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August 5, 1985

NUCLEAR LICENSING & SAFETY DEPARTMENT

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Mr. Denton:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416 and 50-417
License No. NPF-29
File: 0025/L-860.0
Supplementary Response to
Generic Letter 83-28, Item 1.2
AECM-85/0237

Generic Letter 83-28 was issued by the NRC to provide licensees with required actions based on the generic implications of the Salem ATWS events. Requirements for data collection capabilities were delineated in Item 1.2 of the generic letter. Details on Grand Gulf's data collection capabilities were provided in Mississippi Power & Light's (MP&L) submittal of November 2, 1984 (AECM-84/0465).

This letter provides supplementary information which addresses questions raised in a telephone call between members of the NRC staff and MP&L on June 27, 1985 regarding the following items:

- Use of the General Electric Transient Analysis Recorder System (GETARS) computer
- Diversity of Grand Gulf's Data Collection Capabilities
- High Pressure Core Spray Standby Service Water (HPCS SSW) Flow Determination
- Chart Recorder Speed
- Time Discrimination Capabilities

MP&L believes this supplementary response, in addition to the November 2, 1984 submittal, provides sufficient information to respond to the requirements of Generic Letter 83-28 Item 1.2. The body of this letter primarily addresses the concerns involving the use of the GETARS computer. The other issues are addressed in the attachments to this letter.

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The NRC has expressed a concern that performance of a post-trip analysis would be very difficult without input from the GETARS computer. As discussed below, MP&L believes there is sufficient redundancy in Grand Gulf's data collection capabilities so that a post-trip analysis can be performed without the use of GETARS.

Review criteria for Item 1.2 were transmitted in a draft Technical Evaluation Report (TER) for Grand Gulf Nuclear Station (GGNS). The NRC provided a list of parameters deemed necessary, as a minimum, to perform post-trip review. In addition, it was stated that each plant variable should be monitored by at least one recorder (such as a sequence of events recorder or a plant process computer for digital parameters; and strip charts, a plant process computer or analog recorder for analog (time history) variables).

With the exception of Turbine Bypass Valve Position which is recorded only by GETARS, MP&L has the capability to measure all the desirable parameters identified in the NRC draft TER on at least one type of recorder excluding GETARS. Attachment I provides a list for each desirable parameter of available SOE Log, Post Trip Log, and associated (alarm) points for the NSSS and BOP computers, GETARS Sentinel points and control room chart recorders as applicable. Attachment II provides a summary matrix of desirable parameters versus the sources of information for each parameter. These sources include computer points, chart recorders, and available control room indication which consists of annunciators, meters, equipment status lights or valve status lights. Attachment IV provides example outputs from all computer logs including the BOP Post Trip, SOE and Alarm Log edits, the NSSS Post Trip, SOE and Alarm Log edits, and GETARS plots. A complete listing of computer points for all logs is available onsite for review.

As described in the November 2, 1984 submittal, MP&L's method of post-trip review relies on the diversity of sources of information available at GGNS such that a loss of one system does not cause a loss of important data. The sources of this information include the NSSS Computer Post Trip, Sequence of Events and Alarm Log, the BOP Computer Post Trip, Sequence of Events and Alarm Log, GETARS Sentinel Program output, recorder and strip chart output, control room panel instrumentation, shift logs and turnover sheets, and written statements from individuals involved in the event. While all data sources may not be available for every transient, there is adequate redundancy to allow a restart decision. GETARS is one of many engineering tools available for use in the post-trip analysis. However, when it is not available, a post-trip analysis can still be performed.

It should be emphasized that the computer points described in Attachment I are those that are currently available at GGNS. Additions and deletions may be made as improvements are made in Grand Gulf's post-trip analysis capability and/or changes are made to plant equipment. As GGNS gains more experience from its power operation phase it is anticipated that changes will be made to the Post Trip Analysis procedure (which provides guidance for the evaluation of unscheduled reactor trips) as well as specific computer points. Like most plant procedures, the Post Trip Analysis procedure is a living document which is changed and improved as necessary to be responsive to plant needs. Changes

made to the procedure are intended to make it more useful for personnel performing and reviewing the post-trip analysis. For example, revision 4 to the procedure was issued June 4, 1985 and included changes to incorporate requirements for the Manager of Plant Operations approval of the post-trip analysis report, concurrence from the Technical Superintendent and Operations Superintendent (may be via telecon), delivery of several items of the post-trip package to the NRC Resident Inspector and changes in data collection requirements including deletion of tables that were not used and addition of a checklist of safety-related systems. This revision of the procedure is available onsite for review.

In conclusion, MP&L believes that restricting GETARS to the Sentinel mode of operation is both unnecessary and can not be accommodated if the GETARS is to perform its intended functions. The analysis of reactor trips is performed by a group of trained and qualified individuals using an approved post-trip analysis procedure. The diversity and redundancy of sources of information available enable personnel to perform a post-trip review and reach a restart decision without the use of GETARS.

Answers to specific questions on HPCS SSW data capability, effectiveness of chart recorder speed, use of GETARS and time discrimination capabilities of computers are provided in Attachments III, V, VI, and VII respectively. Please advise if further information is required.

Yours truly,

S H Hobbs

for L. F. Dale
Director

ARR/GWS/SHH:vog
Attachment

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DATA SOURCES FOR BWR DESIRABLE PARAMETERS

Data sources for the following list of desirable parameters are provided in this attachment. All applicable SOE and Post Trip log points from the NSSS and BOP computers and some of the pertinent associated points are included. Also, GETARS Sentinel points and control room recorder information is provided where applicable.

The desirable parameters are discussed in the following sections:

1.0 Reactor Trip
2.0 Safety Injection
3.0 Containment Isolation
4.0 Turbine Trip
5.0 Control Rod Position
6.0 Neutron Flux, Power
7.0 Main Steam Radiation
8.0 Containment (Drywell) Radiation
9.0 Drywell Pressure (Containment Pressure)
10.0 Suppression Pool Temperature
11.0 Primary System Pressure
12.0 Primary System Level
13.0 MSIV Position
14.0 Turbine Stop Valve/Control Valve Position
15.0 Turbine Bypass Valve Position
16.0 Feedwater Flow
17.0 Steam Flow
18.0 Recirculation; Flow, Pump Status
19.0 Scram Discharge Level
20.0 Condenser Vacuum
21.0 AC and DC System Status
22.0 Safety Injection; Flow, Pump/Valve Status
23.0 Diesel Generator Status

The associated points are points which either have an alarm message or status message printed when the applicable setpoint is reached or which show that an action may have occurred. Chart recorders described in this attachment are those which are considered useful for post-trip review. These recorders and recorders which provide a limited amount of information (i.e. turbine speed, recirc flow, 500 kV bus voltage) are identified in Attachment II.

1.0 REACTOR TRIP

1.1 NSSS COMPUTER

The following points may be available on the NSSS SOE Log pertaining to the occurrence and cause of a reactor scram:

B21NC001 Reactor Hi-Press A
B21NC002 Reactor Hi-Press B
B21NC003 Reactor Hi-Press C
B21NC004 Reactor Hi-Press D
B21NC005 Vessel Low Wtr Lvl Ch A
B21NC006 Vessel Low Wtr Lvl Ch B
B21NC007 Vessel Low Wtr Lvl Ch C
B21NC008 Vessel Low Wtr Lvl Ch D
B21NC047 MSL Isolation Ch A
B21NC048 MSL Isolation Ch B
B21NC049 MSL Isolation Ch C
B21NC050 MSL Isolation Ch D
B21NC051 Vessel Hi Wtr Lvl Ch A
B21NC052 Vessel Hi Wtr Lvl Ch B
B21NC053 Vessel Hi Wtr Lvl Ch C
B21NC054 Vessel Hi Wtr Lvl Ch D
C11NC033 Disch Vol Hi Wtr Lvl Ch A
C11NC034 Disch Vol Hi Wtr Lvl Ch B
C11NC035 Disch Vol Hi Wtr Lvl Ch C
C11NC036 Disch Vol Hi Wtr Lvl Ch D
C51NC031 IRM Upscale Lvl Ch A
C51NC032 IRM Upscale Lvl Ch B
C51NC033 IRM Upscale Lvl Ch C
C51NC034 IRM Upscale Lvl Ch D
C51NC035 IRM Upscale Lvl Ch E
C51NC036 IRM Upscale Lvl Ch F
C51NC037 IRM Upscale Lvl Ch G
C51NC038 IRM Upscale Lvl Ch H
C51NC061 APRM Neut Flux Ch A
C51NC062 APRM Neut Flux Ch B
C51NC063 APRM Neut Flux Ch C
C51NC064 APRM Neut Flux Ch D
C51NC065 APRM Neut Flux Ch E
C51NC066 APRM Neut Flux Ch F
D17NC001 MSL Hi Radiation Ch A
D17NC002 MSL Hi Radiation Ch B
D17NC003 MSL Hi Radiation Ch C
D17NC004 MSL Hi Radiation Ch D
C51NC067 APRM Neut Flux Ch G
C51NC068 APRM Neut Flux Ch H
C51NC071 APRM Thermal Power A
C51NC072 APRM Thermal Power B
C51NC073 APRM Thermal Power C
C51NC074 APRM Thermal Power D
C51NC075 APRM Thermal Power E

C51NC076 APRM Thermal Power F
C51NC077 APRM Thermal Power G
C51NC078 APRM Thermal Power H
C51NC091 Neut Mon System A1
C51NC092 Neut Mon System A2
C51NC093 Neut Mon System B1
C51NC094 Neut Mon System B2
C71NC001 Drywell Hi-Press Ch A
C71NC002 Drywell Hi-Press Ch B
C71NC003 Drywell Hi-Press Ch C
C71NC004 Drywell Hi-Press Ch D
C71NC005 Manual Scram Div 1 or 3
C71NC006 Manual Scram Div 2 or 4
C71NC009 Reactor Scram Div 1 or 3
C71NC010 Reactor Scram Div 2 or 4
C71NC013 TSV Closure Ch A
C71NC014 TSV Closure Ch B
C71NC015 TSV Closure Ch C
C71NC016 TSV Closure Ch D
C71NC017 TCV Fast Closure Ch A
C71NC018 TCV Fast Closure Ch B
C71NC019 TCV Fast Closure Ch C
C71NC020 TCV Fast Closure Ch D

Associated Points: (NON-SOE)

C11NC037 Scram Valve is Open
C11NC031 Rod is Drifting
C51NC002 SRM Upscale Alarm
C51NC003 SRM Instr-Inop Alarm
C51NC023 IRM Instr-Inop Trip
C51NC024 IRM Upscale Alarm
C51NC041 Flow Unit Upscale Alarm
C51NC052 APRM Upscale Alarm
C51NC053 APRM Instr-Inop Trip

1.2 BOP COMPUTER

A. There are no BOP SOE or Post Trip Log Reactor Trip points. There are associated digital and analog alarm points which might indicate whether a scram should have or did occur.

