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Analysis of Core Damage Frequency: Surry, Unit 1 Internal Events Appendices

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Sandia National Laboratories

Prepared for
U.S. Nuclear Regulatory Commission

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ABSTRACT

This document contains the appendices for the accident sequence analyses of internally initiated events for the Surry Nuclear Station, Unit 1. This is one of the five plant analyses conducted as part of the NUREG-1150 effort by the Nuclear Regulatory Commission. NUREG-1150 documents the risk of a selected group of nuclear power plants. The work performed and described here is an extensive reanalysis of that published in November 1986 as NUREG/CR-4550, Volume 3. It addresses comments from numerous reviewers and significant changes to the plant systems and procedures made since the first report. The uncertainty analysis and presentation of results are also much improved. The context and detail of this report are directed toward PRA practitioners who need to know how the work was performed and the details for use in further studies.

The mean core damage frequency at Surry was calculated to be 4.0E-5 per year, with a 95% upper bound of 1.3E-4 and 5% lower bound of 6.8E-6 per year. Station blackout type accidents (loss of all AC power) were the largest contributors to the core damage frequency, accounting for approximately 68% of the total. The next type of dominant contributors were Loss of Coolant Accidents (LOCAs). These sequences account for 15% of core damage frequency. No other type of sequence accounts for more than 10% of core damage frequency.

The numerical results are dominated by the frequency of loss of offsite power, probabilities for non-recovery of offsite power, and diesel generator failure probabilities. Considerable effort was expended on the modeling of station blackout sequences, including the development of a reactor coolant pump seal LOCA model through elicitation of expert judgment. The study results can also be used to show the benefit of cross ties of important systems, between the two units at the Surry Station.

This report evaluates core damage frequency from internally initiated events. The consequences of these accidents are evaluated and reported under separate cover. Core damage sequences from externally initiated events are reported in Part 3 of this volume.

CONTENTS

FOREWORD

This is one of numerous documents that support the preparation of the NUREG-1150 document by the NRC Office of Nuclear Regulatory Research. Figure 1 illustrates the front-end documentation. There are three interfacing programs at Sandia National Laboratories performing this work: the Accident Sequence Evaluation Program (ASEP), the Severe Accident Risk Reduction Program (SARRP), and the Phenomenology and Risk Uncertainty Evaluation Program (PRUEP). The Zion PRA was performed at Idaho National Engineering Laboratory and Brookhaven National Laboratory.

Table 1 is a list of the original primary documentation and the corresponding revised documentation. There are several items that should be noted. First, in the original NUREG/CR-4550 report, Volume 2 was to be a summary of the internal analyses. This report was deleted. In Revision 1, Volume 2 now is the expert judgment elicitation covering all plants. Volumes 3 and 4 include external events analyses for Surry and Peach Bottom, respectively.

The revised NUREG/CR-4551 covers the analysis included in the original NUREG/CR-4551 and NUREG/CR-4700. However, it is different from NUREG/CR-4550 in that the results from the expert judgment elicitation are given in four parts to Volume 2 with each part covering one category of issues. The accident progression event trees are given in the appendices for each of the plant analyses.

Originally, NUREG/CR-4550 was published without the designation "Draft for Comment." Thus, this revision of NUREG/CR-4550 is designated Revision 1. The label Revision 1 is used consistently on all volumes except Volume 2, which was not part of the original documentation. NUREG/CR-4551 was originally published as a "Draft for Comment" so, in its final form, no Revision 1 designator is required to distinguish it from the previous documentatation.

There are several other reports published in association with NUREG-1150. These are:

NUREG/CR-5032, SAND87-2428, Modeling Time to Recovery and Initiating Event Frequency for Loss of Off-site Power Incidents at Nuclear Power Plants, R. L. Iman and S. C. Hora, Sandia National Laboratories, Albuquerque, NM, January 1988.

NUREG/CR-4840, SAND88-3102, Recommended Procedures for External Event Risk Analyses for NUREG-1150, M. P. Bohn and J. A. Lambright, Sandia National Laboratories, Albuquerque, NM, November 1989.

SUPPORT DOCUMENTS TO NUREG - 1150

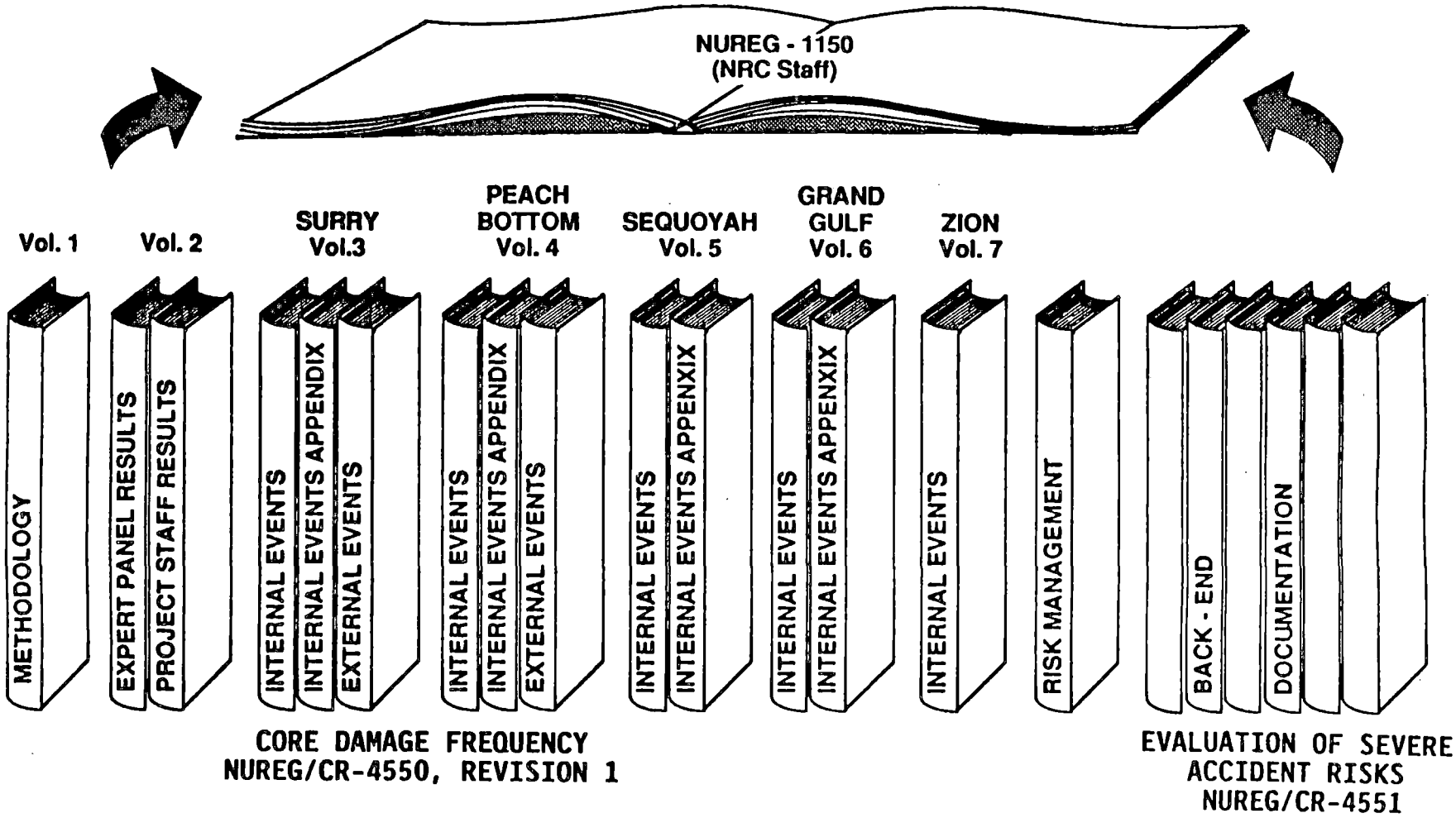

FIGURE 1. DOCUMENTATION FOR NUREG-1150.

Table 1.
NUREG-1150 Analysis Documentation

Original Documentation

NUREG/CR-4550
Analysis of Core Damage Frequency From Internal Events

Volume 1 Methodology
2 Summary (Not Published)
3 Surry Unit 1
4 Peach Bottom Unit 2
5 Sequoyah Unit 1
6 Grand Gulf Unit 1
7 Zion Unit 1

NUREG/CR-4551
Evaluation of Severe Accident Risks and the Potential for Risk Reduction

Volume 1 Surry Unit 1
2 Sequoyah Unit 1
3 Peach Bottom Unit 2
4 Grand Gulf Unit 1
5 Zion Unit 1

NUREG/CR-4700
Containment Event Analysis for Potential Severe Accidents

Volume 1 Surry Unit 1
2 Sequoyah Unit 1
3 Peach Bottom Unit 2
4 Grand Gulf Unit 1

Revised Documentation

NUREG/CR-4550, Revision 1
Analysis of Core Damage Frequency

Volume 1 Methodology
2 Part 1 Expert Judgment Elicit. Expert Panel
Part 2 Expert Judgment Elicit.--Project Staff
3 Part 1 Surry Unit 1 Internal Events
Part 2 Surry Unit 1 Internal Events App.
Part 3 Surry Unit 1 External Events
4 Part 1 Peach Bottom Unit 2 Internal Events
Part 2 Peach Bottom Unit 2 Internal Events App.
Part 3 Peach Bottom Unit 2 External Events
5 Part 1 Sequoyah Unit 1 Internal Events
Part 2 Sequoyah Unit 1 Internal Events App.
6 Part 1 Grand Gulf Unit 1 Internal Events
Part 2 Grand Gulf Unit 1 Internal Events App.
7 Zion Unit 1 Internal Events

NUREG/CR-4551, Evaluation of Severe Accident Risks

Volume 1 Methodology
2 Part 1 Expert Judgment Elicit.--In-vessel
Part 2 Expert Judgment Elicit.--Containment
Part 3 Expert Judgment Elicit.--Structural
Part 4 Expert Judgment Elicit.--Source-Term
Part 5 Expert Judgment Elicit.--Supp. Calc.
Part 6 Expert Judgment Elicit.--Proj. Staff
Part 7 Expert Judgment Elicit.--Supp. Calc.
Part 8 Expert Judgment Elicit.--MACCS Input
3 Part 1 Surry Unit 1 Anal. and Results
Part 2 Surry Unit 1 Appendices
4 Part 1 Peach Bottom Unit 2 Anal. and Results
Part 2 Peach Bottom Unit 2 Appendices
5 Part 1 Sequoyah Unit 2 Anal. and Results
Part 2 Sequoyah Unit 2 Appendices
6 Part 1 Grand Gulf Unit 1 Anal. and Results
Part 2 Grand Gulf Unit 1 Appendices
7 Part 1 Zion Unit 1 Anal. and Results
Part 2 Zion Unit 1 Appendices

NUREG/CR-4772, SAND86-1996, Accident Sequence Evaluation Program Human Reliability Analysis Procedure, A. D. Swain III, Sandia National Laboratories, Albuquerque, NM, February 1987.

NUREG/CR-5263, SAND88-3100, The Risk Management Implications of NUREG-1150 Methods and Results, A. C. Camp et al., Sandia National Laboratories, Albuquerque, NM, December 1988.

A Human Reliability Analysis for the ATWS Accident Sequence with MSIV Closure at the Peach Bottom Atomic Power Station, A-3272, W. J. Luckas, Jr. et al., Brookhaven National Laboratory, Upton, NY, 1986.

A brief flow chart for the documentation is given in Figure 2. Any related supporting documents to the back-end NUREG/CR-4551 analyses are delineated in NUREG/CR-4551. A complete list of the revised NUREG/CR-4550, volumes and parts is given below.

General

NUREG/CR-4550, Volume 1, Revision 1, SAND86-2084, Analysis of Core Damage Frequency: Methodology Guidelines for Internal Events.

NUREG/CR-4550, Volume 2, SAND86-2084, Analysis of Core Damage Frequency from Internal Events: Expert Judgment Elicitation on Internal Events Issues - Part 1: Expert Panel Results, Part 2: Project Staff Results.

Parts 1 and 2 of Volume 2, NUREG/CR-4550 are bound together. This volume was not part of the original documentation and was first published in April 1989 and distributed in May 1989 with the title: Analysis of Core Damage Frequency from Internal Events: Expert Judgment Elicitation. In retrospect, a more descriptive title would be: Analysis of Core Damage Frequency: Expert Judgment Elicitation on Internal Events Issues.

Surry

NUREG/CR-4550, Volume 3, Revision 1, Part 1, SAND86-2084, Analysis of Core Damage Frequency: Surry Unit 1 Internal Events.

NUREG/CR-4550, Volume 3, Revision 1, Part 2, SAND86-2084, Analysis of Core Damage Frequency: Surry Unit 1 Internal Events Appendices.

NUREG/CR-4550, Volume 3, Revision 1, Part 3, SAND86-2084, Analysis of Core Damage Frequency: Surry Unit 1 External Events.

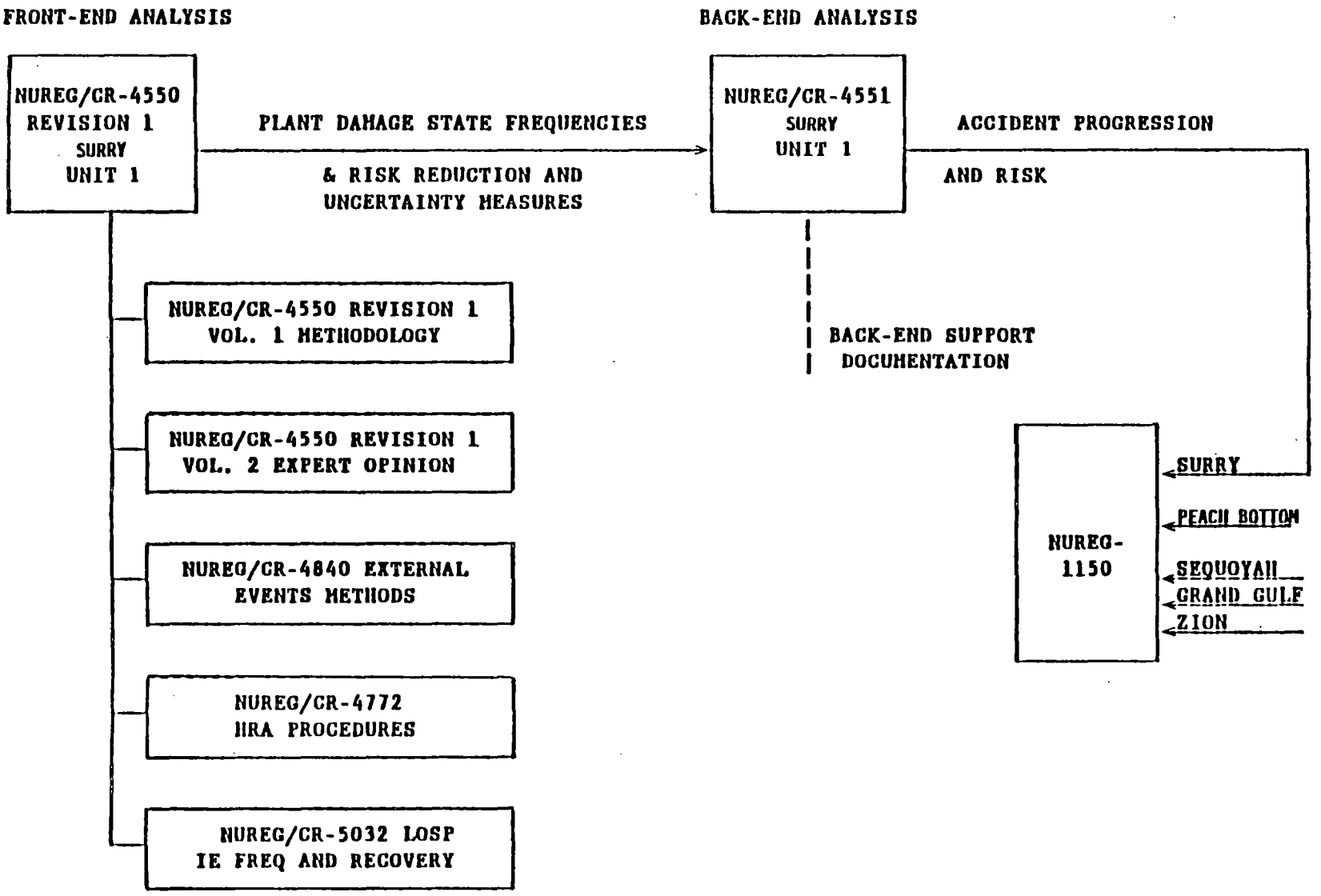

Figure 2. Surry Related Documentation.

