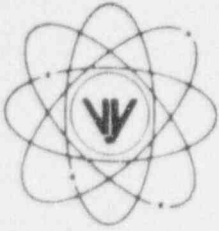


VERMONT YANKEE NUCLEAR POWER CORPORATION



Ferry Road, Brattleboro, VT 05301-7002

REPLY TO
ENGINEERING OFFICE
580 MAIN STREET
BOLTON, MA 01740
(508) 779-6711

March 29, 1996
BVY 96-33

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

References: (a) License No. DPR-28 (Docket No. 50-271)
(b) Letter, VYNPC to USNRC, BVY 89-80, dated September 1, 1989
(c) Letter, VYNPC to USNRC, BVY 95-117, dated October 26, 1995

Attachments: Summary of Changes
A. Regulatory Guide 1.97 Qualification Summary
B. Regulatory Guide 1.97 Matrix
C. Regulatory Guide 1.97 Design and Qualification Criteria for Instrumentation (Summary)

Subject: NUREG-0737, Supplement No. 1 - Regulatory Guide 1.97 Program Update

In Reference (c) Vermont Yankee committed to perform a comprehensive review of its current RG 1.97 program document [Reference (b)]. Attached with this letter is an updated RG 1.97 program document revised to incorporate the results of that review.

We trust that the information provided is acceptable; however, should you have any questions, please contact this office.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

James J. Duffy
Licensing Engineer

020020

c: USNRC Region I Administrator
USNRC Resident Inspector - VYNPS
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Summary of Changes
to the
Vermont Yankee September 1989 RG 1.97 Submittal

March 1996

Item #	Attachments Affected	Description of Change	Type of Change (Admin/Tech)	50.59 Required (Impacts SER (NVY 90-215))
N/A	A	Moved some of the parameter interpretation to Attachment 'C'. Added some additional clarification.	Administrative	No - Information relocated and clarification provided for clarity.
N/A	B	RG 1.97 Attachment 'B' category column. Originally only reflected RG 1.97 required category. Revised to include Vermont Yankee committed category as stated in attachment 'A'.	Administrative	No - Information added for clarity
N/A	C	Attachment 'C' added to provide clarification on how parameter requirements have been satisfied.	Administrative	No - Information added for clarity.
A1, A2, C4, C9	B	Recorder ID revised from LR/PR 2-3-67 & 68 to LR/PR 2-3-68A&B	Administrative	No - The same recorders as originally committed to still being used.
B1	A, B	Neutron Flux deleted.	Technical	No - SER (NVY 93-036 & NVY 94-28) concurred with the removal of neutron flux.
B10	A	Added FCV 2-39 & 40 as requiring upgrade to satisfy RG 1.97 PCIS valve position indication requirements.	Technical	No - Valves to be upgraded to comply with SER. BMO addresses operability concerns.
B10	A, B	Removed list of PCIS valves from Attachment 'A' and included them as part of Attachment B. Reference to "long term" & "short term" operability requirements removed (not a RG 1.97 issue).	Administrative	No - List of valves moved to a more appropriate location; added redundancy class for clarification.
B10	A,B	Removed MOV 10-33 from list.	Administrative	No - This valve was removed from service via PDCR 91-11. As such, it no longer is required to provide PCIS valve position indication and therefore RG 1.97 item B10 requirements no longer apply.
C1	A,B	The description provided in Attachment 'B' relates to an instrument system which will not be effective after the MSIVs are shut. It will not be relied on after that. Therefore, a Category 1 status does not apply. Instead, the description provided in Attachment 'B' more closely resembles a Category 3 requirement.	Technical	No - The Category change from 1 to 3 reflects the functional description originally provided in Attachment 'B'. The intended use and post-accident function has not changed
D20, D21	B	Revised recorder identification number: From TRS 10-130 To TRS 23-115	Administrative	No - Corrective update to reflect actual recorder used. Referenced recorder satisfies Category 3 requirements.
D21	B	Revise temperature range of cooling water to ESF components from 0° F - 150° F to 0° F - 600° F.	Technical	No - Revised range addresses outstanding SER comment. Revised range addressed in NRC letter BVY 91/09 dated 1-17-91 and validated during RG 1.97 audit #50-271/91-08 dated 4-10-91.
D25	B	Revise emergency power indicator ID numbers as follows: From EI-386F (CRP 9-8) To EI-386D (CRP 9-8) From EI-52 (CRP 9-8) To DC-1-VM (Local/Cbl Vlt) From EI-53 (CRP 9-8) To DC-2-VM (Local/Cbl Vlt)	Administrative/ Technical	No - Although different indicators will be used, the RG 1.97 parameters will continue to be monitored to the same requirements assumed in the SER. This variable is "Plant Specific"

Summary of Changes
to the
Vermont Yankee September 1989 RG 1.97 Submittal

March 1996

Item #	Attachments Affected	Description of Change	Type of Change (Admin/Tech)	50.59 Required (Impacts SER (NVY 90-215))
D25	B	Revise emergency power indicator range as follows: D25G, H, & I: From 150 to 0 to 150 To 0 to 150 D25L: Removed reference to 0 to 300 Vac and added note D20.	Administrative	No - Although different ranges will be used, the RG 1.97 parameters will continue to be monitored to the same requirements assumed in the SER. This variable is "Plant Specific"
E8	A,B	Assigned the existing RG 1.97 category 2 to RD 17-155. Assigned separate RG 1.97 category 3 for Stack Gas I & II. Parameter requirements revised to address Category 3 requirements in lieu of Category 2 for the low range plant stack radiation effluent monitoring function. (High range remains Category 2).	Technical	Yes - SER based on both low range and high range being RG 1.97 category 2.
E8	B	Note E7 - Correct equivalent range; From 2E-5 to 1E-2 uCi/cc To 1E-7 to 1E-1 uCi/cc and From 10E-4 to 10E+4 uCi/cc to 1E-2 to 1E+5 uCi/cc Changed installed low range span; From 10 to 10E+6 CPM To 10 to 10E+7 CPM	Administrative	No - Range provided in notes inadvertently used. Bases for revised range provided in VY1 33/90 and earlier RG 1.97 submittals. This range supports position taken in Attachment B and envelopes the range required by RG 1.97.
Notes B11,C10	B	Described sump level control requirements.	Administrative	No - Information provided for clarification. Reflects Attachment 'A' and SER description.
D15,D17 D18,D22 E2	B	Parameter requirements revised to address Category 3 requirements in lieu of Category 2.	Administrative	No - Attachment 'A' details the requirements for the different RG 1.97 Categories. The subject items were determined to be Category 3 monitoring functions in Attachment 'A'. The SER recognized these parameters as Category 3. RG 1.97 originally required these monitoring functions to be Category 2. Attachment 'B' inadvertently listed the requirements associated with Category 2 instead of Category 3.

ATTACHMENT A

Regulatory Guide 1.97

Qualification Summary

March 1996

The following is a list of Post-Accident Monitoring (Regulatory Guide 1.97) instrumentation. It is divided into four sections as follows:

- o Section 1 lists the instrumentation which is in full compliance with the requirements as specified by Regulatory Guide 1.97 and as interpreted in Attachment C.
- o Section 2 details equipment which has been evaluated on a plant-specific basis to provide the information required to support safe shutdown. This equipment may differ in range, environmental qualification, or other attributes from the guidance in Regulatory Guide 1.97. However, the analysis performed ensures that this equipment supports the required safety functions specified in the Vermont Yankee Environmental Qualification Program and conforms to the new Symptom-Based Emergency Operating Procedures.
- o Section 3 details additional instrumentation needed. This additional instrumentation could consist of entirely new instrument channels or existing instrument channels which require some upgrading. All equipment being installed will be qualified in accordance with the appropriate Vermont Yankee specific Design and Qualification Criteria category. No items were listed at the time of the last NRC submittal. Since that time, one item has been added.
- o Section 4 details the instrumentation which has been deleted from the Regulatory Guide 1.97, List of Instrumentation. Vermont Yankee originally considered this equipment within the scope of Regulatory Guide 1.97. However, following further development of operating procedures and the Vermont Yankee Equipment Qualification Program, some equipment was no longer required to be operational. Consequently it has been removed from the Regulatory Guide 1.97 Instrumentation Matrix (Attachment B). Two items have been added to this Section since the last NRC submittal.

Environmental Qualification requirements are determined in the Vermont Yankee EQ Program. In determining environmental qualification requirements, all design basis events, as documented in Chapter 14 of the Vermont Yankee Final Safety Analysis Report (FSAR), have been addressed. Also addressed are High Energy Line Breaks (HELBs) outside containment and flooding. This is consistent with the intent of 10CFR50.49.

The method for identifying electrical equipment within the scope of Paragraphs (b)(1) and (b)(2) of 10CFR50.49 (i.e., safety-related, as well as non-safety-related electrical equipment relied upon to remain functional or whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions during and following design-basis accidents) is described and documented in the Vermont Yankee EQ Program. This included:

- (a) Identification of general design criteria consistent with Vermont Yankee's plant-specific design and 10CFR50.49;
- (b) Defining required safe shutdown safety functions for design-basis accidents utilizing shutdown sequence diagrams based upon existing emergency operating procedures and the Vermont Yankee FSAR;
- (c) Identification of the major electrical components required for each postulated accident in potentially harsh environments which are relied upon to operate (or to not fail) for required safety functions. These components were identified by reviewing Plant Piping and Instrumentation Diagrams (P&IDs); and
- (d) Identification of the remaining electrical components in potentially harsh environments (associated with the major required electrical components) that are relied upon to function, or whose failure could impact any required safety functions or mislead the operator such that required safety functions could be jeopardized. These components were identified by reviewing plant electrical Control Wiring Diagrams (CWDs). In addition, a field walkdown inspection of all major components and associated equipment was performed to ensure accuracy and completeness.