B. Associated points:

C71L600 Turb Cont Vlv/Stop Vlv Trip
C71L601A CRD Disch Vol Wtr Lvl Trip
C71L601B CRD Disch Vol Wtr Lvl Trip
C71L604A Main Stm Line Iso Close Trip
C71L604B Main Stm Line Iso Close Trip
C71L607 Turb Stop Vlv Closure

C71L608 Turb Control Vlv Fast Close
C71L610 Mode Switch Shutdown Scram
C71L613 Manual Scram Permissive
C71L618 Reactor Drywell Pressure
C71L622A-D Safety Trip Unit Cal/Failure
C71L623A Div. 1 Trip Unit Out/Pwr Loss
C71L623B Div. 2 Trip Unit Out/Pwr Loss
C71L623C Div. 3 Trip Unit Out/Pwr Loss
C71L623D Div. 4 Trip Unit Out/Pwr Loss
C71L626A Reactor Protection Sys A Man
C71L626B Reactor Protection Sys B Man
C71L627A Reactor Protection Sys A/C
C71L627B Reactor Protection Sys B/D
C71L628A Recirc Pump Trip Sys A
C71L628B Recirc Pump Trip Sys B
C71L629A RPT System A Trip
C71L629B RPT System B Trip
C11N052 Scram Pilot Vlv Header Press
C11N005 CRD Charging Wtr Pressure

1.3 GETARS

CHANNEL	DESCRIPTION	TYPE	DESCRIPTION
265	Auto Scram	Digital	Reactor Scram Trip Logic C&D
266	Manual Scram	Digital	Rx. Scram Trip Logic C&D

2.0 SAFETY INJECTION

2.1 NSSS COMPUTER

The following SOE computer points are available on the NSSS computer pertaining to safety injections:

B21NC009 RHR/ADS DW Press Ch B
B21NC010 RHR/ADS DW Press Ch F
B21NC011 RHR/ADS Wtr Lvl Ch B
B21NC012 RHR/ADS Wtr Lvl Ch F
B21NC013 LPCS/RHR/ADS DW Press Ch A
B21NC014 LPCS/RHR/ADS DW Press Ch E
B21NC015 LPCS/RHR/ADS Wtr Lvl Ch A
B21NC016 LPCS/RHR/ADS Wtr Lvl Ch E
B21NC017 HPCS Drywell Press Ch C
B21NC018 HPCS Drywell Press Ch L
B21NC019 HPCS Drywell Press Ch G
B21NC020 HPCS Drywell Press Ch R
B21NC021 HPCS Low Wtr Lvl Ch C
B21NC022 HPCS Low Wtr Lvl Ch L
B21NC023 HPCS Low Wtr Lvl Ch G
B21NC024 HPCS Low Wtr Lvl Ch R

E12NC001 RHR Pump Breaker Loop A
E12NC002 RHR Pump Breaker Loop B
E12NC003 RHR Pump Breaker Loop C
E12NC004 RHR Pressure Loop A
E12NC005 RHR Pressure Loop B
E12NC006 RHR Pressure Loop C
E12NC007 RHR Inject Flow Loop A
E12NC008 RHR Inject Flow Loop B
E12NC009 RHR Inject Flow Loop C
E21NC001 LPCS Pump Breaker
E21NC002 LPCS System Pressure
E21NC003 LPCS Lo Flo Byp Vlv
E22NC001 HPCS Pump Breaker No 2
E22NC002 HPCS Pressure
E22NC003 HPCS Lo Flo Byp Vlv

2.2 BOP COMPUTER

There are no safety injection points on the SOE or Post Trip Logs. There are associated computer points on the Alarm Log that would indicate that you had a safety injection.

A. Associated Points:

E12L600A RHR Pump A Disch Pressure
E12L600B RHR Pump B Disch Pressure
E12L600C RHR Pump C Disch Pressure
E12L601A F042A Injection Vlv Perm
E12L601B F042B Injection Vlv Perm
E12L601C F242B Injection Vlv Perm
E12L610A Residual Heat Removal Sys A
E12L610B Residual Heat Removal Sys B
E12L610C Residual Heat Removal Sys C
E12L611A RHR System 1 Activated
E12L611B RHR System 2 Activated
E12L613A Ctmt Spray Man Init Sw Div. 1
E12L613B Ctmt Spray Man Init Sw Div. 2
E12L615 Safety Assoc Div. 2 Trip Unit
E21L602 Manual Init Switch
E21L603 Safety Assoc Trip Unit
E21L605 LPCS System Activation
E21L606 Low Press Core Spray System
E22L600 CNDS Storage Tank Wtr Lvl
E22L604 Reactor Vessel Wtr Lvl (High)
E22L605 Reactor Vessel Wtr Lvl (Low)
E22L606 Drywell Press
E22L607 HPCS System Status
E22L608 Div. 3 Assoc Trip Unit
E22L609 HPCS Manual Initiation Switch
E22L610 ESF Trans No #12 SRC Breaker

E22L611 480V Transformer Feeder
E22L612 HPCS Pump Motor Feeder
E22L613 HPCS System Voltage
E22L614 HPCS Status For Auto Start
E22L615 HPCS Pump Motor Overcurrent
E22L625 HPCS Control Power
E22L626 HPCS 480V System Voltage
E22L627 ESF Trans No #21 SRC Breaker
E22L628 Incoming Breaker Lockout
E22L629 ESF Trans No # 11 SRC Breaker
E22L630 HPCS Battery Charger
E51L600 RCIC Pump Suct Pressure (Low)
E51L601 RCIC Pump Suct Pressure (Low)
E51L602 RCIC Pump Suct Pressure (High)
E51L603 RCIC Pump Discharge Flow
E51L617 RCIC System Status
E51L618 RCIC Manual Initiation Sw

2.3 GETARS

CHANNELS	DESCRIPTION	TYPE
195	RCIC Initiation	Digital
196	RCIC Vessel Injection Vlv Pos.	Digital
197	RCIC Pump Flow	GPM
219	HPCS Flow	GPM
221	HPCS Injection Vlv Pos	Digital
222	HPCS Initiation	Digital
255	LPCS Initiation	Digital
256	LPCS Flow	GPM
128	'B' RHR Initiation	Digital
133	'B' RHR System Flow	GPM
134	'C' RHR System Flow	GPM
243	'A' RHR Initiation	Digital
248	'A' RHR System Flow	GPM

3.0 CONTAINMENT ISOLATION

3.1 NSSS COMPUTER

While no direct information is available from the NSSS computer concerning Containment Isolation, an indication of whether a Containment Isolation Should have occurred can be found by determining if the following SOE points tripped:

B21NC021 HPCS Low Wtr Lvl Ch C
B21NC022 HPCS Low Wtr Lvl Ch L
B21NC023 HPCS Low Wtr Lvl Ch G
B21NC024 HPCS Low Wtr Lvl Ch R

and

B21NC009 RHR/ADS Dw Press Ch B
B21NC010 RHR/ADS Dw Press Ch F
B21NC013 LPCS/RHR/ADS Dw Press Ch A
B21NC014 LPCS/RHR/ADS Dw Press Ch E
B21NC017 HPCS Drywell Press Ch C
B21NC018 HPCS Drywell Pres Ch L
B21NC019 HPCS Drywell Press Ch G
B21NC020 HPCS Drywell Press Ch R

Note: The nominal drywell pressure setpoint for the above points is 1.39 psid while the containment isolation setpoint is 1.23 psid; a valid tripping of 1.39 psid points would require that the isolation signal be generated.

Containment Isolation must be observed by operating personnel via valve status lights.

3.2 BOP COMPUTER

A. SOE Log:

M71L603A Div. 1 Vent Isolation
M71L603B Div. 2 Vent Isolation
M71L604A Div. 1 Ctmt Isolation
M71L604B Div. 2 Ctmt Isolation

B. Post Trip Log:

M71N001A Drywell Press
M71N001B Drywell Press

C. Associated Points:

M71L600A Ctmt and Drywell isolation Div. 1
M71L600B Ctmt and Drywell Isolation Div. 2
M71L612A Div. 1 Trip Unit
M71L612B Div. 2 Trip Unit
M71M602A Div. 1 Isolation Valves
M71M602 B Div. 2 Isolation Valves
D17K603 Containment Vent Radiation
M71N601A Drywell Press
M71N601B Drywell Press

3.3 GETARS

CHANNEL	DESCRIPTION	TYPE
119	MSIV Initiation	Digital

4.0 TURBINE TRIP

4.1 NSSS COMPUTER

While no "turbine trip" computer point exists on the NSSS Computer, the occurrence of a turbine trip may be inferred from the trip of the following SOE computer points:

C71NC013 TSV Closure Ch A
C71NC014 TSV Closure Ch B
C71NC015 TSV Closure Ch C
C71NC016 TSV Closure Ch D
C71NC017 TCV Fast Closure Ch A
C71NC018 TCV Fast Closure Ch B
C71NC019 TCV Fast Closure Ch C
C71NC020 TCV Fast Closure Ch D

4.2 BOP COMPUTER

A. SOE Log

N31K214 Condenser Vacuum (Elec)
N31K206 Turb Overspeed Trip 2
N31K217 Turbine Electrical
N31K218 Turbine Manual
N31K228 Tubine Tripped
N31K234 Condenser Vacuum (Hyd)
N32K238 Turbine Tripped (Hyd)
N32K202 EHC Failure
N32K207 Load Rejection Relay
N32K217 IFC Failure
N32K218 BCU Failure

B. Post Trip Log

The Post Trip log itself indicates the turbine trip time. The following points are also available on the post trip log:

C71N005A Turb Cont Valve Sec Fluid
C71N005B Turb Cont Valve Sec Fluid
C71N005C Turb Cont Valve Sec Fluid
C71N005D Turb Cont Valve Sec Fluid
C71N006A Turb Stop Valve Trip Fluid
C71N006B Turb Stop Valve Trip Fluid
C71N006C Turb Stop Valve Trip Fluid
C71N006D Turb Stop Valve Trip Fluid
C71N006E Turb Stop Valve Trip Fluid
C71N006F Turb Stop Valve Trip Fluid
C71N006G Turb Stop Valve Trip Fluid
C71N006H Turb Stop Valve Trip Fluid

C. Associated Points:

N32K235 HYD Vacuum Trip Device

4.3 GETARS

CHANNEL	DESCRIPTION	TYPE
305	Main Turbine Trip	Digital
288	Main Turbine Trip	Digital

5.0 CONTROL ROD POSITIONS

5.1 NSSS COMPUTER

While no SOE points exist on the NSSS computer for control rod positions, the NSSS Alarm typer output contains messages for every control rod movement. For example:

HHMMSS Rod xx-yy from zz1 to zz2

Where hour, minute, second, x-coordinate, y-coordinate, initial and final positions are printed.

Associated points:

C11NC003 'Rod Being Withdraw'
C11NC032 'Rod is Being Driven'

5.2 BOP COMPUTER

There are no control rod position points on the SOE or Post Trip Logs.

A. Associated points:

C11L605 CRD Accumulator
C11L606 Scram Vlv Pilot Air Header
C11L608 Scram Discharge Volume

5.3 GETARS

CHANNELS	DESCRIPTION	TYPE
334 to 382	CRD Movement Indicator	Digital (4 Rods per Channel)

These channels may be used for determination of control rod positions and scram timing.

6.0 NEUTRON FLUX, POWER

6.1 NSSS COMPUTER

The NSSS comuter points serving as SOE points for the neutron flux trip setpoints are listed under item 1.1. These are the C51 SOE points. Historical data is available on the NSSS Post Trip Log for the APRM channel A flux level data.

6.2 BOP COMPTUER

There are no Neutron Flux, Power points on the SOE log.

