VERMONT YANKEE
NUCLEAR POWER CORPORATION

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January 14, 1997
BVY 97-7
TDL 97-001

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

Reference: (a) License No. DPR-28 (Docket No. 50-271)

Subject: Requested Testing Abstracts for Vermont Yankee Simulator Upgrades

As discussed per our phone conversation of December 18, 1996, enclosed are the Vermont Yankee Discrepancy Reports and Test Abstracts for the following Simulator Upgrade Projects:

Attachment 1	Encore to PC conversion, Core and Thermal Hydraulics DR #94-0194 and DR #94-0181
Attachment 2	Primary Containment DR #91-0068
Attachment 3	Secondary Containment DR #93-0003

If you require any further information or have any questions regarding these upgrade projects, please call me at (802) 258-4144.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Mark R. Krider
Training Support Supervisor

Enclosures

c: USNRC Regional Administrator, Region I
USNRC Resident Inspector - VYNPS
USNRC Project Manager - VYNPS
USNRC Frank Collins, Operator Examiner

A005

ATTACHMENT 1

VERMONT YANKEE SIMULATOR

DISCREPANCY REPORT 94-0194

TITLE: CONVERT SOFTWARE FROM ENCORE TO PENTIUM

STATE OF SIMULATOR:

REFERENCE:

DESIGN CHANGE:

IC:

TEST:

DISCREPANCY DESCRIPTION:
Convert all Simulator modules from Encore to Pentium platform.

EXPECTED RESULTS:
Simulator operate identically after conversion as before.

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		DATE	# SHEETS ATTACHED
ORIGINATOR:	JOHN T. HUDACHEK	12/20/94	0
COGNIZANT ENGINEER:	JOHN T. HUDACHEK	12/20/94	0
HARDWARE ENGINEER:			
FIDELITY ASSESSOR:	DAVID E. TUTTLE	12/20/94	0

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PRIORITY: Medium DUE DATE:
VALID DR: Yes JOHN T. HUDACHEK DATE: 02/13/96
COST JUSTIFIED:Yes JOHN T. HUDACHEK DATE: 02/13/96

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WORK COMPLETED: JOHN T. HUDACHEK DATE: 02/13/96
DRAWINGS: None
DOCUMENTATION DONE: JOHN T. HUDACHEK DATE: 02/14/96

TESTED: Dave E. Tuttle DATE: 02/16/96
DAVID E. TUTTLE

CLOSED: John T. Hudachek DATE: 02/16/96
JOHN T. HUDACHEK

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Acceptance Test

1. SUCCESFUL COMPLETION OF ALL ANSI REQUIRED TESTS (ALL MALFUNCTIONS TO BE TESTED)

ATTACHMENT 1

VERMONT YANKEE SIMULATOR

DISCREPANCY REPORT 94-0181

TITLE: CORE & THERMAL HYDRAULICS UPGRADE

STATE OF SIMULATOR:

REFERENCE: APRIL 13, 1994 SPECIFICATION

DESIGN CHANGE:

IC:

TEST:

DISCREPANCY DESCRIPTION:
Replace current core & thermal hydraulics modes with state-of-the-art advanced 3-D, multinodal, fully dynamic models.

EXPECTED RESULTS:
See April 13, 1994 Specification.

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		DATE	# SHEETS ATTACHED
ORIGINATOR:	JOHN T. HUDACHEK	11/14/94	0
COGNIZANT ENGINEER:	JOHN T. HUDACHEK	11/14/94	0
HARDWARE ENGINEER:			
FIDELITY ASSESSOR:	DAVID E. TUTTLE	11/14/94	0

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PRIORITY: Medium DUE DATE:
VALID DR: Yes JOHN T. HUDACHEK DATE: 11/14/94
COST JUSTIFIED:Yes JOHN T. HUDACHEK DATE: 11/14/94