The method used for identifying electrical equipment within the scope of Paragraph (b)(3) of 10CFR50.49 (i.e., "certain post-accident monitoring equipment") included the review of Symptom-Based Emergency Operating Procedures to identify a complete list of associated display instrumentation. The instrumentation necessary to determine that a system is performing its safety function is included in the list of post-accident monitoring instrumentation.

A review for plant-specific Type A variables was conducted utilizing the Symptom-Based Emergency Procedures. These procedures are living documents; as future revisions to the EOPs modify display instrumentation requirements, changes to the instrument list will be made accordingly.

Attachment B is the Regulatory Guide 1.97 Equipment Matrix. It is arranged in a manner which allows identification of requirements and abilities. Where a requirement is not applicable, it is so noted with an N/A under the appropriate column. An explanation of an N/A status is provided in Attachment A, Section 2. Where the regulatory guide does not require specific documentation, N/R is inserted under the appropriate column. The basis for N/R status is provided by Table 1 of the Regulatory Guide. Vermont Yankee interprets the basic design and qualification requirements as follows:

	<u>EQ</u>	<u>Seismic</u>	<u>QA</u>	<u>Redundancy</u>
Category 1	Required ¹	Required	Required	Required
Category 2	Required ¹	N/R	Required ²	N/R
Category 3	N/R	N/R	N/R	N/R

Note 1.

If located in harsh environment.

Note 2

Certain Category 2 variables are not as important as others and, based on evaluation (per the Vermont Yankee Safety Class Manual), an items safety classification (Safety Class or Non-Nuclear Safety) is determined. An item determined to be Safety Class will require QA; Other QA requirements (OQA) for Non-Nuclear Safety related items will be determined on a component specific basis (which could include no QA).

Under the appropriate columns, a Yes or No is indicated to reflect if the documentation or redundancy requirements are adequately addressed. If a No is listed, justification for its acceptability is provided in Attachment A, Section 2.

Attachment C is the RG 1.97 Table 1 design and qualification requirements summary. A summary of how Vermont Yankee satisfies the Table 1 requirements is addressed here.

1. Instrumentation in Full Compliance With Regulatory Guide 1.97

The following instrumentation currently installed at Vermont Yankee fully complies with Regulatory Guide 1.97 requirements:

<u>Item</u>	<u>Service</u>	<u>Notes</u>
A1	Reactor Pressure	1
A2	Reactor Vessel Level	1
A4	Drywell Pressure	1
A5	Drywell Temperature	1
A6	Torus Pressure	1
A7	Torus Water Temperature	1
A8	Torus Water Level	1
A9	Torus Airspace Temperature	1
B2	Control Rod Position	2
B3	RCS Soluble Boron Concentration	2
B6	RCS Pressure	2
B10	Primary Containment Isolation Valve Position Indication	2,3
C2	Primary Coolant Analysis (gamma spectrum)	2
C4	RCS Pressure	2
C5	Primary Containment Area Radiation	2
C7	Suppression Pool Wide-Range Level	2
C9	RCS Pressure	2
C10	Drywell Pressure	2
C11	Containment/Drywell Hydrogen Concentration	2
C12	Containment/Drywell Oxygen Concentration	2
D1	Main Feedwater Flow	2
D3	Suppression Chamber Spray Flow	2
D6	Suppression Pool Water Temperature	2
D8	Drywell Spray Flow	2
D10	Primary Safety Relief Valve Position - ADS	2
D16	LPCI Flow	2
D19	RHR System Flow	2
D23	Radwaste System	2
D25	Standby Power Status	2
E1	Primary Containment Area Radiation	2
E3	Radiation Exposure Rate (Safety Access Areas)	2
E10	Particulates/Halogens	2
E11	Airborne Radio halogens	2
E13	Isotopic Analysis	2
E14	Wind Direction	2
E15	Wind Speed	2
E17	Primary Coolant Sample (Except ph)	2
E18	Containment Air Sample	2

Notes

1. Fully satisfies the requirements for Type "A" variables as defined by Regulatory Guide 1.97. The Vermont Yankee Emergency Operating Procedures determined the need for the variable and the acceptance criteria.
2. Fully satisfies the requirements as defined by Regulatory Guide 1.97. This includes enveloping the stipulated range and category requirements.
3. PCIS valve position indication satisfies RG 1.97 with the exception of FCV 2-39 & FCV 2-40. Refer to Section 3 of this Attachment.

2. Equipment Determined to be Appropriate on a Plant-Specific Basis

This section details equipment currently existing at Vermont Yankee, how it deviates from the regulatory guidance, and a justification for the existing equipment acceptability. This equipment is:

<u>Item</u>	<u>Service</u>	<u>Results</u>
B1	Neutron Flux	This parameter has been removed from the Vermont Yankee RG 1.97 submittal. Refer to Section 4 of this Attachment.
B4	Coolant Level	Regulatory Guide 1.97 requires a range from the bottom of the core support plate to the lesser of the top of the vessel or the centerline of the main steam line. The top of active fuel is used as the 0" reference for level indication. Based on that, the bottom of the core support plate is at approximately -154 inches; centerline of the main steam line is approximately +244 inches; approximately 500 inches to the vessel top. The monitored range is +200 inches. The lower range requirement is enveloped. The increasing range is approximately 44 inches less than the requirement. However, it is the widest range which can reasonably be monitored. This is due to the locations of the existing instrument tap locations. Should level exceed +200 inches and fill the vessel, the operator will have indication of increasing reactor pressure. The High Pressure Injection Systems would have automatically shut down due to high water level long before reaching the main steam line. Based on the above discussion, and a review of the EOPs, it is Vermont Yankee's position that the ± 200 " range is acceptable.
B5,C3	Core Temperature	In-core thermocouples do not presently exist at Vermont Yankee. The intent of these instruments is to verify adequate water level/core cooling. Water level issues were addressed via Generic Letter 84-23. At that time, it was determined that in-core thermocouples were not required to ensure adequate water level/core cooling. Furthermore, this parameter was determined to be not required at this time (SECY 82-11). Therefore, it is Vermont Yankee's position that this parameter will not be included at this time in the Regulatory Guide 1.97 submittal.
B7,B9 C8,D4	Drywell Narrow- Range Pressure	Regulatory Guide 1.97 requires both drywell narrow- and wide-range pressure measurement. Drywell narrow-range pressure transmitter, PT 16-19-28, is a single channel instrument. The wide range pressure transmitters, PT 16-19-29A/B, encompass both the narrow- and wide-range requirements. These transmitter loops meet the requirements for Category 1 variables. It is Vermont Yankee's position that narrow-range drywell pressure is not needed post-LOCA due to the fact that once the LOCA has been controlled, the drywell will not repressurize. However, if that were to happen, any changes in pressure will be displayed in the Control Room via the wide-range instruments. Therefore, it is not necessary to provide Category 1 instrumentation for narrow-range pressure. It is Vermont Yankee's position that PT 16-19-29A/B instrument loops satisfy the intent of these four post-LOCA variables.

B8,C6	Drywell Sump Level	<p>The drywell sump level uses level switches to start/stop pumps during normal operation. Regulatory Guide 1.97 requires continuous sump level indication from the bottom to the top. The existing configuration is designed to detect and measure leaks in the drywell by measuring both the sump pump running time and the time between pump initiation with external pump monitoring equipment. During a LOCA, drywell sump level is ineffective because the sump will fill and overflow into the torus. The torus is monitored by an environmentally qualified level measurement system. Additionally, drywell pressure is also monitored by environmentally qualified instrumentation which will indicate a line break in the drywell before the torus level indicates a rise. Therefore, it is Vermont Yankee's position that drywell sump level indication is not appropriate for Vermont Yankee. The existing system, viewed as a Category 3 parameter, is adequate.</p>
C1	Radiation Level in Circulating Primary Coolant	<p>Radiation levels in the main steam line are continually monitored by the main steam line radiation monitors. A steam line isolation and scram are generated by these instruments if the steam radiation exceeds a preset level, indicating a failure of the fuel cladding. Their intended function is to scram the reactor prior to the onset of harsh environmental conditions. In accordance with the methodology used in the Vermont Yankee EQ Program, these detectors, although utilized for fuel failure events, are not relied upon for LOCA or HELB events. Once the MSIVs have closed, there is no circulating primary coolant in the main steam lines. Therefore, there is no longer a need to accurately monitor steam line radiation levels. In addition, the drywell high-range radiation monitors (which are environmentally qualified) will monitor radiation buildup within the drywell. Direct coolant radiation level assessments will be available from the chemical and health physics analysis via the Post-Accident Sampling System.</p> <p>For the reasons stated above, it is Vermont Yankee's position that the existing instrumentation is acceptable and is viewed as a Category 3 parameter.</p>
C13,C14 E4,E5,E7 E9	Noble Gases and Vent Flow Rate	<p>All anticipated post-accident plant effluents pass through the plant stack. Monitoring the common plant vent will provide indication of effluent radiation levels from these areas. The stack monitoring instruments cover the range required. Therefore, it is Vermont Yankee's position that separate monitoring of these parameters is not required. For Type E variables this is explicitly stated as acceptable.</p>