A. Post Trip Log:

C51J807A-H APRM A through H Flux Level

B. Associated points:

C51L603 LPRM Upscale
C51L604 LPRM Downscale
C51L606A IRM Upsc Trip/Inop RPS Ch A
C51L606B IRM Upsc Trip/Inop RPS Ch B
C51L606C IRM Upsc Trip/Inop RPS Ch C
C51L606D IRM Upsc Trip/Inop RPS Ch D
C51L609 SRM Downscale
C51L610 SRM Period

6.3 GETARS

CHANNELS	DESCRIPTION	TYPE
112	APRM B	Percent
113	APRM F	Percent
215	APRM C	Percent
216	APRM G	Percent
174	APRM A	Percent
175	APRM E	Percent
384	APRM D	Percent
385	APRM H	Percent

6.4 Control Room Recorders

NEUTRON FLUX POWER

Description of Parameter	Instrument No.	Chart Speed Slow/Fast	Power Supply	Location
IRM/APRM Lvl Div. I (A&E)	C51-R603A	.75"/hr;.75"/min	U.P.S.*	1H13-P680
IRM/APRM Lvl Div. III (C&G)	C51-R603C	.75"/hr;.75"/min	U.P.S.	1H13-P680
IRM/APRM Lvl Div. II (B&F)	C51-R603B	.75"/hr;.75"/min	U.P.S.	1H13-P680
IRM/APRM Lvl Div. IV (D&H)	C51-R603D	.75"/hr;.75"/min	U.P.S.	1H13-P680
SRM Log Count Rate (A,C,E)	C51-R602A	.75"/hr;.75"/min	U.P.S.	1H13-P680
SRM Log Count Rate (B,D,F)	C51-R602B	.75"/hr;.75"/min	U.P.S.	1H13-P680

* U.P.S. - Uninterruptible Power Supply

7.0 MAIN STEAM RADIATION

7.1 NSSS COMPUTER

Indication of main steam line high radiation is available on the NSSS computer via SOE points for the RPS trip function.

These points are:

D17NC001 MSL Hi Rad Ch A
D17NC002 MSL Hi Rad Ch B
D17NC003 MSL Hi Rad Ch C
D17NC004 MSL Hi Rad Ch D

7.2 BOP COMPUTER

There are no main steam radiation points on the SOE or the Post Trip Logs.

a. Associated points:

D17L633A Main Steam Line Chan A/D Rad
D17L633B Main Steam Line Chan B/C Rad
D17L634A Main Steam Line Rad
D17L634B Main Steam Line Rad

7.3 GETARS

Currently there are no points on the GETAR's Sentinel File concerning main steam radiation.

8.0 CONTAINMENT (DRYWELL) RADIATION

8.1 NSSS COMPUTER

There is no information available from NSSS computer edits pertaining to containment (drywell) radiation.

8.2 BOP COMPUTER

There are no containment (Drywell) radiation points on the SOE or the Post Trip Logs.

A. Associated Points:

D17L606 Containment Vent Radiation
D17L607 Containment Vent Radiation
D17L608 Containment Vent Radiation
D17L639 Containment Vent Sample Flow
D17L642A Ctmt/Drwl Exh Chan A/D Radn
D17L642B Ctmt/Drwl Exh Chan B/C Radn
D17L643A Ctmt/Drwl Vent Exh Radn
D17L643B Ctmt/Drwl Vent Exh Radn
D21K6062 Drwl Equip Hatch Radn
D21K6072 Drwl Pers Airlock Radn
D21K6082 Ctmt Pers Airlock Radn
D21K6172 Ctmt Vent Equip Room Radn

D21K6202 Ctmt Vent Filter Train Radn
D21K6212 Ctmt Sample Station Radn
D21K6262 Ctmt Fuel Area Radn
D21K6302 Ctmt Pers Airlock Radn
D23K6012 Drywl Particulate Radn
D23K6013 Drwl Particulate Radn Instr
D23K6014 Drwl Particulate Radn
D23K6022 Drwl Iodine Radiation
D23K6023 Drwl Iodine Radn Instrument
D23K6024 Drwl Iodine Radn
D23K6032 Drwl Gaseous Radn
D23K6033 Drwl Gaseous Radn Instrument
D23K6034 Drwl Gaseous Radn
D17K603 Containment Vent Radn
D21K6051 Radn Mon Tip Mechanism Area
D21K6061 Radn Mon Drwl Equip Hatch
D21K6071 Radn Mon Drwl Pers Airlock
D21K6081 Radn Mon Ctmt Pers Airlock
D21K6091 Radn Mon CRD Hyd Units North
D21K610 Radn Mon CRD Hyd Units South
D21K6201 Radn Mon Ctmt Vent Fltr Tn
D21K6261 Radn Mon Dryer Storage Area
D21K627 Radn Mon Sep Storage Area
D21K628 Radn Mon Ctmt Fuel Area N
D21K629 Radn Mon Ctmt Fuel Area S
D21K6301 Radn Mon Ctmt Pers Airlock

8.3 GETARS

There are no relevant points in the Getars Sentinel file relating to Containment or Drywell Radiation at this time.

8.4 Control Room Recorders

Drywell/Containment Radiation

Description of Parameter	Instrument No.	Chart Speed	Power Supply	Location
Drywell Rad A	1D21-R601A	.75"/hr	ESF Bus 15AA	1H13-P870
Containment Rad A	1D21-R601A	.75"/hr	ESF Bus 15AA	1H13-P870
Drywell Rad B	1D21-R601B	.75"/hr	ESF Bus 16AB	1H13-P870
Containment Rad B	1D21-R601B	.75"/hr	ESF Bus 16AB	1H13-P870
Drywell Fission Prod. Mon. (Part., Iodine, Gas)	1D23-R600	.75"/hr	ESF Bus 15AA	1H13-P870

9.0 DRYWELL PRESSURE (CONTAINMENT PRESSURE)

9.1 NSSS COMPUTER

The SOE information available on the NSSS computer concerning drywell pressure consists of the SOE points showing reactor trip and safety injection initiation signals due to high drywell pressure. These points are:

C71NC001 Drwl Hi-Press Ch A
C71NC002 Drwl Hi-Press Ch B
C71NC003 Drwl Hi-Press Ch C
C71NC004 Drwl Hi-Press Ch D
B21NC009 RHR/ADS Dw Press Ch B
B21NC010 RHR/ADS Dw Press Ch F
B21NC013 LPCS/RHR/ADS Dw Prs Ch A
B21NC014 LPCS/RHR/ADS Dw Prs Ch E
B21NC017 HPCS Drwl Press Ch C
B21NC018 HPCS Drwl Press Ch L
B21NC019 HPCS Drwl Press CH G
B21NC020 HPCS Drwl Press Ch R

9.2 BOP COMPUTER

A. SOE Points:

E61N600A-H Drywell/Ctmt Diff Pressure
E61N601A-H Ctmt/Drywell Diff Pressure
M71J600A Div. 1 LOCA Trip
M71J600B Div. 2 LOCA Trip

B. Post Trip Log:

M71N001A,B Drywell Pressure

C. Associated Points:

M71N601A Drywell Pressure
M71N601B Drywell Pressure
M71N602A Containment Pressure
M71N602B Containment Pressure
M71N002A Containment Pressure
M71N002B Containment Pressure
M71N004 Containment Pressure
M71N027A Containment Pressure
M71N027B Containment Pressure

9.3 GETARS

CHANNEL	DESCRIPTION	TYPE
109	Drywell Press	Inches Water Column

9.4 Control Room Recorders

DRYWELL PRESSURE

(CONTAINMENT PRESSURE)

Description of Parameter	Instrument No.	Chart Speed Slow/Fast	Power Supply	Location
Drwl Wide Range Press A	1M71-R601A	.75"/hr;.75"/min	125V D.C. 72-11A29	1H13-P870
CTMT Narrow Range Press A	1M71-R601A	.75"/hr;.75"/min	125V D.C. 72-11A29	1H13-P870
CTMT Wide Range Press A	1M71-R601A	.75"/hr;.75"/min	125V D.C. 72-11A29	1H13-P870
Drwl Wide Range Press B	1M71-R601B	.75"/hr;.75"/min	125V D.C. 72-11B32	1H13-P870
CTMT Narrow Range Press B	1M71-R601B	.75"/hr;.75"/min	125V D.C. 72-11B32	1H13-P870
CTMT Wide Range Press B	1M71-R601B	.75"/hr;.75"/min	125V D.C. 72-11B32	1H13-P870

10.0 SUPPRESSION POOL TEMPERATURE

10.1 NSSS COMPUTER

There is no information available from the NSSS computer regarding the suppression pool temperature.

10.2 BOP COMPUTER

There are no suppression pool temperature computer points on the SOE or Post Trip Alarm Logs.

A. Associated Points:

M71N603A (Post LOCA) Pool Temp AZ 40
M71N603B (Post LOCA) Pool Temp AZ 40
M71N603C Suppression Pool Temp AZ 40
M71N603D Suppression Pool Temp AZ 40
M71N622A (Post LOCA) Pool Temp AZ 82
M71N622B (Post LOCA) Pool Temp AZ 82
M71N622C Suppression Pool Temp AZ 82
M71N622D Suppression Pool Temp AZ 82
M71N623A (Post LOCA) Pool Temp AZ 142
M71N623B (Post LOCA) Pool Temp AZ 142
M71N623C (Post LOCA) Pool Temp AZ 142
M71N623D (Post LOCA) Pool Temp AZ 142
M71N624A (Post LOCA) Pool Temp AZ 180
M71N624B (Post LOCA) Pool Temp AZ 180
M71N624C Suppression Pool Temp AZ 180
M71N624D Suppression Pool Temp AZ 180
M71N625A (Post LOCA) Pool Temp AZ 262
M71N625B (Post LOCA) Pool Temp AZ 262
M71N625C Suppression Pool Temp AZ 262
M71N625D Suppression Pool Temp AZ 262
M71N626A (Post LOCA) Pool Temp AZ 318
M71N626B (Post LOCA) Pool Temp AZ 318
M71N626C (Post LOCA) Pool Temp AZ 318
M71N626D (Post LOCA) Pool Temp AZ 318
M71N606A (Post LOCA) Pool Temp AZ 40
M71N606B (Post LOCA) Pool Temp AZ 40
M71N606C Suppression Pool Temp AZ 40
M71N606D Suppression Pool Temp AZ 40
M71N612A (Post LOCA) Pool Temp AZ 82
M71N612B (Post LOCA) Pool Temp AZ 82
M71N612C Suppression Pool Temp AZ 82
M71N612D Suppression Pool Temp AZ 82
M71N613A-D (Post LOCA) Pool Temp AZ 142
M71N614A,B (Post LOCA) Pool Temp AZ 180
M71N614C,D Suppression Pool Temp AZ 180
M71N615A,B (Post LOCA Pool Temp AZ 262
M71N615C,D Suppression Pool Temp AZ 262
M71N616A,B Suppression Pool Temp AZ 318
M71N616C,D (Post LOC A) Pool Temp AZ 31

10.3 GETARS

There are currently no suppression pool temperature channels included in the Getars Sentinel File.

10.4 Control Room Recorders

SUPPRESSION POOL TEMPERATURE

Description of Parameter	Instrument No.	Chart Speed	Power Supply	Location
Supp. Pool Temp Channel A	1M71-R605A	.75"/hr	125V D.C. 72-11A29	1H13-P870
Supp. Pool Temp Channel B	1M71-R605B	.75"/hr	125V D.C. 72-11B32	1H13-P870
Supp. Pool Temp Channel C	1M71-R605C	.75"/hr	125V D.C. 72-11A29	1H13-P870
Supp. Pool Temp Channel D	1M71-R605D	.75"/hr	125V D.C. 72-11B32	1H13-P870

11.0 PRIMARY SYSTEM PRESSURE

11.1 NSSS COMPUTER

The information available on the NSSS computer related to primary system pressure for time history recording is the point C34NA001, Steam Dome Pressure. This point is available on the Post Trip Log.

