AT LEAST THE ENTIRE PERIMETER OF THE TANK?	[X] Yes	[ ] No
6.	ARE WEIR LOADINGS 15,000 GALLONS OR LESS PER DAY PER FOOT OF WEIR LENGTH?	[X] Yes	[ ] No
7.	IF ORIFICES ARE USED, DO THEY PRODUCE UNIFORM RISING RATES OVER THE AREA OF THE TANK?	[X] Yes	[ ] No
8.	ARE UPFLOW RATES 1,500 GALLONS OR LESS PER DAY PER SQUARE FOOT OF SURFACE AREA AT THE SLURRY SEPARATION LINE?	[X] Yes	[ ] No
9.	IF THE FLOW IS SUBJECT TO SURGES, IS AN EQUALIZATION TANK PROVIDED?	[ ] Yes	[ ] No [X] N/A

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MODULE 7 – FILTERS

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TABLE I	Type Of Units	Number Of Units	Capacity (Mgd)
	Monovalve Gravity Filters	2	.432 each
		Total	

A. GENERAL

1. ARE THE FILTERS PRECEDED BY FLOCCULATION AND SEDIMENTATION? [X] Yes [ ] No
2. ARE THE FILTERS STANDARD RATE GRAVITY TYPE? [ ] Yes [X] No

B. STANDARD RATE FILTERS [X] N/A

1. ARE TWO OR MORE UNITS PROVIDED? [ ] Yes [ ] No
2. IS THE RATE OF FILTRATION 2 GALLONS OR LESS PER SQUARE FOOT PER MINUTE? [ ] Yes [ ] No
3. ARE THE SIDES OF THE FILTERS VERTICAL? [ ] Yes [ ] No
4. IS THE ENTIRE AREA COVERED BY A SUPERSTRUCTURE? [ ] Yes [ ] No
5. IS THE FILTER AT LEAST 8.50 FEET DEEP? [ ] Yes [ ] No
6. IS THE TOP OF THE SAND AT LEAST 3 FEET BELOW THE WATER SURFACE? [ ] Yes [ ] No
7. IS THE MAXIMUM WATER LEVEL 8 FEET OR HIGHER ABOVE THE MAXIMUM WATER LEVEL OF THE CLEAR WELL? [ ] Yes [ ] No
8. IS A CURB PROVIDED AROUND THE FILTER? [ ] Yes [ ] No
9. IS AN OVERFLOW PROVIDED? [ ] Yes [ ] No
10. IS THE WATER LEVEL BELOW THE FILTER OPERATING FLOOR? [ ] Yes [ ] No
11. IS THE VELOCITY IN THE INFLUENT LESS THAN 2 FEET PER SECOND? [ ] Yes [ ] No
12. ARE ADEQUATE CLEAN-OUTS IN THE INFLUENT LINE PROVIDED? [ ] Yes [ ] No
13. IS THE EFFLUENT LINE TO THE CLEAR WELL TRAPPED? [ ] Yes [ ] No
14. ARE THE FILTER DRAINS OF SUFFICIENT CAPACITY TO CARRY AWAY THE WASTE WATER? [ ] Yes [ ] No
15. ARE ALL ROOF DRAINS EXCLUDED FROM THE FILTERS? [ ] Yes [ ] No
16. IS THE BOTTOM OF THE WASH-WATER TROUGH ABOVE THE LEVEL OF THE EXPANDED SAND DURING WASHING? [ ] Yes [ ] No
17. IS THE BOTTOM OF THE WASH-WATER TROUGH BETWEEN 24 AND 30 INCHES ABOVE THE SAND? [ ] Yes [ ] No

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B. STANDARD RATE FILTERS – CONTINUED

18.	IS THE CAPACITY OF THE TROUGH SUCH THAT THERE WILL ALWAYS BE A 2 INCH FREEBOARD DURING WASHING?	☐ Yes	☐ No	
19.	ARE THE TROUGHS SPACED SO THAT THE MAXIMUM HORIZONTAL TRAVEL OF SUSPENDED PARTICLES IS 3 FEET OR LESS?	☐ Yes	☐ No	
20.	IS THE MEDIA CLEAN SILICA SAND OR CLEAN ANTHRACITE COAL OR SIMILAR MATERIAL?	☐ Yes	☐ No	
21.	IS THE DEPTH OF THE MEDIA MORE THAN 24 INCHES AND LESS THAN 30 INCHES?	☐ Yes	☐ No	
22.	IS THE EFFECTIVE SIZE FROM 0.35 MILLIMETERS TO 0.80 MILLIMETERS?	☐ Yes	☐ No	
23.	IS THE UNIFORMITY COEFFICIENT LESS THAN 1.70?	☐ Yes	☐ No	
24.	IF TORPEDO SAND IS USED, IS THE EFFECTIVE SIZE BETWEEN 0.80 MILLIMETERS AND 2 MILLIMETERS?	☐ Yes	☐ No	☐ N/A
25.	IF GRAVEL IS USED:			☐ N/A
	A. IS THE DEPTH OF GRAVEL BETWEEN 15 AND 24 INCHES?	☐ Yes	☐ No	
	B. IS THE GRAVEL LESS THAN 2.50 INCHES IN SIZE?	☐ Yes	☐ No	
	C. ARE 4 OR MORE LAYERS OF GRAVEL PROVIDED OF THE SIZES SUGGESTED IN THE PUBLIC WATER SUPPLY MANUAL?	☐ Yes	☐ No	
26.	IF A PIPE DISTRIBUTION SYSTEM IS USED: (IF NOT, DESCRIBE TYPE ON REVERSE SIDE OF THIS PAGE)			☐ N/A
	A. ARE PERFORATIONS AND STRAINERS EVENLY SPACED OVER THE ENTIRE AREA?	☐ Yes	☐ No	
	B. IS THE RATIO OF THE AREA OF THE OPENINGS OF STRAINER SYSTEM TO THE AREA OF THE FILTER ABOUT 0.003?	☐ Yes	☐ No	
	C. IS THE TOTAL AREA OF THE LATERALS ABOUT TWICE THE AREA OF THE OPENINGS OF THE STRAINER SYSTEM?	☐ Yes	☐ No	
	D. IS THE AREA OF THE MANIFOLD BETWEEN 1.50 AND 2 TIMES THE TOTAL AREA OF THE LATERALS?	☐ Yes	☐ No	
27.	IF A SURFACE WASH IS PROVIDED, IS THE WATER PRESSURE 45 TO 75 POUNDS?	☐ Yes	☐ No	☐ N/A
28.	IS A RATE CONTROLLER, INDICATING LOSS-OF-HEAD, GAUGE, AND A RATE OF FLOW GAUGE PROVIDED?	☐ Yes	☐ No	
29.	IS PROVISION MADE TO FILTER WASTE?	☐ Yes	☐ No	

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MODULE 7 – FILTERS

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B. STANDARD RATE FILTERS – CONTINUED

30. IS THE BACKWASH WATER RATE 15 TO 20 GALLONS PER SQUARE FOOT PER MINUTE? ☐ Yes ☐ No

31. IF USED, ARE WASH-WATER PUMPS IN DUPLICATE? ☐ Yes ☐ No ☐ N/A

A. PUMPING RATE IS _____

32. IS SUFFICIENT WATER PROVIDED FOR A 20 MINUTE WASH AT THE DESIGN RATE? ☐ Yes ☐ No

33. IF A WASH-WATER TANK IS USED, IS THE BOTTOM OF THE TANK AT LEAST 25 FEET ABOVE THE TOP OF THE WASH-WATER TROUGH? ☐ Yes ☐ No ☐ N/A

34. IS A WASH-WATER REGULATOR PROVIDED? ☐ Yes ☐ No

35. IS AIR PREVENTED FROM ENTERING THE BACKWASH PIPING? ☐ Yes ☐ No

C. SLOW SAND FILTERS ☒ N/A

1. HAS AN ADEQUATE AND SUITABLE STUDY OF THIS METHOD OF FILTRATION BEEN DONE? ☐ Yes ☐ No

2. HAVE MICROSCOPIC EXAMINATIONS FOR ALGAE BEEN MADE OF THE RAW WATER? ☐ Yes ☐ No

3. WILL THE WATER APPLIED TO THE FILTERS HAVE A TURBIDITY OF LESS THAN 50 UNITS AND A COLOR OF LESS THAN 30 UNITS? ☐ Yes ☐ No

4. WILL ALGAE GROWTH BE ADEQUATELY CONTROLLED BY COPPER SULFATE OR PRECHLORINATION? ☐ Yes ☐ No

5. IS THE PLANT DIVIDED INTO AT LEAST TWO FILTERS? ☐ Yes ☐ No

6. ARE THE FILTERS COVERED? ☐ Yes ☐ No

7. IS THE COVER AT LEAST 6 FEET ABOVE THE SAND? ☐ Yes ☐ No

8. ARE ADEQUATE ACCESS MEANS PROVIDED? ☐ Yes ☐ No

9. IS THE RATE OF FILTRATION BETWEEN 45 AND 150 GALLONS PER DAY PER SQUARE FOOT OF SAND? ☐ Yes ☐ No

10. ARE ADEQUATE UNDERDRAINS PROVIDED? ☐ Yes ☐ No

A. IS THE MAXIMUM VELOCITY OF FLOW IN THE UNDERDRAINS LESS THAN 0.75 FEET PER SECOND? ☐ Yes ☐ No

B. IS THE SPACING OF THE LATERALS 10 FEET OR LESS? ☐ Yes ☐ No

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C. SLOW SAND FILTERS – CONTINUED

11.	IS THE FILTER GRAVEL PLACED AS FOLLOWS:		
	A. SIX INCHES OF GRAVEL PASSING A 3 INCH SCREEN BUT HELD ON A ONE INCH SCREEN?	☐ Yes	☐ No
	B. TWO INCHES OF GRAVEL PASSING A 1 INCH SCREEN BUT HELD ON A .375 INCH SCREEN?	☐ Yes	☐ No
	C. TWO INCHES OF GRAVEL PASSING A .375 INCH SCREEN BUT HELD ON A .1875 INCH SCREEN?	☐ Yes	☐ No
	D. IS THE GRAVEL AT LEAST 2 FEET AWAY FROM THE SIDEWALLS OF THE FILTERS?	☐ Yes	☐ No
12.	IS THE DEPTH OF SAND BETWEEN 24 AND 30 INCHES?	☐ Yes	☐ No
	A. IS THE EFFECTIVE SIZE MORE THAN 0.20 MILLIMETERS BUT NOT MORE THAN 0.40 MILLIMETERS?	☐ Yes	☐ No
	B. IS THE UNIFORMITY COEFFICIENT 2.50 OR LESS?	☐ Yes	☐ No
13.	IS THE WATER DEPTH AT LEAST 3 FEET ABOVE THE SAND?	☐ Yes	☐ No
14.	WILL THE INFLOW OF WATER BE CONTROLLED TO PREVENT SCOURING?	☐ Yes	☐ No
15.	IS A SUITABLE LOSS-OF-HEAD GAUGE PROVIDED?	☐ Yes	☐ No
16.	IS A METERING DEVICE PROVIDED TO INDICATE THE RATE OF FILTRATION?	☐ Yes	☐ No
17.	IS A SAND WASHING UNIT AVAILABLE?	☐ Yes	☐ No
18.	IS A CONTROL BUILDING PROVIDED?	☐ Yes	☐ No