****

WORK COMPLETED: JOHN T. HUDACHEK DATE: 02/13/96
DRAWINGS: None
DOCUMENTATION DONE: JOHN T. HUDACHEK DATE: 02/13/96

TESTED: David E. Tuttle DATE: 02/16/96
DAVID E. TUTTLE

CLOSED: John T. Hudachek DATE: 02/16/96
JOHN T. HUDACHEK

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Discrepancy Report 94-0181 Page 5 of 6 Originated by:JTHU 11/14/94
Title:CORE & THERMAL HYDRAULICS UPGRADE CE:JTHU HE: FA:DET

Acceptance Test

1. PERFORM SUCCESFUL STARTUP AND SHUTDOWN OF SIMULATOR USING VY OP'S
2. PERFORM SUCCESFUL SCRAM AND RECOVERY USING VY OP'S
3. PERFORM SUCCESFULLY ANSI REQUIRED TRANSIENT TESTING
4. INSURE SIMULATOR RUNS IN REAL TIME WITH CORE/THERMAL MODELS INSTALLED

VERMONT YANKEE PLANT SIMULATOR
UPGRADE PERFORMANCE TESTING
ATTACHMENT 1

The following tests were performed using simulator procedure SIM-371, Simulator Performance Testing with the new operating environment, reactor core and thermal hydraulics models fully integrated:

1. ANSI/ANS 3.5 B1.1 Startup, Shutdown and Steady State Tests

   a. Startup from cold to rated power

   b. Shutdown to cold conditions from rated power

   c. Recovery from plant Scram to rated power

   d. Critical (Heat Balance) and non-critical data comparisons at three power levels

   e. One hour stability test

2. ANSI/ANS 3.5 3.1.1 Normal Plant Evolutions

   a. Safety Related Systems Surveillance

3. ANSI/ANS 3.5 4.3 Simulator Operating Limits

   a. Simulator Out of Limits Test

4. ANSI/ANS 3.5 b1.2 Transient Performance Tests

   a. ANSI B1.2(1) Manual Scram

   b. ANSI B1.2(2) Simultaneous Trip Of All Feedwater Pumps

   c. ANSI B1.2(3) Simultaneous Closure Of All Main Steam Isolation Valves

   d. ANSI B1.2(4) Simultaneous Trip Of All Recirc Pumps

VERMONT YANKEE PLANT SIMULATOR
UPGRADE PERFORMANCE TESTING
ATTACHMENT 1
(Continued)

e. ANSI B1.2(5) Single Recirculation Pump Trip

f. ANSI B1.2(6) Main Turbine Trip

g. ANSI B1.2(7) Maximum Rate Power Ramp

h. ANSI B1.2(8) Reactor Coolant System Rupture

i. ANSI B1.2(9) Maximum Unisolable Main Steam Line Rupture

j. ANSI B1.2(10) Simultaneous Closure of All Main Steam Isolation Valves with a Stuck Open Safety Relief Valve

5. Computer Real Time Verification

6. ANSI/ANS 3.5 A3.4 Malfunction Tests

   a. All malfunctions were retested.

Open item upgrade performance testing failures remaining as of this submittal.

None

ATTACHMENT 2

VERMONT YANKEE SIMULATOR

DISCREPANCY REPORT 91-0068

TITLE: NEW CONTAINMENT MODEL

STATE OF SIMULATOR:

REFERENCE:

DESIGN CHANGE:

IC:

TEST:

DISCREPANCY DESCRIPTION:
DR 88-0178 89-0224 89-0101 AND GENERAL CONTAINMENT RESPONSE REQUIRE AN UPGRADE TO THE PRESENT CONTAINMENT MODEL

EXPECTED RESULTS:
NEW CONTAINMENT MODEL

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		DATE	# SHEETS ATTACHED
ORIGINATOR:	DAVID E. TUTTLE	04/05/91	0
COGNIZANT ENGINEER:	DAVID E. TUTTLE	04/05/91	0
HARDWARE ENGINEER:			
FIDELITY ASSESSOR:	MARK R. KRIDER	04/05/91	0

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PRIORITY: Medium DUE DATE:
VALID DR: Yes DAVID E. TUTTLE DATE: 03/30/92
COST JUSTIFIED:Yes JOHN T. HUDACHEK DATE: 03/30/92

