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CHAPTER 2

SITE CHARACTERISTICS

This chapter contains information on the geological, seismological, hydrological and meteorological characteristics of the site and vicinity, in conjunction with population distribution, land use and site activities and control. The purpose of this section was to indicate how these site characteristics influenced plant design, operation and decommissioning and show the Location Madequacy of the site characteristics from a safety viewpoint. However, much of the information that was presented in this chapter is historical in nature and, as permitted by R.G. 1.181 Concerns to (Reference 2.1-4), this information does not require updating. Therefore, in order to eliminate confusion between the historical information and information that needs to be maintained as General Silipart of the plant's "design basis", sections 2.1.3, 2.3, 2.4, and 2.5 have been annotated to indicate that the information contained in these sections is "Historical Information Only". Connection: Yeathoe Sits Plan GEOGRAPHY AND DEMOGRAPHY 2.1 . Hp ire not used. 2.1.1 Site Location and Description Population Sectors Weath 56 effect Specification of Location 2.1.1.1 Gall Follow Flood Hallmore A The site is located in the Town of Haddam, Middlesex County, Connecticut, on the east bank of content of Hartford, Connecticut River at a point 21 miles south-southeast of Hartford, Connecticut, and 25 miles northeast of New Haven, Connecticut. Figure 2.1-1 shows the site location. Surf, a Record Sheet i The geographical coordinates of the centerline of the reactor were as follows: / Record Sheet 2 Latitude Northing Biochas Report Clan and Longitude and Easting N41° 28'57" N236, 589 E668.745 W72° 29'57"

The general plant area was filled and graded from an initial elevation of approximately 12 ft mean sea level (MSL) to a final elevation of 21 ft. This grade is 1.5 ft above the highest recorded river level near the site. At the back or east side of the plant, wooded hillsides rise steeply above the perpendicular rock cut, while the Connecticut River acts as a barrier on the west side as well as at the southern end of the peninsula, approximately one mile from the plant. Access to the site is gained over an improved access road from the north. The general topography is shown on Figure 2.1-2.

2.1.1.2 Site Area Map

The site consists of approximately 525 acres, bounded by the property lines as shown on Figure 2.1-3. The minimum distance overland from the reactor containment to the exclusion area as defined in 10 CFR 100.3, shall be 1,740 ft and the distance to the nearest residence is over 2,000 ft. The largest nearby city, Middletown, is 8 air miles northwest of the plant.

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\bigcirc	The location and orientation of the plant structures within the site area at the time of permanent shutdown are shown on the Site Plot Plan, Figure 2.1-4.
1 d. 1 G. 1 d. 1	Decommissioning changes to the plant involving structures other than the fuel building, Independent Spent Fuel Storage Installation (ISFSI) or auxiliary equipment building are not considered a change to the facility as described in the UFSAR. As such, Figure 2.1-4 may not reflect the up-to-date configuration of site structures as the plant progresses through decommissioning.
•	2.1.1.3 Boundaries for Establishing Effluent Release Limits
e inice april	Figure 2.1-3 depicts the property line and site boundary line. The property line is that line beyond which land is not owned, leased or otherwise controlled. The area within the site boundary is governed by the HNP Part 50 License (Reference 2.1-10 and 2.1-11).
Sporsboold Haile Brai A Digea of a M. Na China	The land outside the bounds of the site boundary is considered an unrestricted area for radiation protection purposes. The land areas between the site boundary and the security protected area is generally considered a controlled area, access to which can be limited by the licensee. Restricted areas are areas which are limited by the licensee for the purposes of protection of individuals from exposure to radiation and radioactive materials. The Haddam Neck Plant restricted area and industrial protected area generally correspond. Additional restricted areas may be designated by the licensee in the controlled area as necessary to protect individuals against exposure to radiation and radioactive materials. The ISFSI is a restricted area. The restricted areas, the controlled area, and the unrestricted area are shown
evi india Novi	ion Figure 2:1-3.2% of states and the second and the second and the united and the second and the se
	on Figure 2:1-3.5 and the second s The Haddam Neck Plant prepares an Annual Radioactive Effluent and Release Report (Reference 2.1-1) that provides actual plant effluent release data.
	The Haddam Neck Plant prepares an Annual Radioactive Effluent and Release Report (Reference 2.1-1) that provides actual plant effluent release data. 2.1(2730, 589) Exclusion Area Authority and Control
do Negatina Si Dan Si Dan Ng Si Dan Ng Si Dan Ng Si Dan Ng Si Dan Si Dan	The Haddam Neck Plant prepares an Annual Radioactive Effluent and Release Report (Reference 2.1-1) that provides actual plant effluent release data. 2.1(2535, 589) Exclusion Area Authority and Control