D. HIGH RATE FILTERS ☐ N/A

1.	HAS A REPORT BEEN SUBMITTED TO THIS DEPARTMENT ON AN ENGINEERING STUDY MADE AT THIS TREATMENT PLANT OR AT A PILOT PLANT AT THIS SITE DURING PERIODS OF MAXIMUM VARIATIONS OF RAW WATER QUALITY? See attachment	☐ Yes	☒ No
	A. DOES THE STUDY EXTEND OVER ONE YEAR?	☐ Yes	☒ No
	B. DOES THE STUDY INCLUDE DAILY MINIMUM, AVERAGE AND MAXIMUM TURBIDITY OF THE RAW, SETTLED AND FILTERED WATER?	☐ Yes	☒ No
	C. IS THE LENGTH OF TIME REQUIRED FOR FILTERING TO WASTE INDICATED?	☐ Yes	☒ No
	D. DOES THE EFFLUENT TURBIDITY METER RECORD IN GRADUATIONS OF NOT MORE THAN 0.01 JACKSON UNITS BETWEEN 0 AND 5.0 UNITS?	☒ Yes	☐ No

Module 7 - Filters

Section D

Question 1

Complete testing of the river water conditions under all flow parameters including high, medium, and low flows, was completed prior to issuing specifications for the raw water treatment system. The filters were designed based on this information and have operated adequately during the 8+ years the system has been in use. This is evidenced by continuous monitoring of the turbidity at the entrance and exit from the filters.

Two monovalve gravity filters are used to filter the clarified water leaving the reactivator before it enters the clearwell storage area. Each filter unit is a cylindrical carbon steel vessel, approximately ten feet in diameter and houses a backwash storage compartment, filter section, and strainers.

The filter consists of a bed of anthracite, 18" deep, on top of a 6" deep bed of sand. The filter is capable of filtering 4 gpm per square foot of filter area. Water from the reactivator is equally distributed to each filter unit by the flow splitting box located above both filters. Both filter units may be in-service at the same time, however, if one of the units is undergoing a backwash cycle, the other unit is fully capable of filtering water at the system design flow rate.

The gravity filters have been designed to automatically backwash themselves with internally stored water. After the backwash cycle, the backwash water storage compartment refills and the filter returns to service automatically.

(Reference Module 5, Section A Question 1)

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D. HIGH RATE FILTERS – CONTINUED

2. DO THE FILTERS COMPLY WITH THE REQUIREMENTS FOR STANDARD RATE FILTERS EXCEPT AS PROVIDED BELOW? ☐ Yes ☒ No

A. IS THE RATE OF FILTRATION 4 GALLONS OR LESS PER SQUARE FOOT? ☒ Yes ☐ No

B. IS THE FILTER MEDIA CLEAN ANTHRACITE COAL HAVING A DEPTH OF AT LEAST 21 INCHES, AN EFFECTIVE SIZE OF NOT MORE THAN ONE MILLIMETER AND A UNIFORMITY COEFFICIENT NOT GREATER THAN 1.70, AND A CLEAN SILICA SAND HAVING A DEPTH OF NOT LESS THAN 6 INCHES, AN EFFECTIVE SIZE OF NOT MORE THAN 0.45 MILLIMETERS AND A UNIFORMITY COEFFICIENT NOT GREATER THAN 1.70? ☐ Yes ☒ No

18 inches of Anthracite
6 inches of sand with size distribution as given.

C. ARE INDICATING AND RECORDING TURBIDITY MONITORS PROVIDED IN THE RAW WATER, THE INFLUENT TO EACH FILTER, AND THE EFFLUENT FROM EACH FILTER? ☒ Yes ☐ No

(1) ARE THESE TURBIDIMETERS GRADUATED BETWEEN 0 AND 5 JACKSON UNITS IN GRADUATIONS OF NOT MORE THAN 0.01 JACKSON UNITS? ☒ Yes ☐ No

(2) DOES THE TURBIDITY MONITOR ON EACH FILTER EFFLUENT HAVE AN ALARM AND SHUTOFF DEVICE THAT WILL SHUT DOWN THE FLOW WHEN THE TURBIDITY EXCEEDS 0.20 UNITS? ☐ Yes ☒ No see below

There is a high and low alarm setting that sound at an alarm panel but there is no automatic shutdown function.

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MODULE 8 – DISINFECTION

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TABLE I TYPE OF UNITS	NUMBER OF UNITS	CAPACITY (LBS/DAY)
Hypochlorite		
Positive displacent diaphragm metering pumps	2	10gph
Hypochlorite water meter driven positive deplace-	2	10gpm
ment pumps		Hypochlorite
		solution
	TOTAL	

A. FORMS OF CHLORINE USED (Check Appropriate Blocks)

Concentration of Hypochlorite solution is varied as needed to allow maintenance of proper chlorine residual outside of available pump adjustment.

1. DISINFECTION IS ACCOMPLISHED WITH:

- [ ] CHLORINE DIOXIDE
- [ ] LIQUID CHLORINE
- [X] CALCIUM OR SODIUM HYPOCHLORITES
- [ ] CHLORAMINES

2. WHERE CHLORINATION IS PROPOSED AS THE SOLE TREATMENT, IS ADEQUATE SUPPORTING EVIDENCE SUBMITTED TO JUSTIFY THE DEGREE OF TREATMENT? [ ] Yes [ ] No [X] N/A

B. EQUIPMENT

1. WHERE CHLORINE DIOXIDE IS USED, IS THE METHOD OF CHLORINE DIOXIDE GENERATION THE INJECTION OF A SODIUM CHLORITE SOLUTION INTO THE DISCHARGE LINE OF A SOLUTION-FEED-GAS-TYPE CHLORINATOR, WITH SUBSEQUENT FORMATION OF THE CHLORINE DIOXIDE IN A REACTION CHAMBER AT A pH NOT OVER 4? [ ] Yes [ ] No [X] N/A

2. IS THE CHLORINATOR CAPACITY SUCH THAT A FREE CHLORINE RESIDUAL OF AT LEAST 2 MILLIGRAMS PER LITER CAN BE ATTAINED IN THE WATER AFTER A CONTACT TIME OF AT LEAST 20 MINUTES? [X] Yes [ ] No

   A. WILL THIS CONDITION BE OBTAINABLE EVEN WHEN MAXIMUM FLOW RATES COINCIDE WITH ANTICIPATED MAXIMUM CHLORINE DEMANDS? [X] Yes [ ] No

   B. IS THE EQUIPMENT DESIGN SUCH THAT IT WILL OPERATE ACCURATELY AT BOTH MAXIMUM AND MINIMUM RATES? [ ] Yes [X] No
   See attachment

3. IF STANDBY EQUIPMENT IS NOT PROVIDED, CAN REPAIRS BE MADE IN LESS TIME THAN IT WOULD TAKE TO ACTIVATE STANDBY EQUIPMENT? [ ] Yes [ ] No [X] N/A

4. HAS DUE CONSIDERATION BEEN GIVEN TO THE CONTACT TIME OF THE CHLORINE IN THE WATER, WITH RELATION TO pH, AMMONIA CONTENT, TASTE-PRODUCING SUBSTANCES, TEMPERATURE, AND OTHER PERTINENT FACTORS? [X] Yes [ ] No

   A. IS THE CHLORINE APPLIED AT A POINT WHICH WILL PROVIDE THE MAXIMUM CONTACT TIME? [X] Yes [ ] No

   B. IS THE MINIMUM CONTACT TIME TO THE FIRST CONSUMER 20 MINUTES OR MORE? [X] Yes [ ] No

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B. EQUIPMENT – CONTINUED

C. WHERE THE pH IS INCREASED BY OTHER CHEMICAL TREATMENT, IS THE CONTACT PERIOD PROVIDED BEFORE ADDING THE OTHER CHEMICALS, OR ELSE IS CHLORINE DIOXIDE TREATMENT USED?	☐ Yes	☐ No	☒ N/A
D. IS PROVISION MADE FOR APPLYING CHLORINE TO THE RAW WATER, THE APPLIED WATER, AND TO THE FILTERED WATER?	☒ Yes	☐ No	☐ N/A
5. ARE AUTOMATIC PROPORTIONING CHLORINATORS PROVIDED ON ALL GRAVITY SYSTEMS?	☐ Yes	☐ No	☒ N/A
6. ARE AUTOMATIC PROPORTIONING CHLORINATORS PROVIDED ON ALL SYSTEMS WHERE THERE ARE SIGNIFICANT VARIATIONS IN FLOW?	☒ Yes	☐ No	☐ N/A
7. ARE SCALES PROVIDED FOR WEIGHING CYLINDERS?	☐ Yes	☐ No	☒ N/A
A. AT LARGE PLANTS, ARE INDICATING AND RECORDING SCALES PROVIDED?	☐ Yes	☐ No	☐ N/A
B. ARE SCALES OF CORROSION-RESISTANT MATERIAL?	☐ Yes	☐ No	
C. ARE SCALES ACCURATE ENOUGH TO INDICATE THE LOSS OF WEIGHT TO THE NEAREST 0.25 POUND?	☐ Yes	☐ No	
8. IS EQUIPMENT AVAILABLE FOR MEASURING CHLORINE RESIDUALS?	☒ Yes	☐ No	
A. IS THE EQUIPMENT CAPABLE OF MEASURING CHLORINE RESIDUALS TO THE NEAREST 0.10 MILLIGRAMS PER LITER IN THE RANGE BELOW 0.50 MILLIGRAMS PER LITER AND TO AN ACCURACY OF APPROXIMATELY 25% ABOVE 0.50 MILLIGRAMS PER LITER?	☒ Yes	☐ No	
B. WHERE THE CHLORINE DEMAND VARIES APPRECIABLY OVER A SHORT PERIOD OF TIME, ARE AUTOMATIC CHLORINE RESIDUAL RECORDERS PROVIDED?	☐ Yes	☐ No	☒ N/A
9. IS AN AMPLE SUPPLY OF WATER AVAILABLE FOR OPERATING THE CHLORINATOR?	☒ Yes	☐ No	☐ N/A
A. WHERE A BOOSTER PUMP IS REQUIRED:			☒ N/A
(1) IS DUPLICATE EQUIPMENT PROVIDED?	☐ Yes	☐ No	
(2) WHEN POWER IS SUBJECT TO FAILURE, IS STANDBY POWER PROVIDED AS WELL?	☐ Yes	☐ No	
B. IS ADEQUATE PROTECTION PROVIDED AGAINST BACKFLOW?	☒ Yes	☐ No	
10. WHERE GAS CHLORINATION IS USED:			☒ N/A
A. ARE 1 TON CONTAINERS PROVIDED WHERE THE AVERAGE DAILY CHLORINE CONSUMPTION IS OVER 150 POUNDS?	☐ Yes	☐ No	☐ N/A
B. IS THE CHLORINE GAS CONDUCTED THROUGH COPPER, IRON, OR STEEL PIPE OF EXTRA HEAVY WEIGHT?	☐ Yes	☐ No	

Module 8 - Disinfection

Section B

Question 2.B

At very low flow rates, no chlorine solution is injected due to insufficient pressure differential to turn metering pump.