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WORK COMPLETED: DAVID E. TUTTLE DATE: 03/30/92
DRAWINGS: None
DOCUMENTATION DONE: DAVID E. TUTTLE DATE: 03/30/92

TESTED: _____ DATE: 04/07/92
MARK R. KRIDER

CLOSED: _____ DATE: 04/07/92
JOHN T. HUDACHEK

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Discrepancy Report 91-0068 Page 5 of 6 Originated by:DET 04/05/91
Title:NEW CONTAINMENT MODEL CE:DET HE: FA:MRK

Acceptance Test

NEW CONTAINMENT MODEL TESTED AND EXCEPTED USING CONTAINMENT MODEL ACCEPT
ANCE TEST AFTER INSTALLATION BY GPI.

VERMONT YANKEE CONTAINMENT MODEL ACCEPTANCE TEST

INITIAL CONDITIONS

1. Unless specified elsewhere the simulator will be reset to IC-09 and left in freeze.

2. All malfunctions will be entered with a 1 min time delay.

DATA COLLECTION

1. Data will be collected for trending via "ANSISAVE" data set 3.

2. Data may also be collected from visual indication in the Simulator(charts indicators etc.).

3. Data may be monitored using ISD.

ACCEPTANCE CRITERIA

Results of tests will compare favorably with:

1. Benchmark Analysis of the Vermont Yankee Simulator performed by YAEC.

2. Plant data where applicable.

3. Best estimate when no data is available.

4. Simulation responds to normal operations in accordance with Vermont Yankee operating procedures and practices.

ACCEPTANCE TESTS

A. LARGE BREAK LOCA

1. Insert malf RR01A at 100% severity and place simulator to run.

2. Allow the simulator to run until ANSISAVE returns to the TSM prompt.

note: the simulator may be allowed to run longer to identify any adverse trends or indications.

3. Collect and analyze data.

B. UNISOLATABLE MAIN STEAMLINE LEAK

1. Insert malf MS06 at 100% severity and place simulator to run.

2. Allow the simulator to run until ANSISAVE returns to the TSM prompt.

note: the simulator may be allowed to run longer to identify any adverse trends or indications.

3. Collect and analyze data.

C. SMALL BREAK LOCA

1. Insert malf RRO1B at 10% severity and place simulator to run.

2. Allow the simulator to run until ANSISAVE returns to the TSM prompt.

note: the simulator may be allowed to run longer to identify any adverse trends or indications.

3. Collect and analyze data.

D. DBA LOCA WITH LOSS OF PWR

1. Insert malf ED17 & RR01A at 100% and place simulator to run.

2. Allow the simulator to run until ANSISAVE returns to the TSM prompt.

note: the simulator may be allowed to run longer to identify any adverse trends or indications.

3. Collect and analyze data.

E. LOSS OF DRYWELL COOLER

1. Insert malf PC03D and place simulator to run.

2. Allow the simulator to run until ANSISAVE returns to the TSM prompt.

note: the simulator may be allowed to run longer to identify any adverse trends or indications.

3. Collect and analyze data.

F. LOSS OF DRYWELL COOLERS

1. Insert malf PC03A.

1a. Insert malf PC03C on 5 min delay and place simulator to run.

2. Allow the simulator to run until ANSISAVE returns to the TSM prompt.

note: the simulator may be allowed to run longer to identify any adverse trends or indications.

3. Collect and analyze data.

G. NODAL TEMPERATURE RESPONSE

1. Place simulator to run.

2. Using the following malfunctions at low severity verify nodal temperature effects.

1a. RR01A

1b. RR01B

1c. MS06

1d. AD01A

1e. AD01B

1f. AD01C

1g. AD01D

note: initial effects should be seen in the node corresponding to the area the leak is located in and propagate into surrounding nodes in a timely manner.