D2	Condensate Storage Tank Level	Regulatory Guide 1.97 requires CST level indication from top to bottom. The existing range is 0 to 35'. 38'-3" is the overall height of the CST. It is Vermont Yankee's position that the existing range is adequate. This is based, in part, on the fact that the portion of the CST above 36'-9" is cone shaped. Level increases above the level do not relate to any significant additional volume. Furthermore, by procedures, the operator will limit the level in the CST to less than 35' to ensure overflow does not occur through the tank's vent.
D5	Torus Level	Variable D5 requires level be monitored from "top of vent to top of Weir Wall". The Vermont Yankee torus design does not utilize a Weir Wall. Therefore, this parameter is not applicable.
D7	Drywell Atmospheric Temperature	Drywell atmospheric temperature displays 0°F to 350°F, which is less than the 40° F to 440° F range required. The accident analysis conducted to support Vermont Yankee's EQ Program indicates that the postulated drywell temperature will not exceed 350° F. Therefore, a 0° F to 350° F range is appropriate for Vermont Yankee.
D9	MSIV Leak Control	The Vermont Yankee design does not include an MSIV Leak Detection System. Therefore, this parameter is not applicable.
D11,D12	Isolation Condenser System Level & Valve Position	Variables D11 and D12 pertain to plants which utilize isolation condensers in their design. Vermont Yankee does not utilize an isolation condenser. Therefore, these variables are not applicable.
D13,D14	RCIC Flow HPCI Flow	Both HPCI and RCIC flow indication is available to the Control Room. Regulatory Guide 1.97 requires these two variables to be environmentally qualified. Per the Vermont Yankee EQ Program, these two variables do not experience harsh environments during the small break LOCA event in which they are relied upon. Once the vessel has been depressurize, both HPCI and RCIC become inoperative and their flow indication is not needed. Therefore, it is Vermont Yankee's position that the existing equipment is acceptable.
D15,D22	Core Spray Flow Cooling Water Flow to ESF System Components	In the EQ Program, flow indication for these safety systems is not required. In lieu of various flows, the instrumentation that monitors the reactor and primary containment responses post-accident would be the ultimate indication of ECCS performance (i.e., reactor vessel level, pressure, drywell temperature, drywell pressure). In addition, ECCS valve position information, along with ECCS pump motor running current (amps) indicates the mode of operation and is far more valuable than monitoring flow. Therefore, additional qualification or upgrading is not warranted. Vermont Yankee considers these parameters Category 3.

D17,D18 SLCS Flow &
Storage Tank Level

SLCS flow and storage tank level is required by Regulatory Guide 1.97 to be environmentally qualified. Per the EQ Program and the Vermont Yankee FSAR (Section 3.8.4), this system provides a method to shut down the reactor from the full-power condition and maintain the reactor subcritical during cooldown, independent of the control rods. As such, it is not expected to be needed for plant safety following a Design Basis Accident (DBA). Since this system is for independent backup of the control rods, it is not relied upon for accidents in which harsh environments are created. Therefore, environmental qualification of any SLC component is not warranted, although specified in Regulatory Guide 1.97. These parameters are considered Category 3 by Vermont Yankee.

SLC pump discharge pressure is monitored rather than SLC flow. This parameter is adequate to inform the operator that the pump is discharging fluid in a manner indicative of proper operation.

In addition, the Regulatory Guide requires the SLCS tank level be monitored from top to bottom. For Vermont Yankee, this would require a range of 0" to 132.5". The available range is 0" to 127.5". By procedures, the operator is to limit the level to 92% (approximately 122"). Should level exceed the 92% full mark, the operator would take appropriate action should level approach the 127.5" level. As such, monitoring level up to 132.5" is not necessary. Therefore, it is Vermont Yankee's position that the existing range is adequate.

D20,D21 RHR Heat Exchanger
Outlet Temperature
Cooling Water

Regulatory Guide 1.97 requires environmentally qualified monitoring of these two variables. In the Vermont Yankee EQ Program Temperature to ESF, monitoring the RHR System Components heat exchanger shell and tube side outlet temperature is not relied upon. The function of the RHR heat exchangers post-accident is to remove stored and decay heat. In lieu of the RHR heat exchanger temperature variables, monitoring the reactor and primary containment responses (i.e., torus water temperature, drywell, and reactor pressure) will be the most important indicators of RHR heat exchanger performance. Therefore, additional qualification or upgrading is not warranted. Vermont Yankee considers these parameters Category 3.

D24 Emergency Ventilation
Damper Position

The Regulatory Guide requires that this parameter be environmentally qualified. However, per the Vermont Yankee Environmental Program, environmental qualification of damper position is not required. This is because the dampers are located outside the Reactor Building. As such, they will not experience a harsh environment. Therefore, it is Vermont Yankee's position that emergency ventilation damper position is not required to be environmentally qualified to satisfy the intent of Regulatory Guide 1.97.

D25 Status of Standby Power
(A thru I,
L, & M)

The Regulatory Guide requires that this variable be environmentally qualified. Variables D25J, K, N, and O have been determined to satisfy this requirement. The remainder of the Variable D25 indications do not require environmental qualification because none of the cables or components are located within a harsh environment. Therefore, it is Vermont Yankee's position that the remaining D25 variables are acceptable without environmental qualification.

E2 Reactor Building or
Secondary Containment
Area Radiation

Post-accident secondary containment area radiation monitoring, as well as radiation monitoring in other areas where personnel access may be desirable, would be helpful to the Health Physics Department in determining local radiological conditions prior to entering these areas. This function is important from the standpoint of evaluating personnel habitability in the event of a severe core damage accident.

Areas outside the Reactor Building that do require personnel access post-accident have been analyzed using very conservative assumptions to show that habitability would be allowed.

The EQ Program assumes that habitability in the Reactor Building is not possible for at least three months post-accident. Equipment required for long-term post-accident operations has generally been environmentally qualified for one year. Therefore, any decisions on habitability inside the Reactor Building would not be necessary for some time after the event. If the secondary containment area radiation monitors were not functioning at this time, alternate means to estimate secondary containment radiation levels would be possible (i.e., correlations based on drywell, vent stack, and site area radiation measurements).

Therefore, Vermont Yankee considers this parameter Category 3.

E6 Noble Gases and
Vent Flow (Reactor
Shield Annulus)

Variable E6 pertains to a Reactor Shield Building annulus. Vermont Yankee does not utilize a Reactor Shield Building in their design. Therefore, this is not applicable.

E8 Airborne Radioactive
Material Releases -
Common Plant
Ventilation

These monitors are located in the stack. The only possible harsh environment is due to radiation. This equipment is specifically designed and tested to measure radiation levels higher than those which will be encountered. Therefore, they are qualified for their intended service.

These instruments read out in CPM and millirem; however, a simple conversion to microcuries per cubic centimeter can be accomplished by Health Physics. The range of millirem, once converted, envelopes the uCi/cc range specified by Regulatory Guide 1.97. Therefore, it is Vermont Yankee's position that the existing instruments satisfy the intent of the Regulatory Guide.

The low range instruments are only relied on to provide information while the stack effluent is still representative of normal plant operation. The low range instruments are relied on during the initial stages of an accident scenario. The high range instruments are relied on to follow the progress of post-accident releases up the stack. Therefore, the high range instruments are viewed as Category 2 instruments, while the low range instruments are considered to be acceptable as Category 3.

E12 Environments Radiation
Radioactivity Plant
and Environments
Radiation

Presently, there is one portable survey instrument at Vermont Yankee that can measure up to 104 R/hr photons, but none that can measure the Regulatory Guide required 104 R/hr beta. The existing instrumentation can measure approximately 102 R/hr beta. These ranges are sufficient for portable plant use.

E16 Atmospheric Stability

The existing delta temperature is ranged -50° F to +15° F. Regulatory Guide 1.97 requires a range of -9° F to +18° F. This covers all seven stability classes. It is Vermont Yankee's position that the existing range is adequate. This is based on the fact that the existing range has historically been adequate over the operation of the system. Expanding the range does not provide improved information.

E17 Primary Coolant Sample
(pH)

Regulatory Guide 1.97 requires the on-site ability to perform several different analyses on the primary coolant sample, one of which has a pH concentration of 1 to 13. However, in a previous Vermont Yankee letter, dated September 21, 1984, concerning NUREG-0737, Item II.B.3, "Post-Accident Sampling Capability," Criterion 10, that, "... pH measurements are not included because an undiluted sample cannot be obtained from the post-accident sample panel 9". The NRC issued a safety evaluation report on January 14, 1985 accepting this position. The above exception is based on tests conducted at Vermont Yankee on actual reactor coolant samples. This sample was obtained and diluted with demineralized water to a dilution of 1000:1, which is the minimum dilution appropriate to maintain personnel radiation exposures ALARA for the expected post-accident coolant activity levels. The resulting measurement concluded that no meaningful information was obtained other than the undiluted sample was acidic or alkaline. Additionally, Vermont Yankee evaluated the need to measure coolant pH at a freshwater BWR site and determined that pH is not particularly important since all metals which contact the coolant are compatible with liquids having a wide range of pH. Thus, we conclude that relatively little meaningful information would be gained from post-accident coolant pH sampling.

Therefore, based on Vermont Yankee's prior notification to NRC stating that undiluted pH samples cannot be obtained for the post-accident sample station; NRC's acceptance of Vermont Yankee's provisions to meet NUREG-0737, Item II.B.3, Criterion 10; and Vermont Yankee's evaluation of diluted pH samples discussed above, we have removed primary coolant pH from our post-accident monitoring instrumentation list.

3. Instrumentation Requiring Upgrade or Modification

This section details additional instrumentation needed for compliance to the Regulatory Guide. This additional instrumentation consists of any equipment which requires modifications to establish compliance. This could consist of entirely new instrument channels or existing instrument channels which require some upgrade.

<u>Item</u>	<u>Service</u>	<u>Results</u>
B10	Primary Containment Isolation Valve Position Indication (FCV 2-39 & FCV 2-40)	These are recirculation sample line isolation line PCIS valves. Item B10 requires PCIS valve position indication. These valves presently do not have a direct means of monitoring valve open-closed position. A means of direct position indication will be added to these valves during the 1998 refueling outage. Other PCIS valves associated with B10 (valve position indication) have adequate direct measurement. Refer to LER 95-18 dated October 26, 1995 (NRC notification BVY 95-117).

There are no other instruments under this category.