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B. EQUIPMENT – CONTINUED

C. DOES PIPING SLOPE UPWARD FROM THE CYLINDER TO THE CHLORINATOR?	☐ Yes	☐ No		
D. AT LARGE INSTALLATIONS, ARE TANK CARS USED?	☐ Yes	☐ No	☐ N/A	

C. HOUSING FOR GAS CHLORINATORS ☒ N/A

1. ARE SEPARATE ROOMS PROVIDED FOR CYLINDERS AND FOR EQUIPMENT?	☐ Yes	☐ No	☐ N/A
2. ARE CONTAINERS AND EQUIPMENT ON THE GROUND FLOOR?	☐ Yes	☐ No	
3. IS THERE EASY ACCESS TO ALL EQUIPMENT?	☐ Yes	☐ No	
4. ARE CONTAINERS OF AMMONIA AND CHLORINE STORED IN SEPARATE ROOMS?	☐ Yes	☐ No	☐ N/A
5. IS POSITIVE VENTILATION FOR EACH ROOM PROVIDED WHICH WILL GIVE ONE COMPLETE AIR CHANGE PER MINUTE?	☐ Yes	☐ No	☐ N/A
A. IS THE AIR OUTLET FROM THE ROOM NEAR THE FLOOR?	☐ Yes	☐ No	
B. IS THE POINT OF DISCHARGE SO LOCATED AS NOT TO CONTAMINATE AIR INLETS TO ANY BUILDINGS AND AREAS USED BY PEOPLE?	☐ Yes	☐ No	
C. ARE AIR INLETS THROUGH LOUVERS NEAR THE CEILING WITH THE AIR OF SUCH TEMPERATURE THAT IT WILL NOT AFFECT THE CHLORINATION EQUIPMENT ADVERSELY?	☐ Yes	☐ No	
D. ARE SWITCHES FOR FANS AND LIGHTS LOCATED OUTSIDE THE ROOM AT THE ENTRANCE?	☐ Yes	☐ No	
E. DOES THE VENT HOSE FROM THE MACHINE DISCHARGE TO THE OUTSIDE ATMOSPHERE ABOVE GRADE?	☐ Yes	☐ No	
6. IS HEAT PROVIDED?	☐ Yes	☐ No	☐ N/A
A. ARE CHLORINATOR ROOMS HEATED TO 60 DEGREES FAHRENHEIT?	☐ Yes	☐ No	
B. ARE CHLORINATOR ROOMS PROTECTED FROM EXCESS HEAT?	☐ Yes	☐ No	
C. ARE CYLINDERS IN USE PROTECTED FROM TEMPERATURES ABOVE THAT OF THE EQUIPMENT?	☐ Yes	☐ No	
D. IS PROVISION MADE TO INSURE THAT THE CHLORINE WILL BE IN THE GASEOUS FORM WHEN IT ENTERS THE CHLORINATOR?	☐ Yes	☐ No	
7. IS A CLEAR GLASS WINDOW INSTALLED IN THE DOOR OR WALL OF THE CHLORINATOR ROOM TO PERMIT THE CHLORINATOR TO BE VIEWED WITHOUT ENTERING THE ROOM?	☐ Yes	☐ No	☐ N/A

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D. OTHER REQUIREMENTS FOR GAS CHLORINATORS

☒ N/A

1. ARE GAS MASKS OF THE CANNISTER TYPE, DESIGNED FOR CHLORINE GAS AND MEETING THE REQUIREMENTS OF THE UNITED STATES BUREAU OF MINES, AVAILABLE AT ALL INSTALLATIONS WHERE CHLORINE GAS IS HANDLED? ☐ Yes ☐ No

   A. ARE THEY STORED OUTSIDE ANY ROOM WHERE CHLORINE IS USED OR STORED? ☐ Yes ☐ No

   B. IS CANNISTER SHELF-LIFE TAKEN INTO CONSIDERATION? ☐ Yes ☐ No

   C. AT LARGE INSTALLATIONS, IS OXYGEN-SUPPLYING EQUIPMENT PROVIDED? ☐ Yes ☐ No ☐ N/A

2. IS A BOTTLE OF AMMONIUM HYDROXIDE AVAILABLE FC TESTING FOR CHLORINE LEAKS? ☐ Yes ☐ No

3. AT INSTALLATIONS USING CONTAINERS LARGER THAN 150 POUNDS, IS AN EMERGENCY REPAIR KIT AVAILABLE TO PROPERLY CONFINE GAS LEAKAGE? ☐ Yes ☐ No ☐ N/A

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TABLE I TYPE OF UNITS	NUMBER OF UNITS	CAPACITY (MGD)
* 2 stage verticalmounted centrifugal pump (1150Hp)	4	19.4 each
	TOTAL	

* River water intake structure, 3 pumps normally run at 41.8 mgd capacity.

A. GENERAL

1. ARE THE PUMPING STATIONS DESIGNED TO MAINTAIN THE SANITARY QUALITY OF PUMPED WATER? [X] Yes [ ] No

2. ARE SUBSURFACE PITS OR PUMP ROOMS AND INACCESSIBLE INSTALLATIONS AVOIDED? [X] Yes [ ] No

3. IS FLOODING PREVENTED AT PUMPING STATIONS? [X] Yes [ ] No

4. WHERE RAW WATER IS DRAWN FROM SURFACE WATER (STREAMS, LAKES, RESERVOIRS, ETC.) DOES THE DESIGN OF INTAKE CONDUIT AND SUCTION WELL RECEIVE SPECIAL ATTENTION TO PREVENT CLOGGING CAUSED BY TRASH, SILT SETTLING, OR ICE FORMATION? [X] Yes [ ] No [ ] N/A

B. LOCATION

1. ARE THE PUMPING STATIONS SO LOCATED THAT THE PROPOSED SITE WILL MEET THE REQUIREMENTS OF THE.

A. SANITARY PROTECTION OF WATER QUALITY? [X] Yes [ ] No

B. HYDRAULICS OF SYSTEM? [X] Yes [ ] No

C. PROTECTION AGAINST INTERRUPTION OF SERVICE BY FIRE, FLOOD, OR ANY OTHER HAZARD? [X] Yes [ ] No

D. GROWTH AND EXPANSION? See attachment [ ] Yes [ ] No N/A

2. IS THE ELEVATION OF STATION SITE A MINIMUM OF 1 FOOT ABOVE THE HIGHEST RECORDED FLOOD ELEVATION OR SUITABLY PROTECTED TO SUCH AN ELEVATION? [X] Yes [ ] No

3. IS THE STATION SITE ACCESSIBLE AT ALL TIMES REGARDLESS OF FLOODS OR OTHER HAZARDS BY REASONABLY PASSABLE ROADS OR OTHER PRACTICAL MEANS OF ACCESS? [X] Yes [ ] No [ ] N/A

4. IS ALL SURFACE DRAINAGE LED AWAY FROM THE PUMPING STATION? [X] Yes [ ] No

5. IS THE GROUND GRADED AND LANDSCAPED? [X] Yes [ ] No [ ] N/A

6. ARE PROVISIONS MADE TO PREVENT THE ENTRANCE OF UNAUTHORIZED PERSONS AND ANIMALS? [X] Yes [ ] No

7. DOES THE SITE HAVE AMPLE SPACE FOR FUTURE GROWTH AND EXPANSION? [ ] Yes [X] No
See attachment

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C. PUMPING STATION BUILDING

1. DOES THE BUILDING HAVE ADEQUATE SPACE FOR THE INSTALLATION AND SAFE SERVICING OF ALL EQUIPMENT?	[X] Yes	[ ] No		
2. IS SPACE PROVIDED FOR ADDITIONAL UNITS NEEDED WITHIN A REASONABLE TIME?	[ ] Yes	[ ] No	[X] N/A	
3. IS THE BUILDING OF MASONRY OR OTHER FIRE AND WEATHER RESISTANT MATERIAL OF DURABLE CHARACTER WITH OUTWARD OPENING DOORS?	[X] Yes	[ ] No		
4. IS THE FLOOR ELEVATION AT LEAST 2 FEET ABOVE THE HIGHEST RECORDED FLOOD LEVEL AND AT LEAST 6 INCHES ABOVE THE FINISHED GRADE?	[X] Yes	[ ] No		
5. IS THE UNDERGROUND STRUCTURE OF THE BUILDING WATERPROOFED?	[X] Yes	[ ] No		
6. ARE ALL FLOORS, DRY WELLS, AND METER PITS DRAINED WITHOUT IMPAIRING THE QUALITY OF WATER HANDLED BY THE STATION?	[X] Yes	[ ] No		
7. DO ALL FLOORS WHICH CONTAIN EQUIPMENT OR WATER PIPING SLOPE AT LEAST 3 INCHES IN EVERY 10 FEET TO THE POINT OF DRAINAGE?	[X] Yes	[ ] No		
8. DOES THE BUILDING HAVE REASONABLE PROTECTION AGAINST VANDALISM?	[X] Yes	[ ] No		
9. IS IT GIVEN FIRE PROTECTION?	[X] Yes	[ ] No		
10. IS THE STRUCTURE OF SUCTION WELLS WATERPROOF?	[X] Yes	[ ] No	[ ] N/A	
A. DO FLOORS HAVE SUFFICIENT SLOPE TO PERMIT THE REMOVAL OF WATER AND ANY ENTRAINED SOLIDS?	[X] Yes	[ ] No		
B. ARE THEY COVERED OR OTHERWISE PROTECTED AGAINST SURFACE POLLUTION?	[X] Yes	[ ] No		
11. ARE CRANE-WAYS, HOIST BEAMS, EYEBOLTS, OR OTHER ADEQUATE FACILITIES PROVIDED FOR SERVICING OR REMOVING PUMPS, MOTORS, AND OTHER HEAVY EQUIPMENT?	[X] Yes	[ ] No		
12. WHERE NECESSARY, ARE OPENINGS PROVIDED IN THE STATION FLOORS, ROOFS, AND WHEREVER ELSE NEEDED FOR THIS PURPOSE?	[X] Yes	[ ] No		
13. ARE A TOOL BOARD AND OTHER FACILITIES REQUIRED FOR THE PROPER OPERATION AND MAINTENANCE OF THE EQUIPMENT AND BUILDINGS PROVIDED AND PLACED IN A CONVENIENT LOCATION?	[X] Yes	[ ] No		
14. ARE STAIRWAYS OR LADDERS WHICH MEET THE REGULATIONS OF THE DEPARTMENT OF LABOR AND INDUSTRY PROVIDED BETWEEN ALL FLOORS IN ALL PITS OR COMPARTMENTS WHICH MUST BE ENTERED?	[X] Yes	[ ] No	[ ] N/A	
15. ARE PROVISIONS MADE FOR ADEQUATE HEATING?	[X] Yes	[ ] No		

Module 13 - Pumping Stations

Section B

Question 1.D

The intake structure and pump capacity is sufficient to meet requirements of the nuclear plants need for cooling water and makeup water. The domestic water supply is provided as part of the makeup water system. No expansion of the facility is planned and fluctuations in the domestic water needs can be easily supplied by excess pump capacity.