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		Control of Activities Unrelated to Plant Operation	
	Connecticut Y	site is leased and all structures located on the site are under the control the ankee Atomic Power Company.	
	The location a of the overall s during an eme	and extent of the plant site was one of the considerations entering into the ana safety of the plant. To ensure the safety of people within the exclusion area ergency, an emergency plan (see Section 13.3) for the site describes procedu f visitors on-site.	-
	2.1.2.3 Arrang	gements for Traffic Control	
ែកម្ម អន់ត	Connecticut R	visions in Reference 2.1-5 for the U.S. Coast Guard to control water traffic or River in the vicinity of the Haddam Neck Plant in the event of an emergency. A also available for use by the State Police to keep river traffic away from the s	A
Alfon propping property and a second clinic of the second statement	No abandonm 2.1.3 The informatic population with increase to ab 2030 [Connec of Commerce, of Middlesex C	Abandonment or Relocation of Roads and Section of Abandonment or Relocation of roads is necessary. A Section of roads is necessary. A Section of Population Distribution of the section of the section of the population of the plant is estimated to be 78,141. This population is project bout 83,496 by the year 2000 and to a total of approximately 88,211 by the ye cticut Office of Policy and Management, 1991 (Reference 2.1-6); U.S. Departre, 1990 Census of Population (Reference 2.1-7)]. The 10-mile area includes in County and small portions of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London, Hartford, Tolland, and New Haven the office of Policy and Section of New London (Network Section of New London) (Network Section of Network Section of Network Section of Network Section of Network Se	ted to ear ment most
Authorty Statisticari i John and M	area within a t wooded and m general farmin population dis directional sec	scattering of small towns and villages and a portion of the city of Middletown, ten-mile radius of the site is predominantly rural. About 80% of this area is much of it is state parks and forests. The remaining area is devoted primarily ng and some minor industry. Table 2.1-1 provides the 1990 tabulation of stribution within 10 miles of the Haddam Neck Plant and is keyed to distances ctors shown in Figure 2.1-6. The remaining area is devoted primarily	to
	The total population gro within the 10-r The Town of H of 6,769 in 199 Census of Pop population gro projected to co Haddam is exp	 Considerable to the set of the and the stora, as Considerable to the set of the and the storage and the storage as Considerable to the set of the storage at the set of the	ation st rth is
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The population distribution within 10 miles of the plant is based on 1990 Census of Population by Census Block (Reference 2.1-7). The population within each Census Block was assumed to be distributed evenly over its land area, unless shown otherwise by USGS 7.5 minute quadrangle maps (Reference 2.1-9) of the area. The proportion of each Census Block area within each grid sector was estimated and applied to the total population within the Block. The population of all Blocks or portions of Blocks within a sector were added to calculate the total population within each sector. Population projections by municipality, generated by the Connecticut Office of Policy and Management (Reference 2.1-6), provided growth factors to

calculate the population in each sector in the future.

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actively, in which does holdown Neck Picer is torated, contained a total population or when a rectage population density of 164 poople par square rate (1990 schelen and unweing) (Reference 2.1-6). Heldernings experimented a modest wat, but hus starved considerably compared to provides docades. This growth is call that hus starved considerably compared to provides docades. This growth is call to its couple 20 or started properties of a charter backdos of rectain or second 7,470.

