VERMONT YANKEE
NUCLEAR POWER CORPORATION

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November 17, 1999
BVY 99-140

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

References:

(a) Letter, VYNPC to USNRC, "Technical Specification Proposed Change No. 207 Spent Fuel Pool Storage Capacity Expansion," BVY 98-130, dated September 4, 1998

(b) Letter, VYNPC to USNRC, "Supplement to Technical Specification Proposed Change No. 207 Spent Fuel Pool Capacity Expansion," BVY 99-19, dated February 8, 1999

(c) Letter, VYNPC to USNRC, "Supplement to Technical Specification Proposed Change No. 207 Spent Fuel Pool Capacity Expansion," BVY 99-59, dated April 16, 1999

(d) Letter, USNRC to VYNPC, "Meeting With Vermont Yankee Nuclear Power Corporation," NVY 98-160, dated November 23, 1998

(e) Letter, USNRC to VYNPC, "Vermont Yankee Nuclear Power Station, Request For Additional Information Regarding Spent Fuel Pool Storage Capacity Expansion (TAC No. MA 3490)," NVY 99-68, dated July 14, 1999

(f) Letter, VYNPC to USNRC, "Response to Request for Additional Information Regarding Spent Fuel Pool Capacity Expansion," BVY 99-107, dated August 26, 1999

(g) Letter, VYNPC to USNRC, "Response to Request for Additional Information Regarding Spent Fuel Pool Capacity Expansion," BVY 99-115, dated September 16, 1999

Subject: **Vermont Yankee Nuclear Power Station**
License No. DPR-28 (Docket No. 50-271)
Supplement to Technical Specification Proposed Change No. 207
Spent Fuel Pool Capacity Expansion

By letter dated September 4, 1998, Vermont Yankee (VY) submitted Technical Specification Proposed Change No. 207 to increase the spent fuel storage capacity of the VY spent fuel pool from 2,870 to 3,355 fuel assemblies. The submittal was supplemented by letters dated February 8, 1999 and April 16, 1999. Additionally, responses to staff requests for additional information were provided in letters dated August 26, 1999 and September 16, 1999. This letter supplements the previous submittals based on a recent change made to the total number of fuel assemblies proposed to be stored in the spent fuel pool.

A001

PDR ADOCK 05000271 Change: NRC PDR ltr and 1 w/attach

During development of the final design details, two peripheral cells from the corner of rack SE were eliminated. The attached revised pages of the Holtec International Technical Report provide additional information about this change. This reduces the maximum number of fuel assemblies proposed to be stored in the spent fuel pool from 3,355 to 3,353.

VY has reviewed the change against the technical basis for the prior request and concluded that the safety margins previously reported remain bounding and conservative. Additionally, this submittal does not change the no significant hazards consideration conclusion or the environmental impact evaluation conclusion contained within our original submittal.

Attachment 1 provides the marked-up version of the current Technical Specification page. Attachment 2 provides a retyped Technical Specification page. Attachment 3 contains the revised pages of Holtec International's technical report. This report contains proprietary information and it is requested that this information be withheld from public disclosure per 10CFR2.790(a)(4). Holtec's affidavit for propriety information is contained within Attachment 3. Attachment 4 provides the effected pages of the technical report in a non-proprietary format, and is provided for public disclosure.

If you have any questions on this submittal, please contact Mr. Jim DeVincentis at (802) 258-4236.

Sincerely,
VERMONT YANKEE NUCLEAR POWER CORPORATION

Don M. Leach
Vice President, Engineering

STATE OF VERMONT)
)SS
WINDHAM COUNTY)

Then personally appeared before me, Don M. Leach, who, being duly sworn, did state that he is Vice President, Engineering of Vermont Yankee Nuclear Power Corporation, that he is authorized to execute and file the foregoing document in the name and on behalf of Vermont Yankee Nuclear Power Corporation and that the statements therein are true to the best of his knowledge and belief.