4. Instrumentation Deleted from the Submittal

This section details instrumentation which has been deleted from the original Regulatory Guide 1.97 submittal. The equipment removed and the reasons for the removal are listed below:

<u>Item</u>	<u>Service</u>	<u>Results</u>
A3	Reactor Vessel Reference Leg Area Thermocouple	Originally, Vermont Yankee classified this variable as Type A, Category 1, based on the Vermont Yankee draft Emergency Operating Procedures (EOPs). Vermont Yankee has further developed the EOPs and concluded that these variables are not Type A variables. This is based on the fact that this variable does not provide primary indication of a plant parameter. The reference leg thermocouples provide the Control Room operators with information on the reliability of the reactor vessel level indication. As such, they provide indication of the confidence in a variable providing primary indication of a plant parameter. Based on the above discussion, Vermont Yankee has removed this item from the Regulatory Guide 1.97 submittal. However, reference leg thermocouples have been installed as a part of the resolution of Generic Letter 84-23, "Reactor Vessel Water Level Instrumentation of BWRs."
B1	Neutron Flux Monitoring	Neutron Flux Monitoring was an open issue in the SER provided to Vermont Yankee. Subsequent effort by Vermont Yankee and the BWROG determined that this variable was not required for RG 1.97. Supplemental SERs (NVY 93-036 & NVY 94-28) concurred with the removal of neutron flux from the Vermont Yankee RG 1.97 submittal.
B10	Primary Containment Isolation Valve Position Indication (V10-18)	RHR shutdown cooling supply, Valve 10-18, has been removed from the original Regulatory Guide 1.97 submittal and the Vermont Yankee EQ Program. This valve is normally closed by a pressure interlock during plant operation and opened only when the plant is shut down. Following a LOCA, this valve is not needed for accident mitigation. Additionally, post-LOCA failure will not cause the valve to open. Consequently, removal of this valve from the Regulatory Guide PCIS valve position list is acceptable.
B10	Primary Containment Isolation Valve Position Indication (V10-33)	RHR Head Spray Isolation Valve 10-33, has been removed from the original Regulatory Guide 1.97 submittal and the Vermont Yankee EQ Program. This valve has been removed from service by a plant design change. It no longer receives a PCIS signal. Following a LOCA, this valve is not needed for accident mitigation. Additionally, post-LOCA failure will not cause the valve to open. Consequently, removal of this valve from the Regulatory Guide PCIS valve position list is acceptable.

ATTACHMENT B

REGULATORY GUIDE 1.97 MATRIX

March 1996

RG 1.97 VARIABLE MATRIX			TYPE 'A' VARIABLES								DOCUMENTATION/QUALIFICATION				
VARIABLE ID	VARIABLE DESCRIPTION	CATEGORY REQUIRED/ COMMITTED	REQUIRED RANGE	AVAILABLE RANGE	REDUNDANCY	LOOP SENSOR ID	LOOP POWER SUPPLY	INDICATOR ID/ LOCATION	RECORDER ID/ LOCATION	COMPUTER INPUT AVAILABLE	EQ	SEISMIC	QA	REMARKS	
A1	REACTOR VESSEL PRESSURE	1/1	PLANT SPECIFIC	0 to 1500 psig	YES	PT 2-3-56A&B	ECCS 24Vdc A&B	PI 2-3-56A&B/ CRP 9-5	LR/PR 2-3-68A&B/ CRP 9-3 & 9-4	YES	YES	YES	YES	NOTE A1	
A2	REACTOR VESSEL WATER LEVEL	1/1	PLANT SPECIFIC	-200 to +200" H2O	YES	LT 2-3-73A&B	ECCS 24Vdc A&B	LI 2-3-91A&B/ CRP 9-3	LR/PR 2-3-68A&B/ CRP 9-3 & 9-4	YES	YES	YES	YES	NOTE A1	
A3	DELETED	-	-	-	-	-	-	-	-	-	-	-	-	NOTE A2	
A4	DRYWELL PRESSURE	1/1	PLANT SPECIFIC	-15 to 260 psig	YES	PT 16-19-29A&B	VITAL ac INSTR ac	LI/PI 16-19-12A&B/ CRP 9-3	NONE	YES	YES	YES	YES	NOTE A1	
A5	DRYWELL TEMPERATURE	1/1	PLANT SPECIFIC	0 to 350 F	YES	TE 16-19-30A&B	VITAL ac INSTR ac	TI 16-19-30B/ CRP 9-25	TR 16-19-45/ CRP 9-25	YES	YES	YES	YES	NOTE A1	
A6	TORUS PRESSURE	1/1	PLANT SPECIFIC	-15 to 65 psig	YES	PT 16-19-36A&B	VITAL ac INSTR ac	PI 16-19-36A&B/ CRP 9-3	NONE	YES	YES	YES	YES	NOTE A1	
A7	TORUS WATER TEMPERATURE	1/1	PLANT SPECIFIC	0 to 250 F	YES	TE 16-19-33A&C	VITAL ac INSTR ac	TI 16-19-33A&C/ CRP 9-3	NONE	YES	YES	YES	YES	NOTE A1	
A8	TORUS WATER LEVEL	1/1	PLANT SPECIFIC	0 to 25" H2O	YES	LT 16-19-10A&B	VITAL ac INSTR ac	LI/PI 16-19-12A&B/ CRP 9-3	NONE	YES	YES	YES	YES	NOTE A1	
A9	TORUS AIRSPACE TEMPERATURE	1/1	PLANT SPECIFIC	50 to 300 F & 0 TO 350 F	YES	TE 16-19-34 & TE 16-19-41	VITAL ac INSTR ac	TI 16-19-41/ CRP 9-3	TR 16-19-45/ CRP 9-25	YES	YES	YES	YES	NOTE A1	

NOTES:

- A1 THIS VARIABLE FULLY SATISFIES THE REQUIREMENTS FOR TYPE "A" VARIABLE. ACCEPTABILITY OF RANGE IS BASED ON A REVIEW OF THE PLANT SPECIFIC EMERGENCY OPERATING PROCEDURES.
- A2 THIS ITEM HAS BEEN DELETED AS A TYPE "A" VARIABLE. REFER TO ATTACHMENT 'A', TABLE 4 OF TEXT.

RG 1.97 VARIABLE MATRIX											DOCUMENTATION/QUALIFICATION			
VARIABLE ID	VARIABLE DESCRIPTION	CATEGORY REQUIRED/ COMMITTED	REQUIRED RANGE	AVAILABLE RANGE	REDUNDANCY	LOOP SENSOR ID	LOOP POWER SUPPLY	INDICATOR ID/ LOCATION	RECORDER ID/ LOCATION	COMPUTER INPUT AVAILABLE	EQ	SEISMIC	QA	REMARKS
REACTIVITY CONTROL														
B1	DELETED													NOTE B5
B2	CONTROL ROD POSITION	3/3	FULL IN OR NOT FULL IN	FULL IN to FULL OUT	N/R	ROD POSITION	INST ac	ROD POSITION/ CRP 9-5	NONE	YES	N/R	N/R	N/R	NOTE B1
B3	RCS SOLUBLE BORON CONCENTRATION (GRAB SAMPLE)	3/3	0 to 1000 ppm	0 to 1000 ppm	N/R	GRAB SAMPLE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NOTE B1,B3
CORE COOLING														
B4	COOLANT LEVEL IN REACTOR VESSEL	1/1	BOTTOM OF CORE SUPPORT PLATE TO LESSER OF TOP OF VESSEL OR CENTERLINE OF MAIN STEAM LINE	-200 to +200" H2O	YES	LT 2-3-73A&B	ECCS 24Vdc A&B	LI 2-3-91A&B/ CRP 9-3	LR/PR 2-3-68A&B/ CRP 9-3 & 9-4	YES	YES	YES	YES	NOTE B2,B7
B5	BWR CORE TEMPERATURE	(NONE)	200 F to 2300 F	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NOTE B4
MAINTAINING REACTOR COOLANT SYSTEM INTEGRITY														
B6	RCS PRESSURE	1/1	0 to 1500 (psig)	0 to 1500 psig	YES	PT 2-3-56A&B	ECCS 24Vdc A&B	PI 2-3-56A&B/ CRP 9-5	LR/PR 2-3-68A&B/ CRP 9-3 & 9-4	YES	YES	YES	YES	NOTE B1
B7	DRYWELL PRESSURE	1/1	0 to DESIGN	-15 to 260 psig	YES	PT 16-19-29A&B	VITAL ac INSTR ac	LI/PI 16-19-12A&B/ CRP 9-3	NONE	YES	YES	YES	YES	NOTE B2,B6
B8	DRYWELL SUMP LEVEL	1/3	TOP to BOTTOM	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NOTE B11
MAINTAINING CONTAINMENT INTEGRITY														
B9	PRIMARY CONTAINMENT PRESSURE	1/1	-5 psig to DESIGN PRESSURE	-15 to 260 psig	YES	PT 16-19-29A&B	VITAL ac INSTR ac	LI/PI 16-19-12A&B/ CRP 9-3	NONE	YES	YES	YES	YES	NOTE B2,B6
B10	PRIMARY CONTAINMENT ISOLATION VALVE POSITION (EXCLUDING CHECK VALVES)	1/1	CLOSED-NOT CLOSED	CLOSED-NOT CLOSED	YES	PER EACH VALVE	VARIOUS	LIGHTS/ CRP 9-3	NONE	NONE	YES	YES	YES	NOTE B1, B10, B12

NOTES:

- B1 FULLY SATISFIES THE REQUIREMENTS SPECIFIED BY RG 1.97.
 B2 SATISFIES THE INTENT OF THE REQUIREMENTS SPECIFIED BY RG 1.97 ON A PLANT SPECIFIC BASIS. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.
 B3 THERE IS NO INSTRUMENTATION DIRECTLY ASSOCIATED WITH THIS PARAMETER. THE SAMPLE ANALYSIS IS PERFORMED BY THE CHEMISTRY & HEALTH PHYSICS DEPARTMENT.
 B4 NOT REQUIRED AT THIS TIME (REFER TO SECY 82-111). WATER LEVEL ISSUES ADDRESSED IN VYs RESPONSE TO GENERIC LETTER 84-23. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.
 B5 ITEM REMOVED. REFER TO ATTACHMENT 'A' TABLE 4 OF TEXT.
 B6 DESIGN PRESSURE IS 56 PSIG.
 B7 THE FOLLOWING LEVELS ARE APPROXIMATE: BOTTOM OF CORE SUPPORT PLATE IS -154"; TOP OF VESSEL IS +500"; CENTERLINE OF MAIN STEAM LINE IS +244". TOP OF ACTIVE FUEL IS 0" REFERENCE POINT.
 B8 DELETED. REPLACED BY NOTE 12.
 B9 ITEM REMOVED. REFER TO ATTACHMENT 'A' TABLE 4 OF TEXT.
 B10 SOME VALVE POSITION MAY INPUT TO ERFIS. HOWEVER, IT IS NOT NECESSARY TO INPUT ALL OF THEM.
 B11 TORUS WATER LEVEL IS RELIED UPON TO PROVIDE INDICATION OF SUMP LEVEL OVERFLOW. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT. CATEGORY 3 SUMP LEVEL CONTROLS ARE RELIED ON.
 B12 THE LIST OF PCIS VALVES WHOSE INDICATION IS INCLUDED IS AS FOLLOWS (REDUNDANCY CLASS DEFINED IN ATTACHMENT C):

VALVE TAG NUMBER	SERVICE	REDUND CLASS	VALVE TAG NUMBER	SERVICE	REDUND CLASS	VALVE TAG NUMBER	SERVICE	REDUND CLASS
AOV-2-80A, B, C, D	Main Steam Isolation (Inboard)	1	MOV-2-74, 77	Main Steam Drain, Isolation	1	NG-11A, B	CAD Purge Supply Isolation	2
AOV-2-86A, B, C, D	Main Steam Isolation (Outboard)	1	MOV-10-13A, B, C, D	RHR Pump Suction From Torus Iso.	4	NG-12A, B	CAD Purge Supply Isolation	2
AOV-20-82, 83	DW Floor Drain Isolation	1	MOV-10-16A, B	RHR Minimum Recirc. to Torus Iso.	4	NG-13A, B	CAD Purge Supply Isolation	2
AOV-20-94, 95	DW Equipment Drain Isolation	1	MOV-10-17	Shutdown Cooling Reactor Isolation	4	VG-9A, B	CAD Vent Isolation	2
AOV-72-38A, B	DW Air Compressor Suction Isolation	1	MOV-10-25A, B	RHR LPCI to Reactor Isolation	2	VG-22A, B	CAD Vent Isolation	2
FCV-2-39, 40	Reactor Sample Line Isolation	3	MOV-10-27A, B	RHR LPCI to Reactor Isolation	2	VG-23	Drywell Radiation Monitor Supply Isolation	3
TIP BV	TIP Ball Valves	1	MOV-10-26A, B	RHR to DW Spray Isolation	2	VG-24	Torus H2/O2 Sample Isolation	2
TIP SV	TIP Shear Valves	1	MOV-10-31A, B	RHR to DW Spray Isolation	2	VG-25	Torus H2/O2 Sample Isolation	2
						VG-26	DW Radiation Monitor Isolation	3
FSO-109-76A, B	DW Radiation Monitor to Torus Isolation	3	MOV-10-34A, B	RHR to Torus Isolation	2	VG-33	Torus H2/O2 Sample Isolation	2
V16-20-20, 22A, B	N2 Makeup Isolation	1	MOV-10-38A, B	RHR to Torus Spray Isolation	2	VG-34	Torus H2/O2 Sample Isolation	2
SB-9, 10, 11, 12	RB HVAC Isolation (see D24)	1	MOV-10-39A, B	RHR to Torus Spray Isolation	2	FSO-109-75A1, A2	Torus H2/O2 Sample Isolation	2
SB-16-19-05	DW Vent to SBGT Isolation	1	MOV-10-57, 66	RHR to Radwaste Isolation	1	FSO-109-75A3, A4	Torus H2/O2 Sample Isolation	2
SB-16-19-06A, 07A	DW Vent Isolation	1	MOV-12-15, 18	RWCU Supply Isolation	1	FSO-109-75B1, B2	Drywell H2/O2 Sample Isolation	3
SB-16-19-06B, 07B	Torus Vent Isolation	1	MOV-12-68	RWCU Return Isolation	4	FSO-109-75C1, C2	Drywell H2/O2 Sample Isolation	2
SB-16-19-07	DW Vent to Stack Isolation	1	MOV-13-15, 16	RCIC Turbine Steam Supply Isolation	1	FSO-109-75D1, D2	Drywell H2/O2 Sample Isolation	2
SB-16-19-08	Purge Supply to DW Isolation	1	MOV-14-05A, B	CS Minimum Recirc. to Torus Isolation	4			
SB-16-19-09	Air Purge Supply From RB Isolation	1	MOV-14-07A, B	CS Suction Isolation	4			
SB-16-19-10	Purge Supply to Torus Isolation	1	MOV-14-11A, B	CS to Reactor Isolation	2			
SB-16-19-11A, B	DW Vacuum Relief Isolation	4	MOV-14-12A, B	CS to Reactor Isolation	2			
SB-16-19-23	N2 Purge Supply Isolation	1	MOV-23-15, 16	HPCL Steam Supply Isolation	1			

RG 1.97 VARIABLE MATRIX			TYPE "C" VARIABLES								DOCUMENTATION/QUALIFICATION				
VARIABLE ID	VARIABLE DESCRIPTION	CATEGORY REQUIRED/ COMMITTED	REQUIRED RANGE	AVAILABLE RANGE	REDUNDANCY	LOOP SENSOR ID	LOOP POWER SUPPLY	INDICATOR ID/ LOCATION	RECORDER ID/ LOCATION	COMPUTER INPUT AVAILABLE	EQ	SEISMIC	QA	REMARKS	
FUEL CLADDING															
C1	RADIOACTIVITY CONCENTRATION OR RADIATION LEVEL IN CIRCULATING PRIMARY COOLANT	1/3	1/2 to 100X TECHNICAL SPECIFICATION LIMIT	0 to 1E+6 mR/Hr	N/R	RD17-230A,B,C,D	RPS BUS A&B	RM 17-251A,B,C.&D/ CRP 9-10	RR 17-252/ CRP 9-2	YES	N/R	N/R	N/R	NOTE C2,C6,C9	
C2	ANALYSIS OF PRIMARY COOLANT (GAMMA SPECTRUM)	3/3	10 uCi/ml to 10 Ci/ml OR TID-14844 SOURCE TERM IN COOLANT VOLUME	10 uCi/ml to 10 Ci/ml	N/R	COOLANT SAMPLE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NOTE C1,C3	
C3	BWR CORE TEMPERATURE	(NONE)	200 F to 2300 F	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NOTE C4	
REACTOR COOLANT PRESSURE BOUNDARY															
C4	RCS PRESSURE	1/1	0 to 1500 (psig)	0 to 1500 psig	YES	PT 2-3-56A&B	ECCS 24Vdc A&B	PI 2-3-56A&B/ CRP 9-5	LR/PR 2-3-68A&B/ CRP 9-3 & 9-4	YES	YES	YES	YES	NOTE C1	
C5	PRIMARY CONTAINMENT AREA RADIATION	3/3	1 R/hr to 1E+5 R/hr	1 R/hr to 1E+7 R/hr	N/R	RD 16-19-1A&B	VITAL ac INSTR ac	RI 16-19-1A&B/ CRP 9-3	NONE	YES	N/R	N/R	N/R	NOTE C1	
C6	DRYWELL DRAIN SUMPS LEVEL (IDENTIFIED AND UNIDENTIFIED LEAKAGE)	1/3	TOP to BOTTOM	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NOTE C10	
C7	SUPPRESSION POOL WATER LEVEL	1/1	BOTTOM OF ECCS SUCTION LINE to 5 FT ABOVE NORMAL WATER LEVEL	0 to 25' H2O	YES	LT 16-19-10A&B	VITAL ac INSTR ac	LI/PI 16-19-12A&B/ CRP 9-3	NONE	YES	YES	YES	YES	NOTE C1,C7	
C8	DRYWELL PRESSURE	1/1	0 to DESIGN PRESSURE (psig)	-15 to 260 psig	YES	PT 16-19-29A&B	VITAL ac INSTR ac	LI/PI 16-19-12A&B/ CRP 9-3	NONE	YES	YES	YES	YES	NOTE C2,C5	
CONTAINMENT															
C9	RCS PRESSURE	1/1	0 to 1500 (psig)	0 to 1500 psig	YES	PT 2-3-56A&B	ECCS 24Vdc A&B	PI 2-3-56A&B/ CRP 9-5	LR/PR 2-3-68A&B/ CRP 9-3 & 9-4	YES	YES	YES	YES	NOTE C1	
C10	PRIMARY CONTAINMENT PRESSURE	1/1	-5 psig PRESSURE to 3 TIMES DESIGN PRESSURE FOR CONCRETE; 4 TIMES DESIGN PRESSURE FOR STEEL	-15 to 260 psig	YES	PT 16-19-29A&B	VITAL ac INSTR ac	LI/PI 16-19-12A&B/ CRP 9-3	NONE	YES	YES	YES	YES	NOTE C1,C5	
C11	CONTAINMENT AND DRYWELL HYDROGEN CONCENTRATION	1/1	0 to 30 VOL-%(CAPABILITY OF OPERATING FROM -5 psig TO DESIGN PRESSURE)	0% to 10% to 30%	YES	SAH VG-5A&B	PP-89 AC-DP-5	NONE	SR VG-6A&B/ CAD PNL A&B	YES	YES	YES	YES	NOTE C1,C5	