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	2.1-1	R. A: Mellor letter to U.S. Nuclear Regulatory Commission Document Control Desk, transmitting the January - December 1998 Annual Radioactive Effluent Report for the Haddam Neck Plant, dated April 4, 1999 and subsequent revisions thereto submitted on an annual basis. Correspondence Letter dated April 27, 1981, Docket No. 50-213, A01452 SEP Topic II-1.A, "Exclusion Area Authority and Control," TO: Dennis M. Crutchfield (NRC), FROM: W.G. Counsil (CYAPC), NUSCO File No. 8113310199.	
	2.1-3	R. A. Mellor letter to U.S. Nuclear Regulatory Commission, Document Control Desk, "Haddam Neck Plant Revision 3 to the Haddam Neck Plant Defueled Emergency Plan," dated April 2000 and subsequent revisions thereto.	
	2.1-4	Regulatory Guide 1.181, "Content of the Updated Final Safety Analysis Report in Accordance with 10 CFR 50.71(e)."	
	2.1-5	State of Connecticut Radiological Emergency Response Plan. Millstone Nuclear Power Station, Waterford, Connecticut Haddam Neck Plant, Haddam Neck Plant, Haddam, Connecticut.	
	2.1-6	Connecticut Office of Policy Management, Interim Population Projection Series 91.1, 1991.	
\bigcirc	2.1-7	U.S. Department of Commerce, Bureau of the Census, 1990 Census of Population, P.L. 94-171 Counts by Census Block, 1991.	
	2.1-8	U.S. Department of Commerce, Bureau of the Census, 1990 Census of Population and Housing, Connecticut, 1990 CPH-1-8, 1991.	
	2.1-9	U.S. Geological Survey, 7.5-Minute Quadrangle maps.	
	2.1.10	W. A. Norton (CYAPCO) letter to the US NRC, "Haddam Neck Plant, Letter of Intent Concerning the Release at the East Side Grounds from the Part 50 License", dated April 29, 2004.	
	2.1.11	T. Smith (NRC) to W. Norton (CYAPCO), "Haddam Neck Plant, Release of East Site Grounds from Part 50 License", dated September 1, 2004.	