Sally A. Sandstrum Notary Public
My Commission Expires February 10, 2003

Attachments
cc: USNRC Region 1 Administrator
USNRC Resident Inspector - VYNPS
USNRC Project Manager - VYNPS
Vermont Department of Public Service

Docket No. 50-271
BVY 99-140

Attachment 1

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change 207

Spent Fuel Pool Storage Capacity Expansion

Marked-up Version of the Current Technical Specifications

(1)

D. The number of spent fuel assemblies stored in the spent fuel pool shall not exceed ~~2870~~ 3353.

E. The maximum core geometry infinite lattice multiplication factor of any segment of the fuel assembly stored in the spent fuel storage pool or the new fuel storage facility shall be less than or equal to 1.31 at 20°C.

Docket No. 50-271
BVY 99-140

Attachment 2

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change 207

Spent Fuel Pool Storage Capacity Expansion

Retyped Technical Specification Page

D. The number of spent fuel assemblies stored in the spent fuel pool shall not exceed 3353.

E. The maximum core geometry infinite lattice multiplication factor of any segment of the fuel assembly stored in the spent fuel storage pool or the new fuel storage facility shall be less than or equal to 1.31 at 20°C.

AFFIDAVIT PURSUANT TO 10CFR2.790

I, Michael P. McNamara, being duly sworn, depose and state as follows:

(1) I am the Vice President, Nuclear Projects for Holtec International and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the revision 4 pages to the original document entitled "Vermont Yankee Nuclear Power Station Spent Fuel Storage Expansion Project," Holtec Report HI-981932. The proprietary information is designated with backshading.

(3) In making this application for withholding of proprietary information of which it is the owner, Holtec International relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4) and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10CFR Part 9.17(a)(4), 2.790(a)(4), and 2.790(b)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by Holtec's competitors without license from Holtec International constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.

c. Information which reveals cost or price information, production, capacities, budget levels, or commercial strategies of Holtec International, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future Holtec International customer-funded development plans and programs of potential commercial value to Holtec International;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs 4.a, 4.b, 4.d, and 4.e, above.

(5) The information sought to be withheld is being submitted to the NRC in confidence. The information (including that compiled from many sources) is of a sort customarily held in confidence by Holtec International, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by Holtec International. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within Holtec International is limited on a "need to

know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his designee), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside Holtec International are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information classified as proprietary was developed and compiled by Holtec International at a significant cost to Holtec International. This information is classified as proprietary because it contains detailed historical data and analytical results not available elsewhere. This information would provide other parties, including competitors, with information from Holtec International's technical database and the results of evaluations performed using codes developed by Holtec International. Release of this information would improve a competitor's position without the competitor having to expend similar resources for the development of the database. A substantial effort has been expended by Holtec International to develop this information.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to Holtec International's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of Holtec International's comprehensive spent fuel storage technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology, and includes development of the expertise to determine and apply the appropriate evaluation process.

The research, development, engineering, and analytical costs comprise a substantial investment of time and money by Holtec International.

AFFIDAVIT PURSUANT TO 10CFR2.790

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

Holtec International's competitive advantage will be lost if its competitors are able to use the results of the Holtec International experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

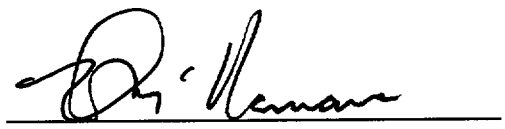
The value of this information to Holtec International would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive Holtec International of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

STATE OF NEW JERSEY)
) ss:
COUNTY OF BURLINGTON)

Michael P. McNamara, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Marlton, New Jersey, this 10th day of November, 1999.



Michael P. McNamara
Holtec International

Subscribed and sworn before me this 10th day of November, 1999.

MARIA C. PEPE
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires April 25, 2000

MARIA C. PEPE
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires April 25, 2000

Docket No. 50-271
BVY 99-140

Attachment 4

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change 207

Spent Fuel Pool Storage Capacity Expansion

Technical Report for the Vermont Yankee Spent Fuel Pool Storage Expansion and Proprietary Information Affidavit