RG 1.97 VARIABLE MATRIX											TYPE "C" VARIABLES				DOCUMENTATION/QUALIFICATION			
VARIABLE ID	VARIABLE DESCRIPTION	CATEGORY REQUIRED/ COMMITTED	REQUIRED RANGE	AVAILABLE RANGE	REDUNDANCY	LOOP SENSOR ID	LOOP POWER SUPPLY	INDICATOR ID/ LOCATION	RECORDER ID/ LOCATION	COMPUTER INPUT AVAILABLE	EQ	SEISMIC	QA	REMARKS				
C12	CONTAINMENT AND DRYWELL OXYGEN CONCENTRATION (FOR INERTED CONTAINMENT PLANTS)	1/1	0 to 10-VOL-%(CAPABILITY OF OPERATING FROM -5 psig TO DESIGN PRESSURE)	0% to 10% to 25%	YES	SAH VG-5A&B	PP-89 AC-DP-5	INDICATOR (NO ID)/CAD PNL A&B	SR VG-6A&B/ CAD PNL A&B	YES	YES	YES	YES	NOTE C1,C5				
C13	CONTAINMENT EFFLUENT RADIOACTIVITY - NOBLE GASES (FROM IDENTIFIED RELEASE POINTS INCLUDING STANDBY GAS TREATMENT SYSTEM VENT)	3/-	1E-6 uCi/cc to 1E-2 uCi/cc	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NOTE C8				
C14	EFFLUENT RADIOACTIVITY - NOBLE GASES (FROM BUILDINGS OR AREAS WHERE PENETRATIONS AND HATCHES ARE LOCATED, e.g. SECONDARY CONTAINMENT AND AUXILIARY BUILDINGS AND FUEL HANDLING BUILDINGS THAT ARE IN DIRECT CONTACT WITH PRIMARY CONTAINMENT)	2/-	1E-6 uCi/cc to 1E+3 uCi/cc	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NOTE C8				

NOTES:

- C1 FULLY SATISFIES THE REQUIREMENTS SPECIFIED BY RG 1.97.
- C2 SATISFIES THE INTENT OF THE REQUIREMENTS SPECIFIED BY RG 1.97 ON A PLANT SPECIFIC BASIS. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.
- C3 THERE IS NO INSTRUMENTATION DIRECTLY ASSOCIATED WITH THIS PARAMETER. THE SAMPLE ANALYSIS IS PERFORMED BY THE CHEMISTRY & HEALTH PHYSICS DEPARTMENT.
- C4 NOT REQUIRED AT THIS TIME (REFER TO SSCY 82-111). WATER LEVEL ISSUES HAVE BEEN ADDRESSED IN VYs RESPONSE TO GENERIC LETTER 84-23. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.
- C5 DESIGN PRESSURE IS 56 PSIG.
- C6 TECH SPEC LIMIT IS 3X BACKGROUND. TYPICALLY, BACKGROUND DOES NOT EXCEED 300 mR/HR.
- C7 LEVELS ARE APPROXIMATE. BOTTOM OF ECCS SUCTION IS 2'. NORMAL LEVEL IS 12'.
- C8 INDIVIDUAL MONITORING OF THIS PARAMETER IS NOT APPLICABLE. INCLUDED IN ITEM E8. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.
- C9 PER THE VERMONT YANKEE EQ MATRIX THESE DEVICES ARE CATEGORY 'C'. AS SUCH, THIS EQUIPMENT WILL EXPERIENCE HARSH ENVIRONMENTAL CONDITIONS WHICH IT NEED NOT FUNCTION FOR MITIGATION OF THE ACCIDENT AND WHOSE FAILURE DURING THE ACCIDENT IS NOT DETRIMENTAL TO PLANT SAFETY OR ACCIDENT MITIGATION. THEREFORE, THIS EQUIPMENT NEED NOT BE QUALIFIED FOR THE ACCIDENT.
- C10 TORUS WATER LEVEL IS RELIED UPON TO PROVIDE INDICATION OF SUMP LEVEL OVERFLOW. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT. CATEGORY 3 SUMP LEVEL CONTROLS ARE RELIED ON.

[illegible]

RG 1.97 VARIABLE MATRIX											TYPE "D" VARIABLES					DOCUMENTATION/QUALIFICATION			
VARIABLE ID	VARIABLE DESCRIPTION	CATEGORY REQUIRED/ COMMITTED	REQUIRED RANGE	AVAILABLE RANGE	REDUNDANCY	LOOP SENSOR ID	LOOP POWER SUPPLY	INDICATOR ID/ LOCATION	RECORDER ID/ LOCATION	COMPUTER INPUT AVAILABLE	EQ	SEISMIC	QA	REMARKS					
D12	ISOLATION CONDENSER SYSTEM VALVE POSITION	2/-	OPEN OR CLOSED	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NOTE D9					
D13	RCIC FLOW	2/2	0 to 110% DESIGN FLOW	0 to 500 gpm	N/R	FT 13-58	VITAL ac	FI 13-91-1/ CRP 9-4	NONE	YES	NO	N/R	YES	NOTE D2,D10					
D14	HPCI FLOW	2/2	0 to 110% DESIGN FLOW	0 to 5000 gpm	N/R	FT 23-82	DC-1C	FI 23-108-1/ CRP 9-3	NONE	YES	NO	N/R	YES	NOTE D2,D11					
D15	CORE SPRAY SYSTEM FLOW	2/3	0 to 110% DESIGN FLOW	0 to 5000 gpm	N/R	FT 14-40A&B	INSTR ac	FI 14-50A&B/ CRP 9-3	NONE	YES	N/R	N/R	N/R	NOTE D2, D4, D12					
D16	LPCI SYSTEM FLOW	2/2	0 to 110% DESIGN FLOW	0 to 20000 gpm	N/R	FT 10-109A&B	INSTR ac	FI 10-139A&B/ CRP 9-3	FR 10-143/ CRP 9-3	YES	YES	N/R	YES	NOTE D1, D4, D14					
D17	SLCS FLOW	2/3	0 to 110% DESIGN FLOW	0 to 2000 psig	N/R	PT 11-52	INSTR ac	PI 11-65/ CRP 9-5	NONE	YES	N/R	N/R	N/R	NOTE D2,D15					
D18	SLCS STORAGE TANK LEVEL	2/3	TOP to BOTTOM	0 to 127.5"	N/R	LT 11-45	INSTR ac	LI 11-66/ CRP 9-5	NONE	YES	N/R	N/R	N/R	NOTE D2,D16					
RESIDUAL HEAT REMOVAL (RHR) SYSTEMS																			
D19	RHR SYSTEM FLOW	2/2	0 to 110% DESIGN FLOW	0 to 20000 gpm	N/R	FT 10-109A&B	INSTR ac	FI 10-139A&B/ CRP 9-3	FR 10-143/ CRP 9-3	YES	YES	N/R	YES	NOTE D1, D4, D14					
D20	RHR HEAT EXCHANGER OUTLET TEMPERATURE	2/3	40 F to 350 F	0 to 300 F	N/R	TE 10-93A&B TE 10-95A&B	INSTR ac	NONE	TRS 23-115/ CRP 9-21	YES	NO	N/R	YES	NOTE D2,D17					
COOLING WATER SYSTEM																			
D21	COOLING WATER TEMPERATURE TO ESF SYSTEM COMPONENTS	2/3	40 F to 200 F	0 to 600 F	N/R	TE 10-94A&B	INSTR ac	NONE	TRS 23-115/ CRP 9-21	YES	NO	N/R	YES	NOTE D2,D17					
D22	COOLING WATER FLOW TO ESF SYSTEM COMPONENTS	2/3	0 to 110% DESIGN FLOW	0 to 4000 gpm	N/R	FT 10-97A&B	INSTR ac	FI 10-132A&B/ CRP 9-3	NONE	YES	N/R	N/R	N/R	NOTE D2,D18					
RADWASTE SYSTEMS																			
D23	HIGH RADIOACTIVITY LIQUID TANK LEVEL																		
A	WASTE COLLECTION TANK	3/3	TOP to BOTTOM	0 to 140"	N/R	LT 20-369	INSTR ac	NONE	LRS 20-392/ RACK 25-17	NONE	N/R	N/R	N/R	NOTE D1,D8					
B	WASTE SURGE TANK	3/3	TOP to BOTTOM	0 to 336"	N/R	LT 20-395	INSTR ac	NONE	LRS 20-392/ RACK 25-17	NONE	N/R	N/R	N/R	NOTE D1,D8					