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SUPPORTING REFERENCES

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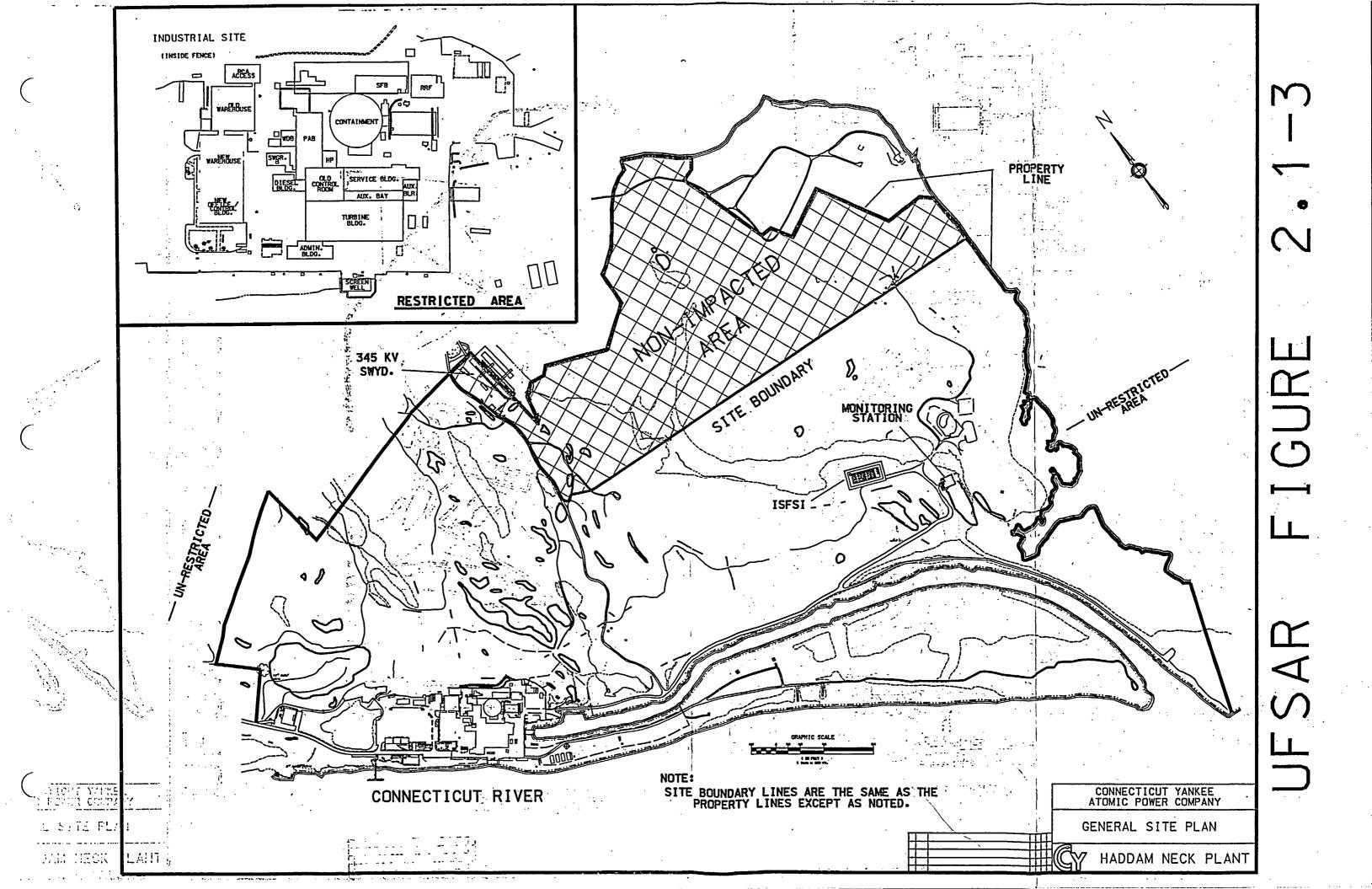
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