Peach Bottom

NUREG/CR-4697, EGG-2464, Containment Venting Analysis for the Peach Bottom Atomic Power Station, D. J. Hansen et al., Idaho National Engineering Laboratory (EG&G Idaho, Inc.) February 1987.

NUREG/CR-4550, Volume 4, Revision 1, Part 1, SAND86-2084, Analysis of Core Damage Frequency: Peach Bottom Unit 2 Internal Events.

NUREG/CR-4550, Volume 4, Revision 1, Part 2, SAND86-2084, Analysis of Core Damage Frequency: Peach Bottom Unit 2 Internal Events Appendices.

NUREG/CR-4550, Volume 4, Revision 1, Part 3, SAND86-2084, Analysis of Core Damage Frequency: Peach Bottom Unit 2 External Events.

Sequoyah

NUREG/CR-4550, Volume 5, Revision 1, Part 1, SAND86-2084, Analysis of Core Damage Frequency: Sequoyah Unit 1 Internal Events.

NUREG/CR-4550, Volume 5, Revision 1, Part 2, SAND86-2084, Analysis of Core Damage Frequency: Sequoyah Unit 1 Internal Events Appendices.

Grand Gulf

NUREG/CR-4550, Volume 6, Revision 1, Part 1, SAND86-2084, Analysis of Core Damage Frequency: Grand Gulf Unit 1 Internal Events.

NUREG/CR-4550, Volume 6, Revision 1, Part 2, SAND86-2084, Analysis of Core Damage Frequency: Grand Gulf Unit 1 Internal Events Appendices.

Zion

NUREG/CR-4550, Volume 7, Revision 1, EGG-2554, Analysis of Core Damage Frequency: Zion Unit 1 Internal Events.

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APPENDIX A

A. Plant Specific Thermal Hydraulic Calculations

This appendix describes the plant specific thermal hydraulic calculations performed in the revised Surry probabilistic risk assessment. There were three important thermal hydraulic analyses performed for this study. A description and summary of these calculations was not available for this draft publication. They will be included in the final report. The three analyses are briefly described below.

A.1 Containment Pressure Rise After Loss of Containment Heat Removal

Several sequences in the Surry study involve loss of containment heat removal, with success of core make-up. These conditions were called core vulnerable conditions. Part of the resolution of core vulnerable conditions involved prediction of containment pressure rise versus time. Sandia performed a series of calculations in the Evaluation of Severe Accident Risks and the Potential for Risk Reduction: Surry Power Station, Unit 1, NUREG-4551 Volume 1, Draft for Comment, February 1987, A.S. Benjamin, et al. The portion of this report[1] describing the calculations is shown in an excerpt which follows. The results of the analysis calculated the best estimate probability of core vulnerable sequences resulting in core damage as 0.02. This probability was used for event tree heading CV and basic event CON-VFC-RP-COREM.

An additional analysis was conducted by Battelle[3] to determine whether containment failure could be predicted and the timing of such failure. This analysis was evaluated for various size LOCAs followed by failure of containment heat removal scenarios. It has been reprinted in Section A.1.2.

A.2.2 Core-Vulnerable Sequences

One type of sequence is not addressed specifically by this set of plant-damage states. This type of sequence involves conditions in which the core is being cooled by high- or low-pressure recirculation, with decay heat rejected to the containment through a break or through the pressurizer relief valves. Under these circumstances, heat removal must be provided by the containment spray recirculation systems and their heat exchangers. Because of the mass and energy discharged to containment, failure of the containment heat removal system is likely to lead eventually to overpressurization of the containment. These sequences may or may not result in core melt, and were therefore designated by ASEP as "core-vulnerable" sequences.

Several of these scenarios were examined by Battelle to ascertain whether or not containment failure would occur, and if so, when the failure would be expected. In consultation with the ASEP analysts, the SARRP team constructed a bridge event tree which identifies phenomenological events, system failures, and operator actions that might determine whether a core-vulnerable sequence proceeds to a core-damage sequence. Assessing the probabilities of the individual pathways resulted in a fraction that determines the percent of core-vulnerable sequences expected to result in core melt as a result of the initial containment failure.

Affected Sequences

For small LOCAs and transients, it was determined that the removal of decay heat via the steam generators would prevent overpressurization of containment, provided feedwater were available [2]. Even if feedwater were unavailable, the time it would take for containment to be overpressurized would be very long, although this case was retained for further analysis using the bridge event tree. The thermal hydraulic analysis of containment cooling modeled the specific Surry conditions and procedures as closely as possible.

For large and intermediate LOCAs however, the Battelle analysis showed that containment would be likely to fail at 51 hours. This result may well be conservative for two reasons. First, the Source Term Code Package does not adequately model containment heat sinks and the loss of heat to the environment is probably greater than the value calculated. Second, although the non-emergency fan coolers at Surry are at least partially submerged when

the RWST is injected, and are therefore unavailable during these accidents, the operations staff could continue to supply cooling water to the fans cooling units, achieving some degree of heat removal.

Bridge Event Tree

It is recognized that the containment failure does not automatically lead to core damage. First of all, the core cooling systems could continue to operate after the containment failure. Second, if the systems did fail, other systems could potentially be used to perform the cooling function. Third, because of the duration of the accident, the operators possibly could act to prevent overpressurization altogether, by a controlled depressurization. The ASEP sequence frequency already accounted for recovery of the heat removal systems in the time frames presented by these accidents.

In consultation with ASEP analysts, the bridge event tree illustrated in Figure A-1 was constructed to determine the probability of core-vulnerable sequences resulting in core damage. The events and phenomena that could lead to a consequential failure of emergency core systems are described below:

- Containment pressure relief. Pressure could be maintained within the containment capacity if operator action were taken to accomplish venting. The operations staff, and support personnel would have two days to take this type of corrective action.
- Injection piping not damaged. If the containment were to fail structurally, there is a potential that the injection piping itself could be damaged by the failure.
- Net-positive suction head (NPSH) for the low-pressure injection pumps maintained. As the containment depressurizes after failure, some of the water in the containment sump will flash to steam; sump water will also continue to evaporate in the ensuing period. If sufficient subcooling of the sump water is lost, the low-pressure injection pumps may fail due to a lack of adequate NPSH.
- Low-pressure injection pump in standby. In the long period following the early phases of the accident, it is very possible that the operators will secure equipment that is not needed for the immediate preservation of core cooling. If a low-pressure injection pump has been returned to a standby condition, it may be possible to maintain core cooling even if the operating pump fails due to loss of NPSH. It was judged to be likely that, in this situation, the operators would start the standby pump and take measures to protect it from failure. For example, because this situation would only arise many hours into the accident, it would be possible to stop the pump periodically if it were to begin to overheat due to NPSH problems.

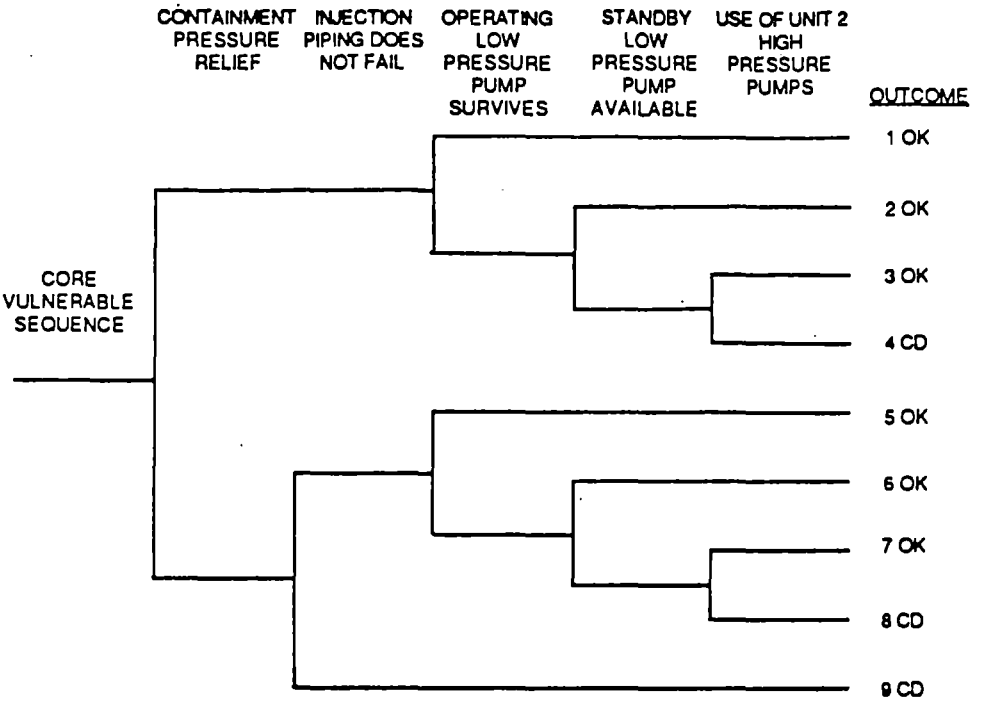

Figure A-1. Bridge Event Tree for Evaluation of Core-Vulnerable Sequences

- Use High Pressure Pump from Other Unit or Refill RWST and Use High-Pressure Injection. The high pressure systems are Surry are cross - connected between units, and the RWST inventory of Unit 2 is part of the technical specification of Unit 1. The high pressure pumps can be used to inject into the hot legs to avoid any problems with the buildup of boron. A final possibility considered in the event tree was the restoration of a level in the RWST adequate to provide suction to the high-pressure injection pumps. Again, it was judged to be likely that the operators could establish such a pathway for core cooling. Because of the reduced requirements for decay-heat removal at this point, the flow could be throttled back to prevent runout of the high-pressure injection pumps, while still providing adequate core cooling.

Of the five events, the second and third were referred to the containment review experts for consideration. The other three and the actual tree constructions were examined jointly by SARRP and ASEP.

Expert Review Input

Tables A-3 and A-4 illustrate the inputs of the reviewers for the probability of ECCS pump and piping failure as a function of containment failure size. Table A-5 shows the

probability estimates of these same reviewers for containment failure pressure and Table A-6 illustrates their estimates of containment hole size as a function of containment failure pressure. Only three of the reviewers responded to all four questions as indicated. The inputs for containment failure pressures of 67 and 180 psig were added to those of 85 and 143 psig, respectively, for the purposes of this analysis.

These inputs were combined into composites as illustrated in Table A-7. The composite results of each reviewer were used for three distinct walkthroughs of the bridge tree.

TABLE A-3
EFFECT OF CONTAINMENT FAILURE ON ECCS PUMP OPERABILITY

OUTCOME CORRELATED TO FAILURE SIZE	WEIGHTING FACTORS Reviewer 1	2	3
1. 4 sq. in.	0.0	0.0	0.0
2. .1 sq. ft.	0.0	0.0	0.0
3. .7 sq.ft.	.2	.2	.1
4. 7 sq. ft.	.3	.4	.3

TABLE A-4
EFFECT OF CONTAINMENT FAILURE ON INJECTION AND SUCTION PIPING

OUTCOME CORRELATED TO FAILURE SIZE	WEIGHTING FACTORS Reviewer 1	2	3
1. 4 sq. in.	0.0	0.0	0.0
2. .1 sq. ft.	0.0	0.0	0.0
3. .7 sq.ft.	0.0	0.0	0.0
4. 7 sq. ft.	.1	.01	.1

TABLE A-5
REVIEWER INPUT FOR MEAN CONTAINMENT FAILURE PRESSURE

	MEAN FAILURE PRESSURE	WEIGHTING FACTORS Reviewer 1	2	3
1.	67 psi	0.0	0.0	0.0
2.	85 psi	.25	.2	.1
3.	119 psi	.5	.5	.3
4.	143 psi	.2	.2	.5
5.	180 psi	.05	.1	.05

TABLE A-6

CONTAINMENT FAILURE SIZE GIVEN SLOW PRESSURIZATION

OUTCOME Size of Opening	WEIGHTING FACTORS Reviewer 1	2	3
For Containment Failure Pressure 119 psig			
1. 4 sq. in.	.15	.35	.2
2. .1 sq. ft.	.2	.35	.2
3. .7 sq.ft.	.2	.2	.3
4. 7 sq. ft.	.45	.1	.3
For Containment Failure Pressure 85 psig			
1. 4 sq. in.	.15	.5	.4
2. .1 sq. ft.	.2	.4	.5
3. .7 sq.ft.	.2	.1	.1
4. 7 sq. ft.	.45	0.0	0.0
For Containment Failure Pressure 143 or 180 psig			
1. 4 sq. in.	.15	.3	0.0
2. .1 sq. ft.	.2	.3	0.0
3. .7 sq.ft.	.2	.2	.4
4. 7 sq. ft.	.45	.2	.6

TABLE A-7

OVERALL PROBABILITIES OF ECCS FAILURE

OUTCOME CORRELATED TO FAILURE SIZE	WEIGHTING FACTORS Reviewer 1	2	3
PUMP FAILURE PROBABILITY	.08	.17	.1
PIPING FAILURE PROBABILITY	.0014	.03	.019

Event Tree Sequence Description

The sequences of the bridge event tree are described briefly below. The quantification of the other events is also discussed.

Sequence 1. No core or containment damage results from this sequence. The containment pressure has been relieved and the operating pumps have not failed. The pressure relief is assumed to be controlled such that cavitation is not a problem with the operating pumps.

Sequence 2. Once again there is no core damage. The operating pump does fail, but the operator then uses the pump he previously placed in standby.

Sequence 3. This is similar to sequence 2, but the operator uses the high pressure injection pumps from Unit 2.

Sequence 4. Core damage results if the depressurization is large enough to cavitate the pumps and the operations staff does not perform any recovery action.

Sequence 5. The containment fails, but the core is maintained by the operating pumps which are not damaged by the depressurization.

Sequence 6. This is analagous to sequence 2, except that the containment does fail. The core is in a stable, cooled state.

Sequence 7. This is analagous to sequence 3, except that the containment does fail. The core is in a stable, cooled state.

Sequence 8. Core damage results because depressurization is large enough to cavitate the pumps and the operations staff does not perform any recovery action.

Sequence 9. Core damage results because the containment failure causes the injection piping to fail directly.

For the first event in the tree, containment pressure relief, a probability of 0.5 was assigned. This value was chosen because the analysts are nearly completely uncertain considering the likelihood of this event. There is certainly the time and means to affect containment venting, but to our knowledge, there are no procedures to do so. Also, both the ASEP and SARRP analyses have assumed that the instrumentation will continue to operate. If it does not, the operations staff may be very reluctant to create a containment opening without good knowledge of core and containment conditions. In addition, state and federal authorities could intervene, how, we cannot speculate.

For the fourth and fifth events, it was assessed "likely" that the staff will succeed if the operator has successfully recognized the situation and vented the containment. In keeping with

the philosophy of verbal descriptor probabilities used in the containment analysis, a value of 0.9 for success of each of these events was assigned

If venting did not occur, the fourth and fifth events are believed to be "uncertain", and a probability of 0.5 was assigned. At this point in time it is outside the scope to assess all of the reasons for failure to vent, but it is this event which is closely coupled with the other operator recoveries.

Results of the Bridge Tree Assessment

Three separate walkthroughs of the tree were quantified. All three used the split fractions of the first, fourth and fifth events discussed above. Each walkthrough differed in the second and third events by using the separate estimates of the three individual reviewers.

The probabilities of core vulnerable sequences resulting in core damage were calculated as 0.01, 0.02, and 0.04. These were used as the optimistic, central and pessimistic in the OCP analysis, respectively. In the limited Latin hypercube analysis, each result was weighted equally.*

*The resulting spread in the results is limited, perhaps more than if the uncertainty in this issue had been addressed by a larger group, or if their input had been manipulated differently.

A.1.2 EVALUATION OF LOSS OF CONTAINMENT HEAT SINK SCENARIOS FOR SURRY

Introduction

This note summarizes the results of the MARCH 3 calculations performed for the Surry S3G, S2G, S1G, and AG sequences. In these sequences a break in the primary system is accompanied by failure of the containment heat removal system; the emergency core cooling and containment spray systems are available. At the start of the incident the normal containment cooling system as well as the primary coolant pumps would be operating. Both of these would be turned off upon reaching the 25 psia containment spray initiation and containment isolation level. The operator would be expected to manually depressurize the secondary side of the steam generators over a period of four hours. For purposes of these analyses the water available to the auxiliary feedwater system was assumed to be unlimited. (The value of 100 psia for the steam generator secondary depressurization level used in the present analyses is hard-wired into MARCH; the more representative level may be 150 psia.)