H. DRYWELL DEINERTION/PURGE

1. Place simulator to run.

2. Using applicable VY procedures perform the steps necessary to deinert and purge the drywell.

3. Insure no adverse temperature/pressure effects occur.

4. Insure procedure steps can be completed in a time frame comparable to plant data.

5. Insure torus level indication responds in a manner similar to referenced plant (OP 2115 fig. I).

I. DRYWELL INERTION

1. Reset simulator to IC-07 and run.

2. Using applicable VY procedures perform the steps necessary to inert the drywell.

3. Insure no adverse temperature/pressure effects occur.

4. Insure procedure steps can be completed in a time frame comparable to plant data.

5. Insure torus level indication responds in a manner similar to referenced plant (OP 2115 fig. I).

J. HPCI FULL FLOW SURVEILLANCE TEST

1. Place simulator to run.
2. Using applicable VY procedures perform the steps necessary to complete the HPCI surv.
3. Insure containment temperature response compare favorably to plant surv. data.

K. DRYWELL SUMPS LEVEL CHECK

1. Reset simulator to IC02.
2. Insert malf FW21 at 1% and place simulator to run. note: malf severity may adjusted to insure accurate results are obtained.
3. Via ISD monitor the following:
   a. DWFDS level response
   b. DWEDS level response
   c. Drywell level response
   d. Torus level response
   e. Drywell temp and press response
   f. Torus temp and press response
4. Test to continue until liquid level in Drywell overflows into Torus as evidenced by increase in Torus level with a halt in Drywell level increase.

L. DRYWELL SPRAY INITIATION (LIQUID BREAK)

1. Insert malf's RR01A,HP01,RC01,CD01A-C,RH07A-B and place simulator to run.
2. After drywell press has increase above 20psig initiate drywell spray via "A" RHR loop
3. Monitor drywell temp and press response from panel indications.

M. DRYWELL SPRAY INITIATION (STEAM BREAK)

1. Insert malf's MS06,HP01,RC01,CD01A-C,RH07A-B and palce simulator to run.
2. After drywell press has increase above 20psig initiate drywell spray via "A" RHR loop
3. Monitor drywell temp and press response from panel indications.

N. FEEDWATER BREAK INSIDE DRYWELL

1. Insert malf FW27A and place simulator to run.
2. Allow the simulator to run until ANSISAVE returns to the TSM prompt.

   note: the simulator may be allowed to run longer to identify any adverse trends or indications.

3. Collect and analyze data.

O. CONTAINMENT FLOODING (NO POWER)

1. Reset simulator to IC-02
2. Insert malf RR01A place simulator to run.
3. Allow simulator to run until drywell is flooded to TAF or higher.
4. Monitor panel indications insuring no adverse Containment temp or press effects.

P. CONTAINMENT FLOODING (FULL POWER)

1. Insert malf RR01A place simulator to run.
2. Allow simulator to run until drywell is flooded to TAF or higher.
3. Monitor panel indications insuring no adverse Containment temp or press effects.

Q. CONTAINMENT GAS AND PARTICULATE RAD MONITOR

1. Insert malf RX01 at .05% and place simulator to run.
2. Insure gas and particulate rad monitor responds to increase drywell activity.

R. MODEL STRESS TEST (FOR WANT OF A NAME)

1. Insert malf RD12A/B (atws) and RR01B and place simulator to run.
2. Maintain this condition for 1 hr.
3. Insure simulator model doesn't cause an abort or computer fault.

ATTACHMENT 3

VERMONT YANKEE SIMULATOR

DISCREPANCY REPORT 93-0003

TITLE: NEW SECONDARY CONTAINMENT MODEL

STATE OF SIMULATOR:

REFERENCE:

DESIGN CHANGE:

IC:

TEST:

DISCREPANCY DESCRIPTION:
THE PRESENT SECONDARY MODEL IS INADEQUATE FOR THE LATEST TRAINING REQUIREMENTS

EXPECTED RESULTS:
A NEW IMPROVED MODEL

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		DATE	# SHEETS ATTACHED
ORIGINATOR:	DAVID E. TUTTLE	01/08/93	0
COGNIZANT ENGINEER:	DAVID E. TUTTLE	01/08/93	0
HARDWARE ENGINEER:			
FIDELITY ASSESSOR:	ALLEN F. THOMAS	01/08/93	0

