UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 11 1983

Docket No.: 50-412

APPLICANT: Duquesne Light Company

FACILITY: Beaver Valley Power Station, Unit 2

SUBJECT: SUMMARY OF BEAVER VALLEY 2 OL APPLICATION DOCKETING MEETING

A meeting was held with Duquesne Light Company (DLC) on June 7, 1983 at 2:00 pm at NRC Headquarters in Bethesda, Maryland. The NRC staff was represented by members of the Division of Licensing, Division of Safety Technology, Division of Systems Integration, Division of Engineering, Division of Human Factors Safety, Division of Quality Assurance, Safeguards & Inspection Programs, IE, Division of Emergency Preparedness & Engineering Response, IE, and the Office of Nuclear Reactor Regulation. A list of attendees is included as Enclosure 1.

The purpose of the meeting was to provide an opportunity for NRC management to meet DLC management, and to discuss their views on specific issues which may be of particular interest during the licensing review.

The applicant began the meeting with a presentation summarizing the status of construction at the Beaver Valley Power Station, Unit 2 (BVPS-2) and briefly reviewing the BVPS-2 design including a list of unique design features. As of April 30, 1983 construction is approximately 64.2% complete. In the year 1983 alone DLC intends to complete 20% of the project. The applicant also discussed simularities between BVPS-2 and BVPS-1, Millstone Unit 3 (Northeast Utility Company), and North Anna Units 1 & 2 (Virginia Electric Power Company). Design simularities were discussed in the areas of nuclear steam supply system, engineered safety features, and waste management systems. The applicant provided the staff with a table comparing the structural designs of all five units in a report entitled "Management Meeting, Beaver Valley 2, Operating License Application." Part of this report is included as Enclosure 2. A list of unique plant features is also included. Of the over 80 features listed the applicant highlighted only a few during the presentation. The subatmospheric containment and alternate shutdown panel where two of those discussed. Finally the applicant reviewed the status of technical information to be submitted to the NRC at a later date. This information is also provided in Enclosure 2.

Following DLC's presentation, members of the NRC briefly discussed issues they feel the applicant should focus attention on early in the review. Management from the Office of Nuclear Reactor Regulation questioned how much of the BVPS Unit 1 review would be useful to Unit 2's. The applicant commented that Unit 1's Physical Security Plan and Emergency Preparedness Plan are being modified to include Unit 2 and will be submitted to the staff as site plans, and not unit specific plans. They, therefore, will contain much of the information the staff has already reviewed and approved. The staff also discussed the importance of integrity on the part of the utility and stressed that the NRC is doing everything it can to control "ratchets" by formalizing communication procedures with the applicant. On the subject of Human Factors Engineering, when questioned the applicant responded that Unit 1 currently utilizes a 4 shift operation but, in the future, it is intended that both units operate with 5 or 6 shifts.

The Division of Licensing staff raised the issue of conformance to the Standard Review Plan. DLC replied that they submitted, with Amendment 1 to their FSAR, Section 1.9 entitled "Standard Review Plan Conformance Evaluation." The staff commented that this information will be screened early in the review for significant deviations from NUREG-0800 which requires staff and licensee discussions to resolve. The section will be used continuously throughout the review as a guide for the reviewers.

The Division of Human Factors Safety staff discussed the review of FSAR Chapter 14, Initial Test Program. A list of Staff Positions concerning the Initial Test Program was provided to the applicant at the meeting.

Comments made by the Division of Emergency Preparedness & Engineering Response staff included stressing the extreme importance of state and federal involvement in the Emergency Preparedness Plan (EPP). The applicant's first annual EPP exercise is scheduled for June 1985 and will coordinate 17 different state and federal agencies, including over 100 federal evaluators participating as offsite observers.

The Division of Quality Assurance, Safeguards & Inspection Programs staff discussed construction quality and independent design verification programs. It was remarked that an independent review by contractors was an assuring way to verify that the design was translated correctly during construction. At the time of licensing a letter from DLC management stating that the plant has been constructed in accordance with the FSAR is expected. Additionally, the staff mentioned that the applicant will be receiving an information notice on the issue of Safety/Safeguards interface in design and operation.

The subject of radiation protection was raised by the Division of Systems Integration staff. The applicant was asked to focus on reducing occupation radiation exposures. The applicant informed the staff that they were aware of the importance of this issue and have employed on their staff, at this time Health Physicists and Radiation Protection Engineers.

The Division of Engineering staff reminded the applicant that environmental qualification of electrical equipment must be completed prior to licensing.

Finally, to elaborate on the staff's position concerning the interpretation of the terms "safety-related equipment" and "equipment important to safety", it was sugessted that a future meeting be held with the applicant.

Lisamarie Lazo, Project Manager
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Enclosures:
As stated