The principal question to be answered by these analyses is whether containment failure would be predicted, and what would be the timing of such failure. In the event that containment failure did take place, it could be followed by failure of the emergency core cooling systems and eventual core melting.

S3G Sequence

The most probable initiating event for the S3G sequence has been indicated to be pump seal failure. ASEP analysed had previously indicated that pump seal failures would be characterized by primary system water leakages of 50 to 500 gallons per minute. In the present analysis a break area of 0.0044 sq ft, corresponding to a 0.9 inch diameter opening was used. With this break area and the predicted conditions of temperature and pressure, primary leakages of about 400 gallons per minute were observed. The emergency core cooling systems supplying makeup to the primary system were assumed to be available at their full capacities, with the pump performance curves being modeled in the analysis. With the limited break area associated with pump seal failure and the operability of the emergency core cooling systems, the primary system pressure was predicted to be maintained at about 770 psia. The balance between the leakage from the primary system and the coolant makeup rate was such that all the decay heat as well as that input by the primary pumps could be removed with no net steam generation in the primary system. With the combination of steam generator heat removal, containment cooler heat removal, and heat loss to structures, only a relatively small fraction of the total available energy was predicted to go into heating and pressurizing the containment atmosphere. The containment isolation and spray initiation setpoint of 25 psia was predicted to be reached at 3793 minutes after the start of the accident. Just prior to spray initiation about 60 percent of the decay and primary pump energy was being removed by the steam generators,

about 20 percent by the building coolers, and approximately 10 percent was being absorbed by containment structures.

The primary pumps as well as the building coolers were tripped off at spray initiation. The containment continued to pressurize slowly, with the sprays keeping the containment sump and atmosphere in equilibrium. The calculation was carried out for 12,000 minutes of accident time. At the end of the calculation the containment pressure was predicted to be 64 psia, with both the atmosphere and sump temperatures at 282 F. At this time approximately 60 percent of the decay heat was being removed by the steam generators, about 34 percent was going to structures, and the balance went to heating of the containment water inventory. At the end of the calculation the inside surface of the containment dome was predicted to be at 282 F, with the outside at 149 F. With the outside surface being predicted to have risen by 49 F, considerable heat loss to the environment would be possible. The latter is not included in the analysis.

S2G Sequence

The S2G sequence was assumed to be initiated by a primary system pipe rupture equivalent to two inches in diameter. As in the preceding S3G scenario, the auxiliary feedwater system as well as the full complement of emergency core cooling systems were assumed to be available.

For the 2 inch break the containment spray setpoint pressure was predicted to be reached in about 33 minutes after the start of the accident. The primary system pumps were initially on but were assumed to trip upon reaching the containment spray initia-

tion pressure, as in the preceding case.

With the larger break size the primary system pressure decreased failrly rapidly; this combined with the cold water injection by the emergency core cooling system resulted in primary system temperature dropping to the point where the steam generators were ineffective for heat removal. As the water supply to the primary system heated up with time, however, the steam generators were predicted to come back into play. The primary system pressure was predicted to be maintained between about 570 and 600 psia during the course of this transient. The leakage from the primary system was balanced by makeup by the emergency core cooling systems. As in the preceeding case, it was predicted that all the decay heat could be removed with no net steam generation. Thus, again, the scenario was characterized by slow heatup of the containment water inventory, with significant heat removal by the steam generators. At the end of the calculation, at 11,880 minutes into the accident, the containment pressure was predicted to be 108 psia. The atmosphere and sump water temperatures at that time were 323 and 325 F, respectively. With the sump water being supplied to the primary system at an elevated temperature, about 72 percent of the decay heat was predicted to be removed by the steam generators, with about 26 percent of the decay heat being absorbed by containment structures. Thus only a small fraction of the decay heat was going into the heatup and pressurization of the containment atmosphere. At the end of the calculation the inside surface of the containment dome was predicted to be at 323 F, with the outside at 177 F. At the latter

outside temperature considerable heat loss to the environment would be possible; the latter is not included in the analysis.

S1G Sequence

Two examples of the intermediate (S1) size break were considered for this study, one with a break diameter of four inches, and the other with a six inch diameter break.

For the four inch diameter break the primary system depressurized rapidly and the containment spray initiation pressure was reached at about 5 minutes into the accident. Thus neither the containment coolers nor the primary system pumps had a significant impact on this scenario. The emergency core cooling systems switched to the recirculation mode at about 65 minutes.

Since the primary system was predicted to depressurize rapidly, the steam generators lost their effectiveness as heat sinks early in the sequence. Due to the continuing operation of the emergency core cooling systems, however, the primary system never completely depressurized. Late in time, as the sump water being pumped to the primary system heated up, the primary system pressure was predicted to increase. With increasing primary system pressure and temperature the steam generators were predicted to be able to remove a significant fraction of the decay heat. The latter is predicated on depressurization of the steam generator secondary side to 100 psia. At the end of the calculation at 12,000 minutes, for the four inch break case the containment pressure was predicted to be 116 psia, with the atmosphere and sump temperatures at 329 and 330 F, respectively. At that time approximately 75 percent of the decay heat was going to the steam

generators and about 23 percent to the containment structures. Thus only a very small fraction of the decay heat was going into the heating of the containment sump and atmosphere. Under these conditions substantial additional time would be required to reach the failure pressure of 135 psia.

The results for the 6 inch break are very similar to the preceding case. With the larger break area the containment spray initiation setpoint was reached in about 2 minutes. Thus, again, the containment coolers and the primary system pumps were turned off very early in the sequence. The primary system pressure was predicted to drop rapidly to about 140 psia, with the emergency core cooling sytem injection precluding complete depressurization. The switch to emergency core cooling recirculation was predicted at about 45 minutes. The steam generators were ineffective for heat removal during the initial part of the accident sequence. As the containment sump water heated up, the primary system pressure and temperature increased, and heat removal from the now depressurized steam generators became possible. At 12,000 minutes into the accident the containment pressure appeared to have leveled off at 118 psia, with the atmosphere and sump temperatures at 330 and 332 F, respectively. At this time the heat removal by the steam generators and the heat losses to structures were equal to the decay heat. At the end of the calculation the inside surface of the dome was predicted to be at 330 F, with the outside at 183 F; at the latter temperature considerable heat loss to the environment would be possible, but is not considered in the analysis.

AG Sequence

In a large break loss-of-coolant-accident the MARCH code precludes heat removal by the steam generators. This is an assumption built into the code which may not be applicable under all circumstances. For the accident scenario in question, i.e., a large pipe break with loss of containment heat removal, but with all the other safety systems operational, if the break is in the cold leg the effluent from the core would have to pass through the steam generators to get to the break in the system. If the temperature of the coolant leaving the core were higher than the secondary side of the steam generators, heat removal by the steam generators would be possible. Thus the assumption of no steam generator heat removal is strictly applicable only to large hot leg break cases; the latter would be the limiting cases from the point of view of containment pressurization.

The sequence of events predicted for the AG sequence is given in Table I. At the predicted time of containment failure at 3054 minutes the containment atmosphere and sump are at 340 F. The average water temperature in the primary system is about 350 F; at this level steam generator heat removal may be possible if the flow were through the steam generators. At the time of predicted containment failure the inside surface of the containment dome is predicted to be at 340 F, with the exterior surface at 104 F. Since the latter has only increased four degrees above the assumed initial temperature, little heat loss to the environment would be indicated. The latter is not included in these analyses.

Discussion

For the small and intermediate break cases accompanied by loss of containment heat removal the present analyses indicate the steam generators to be very effective in removing decay heat and thus limiting containment pressurization. With the low containment pressurization rates indicated, it would appear highly likely that time would be available for recovery actions and containment failure could be precluded in most of the scenarios considered. This conclusion is subject to effective depressurization of the steam generator secondary, continued availability of auxiliary feedwater, and of course, the approximations inherent in the MARCH modeling of the systems and their performance.

For all the small and intermediate break cases considered here the MARCH analyses predicted that the primary system would not completely depressurize. This aspect of the analysis may be somewhat questionable due to the quite simplified modeling of the primary system by MARCH. The essential indication that the steam generators can be quite effective in these scenarios appears to be valid, however. As the sump water temperature being supplied to the primary system approaches that of the steam generator secondary, and is further elevated by core decay heat, heat transfer from the primary to the secondary will take place. The efficiency of the steam generators under the conditions in question is quite uncertain. The present analyses indicate that a substantial fraction of the decay heat can be removed even at very small temperature differences between the primary and secondary sides of the steam generators. In this regard, MARCH has hard-wired into it a secondary depressurization pressure of 100

psia, with a corresponding saturation temperature of 327.8 F. If the actual secondary side pressure is higher, the effectiveness of the steam generators would be lower than indicated in the present analyses.

In the analyses considered here no consideration was given to heat losses from the containment to the environment. For the extended scenarios associated with the small and intermediate break cases it was observed that the outside surface of the containment would experience considerable temperature increases. With such temperature rises considerable heat losses to the environment would be possible. The latter would further limit containment pressurization during the already extended scenarios. Possible heat losses to the environment would not significantly influence the containment pressurization history for the limiting case of a large hot leg pipe break.

TABLE I. ACCIDENT EVENT TIMES FOR SURRY AG SEQUENCE

EVENT	TIME,MIN
Spray On	1
ECCS Recirculation	29
Containment Fails	3054
Core Uncovers	3081
Start Melt	3156
Core Slump	3207
Core Collapse	3210
Head Fails	3371
Concrete Attack	3372

A.2 Buildup of Sump Inventory After Containment Spray Failure

An important sequence in WASH-1400 was S_2C. This represents a small LOCA followed by failure of the containment spray system. Failure of the containment spray system prevented injection of the RWST directly into containment. Because the initiator is a small, only limited break flow is discharged into containment. The result is that insufficient water is in the containment sump to support inside and outside spray recirculation systems (ISR and OSR) operation. Automatic activation of these systems without sufficient water in the sump led to pump failure.

Battelle performed a thermal hydraulic analysis[2] on these sequences to find accurate condensation rates and sump inventory levels versus time. This analysis is included in section A.2.2.

A.2.2 Thermal Hydraulic Analyses of Sump Inventory after Containment Spray Failure

SARRP SOURCE TERM ANALYSES FOR SURRY DESIGN

Introduction

The S_2C sequence was found to be one of the risk dominant sequences for the Surry design in the WASH-1400 analyses. In this sequence the initiating event is a small break in the primary coolant system and it is accompanied by failure of the containment spray injection system. In the Surry design the containment spray injection and spray recirculation systems utilize separate pumps and headers. The recirculation sprays are started automatically after a preset delay after the receipt of the spray actuation signal. For a small pipe break coupled with failure of spray injection, the automatic actuation of the recirculation sprays has been postulated to lead to the operation of the spray recirculation pumps while the sump is still dry; the latter could lead to the burnout of the pumps. Since containment heat removal is associated with the spray recirculation system, loss of the latter would imply loss of the former as well. In the absence of containment heat removal the containment pressure would increase to the failure level; the latter would be followed by the failure of the emergency core cooling system due to pump cavitation and eventual core melting. In the WASH-1400 analyses for Surry, it was postulated that the initiating event was a break in one of the in-core instrument penetrations in the reactor vessel, leading to the discharge of the primary coolant into the reactor cavity rather than the containment sump; in these analyses it was also assumed that the spray actuation signal would be received at the start of the accident. The latter would be true for a large break loss-of-coolant-accident but not necessarily applicable to other initiating events.

The likelihood that the S_2C sequence would lead to core melting is expected to be substantially lower in the current view than it was at the time of WASH-1400; however, since this sequence could still be risk significant, the availability of up to date results on the possible course of such an event would be useful in the development of an updated risk perspective for the Surry design. It will be recalled that the WASH-1400 analyses were limited in scope, focusing largely on large break initiated events, and are generally considered to be conservative in light of today's knowledge. Several MARCH 2 calculations were performed to model the S_2C sequence, considering the specific scenario postulated in WASH-1400 as well as some alternate assumptions. The key results from these analyses were the time of the receipt of the spray actuation signal and the quantity of water in the containment sump at that time. The basis for and the details of these analyses are discussed below.

Assumptions

The detailed description of the Surry plant design for the present analyses was identical to that used for the BMI-2104 source term calculations. The containment ventilation heat removal system was considered operable. The latter would be isolated at a containment pressure of 25 psia (10 psig), the containment spray actuation level. The emergency core cooling as well as the auxiliary feedwater systems were assumed to be available at their full capacities; the latter is in contrast to the WASH-1400 assumption of only minimal safety system operation. In the modeling of the emergency core cooling system the pump curve option was utilized, making pump capacity dependent on the primary system pressure. While heat removal by the steam generators was considered, depressurization of the steam generator secondary side was not included in the present analysis.

Results

The results of the WASH-1400 S_2C scenario, i.e., a break in an in-core instrument penetration in the bottom head of the reactor vessel, are discussed below. The break area for this analysis was taken to be 0.0205 sq. ft., corresponding to a 2 inch instrument line with a 0.5 inch instrument lead inside. The break was assumed to be in the vessel bottom head and discharged into the reactor cavity; when the latter as well as the in-core instrument tunnel were filled, at a total volume of 11,680 cu. ft., water was allowed to overflow into the containment sump. The MARCH 2 results for the above case indicate that the earliest time at which the containment pressure would approach the spray initiation setpoint of 25 psia is about 50 minutes from the start of the accident; though it is not clear if the sprays would be actuated at this time. At 50 minutes into the accident the reactor cavity would not have been completely filled, but there would be an excess of 130,000 lb of water on the containment floor due to steam condensation on structures. If the spray pumps were actuated at this time there would be sufficient water in the containment sump for their operation. Overflow of water from the reactor cavity into the containment sump is predicted to start at about 60 minutes.

At the time that the containment pressure first approaches the spray initiation setpoint the pressure rise is not monotonic, and is actually predicted to decrease somewhat after that due to the fact that the emergency core cooling system is able to cool off the primary system. Eventually, however, the containment pressure will start to increase again if heat removal is not restored. The containment pressure is predicted to exceed 25 psia at about 430 minutes from the start of the accident. If the sprays have not been started until this time, there is little question of their ability to operate since the inventory of the refueling water storage tank has been exhausted by this time and the containment sump is predicted to have about 2.3E+6 lb of water at a temperature of 197 F.

In addition to the above sequence of events, an alternate scenario was considered in which the pipe break was assumed to be at a high elevation in the primary system so that it would discharge steam instead of water to the containment. For this situation the containment spray actuation pressure would be reached in about 60 minutes, with about 100,000 lb of water in the containment sump at that time. Thus operability of the recirculation sprays would seem likely under these assumptions.

Conclusions

Based on the present analyses it appears that given the initiating events associated with the S_2C sequence, there would be more than adequate water in the containment sump at the time of recirculation spray actuation. Thus this combination of initiating events would not be expected to lead to containment failure or core melting.

A.3 Success Criteria for Containment Heat Removal

Surry design provides two systems for containment heat removal; the outside spray recirculation system and the inside spray recirculation system. Each of these systems is a two train system. The design basis for containment heat removal is that one heat exchanger in each train is sufficient. The utility performed an analysis to show that one heat exchanger was sufficient to provide containment heat removal. One heat exchanger will not provide sufficient containment pressure reduction to satisfy 10 CFR 100 site dosage limitations, but will keep the containment significantly below design pressure at all times. The single heat exchanger success criteria was used in this study.

A.4 References

A-1. A.S. Benjamin, et al., Evaluation of Severe Accident Risks and the Potential for Risk Reductions: Surry Power Station, Unit 1, NUREG/CR-4551 Vol 1, Draft for Comment, February 1987.

A-2. Peter Cybulskis, SAARP Source Term Analyses for Surry Design, Battelle Columbus Laboratories.

A-3. Peter Cybulskis, Evaluation of Loss of Containment Heat Sink Scenarios for Surry, Draft, Battelle Columbus Laboratories, November 1985.

APPENDIX B

Surry Boolean Equations

and

Fault Trees

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B.2 FAULT TREES (Cont'd)

APPENDIX B

B. Appendix B contains the Boolean equations and fault trees of the systems modeled for the Surry probabilistic risk assessment. The Boolean equations modeling for station blackout are also included. The appendix is organized into two subappendices as follows:

- B.1 Boolean Equations
  - System Event Equations
  - Station Blackout Equations
- B.2 Fault Trees

B.1 Boolean Equations

Boolean equations were used to model actuation systems, relief valves failing to reclose, steam generator integrity, station blackout (SBO) events, and several Unit 2 systems used in the SBO analysis. The system descriptions, nomenclature and identifiers used, assumptions made, and success criteria are contained in Section 4.6, System Analysis.