Several SOE points are available to indicate when reactor pressure has risen above a trip setpoint. These are:

B21NC001 Reactor Hi-Press A
B21NC002 Reactor Hi-Press B
B21NC003 Reactor Hi-Press C
B21NC004 Reactor Hi-Press D

A knowledge of SRV relief setpoints with the following SOE points will provide additional information:

Point	DESCRIPTION	VALVE
B21NC025	RLF Vlv Pilot Sol No 1	B21F041A
B21NC026	RLF Vlv Pilot Sol No 2	B21F041B
B21NC027	RLF Vlv Pilot Sol No 3	B21F041C
B21NC028	RLF Vlv Pilot Sol No 4	B21F041D
B21NC029	RLF Vlv Pilot Sol No 5	B21F041E
B21NC030	RLF VlvPilot Sol No 6	B21F041F
B21NC031	RLF Vlv Pilot Sol No 7	B21F041G
B21NC032	RLF Vlv Pilot Sol No 8	B21F041K
B21NC033	RLF Vlv Pilot Sol No 9	B21F047A
B21NC034	RLF Vlv Pilot Sol No 10	B21F047C
B21NC035	RLF Vlv Pilot Sol No 11	B21F047D
B21NC036	RLF Vlv Pilot Sol No 12	B21F047G
B21NC037	RLF Vlv Pilot Sol No 13	B21F047H
B21NC038	RLF Vlv Pilot Sol No 14	B21F047L

B21NC039	RLF Vlv Pilot Sol No 15	B21F051A
B21NC040	RLF Vlv Pilot Sol No 16	B21F051B
B21NC041	RLF Vlv Pilot Sol No 17	B21F051C
B21NC042	RLF Vlv Pilot Sol No 18	B21F051D
B21NC043	RLF Vlv Pilot Sol No 19	B21F051F
B21NC044	RLF Vlv Pilot Sol No 20	B21F051K

11.2 BOP COMPUTER

There are no primary system pressure computer points on the SOE trip log.

A. Post Trip Log:

C34N005 Reactor Pressure

B. Associated Points:

B21L626A Safety/Relief Valve Logic A
B21L626B Safety/Relief Valve Logic B
B21L626E Safety/Relief Valve Logic E
B21L626F Safety/Relief Valve Logic F
C34L601 Reactor Pressure

11.3 GETARS

CHANNELS	DESCRIPTION	TYPE
67	Narrow Range Dome Pressure	PSIG
68	Wide Range Dome Pressure	PSIG
127	Reactor Pressure 'A'	PSIG
172	Wide Range Press	PSIG
173	Wide Range Press	PSIG
258	Wide Range Press	PSIG

11.4 Control Room Recorders

PRIMARY SYSTEM PRESSURE

Description of Paraeter	Instrument No.	Chart Speed Slow/Fast	Power Supply	Location
Wide Range Reactor Pressure	1C34-R614	.75"/hr	U.P.S.	1H13-P680
Narrow Range Reactor Pressure	1C34-R615	.75"/hr	U.P.S.	1H13-P680
Narrow Range Reactor Pressure	1C34-R609	.75"/hr	U.P.S.	1H13-P680
Wide Range Reactor Pressure A	1B21-R623A	1"/hr/60"hr	Bus 15AA	1H13-P601
Wide Range Reactor Pressure B	1B21-R623B	1"/hr/60"/hr	Bus 16AB	1H13-P601

12.0 PRIMARY SYSTEM LEVEL

12.1 NSSS COMPUTER

Time history recording of narrow range reactor vessel level is available on the NSSS Post Trip Log. The point is C34NA004. A variety of SOE points are available to indicate Level 8, 3, 2 and 1 trip setpoints. These points are:

B21NC005 Vessel Low Wtr Lvl Ch A
B21NC006 Vessel Low Wtr Lvl Ch B
B21NC007 Vessel Low Wtr Lvl Ch C
B21NC008 Vessel Low Wtr Lvl Ch D
B21NC011 RHR/ADS Wtr Lvl Ch B
B21NC012 RHR/ADS Wtr Lvl Ch F
B21NC015 LPCS/RHR/ADS Wtr LV Ch A
B21NC016 LPCS/RHR/ADS Wtr LV Ch E
B21NC021 HPCS Low Wtr Lvl Ch C
B21NC022 HPCS Low Wtr Lvl Ch L
B21NC023 HPCS Low Wtr Lvl Ch G
B21NC024 HPCS Low Wtr Lvl Ch R
B21NC051 Vessel Hi Wtr Lvl Ch A
B21NC052 Vessel Hi Wtr Lvl Ch B
B21NC053 Vessel Hi Wtr Lvl Ch C
B21NC054 Vessel Hi Wtr Lvl Ch D

12.2 BOP COMPUTER

A. SOE Log:

C34L604 Reactor Hi Water Level

B. Post Trip Log:

C34N004A Reactor Water Level A
C34N004B Reactor Water Level B
C34N004C Reactor Water Level C

C. Associated Points:

B21L600A RPV Water Level Logic A
B21L600B RPV Water Level Logic B
C34L600 Rx Water Level
C34N017 Rx Water Level (Wide Range)

12.3 GETARS

CHANNELS	DESCRIPTION	TYPE
66	Narrow Range Level	Inches
87	Upset Range Level	Inches
90	Compensated Level	Inches
223	Wide Range Level	Inches

12.4 Control Room Recorders

PRIMARY SYSTEM LEVEL

Description of Parameter	Instrument No.	Chart Speed Slow/Fast	Power Supply	Location
Rx Wtr Lvl Wide Rng	1C34-R614	.75"/hr	U.P.S.	1H13-P680
Rx Wtr Lvl Upset Rng	1C34-R614	.75"/hr	U.P.S.	1H13-P680
Rx Wtr Lvl Narrow Rng	1C34-R615	.75"/hr	U.P.S.	1H13-P680
Rx Wtr Lvl Wide Rng A	1B21-R623A	1"/hr/60"/hr	Bus 15AA	1H13-P601
Rx Twr Lvl Wide Rng B	1B21-R623B	1"/hr/60"/hr	Bus 16AB	1H13-P601
Rx Wtr Lvl Fuel Zone	1B21-R615	.75"/hr	U.P.S.	1H13-P601

13.0 MSIV POSITION

13.1 NSSS COMPUTER

There are no SOE or Post Trip Log Points on the NSSS computer showing MSIV position. MSIV isolation logic input to RPS is available on the SOE log from the following points:

B21NC047 MSL Isolation CH A
B21NC048 MSL Isolation Ch B
B21NC049 MSL Isolation Ch C
B21NC050 MSL Isolation Ch D

13.2 BOP COMPUTER

There are no MSIV position computer points on the SOE or Post Trip Logs.

A. Associated Points:

Note: Software changes have been made as a result of this review to allow the following status points to print a change of status message:

B21N101A MSL A Inbd Isolation Valve Posn
B21N101B MSL B Inbd Isolation Valve Posn
B21N101C MSL C Inbd Isolation Valve Posn
B21N101D MSL D Inbd Isolation Valve Posn
B21N102A MSL A Outbd Isolation Valve Posn
B21N102B MSL B Outbd Isolation Valve Posn
B21N102C MSL C Outbd Isolation Valve Posn
B21N102D MSL D Outbd Isolation Valve Posn
B21N104A MSL A Outbd Dr Valve Posn
B21N104B MSL B Outbd Dr Valve Posn
B21N104C MSL C Outbd Dr Valve Posn
B21N104D MSL D Outbd Dr Valve Posn

13.3 GETARS

CHANNELS	DESCRIPTION	TYPE
120	A Inboard MSIV	Digital
121	B Inboard MSIv	Digital
122	C Inboard MSIV	Digital
123	D Inboard MSIV	Digital
251	A Outboard MSIV	Digital
252	B Outboard MSIV	Digital
253	C Outboard MSIV	Digital
254	D Outboard MSIV	Digital

14.0 TURBINE STOP VALVE/CONTROL VALVE POSITION

14.1 NSSS COMPUTER

The following SOE points trip on turbine control valve and turbine stop valve closure as indicated by the point name:

C71NC013 TSV Closure Ch A
C71NC014 TSV Closure Ch B
C71NC015 TSV Closure Ch C
C71NC016 TSV Closure Ch D
C71NC017 TCV Fast Closure Ch A
C71NC018 TCV Fast Closure Ch B
C61NC019 TCV Fast Closure Ch C
C71NC020 TCV Fast Closure Ch D

14.2 BOP COMPUTER

There are no turbine stop valve/control valve position computer points on the SOE Log.

A. Post Trip Log:

N30N023A Main Cont Valve 4 Posn
N30N023B Main Cont Valve 3 Posn
N30N023C Main Cont Valve 2 Posn
N30N023D Main Cont Valve 1 Posn

14.3 GETARS

CHANNELS	DESCRIPTION	TYPE
290	A HP Stop Valve Pos	Percent
287	A HP Control Valve Position	Percent
304	B HP Control Valve Position	Percent
307	B HP Stop Valve Position	Percent
308	Total HP Control Valve Position	Percent
309	D HP Control Valve Position	Percent
324	D HP Stop Valve Position	Percent
323	C HP Stop Valve Position	Percent
321	C HP Control Valve Position	Percent

15.0 TURBINE BYPASS VALVE POSITION

15.1 NSSS COMPUTER

There is no information available on the NSSS Computer pertaining to turbine bypass valve position.

15.2 BOP COMPUTER

There are no Turbine Bypass Valve Position computer points on the SOE or Post Trip Logs. There are also no associated computer points.

15.3 GETARS

CHANNELS	DESCRIPTION	TYPE
285	A Bypass Control Valve Position	Percent
302	B Bypass Control Valve Position	Percent
319	C Bypass Control Valve Position	Percent
327	Total Bypass Control Vlv Position	Percent

16.0 FEEDWATER FLOW

16.1 NSSS COMPUTER

Time history data for feedwater flow consists of points C34NA002 and C34NA003, 'RTR FW Loop A flow' and 'RTR FW Loop B flow' respectively. These points appear on the Post Trip Log.