Question 7

No expansion is planned. Ample capacity to supply increased domestic water need is already available.

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C. PUMPING STATION BUILDING – CONTINUED

16. IS THERMOSTATIC CONTROL OF TEMPERATURE PROVIDED?	[X] Yes	[ ] No	[ ] N/A
17. IS VENTILATION PROVIDED FOR ALL PUMPING STATIONS?	[X] Yes	[ ] No	
18. IS ADEQUATE FORCED VENTILATION PROVIDED FOR ALL ROOMS, COMPARTMENTS, PITS, AND OTHER ENCLOSURES BELOW THE GRADE FLOOR WHICH MIGHT BE ENTERED AND IN WHICH AN UNSAFE ATMOSPHERE MAY DEVELOP OR WHERE EXCESSIVE HEAT MAY BE BUILT UP BY EQUIPMENT?	[X] Yes	[ ] No	[ ] N/A
19. DOES THE VENTILATION PROVIDE AT LEAST 6 CHANGES OF AIR PER HOUR?	[X] Yes	[ ] No	
20. ARE SWITCHES FOR OPERATION OF VENTILATION EQUIPMENT MARKED AND LOCATED CONVENIENTLY?	[X] Yes	[ ] No	[ ] N/A
21. IS CONSIDERATION GIVEN TO INSTALLATION OF DEHUMIDIFYING EQUIPMENT? Consideration given. Equipment not needed. Pumps and equipment are rated at 100% humidity.	[ ] Yes	[ ] No	[X] N/A
22. DOES THE VENTILATION CONFORM TO THE EXISTING LOCAL AND/OR STATE CODES?	[X] Yes	[ ] No	
23. IS THE STATION ADEQUATELY LIGHTED THROUGHOUT?	[X] Yes	[ ] No	
24. DOES ALL ELECTRICAL WORK CONFORM TO THE REQUIREMENTS OF THE NATIONAL BOARD OF FIRE UNDERWRITERS AND TO RELEVANT STATE AND/OR LOCAL CODES?	[X] Yes	[ ] No	
25. EXCEPT IN THE CASE OF SMALL AUTOMATIC STATIONS WHERE SUCH FACILITIES ARE OTHERWISE AVAILABLE, ARE ALL PUMPING STATIONS PROVIDED WITH LAVATORY AND TOILET FACILITIES AND WITH POTABLE WATER?	[ ] Yes	[X] No	[ ] N/A
26. ARE WASHROOMS AND OFFICE FACILITIES PROVIDED AT ALL LARGE PUMPING STATIONS?	[ ] Yes	[ ] No	[X] N/A
A. IS PLUMBING SO LOCATED AND INSTALLED AS TO PREVENT POSSIBILITIES OF CONTAMINATION OF PUBLIC WATER SUPPLIES?	[ ] Yes	[ ] No	
B. IS THE WASTE DISCHARGED TO A DISPOSAL SYSTEM APPROVED BY THE DEPARTMENT?	[ ] Yes	[ ] No	[ ] N/A

D. PUMPING UNITS

1. DO PUMPING STATION UNITS AND AUXILIARY EQUIPMENT HAVE AMPLE CAPACITY TO SUPPLY THE PEAK DEMAND WITHOUT DANGEROUS OVERLOADING?	[X] Yes	[ ] No	
2. ARE TWO PUMPING UNITS INSTALLED EXCEPT IN WELLS OR SMALL PUMPING STATIONS WHERE AMPLE TIME WILL BE AVAILABLE BETWEEN PUMPING PERIODS FOR NECESSARY REPAIRS?	[X] Yes	[ ] No	[ ] N/A

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D. PUMPING UNITS – CONTINUED

3.	IF ONLY TWO UNITS ARE PROVIDED, DO THEY HAVE EQUAL CAPACITY AND IS EACH ABLE TO CARRY THE PEAK DEMAND?	☐	Yes	☐	No	☒ N/A
4.	WHERE MORE THAN TWO PUMPING UNITS ARE INSTALLED, DO THEY HAVE A SUFFICIENT CAPACITY THAT WITH ANY ONE PUMP OUT OF SERVICE THE REMAINING PUMPS WILL SUPPLY THE MAXIMUM DEMAND?	☒	Yes	☐	No	☐ N/A
5.	ARE SPARE PARTS AND TOOLS READILY AVAILABLE?	☒	Yes	☐	No	
6.	ARE BOOSTER PUMPS LOCATED OR CONTROLLED SO THAT THEY WILL NOT PRODUCE NEGATIVE PRESSURE UPON THEIR SUCTION LINE?	☐	Yes	☐	No	☒ N/A
	A. IS THE INTAKE PRESSURE AT LEAST 20 POUNDS PER SQUARE INCH WHEN PUMP IS IN NORMAL OPERATION?	☐	Yes	☐	No	
	B. IS THE AUTOMATIC CUT-OFF PRESSURE AT LEAST 5 POUNDS PER SQUARE INCH IN THE SUCTION LINE OR SUCH PRE-DETERMINED POSITIVE PRESSURE AS MAY BE APPROVED BY THE DEPARTMENT?	☐	Yes	☐	No	
	C. DOES THE AUTOMATIC OR REMOTE CONTROL DEVICE HAVE A LARGE RANGE BETWEEN THE START AND CUT-OFF PRESSURE?	☐	Yes	☐	No	
7.	IS SUCTION LIFT AVOIDED INSOFAR AS IT IS POSSIBLE?	☒	Yes	☐	No	☐ N/A
8.	ARE THE PUMPS SO LOCATED THAT THEY WILL BE WITHIN THE ALLOWABLE SUCTION LIFT?	☐	Yes	☐	No	☒ N/A
9.	IS THE SUCTION LIFT LESS THAN 15 FEET?	☐	Yes	☐	No	☒ N/A
10.	WHERE SUCTION LIFT CANNOT BE AVOIDED, IS PROVISION MADE FOR PRIMING THE PUMPS?	☐	Yes	☐	No	☒ N/A
11.	IS THE WATER USED FOR PRIMING EQUAL IN SANITARY QUALITY TO THAT DELIVERED BY PUMPS?	☐	Yes	☐	No	☒ N/A
	A. ARE MEANS PROVIDED TO PREVENT ANY CROSS-CONNECTION?	☐	Yes	☐	No	☒ N/A
	B. WHEN AN AIR OPERATED EJECTOR IS USED FOR EXHAUSTING AIR FROM THE SUCTION PIPE, DOES THE SCREENED INTAKE DRAW UNPOLLUTED AIR?	☐	Yes	☐	No	☒ N/A
12.	DOES THE FOOT VALVE ON THE SUCTION LINE HAVE A NET VALVE AREA AT LEAST 2.50 TIMES THAT OF THE SUCTION PIPE AND IS IT SCREENED WHERE NECESSARY?	☐	Yes	☐	No	☒ N/A
13.	WHERE A FOOT VALVE IS NOT PROVIDED, ARE THE PUMPS SELF-PRIMING, HAVE VACUUM PRIMING, OR HAVE A POSITIVE SUCTION HEAD?	☒	Yes	☐	No	☐ N/A
14.	IS A SHUTOFF VALVE OF APPROPRIATE TYPE PLACED ON THE DISCHARGE LINE OF EACH PUMP?	☒	Yes	☐	No	

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D. PUMPING UNITS – CONTINUED

15.	WHEN THE PUMPS ARE OPERATING WITH POSITIVE SUCTION HEAD, ARE SHUTOFF VALVES PLACED ALSO ON THE SUCTION LINES?	☐	Yes	☒	No	☐ N/A
16.	DOES EACH PUMP HAVE A POSITIVE ACTING CHECK VALVE ON THE DISCHARGE SIDE BETWEEN THE PUMP AND SHUTOFF VALVE?	☒	Yes	☐	No	
17.	IS THE PIPING SO DESIGNED THAT THE FRICTION HEAD WILL BE LOW?	☒	Yes	☐	No	
18.	ARE TRAPS, EITHER FOR SEDIMENT OR FOR GAS, ELIMINATED BY SLOPING THE PIPES IN ONE DIRECTION TO DRAINS AND BY THE INSTALLATION OF ADEQUATE CLEANOUTS?	☒	Yes	☐	No	
19.	DOES EACH PUMP HAVE AN INDIVIDUAL SUCTION LINE OR ARE THE LINES SO MANIFOLDED THAT THEY WILL INSURE SIMILAR HYDRAULIC AND OPERATING CONDITIONS?	☒	Yes	☐	No	
20.	IS ANY SUCTION PIPE OR MANIFOLD PIPING WHICH IS BURIED IN THE GROUND OR SUBMERGED IN NON-POTABLE WATER BETWEEN A FINISHED WATER RESERVOIR AND A PUMPING UNIT SO DESIGNED AND CONSTRUCTED THAT IT WILL BE UNDER POSITIVE HEAD AT ALL TIMES?	☐	Yes	☐	No	☒ N/A
21.	DO ALL CONNECTING PIPES TO PUMPS HAVE WATERTIGHT JOINTS?	☒	Yes	☐	No	
22	DOES EACH PUMP HAVE A STANDARD TYPE GAUGE, OR ITS EQUIVALENT, UPON ITS DISCHARGE LINE AND A COMPOUND GAUGE UPON ITS SUCTION LINE?	☐	Yes	☒	No	See attachment
23.	ARE RECORDING GAUGES INSTALLED AT THE LARGER STATIONS?	☒	Yes	☐	No	☐ N/A
24.	ARE SATISFACTORY MEANS PROVIDED FOR MEASURING THE DISCHARGE OF EACH PUMP?	☒	Yes	☐	No	
25.	ARE MEANS PROVIDED FOR MEASURING THE TOTAL WATER PUMPED BY THE STATION?	☒	Yes	☐	No	
26.	IS IT MEASURED BY AN INDICATING, RECORDING, AND INTEGRATING METER?	☐	Yes	☒	No	☐ N/A
	Indicating and recording on strip chart only. Manual integration.					
27.	IS PROVISION MADE TO PROTECT THE PIPE LINES AGAINST THE EFFECT OF SURGE OR WATER HAMMER?	☒	Yes	☐	No	
28.	IS EACH PUMP DRIVEN BY A PRIME MOVER ABLE TO OPERATE AGAINST THE MAXIMUM HEADS, DISCHARGE RATES AND TEMPERATURES WHICH MAY BE ENCOUNTERED?	☒	Yes	☐	No	
29.	ARE THE PRIME MOVERS OF REPUTABLE MANUFACTURE AND INSTALLED IN ACCORDANCE WITH THE DIRECTIONS OF THEIR MANUFACTURER?	☒	Yes	☐	No	
30.	WHERE AN AIRLIFT IS USED FOR PUMPING, DOES THE SCREENED INTAKE DRAW UNPOLLUTED AIR FROM A POINT AT LEAST 10 FEET ABOVE THE GROUND OR OTHER SOURCE OF CONTAMINATION, UNLESS IT IS FILTERED BY APPARATUS APPROVED BY THE DEPARTMENT?	☐	Yes	☐	No	☒ N/A