The following systems, or portions of systems, were modeled by Boolean equations shown and described in this appendix.

- Consequence Limiting Control System
- Auxiliary Feedwater System during Station Blackout
- Primary Pressure Relief System failing to reclose following a Transient
- Power Conversion System: SG Integrity
- Recirculation Mode Transfer System
- Safety Injection Actuation System
- Reactor Coolant Pump Seal Cooling from Unit 2
  - HPI seal cooling from Unit 2
  - CCW thermal barrier cooling from Unit 2

In addition to the systems modeled, two Boolean equations were developed to model the SBO at Unit 1 and SBO at Units 1 and 2. These equations are also included.

B.1.1 Consequence Limiting Control System

As shown in Section 4.6.6, the consequence limiting control system is modeled as two events. The Boolean equations for these two events are as follows:

CLS-ACT-FA-2A = CLS-ACT-FA-CLS2A + DCP-TDC-LP-BUS1A.

CLS-ACT-FA-2B = CLS-ACT-FA-CLS2B + DCP-TDC-LP-BUS1B.

The CLS-ACT-FA-CLS2A and CLS-ACT-FA-CLS2B terms represent the CLCS actuation train A and B unavailabilities. The DCP-TDC-LP-BUS1A and DCP-TDC-LP-BUS1B terms represent developed events, providing power to the actuation trains. The power events are developed as fault trees in the Emergency Power System, Section 4.6.8.

B.1.2 Auxiliary Feedwater System during Station Blackout

As shown in Section 4.6.3, the success criteria for the auxiliary feedwater (AFW) system during a transient is that flow from at least one of three AFW pumps supply one of three steam generators (SG). During SBO, the motor driven pumps are unavailable, so that the AFW-L fault tree reduces to the following equations representing failure of the turbine driven AFW pump at Unit 1.

AFW-TDP-U1 =
AFW-TDP-FR-2P6HR +
AFW-TDP-FS-FW2 +
AFW-TDP-MA-FW2 +
AFW-CKV-OO-CV172 +
AFW-PSF-FC-XCONN +
AFW-CCF-FT-102AB +
AFW-CKV-FT-CV142 +
AFW-CCF-LK-STMBD +
AFW-XVM-PG-XV153 +
AFW-AOV-FT-102A * AFW-AOV-FT-102B +
AFW-TNK-VF-CST +
AFW-CKV-FT-CV138 * AFW-CKV-FT-CV131 +
AFW-CKV-FT-CV131 * AFW-CKV-FT-CV136 +
AFW-CKV-FT-CV133 * AFW-CKV-FT-CV136 +
AFW-CKV-FT-CV138 * AFW-CKV-FT-CV133 +
AFW-AOV-PG-102A * AFW-AOV-PG-102B.

From the equation for failure of the turbine driven AFW pump at Unit 1, a similar equation was developed to model the turbine driven AFW pump at Unit 2. The motor driven pumps were not modeled at Unit 2. For the SBO at Unit 1 only, the loss of one bus (due to the loss of offsite power and failure of diesel 2 or 3) leaves only one motor driven pump which was assumed to have insufficient capacity to supply two units. For SBO at both units, there is no power to supply a motor driven pump at Unit 2.

AFW-TDP-U2 =
AFW-TDP-FR-6HRU2 +
AFW-TDP-FS-U2FW2 +
AFW-TDP-MA-U2FW2 +
AFW-CKV-OO-CV272 +
AFW-CCF-LK-2STMB +
AFW-CCF-FT-202AB +
AFW-CKV-FT-CV242 +
AFW-XVM-PG-XV253 +
AFW-MOV-FT-260A * AFW-MOV-FT-260B +
AFW-AOV-FT-202A * AFW-AOV-FT-202B +
AFW-TNK-VF-V2CST +
AFW-CKV-FT-CV238 * AFW-CKV-FT-CV232 +
AFW-CKV-FT-CV232 * AFW-CKV-FT-CV236 +
AFW-CKV-FT-CV233 * AFW-CKV-FT-CV236 +
AFW-CKV-FT-CV238 * AFW-CKV-FT-CV233 +
AFW-AOV-PG-202A * AFW-AOV-PG-202B.

The top event heading L in the SBO event tree combines failures of the Unit 1 and 2 turbine driven pumps with an operator error. The top events for SBO at Unit 1 only and SBO at Units 1 and 2, are an expansion of the equations shown below.

L-SBOU1 = AFW-TDP-U1 * (AFW-XHE-FO-U1SBO + AFW-TDP-U2).

L-SBOU1U2 = AFW-TDP-U1 * (AFW-XHE-FO-U2SBO + AFW-TDP-U2 + UNIT2-LOW-POWER + QS-UNIT2).

The equation for SBO at Unit 1 and 2 also includes terms for failure of AFW from Unit 2 due to low initial power (no steam for the pump turbine) and a stuck open SG power operated relief valve at Unit 2 due to the SBO transient. Additionally, for SBO sequences with a stuck open SG relief valve, a cross connect to the Unit 2 condensate storage tank was required. These "extra" failures occur because if only Unit 1 has an SBO, the Unit 2 AFW motor driven pumps are still available.

B.1.3 Primary Pressure Relief System

The portion of the Primary Pressure Relief System (PPRS) modeled by Boolean equations is the failure of the reactor coolant system (RCS) power operated relief valves (PORV) to reclose following a transient demanding PORV opening. Section 4.6.14 describes the success criteria for event Q as one or more PORVs failing to reclose following a transient other then S_3. Event Q during an S_3 loss of coolant accident is modeled as a "black box" event in Appendix D.1. Event Q was modeled slightly differently for SBO (Q-SBO), steam generator tube rupture (Q-SGTR), and all other transients (Q). The expression for the failure of the RCS PORVs to reclose for generic transients, other than SBO or SGTR follows.

Q = PORV-DEMAND * PPS-SOV-OO-1455 * (ACP-TAC-LP-1J1-2 + PPS-MOV-OO-1536 + PPS-MOV-FC-OPER) +

PORV-DEMAND * PPS-SOV-OO-1456 * (ACP-TAC-LP-1H1-2 + PPS-MOV-OO-1535 + PPS-MOV-FC-OPER).

Each of the cut sets represent the PORV being demanded, PORV failing to reclose, and failure to shut the PORV block valve. Failure to shut the PORV block valve is due to loss of electrical power, failure of the motor operated block valve to shut, or failure of the operator to shut the block valve. The electrical power events (ACP-TAC-LP-1H1-2 and ACP-TAC-LP-1J1-2) are top events of fault trees developed in the Emergency Power System, Section 4.6.8. The PORV-DEMAND event consists of three terms multiplied together: the probability of initially being at high power (0.90), the probability that each relief is not blocked $\frac{1-(.3)^2}{2}$, and the PORV demand probability. The PORV demand probability is 0.1 for T_1 and 0.014 for all other sequences except SGTR and SBO. The PORV demand probability for SGTR and SBO are described below.

The expression for failure of the RCS PORVs to reclose during SBO is a reduction of the generic Q equation, with the loss of AC power failing the block valves, and the PORV demand rate equal to 1.0.

Q-SBO = SBO-PORV-DMD * PPS-SOV-OO-14556 + SBO-PORV-DMD * PPS-SOV-OO-1456.

For the steam generator tube rupture event tree, there are three different versions of the Q-SGTR. Each variation depends on the success or failure of the operator

depressurization and high pressure injection (HPI) events. Each version is identical to the generic Q expression, with a different identifier specifying the PORV demand rate. For successful operator depressurization and HPI, the PORV demand rate is 0.1 and the identifier is RCS-PORV-DMD. For successful operator depressurization and failure of HPI, the PORV demand rate is 0.25 and the identifier is RCS-PORV-ODMD. For failure to depressurize, the demand rate is 1.0 and the identifier is RCS-PORV-D1DMD. The resulting Boolean equations are shown below.

For success of operator depressurization and HPI:

Q-SGTR =
RCS-PORV-DMD * PPS-SOV-OO-1455C *
(ACP-TAC-LP-1J1-2 + PPS-MOV-OO-1536 + PPS-MOV-FC-OPER) +

RCS-PORV-DMD * PPS-SOV-OO-1456 *
(ACP-TAC-LP-1H1-2 + PPS-MOV-OO-1535 + PPS-MOV-FC-OPER).

For successful depressurization, but HPI fails:

Q-OD-SGTR =
RCS-PORV-ODMD * PPS-SOV-OO-1455C *
(ACP-TAC-LP-1J1-2 + PPS-MOV-OO-1536 + PPS-MOV-FC-OPER) +

RCS-PORV-ODMD * PPS-SOV-OO-1456 *
(ACP-TAC-LP-1H1-2 + PPS-MOV-OO-1535 + PPS-MOV-FC-OPER).

For failure to depressurize:

Q-OD-D1-SGTR =
RCS-PORV-D1DMD * PPS-SOV-OO-1455C*
(ACP-TAC-LP-1J1-2 + PPS-MOV-OO-1536 + PPS-MOV-FC-OPER) +

RCS-PORV-D1DMD * PPS-SOV-OO-1456 *
(ACP-TAC-LP-1H1-2 + PPS-MOV-OO-1535 + PPS-MOV-FC-OPER).

B.1.4 Power Conversion System: Steam Generator Integrity

The success criterion for the SG portion of the power conversion system (PCS) was defined as closure of all SG penetrations following a transient. The PCS system assumptions and success criteria are further described in Section 4.6.13. This success criterion translates into three separate Boolean equations, one equation for SBO and two equations for SGTR. The Boolean equation derived for SBO follows:

QS - SBO = SBO-SGSRV-DMD * MSS-SRV-OO-SGSRV.

The probability for SBO-SGSRV-DMD is derived in Appendix D. For steam generator tube rupture, there are two equations, depending on the success of the operator depressurization event. If the operator succeeds in depressurization and cooldown, then the equation for Q_S is as follows:

QS - SGTR =

PORV-BLK * SGTR-SGSRV-DMD * MSS-SRV-OO-SGSRV +
PORV-NOT-BLK * SGTR-SGADV-DMD * MSS-SOV-OO-SGADV *
MSS-XHE-FO-BLOCK +
MSS-XHE-FO-ISAFW +
MSS-CCF-FT-TVAB * MSS-XHE-FO-ISBDN +
MSS-AOV-FT-TVBDA * MSS-AOV-FT-TVBDB * MSS-XHE-FO-ISBDN.

The first cut set in the equation represents the SG power operated relief valve (PORV) as blocked, the SG safety relief valve (SRV) being demanded, and the SRV failing to reclose. The second cut set models the SG PORV as not blocked, the SG PORV demanded, opens, fails to reclose, and the operator fails to block.

The equation for Q_S, when the operator fails to depressurize or cooldown, is very similar to the equation shown above. The SG relief valve demand rates change in response to the failure to depressurize. Also, the SG SRV is demanded even if the PORV is not blocked. The equation for Qs then becomes the following:

QS-OD-SGTR =

PORV-BLK * SGTR-SGSRV-ODMD1 * MSS-SRV-OO-ODSRV +
PORV-NOT-BLK * SGTR-SGSRV-ODMD2 * MSS-SRV-OO-ODSRV +
PORV-NOT-BLK * SGTR-SGADV-ODMD * MSS-SOV-OO-ODADV *
MSS-XHE-FO-BLOCK +
MSS-XHE-FO-ISAFW +
MSS-CCF-FT-TVAB * MSS-XHE-FO-ISBDN +
MSS-AOV-FT-TVBDA * MSS-AOV-FT-TVBDB * MSS-XHE-FO-ISBDN.

B.1.5 Recirculation Mode Transfer System

As shown in Section 4.6.16, the recirculation mode transfer (RMT) system is modeled as two events. The Boolean expressions for these events are as follows:

RMT-ACT-FA-A = RMT-ACT-FA-RMTSA +
RMT-CCF-FA-MSCAL +
ACP-TAC-LP-BUS1I.

RMT-ACT-FA-B = RMT-ACT-FA-RMTSB +
RMT-CCF-FA-MSCAL +
ACP-TAC-LP-BS1IV.

The RMT-ACT-FA-RMTSA and RMT-ACT-FA-RMTSB terms represent the RMT actuation train A or B unavailabilities. The ACP-TAC-LP-BUS1I and ACP-TAC-LP-BS1IV terms represent developed events, top events in the vital AC power fault trees. The AC power fault trees are developed in Section 4.6.8. The RMT-CCF-FA-MSCAL represents common cause failure of RMT due to miscalibration of the sensors.

B.1.6 Safety Injection Actuation System

The safety injection actuation system (SIS) is modeled as two events, as shown in Section 4.6.18. The Boolean equation for these two events follows.

SIS-ACT-FA-A = SIS-ACT-FA-SISA + ACP-TAC-LP-BUS1I + DCP-TDC-LP-BUS1A.

SIS-ACT-FA-B = SIS-ACT-FA-SISB + ACP-TAC-LP-BS1IV + DCP-TDC-LP-BUS1B.

The SIS-ACT-FA-SISA and SIS-ACT-FA-SISB terms represent the SIS actuation train A or B unavailabilities. The other terms model electrical power dependencies. The electrical power events are described in Section 4.6.8 and are developed as top events in fault trees.

B.1.7 Reactor Coolant Pump Seal Cooling from Unit 2

Modeling of the reactor coolant pump (RCP) seal cooling supplied by Unit 2 (event W_2) involved modeling two Unit 2 systems, HPI and component cooling water (CCW). The Unit 2 HPI cools the RCP seals directly, whereas the CCW cools the RCP thermal barrier. The success criterion for top event W_2 was Unit 1 RCP seal cooling provided from Unit 2 HPI or CCW. This translated into the following top event and Boolean equation.

W_2 - Failure of the operator to provide seal cooling from Unit 2 or failure of Unit 2 HPI and Unit 2 CCW.

W_2 = REC-XHE-FO-SCOOL + (D3U2 * WU2).

D3U2 represents failure of HPI from Unit 2 and is modeled by the following equation.

D3U2 =
MCW-CCF-VF-SBO +
CPC-MDP-FS-SW20A +
HPI-MDP-FS-CH2C +
CPC-MDP-FS-2CC2A +
HPI-CKV-OO-267U2 +
HPI-CKV-OO-276U2 +
CPC-MDP-FR-SW2OA +
HPI-MDP-FR-2C6HR +
CPC-STR-PG-2AU26 +
CPC-STR-PG-1AU26 +
CPC-MDP-FR-2CC2A +
ACP-BAC-ST-4KV2H +
ACP-BAC-ST-2H1 +
ACP-BAC-ST-2H1-1 +
ACP-TFM-NO-2H1 +
ACP-CRB-CO-24H14 +
ACP-CRB-CO-25H7 +
ACP-CRB-CO-24H15.

The equation for D3U2 was derived from the solution of the Unit 1 D_3 fault tree. Similarly, the equation for CCW from Unit 2 (WU2) was based on the Unit 1 W fault tree. The equation for CCW from Unit 2 is shown below.

WU2 =
MCW-CCF-VF-SBO +
ACP-XHE-FO-STBBS +
CCW-MDP-FS-CCP2A +
CCW-MDP-MA-CCP2A +
CCW-CKV-OO-563U2 +
CCW-MDP-FR-CCP2A +

CCW-HTX-PG-U2E1A +
ACP-BAC-ST-4KV2H +
ACP-BAC-ST-STB2H +
CCW-HTX-LK-U2E1A +
SWS-XVM-PG-39U2 +
CCW-XVM-PG-580U2
IAS-AOV-PG-CC107 +
CCW-XVM-PG-583U2 +
SWS-XVM-PG-37U2 +
ACP-CRB-CO-25H9 +
IAS-AOV-LK-CC107 +
IAS-AOV-OC-CC107.

B.1.8 Station Blackout

The methods used to develop the equations for SBO at Unit 1 and SBO at Units 1 and 2 are described in Section 4.6.8. The expanded version of the equation for SBO at Unit 1 only, with double maintenance terms which violate Technical Specifications deleted, is shown below. Note that a term NOTDG appears in each cut set for SBO-U1, accounting for the success of the third diesel generator.

