5.0 DESIGN FEATURES

5.1 Site

The station is located on the property on the west bank of the Connecticut River in the Town of Vernon, Vermont, which the Vermont Yankee Nuclear Power Corporation either owns or to which it has perpetual rights and easements. The site plan showing the exclusion area boundary, boundary for gaseous effluents, boundary for liquid effluents, as well as areas defined per 10CFR20 as "controlled areas" and "unrestricted areas" are on plant drawing 5920-6245. The minimum distance to the boundary of the exclusion area as defined in 10CFR100.3 is 910 feet.

No part of the site shall be sold or leased and no structure shall be located on the site except structures owned by the Vermont Yankee Nuclear Power Corporation or related utility companies and used in conjunction with normal utility operations.

5.2 Reactor

A. The core shall consist of not more than 368 fuel assemblies.

B. The reactor core shall contain 89 cruciform-shaped control rods. The control material shall be boron carbide powder (B_4C) or hafnium, or a combination of the two.

5.3 Reactor Vessel

The reactor vessel shall be as described in Table 4.2-3 of the FSAR. The applicable design codes shall be as described in subsection 4.2 of the FSAR.

5.4 Containment

A. The principal design parameters and applicable design codes for the primary containment shall be as given in Table 5.2.1 of the FSAR.

B. The secondary containment shall be as described in subsection 5.3 of the FSAR and the applicable codes shall be as described in Section 12.0 of the FSAR.

C. Penetrations to the primary containment and piping passing through such penetrations shall be designed in accordance with standards set forth in subsection 5.2 of the FSAR.

5.5 Spent and New Fuel Storage

A. The new fuel storage facility shall be such that the effective multiplication factor (K_{eff}) of the fuel when dry is less than 0.90 and when flooded is less than 0.95.

B. The K_{eff} of the fuel in the spent fuel storage pool shall be less than or equal to 0.95.

C. Spent fuel storage racks may be moved (only) in accordance with written procedures which ensure that no rack modules are moved over fuel assemblies.

STATION SITE AND ENVIRONS

LIST OF FIGURES

2.2 SITE DESCRIPTION

2.2.1 Location and Area

The site is located in the town of Vernon, Vermont in Windham County on the west shore of the Connecticut River immediately upstream of the Vernon Hydroelectric Station. The site contains about 125 acres owned by the Vermont Yankee Nuclear Power Corporation and a narrow strip of land between the Connecticut River and the east boundary of the Vermont Yankee property to which Vermont Yankee has perpetual rights and easements from the New England Power Company. This land is bounded on the north, south, and west by privately-owned land and on the east by the Connecticut River. Site coordinates are approximately 42° 47′ north latitude and 72° 31′ west longitude. Figures 2.2-1 through 2.2-3 locate the site. The site plot plan is shown on Figure 2.2-4. The site's exclusion area boundary and site area boundaries for both gaseous and liquid effluents are shown on Figure 2.2-5.

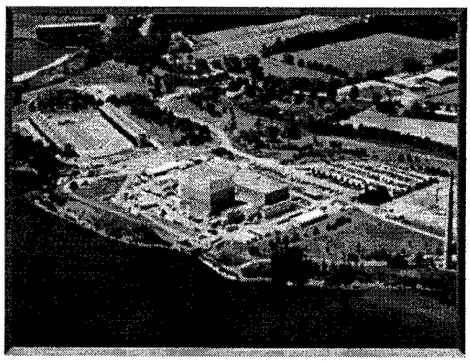
2.2.2 Population

The population density for 1980 was estimated to be about 106 people per square mile within a five-mile radius of the site. The population density in this same area was estimated to be 121 people per square mile in 1990, and projected to be about 127 people per square mile by 2000. Table 2.2.1 compares the growth of the estimated population and population density within 25 miles of the site between 1980 and 1990. In 1980, the total population within 25 miles was estimated to be 173,630, or an average density of 88 people per square mile. For 1990, the 25-mile radius population has been estimated to be about 189,038, or an average density of 96 people per square mile. This represents a growth factor of about 8.9% for this area over the ten-year period 1980 to 1990. Table 2.2.2 shows the current (1990) distribution of population in the area within a 50-mile radius of the site. The total resident population within 50 miles for 1990 is estimated to be about 1,435,699. Table 2.2.3 indicates the projected population by radial distance out to 50 miles for the year 2000 based on this region's projected growth rate of 5% over the next 10 years. The estimated 50-mile population for the year 2000 is 1,507,483.