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D. PUMPING UNITS – CONTINUED

31.	ARE WATER SEALS SUPPLIED WITH WATER OF A QUALITY EQUAL TO THAT PUMPED? Seal water is better quality water pumped from a drilled well.	[X]	Yes	[ ]	No	
32.	WHERE PUMPS ARE SEALED WITH POTABLE WATER AND ARE PUMPING NON-POTABLE WATER, IS THE SEAL SUPPLIED FROM A BREAK TANK WHICH IS OPEN TO ATMOSPHERIC PRESSURE?	[ ]	Yes	[ ]	No	[X] N/A
	A. IS THE AIR GAP BETWEEN THE FEEDER LINE AND THE SPILL LINE OF TANK AT LEAST 6 INCHES OR 2 PIPE DIAMETERS, WHICHEVER IS GREATER?	[ ]	Yes	[ ]	No	
33.	ARE PUMPS, THEIR PRIME MOVERS, AND ACCESSORIES CONTROLLED IN SUCH A MANNER THEY THAT WILL OPERATE AT RATED CAPACITY WITHOUT DANGEROUS OVERLOAD?	[X]	Yes	[ ]	No	
34.	IN CASES WHERE 2 OR MORE PUMPS ARE INSTALLED, IS PROVISION MADE FOR PROPER ALTERNATING?	[X]	Yes	[ ]	No	[ ] N/A

E. POWER

1.	IS A POWER SUPPLY AVAILABLE FROM AT LEAST TWO INDEPENDENT SOURCES?	[X]	Yes	[ ]	No	[ ] N/A
2.	ARE ALL MAIN PUMPING STATIONS PROVIDED WITH AN AUXILIARY SOURCE OF POWER?	[X]	Yes	[ ]	No	[ ] N/A
3.	WHEN POWER FAILURE WOULD RESULT IN CESSATION OF MINIMUM ESSENTIAL SERVICES ARE MEANS PROVIDED FOR EMERGENCY OPERATION (STANDBY GENERATOR, ETC.)?	[X]	Yes	[ ]	No	[ ] N/A

F. INTAKES

[ ] N/A

1.	IS THE INTAKE OF A TYPE APPROPRIATE TO THE PUMPING STATION?	[X]	Yes	[ ]	No	
2.	IS THE INTAKE PROTECTED SO AS TO PREVENT DETERIORATION OF THE SANITARY QUALITY OF THE WATER TO BE PUMPED?	[X]	Yes	[ ]	No	
3.	EXCEPT IN THE CASE OF SMALL STATIONS OR WHERE THE PUMP SUCTION IS TAKEN DIRECTLY FROM AN ADJACENT SUPPLY, IS THE WATER CONDUCTED FROM ITS SOURCE BY A WATERTIGHT CONDUIT INTO A SUCTION WELL WHICH IS IN OR ADJACENT TO THE PUMP HOUSE?	[ ]	Yes	[ ]	No	[X] N/A
4.	ARE THE CAPACITY OF THE CONDUIT AND THE DEPTH OF THE SUCTION WELL SO DESIGNED THAT THE INTAKE PORTS TO THE PUMPS WILL NOT DRAW AIR?	[ ]	Yes	[ ]	No	N/A
5.	IS A MINIMUM VELOCITY OF 3 FEET PER SECOND PROVIDED IN THE INTAKE CONDUIT?	[ ]	Yes	[ ]	No	N/A
6.	IS THE INTAKE PIPE LAID ON A CONTINUALLY RISING OR FALLING GRADE TO AVOID ACCUMULATION OF AIR OR GAS?	[ ]	Yes	[ ]	No	N/A

Module B - Pumping Stations

Section D

Question 22

The gauging of the makeup water pumps at the river water intake structure is as follows: each pump operates on a positive suction head, the impellers of the pumps being located near the bottom of the 20 foot deep pump well, there is a pressure gauge on the discharge piping from each pump with a readout at the pumping station control panel. There is also a water pressure and temperature gauge located on the common discharge header from the four pumps. This information is indicated at the pump station control panel and is permanently recorded on a strip chart there. Total flow from the makeup water pumps is measured in the makeup water piping and is indicated and recorded on a strip chart in the main plant control room.

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MODULE 13 – PUMPING STATIONS

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F. INTAKES – CONTINUED

7.	DO INTAKES THAT DRAW WATER FROM SURFACE STREAMS OR OPEN RESERVOIRS HAVE ADEQUATE PROTECTION AGAINST CLOGGING BY SEDIMENT, DEBRIS, OR ICE AND AGAINST FLOTATION, WIND, AND WAVE PRESSURE?	[X]	Yes	[ ]	No	[ ] N/A
8.	WHERE THE DEPTH OF WATER PERMITS, ARE INTAKES PLACED AT VARIOUS ELEVATIONS?	[ ]	Yes	[ ]	No	[X] N/A
9.	IS THE VELOCITY AT AN INTAKE PORT NOT GREATER THAN 2 FEET PER SECOND AND THE DEPTH OF WATER OVER THE PORT AT LEAST 3 DIAMETERS OF PORT OPENING?	[X]	Yes	[ ]	No	
10.	ARE INTAKE PORTS PLACED SO THAT IF ONE OR MORE PORTS ARE BLOCKED ANOTHER CAN BE OPENED?	[ ]	Yes	[ ]	No	N/A
11.	WHERE PRACTICABLE, IS AN EMERGENCY INTAKE PROVIDED?	[ ]	Yes	[ ]	No	[X] N/A
12.	ARE INTAKES TO THE PUMPS DRAWING RAW WATER PROTECTED BY AT LEAST 2 SETS OF REMOVABLE STATIONARY SCREENS OR BY A TRAVELING SCREEN?	[X]	Yes	[ ]	No	[ ] N/A
A.	ARE THE OPENINGS BETWEEN BARS SMALL ENOUGH TO EXCLUDE ALL MATTER WHICH WILL CLOG THE SUCTION LINE OR INJURE THE PUMPS?	[X]	Yes	[ ]	No	
B.	IS THE VELOCITY THROUGH A SCREEN NOT MORE THAN 20 FEET PER MINUTE? 51 fpm through bar screen free area 60 fpm through traveling water screen free area	[ ]	Yes	[X]	No	
C.	ARE SUITABLE FACILITIES FOR CLEANING THE SCREENS PROVIDED?	[X]	Yes	[ ]	No	
D.	WHERE ICE FORMATION CAN BE ANTICIPATED, IS THE INTAKE DESIGNED TO MINIMIZE IT?	[X]	Yes	[ ]	No	[ ] N/A
E.	WHERE NECESSARY, IS PROVISION MADE TO DE-ICE THE SCREENS AND INTAKE OPENINGS AND TO CONTROL FRAZIL (ANCHOR) ICE BY MEANS OF STEAM OR ELECTRICAL HEATING DEVICES OR OTHERWISE?	[X]	Yes	[ ]	No	[ ] N/A

G. WELLS AND SPRINGS [X] N/A

1.	WHERE THE SOURCE OF SUPPLY IS A WELL OR SPRING, IS IT PROTECTED AGAINST SURFACE AND/OR SUBSURFACE POLLUTION?	[ ]	Yes	[ ]	No
2.	ARE THE WELLS OR SPRINGS VENTED BY MEANS OF A PROPERLY HOODED AND SCREENED PIPE WHICH EXTENDS AT LEAST 12 INCHES ABOVE THE PUMP FLOOR AND WHICH IS PROTECTED AGAINST THE ENTRANCE OF POLLUTION?	[ ]	Yes	[ ]	No
3.	IS PROVISION MADE FOR LUBRICATING THE PUMP FROM A POINT AT LEAST 6 INCHES ABOVE THE TOP OF THE WELL COVER BY MEANS WHICH WILL PREVENT CONTAMINATION OF WATER SUPPLY?	[ ]	Yes	[ ]	No

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G. WELLS – CONTINUED

4. DO STATIONS WHICH ARE LOCATED OVER A DUG WELL HAVE A WATERTIGHT CONCRETE FLOOR?	☐ Yes	☐ No	☐ N/A
A. IS THE ENTRANCE HATCH IN THE PUMP FLOOR LOCATED ADJACENT TO AND INSIDE OF THE WELL PERIMETER WITH AN ELEVATED CURB OR COMBING AT LEAST 4 INCHES HIGH?	☐ Yes	☐ No	
B. DOES THE EDGE OF COVER EXTEND DOWN OVER THE CURB AT LEAST 2 INCHES?	☐ Yes	☐ No	
C. DOES THE HATCH COVER HAVE FACILITIES FOR BEING LOCKED IN PLACE?	☐ Yes	☐ No	
5. ARE ALL CONNECTIONS BETWEEN THE WELL AND THE PUMP MADE IN SUCH A WAY AS TO PREVENT THE CONTAMINATION OF THE WELL, REGARDLESS OF VIBRATION OR OTHER FACTORS?	☐ Yes	☐ No	
6. IS THE RISER PIPE OR CASING FIRMLY CONNECTED TO THE PUMP STRUCTURE SO AS TO PROVIDE A WATERTIGHT UNION?	☐ Yes	☐ No	
7. DOES THE CASING EXTEND AT LEAST 6 INCHES ABOVE THE FLOOR?	☐ Yes	☐ No	
8. IS IT EQUIPPED WITH A FLANGE, SUITABLE STUFFING BOX, OR OTHER DEVICE?	☐ Yes	☐ No	
9. WHERE A WATERTIGHT CONNECTION IS NOT PROVIDED, IS THE CASING INSERTED INTO A RECESS EXTENDING AT LEAST 1 INCH INTO THE BASE OF THE PUMP?	☐ Yes	☐ No	☐ N/A
10. IS THE BASE OF THE PUMP NOT LESS THAN 6 INCHES ABOVE THE PUMP ROOM FLOOR?	☐ Yes	☐ No	
11. DOES THE DESIGN OF THE PUMP FOUNDATION AND THE PUMP BASE PREVENT WATER FROM COMING INTO CONTACT WITH THE JOINT?	☐ Yes	☐ No	
12. WHERE A SUBMERSIBLE PUMP IS USED, IS THE TOP OF THE CASING EFFECTIVELY SEALED AGAINST THE ENTRANCE OF WATER UNDER ALL CONDITIONS OF VIBRATION OR MOVEMENT OF CONDUCTORS OR CABLES?	☐ Yes	☐ No	☐ N/A
13. ARE THE DISCHARGE LINE AND ITS CONTROL VALVES LOCATED ABOVE THE PUMP FLOOR?	☐ Yes	☐ No	
14. ARE PUMPS PROTECTED AGAINST FREEZING AND VALVED TO PERMIT TESTING AND CONTROL OF EACH WELL?	☐ Yes	☐ No	
15. DO CONNECTING PIPES TO PUMPS HAVE WATERTIGHT JOINTS?	☐ Yes	☐ No	
16. ARE ALL EXTERNAL VALVES PROTECTED BY CURB BOXES OR OTHER CONSTRUCTION?	☐ Yes	☐ No	