The following associated points exists:

B21NC055 Feedwater Loop A Action
B21NC056 Feedwater Loop B Active

16.2 BOP COMPUTER

There are no feedwater flow computer points on the SOE Log. The following points are included on the Post Trip Recall Log:

N21N087A RFP A Suction Flow
N21N087B RFP B Suction Flow
N21N088A RFP A Suction Flow
N21N088B RFP B Suction Flow

16.3 GETARS

CHANNELS	DESCRIPTION	TYPE
74	Total Fdwtr Flow	Mlb/HR
83	A Fdwtr Loop Flw	Mlb/HR
84	B Fdwtr Loop Flw	Mlb/HR
91	A Fdpmp Suct Flw	Mlb/HR
92	B Fdpmp Suct Flw	Mlb/HR

16.4 Control Room Recorders

FEEDWATER FLOW

Description of Parameter	Instrument No.	Chart Speed	Power Supply	Location
FDW/STM Flow Recorder	1C34-R607	.75"/hr	*U.P.S.	1H13-P680
FDW Flow Loop A/B	1C34-R616	.75"/hr	U.P.S.	1H13-P680

*U.P.S. Uninterruptible Power Supply

17.0 STEAM FLOW

17.1 NSSS COMPUTER

Time history data for steam flow is available from the Post Trip Log for points:

C34NA005 Total Steam Flow
C34NA006 Main Turbine Steam Flow

17.2 BOP COMPUTER

There are no steam flow computer points on the SOE or Post Trip Logs. The following associated points are available:

C34N030A Main Steam Line A Flow
C34N030B Main Steam Line B Flow
C34N030C Main Steam Line C Flow
C34N030D Main Steam Line D Flow

17.3 GETARS

CHANNELS	DESCRIPTION	TYPE
69	A Steam Line Flow	MLB/HR
70	B Steam Line Flow	MLB/HR
71	C Steam Line Flow	MLB/HR
72	D Steam Line Flow	MLB/HR
73	Total Stm Line Flow	MLB/HR
76	Turbine Steam Flow	MLB/HR

17.4 Control Room Recorders

STEAM FLOW

Description of Parameter	Instrument No.	Chart Speed	Power Supply	Location
FDW/STM Flow Recorder	1C34-R607	.75"/hr	U.P.S.	1H13-P680
Rx Press/Turb Stm Flow Recorder	1C34-R609	.75"/hr	U.P.S.	1H13-P680

18.0 RECIRCULATION; FLOW, PUMP STATUS

18.1 NSSS COMPUTER

There are no SOE points currently implemented on the NSSS computer which show Recirc pump status. Total Core Flow data from point B33NA001 is available on the Post Trip Log. The following related alarm points exist:

B33NC001 Recirc Loop A INAC
B33NC002 Recirc Loop B INAC

18.2 BOP COMPUTER

A. SOE Log:

B33L622B Recirc Pump Mtr A Breaker
B33L622A Recirc Pump Mtr B Breaker
B33L623B Recirc Pump Motor A Lockout
B33L623B Recirc Pump Motor B Lockout
B33L624A Recirc Motor A L/O Bus Volts
B33L624B Recirc Motor B L/O Bus Volts

B. Post Trip Log:

B33N014A Recirc LP A1 Dr Fl MLB/HR
B33N014D Recirc LP A2 Dr Fl MLB/HR
B33N024A Recirc LP B1 Dr Fl MLB/HR
B33N024D Recirc LP B2 Dr Fl MLB/HR

C. Associated points:

B33L609A Recirc Pump Trip Ch A
B33L609B Recirc Pump Trip Ch B
B33NC001 Recirc Loop A Inac
B33NC002 Recirc Loop B Inac
B33S700A Reactor Recirc M-G Breaker
B33S700B Reactor Recirc M-G Breaker
B33S701A Reactor Recirc M-G Breaker
B33S701B Reactor Recirc M-G Breaker
B33N011A Reactor Recirc Loop A Flow
B33N011B Reactor Recirc Loop B Flow

18.3 GETARS

CHANNELS	DESCRIPTION	TYPE
3	A Recirc Flow Cont Valve Pos	PCT
4	B Recirc Flow Cont Valve Pos	PCT
19	A Recirc Pump Pwr	MW
20	B Recirc Pump Pwr	MW
25	A Recirc Loop Flow Cont Output	PCT

CHANNELS	DESCRIPTION	TYPE
26	B Recirc Loop Flow Cont. Output	PCT
30	Master Controller Output	PCT
37	1A LFMG Set Breaker	Digital
38	2A LFMG Set Breaker	Digital
39	1B LFMG Set Breaker	Digital
40	2B LFMG Set Breaker	Digital
280	Recirc Pump/Motor CB5A Position	Digital
281	Recirc Pump/Motor CB5B Position	Digital

19.0 SCRAM DISCHARGE LEVEL

19.1 NSSS COMPUTER

The points available on the NSSS computer SOE Log concerning scram discharge volume level are the RPS input points:

C11NC033 Disch Vol Hi Wtr Lvl Ch A
C11NC034 Disch Vol Hi Wtr Lvl Ch B
C11NC035 Disch Vol Hi Wtr Lvl Ch C
C11NC036 Disch Vol Hi Wtr Lvl Ch D

Associated Point:

C11NC001 Dsch Vol Hi Lvl Block

19.2 BOP COMPUTER

There are no scram discharge level computer points on the SOE or Post Trip Logs.

A. Associated points.

C11L608 Scram Discharge Volume
C11N110 Scram Disch Vol Vent Valve
C11N111 Scram Disch Vol Drain Valve
C71L601A CRD Disch Vol Wtr Lvl Trip
C71L601B CRD Disch Vol Wtr Lvl Trip

20.0 CONDENSER VACUUM

20.1 NSSS COMPUTER

There are no points on the NSSS computer concerning condenser vacuum.

20.2 BOP COMPUTER

A. SOE Log:

N31K214 Condenser Vacuum (Elec)
N31K234 Condenser Vacuum (Hyd)

B. Post Trip Log:

N19N005A HP Cond Shl A Press
N19N005B IP Cond Shl B Press
N19N005C LP Cond Shl C Press

C. Associated Points

N62N008A Mech Vac Pmp A Suct Press
N62N008B Mech Vac Pmp B Suct Press
N62N008C Mech Vac Pmp C Suct Press
N62N011A Mech Vac Pmp A Suct Press
N62N011B Mech Vac Pmp B Suct Press
N62N011C Mech Vac Pmp C Suct Press
N19N036 HP Cond Shell Vacuum

20.3 GETARS

CHANNELS	DESCRIPTION	TYPE
107	Condenser Vacuum	Inches Hg

21.0 AC and DC SYSTEM STATUS

21.1 NSSS COMPUTER

There is no information available on the NSSS computer concerning AC and DC system status.

21.2 BOP COMPUTER

There are no AC and DC system status computer points on the Post Trip Log.

A. SOE Log:

R15S701 Serv XFMR 11 Primary Lo Rly
R15S702 Serv XFMR 11 Bu Lo Rly
R15S711 Serv XFMR 11 Sudden Press Ry
R15S725 Serv XFMR 11 Pri Diff Rly
R15S726 Serv XFMR 11 Overcurrent Rly
R15S727 Serv XFMR 11 Neutral O/C Rly
R15S728 Serv XFMR 11 Bu Diff Rly
R15S730 Grndg XFMR 11 O/C Trip Rly
R15S731 Grndg XFMR 11 Neu O/C Trip
R15S732 Grndg XFMR 11 OV Trip Rly
R15S733 Grndg XFMR 21 O/C Trip Rly
R15S734 Grndg XFMR 21 Neu O/C Trip
R15S735 Grndg XFMR 21 OV Trip

R15S737 Serv XFMR 21 Pri L/O Trip
R15S738 Serv XFMR 21 Sec L/O Trip
R15S746 Serv XFMR 21 Sud Press Trip
R15S753 Serv XFMR 21 Pri Diff Trip
R15S754 Serv XFMR 21 O/C Relay Trip
R15S755 Serv XFMR 21 Neutral O/C Rly
R15S756 Serv XFMR 21 Bu Diff Rly
R21S736 Buss 15AA Undervoltage Rly
R21S738 Bus 16AB Undervoltage Rly
R21S755 Loss of Offsite Pwr Sources
R21S761 Loss of Offsite Pwr Sources

B. Associated Computer Points:

L11S702 Continuity Batt A
L11S706 Continuity Batt B
L20S704 24V DC Bus 11DH Ground
L20S705 24V DC Bus 11DH Ground
L20S710 24V DC Bus 11DJ Ground
L20S711 24V DC Bus 11DJ Ground
L21S700 125V Bus Volt 27B Batt A
L21S701 Gnd Detect 64 Batt A
L21S704 125V Bus Volt 27B Batt B
L21S705 Gnd Detect 64 Batt B
L21S730 125V Bus Volt 27B Batt E
L21S731 125V Bus Volt 27B Batt D
L21S732 Grnd Detect 64A Batt D
L21S733 Grnd Detect 64B Batt E
L21S736 125V DC Bus 21 DG Voltage
L21S737 125V DC Bus 21DG Ground
L21S738 125V DC Bus 11DG Voltage
L21S743 125V DC Bus 11DG Ground
L21S760 Gnd Detector 64K Batt K
L21S761 Gnd Detector 64L Batt L
L21S762 125V Bus UV 27B Batt K
L21S763 125V Bus UV 27B Batt L
R11S640 BOP Transformer 13
R11S641 BOP Transformer 13 L/O
R11S642 BOP XFMR 13 Control Voltage
R11S645 BOP XFMR 23 Trouble
R11S646 BOP Transformer 23 L/O
R11S647 BOP XFMR 23 Control Voltage
R11S700 ESF Transformer 11 L/O
R11S701 ESF XFMR 11 Control Voltage
R11S730 BOP XFMR 12A Lockout
R11S731 BOP XFMR 12A Control Voltage
R11S750 ESF XFMR 12 Lockout
R11S751 ESF XFMR 12 Control Voltage
R11S760 BOP XFMR 11A lockout
R11S761 BOP XFMR 11A Control Voltage

R11S807 ESF XFMR 21 Lockout
R11S808 ESF XFMR 21 Control Voltage
R11S826 BOP XFMR 13 Lockout
R11S827 ESF XFMR 12 115KV Power
R12S740 BOP XFMR 12B Lockout
R12S741 BOP XFMR 12B Control Voltage
R12S770 BOP XFMR 11B Lockout
R12S771 BOP XFMR 11B Control Voltage
R13S780 BOP XFMR 14 Lockout
R13S781 BOP XFMR 14 Control Voltage
R13S816 BOP XFMR 24 Lockout
R13S817 BOP XFMR 24 Control Voltage
R14S704 Main XFMR Aux Power Phase A
R14S715 Main XFMR Aux Power Phase B
R14S726 Main XFMR Aux Power Phase C
R14S737 Main XFMR Aux Power Phase D
R15S700 DC Volt Service XFMR 11
R15S708 Serv XFMR 11 Aux Power
R15S712 Serv XFMR 11 Clr Pwr Auto
R15S743 Serv XFMR 21 Aux Power
R15S760 Serv XFMR 21 DC Voltage
R20S650 Bus 18BG1 Undervoltage
R20S651 Bus 28BG1 Undervoltage
R20S700 Bus 15BA1 Undervoltage
R20S701 Bus 15BA3 Undervoltage
R20S702 Bus 15BA2 Undervoltage
R20S703 Bus 15BA4 Undervoltage
R20S704 Bus 15BA5 Undervoltage
R20S705 Bus 15BA6 Undervoltage
R20S715 Bus 16BB1 Undervoltage
R20S716 Bus 16BB3 Undervoltage
R20S717 Bus 16BB2 Undervoltage
R20S718 Bus 16BB4 Undervoltage
R20S719 Bus 16BB5 Undervoltage
R20S720 Bus 16BB6 Undervoltage
R20S730 Bus 13BD5 Undervoltage
R20S731 Bus 13BD2 Undervoltage
R20S732 Bus 13BD1 Undervoltage
R20S733 Bus 11BD7 Undervoltage
R20S734 Bus 11BD5 Undervoltage
R20S7351 Bus 11BD4 Undervoltage
R20S736 Bus 11BD3 Undervoltage
R20S737 Bus 11BD2 Undervoltage
R20S738 Bus 11BD1 Undervoltage
R20S739 Bus 12BE5 Undervoltage
R20S740 Bus 12BE4 Undervoltage
R20S741 Bus 12BE6 Undervoltage
R20S742 Bus 12BE2 Undervoltage
R20S743 Bus 12BE1 Undervoltage
R20S744 Bus 14BE1 Undervoltage
R20S745 Bus 14BE2 Undervoltage
R20S746 Bus 22BE3 Undervoltage