Non-Proprietary Version

1.0 INTRODUCTION

The Vermont Yankee Nuclear Power Station (VYNPS) is a single unit boiling water nuclear power reactor installation owned and operated by the Vermont Yankee Nuclear Power Corporation. VYNPS is located in the township of Vernon, which is approximately five miles south of the city of Brattleboro, Vermont. VYNPS received its construction permit from the NRC (formerly AEC) in December 1967. The VYNPS reactor, rated at 514 MWe (1593 MWt), began commercial operation on November 30, 1972, and reached 100% power on February 28, 1973. The VYNPS fuel storage system is made up of a fuel pool 312 inches long and 480 inches wide with an integral cask laydown area. The pool presently contains 2,683 spent fuel storage locations in nine free-standing high density fuel racks. Another 180-cell rack, which is licensed for use in the pool, is kept in storage. Thus, the total available capacity is 2,863 cells. A total of 2,331 fuel assemblies are currently stored in the Vermont Yankee pool. Since the full core comprises 368 fuel assemblies, maintaining full-core offload capability during plant operations implies that a total of 2,699 storage cells are needed in the pool. Table 1.1 provides the data on previous and projected fuel assembly discharges in the VYNPS spent fuel pool. Table 1.2, constructed from Table 1.1 data, indicates that Vermont Yankee will lose full-core discharge capability in 2001. This projected loss of full-core discharge capability prompted the present undertaking to increase spent fuel storage capability in the VYNPS pool.

In May 1988, Vermont Yankee received License Amendment No. 104 (Docket #50-271). It allowed ten new racks to be installed. The company, however, installed only nine modules containing a total of 2,683 storage cells, keeping the 180-cell module in dry reserve (uncontaminated). In July 1991, Vermont Yankee received License Amendment 130. It allowed the new racks to be used to store fuel. Considerations of optimum future operational flexibility determined that the presently planned capacity expansion utilize three new high density racks configured to maximize the available storage capacity.

Of the three new rack modules, one module will occupy the space reserved for staging of fuel transfer casks for defueling of the spent fuel pool. This module, henceforth referred to as the Rack CA, does not need to be installed in the fuel pool in the next capacity expansion. Rack CA, consisting of 266 storage cells, will be utilized as temporary storage for full-core offload to the pool, if required. After use, the Rack CA can be removed to facilitate cask related activities.

In summary, the purpose of this submittal is to request the authorization to increase spent fuel pool storage capacity from the current Technical Specification (Section 5.5) limit of 2,870 to 3,353 assemblies. This represents an increase in the licensed storage capacity of 483 assemblies and will be accomplished by the installation of three new high density, free standing racks referred to as Rack SE, Rack NE and Rack CA.

Upon installation of the three new Holtec high-density racks, the spent fuel pool will contain a total of 3,353 storage cells. The design and construction of the new storage racks are described in Chapter 3 of this document. Table 1.3 presents key parameters for the existing and proposed new racks. Table 1.4 provides a comparison between the existing capacity and the proposed capacity expansion.

As stated earlier, Rack CA containing 266 storage cells does not need to be installed in the proposed 2000 rerack project. Rack CA would be installed only if a full-core discharge were required after the 2004 refueling outage. Rack SE contains 8 dual storage locations as depicted in Figure 2.1. These storage locations can be used to store control rod blades. These 8 dual purpose cells can be converted into fuel storage cells with the installation of a cruciform insert which converts one control rod blade storage cell into four spent fuel storage cells.

Therefore, the proposed reracking effort scheduled for the year 2000 will increase the number of *installed* storage locations to 3,087 and, as indicated in Table 1.2, will extend the date of loss of full-core discharge capability of (368 bundles) through the 2004 refueling outage.

It should be noted that in this revision i.e. revision 4.0 of this amendment report, the two peripheral cells located in the north-west corner of rack SE have been removed so that this module now has a

rectangular planform which would result in reduced welding induced distortion in the manufacturing of the rack. Additionally, the removal of these cells enables the cell opening of 8 dual purpose cells of this rack to be increased by a small amount to facilitate ease in installation of fuel assemblies and control rod blades. As a result of these changes, the envelope dimensions of rack SE are very slightly changed (from 108.20 x 87.916 inches to 106.042 x 88.512 inches). The weight of rack SE reported in this report remains bounding and therefore, has not been changed. All analysis disciplines including rack seismic, pool structural, mechanical accidents, thermal hydraulic, criticality and radiological performed in support of this amendment report have been carefully evaluated to assess the consequences due to this change. This evaluation has concluded that the safety margins reported in this report remain bounding and conservative.