cc: See next page

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Enclosure 1

List of Attendees

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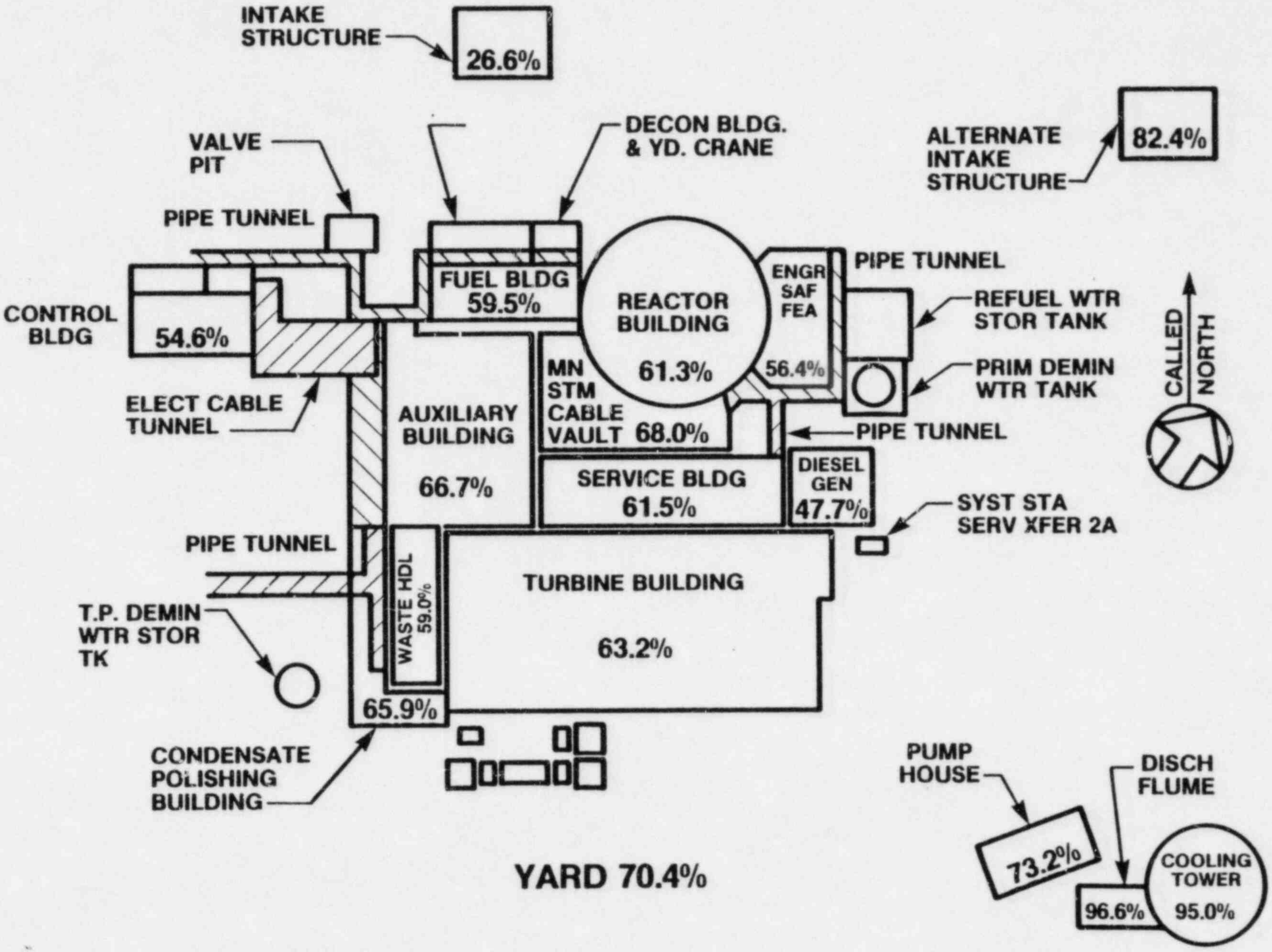
Enclosure 2

MANAGEMENT MEETING
BEAVER VALLEY 2
OPERATING LICENSE APPLICATION

June 7, 1983

BEAVER VALLEY POWER STATION - UNIT NO. II
CONSTRUCTION PROGRESS - 64.2%
APRIL 30, 1983



ANNUAL/CUMULATIVE CONSTRUCTION PROGRESS (%)

	1983	1984	1985	1986
ANNUAL	20.0	16.9	4.0	1.0
CUMULATIVE	78.1	95.0	99.0	100.0

PROJECTED

Similarities to Other Plants

The following information is extracted from Section 1.3 of the Beaver Valley Power Station - Unit 2 (BVPS-2) FSAR which was submitted to the NRC on January 26, 1983, and docketed on May 16, 1983. This portion of FSAR Section 1.3 compares the general design features of BVPS-2 with those of Beaver Valley Power Station - Unit 1, Millstone Unit 3 (Northeast Utility Company), and North Anna Units 1 and 2 (Virginia Electric Power Company).

1.3 COMPARISON TABLES

1.3.1 Comparison with Similar Facility Designs

Beaver Valley Power Station - Unit 2 (BVPS-2) utilizes proven mature designs. The nuclear steam supply system (NSSS) is of proven design and incorporates systems, equipment, and technology which have been successfully applied in more than 100 units designed by Westinghouse Electric Corporation. The balance of the unit, including the containment structure, is designed and constructed by the Applicant through its agent, Stone & Webster Engineering Corporation (SWEC). The SWEC design incorporates mature design concepts which they have utilized in nine operating nuclear power plants and seven nuclear plants which are in various stages of design, U.S. Nuclear Regulatory Commission (USNRC) review, and construction.

In Table 1.3-1, the general design features of BVPS-2 are compared with those of Beaver Valley Power Station - Unit 1 (BVPS-1), Millstone Unit 3 (Northeast Utility Company), and North Anna Units 1 and 2 (Virginia Electric Power Company). The plant comparison follows the general outline of the Final Safety Analysis Report (FSAR) chapters and is based on a single unit of each design. The USNRC has reviewed these designs extensively; BVPS-2 design incorporates the experience gained in these applications.

1.3.1.1 Comparison of Nuclear Steam Supply Systems

The NSSS for BVPS-2 is similar to that of the other units, except for power level differences. In addition, Millstone Unit 3 has four reactor coolant loops while the other units each have three loops.

1.3.1.2 Comparison of Engineered Safety Features

The engineered safety features (ESF) compared are the emergency core cooling system (ECCS), containment heat removal system, containment combustible gas control system, containment isolation system, control room habitability, and the emergency filtration system. The ESF are the same, except BVPS-2 and Millstone Unit 3 utilize two of the recirculation spray pumps to inject recirculated containment sump water as part of the ECCS. The BVPS-2 recirculation spray pumps also supply the high head safety injection pumps in the ECCS recirculation mode. Beaver Valley Power Station - Unit 1 and North Anna Units 1 and 2 utilize low head safety injection pumps to perform this function.

1.3.1.3 Comparison of Containment Concepts

The containment concept, as shown by the comparison of parameters in Table 1.3-1, is the same as that of the other plants listed. These plants have already been extensively reviewed and approved by the USNRC for operation.