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G. WELLS AND SPRINGS – CONTINUED

17. IS DISCHARGE PIPING FROM WELL PUMPS PROVIDED WITH MEANS TO PUMP TO WASTE? ☐ Yes ☐ No ☐ N/A

18. DO ALL RECEIVING TANKS FORMING PART OF THE PUMP HOUSE EQUIPMENT HAVE APPROPRIATE DEVICES FOR INDICATING THE WATER LEVEL IN THE TANK? ☐ Yes ☐ No ☐ N/A

A. ARE TANKS LOCATED AND CONSTRUCTED SO AS TO PREVENT CONTAMINATION OF WATER THEREIN? ☐ Yes ☐ No

H. AUTOMATIC AND REMOTE-CONTROLLED STATIONS ☐ N/A

1. ARE ALL AUTOMATIC STATIONS PROVIDED, WHERE PRACTICAL, WITH AUTOMATIC SIGNALING APPARATUS WHICH WILL REPORT WHEN THE STATIONS ARE OUT OF SERVICE? ☒ Yes ☐ No

2. ARE ALL REMOTE-CONTROLLED PUMPING STATIONS ELECTRICALLY OPERATED AND CONTROLLED? ☒ Yes ☐ No ☐ N/A

3. DO THEY HAVE SIGNALING APPARATUS OF PROVEN PERFORMANCE? ☒ Yes ☐ No ☐ N/A

4. DOES INSTALLATION OF ELECTRICAL EQUIPMENT CONFORM WITH THE NATIONAL ELECTRIC CODE? ☒ Yes ☐ No

I. CROSS-CONNECTIONS

1. ARE CROSS-CONNECTIONS PREVENTED AT ANY POINT IN THE PUMPING STATION? ☒ Yes ☐ No

2. ARE STEAM ENGINE EXHAUST AND THE COOLING WATER FROM ENGINE JACKETS OR OTHER HEAT EXCHANGE DEVICES PREVENTED FROM RETURNING TO A POTABLE WATER SUPPLY? ☒ Yes ☐ No ☐ N/A

3. ARE PLUMBING FIXTURES OR DEVICES EXCLUDED WHICH WILL PROVIDE INTER-CONNECTIONS OR MAKE POSSIBLE THE BACKFLOW OF SEWAGE OR WASTES INTO THE WATER SUPPLY SYSTEM? ☒ Yes ☐ No

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MODULE 14 – RESERVOIRS, ELEVATED TANKS, STANDPIPES AND PRESSURE TANKS

For Department Use Only

This Report Is Not Required For Existing Covered Standpipes, Covered Elevated Tanks And Booster Pump Stations Provided The Public Water Supply Complies With The Regulations For Public Water Supplies Regarding Water Quality, Quantity And Pressure.

TABLE I — TYPE OF UNITS	NUMBER OF UNITS	VOLUME (MG)
Clarified water storage tank	1	.5
	TOTAL	

A. GENERAL

1. IS STORAGE PROVIDED FOR FINISHED WATER AS AN INTEGRAL PART OF THE WATER SUPPLY SYSTEM? — [X] Yes [ ] No

2. ARE GROUND LEVEL RESERVOIRS OR LOW TANKS WITH MULTIPLE PUMPS AND AUXILIARY POWER USED TO MAINTAIN PRESSURES ON THE DISTRIBUTION SYSTEM WHEN ELEVATED STORAGE IS NOT MORE FEASIBLE? — [X] Yes [ ] No [ ] N/A
See attachment

3. ARE PRESSURE TANKS INSTALLED FOR DOMESTIC NEEDS OF SMALL COMMUNITIES? — [ ] Yes [ ] No [X] N/A

4. DO CLEAR WELLS, WHETHER DESIGNED AS SEPARATE STRUCTURES OR AS PART OF THE FILTER STRUCTURE, MEET THE REQUIREMENTS FOR RESERVOIRS? — [X] Yes [ ] No

5. DO THE LOCATION, SIZE, TYPE, AND ELEVATION OF RESERVOIR, TANK, OR STANDPIPE GIVE NORMAL PRESSURES OF 50 TO 60 POUNDS PER SQUARE INCH ON THE DISTRIBUTION SYSTEM? — [ ] Yes [ ] No N/A
(Refer to Question 2 for explanation)

Not a normal operating mode.

B. DESIGN

1. ARE FACILITIES DESIGNED TO CONFORM TO APPLICABLE CODES? — [X] Yes [ ] No

2. IS THE BOTTOM OF THE GROUND-LEVEL RESERVOIR ESTABLISHED ABOVE THE GROUND WATER TABLE AND AT THE NORMAL GROUND SURFACE ABOVE ANY POSSIBLE FLOODING? — [X] Yes [ ] No [ ] N/A

3. WHERE THE BOTTOM OF THE RESERVOIR IS BELOW THE NORMAL GROUND SURFACE, ARE SEWERS, DRAINS, PRIVIES, STANDING SURFACE WATER, AND SIMILAR SOURCES OF CONTAMINATION AT LEAST 50 FEET AWAY? — [ ] Yes [ ] No [X] N/A

4. ARE SEWERS AT DISTANCES OF LESS THAN 50 FEET CONSTRUCTED OF CLASS 100 OR BETTER MECHANICAL JOINT WATER PIPE TESTED TO 50 POUNDS PER SQUARE INCH? — [ ] Yes [ ] No [X] N/A

5. IS THE TOP OF THE GROUND-LEVEL RESERVOIR AT LEAST 2 FEET ABOVE THE NORMAL GROUND SURFACE OR ANY POSSIBLE FLOOD LEVEL? — [X] Yes [ ] No [ ] N/A

6. DO RESERVOIRS FOR FINISHED WATER STORAGE HAVE A SUITABLE WATER-TIGHT ROOF OR COVER WHICH EXCLUDES BIRDS, ANIMALS, INSECTS, AND EXCESSIVE DUST AND WHICH WILL MAINTAIN A FINISHED WATER THAT IS ASSUREDLY CLEAN AND PROTECTED FROM RADIOACTIVE FALLOUT? — [X] Yes [ ] No

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MODULE 14 – RESERVOIRS, ELEVATED TANKS, STANDPIPES AND PRESSURE TANKS

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B. DESIGN – CONTINUED

7. ARE FENCING, LOCKS ON ACCESS MANHOLES, AND OTHER NECESSARY PRECAUTIONS TAKEN TO PREVENT TRESPASSING, VANDALISM, OR SABOTAGE?	[X] Yes	[ ] No		
8. IS THE MAXIMUM VARIATION OF WORKING LEVELS IN STORAGE FACILITIES WHICH FLOAT ON A DISTRIBUTION SYSTEM NOT IN EXCESS OF 30 FEET?	[X] Yes	[ ] No	[ ] N/A	
9. WHERE SUITABLE HIGH GROUND IS AVAILABLE, IS A RESERVOIR CONSTRUCTED AT GROUND LEVEL, PROPERLY COVERED, AND MOUNDED OR COVERED WITH EARTH FROM PROTECTION AGAINST FREEZING OR SUMMER HEAT?	[ ] Yes	[ ] No	[X] N/A	
10. IF AVAILABLE GROUND ELEVATIONS ARE NOT HIGH ENOUGH, IS A STANDPIPE OF STEEL OR REINFORCED CONCRETE PROVIDED?	[ ] Yes	[ ] No	[X] N/A	
11. IS ADDITIONAL STORAGE BELOW THE TOP 30 FEET FOR EMERGENCY OR FIRE USE PROVIDED WHERE PRACTICABLE?	[X] Yes	[ ] No	[ ] N/A	
12. WHEN THE HEIGHT OF THE RESERVOIR IS TO EXCEED 50 OR 60 FEET, IS AN ELEVATED TANK PROVIDED?	[ ] Yes	[ ] No	[X] N/A	
13. IS PROVISION MADE TO DRAIN THE TANK FOR CLEANING OR REPAIR WHILE MAINTAINING PRESSURE ON THE SYSTEM BY DIRECT PUMPING?	[X] Yes	[ ] No		
14. IS THE RESERVOIR OR TANK DRAINED TO THE GROUND SURFACE IN A MANNER TO PRECLUDE CONTAMINATION BY SURFACE WATER OR ANIMALS?	[X] Yes	[ ] No		
15. IS A DIRECT CONNECTION TO A STORM WATER DRAIN OR TO A SEWER PREVENTED?	[X] Yes	[ ] No		
16. IS THE OVERFLOW PIPE OF THE ELEVATED TANK BROUGHT NEAR THE GROUND?	[X] Yes	[ ] No	[ ] N/A	
17. DO OVERFLOWS ON ALL STRUCTURES HAVE FREE FALL DISCHARGES THAT ARE IN PLAIN VIEW?	[X] Yes	[ ] No		
18 ARE VENTS, OVERFLOW, FINIAL DECORATIONS, AND WARNING LIGHTS SO CONSTRUCTED AS TO EXCLUDE DUST, BIRDS, ANIMALS, AND INSECTS?	[X] Yes	[ ] No		
19. DO VENTS ON GROUND-LEVEL RESERVOIRS TERMINATE IN AN INVERTED U CONSTRUCTION, THE OPENING OF WHICH IS COVERED WITH 24-MESH NON-CORRODIBLE SCREEN CLOTH AT LEAST 24 INCHES ABOVE THE SOD? An air filter is incorporated in the inverted U pipe.	[X] Yes	[ ] No		
20. ARE PIPES RUNNING THROUGH THE SHELL OF THE STORAGE STRUCTURE WELDED OR PROPERLY GASKETED IN METAL TANKS OR CONNECTED TO STANDARD WALL CASTINGS WHICH ARE POURED IN PLACE DURING THE FORMING OF A CONCRETE STRUCTURE?	[X] Yes	[ ] No		
21 DO THESE WALL CASTINGS HAVE A FLANGE OR FLANGES IMBEDDED IN THE CONCRETE BOTH FOR RIGIDITY AND TO PREVENT SEEPAGE ALONG THE OUTER FACE OF THE PIPING?	[ ] Yes	[ ] No	[X] N/A	

Section A

Question 2

The makeup water system at the Susquehanna Steam Electric Station utilizes a 500,000 gallon clarified water storage tank to provide peak water demands for the domestic water system and reactor makeup water system. The tank is 30 feet in diameter and 100 feet tall. A standpipe inside the tank reserves 300,000 gallons for fire protection.