The new racks are similar in design to the existing racks in all important respects. Both racks employ honeycomb construction using "composite boxes" arrayed in a checkerboard pattern and utilize the Boral™ neutron absorber. Table 1.3 presents key comparison data between existing and the proposed maximum density rack modules for VYNPS.

As the description in Chapter 3 of this report confirms, the physical geometry and fabrication of the new high density racks for Vermont Yankee are identical to those of other non-flux trap racks provided to over three dozen spent fuel pools in the U.S. and overseas.

The new spent fuel storage racks are free-standing and self-supporting. The principal construction materials for the new racks are SA240-Type 304L stainless steel sheet and plate stock, and SA564-630 (precipitation hardened stainless steel) for the adjustable support spindles. The only non-stainless material utilized in the rack is the neutron absorber material which is boron carbide/aluminum-cermet available under the trademark "Boral".

The new racks are designed and analyzed in accordance with Section III, Division 1, Subsection NF of the ASME Boiler and Pressure Vessel (B&PV) Code. The material procurement, analysis, and fabrication of the rack modules conform to 10CFR50 Appendix B requirements.

This report documents the design and analyses performed to demonstrate that the new spent fuel racks satisfy the governing requirements of the applicable codes and standards, in particular, "OT

Position for Review and Acceptance of Spent Fuel Storage and Handling Applications", USNRC (1978) and 1979 Addendum thereto.

The safety assessment of the proposed rack modules involves demonstration of their thermal-hydraulic, criticality, and structural adequacy. Thermal-hydraulic adequacy requires that fuel cladding will not fail due to excessive thermal stress, and that the maximum pool bulk temperature will remain within the limits prescribed for the spent fuel pool. Demonstration of structural adequacy primarily involves analyses showing that the free-standing rack modules will not impact with each other or with the pool walls under the postulated Safe Shutdown Earthquake (SSE) and Operating Basis Earthquake (OBE) events, and that the primary stresses in the rack module structure will remain below the ASME B&PV Code (Subsection NF) allowables. The structural qualification also includes analytical demonstration that the subcriticality of the stored fuel will be maintained under accident scenarios such as fuel assembly drop and accidental misplacement of a fuel assembly outside of a rack. The structural consequences of these postulated accidents are evaluated and presented in Chapter 7 of this report.

The criticality safety analysis shows that the neutron multiplication factor for the stored fuel array is bounded by the limit of 0.95 (OT Position Paper) under assumptions of 95% probability and 95% confidence. Consequences of the inadvertent placement of a fuel assembly are also evaluated as part of the criticality analysis. The criticality evaluation is summarized in Chapter 4 and sets the requirements on the length of the Boral panel and the B-10 areal density.

This report contains documentation of the analyses performed to demonstrate that the proposed change meets the guidance set forth in the OT Position Paper and other applicable guidance documents referenced in the individual chapters. This report also contains the results of the analysis performed to demonstrate the integrity of the fuel pool reinforced concrete structure, and an appraisal of radiological considerations. Environmental considerations are included in Chapter 12 of this report.

Holtec computer programs utilized in performing the analyses documented in this report are identified in the appropriate sections. Holtec computer codes are benchmarked and verified in accordance with Holtec International's Nuclear Quality Assurance Program.

The analyses summarized in this report demonstrate that the rack module arrays possess adequate margins of safety from all four vantage points: thermal-hydraulic, criticality, structural, and radiological. The no-significant-hazard considerations submitted to the Commission along with this report is based on the descriptions and analyses summarized in the chapters of this report.

Table 1.1
PAST AND PROJECTED FUEL DISCHARGE SCHEDULE IN THE VY POOL

End-of-Cycle Discharged	Bundles Permanently Discharged	Total Number of Fuel Assemblies in the SFP	Date Discharged
1	10	10	1/17/73
1A	40	50	9/29/73
2	328	378	10/12/74
3 to 8*	136	514	10/16/81
4 to 8*	84	598	10/16/81
5 to 8*	96	694	10/16/81
6 to 8*	96	790	10/16/81
7 to 8*	80	870	10/16/81
8	120	990	10/16/81
9	108	1,098	3/05/83
10	104	1,202	06/15/84
11	120	1,322	9/20/85
12	136	1,458	8/07/87
13	136	1,594	2/11/89
14	129	1,723	8/31/90
15	128	1,851	3/06/92
16	128	1,979	8/27/93
17	120	2,099	3/17/95
18	120	2,219	9/06/96
19	112	2,331	3/20/98
20	108	2,439	9/17/99
21**	100	2,539	3/23/01
22	100	2,639	9/20/02
23	100	2,739	3/19/04
24	96	2,835	9/16/05
25	100	2,935	3/16/07
26***	100	3,035	9/12/08