Figures 2.2-6 and 2.2-7 show the estimated population in each 22-1/2° sectors around the site to a distance of 5 miles. Figure 2.2-7 shows the estimated population in each sector out to 10 miles from the site. The greatest concentration of population in these sectors is in the city of Brattleboro 4 to 5 miles NNW of the site. Figure 2.2-8 shows the estimated population in

United States
Nuclear Regulatory Commission

Vermont Yankee Unit #1



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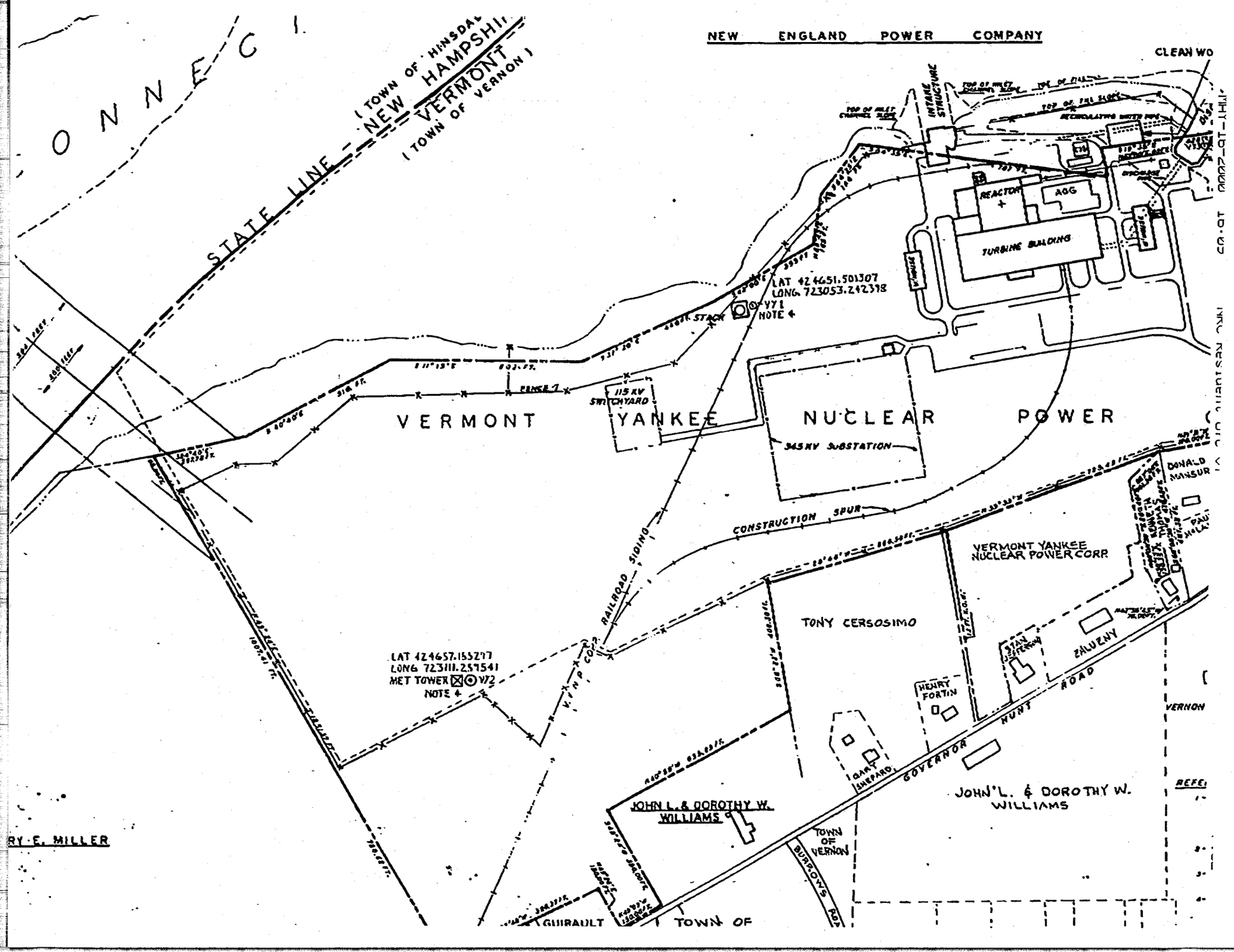
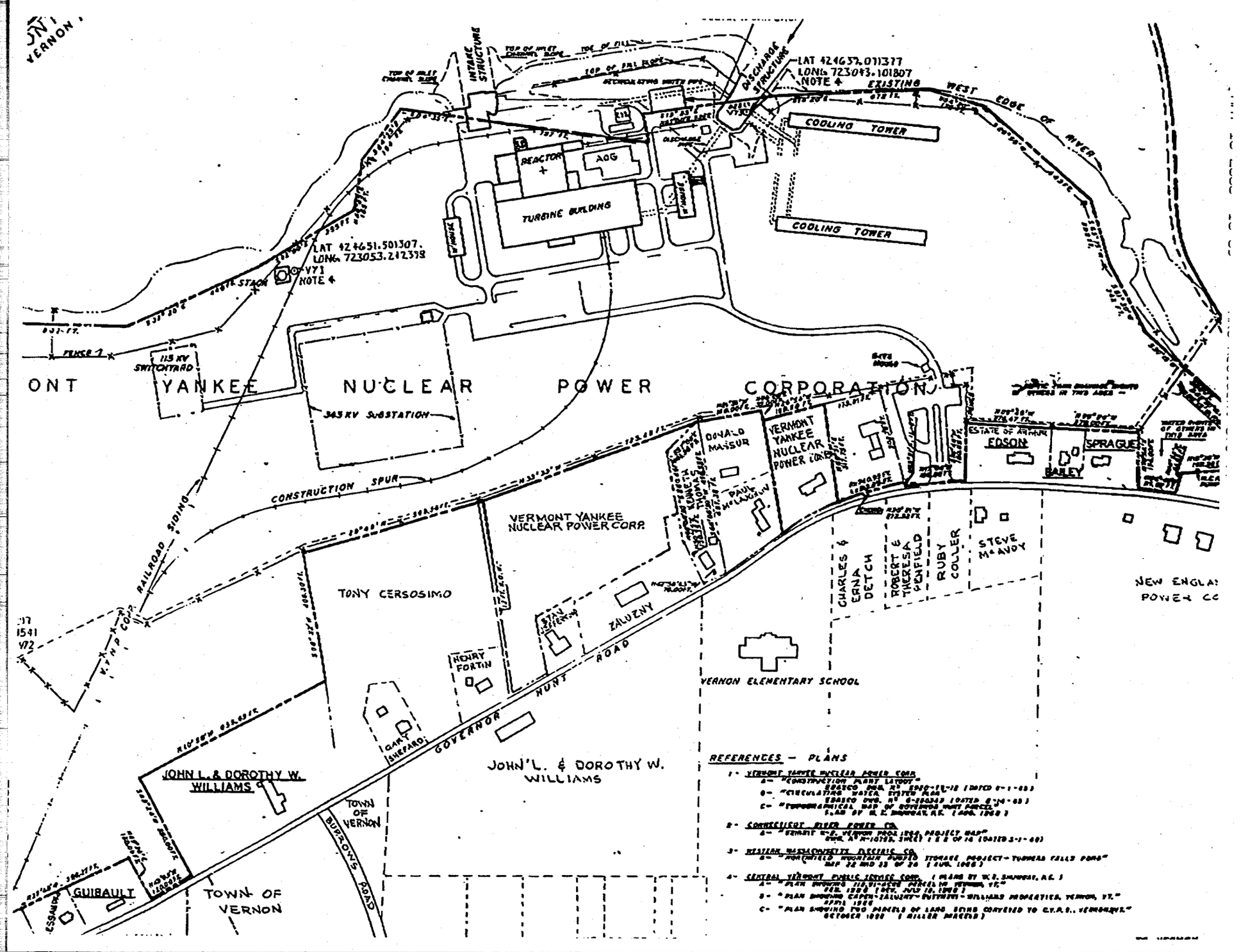
NEW ENGLAND POWER COMPANY