1.3.1.4 Comparison of Instrumentation Systems

Instrumentation and controls are functionally similar to those at the other plants. The term functionally similar is intended to mean similar in the basic operating and safety functions of the compared systems to which this applies. The specific features of BVPS-2 design are shown in detail and described in applicable sections of the FSAR.

1.3.1.5 Comparison of Electrical Systems

Sections 8.2 and 8.3 of Table 1.3-1 provides a summary comparison of the electrical systems and parameters. While the transmission systems and onsite power systems differ due to utility preference, the emergency power systems, ac vital bus systems, and 125 V dc systems are similar in design.

1.3.1.6 Comparison of Waste Management Systems

Sections 11.2, 11.3, and 11.4 of Table 1.3-1 provides a summary comparison of the waste management systems. The liquid systems are functionally similar for all units compared. The gaseous waste systems are functionally similar for all units compared except that North Anna Units 1 and 2 use recombiners for gaseous waste volume reduction and all other designs utilize the charcoal delay bed concept for radioactive gas management. Beaver Valley Power Station - Unit 2 utilizes a prefilled, cement-in-drum solid waste system, while BVPS-1 uses an in-line, cement, solid waste system. The other plants use an urea-formaldehyde or Dow process binder solidification agent.

1.3.1.7 Comparison of Other Nuclear Plant Systems

The auxiliary systems (fuel pool cooling, component cooling water, service water, and boron recovery systems) are functionally similar for all units compared. Some differences occur due to siting, plant arrangement, and system design; however, the design basis for the auxiliary systems is essentially the same. In addition, North Anna Units 1 and 2 share the same fuel pool cooling and purification system while BVPS-1 and BVPS-2 share tankage subsystems of the boron recovery system.

1.3.1.8 Comparison of Structural Design Characteristics

Sections 2.1, 2.5, 3.3 and 3.8 of Table 1.3-1 compare the BVPS-2 structural design criteria with those of the other plants. Some differences occur due to different site conditions. However, the basic parameters that define structural loadings are essentially the same.

TABLE 1.3-1

DESIGN COMPARISON

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Introduction					
Reactor type	1.1	PWR	Same*	Same*	Same*
Reactor manufacturer	1.1	Westinghouse	Same*	Same*	Same*
Site Characteristics					
Exclusion area boundary (minimum) (ft)	2.1	1,500	2,000	1,795	4,432
Low population zone (mi)	2.1	3.6	3.6	2.4	6
Safe shutdown earthquake (horizontal) (g)	2.5	0.125	0.125	0.17	0.12
Operating basis earthquake (horizontal) (g)	2.5	0.06	0.06	0.09	0.06
Structural Design Category I					
Normal wind (mph)	3.3	80	Same*	115	Same*
Tornado region	3.3	I	I	I	I
Foundation type	3.8	Sand and gravel	Sand and gravel	Bedrock	Rock
Reactor					
Nominal core power (MWt)	4.1	2,652	2,652	3,411	2,775
Fuel	4.2	17 × 17	Same*	Same*	Same*

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Reactivity control	4.2	Reactor control rods and boric acid shim	Same*	Same*	Same*
Nuclear design	4.3	Slightly enriched UO ceramic pellets in Zircaloy-4 tubing	Same*	Same*	Same*
Reactor Coolant System and Connected Systems and Equipment	5.1				
Reactor vessel	5.3	Cylindrical with welded hemispherical bottom head and removable hemispherical top head	Same*	Same*	Same*
Reactor coolant pumps	5.4.1	3 single-speed centrifugal units driven by air-cooled 3-phase induction motors	Same*	Same* except that it has 4 RCPs due to four loop design	Same*
Steam generators	5.4.2	Vertical U-tube	Same*	Same*, except 4 units	Same*
Residual heat removal system	5.4.7				
Number of pumps		2	Same*	Same*	Same*
Number of heat exchangers		2	Same*	Same*	Same*
Pressurizer	5.4.10	Vertical cylindrical vessel using electric heaters for maintaining system pressure	Same*	Same*	Same*

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Engineered Safety Features	6.2				
Containment	6.2				
Type	6.2	Subatmospheric (9-11 psia)	Same*	Same*	Same*
Design pressure (psig)	6.2	45	Same*	Same*	
Design leak rate (percent per day)	6.2	0.1	Same*	0.9	Same*
Containment heat removal systems	6.2.2	Quench spray system, recirculation spray system	Same*	Same*	Same*
Combustible gas control system	6.2.5	Hydrogen recombiners to maintain containment atmosphere hydrogen concentration below 4% by volume	Same*	Same*	Same*
Containment isolation system	6.2.4	Complies with General Design Criteria 54,55,56, and 57	Same*	Same*	Same*
Emergency core cooling system	6.3	Injection of borated water by accumulators, charging/HHSI pumps, and LHSI pumps during injection phase; recirculation of spilled coolant from containment sump by recirculation and charging/HHSI pumps	Same* as BVPS-2, except LHSI pumps recirculate the containment sump water	Same* as BVPS-2, except that the RHR pumps perform the same function as the LHSI pumps	Same as BVPS-2, except LHSI pumps recirculate the containment sump water

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Control room habitability	6.4	Radiation shielding, control room pressurization system, emergency air filtration, air-conditioning and ventilation, portable fire protection, personnel protective equipment and first aid, food and water storage, utility and sanitary facilities. Some components and systems are shared with BVPS-1	Same*	Radiation shielding, control room pressurization system, emergency air filtration, air-conditioning and ventilation, portable fire protection, personnel protective equipment and first aid, food and water storage, utility and sanitary facilities	Radiation shielding, control room pressurization system, emergency air filtration, air-conditioning and ventilation, fire protection, personnel protective equipment and first aid, food and water storage, utility and sanitary facilities, remote air intakes
Emergency filtration systems	6.5	Control room area pressurization filtration system and supplementary leak collection and release system used to mitigate the consequence of an accident	Same*	Same*	Same*