RG 1.97 VARIABLE MATRIX											DOCUMENTATION/QUALIFICATION			
TYPE "D" VARIABLES														
VARIABLE ID	VARIABLE DESCRIPTION	CATEGORY REQUIRED/ COMMITTED	REQUIRED RANGE	AVAILABLE RANGE	REDUNDANCY	LOOP SENSOR ID	LOOP POWER SUPPLY	INDICATOR ID/ LOCATION	RECORDER ID/ LOCATION	COMPUTER INPUT AVAILABLE	EQ	SEISMIC	QA	REMARKS
C	FLOOR DRAIN COLLECTION TANK	3/3	TOP to BOTTOM	0 to 140"	N/R	LT 20-420	INSTR ac	NONE	LRS 20-419/ RACK 25-17	NONE	N/R	N/R	N/R	NOTE D1,D8
D	FLOOR DRAIN SAMPLE TANK	3/3	TOP to BOTTOM	0 to 250"	N/R	LT 20-437	INSTR ac	NONE	LRS 20-435/ RACK 25-17	NONE	N/R	N/R	N/R	NOTE D1,D8
E	WASTE SAMPLE TANK 16A	3/3	TOP to BOTTOM	0 to 215"	N/R	LT 20-388A	INSTR ac	NONE	LRS 20-386/ RACK 25-17	NONE	N/R	N/R	N/R	NOTE D1,D8
F	WASTE SAMPLE TANK 16B	3/3	TOP to BOTTOM	0 to 215"	N/R	LT 20-388B	INSTR ac	NONE	LRS 20-386/ RACK 25-17	NONE	N/R	N/R	N/R	NOTE D1,D8
VENTILATION SYSTEMS														
D24	EMERGENCY VENTILATION DAMPER POSITION	2/2	OPEN-CLOSED STATUS	OPEN-CLOSED	N/R	SJ-9 10,11, & 12	AC-DP-5 PP-9A	LIGHTS/ CRP 9-26	NONE	YES	NO	N/R	YES	NOTE D2,D13
POWER SUPPLIES														
D25	STATUS OF STANDBY POWER AND OTHER ENERGY SOURCES IMPORTANT TO SAFETY (ELECTRIC, HYDRAULIC, PNEUMATIC) (VOLTAGES, CURRENTS, PRESSURES)													
A	4160 V EMERGENCY BUS 3 (VOLTAGE)	2/2	PLANT SPECIFIC	0 to 5000V ac	N/R	EI-20	SOURCE	EI-20/ CRP 9-8	NONE	YES	NO	N/R	YES	NOTE D2,D13
B	4160 V EMERGENCY BUS 4 (VOLTAGE)	2/2	PLANT SPECIFIC	0 to 5000V ac	N/R	EI-21	SOURCE	EI-21/ CRP 9-8	NONE	YES	NO	N/R	YES	NOTE D2,D13
C	DG 1-1A (WATTS)	2/2	PLANT SPECIFIC	0 to 5000 kW	N/R	EI-43	SOURCE	EI-43/ CRP 9-8	NONE	YES	NO	N/R	YES	NOTE D2,D13
D	DG 1-1B (WATTS)	2/2	PLANT SPECIFIC	0 to 5000 kW	N/R	EI-42	SOURCE	EI-42/ CRP 9-8	NONE	YES	NO	N/R	YES	NOTE D2,D13
E	DG 1-1A (FREQUENCY)	2/2	PLANT SPECIFIC	56 to 65 Hz	N/R	EI-36	SOURCE	EI-36/ CRP 9-8	NONE	YES	NO	N/R	YES	NOTE D2,D13
F	DG 1-1B (FREQUENCY)	2/2	PLANT SPECIFIC	56 to 65 Hz	N/R	EI-35	SOURCE	EI-35/ CRP 9-8	NONE	YES	NO	N/R	YES	NOTE D2,D13
G	125V dc DIST PNL DC-1 (VOLTAGE)	2/2	PLANT SPECIFIC	0 to 150V dc	N/R	DC-1-VM	SOURCE	DC-1-VM/ LOCAL-CBL VLT	NONE	YES	NO	N/R	YES	NOTE D2,D13
H	125V dc DIST PNL DC-2 (VOLTAGE)	2/2	PLANT SPECIFIC	0 to 150V dc	N/R	DC-2-VM	SOURCE	DC-2-VM/ LOCAL-CBL VLT	NONE	YES	NO	N/R	YES	NOTE D2,D13
I	125V dc BATTERY BUS D-2AS (VOLTAGE)	2/2	PLANT SPECIFIC	0 to 150V dc	N/R	EI-368D	SOURCE	EI-368D/ CRP 9-8	NONE	YES	NO	N/R	YES	NOTE D2,D13, D19
J	MCC 85A (VOLTAGE) (UPS 1A)	2/2	PLANT SPECIFIC	0 to 600V ac	N/R	INDICATOR (NO ID ASSIGNED)	SOURCE	INDICATOR (NO ID)/CRP 9-3	NONE	YES	YES	N/R	YES	NOTE D1

RG 1.97 VARIABLE MATRIX		TYPE "D" VARIABLES									DOCUMENTATION/QUALIFICATION			
VARIABLE ID	VARIABLE DESCRIPTION	CATEGORY REQUIRED/ COMMITTED	REQUIRED RANGE	AVAILABLE RANGE	REDUNDANCY	LOOP SENSOR ID	LOOP POWER SUPPLY	INDICATOR ID/ LOCATION	RECORDER ID/ LOCATION	COMPUTER INPUT AVAILABLE	EQ	SEISMIC	QA	REMARKS
D25	(CONTINUED)													
K	MCC 89B (VOLTAGE) (UPS 1B)	2/2	PLANT SPECIFIC	0 to 600V ac	N/R	INDICATOR (NO ID ASSIGNED)	SOURCE	INDICATOR (NO ID)/CRP 9-3	NONE	YES	YES	N/R	YES	NOTE D1
L	120/240V UNINTER- UPTABLE ac (VOLTAGE)	2/2	PLANT SPECIFIC	0 to 150V ac	N/R	EI-68	SOURCE	EI-68/ CRP 9-8	NONE	NONE	NO	N/R	YES	NOTE D2,D13,D20
M	120/240V UNINTER- UPTABLE ac (FREQUENCY)	2/2	PLANT SPECIFIC	55 to 65 Hz	N/R	EI-67	SOURCE	EI-67/ CRP 9-8	NONE	NONE	NO	N/R	YES	NOTE D2,D13
N	ECCS 24V dc BUS A (VOLTAGE)	2/2	PLANT SPECIFIC	0 to 50V dc	N/R	EI 2-3-60A	SOURCE	EI 2-3-60A/ CRP 9-4	NONE	YES	YES	N/R	YES	NOTE D1
O	ECCS 24V dc BUS B (VOLTAGE)	2/2	PLANT SPECIFIC	0 to 50V dc	N/R	EI 2-3-60B	SOURCE	EI 2-3-60B/ CRP 9-4	NONE	YES	YES	N/R	YES	NOTE D1

NOTES:

D1 FULLY SATISFIES THE REQUIREMENTS SPECIFIED BY RG 1.97

D2 SATISFIES THE INTENT OF THE REQUIREMENTS SPECIFIED BY RG 1.97 ON A PLANT SPECIFIC BASIS. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.

D3 DESIGN IS 6.4E+6 LBM/HR FOR TWO PUMPS, OR 3.2E+6 LBM/HR PER EACH FLOW LOOP.

D4 DUPLICATE CHANNELS FOR INFORMATION. COMMON POWER SOURCE USED FOR BOTH CHANNELS.

D5 HEIGHT OF CONDENSATE STORAGE TANK IS FROM 0 to 38'-3".

D6 DESIGN IS 7000 GPM (TOTAL OF DRYWELL AND TORUS SPRAYS).

D7 DESIGN IS 56 PSIG.

D8 WIDE RANGE LEVEL MONITORING ESSENTIALLY COVERS THE REQUIRED RANGE OF TOP to BOTTOM.

D9 NOT APPLICABLE TO VERMONT YANKEE. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.

D10 DESIGN IS 400 GPM.

D11 DESIGN IS 4250 GPM.

D12 DESIGN IS 3000 GPM.

D13 ENVIRONMENTAL QUALIFICATION DOES NOT APPLY. THESE DEVICES AND THEIR ASSOCIATED CABLES AND COMPONENTS ARE LOCATED IN A NON-HARSH ENVIRONMENT.

D14 DESIGN IS 14000 GPM.

D15 PUMP OUTLET PRESSURE IS USED IN LIEU OF PUMP DISCHARGE FLOW.

D16 HEIGHT OF SLCS TANK IS 11'-6" (132.5").

D17 ALTERNATE VARIABLES RELIED UPON FOR THIS PARAMETER. REFER TO TABLE 2 OF TEXT.

D18 DESIGN IS 2700 GPM (RHRSW FLOW).

D19 EI-368D IS LOCATED ON CRP 9-8 ON THE GROUND BUS DETECTION PANEL.

D20 METER EI-68 MONITORS ONE LINE TO NEUTRAL IN A 240 V_{ac} CIRCUIT.

[illegible]

[illegible]

NOTE E11

NOTES:

E1 FULLY SATISFIES THE REQUIREMENTS SPECIFIED BY RG 1.97.
E2 SATISFIES THE INTENT OF THE REQUIREMENTS SPECIFIED BY RG 1.97 ON A PLANT SPECIFIC BASIS. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.
E3 VERMONT YANKEE HAS A MARK I CONTAINMENT.
E4 THIS PARAMETER IS NOT APPLICABLE. EFFLUENT DISCHARGE IS THROUGH A COMMON VENT. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.
E5 THIS PARAMETER IS NOT APPLICABLE. REACTOR SHIELD ANNULUS IS NOT PART OF THE VERMONT YANKEE DESIGN.
E6 DRYWELL PURGE/STANBY GAS IS INCLUDED IN THE COMMON VENT DISCHARGE. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.
E7 A LOW RANGE OF 10 to 10E+7 CPM IS PROVIDED. OF THAT RANGE, 10 to 10E+6 CPM EQUATES TO 1E-7 to 1E-1 uCi/cc; A HIGH RANGE OF 1 to 10E+7 mCi/Hr EQUATES TO 1E-2 to 1E+5 uCi/cc.
E8 THERE IS NO INSTRUMENTATION DIRECTLY ASSOCIATED WITH THIS PARAMETER. THE SAMPLE ANALYSIS IS PERFORMED BY THE CHEMISTRY & HEALTH PHYSICS DEPARTMENT.
E9 THERE IS A PRIMARY TOWER AND A BACK-UP TOWER.
E10 ENVIRONMENTAL QUALIFICATION DOES NOT APPLY. THESE DEVICES ARE LOCATED IN A NON-HARSH ENVIRONMENT (CONTROL ROOM).
E11 THIS PARAMETER PREVIOUSLY DETERMINED TO PROVIDE INCONCLUSIVE RESULTS. REFER TO ATTACHMENT 'A', TABLE 2 OF TEXT.

