

HADDAM NECK NUCLEAR POWER PLANT, NEW DIESEL
GENERATOR BUILDING
(Connecticut Yankee Nuclear Power Plant, New Diesel Generator
Building)
362 Injun Hollow Road
Haddam
Middlesex County
Connecticut

HAER CT-185-I
HAER CT-185-I

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

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HAER No. CT-185-I

Location: ~~On Injun Hollow Road, approximately 2 miles southeast of intersection with Rock Landing Road, and 170 feet northeast of Connecticut River.~~
362 Injun Hollow Road Haddam
Middlesex County
Connecticut

U.S. Geological Survey Haddam & Deep River Quadrangles
UTM Coordinates 18.708748.4595057

Dates of Construction: 1969-1970

Engineers: Westinghouse Electric Company

Present Owners: Connecticut Yankee Atomic Power Company (CYAPCO)
362 Injun Hollow Road
Haddam Neck CT 06424-3022

Present Use: Demolished

Significance: The Haddam Neck Nuclear Power Plant was one of the earliest commercial-scale nuclear power stations in the United States, and was eligible for the National Register of Historic Places. The New Diesel Generator Building provided back-up power for some Engineered Safety Systems, the Service Water pumps, and 4160/480V stepdown transformers.

Project Information: CYAPCO ceased electrical generation at the Haddam Neck plant in 1996 and initiated decommissioning operations in 1998, subject to authority of the Nuclear Regulatory Commission (NRC). NRC authority brought the project under the purview of federal acts and regulation protecting significant cultural resources from adverse project effects.^a This documentation was requested by the Connecticut State Historic Preservation Office to preclude the possibility of any adverse project effects.

^a National Historic Preservation Act of 1966 (PL 89-655), the National Environmental Policy Act of 1969 (PL 91-190), the Archaeological and Historical Preservation Act (PL 93-291), Executive Order 11593, Procedures for the Protection of Historic and Cultural Properties (36 CFR Part 800).

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The New Diesel Generator Building

As originally constructed, the Connecticut Yankee Haddam Neck plant included a Diesel Generator Building equipped with three 400-kW diesel generators to provide back-up power for some Reactor Containment Engineering Safety Systems. By 1970, the original back-up facility was replaced by the New Diesel Generator Building, built immediately to the southwest with almost five times the capacity. The 20.8-foot-high reinforced-concrete structure had 2-foot thick exterior walls, and consisted of a 57.8-by-45-foot room with two muffler-equipped diesel generators (Nos. 2A and 2B) and a 31.3-by-29-foot annex with switchgear. The engine generators were separated by a 12-inch-thick concrete wall. Flood doors, float alarms, fire protection, and ventilation facilities were included (Figures 1-4).¹

New Diesel Generator Building equipment supplied power to the High and Low Pressure Safety Injection Pumps and Charging Pump components of the Emergency Core Cooling System for Reactor Containment, the Service Water pumps in the Screen House, 4160/480V step-down transformers and the Containment Air Recirculation fans (see HAER Nos. CT-185, CT-185-A, and CT-185-B).² The prime movers were General Motors type 645, twenty-cylinder, two-cycle, 3950-hp turbo-charged diesel engines, direct connected to 2850-kW, 3250-KVA, 4160V AC generators.³ The basic prime mover was developed by the Electromotive Corporation (later the Electromotive Division of General Motors, EMD) during the 1930s to power lightweight streamlined trains. By the mid 1960s this type of unit was a very common power supply for diesel locomotives, work boats, and stationary plants.

If there was an interruption of power on the 4160V service (which ran the plant's larger electric motors) or of the 115kV power coming into the plant, the engine generators came on automatically. Each unit would start when sensors noted a loss of AC power on the respective bus, or when a safety injection signal was received. The engine generators could take the load within 30 seconds from start. The generator feeds were redundant; each supplying a separate emergency bus to the safeguard equipment. Secure DC control of those buses came from the A and B switchgear batteries, located respectively in the Service and Switchgear buildings.⁴ All the specified safeguards could be run by one of the generator units, with the other serving as a back-up. There was local control for testing and operation if the control room had to be evacuated.⁵ To insure reliability, the starting functions were completely independent from the incoming electric power. Each engine was started by redundant initiation relay trains activating compressed-air-powered starting motors, supplied by banks of six air cylinders. Each engine had a base-mounted fuel tank sufficient for two hours of operation, and could be re-fueled from nearby underground 5,000 gallon tanks by pumps powered from the redundant 480V emergency bus in the switchgear facilities of the Service and Switchgear Buildings. Personnel on each shift performed local checks as did the control room operators from the auxiliary boards.