SBO-U1 =
T1 * OEP-DGN-FS-DG02 * OEP-DGN-FS-DG01 * NOTDG +
T1 * OEP-DGN-FS-DG03 * OEP-DGN-FS-DG01 * NOTDG +
T1 * OEP-CCF-FS-DG13 * NOTDG-CCF +
T1 * OEP-DGN-FR-6HDG2 * OEP-DGN-FS-DG01 * NOTDG +
T1 * OEP-DGN-FR-6HDG3 * OEP-DGN-FS-DG01 * NOTDG +
T1 * OEP-DGN-FS-DG02 * OEP-DGN-FR-6HDG1 * NOTDG +
T1 * OEP-DGN-FS-DG03 * OEP-DGN-FR-6HDG1 * NOTDG +
T1 * OEP-DGN-FR-6HDG3 * OEP-DGN-FR-6HDG1 * NOTDG +
T1 * OEP-DGN-FR-6HDG2 * OEP-DGN-FR-6HDG1 * NOTDG +
T1 * OEP-DGN-MA-DG03 * OEP-DGN-FS-DG01 * NOTDG +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FS-DG03 * NOTDG +
T1 * OEP-DGN-MA-DG02 * OEP-DGN-FS-DGO1 * NOTDG +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FS-DG02 * NOTDG +
T1 * OEP-DGN-MA-DG02 * OEP-DGN-FR-6HDG1 * NOTDG +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FR-6HDG2 * NOTDG +
T1 * OEP-DGN-MA-DG03 * OEP-DGN-FR-6HDG1 * NOTDG +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FR-6HDG3 * NOTDG +
T1 * OEP-CRB-FT-15J3 * OEP-DGN-FS-DG01 * NOTDG +
T1 * OEP-DGN-FS-DG02 * OEP-CRB-FT-15H3 * NOTDG +
T1 * OEP-DGN-FS-DG03 * OEP-CRB-FT-15H3 * NOTDG +
T1 * OEP-DGN-FR-6HDG2 * OEP-CRB-FT-15H3 * NOTDG +
T1-* OEP-DGN-FR-6HDG3 * OEP-CRB-FT-15H3 * NOTDG +
T1 * OEP-CRB-FT-15J3 * OEP-DGN-FR-6HDG1 * NOTDG +
T1 * OEP-DGN-MA-DG01 * OEP-CRB-FT-15J3 * NOTDG +
T1 * OEP-DGN-MA-DG03 * OEP-CRB-FT-15H3 * NOTDG +
T1 * OEP-DGN-MA-DG02 * OEP-CRB-FT-15H3 * NOTDG +
T1 * OEP-CRB-FT-15J3 * OEP-CRB-FT-15H3 * NOTDG.

The sum of the terms, or frequency of SBO-U1 is 2.9E-4.

The expanded version of the equation for SBO at Units 1 and 2, with double maintenance terms which violate Technical Specifications deleted, is shown below. In the SBO-U1U2

equation, all three site diesel generators are explicitly modeled to fail. The sum of the terms, or frequency of SBO-U1U3 is 3.7E-5.

SBO-U1U2 =

T1 * OEP-CCF-FS-DG123 +
T1 * OEP-DGN-FS-DG02 * OEP-DGN-FS-DG03 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-FR-6HDG2 * OEP-DGN-FS-DG03 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-FS-DG02 * OEP-DGN-FS-DG03 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-FS-DG02 * OEP-DGN-FR-6HDG3 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-FR-6HDG2 * OEP-DGN-FS-DG03 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-FS-DG02 * OEP-DGN-FR-6HDG3 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-FR-6HDG2 * OEP-DGN-FR-6HDG3 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-MA-DG03 * OEP-DGN-FS-DG02 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-MA-DGO2 * OEP-DGN-FS-DG03 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FS-DG02 * OEP-DGN-FS-DG03 +
T1 * OEP-DGN-MA-DG03 * NOTDG-CFF * OEP-CCF-FS-DG12 +
T1 * OEP-DGN-MA-DG01 * NOTDG-CCF * OEP-CCF-FS-DG23 +
T1 * OEP-DGN-MA-DG02 * OEP-CCF-FS-DG13 * NOTDG-CCF +
T1 * OEP-DGN-FR-6HDG2 * OEP-DGN-FR-6HDG3 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-MA-DG02 * OEP-DGN-FS-DG03 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-MA-DG03 * OEP-DGN-FR-6HDG2 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-MA-DG02 * OEP-DGN-FR-6HDG3 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FR-6HDG2 * OEP-DGN-FS-DG03 +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FS-DG02 * OEP-DGN-FR-6HDG3 +
T1 * OEP-DGN-MA-DG03 * OEP-DGN-FS-DG02 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-FS-DG02 * OEP-CRB-FT-15J3 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-FS-DG02 * OEP-DGN-FS-DG03 * OEP-CRB-FT-15H3 +
T1 * OEP-DGN-FS-DG03 * OEP-DGN-FS-DG01 * OEP-CRB-FT-25H3 +
T1 * NOTDG-CCF * OEP-CCF-FS-DG12 * OEP-DGN-FR-DG03 +
T1 * OEP-CCF-FS-DG13 * NOTDG-CCF * OEP-DGN-FR-DG02 +
T1 * NOTDG-CCF * OEP-CCF-FS-DG23 * OEP-DGN-FR-DG01 +
T1 * OEP-DGN-MA-DG02 * OEP-DGN-FR-6HDG3 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FR-6HDG2 * OEP-DGN-FR-6HDG3 +
T1 * OEP-DGN-MA-DG03 * OEP-DGN-FR-6HDG2 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-FR-6HDG3 * OEP-DGN-FS-DG01 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-FS-DG02 * OEP-CRB-FT-15J3 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-FR-6HDG2 * OEP-DGN-FS-DG03 * OEP-CRB-FT-15H3 +
T1 * OEP-DGN-FS-DG03 * OEP-DGN-FR-6HDG1 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-FR-6HDG2 * OEP-CRB-FT-15J3 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-FS-DG02 * OEP-DGN-FR-6HDG3 * OEP-CRB-FT-15H3 +
T1 * OEP-DGN-FR-6HDG3 * OEP-DGN-FR-6HDG1 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-FR-6HDG2 * OEP-CRB-FT-15J3 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-FR-6HDG2 * OEP-DGN-FR-6HDG3 * OEP-CRB-FT-15H3 +
T1 * OEP-DGN-MA-DG02 * OEP-CRB-FT-15J3 * OEP-DGN-FS-DG01 +
T1 * OEP-DGN-MA-DG03 * OEP-DGN-FS-DG02 * OEP-CRB-FT-15H3 +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FS-DG02 * OEP-CRB-FT-15J3 +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FS-DG03 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-MA-DG02 * OEP-DGN-FS-DG03 * OEP-CRB-FT-15H3 +
T1 * OEP-DGN-MA-DG03 * OEP-DGN-FS-DG01 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FR-6HDG2 * OEP-CRB-FT-15J3 +
T1 * OEP-DGN-MA-DG01 * OEP-DGN-FR-6HDG3 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-MA-DG02 * OEP-DGN-FR-6HDG3 * OEP-CRB-FT-15H3 +
T1 * OEP-DGN-MA-DG02 * OEP-CRB-FT-15J3 * OEP-DGN-FR-6HDG1 +
T1 * OEP-DGN-MA-DG03 * OEP-DGN-FR-6HDG2 * OEP-CRB-FT-15H3 +

T1 * OEP-DGN-MA-DG03 * OEP-DGN-FR-6HDG1 * OEP-CRB-FT-25H3 +
T1 * OEP-CRB-FT-15J3 * OEP-DGN-FS-DG01 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-FS-DG03 * OEP-CRB-FT-15H3 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-FS-DG02 * OEP-CRB-FT-15J3 * OEP-CRB-FT-15H3 +
T1 * OEP-CRB-FT-15J3 * OEP-DGN-FR-6HDG1 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-FR-6HDG2 * OEP-CRB-FT-15J3 * OEP-CRB-FT-15H3 +
T1 * OEP-DGN-FR-6HDG3 * OEP-CRB-FT-15H3 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-MA-DG03 * OEP-CRB-FT-15H3 * OEP-CRB-FT-25H3 +
T1 * OEP-DGN-MA-DG02 * OEP-CRB-FT-15J3 * OEP-CRB-FT-15H3 +
T1 * OEP-DGN-MA-DG01 * OEP-CRB-FT-15J3 * OEP-CRB-FT-25H3 +.

B.2 Fault Trees

This section contains the drawings of all of the fault trees used in the Surry probabilistic risk assessment. The fault tree name, system modeled, and top event heading are shown in Table B-1.

Table B-1

Surry Fault Tree Summary

Fault Tree Name	System	Event Tree Heading	Top Gate Name
AFW-L	Auxiliary Feedwater to 1 of 3 SG	L	AFW-1
AFW-L2	Auxiliary Feedwater to 2 of 3 SG	L_2	AFW-2
AFW-L3	Auxiliary Feedwater to 1 of 2 SG	L_3	AFW-3
CSS	Containment Spray System	C	CSS
CPCA	Charging Pump Cooling	None, support	CPCA
CPCB	Charging Pump Cooling	system to HPI	CPCB
CPCC	Charging Pump Cooling	pumps A,B, & C	CPCC
D_1	High Pressure Injection - Automatic	D_1	D_1
D_2	High Pressure Injection - Manual	D_2	D_2
D_3	High Pressure Injection - RCP seals	D_3	D_3
D_4	High Pressure Injection - Emergency Boration	D_4	HPI-EB
D_5	Accumulators	D_5	ACC
D_6	Low Pressure Injection	D_6	LPI

Table B-1 (Continued)

Surry Fault Tree Summary

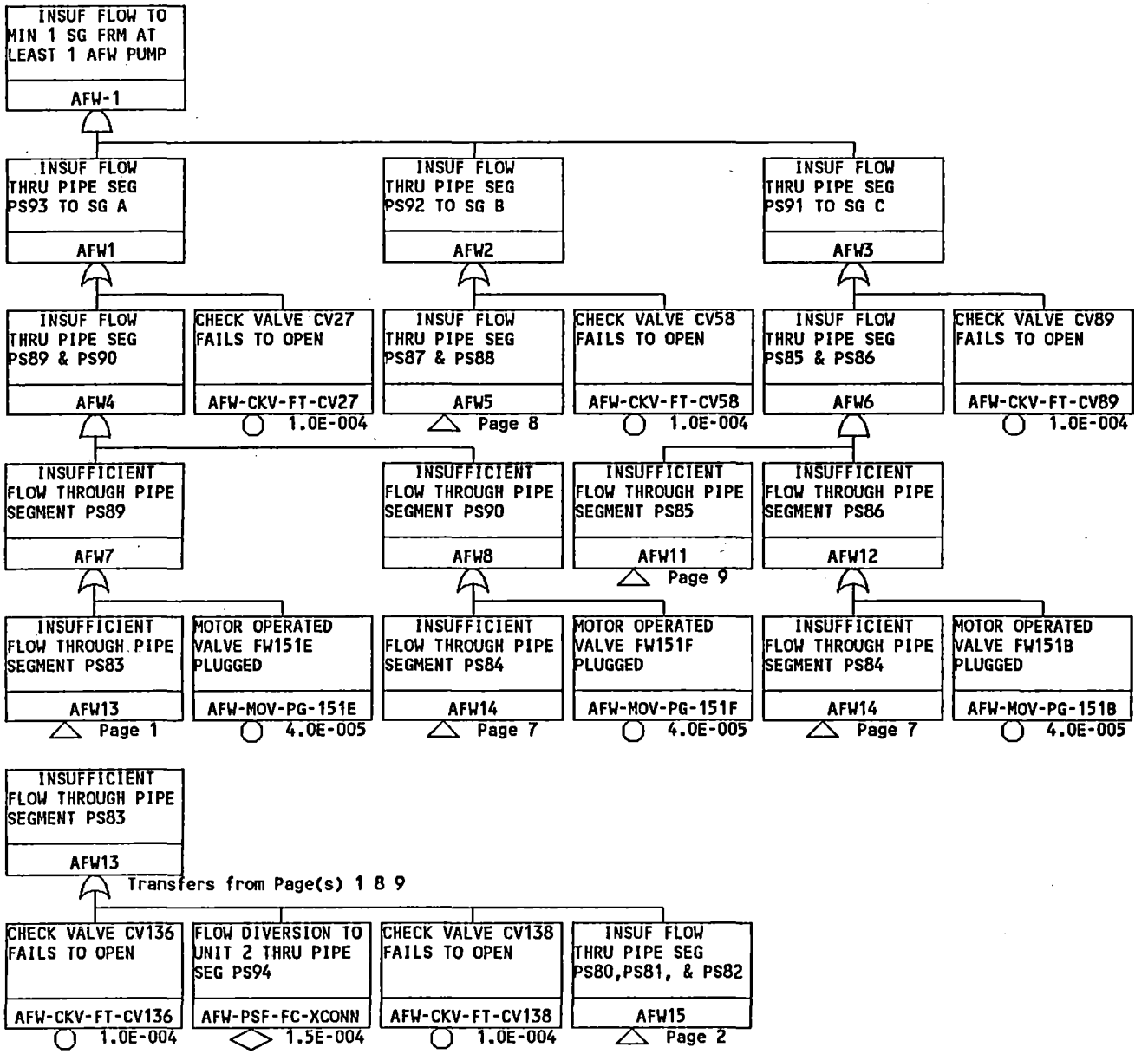
Fault Tree Name	System	Event Tree Heading	Top Gate Name
ESTB1H	Electrical Power - Stub Bus 1H	None, support systems to front line systems.	ACP-TAC-LP-STB1H
ESTB1J	Electrical Power - Stub Bus 1J		ACP-TAC-LP-STB1J
EH1*	Electrical Power - MCC 1H1-1		ACP-TAC-LP-1H1-1
EH2	Electrical Power - MCC 1H1-2		ACP-TAC-LP-1H1-2
EJ1*	Electrical Power - MCC 1J1-1		ACP-TAC-LP-1J1-1
EJ2	Electrical Power - MCC 1J1-2		ACP-TAC-LP-1J1-2
E4801H	Electrical Power - 4801H Bus		ACP-TAC-LP-4801H
E4801J	Electrical Power - 4801J Bus		ACP-TAC-LP-4801J
E1I	Electrical Power - Vital Bus 1I		ACP-TAC-LP-BUS1I
E21II	Electrical Power - Vital Bus 1II		ACP-TAC-LP-BS1II
E31III	Electrical Power - Vital Bus 1III		ACP-TAC-LP-BSIII
E41IV	Electrical Power - Vital Bus 1IV		ACP-TAC-LP-BS1IV
E1A	Electrical Power - DC Bus 1A		DCP-TDC-LP-BUS1A
E1B	Electrical Power - DC Bus 1B		DCP-TDC-LP-BUS1B
HPR-H2	High Pressure Recirculation	H_2	HPR
LPR-HH	Low Pressure Recirculation - to HPR	$H_1(S_2,S_3,T)$	LPR-HH
LPR-LH	Low Pressure Recirculation - to RCS	H_1 (A,S_1)	LPR-LH

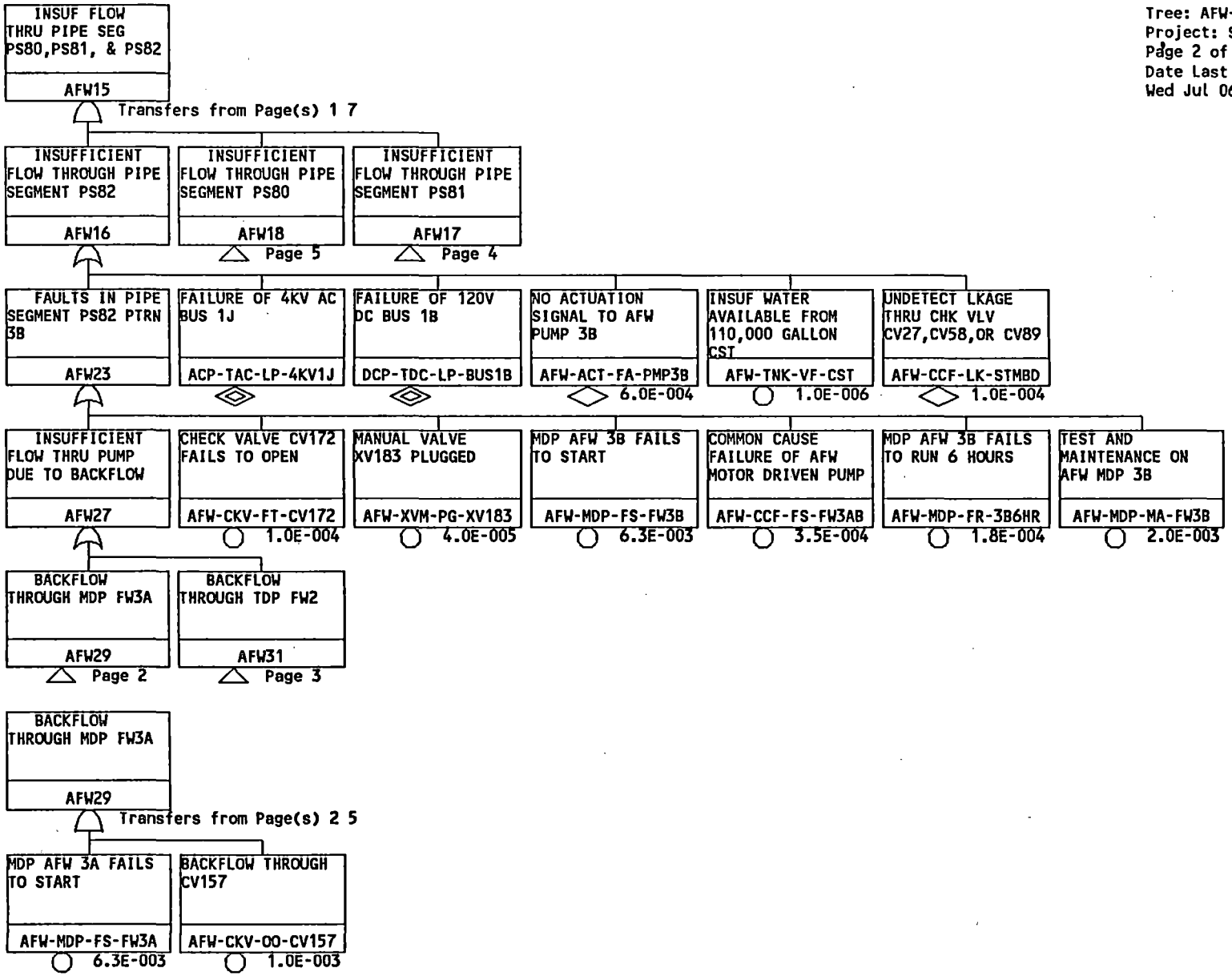
Table B-1 (Continued)