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Instrumentation and Controls					
Reactor trip system	7.2	Process instrumentation and control system, nuclear instrumentation system, solid state logic protection system, reactor trip switchgear, manual actuation circuit	**	**	**
Engineered safety feature systems	7.3	Process instrumentation and control system, solid state logic protection system, engineered safety features test cabinet, automatic transfer from injection phase to recirculation phase	**	**, Same* except manual transfer from injection phase to recirculation phase	**
Systems required for safe shutdown	7.4	Monitoring indicators, controls, pumps, fans, diesel generators, valves, and heaters	**	**, Same* except has the capability for a safety grade cold shutdown from the auxiliary shutdown panel	**
Safety-related display instrumentation	7.5	Feedwater and steam systems parameters, containment pressure, RWST water level, pressurizer water level, containment recir-	**	**	**

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
		culation sump level, nuclear instrumentation, reactor coolant system parameters, reactor control system parameters			
Other safety systems	7.6	Instrumentation and control power supply system, ESF protection channels power supply, RCS loop isolation valve interlocks, residual heat removal isolation, accumulator motor-operated isolation valve, switchover from injection to recirculation, refueling interlocks	**	Instrumentation and control power supply system, ESF protection channels power supply, residual heat removal isolation, accumulator motor-operated isolation valve, switchover from injection to recirculation, refueling interlocks	Instrumentation and control power supply system, ESF protection channels power supply, RCS loop isolation valve interlocks, residual heat removal isolation, accumulator motor-operated isolation valve, switchover from injection to recirculation, refueling interlocks
Control systems not required for safety	7.7	Reactor control system, rod control system, plant control system interlocks, pressurizer pressure control, pressurizer water level control, steam generator water level control, turbine bypass control, incore instrumentation. Designed for 85% loss of external electrical	**	Same*, except 50% load rejection capability without reactor trip	**

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
		load without tripping the reactor and for turbine trip below 70% power without reactor trip			
Electrical Power					
Transmission system to site	8.2.1	3 345 kV lines 3 138 kV lines	Same*	3 345 kV lines	3 500 kV lines
AC power system	8.3.1				
Unit main transformer		1 @ 945 MVA	Same*	2 @ 630 MVA	3 @ 330 MVA
Unit station service transformer		2 @ 32 MVA	Same*	1 @ 40 MVA 1 @ 50 MVA	3 @ 20 MVA
System station service transformers (reserve)		2 @ 32 MVA	Same *	1 @ 45 MVA 1 @ 50 MVA	3 @ 30 MVA
Emergency power system	8.3.1				
Emergency 4.16 kV buses		2 @ 1,200 amp	Same*	2 @ 2,000 amp	2 @ 1,200 amp
Diesel generator sets (2,000 hr rating)		2 @ 4,535 kW	2 @ 2,850 kW	2 @ 5,335 kW	2 @ 3,000 kW
AC vital bus system	8.3.1				
Inverters		4 @ 20 kVA	Same*	4 @ 15 kW	3 @ 15 kVA 1 @ 20 kVA
Dist. cabinets		4	Same*	4	4

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
125 V dc power system	8.3.2				
Unit batteries (125 V)		4 safety-related 2 @ 1,650 AH 2 @ 1,050 AH 2 nonsafety 2 @ 2,400 AH 2 @ 2,400 AH	4 safety-related 2 @ 1,800 AH 1 @ 1,650 AH 1 @ 1,680 AH 1 nonsafety 1 @ 2,400 AH	4 safety-related 2 @ 1,650 AH 2 @ 750 AH 2 nonsafety 2 @ 2,550 AH	4 safety-related 1 @ 1,500 AH 1 @ 800 AH
Battery chargers		5 safety-related 4 @ 100 amp 1 spare @ 100 amp 2 nonsafety 1 @ 200 amp 1 @ 150 amp	4 safety-related 4 @ 100 amp 1 nonsafety 1 @ 150 amp	6 safety-related 2 @ 200 amp 2 @ 50 amp 2 spare @ 200 amp 3 nonsafety 2 @ 200 amp 1 spare @ 200 amp	4 safety-related 4 @ 250 amp 2 spares 2 @ 250 amp
Auxiliary Systems					
Fuel storage and handling					
New fuel storage	9.1.1	Dry storage in steel and concrete structure within the fuel building for 1/3 of a core (53 fuel assemblies) plus 17 spare fuel assemblies	Same*	Same*, but will use spent fuel area for storage of new fuel using the dry storage area as an optional backup location	Common area for both units. Storage the same as BVPS-2 for each unit

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Spent fuel storage	9.1.2	High density poison racks with storage for 1,059 spent fuel assemblies in a reinforced stainless steel-lined pool within the fuel building	High density racks with storage for 833 spent fuel assemblies in a reinforced stainless steel-lined pool within the fuel building	Storage for 1,835 spent fuel assemblies with room for 1 full core off-load	Common area for both units with storage for 966 spent fuel assemblies in a reinforced concrete pool within the fuel building
Spent fuel pool cooling and cleanup	9.1.3	2 pumps and 2 coolers; 2 pumps, 2 filters, and 1 demineralizer for purification	Similar to BVPS-2	Similar to BVPS-2, except 2 additional filters in the purification system	2 pumps and 2 coolers; 3 pumps, 2 filters, and 1 demineralizer for purification
Fuel handling system	9.1.4	System has provisions to prevent fuel handling and cask drop accidents	Similar to BVPS-2	Similar to BVPS-2	Similar to BVPS-2
Water Systems					
Service water system	9.2.1	2 redundant flow paths supplied by three 50% capacity service water pumps supplying cooling water to primary and secondary component cooling systems, control room cooling, charging pump cooling water system, and rod control area air-conditioning systems. For accident conditions, each SWS pump is a 100% capacity pump with all systems isolated except containment recircula-	3 river water pumps supplying cooling water to primary component cooling water system, control room cooling, charging pump cooling water system, and pump and motor bearing cooling on river and raw water pumps. For accident conditions the same as BVPS-2. Turbine plant component cooling water heat exchangers are cooled by a	2 redundant flowpaths, each containing two 100% capacity service water pumps, supplying cooling to component cooling systems, charging pump cooling, control building air-conditioning, SI pump cooler and rod control area air-conditioning on loss of power. For accident conditions, service water supplies containment recirculation spray	2 redundant flowpaths supplied by four 50% capacity service water pumps (normal operation of both units) and two 50% capacity auxiliary service water pumps supplying component cooling systems, control room cooling, charging pump coolers, instrument air comprssors, and pipe penetration cooling. For accident conditions, all systems isolated