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Failures of the generators and systems “frequently” occurred during testing, and during a refueling in 1984 the 115kV incoming power completely failed but one of the generators failed to connect to its bus. As a result of these incidents, diagnostics were added to the engines and increased maintenance procedures were added to the engines and switchgear.⁶

In 1994, a manually-operated, electric-started, Caterpillar sixteen-cylinder, four-cycle, 2520-hp, 2180-kW diesel generator (EG-7) was added to the backup system to meet new NRC requirements for station blackout.¹⁰ This third engine generator was contained in a trailer-movable container sited between the Waste Disposal Building and the Switchgear building (Figure 1). The unit had its own 1000 - gallon fuel oil tank sufficient for eight hours of operation.⁷ EG-7 had an air-cooled radiator, and anti-freeze-cooled engine cylinders typical of contemporary large Caterpillar engine generators.⁸ The unit was installed to energize equipment supporting plant operation if the 115-kV line and one or both of the main back-up generators were lost. Its capacity was not equal to one of the EMD units. The temporary trailer installation was permanently installed c1996, and EG-7 remained in service through plant decommissioning, again mounted on a temporary trailer installation.⁹

Other diesel generators used on site were for the electric powered fire pump (EG-FP), the security systems (EG-SEC), the Emergency Operations Facility and the Spent Fuel Island.¹⁰

SOURCES OF INFORMATION/BIBLIOGRAPHY

A. Engineering Drawings

Drawings are archived as part of the Connecticut Yankee Atomic Power Company, Haddam Neck Plant Records Collection, Archives & Special Collections, Thomas J. Dodd Research Center, University of Connecticut Libraries.

Connecticut Yankee Atomic Power Company/Stone & Webster Engineering Corp.
1969-1988 Arrgt. New Diesel Gen. Bldg. Sheet 1. Nuclear Power Plant - Unit No. 1.
No. 16103-27075 - Sh. 1.

1969-1976 Arrgt. New Diesel Gen. Bldg. Sheet 1. Nuclear Power Plant - Unit No. 1.
No. 16103-27075 - Sh. 2.