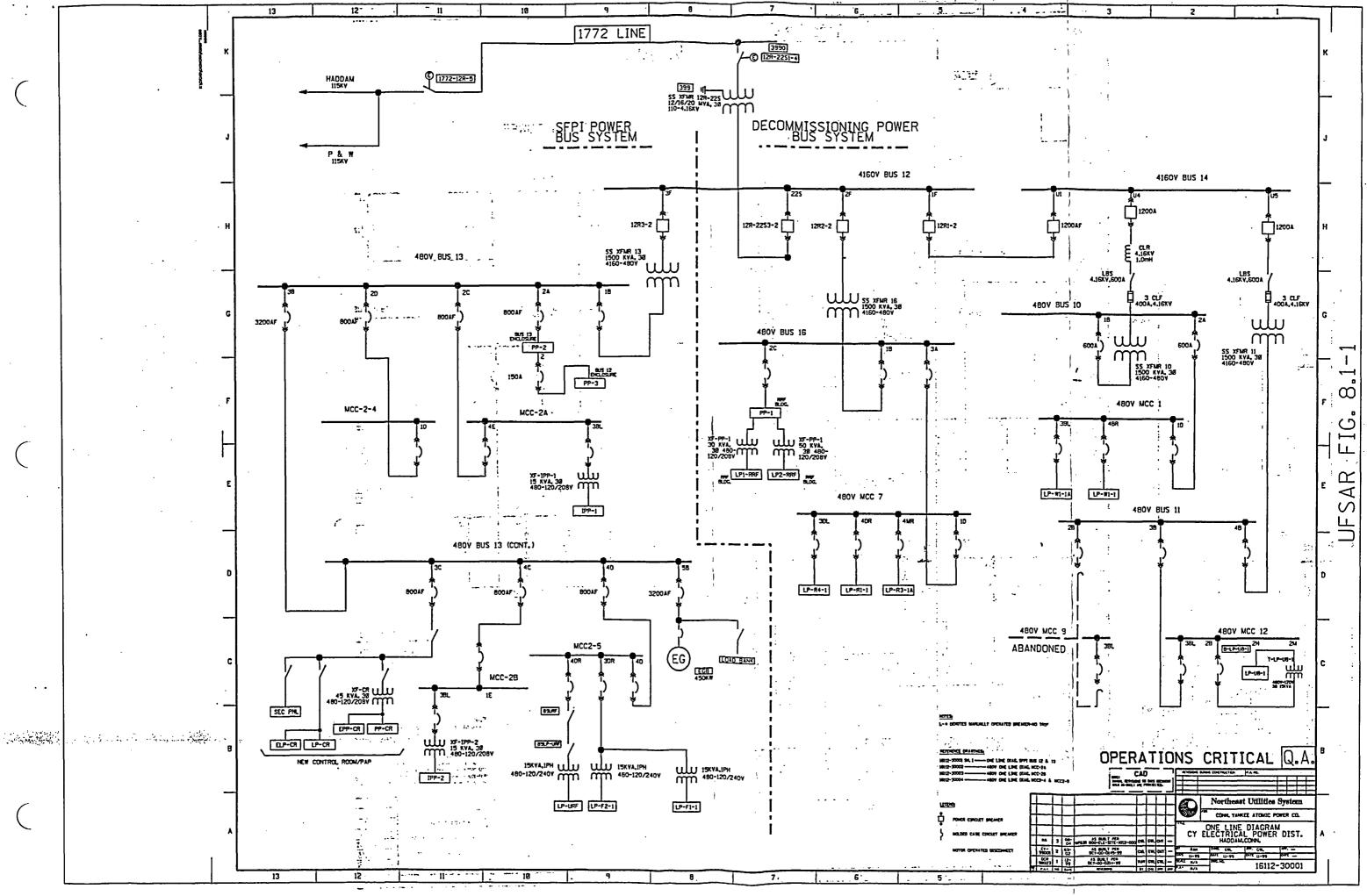
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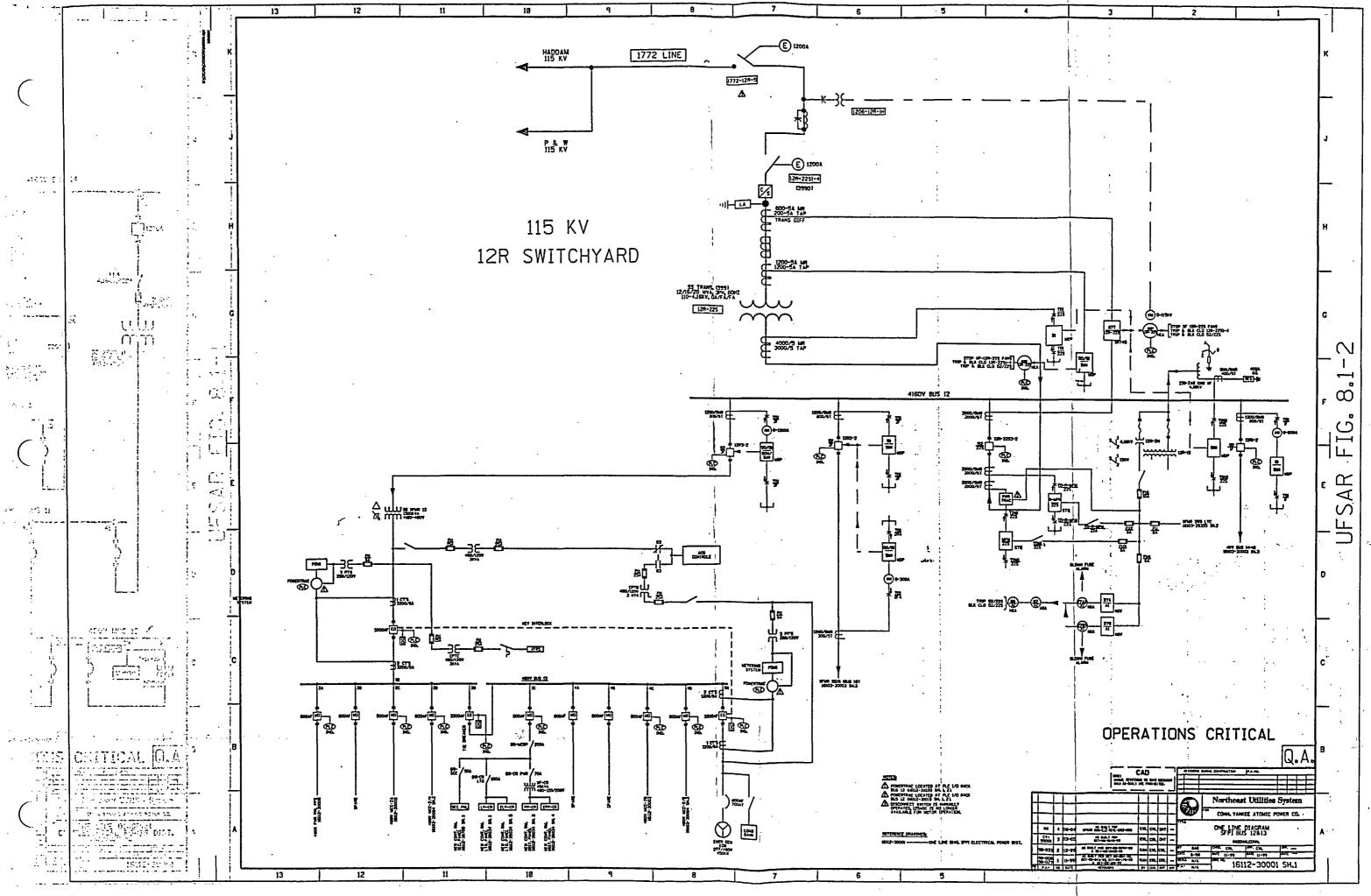
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3.8 DESIGN OF CLASS I AND CLASS II STRUCTURES