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
		tion spray coolers, charging pump coolers, control room cooling, and emergency diesel generator cooling. A standby service water system, consisting of two 100% capacity pumps, takes suction from an alternate intake structure and discharges to the redundant service water headers, to provide cooling for unit shutdown and cooldown after loss of the seismic Category I intake structure.	separate river water system	cooler, containment recirculation pump, ventilation units, SI and charging pump coolers, diesel generators, control building air-conditioning, and post-accident sample cooler	except containment recirculation spray cooling, charging pump coolers, control room cooling, instrument air compressors, and pipe penetration cooling
Ultimate heat sink	9.2.5	Ohio River	Same as BVPS-2	Long Island Sound (Atlantic Ocean)	Service water reservoir with Lake Anna backup
Other water systems	9.2.2.1 9.2.2.2 9.2.3 9.2.4 9.2.6	Primary and secondary plant component cooling water systems, chilled water system, demineralized water makeup, potable and sanitary water systems, and condensate storage facilities.	Same* Same*	Same* Same*	Same* Same*

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Process auxiliaries					
Compressed air systems	9.3.1	2 redundant compressors supply air for instruments and service air system. 2 redundant compressors supply containment instrument air system, and 1 compressor supplies condensate polishing air.	Same as BVPS-2*, except there is no condensate polishing air system and the containment instrument air compressors are inside the containment.	2 redundant compressors supply air for instruments. 1 compressor supplies service air and 2 redundant compressors supply containment instrument air. Also, 2 additional compressors supply air required for cold shutdown.	For both units, 2 compressors supply service air and 2 compressors supply instrument air. For Unit 1, 2 compressors supply containment instrument air. For Unit 2, 4 compressors supply containment instrument air (2 operating, 2 back-up)
Process sampling system	9.3.2	Collects reactor plant and turbine plant gaseous and liquid samples for chemical and radiochemical analysis	Same*	Same*	Same*
Equipment and floor drainage system	9.3.3	Collects and treats potentially radioactive liquid drainage and associated entrained gases	Same*	Same*	Same*
Chemical and volume control system	9.3.4	Letdown and charging system is used for reactivity control, purification of reactor coolant, RCS inventory control, and provides high pressure flow to the ECCS	Same*	Same*	Same*

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Boron recovery system	9.3.4.6	Evaporative concentration of letdown boric acid and production of primary grade water for recycle (shared tankage located on BVPS-1)	Same*	Same*, except for shared portion of BVPS-2	Same*, except for shared portion of BVPS-2
Air-conditioning, heating, cooling, and ventilation systems					
Control building heating, ventilation, and air-conditioning system	9.4.1	Provides heating, ventilation, and air-conditioning to control room, computer room, process instrument room, and other areas of the control building as well as containment air filtration, purge, and CRDM ventilation systems	Same*	Same*, excluding chiller room and cable spreading area	Provides heating, ventilation, and air-conditioning to control room, office and computer room, process instrument room, relay room, and communications room Control room emergency bottled air supply system with subsequent filtered emergency ventilation system
Containment atmosphere recirculation system	9.4.7	Maintains controlled environment for personnel and equipment during normal operation and during a loss-of-offsite power	Same*	Same*	Same*

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Other heating, cooling, and ventilation systems	9.4.2 to 9.4.6 9.4.8 to 9.4.16	Fuel building, auxiliary building, turbine building, waste handling building, emergency diesel generator building, condensate polishing building	Same*, except for condensate polishing building	Same*	Same*
Other auxiliary systems	9.5				
Fire protection system	9.5.1	Detects, extinguishes, and mitigates effects of fires that may occur	Same*	Same*	Same*
Emergency diesel generator cooling water system	9.5.5	Maintains diesel generator jacket water within specified temperature limits by service water system	Same*	Same*	Maintains diesel engine jacket water within specified temperature limits by self-contained radiator cooling system
Additional auxiliary systems	9.5.2, 9.5.3, 9.5.4, 9.5.6, 9.5.7, and 9.5.8	Communications systems, lighting systems, redundant emergency diesel generator support systems including: 1 nonsafety (black) diesel generator, fuel oil storage and transfer, starting, lubrication, and combustion air intake and exhaust systems.	Same*, except for the nonsafety diesel generator	Same*, except for the nonsafety diesel generator	Same*, except for the nonsafety diesel generator

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Steam and Power Conversion System					
Turbine generator	10.2	Westinghouse tandem-compound, 4-flow, 1,800 rpm steam reheat machine; 1 double-flow HP turbine and 2 double-flow LP turbines	Same*	Same*, except General Electric 6-flow turbine generators	Same*
Main steam supply	10.3	797 psia, 11.61 × 10^6 lb/hr steam flow, 518°F	Same*	960 psia, 15.05 × 10^6 lb/hr steam flow, 540°F	850 psia, 12.2 × 10^6 lb/hr steam flow, 525°F
Other features of steam and power conversion system					
Main condensers	10.4.1	Double shell, single-pass, divided water box	Same*	Same*	Same*
Main condenser evacuation system	10.4.2	Steam jet air ejectors with auxiliary steam priming ejectors for initial evacuation	Same*	Steam jet air ejectors with vacuum pumps for initial evacuation	Same*
Turbine bypass system	10.4.4	Passes up to 90% of full-load steam flow to allow up to 100% step load reduction without reactor trip	Same*	Passes up to 40% of maximum steam flow to allow up to 50% step load reduction without reactor or turbine trip	Same*