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PRIORITY: Medium DUE DATE:
VALID DR: Yes DAVID E. TUTTLE DATE: 06/02/93
COST JUSTIFIED:Yes JOHN T. HUDACHEK DATE: 06/02/93

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WORK COMPLETED: DAVID E. TUTTLE DATE: 06/07/93
DRAWINGS: None
DOCUMENTATION DONE: DAVID E. TUTTLE DATE: 06/07/93

TESTED: Allen F. Thomas DATE: 08/27/93
ALLEN F. THOMAS

CLOSED: John T. Hudachek DATE: 09/08/93
JOHN T. HUDACHEK

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Discrepancy Report 93-0003 Page 5 of 6 Originated by:DET 01/08/93
Title:NEW SECONDARY CONTAINMENT MODEL CE:DET HE: FA:AFT

Acceptance Test

1. THE ACCEPTANCE TEST FOR THIS DR WAS COMPLETED PRIOR TO ACCEPTANCE FROM GENERAL PHYSICS. THIS TEST IS AVAILABLE ON THE CORPORATE VAX DISK3[SIM.THOMAS]SECONDARYCONTAINMENT.
2. INDIVIDUAL DR'S MAY STILL BE WRITTEN IF FOUND.

VERMONT YANKEE SECONDARY CONTAINMENT ACCEPTANCE TEST

I. STABILITY RUN.

INITIAL CONDITIONS:
RESET TO IC-19.

PUT SIMULATOR IN RUN AND LET RUN FOR AN ONE(1) HOUR.

ACCEPTANCE CRITERIA:
OBSERVE NO UNEXPECTED ALARMS OR CONDITIONS OCCURED.

II. REACTOR BUILDING VENTILATION

INITIAL CONDITIONS:
RESET TO IC-19.

INPUT IDA PCR04 (RX BLDG VENT) TO 'OFF'.

ACCEPTANCE CRITERIA:

OBSERVE THRU ISD TEMPERTURE IN THE NODES INCREASED

INITIAL CONDITIONS:
RESET TO IC-19.

INPUT IDA PCR22 (RRU-5 RHRSW PUMP AREA SW-23) TO 'OFF'

STARTED RHRSW PUMPS

ACCEPTANCE CRITERIA:

OBSERVE THRU ISD THAT TEMPERATURES IN NODES INCREASED

III. MALFUNCTION TESTING

A. INITIAL CONDITION:
RESET TO IC-19.

INPUT MALF. CU02 (RWCU NON-REGEN. HEAT EXCH. LEAK) @100%
FOR 120 SECONDS.

ACCEPTANCE CRITERIA:

RBCCW SURGE TANK INCREASE

B. INITIAL CONDITIONS:
RESET TO IC-19

INPUT MALF. CU03 (RWCU LEAK UPSTREAM OF REGEN. HEAT EXCH.) @100% FOR 120 SECONDS.

ACCEPTANCE CRITERIA:

RB VENT. RAD ALARM INCREASE
RB VENT. FANS TRIP
RB TEMPERATURE INCREASE
RB/CONT. GAS/PART INCREASE

C. INITIAL CONDITIONS:
RESET TO IC-19

INPUT MALF. CU06 (LINE BREAK IN RWCU PUMP B ROOM) @100% FOR 120 SEC.

ACCEPTANCE CRITERIA:

RB VENT. FANS TRIP
RB VENT. RAD ALARM INCREASE
RB TEMPERATURE INCREASE

D. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. SW06 (RBCCW SYSTEM HEADER LEAK) @100% FOR 120 SEC.

ACCEPTANCE CRITERIA:

RBCCW SURGE TANK DECREASE
RB BLDG FLOOR AND EQUIPMENT DRAINS INCREASE

E. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. SW05A/B (RBCCW HEAT EXCH TUBE LEAK) @100% FOR 120 SECONDS.