There are three clarified water pumps used to transfer water from the clarified water storage tank to the Domestic Water Subsystem and the reactor makeup water Subsystem. Each pump is a single stage, centrifugal, motor driven pump with a rated discharge pressure of approximately 148 psig. Each pump, however, has a different rated capacity. Clarified water pump A is rated at 100 gpm, B pump is rated at 200 gpm, and C pump is rated at 300 gpm. During normal system operation, only pump A is in service. B and C pumps are in a standby condition and will sequentially start, automatically, on decreasing pump discharge header pressure when clarified water demand increases.

The 100 gpm clarified water pump runs continuously to maintain 130 psig pressure in the system and normally supplies 100 percent of system requirement. The backup pumps will sequentially start when necessary to insure that pressure is maintained in the clarified water supply piping. Pressure reducers in the domestic water system provide for a lowered pressure of 85 psig in the domestic water chlorine contact tank and potable water distribution system.

The Susquehanna SES has four backup diesel generators (a fifth is under construction) which supply power for plant operation when other sources of electricity are interrupted.

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PUBLIC WATER SUPPLY
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B. DESIGN – CONTINUED

22.	ARE VALVE STEMS OR SIMILAR PROJECTIONS PREVENTED FROM PASSING THROUGH THE ROOF OF THE RESERVOIR?	[X]	Yes	[ ]	No	
23.	ARE SUCH CONTROLS LOCATED OUTSIDE THE RESERVOIR?	[X]	Yes	[ ]	No	
24.	IS EXISTING CONSTRUCTION MODIFIED SO THAT ANY VALVE STEM PASSING THROUGH THE ROOF IS IN A WALL SLEEVE SET IN A CURBED OPENING OR WELDED TO THE COVER PLATE, WHICH SLEEVE IS IN TURN COVERED BY AN OVERLAPPING TURNED-DOWN HOOD WELDED TO THE VALVE STEM?	[ ]	Yes	[ ]	No	[X] N/A
25.	ARE MANHOLES OR SCUTTLES ABOVE THE WATERLINE OF AN ELEVATED TANK FRAMED AT LEAST 4 INCHES, AND PREFERABLY 6 INCHES, ABOVE THE SURFACE OF THE ROOF AT THE OPENING AND FITTED WITH A SOLID WATERTIGHT COVER WHICH OVERLAPS THE FRAMED OPENING AND EXTENDS DOWN AROUND THE FRAME AT LEAST 2 INCHES?	[ ]	Yes	[ ]	No	[X] N/A
26.	ON A GROUND-LEVEL RESERVOIR, IS A MANHOLE ELEVATED 24 INCHES TO 36 INCHES OR MORE ABOVE THE TOP OF COVERING SOD, DEPENDING ON THE AMOUNT OF SNOW EXPECTED?	[X]	Yes	[ ]	No	[ ] N/A
27.	IS THE COVER HINGED AT ONE SIDE AND PROVIDED WITH A LOCKING DEVICE? The cover is hinged and bolted. The tank is located within the security fence.	[ ]	Yes	[X]	No	
28.	IS THE ROOF OF THE STRUCTURE WELL DRAINED?	[X]	Yes	[ ]	No	
29.	ARE DOWNSPOUT PIPES PREVENTED FROM ENTERING THE RESERVOIR?	[X]	Yes	[ ]	No	
30.	ARE PARAPETS OR SIMILAR CONSTRUCTION WHICH WOULD TEND TO HOLD WATER OR SNOW ON THE ROOF EXCLUDED?	[X]	Yes	[ ]	No	
31.	WHEN FINISHED WATER MUST BE STORED ADJACENT TO AN UNSAFE WATER COMPARTMENT, IS IT SEPARATED BY DOUBLE WALLS HAVING A READILY OBSERVABLE DRAIN FROM THE FLOOR OF THE AREA BETWEEN THE WALLS?	[ ]	Yes	[ ]	No	[X] N/A
32.	IN COLD CLIMATES, ARE RISER PIPES OF A DESIGN THAT WILL PREVENT UNDESIRABLE FREEZING?	[X]	Yes	[ ]	No	
33.	ARE ALTITUDE-CONTROL VALVES OR TELEMETERING EQUIPMENT USED WHERE ANY APPRECIABLE VARIATION IN HEAD LOSS OCCURS IN THE DISTRIBUTION SYSTEM BETWEEN THE SOURCE AND THE STORAGE FACILITY?	[ ]	Yes	[ ]	No	[X] N/A
34.	ARE ALTITUDE VALVES PROVIDED IN THE CASE OF MULTIPLE STORAGE UNITS?	[ ]	Yes	[ ]	No	[X] N/A
35.	ARE PRESSURE CONTROL SWITCHES OR TELEMETER EQUIPMENT PROVIDED WITH OVERFLOW AND LOW-LEVEL WARNINGS OR ALARMS IN APPROPRIATE PLACES ABOUT THE COMMUNITY?	[ ]	Yes	[X]	No	
36	IS DUE REGARD TO THE PERSONAL SAFETY OF EMPLOYEES GIVEN IN THE DESIGN OF AN ELEVATED FACILITY?	[X]	Yes	[ ]	No	

B. DESIGN – CONTINUED

37. ARE BALCONY RAILINGS, LADDER GUARDS, AND PROTECTION FOR THE ENTRANCE HATCH AND THE RISER PIPE INSIDE THE TANK PROVIDED? [X] Yes [ ] No

38. IS THE AREA SURROUNDING A GROUND-LEVEL RESERVOIR GRADED TO PREVENT SURFACE WATER FROM STANDING WITHIN 50 FEET OF THE STRUCTURE? [X] Yes [ ] No [ ] N/A

39. ARE PRESSURE TANKS LOCATED ABOVE THE NORMAL GROUND SURFACE AND COMPLETELY HOUSED TO PREVENT FREEZING OR EARTH–MOUNDED WITH ONE END PROJECTING INTO AN OPERATING HOUSE? [ ] Yes [ ] No [X] N/A

A. IF HOUSED WHOLLY OR PARTIALLY IN A PIT, IS THE PIT DRAINED TO THE GROUND SURFACE WITH NO DIRECT CONNECTION TO A SEWER? [ ] Yes [ ] No

B. DOES THE TANK ITSELF HAVE A PIPING BYPASS TO PERMIT OPERATION OF THE SYSTEM DURING TANK REPAIRS, AN ACCESS MANHOLE, AND A DRAIN? [ ] Yes [ ] No

C. IS CONTROL EQUIPMENT REQUIRED FOR EFFECTIVE USE OF A HYDROPNEUMATIC TANK PROVIDED, INCLUDING PRESSURE GAUGE, WATER SIGHT GLASS, AUTOMATIC OR MANUAL BLOW-OFF FOR EXCESS AIR, MECHANICAL MEANS FOR ADDING AIR, AND PRESSURE OPERATED START-STOP CONTROL FOR THE PUMPS? [ ] Yes [ ] No

C. PAINTING AND/OR CATHODIC PROTECTION

1. IF AN INTERIOR COATING IS APPLIED, DOES IT CONFORM TO THE AMERICAN WATER WORKS ASSOCIATION TENATIVE STANDARD D102–55T? [X] Yes [ ] No [ ] N/A

2. WHEN CATHODIC PROTECTION FOR METAL SURFACES IS USED, IS THE PROJECT DESIGNED AND INSTALLED BY COMPETENT TECHNICAL PERSONNEL AND THE EQUIPMENT PROPERLY MAINTAINED? [ ] Yes [ ] No [X] N/A

D. DISINFECTION

1. DO RESERVOIRS AND TANKS CONFORM TO THE PROVISIONS OF THE PUBLIC WATER SUPPLY MANUAL REGARDING DISINFECTION? [X] Yes [ ] No

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WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY
MODULE 15 – DISTRIBUTION SYSTEMS

For Department Use Only

This Report Is Not Required For Extensions To The Distribution System Provided The Public Water Supply Complies With The Regulations For Public Water Supplies Regarding Water Quality, Quantity, And Pressure.

A. GENERAL

1. HAS THE PIPE SELECTED BEEN MANUFACTURED IN CONFORMITY WITH THE LATEST STANDARD SPECIFICATIONS ISSUED BY THE AMERICAN WATER WORKS ASSOCIATION OR, IF PLASTIC PIPE IS USED, HAS IT BEEN APPROVED BY THE NATIONAL SANITATION FOUNDATION OF ANN ARBOR, MICHIGAN, FOR THE INTENDED USE? [X] Yes [ ] No

2. IF USED WATER MAINS ARE USED AGAIN, HAS THE PIPE BEEN CLEANED THOROUGHLY AND RESTORED PRACTICALLY TO ITS ORIGINAL CONDITION, AND DOES IT MEET THE AMERICAN WATER WORKS ASSOCIATION SPECIFICATIONS? [ ] Yes [ ] No [X] N/A

B. MINIMUM SIZE OF WATER MAIN

1. WILL THE DISTRIBUTION SYSTEM MAINTAIN POSITIVE PRESSURE AT ALL POINTS DURING ALL CONDITIONS OF FLOW AND AFTER DETERIORATION DUE TO AGE? [X] Yes [ ] No

2. FOR HYDRANT SUPPLY IN RESIDENTIAL DISTRICTS IS THE MINIMUM SIZE OF PIPE 6 INCHES IN DIAMETER FOR RUNS NOT EXCEEDING 600 FEET IN LENGTH? [ ] Yes [ ] No [X] N/A

3. IS THE STANDARD GRADING SCHEDULE OF THE NATIONAL BOARD OF FIRE UNDERWRITERS FOLLOWED IN OTHER INSTANCES? [ ] Yes [ ] No [X] N/A

4. ARE SUPPLY MAINS NOT INTENDED FOR FIRE FIGHTING NOT CONNECTED TO FIRE HYDRANTS AND CONSIDERED ONLY AS SPECIAL WATER-SERVICE LINES? [X] Yes [ ] No [ ] N/A

5. FOR SUPPLY PIPES NOT CONNECTED TO FIRE HYDRANTS, IS THE LENGTH OF RUN APPROPRIATE TO LOCAL CONDITIONS? [X] Yes [ ] No [ ] N/A

6. IS THE LENGTH OF RUN NOT IN EXCESS OF 300 FEET FOR 2 INCH PIPE, 600 FEET FOR 3 INCH PIPE, AND 1200 FEET FOR 4 INCH PIPE? [X] Yes [ ] No [ ] N/A

C. DEAD ENDS

1. ARE DEAD ENDS AVOIDED BY LOOPING WHEREVER REASONABLY POSSIBLE? [X] Yes [ ] No

2. DOES THE DEAD END OF EACH MAIN HAVE A FIRE HYDRANT, FLUSHING HYDRANT, OR BLOWOFF FOR FLUSHING PURPOSES? [X] Yes [ ] No

3. ARE FLUSHING DEVICES PREVENTED FROM BEING DIRECTLY CONNECTED TO ANY SEWER? [X] Yes [ ] No

D. LAYING OF WATER MAIN

1. IS A CONTINUOUS AND UNIFORM BEDDING PROVIDED FOR THE PIPE? [X] Yes [ ] No

See attachment

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D. LAYING OF WATER MAIN – CONTINUED