B. Historic Views

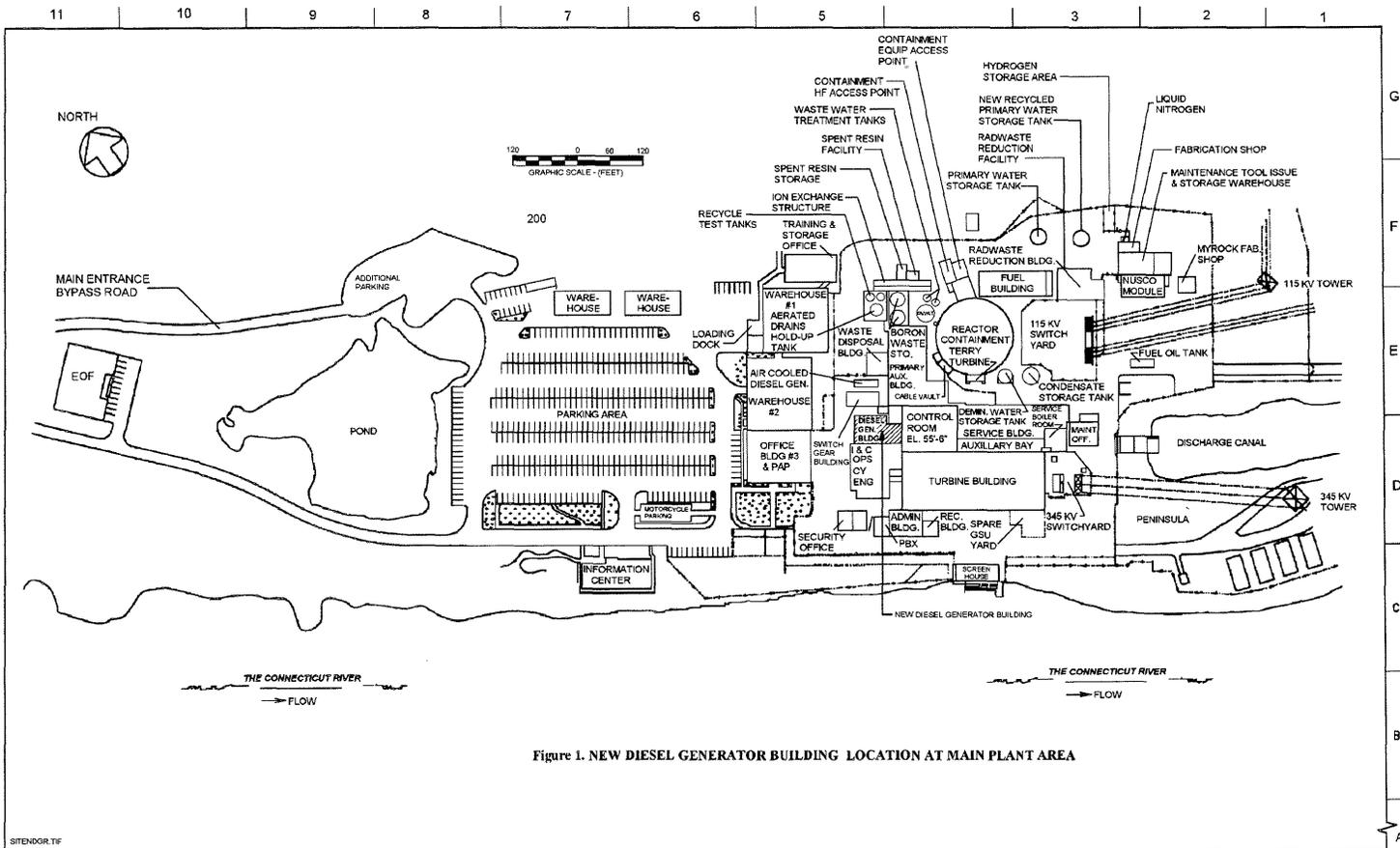
A number of photographs showing HAER No. CT-185-C are archived as part of the Connecticut Yankee Atomic Power Company, Haddam Neck Plant Records Collection, Archives & Special Collections, Thomas J. Dodd Research Center, University of Connecticut

C. Bibliography

Connecticut Yankee Atomic Power Company and Northeast Utilities sources are archived as part of the Connecticut Yankee Atomic Power Company, Haddam Neck Plant Records Collection, Archives & Special Collections, Thomas J. Dodd Research Center, University of Connecticut Libraries.

- Connecticut Yankee Atomic Power Company (CYAPCO)
- 1966-1974 Facility Description and Safety Analysis (FDSA) Vol. 1. Topical Report No. NYO-3250-5. Neck Plant, Haddam, Connecticut.
 - 1987-1993 Connecticut Yankee Plant Information Book. 15 vols.
 - 1994 Permanent Installation of Air-Cooled Diesel EG-7. Plant Design Change Record (PDCR) 889, Project Assignment 91-014. Various Reports, Memos, Letters.
 - 1998 Decommissioning Updated Final Safety Analysis Report (UFSAR). 3 vols. van Noordennen, Gerard (CYAPCO Regulatory Affairs Manager) 2008 Personal communications.