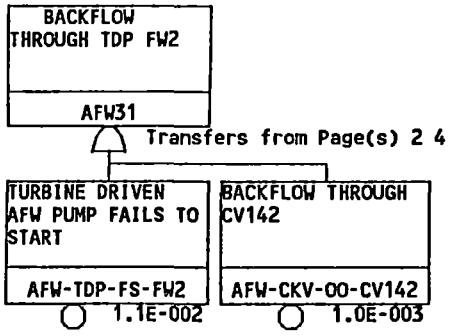
Surry Fault Tree Summary

Fault Tree Name	System	Event Tree Heading	Top Gate Name
ISR	Inside Spray Recirculation	F_1	ISR-F1
OSR	Outside Spray Recirculation	F_2	OSR
OD	Power Conversion System	O_D	OD
OD-SG	Power Conversion System	O_D (T_7)	OD-SG
P	Primary Pressure Relief - 2 of 2	P	P
P_1	Primary Pressure Relief - 1 of 2	P_1	P1
P_2	Primary Pressure Relief - ATWS	P_2	P2
RHR	Residual Heat Removal	W_3	W3
W	Component Cooling Water	W	CCW1

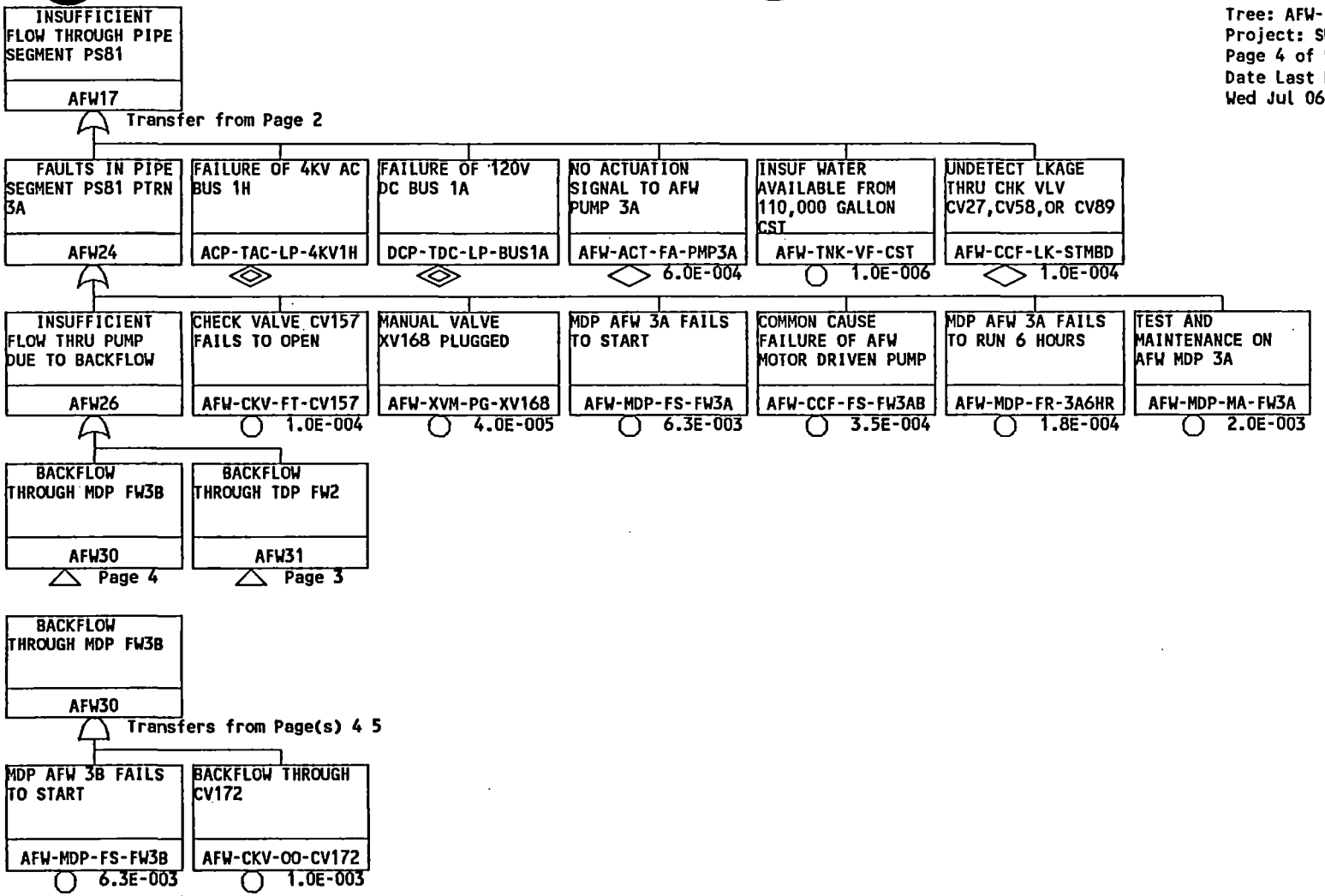
* The 4160 VAC 1H and 1J bus events (ACP-TAC-LP-4KV1H and ACP-TAC-LP-4KV1J) are contained in the EH1 and EJ1 fault trees, respectively.

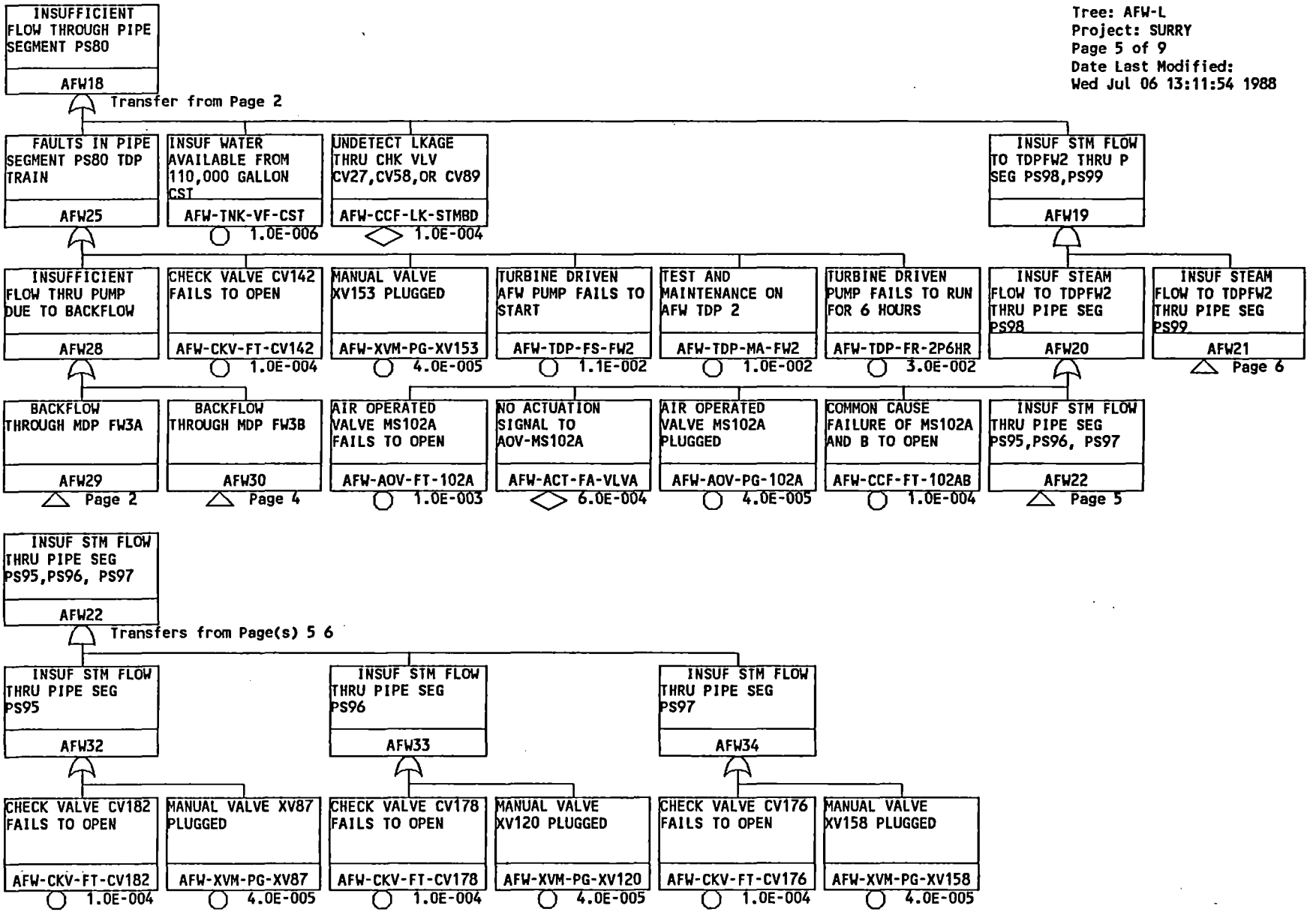

INSUF FLOW TO MIN 1 SG FRM AT LEAST 1 AFW PUMP
AFW-1
INSUF FLOW THRU PIPE SEG PS93 TO SG A
AFW1
INSUF FLOW THRU PIPE SEG PS92 TO SG B
AFW2
INSUF FLOW THRU PIPE SEG PS91 TO SG C
AFW3
INSUF FLOW THRU PIPE SEG PS89 & PS90
AFW4
CHECK VALVE CV27 FAILS TO OPEN
AFW-CKV-FT-CV27
1.0E-004
INSUF FLOW THRU PIPE SEG PS87 & PS88
AFW5
Page 8
CHECK VALVE CV58 FAILS TO OPEN
AFW-CKV-FT-CV58
1.0E-004
INSUF FLOW THRU PIPE SEG PS85 & PS86
AFW6
CHECK VALVE CV89 FAILS TO OPEN
AFW-CKV-FT-CV89
1.0E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS89
AFW7
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS90
AFW8
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS85
AFW11
Page 9
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS86
AFW12
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS83
AFW13
Page 1
MOTOR OPERATED VALVE FW151E PLUGGED
AFW-MOV-PG-151E
4.0E-005
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS84
AFW14
Page 7
MOTOR OPERATED VALVE FW151F PLUGGED
AFW-MOV-PG-151F
4.0E-005
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS84
AFW14
Page 7
MOTOR OPERATED VALVE FW151B PLUGGED
AFW-MOV-PG-151B
4.0E-005
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS83
AFW13
Transfers from Page(s) 1 8 9
CHECK VALVE CV136 FAILS TO OPEN
AFW-CKV-FT-CV136
1.0E-004
FLOW DIVERSION TO UNIT 2 THRU PIPE SEG PS94
AFW-PSF-FC-XCONN
1.5E-004
CHECK VALVE CV138 FAILS TO OPEN
AFW-CKV-FT-CV138
1.0E-004
INSUF FLOW THRU PIPE SEG PS80,PS81, & PS82
AFW15
Page 2

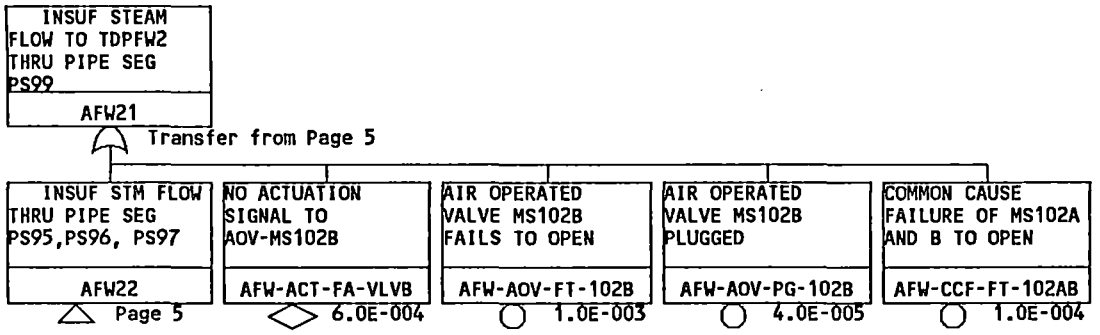

INSUF FLOW THRU PIPE SEG PS80,PS81, & PS82
AFW15
Transfers from Page(s) 1 7
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS82
AFW16
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS80
AFW18
Page 5
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS81
AFW17
Page 4
FAULTS IN PIPE SEGMENT PS82 PTRN 3B
AFW23
FAILURE OF 4KV AC BUS 1J
ACP-TAC-LP-4KV1J
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
NO ACTUATION SIGNAL TO AFW PUMP 3B
AFW-ACT-FA-PMP3B
6.0E-004
INSUF WATER AVAILABLE FROM 110,000 GALLON CST
AFW-TNK-VF-CST
1.0E-006
UNDETECT LKAGE THRU CHK VLV CV27,CV58,OR CV89
AFW-CCF-LK-STMBD
1.0E-004
INSUFFICIENT FLOW THRU PUMP DUE TO BACKFLOW
AFW27
CHECK VALVE CV172 FAILS TO OPEN
AFW-CKV-FT-CV172
1.0E-004
MANUAL VALVE XV183 PLUGGED
AFW-XVM-PG-XV183
4.0E-005
MDP AFW 3B FAILS TO START
AFW-MDP-FS-FW3B
6.3E-003
COMMON CAUSE FAILURE OF AFW MOTOR DRIVEN PUMP
AFW-CCF-FS-FW3AB
3.5E-004
MDP AFW 3B FAILS TO RUN 6 HOURS
AFW-MDP-FR-3B6HR
1.8E-004
TEST AND MAINTENANCE ON AFW MDP 3B
AFW-MDP-MA-FW3B
2.0E-003
BACKFLOW THROUGH MDP FW3A
AFW29
Page 2
BACKFLOW THROUGH TDP FW2
AFW31
Page 3
BACKFLOW THROUGH MDP FW3A
AFW29
Transfers from Page(s) 2 5
MDP AFW 3A FAILS TO START
AFW-MDP-FS-FW3A
6.3E-003
BACKFLOW THROUGH CV157
AFW-CKV-00-CV157
1.0E-003



Tree: AFW-L
Project: SURRY
Page 3 of 9
Date Last Modified:
Wed Jul 06 13:11:54 1988


INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS81
AFW17
Transfer from Page 2
FAULTS IN PIPE SEGMENT PS81 PTRN 3A
AFW24
FAILURE OF 4KV AC BUS 1H
ACP-TAC-LP-4KV1H
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
NO ACTUATION SIGNAL TO AFW PUMP 3A
AFW-ACT-FA-PMP3A
6.0E-004
INSUF WATER AVAILABLE FROM 110,000 GALLON CST
AFW-TNK-VF-CST
1.0E-006
UNDETECT LKAGE THRU CHK VLV CV27,CV58,OR CV89
AFW-CCF-LK-STMBD
1.0E-004
INSUFFICIENT FLOW THRU PUMP DUE TO BACKFLOW
AFW26
CHECK VALVE CV157 FAILS TO OPEN
AFW-CKV-FT-CV157
1.0E-004
MANUAL VALVE XV168 PLUGGED
AFW-XVM-PG-XV168
4.0E-005
MDP AFW 3A FAILS TO START
AFW-MDP-FS-FW3A
6.3E-003
COMMON CAUSE FAILURE OF AFW MOTOR DRIVEN PUMP
AFW-CCF-FS-FW3AB
3.5E-004
MDP AFW 3A FAILS TO RUN 6 HOURS
AFW-MDP-FR-3A6HR
1.8E-004
TEST AND MAINTENANCE ON AFW MDP 3A
AFW-MDP-MA-FW3A
2.0E-003
BACKFLOW THROUGH MDP FW3B
AFW30
Page 4
BACKFLOW THROUGH TDP FW2
AFW31
Page 3
BACKFLOW THROUGH MDP FW3B
AFW30
Transfers from Page(s) 4 5
MDP AFW 3B FAILS TO START
AFW-MDP-FS-FW3B
6.3E-003
BACKFLOW THROUGH CV172
AFW-CKV-OO-CV172
1.0E-003


INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS80
AFW18
Transfer from Page 2
FAULTS IN PIPE SEGMENT PS80 TDP TRAIN
AFW25
INSUF WATER AVAILABLE FROM 110,000 GALLON CST
AFW-TNK-VF-CST
1.0E-006
UNDETECT LKAGE THRU CHK VLV CV27,CV58,OR CV89
AFW-CCF-LK-STMBD
1.0E-004
INSUF STM FLOW TO TDPFW2 THRU P SEG PS98,PS99
AFW19
INSUFFICIENT FLOW THRU PUMP DUE TO BACKFLOW
AFW28
CHECK VALVE CV142 FAILS TO OPEN
AFW-CKV-FT-CV142
1.0E-004
MANUAL VALVE XV153 PLUGGED
AFW-XVM-PG-XV153
4.0E-005
TURBINE DRIVEN AFW PUMP FAILS TO START
AFW-TDP-FS-FW2
1.1E-002
TEST AND MAINTENANCE ON AFW TDP 2
AFW-TDP-MA-FW2
1.0E-002
TURBINE DRIVEN PUMP FAILS TO RUN FOR 6 HOURS
AFW-TDP-FR-2P6HR
3.0E-002
INSUF STEAM FLOW TO TDPFW2 THRU PIPE SEG PS98
AFW20
INSUF STEAM FLOW TO TDPFW2 THRU PIPE SEG PS99
AFW21
Page 6
BACKFLOW THROUGH MDP FW3A
AFW29
Page 2
BACKFLOW THROUGH MDP FW3B
AFW30
Page 4
AIR OPERATED VALVE MS102A FAILS TO OPEN
AFW-AOV-FT-102A
1.0E-003
NO ACTUATION SIGNAL TO AOV-MS102A
AFW-ACT-FA-VLVA
6.0E-004
AIR OPERATED VALVE MS102A PLUGGED
AFW-AOV-PG-102A
4.0E-005
COMMON CAUSE FAILURE OF MS102A AND B TO OPEN
AFW-CCF-FT-102AB
1.0E-004
INSUF STM FLOW THRU PIPE SEG PS95,PS96, PS97
AFW22
Page 5
INSUF STM FLOW THRU PIPE SEG PS95,PS96, PS97
AFW22
Transfers from Page(s) 5 6
INSUF STM FLOW THRU PIPE SEG PS95
AFW32
INSUF STM FLOW THRU PIPE SEG PS96
AFW33
INSUF STM FLOW THRU PIPE SEG PS97
AFW34
CHECK VALVE CV182 FAILS TO OPEN
AFW-CKV-FT-CV182
1.0E-004
MANUAL VALVE XV87 PLUGGED
AFW-XVM-PG-XV87
4.0E-005
CHECK VALVE CV178 FAILS TO OPEN
AFW-CKV-FT-CV178
1.0E-004
MANUAL VALVE XV120 PLUGGED
AFW-XVM-PG-XV120
4.0E-005
CHECK VALVE CV176 FAILS TO OPEN
AFW-CKV-FT-CV176
1.0E-004
MANUAL VALVE XV158 PLUGGED
AFW-XVM-PG-XV158
4.0E-005



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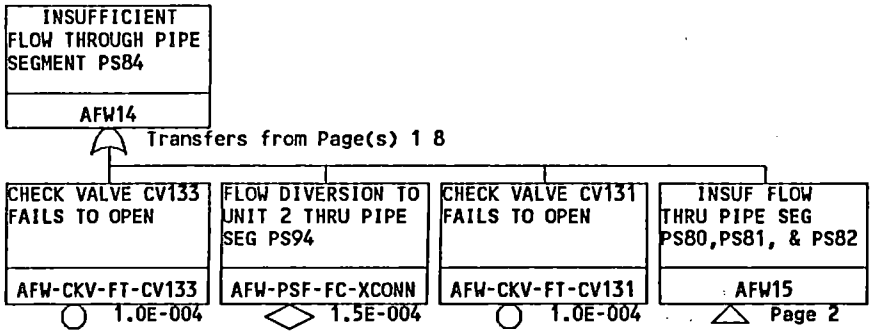

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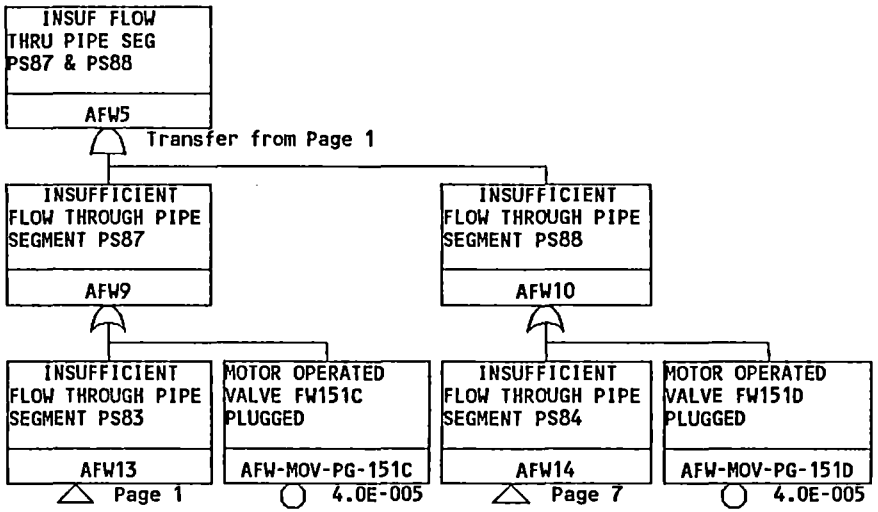

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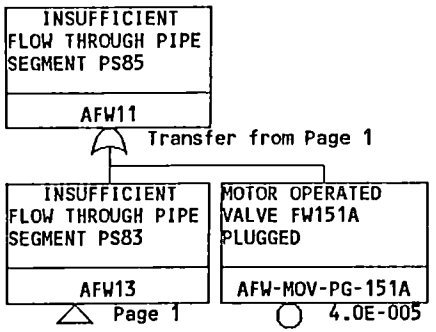

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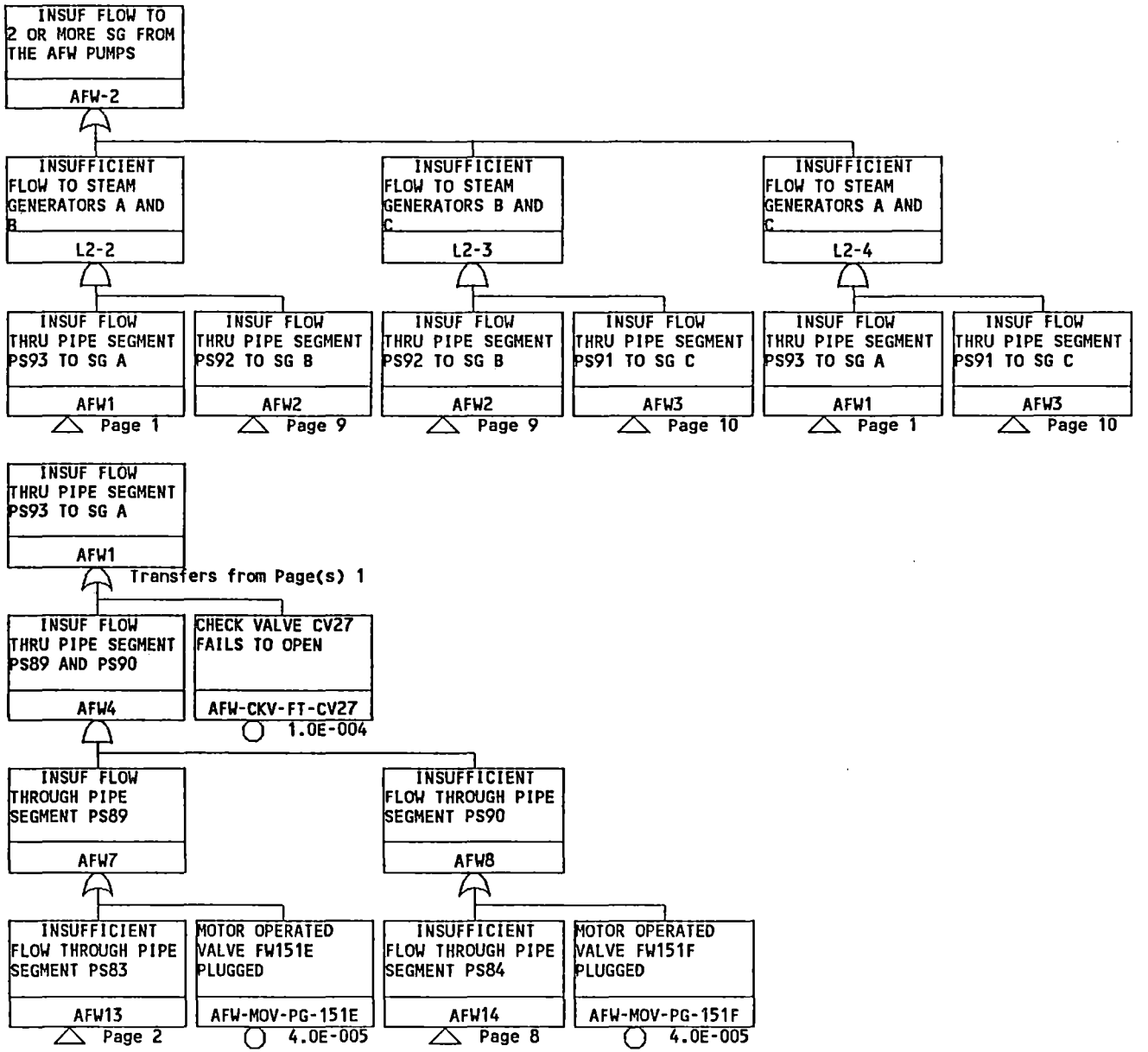
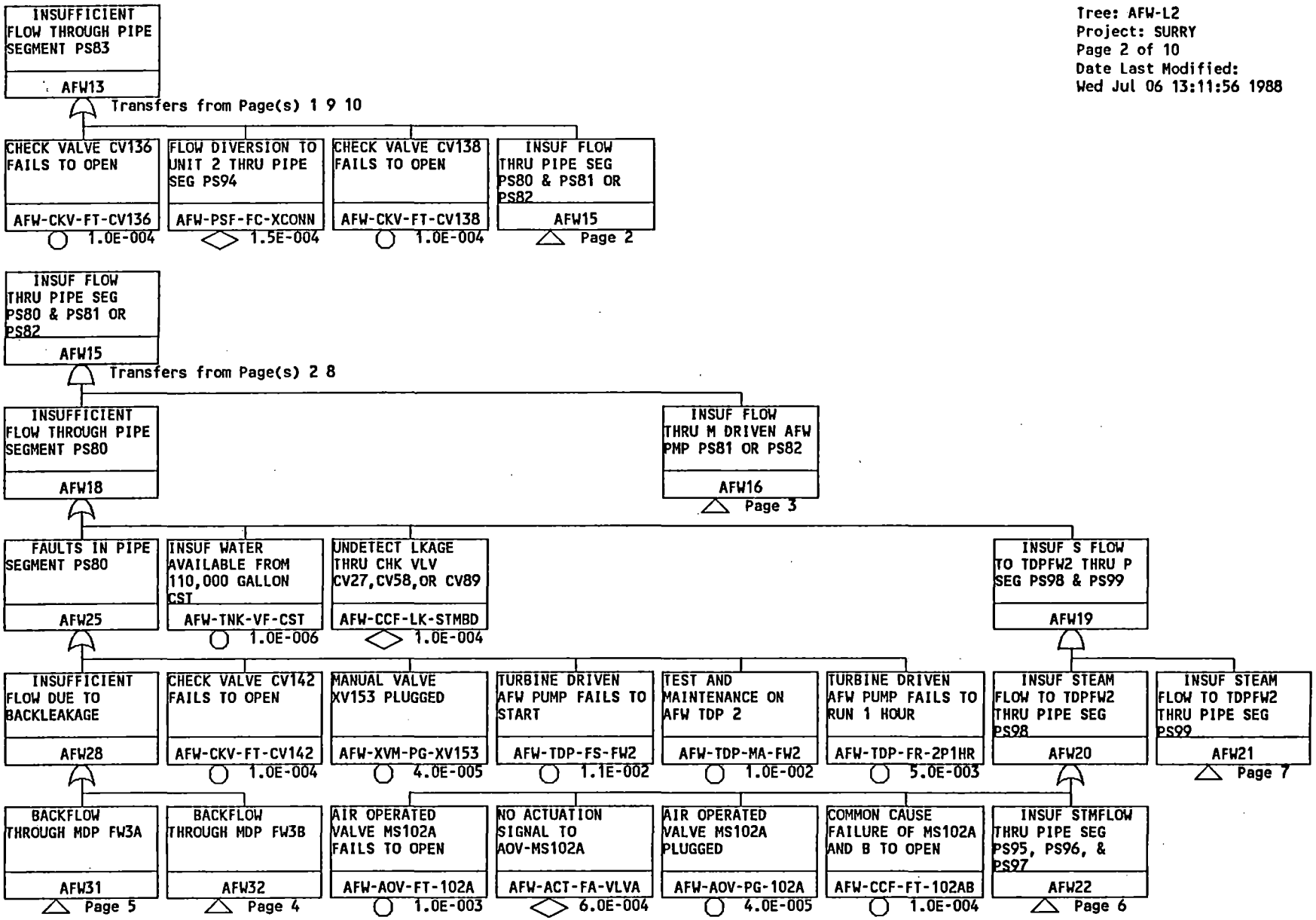
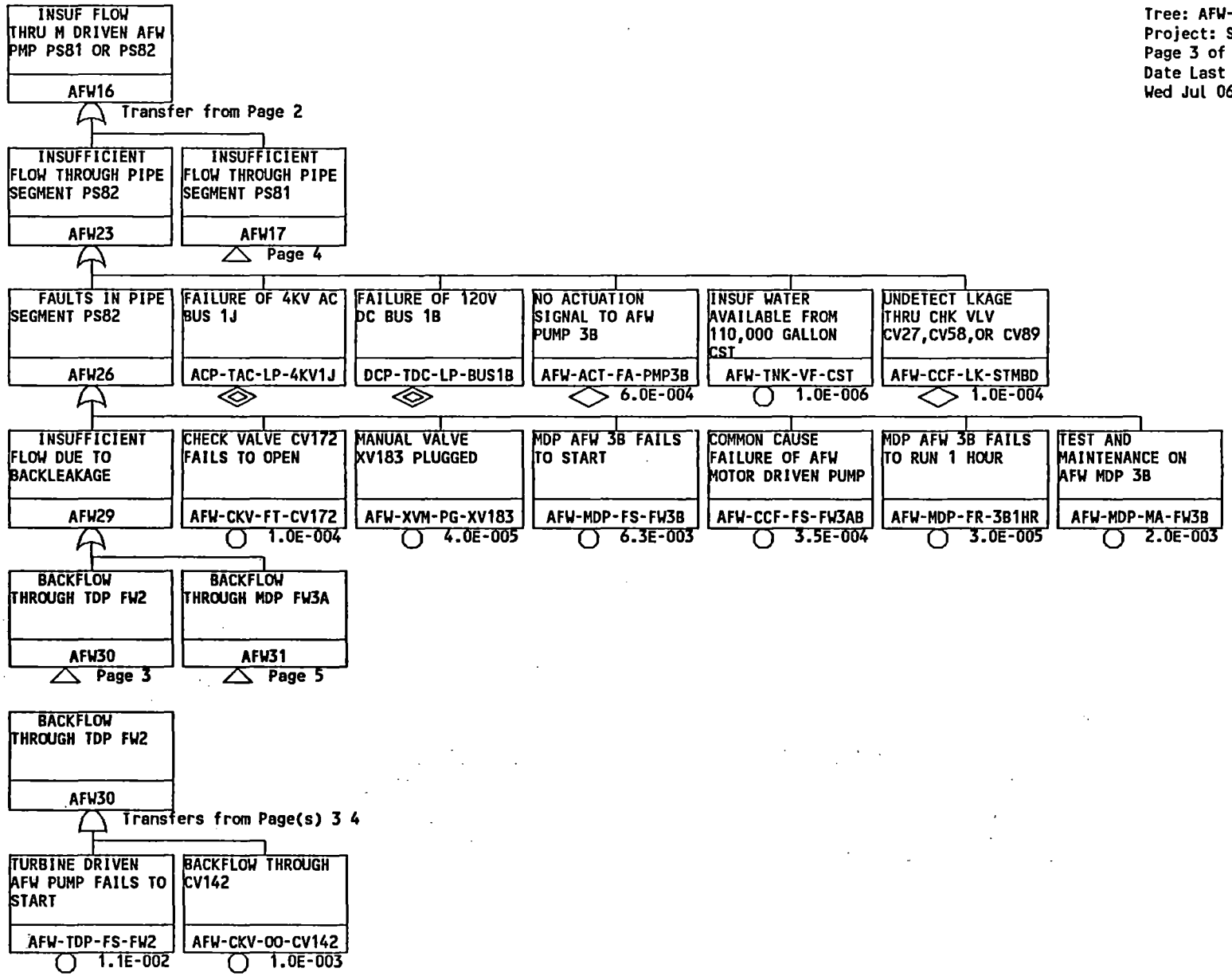
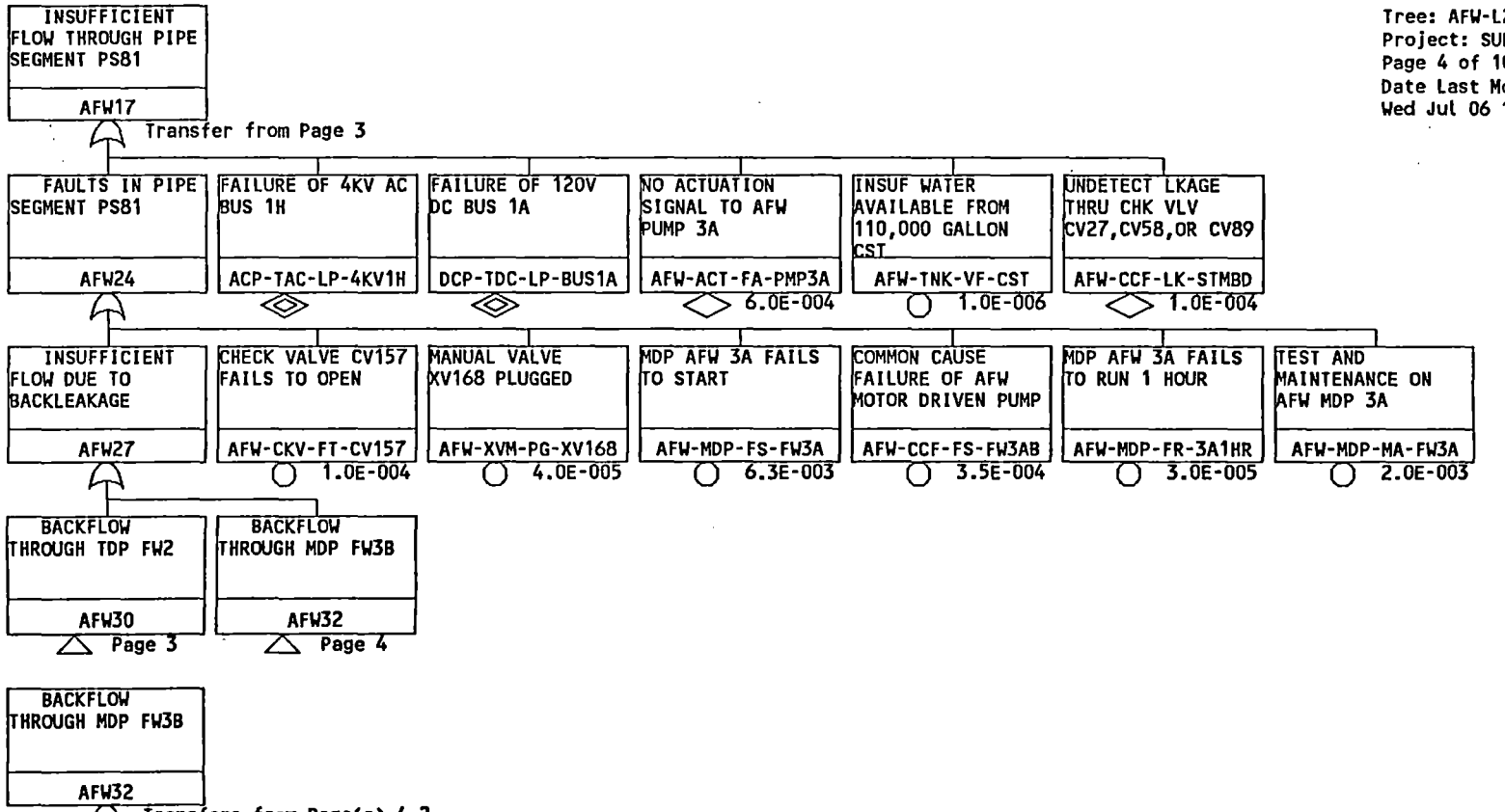
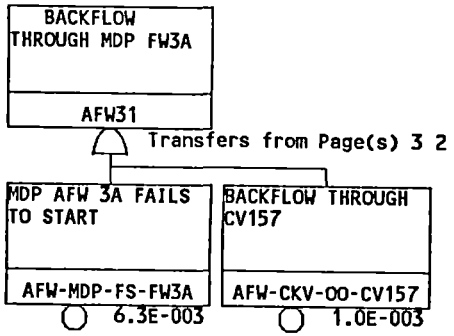