RY E. MILLER


VERNON
INTAKE STRUCTURE
DISCHARGE STRUCTURE
LAT 424632.011377
LONG 723043.101807
NOTE 4
EXISTING
WEST EDGE OF RIVER
COOLING TOWER
COOLING TOWER
REACTOR
AOG
TURBINE BUILDING
LAT 424651.501307
LONG 723053.212378
VY1
NOTE 4
STACK
115 KV SWITCHYARD
ONT YANKEE NUCLEAR POWER CORPORATION
345 KV SUBSTATION
CONSTRUCTION SPUR
RAILROAD SIDING
VERMONT YANKEE NUCLEAR POWER CORP.
DONALD MAISUR
VERMONT YANKEE NUCLEAR POWER CORP
PAUL McLAUGHLIN
ESTATE OF ARTHUR
EDSON
SPRAGUE
BAILEY
CHARLES & ERNA DETCH
ROBERT & THERESA PENFIELD
RUBY COLLER
STEVE McANDY
NEW ENGLAND POWER CO
TONY CERSOSIMO
ZALUZNY
HENRY FORTIN
GARY SHEPARD
GOVERNOR HUNT ROAD
VERNON ELEMENTARY SCHOOL
JOHN L. & DOROTHY W. WILLIAMS
JOHN L. & DOROTHY W. WILLIAMS
TOWN OF VERNON
BURROWS ROAD
GUIBAULT
TOWN OF VERNON
REFERENCES — PLANS
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A- "CONSTRUCTION PLANT LAYOUT" BECHTEL DWG. NO. 8010-[illegible]-18 (DATED 8-1-68)
B- "CIRCULATING WATER SYSTEM PLAN" (BECHTEL DWG. NO. 8-[illegible] (DATED 8-14-68)
C- "TOPOGRAPHICAL MAP OF BOUNDARY SHEET (PARCELS)" PLAN BY W. C. BROWNAN, R.E. (APR. 1968)
2- CONNECTICUT RIVER POWER CO.
A- "VERMONT 67-2, VERNON PROCESSING PROJECT MAP" DWG. NO. M-10138, SHEET 1 & 2 OF 16 (DATED 3-1-68)
3- WESTERN MASSACHUSETTS ELECTRIC CO.
A- "HORSEFIELD MOUNTAIN PUMPED STORAGE PROJECT - THOMAS FALLS POND" MAP 32 AND 33 OF 36 (AUG. 1968)
4- CENTRAL VERMONT PUBLIC SERVICE CORP. (PLANS BY W. B. SHUMWAY, R.E.)
A- "PLAN SHOWING 115 KV-[illegible] PARCELS IN VERNON, VT." FEB. 1968 (REV. JULY 10, 1968)
B- "PLAN SHOWING CAPON-ZALUZNY-PUTNAM-WILLIAMS PROPERTIES, VERNON, VT." APRIL 1968
C- "PLAN SHOWING TWO PARCELS OF LAND BEING CONVEYED TO C.V.P.S., VERNON, VT." OCTOBER 1968 (MILLER PARCEL)

Enclosure

Station Plan Figures 2.2-4 & 2.2-5
are part of the
FINAL SAFETY ANALYSIS REPORT