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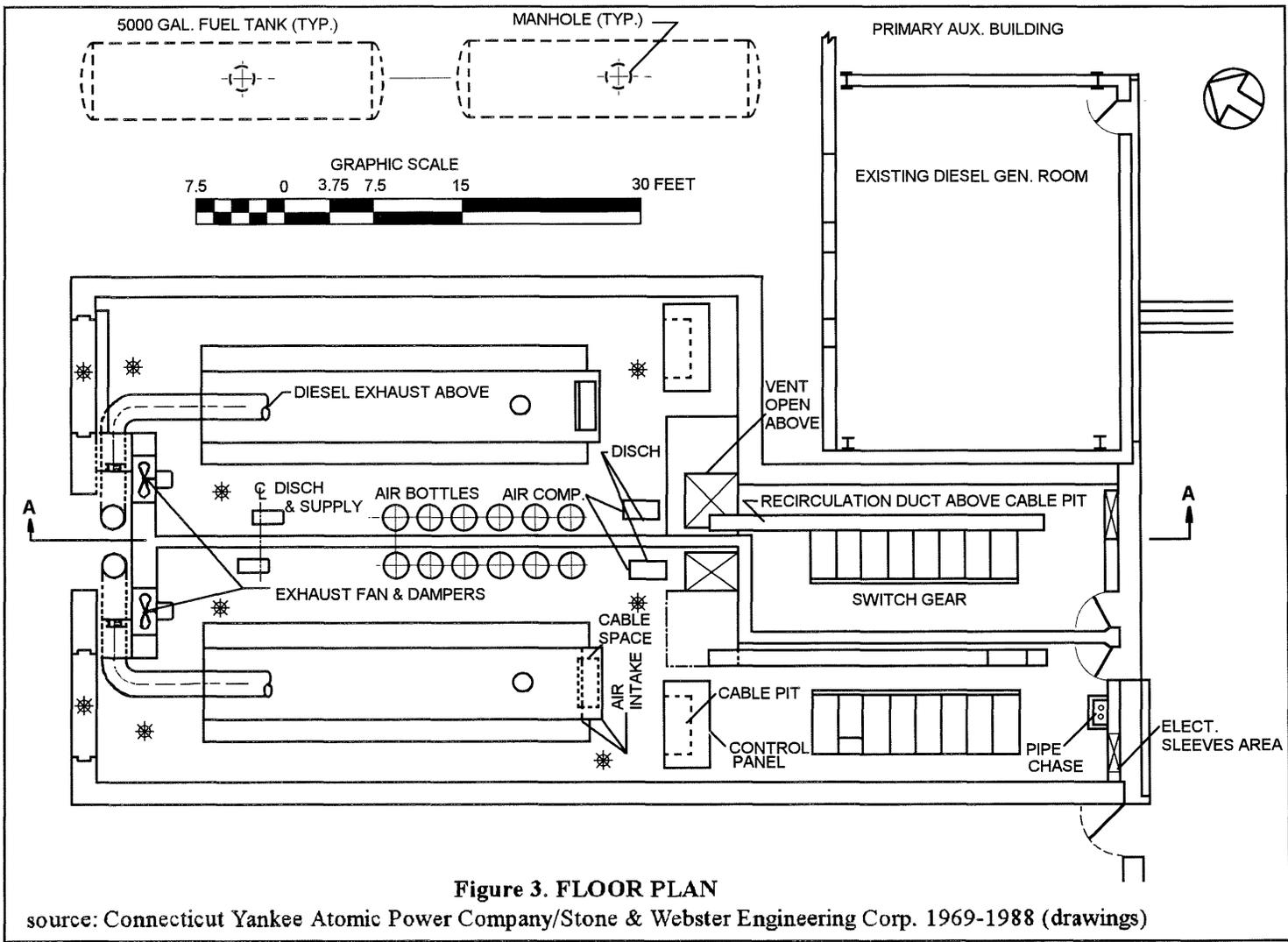
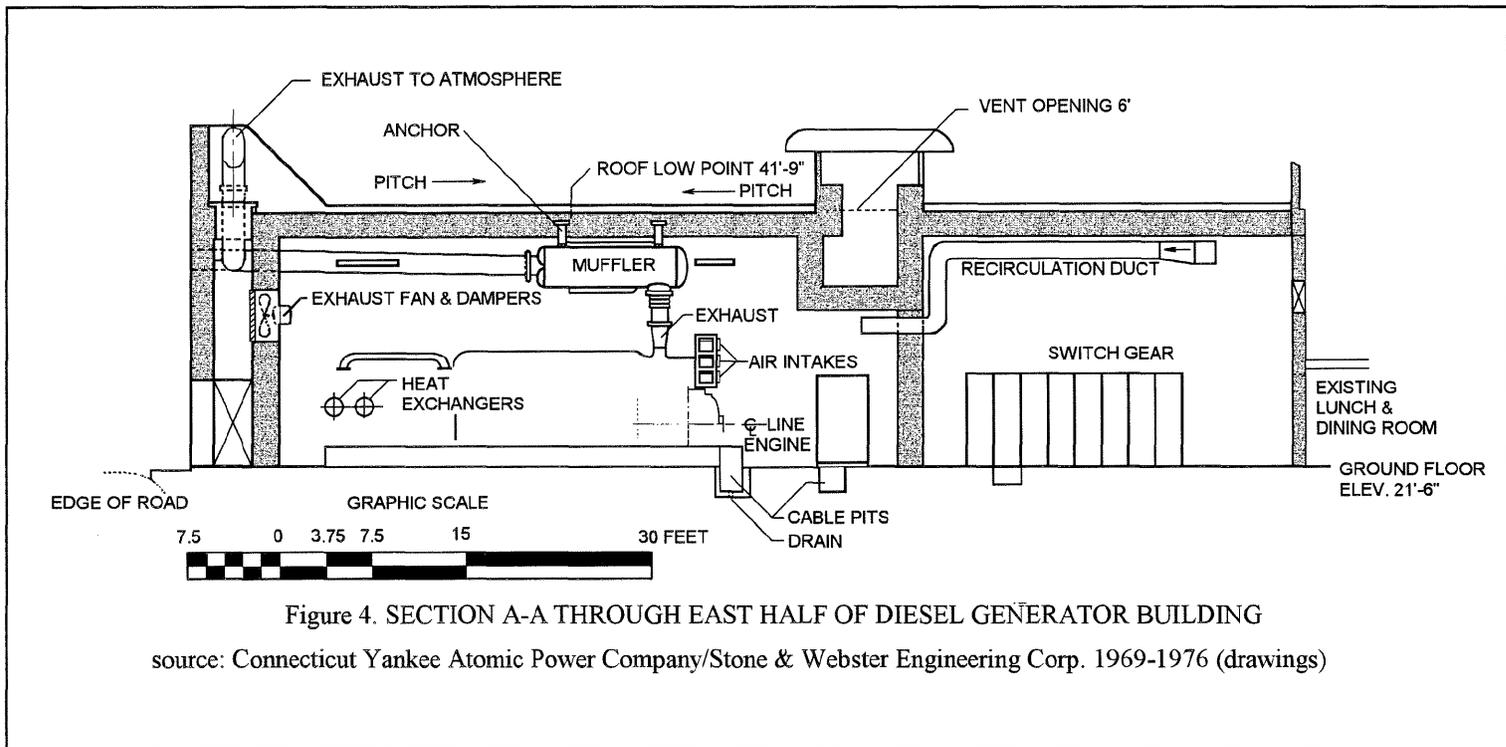


Figure 3. FLOOR PLAN

source: Connecticut Yankee Atomic Power Company/Stone & Webster Engineering Corp. 1969-1988 (drawings)



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¹ Connecticut Yankee Atomic Power Company 1966-1974: 9.5-1.

² The fans are noted in Connecticut Yankee Atomic Power Company 1966-1974: 9.5-1 but not Connecticut Yankee Atomic Power Company 1987-1993: Chapter 72, page 3.

³ Connecticut Yankee Atomic Power Company 1987-1993: Chapter 72, page 2.

⁴ Ibid: page 67.

⁵ Ibid: page 105.

⁶ Ibid: pages 193-4.

⁷ Connecticut Yankee Atomic Power Company 1966-1974: 8.3-17.

⁸ Ibid: 8.3-12, 8.3-17; Connecticut Yankee Atomic Power Company 1995-1996; personal communications, Gerald van Noordennen 2008.

⁹ Connecticut Yankee Atomic Power Company 1995-1996; personal communications, Gerard van Noordennen 2008.

¹⁰ CYAPCO Letter (CY-00-046) to the CT Department of Environmental Protection, Pre-Inspection Questionnaire, dated March 30, 2000.