* Some bundles were reinserted into the core starting with those discharged in Cycle 3. This reinsertion ended in Cycle 8. For conservatism, these batch discharge dates are all set to Cycle 8, which results in a slightly higher decay heat load.

** Loss of Full-Core-Reserve with current storage capacity, 5% Power uprate assumed

*** Loss of Full-Core-Reserve with new racks (including cask pit rack)

Table 1.2

AVAILABLE STORAGE IN VY POOL BEFORE AND AFTER PROPOSED CAPACITY EXPANSION

Refueling No.	Refueling Outage Date (Best Estimate)	Discharge Size	With Present Available Capacity (2,863 Cells)	After Two Racks Installed {No Rack CA) (3,087 Cells)	After All Three Racks Installed {Includes Rack CA) (3,353 Cells)
19	3/20/98	112	532		
20	9/17/99	108	424		
21*	3/23/01	100	324	548	814
22	9/20/02	100		448	714
23**	3/19/04	100		348	614
24	9/16/05	96			518
25	3/16/07	100			418
26***	9/12/08	100			318

* Loss of Full-Core-Reserve with current storage capacity

** Loss of Full-Core-Reserve with two new racks (not including Rack CA)

*** Loss of Full-Core-Reserve with all new racks (including Rack CA)

Table 1.3

RACK MODULE DATA FOR EXISTING AND PROPOSED RACKS

ITEM	EXISTING RACKS	
Number of Cells	2,683	
Number of Modules	9	
Neutron Absorber	Boral	
Nominal Cell Pitch, inch	6.218	
Nominal Cell Opening, inch	5.922	
B-10 Loading (gm/cm^2) min.	0.027	
Height of Rack above Pool Liner, inch	178.5	
Height of Rack Baseplate Above Pool Liner, inch	10.5	

Table 1.4

COMPARISON OF EXISTING VERSUS PROPOSED SPENT FUEL POOL CAPACITY

	EXISTING CAPACITY	PROPOSED EXPANSION
INSTALLED CAPACITY	2,683	2,683
NES RACK NO. 1	180	N/A
TOTAL CURRENT CAPACITY	2,863	N/A
NEW RACK NE	N/A	168
NEW RACK SE	N/A	236 (8 Dual Purpose Cells)
NEW RACK CA*	N/A	266
LICENSED CAPACITY	2,870	3,353
INCREASE	N/A	483 CELLS

* Rack CA is scheduled to be installed, as necessary, to support full core discharge capability after the 2004 refueling outage.

Table 2.1

DESIGN DATA FOR NEW RACKS

Table 2.2

NUMBER OF STORAGE CELLS

MODULE I.D.	QTY.	NUMBER OF CELLS		Total Per Rack
		North-South Direction	East-West Direction	
CA	1	19	14	266
SE	1	17	12 cells	236 *
NE	1	12	14	168
Existing Racks in Pool	9	--	--	2,683
TOTAL:	**12**	--	--	**3,353**