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Circulating water system	10.4.5	Removes heat from the main condenser by circulating water through 1 natural draft cooling tower	Same*	Removes heat from the main condenser by circulating water from Long Island Sound	Removes heat from the main condenser by circulating water from Lake Anna
Condensate cleanup system	10.4.6	Full flow condensate polishing demineralizers are provided at the discharge of the condensate pumps. Here powdered resin demineralizers are capable of maintaining a steam generator chemistry well below maximum requirements.	None	Same*	Same*
Condensate and feedwater system	10.4.7	Returns condensed steam from condenser, and drains from regenerative feedwater heaters (6-stage heater cycle), to steam generators while maintaining water inventories throughout system	Same*	Same*	Same*
Auxiliary feedwater system	10.4.9	Supplies necessary cooling water to steam generators for decay heat removal, feedwater line malfunction, or main steam line break	Same*	Same*	Same*

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Auxiliary steam and condensate system	10.4.10	Supplies heating throughout the plant to various heating and processing equipment, and recovers the condensed steam from the equipment served. Normal source of auxiliary steam is main steam. Auxiliary boiler used when reactor not at power	Same*	Same*	Same*, except normal source of auxiliary steam is second point extraction.
Radioactive Waste Management					
Liquid waste management system	11.2				
Type of processing					
Evaporation		Yes	Yes	Yes	Yes
Demineralization		Yes	Yes	Yes	Yes
Filtration		Yes	Yes	Yes	Yes
Treatment of radioactive waste					
High activity waste	11.2	All liquid waste can be evaporated or filtered depending on its activity. The distillate from the evaporator can be demineralized and filtered. There is no	Evaporation, and/or demineralization/filtration	Similar to BVPS-1	Similar to BVPS-1

TABLE 1.3-1 (Cont)

Section and Characteristics	Reference in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
		separation of high and low activity streams prior to liquid waste tanks			
Low activity waste	11.2	See "High activity waste"	Filtration (low activity waste can be routed to the high activity waste tanks and evaporated)	Filtration (evaporation and subsequent operations are optional)	Similar to Millstone Unit 3 with the addition of a clarifier before release to the environment
Steam generator blowdown	10.4.8	Blowdown piped to flash tank where steam is piped to 2nd point heater and liquid is piped to main condenser via 4th point heaters for processing through condensate polishing demineralizers, or liquid is piped to demineralizers for processing prior to routing to the condenser.	Blowdown piped to flash tank and steam is then piped to the third point heaters and liquid is piped to demineralizers for processing prior to routing to the condenser	Similar to BVPS-2 except steam piped to 4th point heater	Blowdown piped to flash tank where steam is piped to roof vent and liquid processed by clarification.
Gaseous waste management systems	11.3				
Type of treatment					
Degasification		Yes (occurs in boron recovery system)	Yes (occurs in boron recovery system)	Yes	Yes (called gas strippers in boron recovery system)
Decay of noble gases in high activity gas streams		Yes	Yes	Yes	Yes

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced In Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Filtration of low activity gas streams		Yes	Yes	No	Yes
Recombiners		No	No	No	Yes
Treatment of streams					
Continuous degasification of reactor letdown capability		Yes	Yes	Yes	Yes
Degasification of letdown to boron recovery system		Yes	Yes	Yes	Yes
Degasification of reactor plant gaseous drains		Yes	Yes	Yes	Yes
Decay method for gases stripped in degasifier		Adsorption on charcoal for minimum of 30 days and 2 days xenon and krypton decay, respectively, before recycle or release to atmosphere through BVPS-1 process vent on BVPS-1 cooling tower	Same*	Adsorption on charcoal for minimum of 60 days and 4 days xenon and krypton decay, respectively, before recycle or release to the environment	Recombination of hydrogen in the gaseous waste stream to reduce storage requirements in waste gas decay tanks before release to the environment
Low activity air streams (nonventilation streams)		HEPA/charcoal filter assemblies in the process vent on BVPS-1	Same*	Release through Millstone 1 stack	Similar to BVPS-2
Solid waste management	11.4				
Type of treatment					
Solidification		In-drum	In-line	In-container	In-line (1 waste disposal building for both units)

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Solidification agent		Cement	Cement	Dow process binder	Urea-formaldehyde
Inputs (type) treated					
Boron evaporator bottoms		None; processed by BVPS-1	Yes	Yes	Yes
Waste evaporator bottoms		Yes	Yes	Yes	Yes
Spent beaded resins		Yes	Yes	Yes	Yes
Powdered resins		Yes	No	Yes	Yes
Filtered elements		Yes	Yes	Yes	Yes
Miscellaneous waste (contaminated clothing, tools, paper products, etc)		Yes	Yes	Yes	Yes
Radiation Protection					
Radiation Protection Design Features	12.3				
Shielding		Shielding thickness and coverage determined for each area to assure maximum design dose rates are not exceeded and to prevent activation of components within containment	Same*	Same*	Same*

TABLE 1.3-1 (Cont)

Section and Characteristics	Referenced in Section	BVPS-2	BVPS-1	Millstone (Unit 3)	North Anna (Units 1 & 2)
Ventilation		Ventilation, filtration of ventilation streams, and atmospheric release of ventilation streams to maintain comfortable environment and limit airborne radioactivity below concentration limits of 10 CFR 20, Appendix B	Same*	Same*	Same*

NOTES:

*Where the word 'Same' appears, the design feature of the listed unit is the same as that of BVPS-2.
**Instrumentation and Controls are functionally similar. The term functionally similar is intended to mean similar in the basic operating or safety functions of the compared systems to which this applies. The specific features of the BVPS-2 design are described in detail in applicable sections of the FSAR.