With the decision to decommission the Haddam Neck Plant the only remaining safety related structures are those associated with the spent fuel island. As a result, this chapter has been modified to address those safety or regulatory functions that are still served by these and other plant structures.

3.8.1 Containment Structure

Due to decommissioning, the functions of the containment structure have changed from those of an operating plant. The containment structure presently serves the following purposes:

- 1. The containment shell serves as a barrier to the release of airborne activity from ongoing work.
- 2. A portion of the containment interior structure serves as an extension of the fuel transfer tube.
- 3. A portion of the containment shell serves as a seismic support for the yard crane.

4. A portion of the containment shell serves as a seismic support for the fuel transfer tube.

All greater than Class C (GTCC) waste was transferred from containment to the spent fuel pool and the flange on the fuel transfer tube was sealed to form the spent fuel pool boundary.

- 3.8.2 Auxiliary Structures
- 3.8.2.1 Spent Fuel Building

The Spent Fuel Building, shown on Figure 3.8-2, is of concrete construction to elevation 47 with an insulated Galbestos superstructure on steel framing above the spent fuel pool area. The roof of the spent fuel building truck bay, at elevation 47 and the roof of the spent fuel area at elevation 76, are both of concrete construction.

A cask handling area is provided in the building for NAC-MPC canister handling and loading activities. The area consists of a concrete pad which extends out of the east side of the building to allow loading/unloading of fuel transfer components to the heavy haul trailer.

Air is provided locally by an air compressor. Water is provided by the makeup water system only.

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8.2 OFF-SITE POWER SYSTEM

8.2.1 Description

he 115 kV off-site power system is designed to provide reliable and adequate source of power for SFI operations. Details of the off-site power system are shown on Figure 8.1-1.

The switchyard arrangement consist of a 115 kV transmission line tap and multiple station service circuits. One station service supplies power to the SFI while the others supply interim power to support S. decommissioning.

8.2.1.1 Transmission Lines

The transmission line tap which terminates at the switchyard is connected to the Pratt & Whitney, CY. Haddam 1772 line. This 1772 line is connected to: and strategion traders for the Speed Product of Galace

denci description of Haddam substation 11C of the second second of the

Pratt & Whitney Aircraft Substation 23B (Line 1772) which is Moskering of Liggin - Jone of Middletown Switchyard 5A (Line 1572)

8.2.1.2 115 kV Switchyard T. SC. 7 . Etilsen a

The 115 kV system is designed to deliver all station service power for all conditions. The 115 kV off-site AC power is obtained via line 1772, and stepped down to 4160V through station service transformer 12R-22S. Transformer 12R-22S is then used to power the 4160 V Bus 12 which in turn powers the SFI Bus 13, via 4160 V to 480 V station service transformer, 13. Other breakers in Bus 12 are designated to supply interim decommissioning power for the rest of the station.

