INEEL
IDAHO NATIONAL ENGINEERING & ENVIRONMENTAL LABORATORY

LOCKHEED MARTIN

LOCKHEED MARTIN IDAHO TECHNOLOGIES COMPANY
FAX TRANSMITTAL

Date: 01/12/00

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Number of pages INCLUDING Cover page: 11

NOTE/MESSAGE

GLENN:

LOC ET, FTS, Cutsets:

P.O. Box 1625, Idaho Falls, ID 83415-3860
For OVERNIGHT: 2525 N. Fremont Ave., Idaho Falls, ID 83415-3860

LOSS OF COOLING	CONTROL ROOM ALARMS	OTHER INDICATIONS OF LOSS OF COOLING	OPERATOR RECOVERY OF COOLING SYSTEM	OPERATOR INITIATES MAKEUP USING FIRE PUMPS	RECOVERY USING OFFSITE SOURCES				
IE-LOC	CRA	IND	OCS	OFD	OFB	#	SEQUENCE-NAMES	END-STATE-NAMES	FREQUENCY
						1	IE-LOC	OK	
						2	IE-LOCOCS	OK	
						3	IE-LOCOCSOFD	OK	
						4	IE-LOCOCSOFDOFB	SFP3FT	1.197E-008
						5	IE-LOCCRA	OK	
						6	IE-LOCCRAOCS	OK	
						7	IE-LOCCRAOCSOFD	OK	
						8	IE-LOCCRAOCSOFDOFB	SFP3FT	1.530E-010
						9	IE-LOCCRAIND	OK	
						10	IE-LOCCRAINDOFD	OK	
						11	IE-LOCCRAINDOFDOFB	SFP3FT	2.255E-009

IE-LOC

LOC-OCS-U
LOC-OFD
LOC-OFB

LOC-CRA
LOC-OCS-L
LOC-OFD
LOC-OFB

LOC-IND
LOC-OFD-L
LOC-OFB-L

SEQUENCE CUT SETS (QUANTIFICATION) REPORT

Family : NRC-SFP   Sequence : 04
Analysis : RANDOM   Event Tree : IE-LOC
Case   : CURRENT   Init. Event : IE-LOC
        Mincut Upper Bound : 1.197E-008

Cut No.	% Total	% Cut Set	Prob/ Freq.	CURRENT CUT SETS
1	90.2	90.2	1.1E-008	HEP-COOL-REP-E, HEP-RECG-FWSTART
2	97.8	7.6	9.1E-010	FP-2PUMPS-FTF, HEP-COOL-REP-E, HEP-FW-REP-DEPEN, HEP-INV-OFFSITE
3	100.0	2.3	2.7E-010	HEP-COOL-REP-E, HEP-FW-START, HEP-INV-OFFSITE

Family : NRC-SFP   Sequence : 08
Analysis : RANDOM   Event Tree : IE-LOC
Case   : CURRENT   Init. Event : IE-LOC
        Mincut Upper Bound : 1.530E-010

Cut No.	% Total	% Cut Set	Prob/ Freq.	CURRENT CUT SETS
1	78.4	78.4	1.2E-010	HEP-COOL-REP-L, HEP-RECG-FWSTART, SPC-LVL-LOP
2	90.2	11.8	1.8E-011	HEP-COOL-REP-L, HEP-DIAG-ALARM, HEP-RECG-FWSTART
3	96.8	6.6	1.0E-011	FP-2PUMPS-FTF, HEP-COOL-REP-L, HEP-FW-REP-DEPEN, HEP-INV-OFFSITE, SPC-LVL-LOP
4	98.7	2.0	3.0E-012	HEP-COOL-REP-L, HEP-FW-START, HEP-INV-OFFSITE, SPC-LVL-LOP
5	99.7	1.0	1.5E-012	FP-2PUMPS-FTF, HEP-COOL-REP-L, HEP-DIAG-ALARM, HEP-FW-REP-DEPEN, HEP-INV-OFFSITE
6	100.0	0.3	4.5E-013	HEP-COOL-REP-L, HEP-DIAG-ALARM, HEP-FW-START, HEP-INV-OFFSITE

Family : NRC-SFP   Sequence : 11
Analysis : RANDOM   Event Tree : IE-LOC
Case   : CURRENT   Init. Event : IE-LOC
        Mincut Upper Bound : 2.253E-009

Cut No.	% Total	% Cut Set	Prob/ Freq.	CURRENT CUT SETS
1	99.9	99.9	2.3E-009	HEP-DIAG-ALARM, HEP-RECG-FWSTART-L, HEP-WLKDWN-DEPEN
2	100.0	0.1	3.0E-012	HEP-RECG-FWSTART-L, HEP-WLKDWN-LSFPC, SPC-LVL-LOP
3	100.0	0.0	7.5E-014	FP-2PUMPS-FTF, HEP-DIAG-ALARM, HEP-FW-REP-DEPEN, HEP-INV-OFFSITE, HEP-WLKDWN-DEPEN
4	100.0	0.0	2.3E-014	HEP-DIAG-ALARM, HEP-FW-START, HEP-INV-OFFSITE, HEP-WLKDWN-DEPEN