PLANT HIGHLIGHTS

DESCRIPTION	FSAR REFERENCE
NSSS: 3 loop PWR; 2,660 MWt; 836 MWe net	Page 1.1-1 Section 1.1
Engineered Safety Features design based on 2,780 MWt	Page 1.1-1 Section 1.1
Containment design based on 2,713 MWt	Page 1.1-1 Section 1.1
Subatmospheric containment (9.5 psia)	Page 1.1-1 Section 1.1
Site: 509 acres on south bank of Ohio River; minimum exclusion radius = 1,500 ft.; distance to nearest residence = 2,300 ft.; low population zone area distance = 3.6 miles; population center distance = 17 miles	Page 1.2-2 Section 1.2.2
Containment: steel-lined reinforced concrete cylinders with hemispherical dome and flat base	Page 1.2-2 Section 1.2.3
Cooling tower: natural draft hyperbolic with reinforced concrete shell	Page 1.2-2 Section 1.2.3
Steam Generators: Westinghouse, vertical, U-tube units with inconel tubes. Integral dryers to provide steam with moisture $\leq$ 1/4%	Page 1.2-3 Section 1.2.3
Reactor Coolant Pumps: Westinghouse, vertical, single-stage, centrifugal pumps of the shaft-seal type	Page 1.2-3 Section 1.2.4
Reactor control by soluble boron and control rods	Page 1.2-4 Section 1.2.5
Charcoal beds and HEPA filters to control the release of radioactivity	Page 1.2-5 Section 1.2.6
Storage for 1,059 spent fuel assemblies	Page 1.2-6 Section 1.2.7
Turbine: 1,800 rpm, 888MW, tandem-compound, four flow, single reheat unit with provisions for six stages of feedwater heating	Page 1.2-6 Section 1.2.8.1
Generator: direct-driven, three-phase, 60Hz, 22kV, 1,800 rpm hydrogen inner-cooled, synchronous generator rated at 1,026 MVA at 0.90 power factor	Page 1.2-7 Section 1.2.8.1

DESCRIPTION	FSAR REFERENCE
Turbine bypass steam dump to handle up to 90% of full steam flow	Page 1.2-8 Section 1.2.8.6
Circulating water system: pumped, closed-loop system utilizing an air-cooled, natural draft hyperbolic cooling tower	Page 1.2-8 Section 1.2.8.7
ESF system: 1. Containment 2. Emergency core cooling 3. Quench and recirculation spray 4. Supplemental leak collection and release system 5. Post-DBA hydrogen control system 6. Containment isolation 7. Habitability system for control room	Page 1.2-9 Section 1.2.10
Main Steam System: 797 psia, 11.61×10^6 lbs/hr, 518°F	Table 1.3-1 Page 14 of 20
Full flow condensate polishing demineralizer	Table 1.3-1 Page 15 of 20
Hafnium control rods	Table 1.3-2 Page 2 of 19
No thermal sleeves in the reactor coolant loop branch nozzles to simplify the nozzle design	Table 1.3-2 Page 2 of 19
Steam generator integral flow restriction	Table 1.3-2 Page 3 of 19
Two-train dedicated residual heat removal system	Table 1.3-2 Page 3 of 19
Safety grade approach to cold shutdown	Table 1.3-2 Page 3 of 19
Reactor vessel head vent	Table 1.3-2 Page 4 of 19
Auxiliary feedwater cavitating venturies	Table 1.3-2 Page 4 of 19
Improved quench spray nozzle design	Table 1.3-2 Page 4 of 19
No Boron Injection Tank	Table 1.3-2 Page 4 of 19
Automatic transfer to recirculation on Safety Injection Signal	Table 1.3-2 Page 4 of 19

DESCRIPTION	FSAR REFERENCE
Positive displacement NaOH pumps for quench spray system	Table 1.3-2 Page 5 of 19
Alternate shutdown panel in auxiliary building (Appendix R)	Table 1.3-2 Page 6 of 19
Safety parameter display system	Table 1.3-2 Page 6 of 19
Reactor coolant system cold overpressure protection	Table 1.3-2 Page 6 of 19
Upgraded fuel transfer system	Table 1.3-2 Page 7 of 19
Refrigerant-type air dryer with desiccant filter bypass on containment instrument air	Table 1.3-2 Page 10 of 19
On-line pH and Na conductivity monitors for each steam generator	Table 1.3-2 Page 10 of 19
Filtration and exhaust system for gaseous waste storage and cask washdown area	Table 1.3-2 Page 12 of 19
Gland seal steam exhaust ventilation system to filter and monitor non-condensable gases prior to discharge	Table 1.3-2 Page 12 of 19
Fuel oil storage for seven days of full load operation	Table 1.3-2 Page 12 of 19
Motor-driven start-up feedwater pump	Table 1.3-2 Page 15 of 19
Two (2) motor-driven and one (1) turbine-driven auxiliary feedwater pumps	Table 1.3-2 Page 15 of 19
N-1 loop accident analysis	Table 1.3-2 Page 19 of19
Duquesne Light Company will build a plant simulator (BVPS-1 specific)	Table 1.10-1 Page 1 of 6
Emergency air lock in Containment Building is a subassembly of equipment hatch	Page 3.8-9 Section 3.8.1.1.3.2
Fuel assemblies: 17x17 rod array; 264 rods/assembly; 24 guide tubes; one thimble port; Zircaloy-4 clad; bottom nozzle-top nozzle Type 304 stainless steel; inconel grid straps	Page 4.2-9 Section 4.2.2