ATTACHMENT C

REGULATORY GUIDE 1.97 DESIGN & QUALIFICATION

CRITERIA FOR INSTRUMENTATION (SUMMARY)

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RG 1.97 Design & Qualification Criteria
For Instrumentation (Summary)

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Design & qualification requirements are stipulated in RG 1.97 Revision 3 (Table 1). Vermont Yankee satisfies those requirements as summarized below. The description applies in accordance with the RG 1.97 Category Vermont Yankee has committed to. Programs and criteria discussed were in place and available for review during the Vermont Yankee RG 1.97 Audit No. 50-271/91-08 dated April 10, 1991. Revisions which have taken place did not change the intent of what was audited. Approved exceptions to the RG 1.97 requirements are discussed in Attachment A.

<u>Item</u>	<u>Requirement</u>	<u>Vermont Yankee Position</u>
1.	Equipment Qualification	<p>RG 1.97 Category 1 and selected Category 2 instrumentation are included in the Vermont Yankee Environmental Qualification Program. Not all RG 1.97 Category 2 instrumentation is Environmentally Qualified (see exceptions in Attachment A). Equipment located in a Post-accident harsh environment are environmentally qualified. Equipment located in a non-harsh environment do not require environmental qualification, but are qualified for the range of environments in which they will be exposed. The time required to be environmentally qualified is determined in this program.</p> <p>RG 1.97 Category 3 instrumentation does not require environmental qualification.</p>
2.	Redundancy	<p>RG 1.97 Category 1 instrumentation is required to be redundant. This instrumentation has been evaluated to ensure that a single failure will not result in information ambiguities that could lead operators to defeat or fail to accomplish a required safety function. One or more of the following means is available to access plant status of the affected parameter:</p> <ul style="list-style-type: none">• Cross checking with an independent channel that monitors a different variable bearing a known relationship to the failed monitoring channel.• Perturbing the measured variable to determine the failed channel by observing the response on each instrument.• Operating procedures. <p>It should be noted that RG 1.97 Category 1 separation at Vermont Yankee is in accordance with the Vermont Yankee <u>Separation Criteria for Reactor Protection, Engineered Safety Feature and Auxiliary Support Systems-Related Electrical Equipment and Wiring</u>. This is the criteria utilized during the original design and construction of the plant and has been updated to include RG 1.97 considerations. Redundant instrument loops with separate and diverse power supplies are provided. Its use in this application is, therefore, acceptable.</p> <p>RG 1.97 criteria for redundancy is focused toward classic two train instrumentation loops. PCIS valves (and associated valve position indication) have additional criteria to consider. Physical valve redundancy is a design basis requirement for the Vermont Yankee PCIS. For the purposes of RG 1.97 PCIS valve position indication, four redundancy classes are described:</p>

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- a. Redundancy Class 1: Two isolation valves in series, each valve being powered from a different power source. Isolation valves with motor operators arranged with one in the drywell and one outside the drywell satisfy classic PCIS valve electrical redundancy (including position indication). Selected Air Operated Valves (i.e., MSIVs) also satisfy this type of electrical redundancy.
- b. Redundancy Class 2: Two redundant process trains with each train powered from a different source than the other; each train containing two isolation valves in series, both valves being powered from the same source. These PCIS valve isolation trains have an equally important function to remain operable. In these cases, the physical redundancy is maintained but the electrical redundancy is satisfied by an alternative means. The process lines involved are small (less than 2-inches). In these cases:
 - The isolation valves are either normally closed and/or fail closed on loss of air or loss of electrical power.
 - Redundant trains (parallel process paths supporting the same function) are relied on where the need to maintain functional operability on a loss of one train of electrical power is needed. Each train has a power source redundant to the other. Physical redundancy is still applied, but both PCIS valves are powered from a common source.
- c. Redundancy Class 3: A single process train with two (redundant) valve isolation, both valves being powered from a common source. In cases where train redundancy is not required but reliability is desired, physical redundancy is maintained but electrical redundancy is not. If electrical redundancy were applied in these cases, a loss of electrical power in either power source would cause the associated PCIS valve to 'fail closed' and the process function would be lost. The process lines involved are small (less than 2-inches). In these cases:
 - The isolation valves are either normally closed and/or fail closed on loss of air or loss of electrical power.
 - There is no redundant train to support the process function, but the function is not critical to immediate plant operation.
- d. Redundancy Class 4: A single isolation valve in series with a check valve or a single isolation valve. The isolation valve receives motive power from only one source, the check valve receives no motive power and provides no position indication.

In all four redundancy classes, PCIS valve electrical control power is the same as the position indication power. This is important to ensure that the operator is not provided ambiguous information. On a loss of electrical power, the valve is either normally closed and/or will fail closed and position indication will be lost. This loss of position indication implies the valves have closed. Single failure criteria provides reasonable assurance that even if one of the PCIS valves failed to close, the second physically redundant valve would close.

Category 3 instrumentation does not require redundancy.

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3. Power Source

Station standby power sources are applied to Category 1 instrumentation. Standby power typically has battery or Emergency Diesel Generator back-up. Vermont Yankee credits diverse power sources to meet the intent of battery back-up. This includes the Instrument ac (normally supplied from an SII power source) and Vital ac (normally supplied from an SI power source) buses.

Vital ac is fed from an uninterruptible power supply (Vital MG-set). On a loss of normal ac supply, the MG-set continues to provide ac power to the Vital bus uninterrupted. On a loss of the Vital MG-set, a bus transfer occurs, powering the Vital bus from an SII source, the same power train as normal Instrument ac. The momentary interruption in power will be tolerable to the operator.

Instrument ac has an SI source as its back-up. On a loss of Instrument ac, the bus is automatically transferred to the SI source. The momentary interruption in power will be tolerable to the operator.

Category 2 power sources are highly reliable power sources. (See D25). Instrumentation meeting this requirement will either be powered from sources equivalent to Category 1 or be diesel backed. Any momentary interruption in power will be tolerable to the operator. The power sources to these instruments will not be load shed.

Category 3 instrumentation have no specific requirements. They will be provided with a power source commiserate with their importance.
4. Channel Availability

Selected Category 1 & 2 instrumentation required to be available during normal operation are addressed in the Vermont Yankee Technical Specifications, Section 3.2.6. Time out of service is limited by surveillance requirements with appropriate LCO statements. Category 3 instrumentation have no specific requirements.
5. Quality Assurance

Quality Assurance (QA) requirements are applied to safety related equipment and selected non-safety related equipment as determined in the Vermont Yankee Safety Classification Manual (SCM). For RG 1.97 instrumentation, all instrumentation determined to be Safety Class requires QA. This would include all Category 1 instruments.

Certain Category 2 variables are not as important as others and, based on evaluation (per the SCM), an items safety classification (Safety Class or Non-Nuclear Safety) is determined. An item determined to be Safety Class will require QA; Other QA requirements (OQA) for Non-Nuclear Safety related items will be determined on a component specific basis (which could include no QA).

Category 3 instrumentation have no specific requirements.

Attachment 'B' indicates instrumentation requiring QA.
6. Display and Recording

Continuous real time display for Category 1 parameters is provided by Control Room indication (indicators and/or recorders) and computer display. A review of plant-specific requirements indicates that the only parameters which require trend recording are reactor pressure and reactor water level. However, a variety of additional recording and plant computer inputs are available. Category 2 and 3 instrumentation is either displayed or recorded continuously or on demand. Many of the signals are provided to the ERFIS computer system. Radioactive effluents and meteorological monitors are continuously recorded and/or provided to ERFIS.

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| 7. | Range | The ranges committed to are accomplished using one or more instruments. Overlapping of ranges is applied as deemed appropriate to monitor the variable. Where multiple instruments are used to cover the entire range, the requirements for each instrument can vary from each other. An instrument used to cover the low range might only be relied on for conditions representative of normal operating conditions, where the high range instrument might be required to provide its information during harsh environmental conditions. In this situation, the requirements applied to the low range instrument would not be as stringent as those applied to the high range instrument. This philosophy applies to RG 1.97 Categories 1, 2, and 3. |
| 8. | Equipment Identification | Selected Category 1 and Category 2 instrumentation have a "red dot" applied in the vicinity of the readout device (in the Control Room). Category 3 instrumentation have no such means of equipment identification attributable to RG 1.97 requirements. |
| 9. | Interfaces | Electrical isolation (safety class circuits from non-safety class circuits) and cable separation/routing is provided in accordance with the Vermont Yankee <u>Separation Criteria for Reactor Protection, Engineered Safety Feature and Auxiliary Support Systems-Related Electrical Equipment and Wiring</u> . In this application, circuits are isolated using safety class fuses, safety class circuit breakers (fuse & breaker coordination) and safety class isolators. |
| 10. | Servicing, Testing, and Calibration | <p>Category 1, 2, and 3 instrumentation is maintained commiserate with its importance.</p> <ul style="list-style-type: none">• Selected instrumentation is included in the Vermont Yankee Technical Specifications, Section 3.2.6. Surveillance requirements and out of service times are defined. Other instrumentation is maintained by approved procedures or by other plant approved methods.• Isolation devices are located in areas accessible post-accident.• Control of calibration parameters is provided via the procedure change process. |
| 11. | Human Factors | <p>A human factors review and evaluation has been applied to the Control Room design, the panel layouts, and the instrumentation needs of the operator. Modifications have been completed which incorporate upgrades to address deficiencies in this area.</p> <p>In most cases, the instrumentation used during normal plant operation has been designated for use post-accident.</p> |
| 12. | Direct Measurement | To the extent practical, direct parameter measurement has been applied. Indirect measurement is relied on where it is not practical or reasonable to use direct measurement. In those cases, Operator training and experience supplements the use of indirect measurement. |