2.	IS THIS ACCOMPLISHED BY EXCAVATING TO AT LEAST 3 INCHES BELOW THE FINISHED GRADE AND BACKFILLING WITH AN APPROVED MATERIAL SUCH AS SAND OR PEA GRAVEL PROPERLY TAMPED IN LAYERS?	[X]	Yes	[ ]	No
3.	ARE STONES FOUND IN THE BOTTOM OF THE TRENCH REMOVED FOR A DEPTH OF AT LEAST 6 INCHES BELOW THE BOTTOM OF THE PIPE?	[X]	Yes	[ ]	No
4.	ARE AMERICAN WATER WORKS ASSOCIATION STANDARDS ADHERED TO FOR INSTALLING VARIOUS TYPES OF PIPES?	[X]	Yes	[ ]	No
5.	ARE PACKING AND JOINTING MATERIALS USED IN THE JOINTS OF PIPE APPROVED BY THE AMERICAN WATER WORKS ASSOCIATION?	[X]	Yes	[ ]	No

E. WATER MAINS NEAR SEWERS

1.	ARE WATER MAINS LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED DRAIN OR SEWER LINE?	[X]	Yes	[ ]	No	[ ]	N/A
2.	WHERE LOCAL CONDITIONS PREVENT A LATERAL SEPARATION OF 10 FEET, IS THE WATER MAIN LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE SEWER AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER?	[X]	Yes	[ ]	No	[ ]	N/A
3.	WHEN IT IS IMPOSSIBLE TO OBTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS STIPULATED ABOVE, ARE BOTH THE WATER MAIN AND SEWER CONSTRUCTED OF SLIP-ON OR MECHANICAL JOINT CAST IRON PIPE, ASBESTOS-CEMENT PRESSURE PIPE, OR PRE-STRESSED CONCRETE CYLINDER PIPE AND PRESSURE TESTED TO ASSURE WATERTIGHTNESS BEFORE BACK-FILLING?	[ ]	Yes	[ ]	No	[X]	N/A
4.	WHENEVER WATER MAINS MUST CROSS HOUSE SEWERS, STORM DRAINS, OR SANITARY SEWERS, IS THE WATER MAIN LAID AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS 18 INCHES ABOVE THE TOP OF THE DRAIN OR SEWER?	[X]	Yes	[ ]	No	[ ]	N/A
5.	IS THIS VERTICAL SEPARATION MAINTAINED FOR THAT PORTION OF THE WATER MAIN LOCATED WITHIN 10 FEET HORIZONTALLY OF ANY SEWER OR DRAIN IT CROSSES, SAID 10 FEET TO BE MEASURED AS THE NORMAL DISTANCE FROM THE WATER MAIN TO THE DRAIN OR SEWER?	[X]	Yes	[ ]	No	[ ]	N/A
6.	WHERE CONDITIONS PREVENT THE MINIMUM VERTICAL SEPARATION FROM BEING MAINTAINED, OR WHEN IT IS NECESSARY FOR THE WATER MAIN TO PASS UNDER A SEWER OR DRAIN, IS THE WATER MAIN LAID WITH SLIP-ON OR MECHANICAL JOINT CAST IRON PIPE, ASBESTOS-CEMENT PRESSURE PIPE, OR PRE-STRESSED CONCRETE CYLINDER PIPE, AND THE PIPE EXTENDED ON EACH SIDE OF THE CROSSING UNTIL THE NORMAL DISTANCE FROM THE WATER MAIN TO THE SEWER OR DRAIN LINE IS AT LEAST 10 FEET?	[X]	Yes	[ ]	No	[ ]	N/A
7	IN MAKING SUCH A CROSSING, IS A LENGTH OF WATER MAIN PIPE CENTERED OVER THE SEWER TO BE CROSSED SO THAT THE JOINTS WILL BE EQUALLY DISTANT FROM THE SEWER AND AS REMOTE THEREFROM AS POSSIBLE?	[ ]	Yes	[ ]	No	[X]	N/A

Module 15 - Distribution System

Section D

All water distribution pipe was installed to conform with the standards referenced in the technical specification for the installation, testing, and inspection of plumbing and drainage systems which is attached as part of this application package. The standards by which the distribution system was designed and installed include the Uniform Plumbers Code, AWWA and the regulations of the Department of Environmental Resources with respect to water supply, sewage, and erosion control.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
WATER QUALITY MANAGEMENT

PUBLIC WATER SUPPLY
MODULE 15 – DISTRIBUTION SYSTEMS

For Department Use Only

E. WATER MAINS NEAR SEWERS – CONTINUED

8. WHEN A WATER MAIN MUST CROSS UNDER A SEWER, IS A VERTICAL SEPARATION OF 18 INCHES BETWEEN THE BOTTOM OF THE SEWER AND THE TOP OF THE WATER MAINTAINED WITH ADEQUATE SUPPORT FOR THE LARGER SIZE SEWER LINES TO PREVENT THEM FROM SETTLING ON AND BREAKING THE WATER LINE? ☐ Yes ☐ No ☒ N/A

9. ARE ALL WATER PIPES PREVENTED FROM PASSING THROUGH OR COMING INTO CONTACT WITH ANY PART OF A SEWER MANHOLE? ☒ Yes ☐ No

F. VALVE, AIR-RELIEF, METER AND BLOW-OFF CHAMBERS

1. ARE CHAMBERS OR PITS CONTAINING GATE VALVES, AIR-RELIEF VALVES, BLOW-OFFS, METERS OR OTHER SUCH APPURTENANCES TO A DISTRIBUTION SYSTEM PREVENTED FROM BEING CONNECTED DIRECTLY TO ANY STORM OR SANITARY SEWER? ☒ Yes ☐ No

2. ARE BLOW-OFFS AND AIR-RELIEF VALVES PREVENTED FROM BEING CONNECTED DIRECTLY TO ANY SEWER? ☒ Yes ☐ No

3 ARE SUCH CHAMBERS OR PITS DRAINED IF POSSIBLE TO THE SURFACE OF THE GROUND WHERE THEY ARE NOT SUBJECT TO FLOODING BY SURFACE WATER OR TO ABSORPTION PITS UNDERGROUND? ☒ Yes ☐ No

4. IS THE OPEN END OF ANY AIR-RELIEF PIPE EXTENDED WHERE POSSIBLE FROM A MANHOLE OR ENCLOSING CHAMBER TO A POINT AT LEAST 1 FOOT ABOVE GROUND? ☐ Yes ☐ No ☒ N/A

5. IF IT IS IMPOSSIBLE TO EXTEND THE OPEN END OF THE AIR-RELIEF PIPE TO A POINT AT LEAST 1 FOOT ABOVE THE GROUND, IS THE POINT OF AIR-RELIEF NEAR THE TOP OF THE ENCLOSING MANHOLE? ☐ Yes ☐ No ☒ N/A

G. DRAINAGE OF HYDRANTS Hydrants are not part of domestic water system. ☒ N/A

1. ARE HYDRANT DRAINS PLUGGED AND THE BARRELS PUMPED DRY DURING FREEZING WEATHER AND WHEN GROUND WATER RISES ABOVE THE DRAIN PORT? ☐ Yes ☐ No ☐ N/A

2. WHERE HYDRANT DRAINS ARE NOT PLUGGED, DO THEY DRAIN TO THE GROUND SURFACE OR TO DRY WELLS PROVIDED EXCLUSIVELY FOR THAT PURPOSE? ☐ Yes ☐ No ☐ N/A

3. ARE THEY PREVENTED FROM BEING CONNECTED TO SANITARY SEWERS OR STORM DRAINS? ☐ Yes ☐ No

H. SURFACE WATER CROSSINGS ☒ N/A

1. IS THE PIPE OF SPECIAL CONSTRUCTION, HAVING FLEXIBLE WATERTIGHT JOINTS FOR UNDERWATER CROSSINGS? ☐ Yes ☐ No

2 ARE VALVES PROVIDED AT BOTH ENDS OF WATER CROSSINGS SO THAT THE SECTION CAN BE ISOLATED FOR TEST OR REPAIR? ☐ Yes ☐ No

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H. SURFACE WATER CROSSINGS – CONTINUED

3. ARE THE VALVES EASILY ACCESSIBLE AND NOT SUBJECT TO FLOODING? ☐ Yes ☐ No

4. ARE SAMPLING TAPS AVAILABLE AT EACH END OF THE CROSSING TO FACILITATE THE SANITARY CONTROL ON WATER CROSSINGS? ☐ Yes ☐ No

5. ARE PERMANENT TAPS PROVIDED FOR TESTING AND LOCATING LEAKS? ☐ Yes ☐ No

I. CROSS-CONNECTIONS

1. ARE PHYSICAL CONNECTIONS EXCLUDED BETWEEN THE DISTRIBUTION SYSTEM AND ANY PIPE, PUMPS, HYDRANTS OR TANKS WHICH ARE SUPPLIED FROM, OR WHICH MAY BE SUPPLIED OR CONTAMINATED FROM, ANY SOURCE NOT APPROVED BY THE DEPARTMENT? ☐ Yes ☒ No
See attachment

2 ARE STEAM CONDENSATE AND COOLING WATER FROM ENGINE JACKETS OR OTHER HEAT EXCHANGE DEVICES PREVENTED FROM BEING RETURNED TO THE POTABLE WATER SUPPLY? ☐ Yes ☒ No
See attachment

J. WATER SERVICES AND PLUMBING

1. DO WATER SERVICES AND PLUMBING CONFORM TO RELEVANT LOCAL PLUMBING CODES OR THE NATIONAL PLUMBING CODE? ☒ Yes ☐ No

K. WATER PRESSURE IN SYSTEM

1. IS THE MINIMUM WORKING PRESSURE AT LEAST 20 POUNDS PER SQUARE INCH DURING FLOW IN OUTLYING PARTS OF THE DISTRIBUTION SYSTEM? ☒ Yes ☐ No

2. IN THE CENTRAL OR BUILT-UP SECTIONS OF A DISTRIBUTION SYSTEM, IS THE NORMAL WORKING PRESSURE ABOUT 50 POUNDS PER SQUARE INCH AND NOT LESS THAN 35 POUNDS PER SQUARE INCH? ☒ Yes ☐ No

3. IS THERE A MINIMUM OF 20 POUNDS PER SQUARE INCH AT ANY POINT IN THE SYSTEM DURING PERIODS OF FIRE FLOW? ☒ Yes ☐ No

L. DISINFECTING WATER MAINS

1. DO THE SPECIFICATIONS REQUIRE ALL NEW, CLEANED, OR REPAIRED WATER MAINS TO BE DISINFECTED ACCORDING TO THE "STANDARD FOR DISINFECTING WATER MAINS" PREPARED BY THE AMERICAN WATER WORKS ASSOCIATION, C601-54? ☒ Yes ☐ No

Module 15 - Distribution Systems

Section I

Question 1 & 2

A cross connection was added to the domestic water piping between the chlorine injection pumps and the chlorine contact tank at a valved sample tap. The water is piped to a pump that draws vacuum on a raw water system service pump.