ACCEPTANCE CRITERIA:

RBCCW SURGE TANK INCREASE

RB FLOOR AND EQUIP. DRAIN SUMPS INCREASE

F. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. SW04 (RBCCW SURGE TANK MAKEUP VALVE FAILURE) @100%.

ACCEPTANCE CRITERIA:

RBCCW SURGE TANK LEVEL INCREASE
RB FLOOR DRAIN SUMP INCREASE

G. INITIAL CONDITION:
RESET TO IC-19.

INPUT MALF. HP06 (HPCI EXH. DIAPHRAM FAILURE)

RUN HPCI FULL FLOW TEST

ACCEPTANCE CRITERIA:

RB VENT. FAN ISOLATE
RB VENT. RAD INCREASE
ARM'S INCREASE
RB TEMPERATURES INCREASE

H. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. HP11 (HPCI STEAM LEAK AFTER V23-14)

RUN HPCI FULL FLOW TEST

ACCEPTANCE CRITERIA:

RB FANS ISOLATE
RB VENT. RAD INCREASE
ARM'S INCREASE
RB TEMPERATURE INCREASE

I. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. RC06 (RCIC EXH DIAPHRAGM FAILURE)

RUN RCIC FULL FLOW TEST

ACCEPTANCE CRITERIA:

RB FANS ISOLATE
ARM'S INCREASE
RB VENT. RAD INCRASE

J. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. RC09 (RCIC STEAM LEAK AFTER V13-131)

RUN RCIC FULL FLOW TEST

ACCEPTANCE CkITERIA:

RB FANS ISOLATE
RB VENT. RAD INCREASE
ARM'S INCREASE

K. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. PC10 (SUPPESSION POOL LEAK) @100%

ACCEPTANCE CRITERIA:

RB EQUIP/FLOOR DRAINS INCREASE

L. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. PC06 (PRIMARY CONTAINMENT RUPTURE) @100%.

ACCEPTANCE CRITERIA:

RB FANS ISOLATE
RB VENT. RAD INCREASE
CONT AIR MONITOR PART. INCREASE
ARM'S INCREASE

M. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. PC07 (SECONDARY CONTAINMENT RUPTURE)

ACCEPTANCE CRITERIA:

LOST OF RX BLDG D/P

N. INITIAL CONDITIONS:
RESET IC-19.

INPUT MALF. FC01 (FUEL POOL COOLING SYSTEM LEAK) @100%.

ACCEPTANCE CRITERIA:

RB FANS ISOLATE
ARM'S INCREASE
RB FLOOR/EQUIP DRAIN SUMPS INCREASE

O. INITIAL CONDITIONS:
RESET IC-19.

INPUT MALF. MS07 (MS LINE 'B' RUPTURE IN STEAM TUNNEL) @100% FOR 120 SECONDS.

ACCEPTANCE CRITERIA:

ARM'S INCREASE
RB TEMPERATURE INCREASE
RB VENT. RAD INCREASE
RB FANS ISOLATE

P. INITIAL CONDITIONS:
RESET IC-19.

INPUT MALF. RD18A/B (SCRAM DISCH VOLUME VENT VALVE FAIL OPEN)

MANUALLY SCRAM REACTOR

ACCEPTANCE CRITERIA:

RB FANS ISOLATE
RB VENT. RAD INCREASE

Q. INITIAL CONDITIONS:
RESET IC-19.

INPUT MALF. RD13A/B (SCRAM DISCH VOLUME LEAK) @100% FOR 120 SECONDS.

MANUALLY SCRAM REACTOR

ACCEPTANCE CRITERIA:

ARM'S INCREASE
HI RANGE ARM INCREASE
RB VENT RAD INCREASE
RB FANS ISOLATE

R. INITIAL CONDITIONS:
RESET TO IC-19.

INPUT MALF. RD09A/B (SCRAM DISCH VOLUME DRAIN VALVE FAIL OPEN)

ACCEPTANCE CRITERIA:

RB SUMP AREA TEMP INCREASE