R20S791 Bus 21BD3 Undervoltage
R20S792 Bus 21BD4 Undervoltage
R21S620A Bus 18AG Voltage
R21S620B Bus 28AG Voltage
R21S721B Bus 13AD Voltage
R21S723 Bus 14AE Voltage
R21S733 Bus 15AA L/O Trip
R21S734 Bus 15AA Undervoltage
R21S737 Bus 15AA Control Voltage
R21S739 Bus 16AB Control Voltage
R21S740 Bus 16AB L/O Relay
R21S769 Bus 13AD Voltage
R21S771 Bus 14AE Voltage
R21S781 Bus 18AG Undervoltage
R21S782 Bus 28AG Undervoltage
R22S710 Bus 11HD Undervoltage
R22S711 Bus 12HE Undervoltage
R25S700 Bus 11R L/O Relay
R25S711 Bus 11R Control Voltage
R25S714 BOP XFMR 13 Grd Flt L.O. DC
R25S715 BOP XFMR 23 Grd Flt L.O. DC
R25S790 Bus 21R L/O Relay
R25S792 Bus 21R Control Voltage
L21S601 125V DC Bus 11DG
L21S801 125V DC Bus 21DG
R11N773 ESF XFMR 12 WDG1 MWS
R11N774 ESF XFMR 12 WDG2 MWS
R11N775 ESF XFMR 12 WDG1 MVARS
R11N776 ESF XFMR 12 WDG2 MVARS
R11N782 ESF XFMR 12 Amps-1 B Phase
R11N783 ESF XFMR 12 Amps-2 B Phase
R15N777 Serv XFMR 11 WATTS
R15N778 Serv XFMR 11 VARS
R15N790 Serv XFMR 11 Amps B Phase
R15N791 Serv XFMR 21 WATTS
R15N792 Serv XFMR 21 VARS
R15N793 Serv XFMR 21 Amps Phase B
R20S609 Bus 18BG1 Voltage
R20S653 Brkr 52-18101 Amps
R20S809A Bus 28BG1 Voltage
R20S853 Brkr 52-28101 Amps
R21S6061 Bus 18AG A-B Volts
R21S6062 Bus 18AG A-C Volts
R21S607 Brkr 152-1801 Amps
R21S608 Brkr 152 1808 Amps
R21S8061 Bus 28AG A-B Volts
R21S8062 Bus 28AG A-C Volts
R21S8063 Bus 28AG B-C Volts
R21S807 Brkr 152-2801 Amps

21.3 GETARS

CHANNELS	DESCRIPTION	TYPE
138	Bus 16AB Energized	Digital
184	Bus 15AA Energized	Digital
225	Bus 17AC Energized	Digital
191	Loss of Power Div. 1	Digital
145	Loss of Power Div. 2	Digital

22.0 SAFETY INJECTION

All safety injection information is in section 2.0 above.

23.0 DIESEL GENERATOR STATUS

23.1 NSSS COMPUTER

There is no information available on the NSSS computer concerning Diesel Generator Status.

23.2 BOP COMPUTER

A. SOE Log

P75S0E01A Diesel Generator A
P75S0E01B Diesel Generator B

B. Associated Computer Points

E22L616 HPCS Diesel Engine Speed
E22L617 HPCS Diesel Engine
E22L618 HPCS Diesel Engine
E22L619 HPCS Diesel Engine
E22L620 HPCS 125 VDC System
E22L621 Generator Trip/Lockout
E22L622 Diesel Engine in Maintenance
E22L623 HPCS System Ground
E22L624 Diesel Eng Generator Current
P41N603A Stby Service Wtr A Flow Diff
P41N603B Stby Service Wtr B Flow Diff
P41N603C HPCS Service Wtr Flow Diff
P75E001A Diesel Generator A
P75E001B Diesel Generator B
P75L604A Diesel Generator A
P75L604B Diesel Generator B
P75L608A Diesel Generator A
P75L608B Diesel Generator B
P75N067A Diesel Generator A Speed
P75N067B Diesel Generator B Speed

P75S712A DSL Genr 11 Lockout Rly
P75S712B DSl Genr 12 Lockout Rly
P75S713A Diesel Generator 11 Start
P75S713B Diesel Generator 12 Start
P81L602 HPCS Trip Units Trouble

23.3 GETARS

CHANNELS	DESCRIPTION	TYPE
51	D/G I Start Init	Digital
52	D/G I Ready to Load	Digital
53	D/G II Start Init	Digital
54	D/G II Ready to Load	Digital
141	D/G II Watts	MW
142	D/G II Frequency	Hz
187	D/G I Watts	MW
188	D/G I Frequency	Hz
228	D/G III Watts	MW
229	D/G III Frequency	Hz
230	D/G III Start Init	Digital
231	D/G III Ready to Load	Digital

Data Source Matrix

PRIMARY VARIABLE	NSSS SOE LOG	NSSS POST TRIP LOG	BOP SOE LOG	BOP POST TRIP LOG	NSSS ASSOCIATED POINTS	BOP ASSOCIATED POINTS	CHART RECORDER	CONTROL ROOM INDICATION	GETARS
REACTOR TRIP	YES	NO	NO	NO	YES	YES	NO	YES	YES
SAFETY INJECTION [1]	YES	NO	NO	NO	NO	YES	NO	YES	YES
CONTAINMENT ISOLATION	NO	NO	NO	NO	YES	YES	NO	YES	NO
TURBINE TRIP	YES	NO	YES	YES	YES	YES	YES [4]	YES	YES
CONTROL ROD POSITION	NO	NO	NO	NO	YES [3]	YES	NO	YES	YES
NEUTRON FLUX, POWER	YES	YES	NO	YES	YES	YES	YES	YES	YES
MAIN STEAM RADIATION	YES	NO	NO	NO	NO	YES	NO	YES	NO
CONTAINMENT (DRY WELL) RADIATION	NO	NO	NO	NO	NO	YES	YES	YES	NO
DRYWELL PRESSURE (CONTAINMENT PRESSURE)	YES	NO	YES	YES	NO	YES	YES	YES	YES
SUPPRESSION POOL TEMPERATURE	NO	NO	NO	NO	NO	YES	YES	YES	NO
PRIMARY SYSTEM PRESSURE	YES	YES	NO	YES	YES	YES	YES	YES	YES
PRIMARY SYSTEM LEVEL	YES	YES	YES	YES	NO	YES	YES	YES	YES
MSIV POSITION	NO	NO	NO	NO	NO	YES	NO	YES	YES
TURBINE STOP VALVE/CONTROL VALVE POSITION	YES	NO	NO	YES	NO	NO	NO	YES	YES
TURBINE BYPASS VALVE POSITION	NO	NO	NO	NO	NO	NO	NO	YES	YES
FEEDWATER FLOW	NO	YES	NO	YES	YES	NO	YES	YES	YES
STEAM FLOW	NO	YES.	NO	NO	NO	YES	YES	YES	YES

PRIMARY VARIABLE	NSSS SOE LOG	NSSS POST TRIP LOG	BOP SOE LOG	BOP POST TRIP LOG	NSSS ASSOCIATED POINTS	BOP ASSOCIATED POINTS	CHART RECORDER	CONTROL ROOM INDICATION	GETARS
RECIRCULATION, FLOW, PUMP STATUS	NO	YES	YES	YES	YES	YES	YES [4]	YES	YES
SCRAM DISCHARGE LEVEL	YES	NO	NO	NO	YES	YES	NO	YES	NO
CONDENSER VACUUM	NO	NO	YES	YES	NO	YES	NO	YES	YES
AC AND DC SYSTEM STATUS	NO	NO	YES	NO	NO	YES	YES [4]	YES	YES
SAFETY INJECTION, FLOW, PUMP/VALVE STATUS [1]	YES	NO	NO	NO	NO	YES	NO	YES	YES
DIESEL GENERATOR STATUS	NO	NO	YES [2]	NO	NO	YES	NO	YES	YES

TABLE NOTATION

1 RCIC INFORMATION AND INJECTION VALVE STATUS ARE NOT ON THE NSSS COMPUTER BUT ARE ON THE BOP ASSOCIATED POINTS

2 HPCS DIESEL GENERATOR STATUS IS NOT INCLUDED ON THE SOE LOG BUT IS INCLUDED IN ASSOCIATED POINTS

3 SEE EXAMPLE ALARM EDIT (ATTACHMENT IV) FOR NSSS ALARM MESSAGES INDICATING ROD MOVEMENT AND ROD POSITION

4 CHART RECORDER INFORMATION ON THESE PARAMETERS IS NOT INCLUDED IN ATTACHMENT 1

HPCS SSW FLOW CAPABILITY

Verification of HPCS SSW flow can be obtained by the following methods:

1) Observation of SSW pump breaker indication and flow rate on control room instrumentation.

2) Review of BOP computer (associated) points (printed on alarm printer) for status message "HPCS Service Water Pump Running" (point P41 C002) and the absence of alarm points P41N009C "HPCS SVCE WTR PMP DISCH PRES", P41N016C "HPCS SVCE WTR PMP DISCH FLOW", and P41N018C "HPCS SVC WATER RETURN FLOW".

MISSISSIPPI POWER AND LIGHT COMPANY
GRAND GULF NUCLEAR UNIT ONE
---------- POST TRIP RECALL ----------
6/27/85 01:10:10

THE TRIP OCCURRED ON 6/27/85 AT 09:57:16

CONDITION	TIME	RECIRC L P A1 DR FL M#/H B33N014A M#/H	Q	RECIRC L P A2 DR FL M#/H B33N014D M#/H	Q	RECIRC L P B1 DR FL M#/H B33N024A M#/H	Q	RECIRC L P B2 DR FL M#/H B33N024D M#/H	Q	REACTOR WATER LEVEL A C34N004A IN	Q	REACTOR WATER LEVEL B C34N004B IN	Q	REACTOR WATER LEVEL C C34N004C IN	Q	REACTOR PRESSURE C34N005 PSI	Q	FDW BIASING XFER STATION OUT C34R601 %	Q	FDW XFER STATION OUT C34R613 %	Q
PRETRIP																					
	01:16:46	-2.46		-2.37		-2.27		-2.57		-14.09		32.12		33.88		950.25		20.11		23.77	
	01:17:16	-2.46		-2.37		-2.27		-2.57		-14.09		31.57		33.41		950.25		23.46		23.77	
	01:17:46	-2.45		-2.35		-2.25		-2.56		-14.09		31.35		33.04		950.25		27.19		23.77	
	01:18:16	-2.45		-2.35		-2.25		-2.56		-14.93		30.93		32.60		950.25		31.28		23.77	
	01:06:46	-2.44		-2.34		-2.24		-2.55		********B		30.80		32.53		942.37		********B		23.77	
	01:07:17	-2.44		-2.34		-2.24		-2.55		********B		30.29		31.91		942.37		********B		********B	
	01:07:46	-2.43		-2.30		-2.27		-2.56		********B		30.03		31.80		950.25		********B		********B	
	01:08:16	-2.43		-2.30		-2.27		-2.56		-14.93		29.05		30.85		950.25		********B		********B	
	01:08:46	-2.44		-2.34		-2.26		-2.56		-14.96		27.98		29.85		950.25		********B		23.779	
TRIP	01:09:16	-2.44		-2.34		-2.26		-2.56		-15.00		26.88		28.53		950.25		********B		23.779	
	01:09:46	-2.43		-2.38		-2.28		-2.57		-14.93		30.51		31.76		950.25		********B		23.779	
	01:10:16	-2.45		-2.38		-2.28		-2.57		-14.89		31.32		33.00		950.25		8.519		23.779	
	01:10:46	-2.45		-2.39		-2.28		-2.59		-14.89		31.43		33.04		949.87		10.52		23.77	
	01:11:17	-2.45		-2.39		-2.28		-2.59		-14.89		32.93		34.47		949.87		11.44		23.77	
	01:11:46	-2.42		-2.33		-2.27		-2.55		-14.85		34.21		35.82		950.25		11.44		23.77	
	01:12:16	-2.42		-2.33		-2.27		-2.55		-14.85		34.76		36.30		950.25		11.68		23.77	
	01:12:46	-2.41		-2.34		-2.22		-2.54		-14.82		35.24		36.92		950.25		11.50		23.77	
	01:13:16	-2.41		-2.34		-2.22		-2.54		-14.85		34.95		36.63		950.25		11.68		23.77	
	01:13:46	-2.43		-2.33		-2.22		-2.53		-14.85		34.84		36.48		950.25		11.99		23.77	
POSTTRIP	01:14:16	-2.43		-2.33		-2.22		-2.53		-14.85		34.54		36.19		950.25		12.54		23.77	