he principal equipment located in the 115 kV switchyard which supplies power to SFI includes:

the membra comparison of the construction and a construction of the design of the second state

(1) One 12/16/20 MVA, OA/FA/FA, 110-4.16 kV, three-phase, grounded wye-delta connected transformers with tank-mounted 90kV lightning arresters (Station Service Transformer 12R-

(22S) the de a strete of Charles Reff. the Reader Support the same Instantant requirements. The NEWODCRA Industry Constrained

for ir (2) One 115 kV, 1200 amp, three-pole, motor-operated line disconnect switches (manually operated), Automatic (1772-12R-5) without ground blades

to the for the groot state that is a present and the calculated at series of the calculated (3) One 115kV, 2000 amp, three-pole, combination circuit switcher-motor operated disconnect

(12R-22S1-4)

Controls for the 115 kV switchyard devices, and associated relays and meters are located in the 4160 V Shier (Bus 12 Enclosure. The 115 kV line protection includes step-distance primary and backup protective relays installed at Haddam Substation 11C and Middletown Switchyard 5A (Line 1572). These protective relays are all independent of the pilot schemes. Therefore, the relaying at the two terminals will operate

independent of each other.

1.10.000 Fault protection for transformer 12R-22S is provided locally by relaying within 4160 V Bus 12 enclosure. The 4160 V Bus 12 primary and backup protection schemes are supplied from one 48 V DC supply located in Bus 12 enclosure. the environment vie traparate outful ducts.

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Each of Channels R-19A and R-19B has been categorized as Operable, as defined in Section 1.1 (See Section 11.5.3) and shown on Figure 9.1-1. Electrical power for these Channels is provided by the electrical distribution system for the Spent Fuel Island (See Section 8.3). The sensitivities for each of these two Channels are listed in Table 11.5-1. The operating ranges for each of these two Channels is listed in Table 11.5-2.

11.5.2.3 Spent Fuel Island: Area Radiation Monitoring for Spent Fuel Building

This system is primarily intended to warn personnel of escalating radiation levels in the Spent Fuel Building that could be hazardous to personnel at various locations in the plant. The system includes a single area radiation monitor channel, R-3, which is categorized as Operable, as defined in Section 1.1 (See Section 11.5.3). Electrical power for these Channels is provided by the electrical distribution system for the Spent Fuel Island (See Section 8.3) See Section

Building.

11.5.2.4 Monitoring of Liquid Effluents

Channel R-22: Test Tank Effluent Monitor

As described in Section 11.2, Channel R-22 is used to sample the waste and recycle test tanks. A slipstream sample is taken from the process prior to discharge into the service water header. The sample flow enters the monitor and passes through a lead shielded liquid sampler with check source. The sampler houses a scintillation detector. A high activity alarm results in the automatic closing of the Waste Discharge Flow Control Valve.

Channel R-22 has been categorized as Operable, as defined in Section 1.1 (See Section 11.5.3). Channel R-22 supports corresponding requirements of the Radiological Effluent and Monitoring and Offsite Dose Calculation Manual (REMODCM) (Reference 11.5-1) concerning to the radioactive effluent monitoring instrumentation. The REMODCM also includes alternative action requirements corresponding to a status of Channel R-22 that does not support the same effluent monitoring instrument requirements. The REMODCM includes corresponding 200 on p. th requirements for instrumentation to monitor the discharge flow rate from the Recycle Test Tank action requirements. Additionally, the REMODCM includes alternative action requirements.

corresponding to a status of the discharge line flow instrument that does not support the same

The sensitivity for liquid effluent monitor Channel R-22 is listed in Table 11.5-1. The operating Version ange for the channel is listed in Table 11.5-2. The channel is provided with interim Version 110 and Localeton and the part of the channel is provided with interim the place coll 11.5.2.5 here! Monitoring of Miscellaneous Point Exhausts

Separate Miscellaneous Point exhaust filter units are operated to support ventilation of the Primary Auxiliary Building (PAB), Waste Disposal Building, and Tank Farm Tent, and ventilation of the Containment Structure (see Section 6.2.2 "Containment Ventilation"), and other miscellaneous tents and small structures used during the demolition process. These ventilation flow paths exhaust to the environment via separate outlet ducts.

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