OPERATOR FAILS
TO OBSERVE LOC
EVENT DURING
WALKDOWN

LOC-IND

ONLY DIAGNOSIS
FAILURES

DIAGNOSIS AND
HARDWARE FAILURES

GFFT130-A

LOC-IND-A

OPERATOR FAILS TO
OBSERVE LSFPC
DURING WALKDOWN
(DEPENDENT EVENT)

OPERATOR FAILS TO
RESPOND GIVEN
ALARM

LOCAL
FAULTS CAUSING
LOSS OF INDICATION

OPERATOR FAILS TO
OBSERVE LSFPC DURING
WALKDOWN
(NO DEPENDENCY)

HEP-WLKDWN-DEPEN

HEP-DIAG-ALARM

SPC-LVL-LOP

HEP-WLKDWN-LSFPC

FAILURE TO RECOVER
COOLING SYSTEM

LOC-OCS-L

OPERATOR FAILS TO
RESTORE SFPC-LATE
NO DEPENDENCE

HEP-COOL-REP-L

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          ┌─────────────────────┐
          │  FAILURE TO RECOVER │
          │   OFFSITE SOURCES   │
          └─────────────────────┘
                   LOC-OFB-L
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FAILS TO DIAGNOSE
NEED TO START FW

HEP-RECG-FWSTART-L

FAILURE TO
DIAGNOSE/RECOVER VIA
OFFSITE SOURCES (85 HRS)
(DEPENDENT EVENT)

HEP-INV-OFFSITE

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                        ┌─────────────────┐
                        │ OPERATOR FAILS  │
                        │ TO RESPOND TO   │
                        │   CR ALARM      │
                        └─────────────────┘
                              LOC-CRA

   ┌─────────────────┐                      ┌─────────────────┐
   │ OPERATOR FAILS  │                      │     LOCAL       │
   │ TO RESPOND GIVEN│                      │ FAULTS CAUSING  │
   │     ALARM       │                      │LOSS OF INDICATION│
   └─────────────────┘                      └─────────────────┘
           ○                                        ○

   HEP-DIAG-ALARM                             SPC-LVL-LOP
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FAILURE TO PROVIDE MAKEUP USING FW SYSTEM

LOC-OFD-L

FAILS TO DIAGNOSE NEED TO START FW

HEP-RECG-FWSTART-L

FAILURE TO MAKEUP INVENTORY BY USE OF FIRE PROTECTION PUMP

LOC-OFD-LA

OPERATOR FAILS TO ESTABLISH ALTERNATE COOLING - EARLY

HEP-FW-START

DIESEL AND ELECTRIC PUMPS FAIL TO START AND RUN

FP-2PUMPS-FTF

FAILS TO REPAIR DIESEL OR ELECTRIC PUMP - DEPENDENCY (85 HRS)

HEP-FW-REP-DEPEN

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            ┌──────────────────────┐
            │  FAILURE TO RECOVER  │
            │   COOLING SYSTEM     │
            └──────────────────────┘

                  LOC-OCS-U

            ┌──────────────────────┐
            │   OPERATOR FAILS TO  │
            │ RESTORE SFPC-EARLY   │
            │   NO DEPENDENCE      │
            └──────────────────────┘

                HEP-COOL-REP-E
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FAILURE TO RECOVER
OFFSITE SOURCES
(85 HRS)

LOC-OFB

FAILS TO DIAGNOSE
NEED TO START FW

HEP-RECG-FWSTART

FAILURE TO
DIAGNOSE/RECOVER VIA
OFFSITE SOURCES (85 HRS)
(DEPENDENT EVENT)

HEP-INV-OFFSITE

FAILURE TO PROVIDE
MAKEUP USING FW
SYSTEM

LOC-OFD

FAILS TO DIAGNOSE
NEED TO START FW

HEP-RECG-FWSTART

FAILURE TO MAKEUP
INVENTORY BY USE OF
FIRE PROTECTION PUMP

LOC-OFD-A

OPERATOR FAILS TO
ESTABLISH ALTERNATE
COOLING - EARLY

HEP-FW-START

DIESEL AND ELECTRIC
PUMPS FAIL TO
START AND RUN

FP-2PUMPS-FTF

FAILS TO REPAIR
DIESEL OR ELECTRIC
PUMP - DEPENDENCY
(85 HRS)

HEP-FW-REP-DEPEN