BOP Post Trip Recall Log Example Edit

MISSISSIPPI POWER AND LIGHT COMPANY
GRAND GULF NUCLEAR UNIT ONE
----------SEQUENCE OF EVENTS LOG----------
2/06/85 18:35:33

THE FIRST EVENT OCCURRED AT 2/06/85 18:35:00.000

TIME AFTER FIRST EVENT	POINT ID	SERVICE DESCRIPTION	POINT STATUS	QTY	MESSAGE TYPE
0.000 SECS	N62K013B	SJAE B STEAM FLOW	LOW		TRIP
2.517 SECS	N62K013B	SJAE B STEAM FLOW	LOW		TRIP
13.393 SECS	N62K013B	SJAE B STEAM FLOW	LOW		TRIP
15.763 SECS	N62K013B	SJAE B STEAM FLOW	LOW		TRIP
16.666 SECS	N62K013B	SJAE B STEAM FLOW	LOW		TRIP
17.693 SECS	N62K013B	SJAE B STEAM FLOW	LOW		TRIP
29.896 SECS	N62K013B	SJAE B STEAM FLOW	LOW		TRIP

BOP Sequence of Events Log Example Edit

123436	78.5	6.6	6.1	997.5	35.7	12.7	400.3	8.2	68.4	13.5
123441	78.3	6.7	6.1	997.5	36.1	12.7	400.2	8.2	68.5	13.5
123446	78.9	6.6	6.1	997.5	36.3	12.7	400.3	8.2	68.5	13.5
123451	78.2	6.6	6.1	997.5	36.6	12.7	400.1	8.2	68.4	13.5
123456	78.3	6.6	6.0	997.5	36.8	12.7	400.1	8.2	68.4	13.5
123501	79.1	6.6	6.0	997.9	38.4	12.7	400.1	8.3	68.6	13.6
123506	79.5	6.6	6.0	997.5	38.1	12.7	400.1	8.2	68.5	13.6
123511	78.1	6.6	6.0	997.5	36.5	12.7	400.1	8.2	68.4	13.6
123516	77.8	6.5	6.0	997.5	36.4	12.7	400.1	8.2	68.5	13.6
123521	78.2	6.5	6.0	997.5	36.2	12.7	400.1	8.2	68.3	13.6
123526	78.3	6.5	6.0	997.5	35.9	12.7	400.3	8.2	68.4	13.6
123531	78.6	6.5	5.9	997.5	35.9	12.7	400.3	8.2	68.5	13.6
123536	78.3	6.6	6.0	997.9	35.4	12.7	400.5	8.2	68.6	13.6
123541	77.7	6.6	6.0	997.5	35.5	12.7	400.5	8.2	68.5	13.6
123546	78.1	6.6	6.0	997.5	35.6	12.7	400.5	8.2	68.5	13.6
123551	78.4	6.6	6.0	997.9	35.5	12.7	400.5	8.2	68.6	13.6
123556	77.9	6.6	6.1	997.5	36.0	12.7	400.5	8.2	68.5	13.6
123601	78.5	6.6	6.1	997.5	35.8	12.7	400.5	8.2	68.4	13.5
123606	78.0	6.6	6.0	997.5	35.8	12.7	400.5	8.2	68.5	13.5
123611	78.8	6.6	6.1	997.5	36.0	12.7	400.3	8.2	68.4	13.5

123647 SEQUENCE-OF-EVENTS LOG

TIME	CYCLES	PT.ID	DESCRIPTION	ALM STATUS
123146	17	C51NC078	APRM THERMAL POWER CH H	SEQ TRIP
123146	17	C51NC094	NEUT MON SYSTEM CH B2	SEQ TRIP
123146	18	C71NC010	REACTOR SCRAM DIV 2 OR 4	SEQ TRIP
123151	19	C51NC078	APRM THERMAL POWER CH H	SEQ RSET
123151	19	C51NC094	NEUT MON SYSTEM CH B2	SEQ RSET
123151	58	C51NC094	NEUT MON SYSTEM CH B2	SEQ TRIP
123151	58	C51NC078	APRM THERMAL POWER CH H	SEQ TRIP
123154	28	C51NC078	APRM THERMAL POWER CH H	SEQ RSET
123154	29	C51NC094	NEUT MON SYSTEM CH B2	SEQ RSET
123154	35	C51NC094	NEUT MON SYSTEM CH B2	SEQ TRIP
123154	36	C51NC078	APRM THERMAL POWER CH H	SEQ TRIP
123154	52	C51NC078	APRM THERMAL POWER CH H	SEQ RSET
123154	53	C51NC094	NEUT MON SYSTEM CH B2	SEQ RSET
123155	9	C51NC094	NEUT MON SYSTEM CH B2	SEQ TRIP
123155	10	C51NC078	APRM THERMAL POWER CH H	SEQ TRIP
123200	11	C51NC078	APRM THERMAL POWER CH H	SEQ RSET
123200	12	C51NC094	NEUT MON SYSTEM CH B2	SEQ RSET
123200	24	C51NC094	NEUT MON SYSTEM CH B2	SEQ TRIP
123200	24	C51NC078	APRM THERMAL POWER CH H	SEQ TRIP
123203	15	C51NC078	APRM THERMAL POWER CH H	SEQ RSET
123203	16	C51NC094	NEUT MON SYSTEM CH B2	SEQ RSET
123209	5	C71NC010	REACTOR SCRAM DIV 2 OR 4	SEQ RSET

NSSS Sequence of Events Example Edit

MISSISSIPPI POWER AND LIGHT COMPANY
GRAND GULF NUCLEAR UNIT ONE
----------ALARM LOG DISPLAY----------
7/18/85 07:48:51

1

TIME	TYPE	POINT ID	SERVICE DESCRIPTION	ALARMED VALUE	QLTY	UNITS	ALARM LIMIT VALUE
07:48:07	CI	N21N035A	RFP A SEAL WTR STRNR DP	HIGH			
07:48:08	RTN	N21N035A	RFP A SEAL WTR STRNR DP	NOT HIGH			
07:48:09	HIGH	N33N024	SEAL STM GEN DR TANK LEVEL	8.2906		IN	5.0000
07:48:10	RTN	N71N554B	CWP MOTOR B BOT BRG HORZ	2.9172		MILS	3.0000
07:48:12	RTN	N23N011A	FDW HTR 2A DR VALVE POSITION	3.2187		%	0.0000
07:48:14	RTN	N33N030	SSG DR TK DUMP VLV POSN	37.4000		%	0.0000
07:48:18	LOW	N35R043A	1STG DR TK NORM VLV CONT OUT	-0.5000		%	0.0000
07:48:20	HIGH	N71N554B	CWP MOTOR B BOT BRG HORZ	3.0001		MILS	3.0000
07:48:20	CI	N21N035A	RFP A SEAL WTR STRNR DP	HIGH			
07:48:21	RTN	N21N035A	RFP A SEAL WTR STRNR DP	NOT HIGH			
07:48:24	LOW	N33N030	SSG DR TK DUMP VLV POSN	-1.3000		%	0.0000
07:48:27	RTN	T48N600D	ENCL BLDG OUTSIDE DIFF PRESS	NOT LOW			
07:48:27	HIGH	N19N461B	CNDS BSTR PMP B BRG HORZ BOT	1.5281		MILS	1.5000
07:48:28	RTN	N35R043A	1STG DR TK NORM VLV CONT OUT	1.0012		%	0.0000
07:48:28	CI	N21N035A	RFP A SEAL WTR STRNR DP	HIGH			
07:48:29	RTN	N33N024	SEAL STM GEN DR TANK LEVEL	3.3004		IN	5.0000
07:48:29	RTN	N21N035A	RFP A SEAL WTR STRNR DP	NOT HIGH			
07:48:30	HXDR	N71R602	MAKEUP VALVE CONT OUT	102.3437	S	%	
07:48:30	HXDR	C11N009	CRD COOLING WTR FLOW	-0.0000	B	GPM	
07:48:34	CI	N21N035A	RFP A SEAL WTR STRNR DP	HIGH			
07:48:35	RTN	N21N035A	RFP A SEAL WTR STRNR DP	NOT HIGH			
07:48:38	HIGH	N35N015A	1 STG RHTR DR TK A LEVEL	17.4059		IN WC	15.5000
07:48:38	RTN	N23R050C	HTR 2C NORM VLV CONT OUT	2.7500		%	0.0000
07:48:38	HIGH	N35N012A	1 STG RHTR DR TK A LEVEL	16.9997		IN WC	15.5000
07:48:45	HIGH	N43N142B	GEN STATOR SLOT 42 UPR BAR	123.5228		C	120.0000
07:48:45	CI	N21N035A	RFP A SEAL WTR STRNR DP	HIGH			
07:48:46	RTN	N21N035A	RFP A SEAL WTR STRNR DP	NOT HIGH			
07:48:48	RTN	N35N015A	1 STG RHTR DR TK A LEVEL	12.9451		IN WC	15.5000
07:48:48	LOW	N23R050C	HTR 2C NORM VLV CONT OUT	-0.0625		%	0.0000
07:48:48	RTN	N35N012A	1 STG RHTR DR TK A LEVEL	12.5935		IN WC	15.5000
07:48:50	RTN	N71N554B	CWP MOTOR B BOT BRG HORZ	2.9282		MILS	3.0000
07:48:50	HIGH	N71R602	MAKEUP VALVE CONT OUT	100.9375		%	100.0000