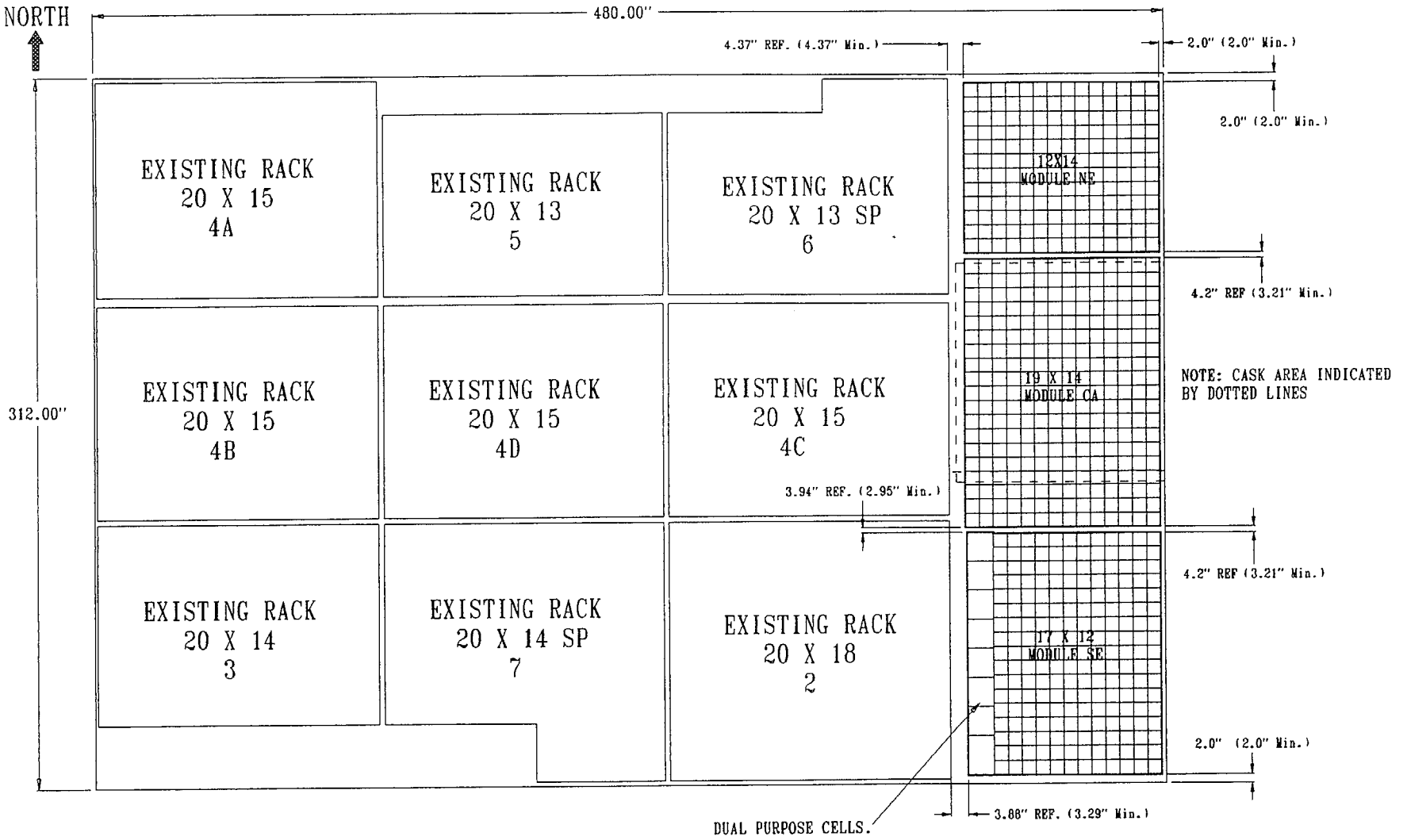
* Includes use of eight dual-purpose storage cells for fuel.

Table 2.3

MODULE DIMENSIONS AND WEIGHTS FOR VY RERACK

Module I.D.	Dimension (inches)†		Shipping Weight in Pounds
	North-South	East-West	
NE	74.991	87.427	16,810
CA	118.517	87.427	25,860
SE	106.417	88.512	23,800

† Nominal rectangular planform dimensions.



BOX I.D. = 6.0
BOX WALL THK. = 0.075
INNER SHEATHING THK. = 0.035
PITCH = 6.218

NEW RACKS : 638 CELLS
DUAL PURPOSE CELLS: 8
TOTAL CELL COUNT:670.

RACK	WEIGHT(lb.)
MODULE CA	25,860#
MODULE SE	23,800#
MODULE NE	16,810#

FIGURE 2.1: POOL LAYOUT FOR VERMONT YANKEE

Note: Dimensions in parentheses are based on pool survey results.
Referance dimensions are based on nominal pool dimensions.