DESCRIPTION	FSAR REFERENCE
BVPS-2 fuel enrichment: 3.1%, 2.6%, 2.1%	Table 4.1-1 Page 4 of 4
Hafnium control rods (48); 149 lbs. each	Table 4.3-1 Page 2 of 2
Dedicated residual heat removal system inside containment	Page 5.4-30 Section 5.4.7
Pressurizer PORV's safety grade and used to achieve cold shutdown	Page 5.4-54 Section 5.4.13.2
BVPS-2 approach to cold shutdown	Appendix 5A
Containment subatmospheric (9-12 psia); design 45 psig; LOCA 44.6 psig	Page 6.2-2 Section 6.2.1.1.2
Refueling Water Storage Tank volume increase (BVPS-2 - 850,000 gal, BVPS-1 - 441,100 gal)	Page 6.2-4 Section 6.2.1.1.3.1
Each quench spray pump can deliver 3000 gpm	Page 6.2-46 Section 6.2.2.2.1
Recirculation spray pumps (4): 3500 gpm, outside	Table 6.2-57
Low head safety injection pumps (2): dedicated 3000 gpm each; used only for initial LOCA (page 6.3-6 first and last paragraphs)	Page 6.3-5 Section 6.3.2.2
Supplementary leak collection system: two 30,000 cfm normal fans; two 43,000 cfm emergency bus fans; four 29,500 cfm filters; two 13,000 cfm charging pump fans	Page 6.5-7 Section 6.5.3.2
Commitment to Reg. Guide 1.97, Revision 2	Page 7.5-1 Section 7.5
Automatic changeover from injection phase to recirculation phase	Page 7.6-6 Section 7.6.5
Interconnection of BVPS-2 to Mansfield, Hanna, and Sammis on 345kV (enhances reliability and availability)	Page 8.1-1 Section 8.1.3
Main transformer 21.5kV - 345kV; rated at 945 MVA; each 138kV bus supplies a 138kV - 4.36kV - 4.36kV transformer	Page 8.1-2 Section 8.1.4
Heat tracing alarms displayed on alarm CRT in control room (See Chapter 7 for more detail)	Page 8.3-7 Section 8.3.1.1.3

DESCRIPTION	FSAR REFERENCE
Swing 1E loads (i.e., 3 pumps available): charging/HHSI pump, service water pump, primary component cooling water pump	Page 8.3-7 Section 8.3.1.1.4
Interlocked swing loads on 480V emergency bus (2N or 2P) containment air recirculation fan (drops out on CIB); 480V "C" service water pump fan (trips if not running on SIS); residual heat removal suction valves (2RHS-MOV702A and 2RHWS701B) (drops out on SIS)	Page 8.3-8 Section 8.3.1.1.4
Each piece of safety related equipment contains an asterisk as part of its mark number	Page 8.3-12 Section 8.3.1.1.9
Onsite Emergency Power: two 4160 V, three-phase, 60 Hz diesel-generators, manufactured by Colt Industries; meet intent of Branch Technical Positions ICSB 7 and 8; diesel generator unit ratings are as follows: Continuous duty: (8760 hrs.) 4238 kW 2000 hrs. 4535 kW 160 hrs. 4662 kW 30 min. 5086 kW	Page 8.3-32 Section 8.3.1.1.15
Standby service water system (alternate intake structure): provides heat sink if intake structure is disabled	Page 9.2-11 Section 9.2.1.2
Total demineralized water shared between BVPS-1 and BVPS-2 is 1.2 million gallons (BVPS-2 has 600,000 gal. storage tank [primary plant]; 140,000 gal. secondary plant)	Page 9.2-28 Section 9.2.3.1
Separate condensate polishing air system for condensate polishing building only	Page 9.3-5 Section 9.3.1.2
Safe shutdown: Chemical and volume control system capable of safety grade cold shutdown (refueling water storage tank is source of borated water)	Page 9.3-39 Section 9.3.4.1.7
Boric Acid Tanks (2) sized for cold shutdown (12,500 gal each)	Page 9.3-50 Section 9.3.4.2.4
Control Room HVAC: Control room pressurization initiated on detection of chlorine	Page 9.4-3 Section 9.4.1.1

DESCRIPTION	FSAR REFERENCE
Gland Seal Steam Exhaust Ventilation System: two 100% capacity charcoal and HEPA filters to reduce potential of turbine radioactive release	Page 9.4-61 Section 9.4.15.2
Condensate Polishing Building Ventilation: contains its own HEPA filters to minimize discharge of radiation to environment	Figure 9.4-17
Fire protection system meets intent of Branch Technical Position CMEB 9.5-1	Page 9.5-1 Section 9.5.1.1
Alternate shutdown capability (Appendix R)	Page 9.5-6 Section 9.5.1.2.4
Steam Dump: turbine by-pass system up to 90% full load steam to condenser	Page 10.1-1 Section 10.1
Turbine: 888 MWe, 1800 rpm	Table 10.1-1 Page 1 of 3
Turbine Control System: step load increase 10%; ramp load 5%/min. over a range of 15% to 100%; no reactor trip on turbine trip below 10%	Page 10.2-4 Section 10.2.2.1.1
Steam Generator Safety Valves: sized to pass steam flow for load rejection without reactor trip	Page 10.3-3 Section 10.3.2
Circulating Water Flow Path: from cooling tower base by gravity to condenser inlet (siphon effect) (vacuum prime system) to pump house to cooling tower fill	Page 10.4-13 Section 10.4.5.2
Condensate Polishing System: five filter/demineralizers; designed for full condensate flow; not for full-time operation; used to maintain chemistry	Page 10.4-19 Section 10.4.6.2.1
Primary Plant Demineralized Water Storage Tank (140,000 gal.) with connection to Demineralized Water Storage Tank (600,000 gal.)	Page 10.4-38 Section 10.4.9.2
Hafnium control rods utilized (reduces tritium source from Ag-In-Cd)	Page 11.1-5 Section 11.1.3.2.2
Gaseous waste system processes for BVPS-2; decay and discharge utilizes BVPS-1 systems	Page 11.3-1 Section 11.3
Air ejector charcoal delay beds accept effluent from BVPS-1 and BVPS-2	Page 11.3-5 Section 11.3.2.2

DESCRIPTION	FSAR REFERENCE
Digital radiation monitoring system (CRT, printer in control room)	Page 11.5-15 Section 11.5.2.6.1
Digital radiation monitoring system central processor functions and data files (trend, etc.)	Page 11.5-18 Section 11.5.2.7

REMAINING SUBMITTALS (EXCLUDING RESPONSES TO QUESTIONS)

SUBMITTAL	DATE
ENVIRONMENTAL REPORT - SECTION 7.1	8/83
EMERGENCY PREPAREDNESS PLAN	1/85
TECHNICAL SPECIFICATIONS	3/85
DETAILED CONTROL ROOM DESIGN REVIEW	Plan 9/83 Final Report 6/85
PHYSICAL SECURITY PLAN	Preliminary 7/83 Final 9/85

MEETING SUMMARY

Document Control (50-412) JUL 11 1983
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