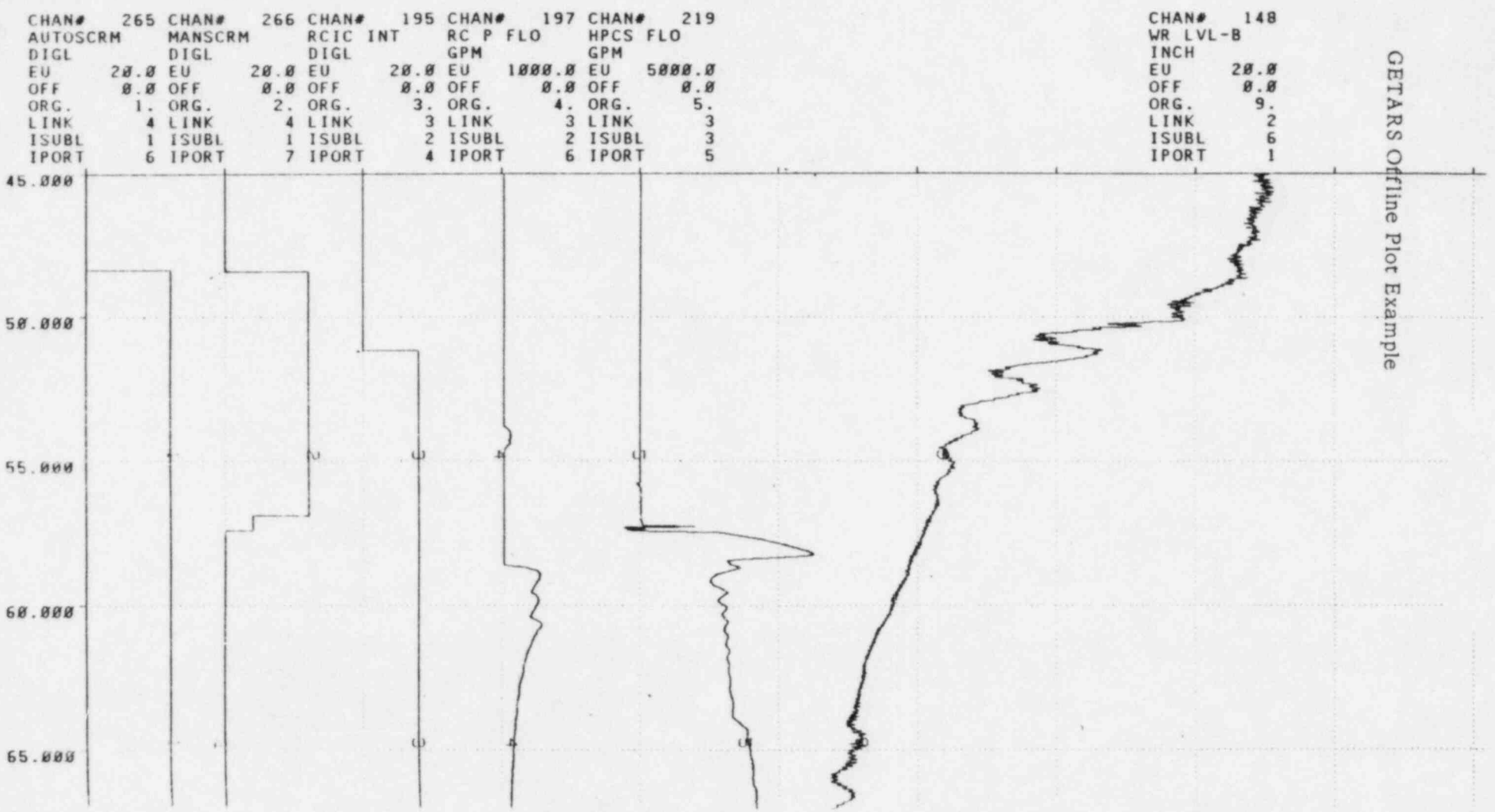
BOP Alarm Log Example Edit

NSSS Alarm Log Example Edit

```
   3411 A   66.6
   4211 A   60.8
   4211 D   27.6
   5011 A   48.8
   1019 A   52.8
   1819 A   54.0

 OD-18.  ALARM LIST EDIT ABORTED.

DEMAND OD5 OR P1 IF CALCULATION OF UPDATED LPRM ALARM TRIP SETTINGS IS DESIRED.
094810 ALM  C11NC032 ROD IS BEING DRIVEN       YES
094811 ALM  C11NC003 ROD BEING WITHDRAWN       YES
094813 NORM C11NC003 ROD BEING WITHDRAWN       NO
094814 ALM  C11NC022 ROD WITHDRAW PERMITTED    NO
094817  ROD 28-37 FROM   2  TO   4
094819 NORM C11NC032 ROD IS BEING DRIVEN       NO
094900 HIGH C51NA527 LPRM 10-19 FLX LV D          26.20    26.11
094901 NORM C11NC022 ROD WITHDRAW PERMITTED    YES
094905 NORM C51NA527 LPRM 10-19 FLX LV D          26.00
 OD-18.  LPRM ALARMS   07-18-85  0949  GRAND GULF 1


   1011 A   30.2
   1811 A   51.6
   2611 A   65.4
   2611 D   26.4
   3411 A   66.4
   4211 A   60.6
   4211 D   27.4
   5011 A   48.8
   1019 A   52.8
   1819 A   54.0

 OD-18.  ALARM LIST EDIT ABORTED.

DEMAND OD5 OR P1 IF CALCULATION OF UPDATED LPRM ALARM TRIP SETTINGS IS DESIRED.
094912 ALM  C11NC032 ROD IS BEING DRIVEN       YES
094913 NORM C11NC032 ROD IS BEING DRIVEN       NO
094915 ALM  C11NC032 ROD IS BEING DRIVEN       YES
094915  ROD 36-29 FROM   0  TO -99
094916 ALM  C11NC003 ROD BEING WITHDRAWN       YES
094917 NORM C11NC003 ROD BEING WITHDRAWN       NO
094922  ROD 36-29 FROM -99  TO   2
094924 NORM C11NC032 ROD IS BEING DRIVEN       NO
094934 ALM  C11NC032 ROD IS BEING DRIVEN       YES
094936 ALM  C11NC003 ROD BEING WITHDRAWN       YES
094937 NORM C11NC003 ROD BEING WITHDRAWN       NO
094939 ALM  C11NC022 ROD WITHDRAW PERMITTED    NO
094942  ROD 36-29 FROM   2  TO   4
094944 NORM C11NC032 ROD IS BEING DRIVEN       NO
094948 NORM C11NC022 ROD WITHDRAW PERMITTED    YES
094956 ALM  C11NC032 ROD IS BEING DRIVEN       YES
094956  ROD 28-29 FROM   0  TO -99
094957 ALM  C11NC003 ROD BEING WITHDRAWN       YES
094959 NORM C11NC003 ROD BEING WITHDRAWN       NO
095000 HIGH C51NA595 LPRM 34-35 FLX LV D          30.00    29.87
095001 HIGH C51NA527 LPRM 10-19 FLX LV D          26.20    26.01
095003  ROD 28-37 FROM -99  TO   2
```

O F F - L I N E P L O T
SENTINEL
FILE #9999
RUN # 1
DATE 6/27/85
TIME @ START OF RUN 1: 0:24:967
SENTINEL TRIP CH# 66 AT 1: 1:13: 39 DATE : 6/27/1985
BEGINNING AT 45.00 SECS. FROM START OF RUN

5.000SEC./GRID LINE



GETARS Offline Plot Example

Post Trip Log Example Edit

NSS	C51NA051	C34NA002	C34NA003	C34NA001	C34NA004	C34NA005	B21NA002	B21NA001	B33NA001	C34NA006
103018	93.8	8.0	7.4	1015.9	-9.6	15.4	412.0	19.7	110.1	16.6
103023	92.2	8.0	7.4	1015.9	-9.6	15.4	412.0	19.6	110.0	16.6
103028	93.4	8.0	7.4	1015.9	-9.6	15.4	411.9	19.7	110.0	16.6
103033	92.0	8.0	7.4	1016.3	-9.6	15.4	411.9	19.7	110.2	16.6
103038	93.1	8.0	7.4	1016.3	-9.7	15.4	411.9	19.7	110.4	16.6
103043	93.7	8.0	7.4	1015.5	-9.6	15.4	412.0	19.6	110.1	16.6
103048	93.5	7.9	7.4	1015.9	-9.7	15.4	412.0	19.7	110.0	16.6
103053	92.7	8.0	7.4	1015.9	-9.6	15.4	412.2	19.7	110.0	16.6
103058	93.0	8.0	7.4	1015.9	-9.7	15.4	412.2	19.6	110.1	16.6
103103	93.4	7.9	7.4	1015.9	-9.7	15.4	412.2	19.6	110.0	16.6
103108	93.2	7.9	7.3	1015.5	-9.7	15.4	412.2	19.6	109.8	16.6

AFFECT OF CHART SPEED ON USEFULNESS OF DATA FOR DESIRABLE PARAMETERS

1. Neutron Flux, Power

As indicated in Item 6.4 on Attachment I, neutron flux levels are recorded on recorders on the P680 panel in the control room. These recorders are used for both Intermediate Range Monitors and the Average Power Range Monitor indication. The recorders normally run at the 3/4 inch per hour speed. They do not automatically shift to fast speed but may be manually shifted. One recorder is normally shifted to fast speed during reactor startup during the power increase from the startup range to mode 1.

The 3/4 inch per hour chart speed is sufficient to determine the minimum or maximum value reached, however, it is difficult to determine the actual sequence of events due to the normally rapid change in power during transients involving a scram. The chart recorder is good for recording slow trends, steady state readings, and determining the maximum APRM reading achieved.

2. Drywell Pressure (Containment Pressure)

As indicated by Item 9.4 of Attachment I, there are two multi-pen recorders on panel 1H13-P870 in the control room which record both containment and drywell pressure.

These recorders normally operate in the 3/4 inch per hour speed. This is adequate for most transients which do not involve a significant change in drywell or containment pressure. The recorders shift to 3/4 inch per minute when vessel level drops to Level 2 or on high drywell pressure. This allows better real time monitoring of containment and drywell pressures.

3. Primary System Pressure and Level

Items 11.4 and 12.4 in Attachment I list the recorders which monitor vessel pressure and level. These recorders normally operate at slow speed and are used to monitor pressure and level during normal operation. Two recorders for each parameter have the capability of automatically shifting to fast speed. These recorders monitor both wide range pressure and wide range level and shift from slow speed (one inch per hour) to fast speed (one inch per minute) when vessel pressure is high or if vessel level drops to Level 3. These recorders are useful for trending during normal and transient operation. The present chart speeds compliment this usage.

4. Feedwater Flow and Steam Flow

The recorders which monitor feedwater flow and steam flow are listed in Items 16.4 and 17.4 of Attachment I. These recorders operate at 3/4 inch per hour and are useful for determining slow trends and maximum/minimum values for flow. Chart speed does not have any significant affect for this usage.

USE OF THE GETARS COMPUTER

The following statement is listed under the explanation of responsibilities in MP&L letter AECM-84/0465 dated November 2, 1984:

"The Shift Technical Advisor is responsible for:
. . . Ensuring that the GETARS is operating in "SENTINEL MODE" whenever the reactor is in Operational Condition 1 or 2 and startup testing requiring use of GETARS is not in progress".

This statement was taken from the GGNS Post Trip Analysis procedure 01-S-06-26 Revision 3. At the time this statement was written, GETARS was used only for startup testing and Sentinel mode operation. This statement is shortsighted because it does not allow for GETARS equipment maintenance during power operations or use of the machine for other activities such as tuning and surveillance activities. It was not the intention to limit the use of GETARS to Sentinel mode operation.

MP&L's post-trip review is performed using a variety of information sources including computers, chart recorders, and personnel logs and observations. While all data sources may not be available for every transient, there is adequate redundancy available so that a restart decision can be made. GETARS is one of the many engineering tools available for use in post-trip analysis. However, when it is not available, a post-trip analysis can still be performed. MP&L intends to reword the statement above by substituting the words "other activities" for "startup testing".

ADDITIONAL INFORMATION ON TIME DISCRIMINATION CAPABILITIES OF COMPUTERS

Time discrimination of NSSS sequence of events points is within 10 milliseconds of the point tripping. In addition to the SOE and Post Trip Log, the NSSS computer has an alarm edit which is output on the I/O typer in the computer room. Points which are printed (referred to as associated points in this submittal) have a time discrimination of within one second of their scan frequencies.

The BOP computer has alarm and status points (referred to as associated points in this submittal) which automatically cause alarm and/or status messages to be printed on the alarm typer in the control room. The time discrimination is within the scan frequency of the point in question.

The data collection capability of the GETARS Sentinel program is a function of the number of channels to be scanned and the scan rate. The present configuration consists of 238 channels at 250 samples per second per channel. This results in data retention for approximately 48 seconds prior to the Sentinel trip and approximately 4 minutes after the trip.