INSUF FLOW TO 2 OR MORE SG FROM THE AFW PUMPS
AFW-2
INSUFFICIENT FLOW TO STEAM GENERATORS A AND B
L2-2
INSUFFICIENT FLOW TO STEAM GENERATORS B AND C
L2-3
INSUFFICIENT FLOW TO STEAM GENERATORS A AND C
L2-4
INSUF FLOW THRU PIPE SEGMENT PS93 TO SG A
AFW1
Page 1
INSUF FLOW THRU PIPE SEGMENT PS92 TO SG B
AFW2
Page 9
INSUF FLOW THRU PIPE SEGMENT PS92 TO SG B
AFW2
Page 9
INSUF FLOW THRU PIPE SEGMENT PS91 TO SG C
AFW3
Page 10
INSUF FLOW THRU PIPE SEGMENT PS93 TO SG A
AFW1
Page 1
INSUF FLOW THRU PIPE SEGMENT PS91 TO SG C
AFW3
Page 10
INSUF FLOW THRU PIPE SEGMENT PS93 TO SG A
AFW1
Transfers from Page(s) 1
INSUF FLOW THRU PIPE SEGMENT PS89 AND PS90
AFW4
CHECK VALVE CV27 FAILS TO OPEN
AFW-CKV-FT-CV27
1.0E-004
INSUF FLOW THROUGH PIPE SEGMENT PS89
AFW7
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS90
AFW8
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS83
AFW13
Page 2
MOTOR OPERATED VALVE FW151E PLUGGED
AFW-MOV-PG-151E
4.0E-005
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS84
AFW14
Page 8
MOTOR OPERATED VALVE FW151F PLUGGED
AFW-MOV-PG-151F
4.0E-005


INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS83
AFW13
Transfers from Page(s) 1 9 10
CHECK VALVE CV136 FAILS TO OPEN
AFW-CKV-FT-CV136
1.0E-004
FLOW DIVERSION TO UNIT 2 THRU PIPE SEG PS94
AFW-PSF-FC-XCONN
1.5E-004
CHECK VALVE CV138 FAILS TO OPEN
AFW-CKV-FT-CV138
1.0E-004
INSUF FLOW THRU PIPE SEG PS80 & PS81 OR PS82
AFW15
Page 2
INSUF FLOW THRU PIPE SEG PS80 & PS81 OR PS82
AFW15
Transfers from Page(s) 2 8
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS80
AFW18
INSUF FLOW THRU M DRIVEN AFW PMP PS81 OR PS82
AFW16
Page 3
FAULTS IN PIPE SEGMENT PS80
AFW25
INSUF WATER AVAILABLE FROM 110,000 GALLON CST
AFW-TNK-VF-CST
1.0E-006
UNDETECT LKAGE THRU CHK VLV CV27,CV58,OR CV89
AFW-CCF-LK-STMBD
1.0E-004
INSUF S FLOW TO TDPFW2 THRU P SEG PS98 & PS99
AFW19
INSUFFICIENT FLOW DUE TO BACKLEAKAGE
AFW28
CHECK VALVE CV142 FAILS TO OPEN
AFW-CKV-FT-CV142
1.0E-004
MANUAL VALVE XV153 PLUGGED
AFW-XVM-PG-XV153
4.0E-005
TURBINE DRIVEN AFW PUMP FAILS TO START
AFW-TDP-FS-FW2
1.1E-002
TEST AND MAINTENANCE ON AFW TDP 2
AFW-TDP-MA-FW2
1.0E-002
TURBINE DRIVEN AFW PUMP FAILS TO RUN 1 HOUR
AFW-TDP-FR-2P1HR
5.0E-003
INSUF STEAM FLOW TO TDPFW2 THRU PIPE SEG PS98
AFW20
INSUF STEAM FLOW TO TDPFW2 THRU PIPE SEG PS99
AFW21
Page 7
BACKFLOW THROUGH MDP FW3A
AFW31
Page 5
BACKFLOW THROUGH MDP FW3B
AFW32
Page 4
AIR OPERATED VALVE MS102A FAILS TO OPEN
AFW-AOV-FT-102A
1.0E-003
NO ACTUATION SIGNAL TO AOV-MS102A
AFW-ACT-FA-VLVA
6.0E-004
AIR OPERATED VALVE MS102A PLUGGED
AFW-AOV-PG-102A
4.0E-005
COMMON CAUSE FAILURE OF MS102A AND B TO OPEN
AFW-CCF-FT-102AB
1.0E-004
INSUF STMFLOW THRU PIPE SEG PS95, PS96, & PS97
AFW22
Page 6


INSUF FLOW THRU M DRIVEN AFW PMP PS81 OR PS82
AFW16
Transfer from Page 2
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS82
AFW23
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS81
AFW17
Page 4
FAULTS IN PIPE SEGMENT PS82
AFW26
FAILURE OF 4KV AC BUS 1J
ACP-TAC-LP-4KV1J
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
NO ACTUATION SIGNAL TO AFW PUMP 3B
AFW-ACT-FA-PMP3B
6.0E-004
INSUF WATER AVAILABLE FROM 110,000 GALLON CST
AFW-TNK-VF-CST
1.0E-006
UNDETECT LKAGE THRU CHK VLV CV27,CV58,OR CV89
AFW-CCF-LK-STMBD
1.0E-004
INSUFFICIENT FLOW DUE TO BACKLEAKAGE
AFW29
CHECK VALVE CV172 FAILS TO OPEN
AFW-CKV-FT-CV172
1.0E-004
MANUAL VALVE XV183 PLUGGED
AFW-XVM-PG-XV183
4.0E-005
MDP AFW 3B FAILS TO START
AFW-MDP-FS-FW3B
6.3E-003
COMMON CAUSE FAILURE OF AFW MOTOR DRIVEN PUMP
AFW-CCF-FS-FW3AB
3.5E-004
MDP AFW 3B FAILS TO RUN 1 HOUR
AFW-MDP-FR-3B1HR
3.0E-005
TEST AND MAINTENANCE ON AFW MDP 3B
AFW-MDP-MA-FW3B
2.0E-003
BACKFLOW THROUGH TDP FW2
AFW30
Page 3
BACKFLOW THROUGH MDP FW3A
AFW31
Page 5
BACKFLOW THROUGH TDP FW2
AFW30
Transfers from Page(s) 3 4
TURBINE DRIVEN AFW PUMP FAILS TO START
AFW-TDP-FS-FW2
1.1E-002
BACKFLOW THROUGH CV142
AFW-CKV-00-CV142
1.0E-003


INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS81
AFW17
Transfer from Page 3
FAULTS IN PIPE SEGMENT PS81
AFW24
FAILURE OF 4KV AC BUS 1H
ACP-TAC-LP-4KV1H
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
NO ACTUATION SIGNAL TO AFW PUMP 3A
AFW-ACT-FA-PMP3A
6.0E-004
INSUF WATER AVAILABLE FROM 110,000 GALLON CST
AFW-TNK-VF-CST
1.0E-006
UNDETECT LKAGE THRU CHK VLV CV27,CV58,OR CV89
AFW-CCF-LK-STMBD
1.0E-004
INSUFFICIENT FLOW DUE TO BACKLEAKAGE
AFW27
CHECK VALVE CV157 FAILS TO OPEN
AFW-CKV-FT-CV157
1.0E-004
MANUAL VALVE XV168 PLUGGED
AFW-XVM-PG-XV168
4.0E-005
MDP AFW 3A FAILS TO START
AFW-MDP-FS-FW3A
6.3E-003
COMMON CAUSE FAILURE OF AFW MOTOR DRIVEN PUMP
AFW-CCF-FS-FW3AB
3.5E-004
MDP AFW 3A FAILS TO RUN 1 HOUR
AFW-MDP-FR-3A1HR
3.0E-005
TEST AND MAINTENANCE ON AFW MDP 3A
AFW-MDP-MA-FW3A
2.0E-003
BACKFLOW THROUGH TDP FW2
AFW30
Page 3
BACKFLOW THROUGH MDP FW3B
AFW32
Page 4
BACKFLOW THROUGH MDP FW3B
AFW32
Transfers from Page(s) 4 2
MDP AFW 3B FAILS TO START
AFW-MDP-FS-FW3B
6.3E-003
BACKFLOW THROUGH CV172
AFW-CKV-OO-CV172
1.0E-003



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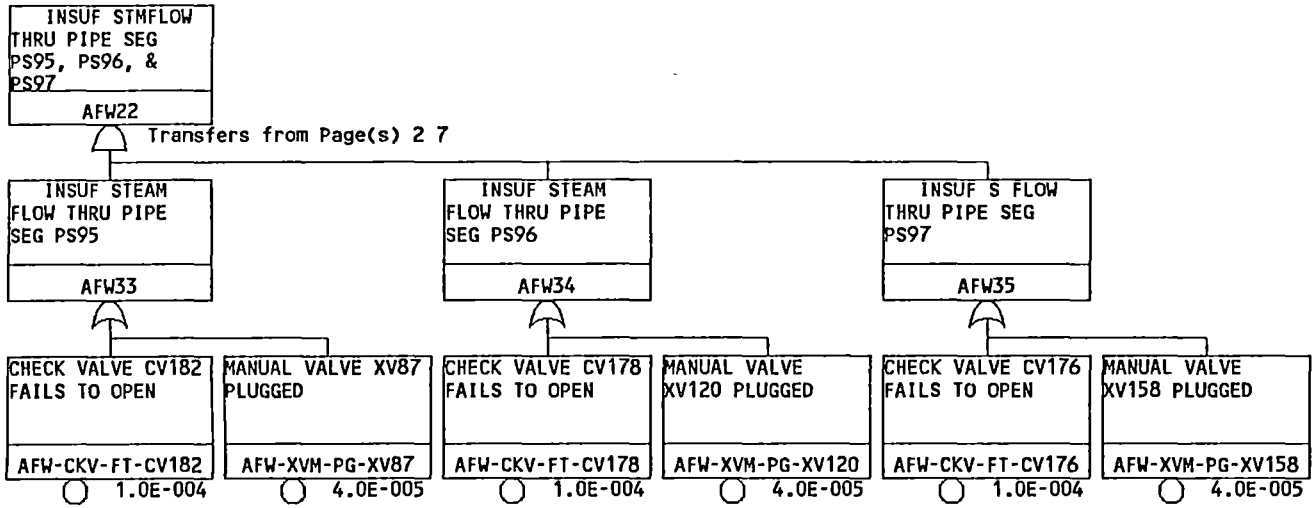
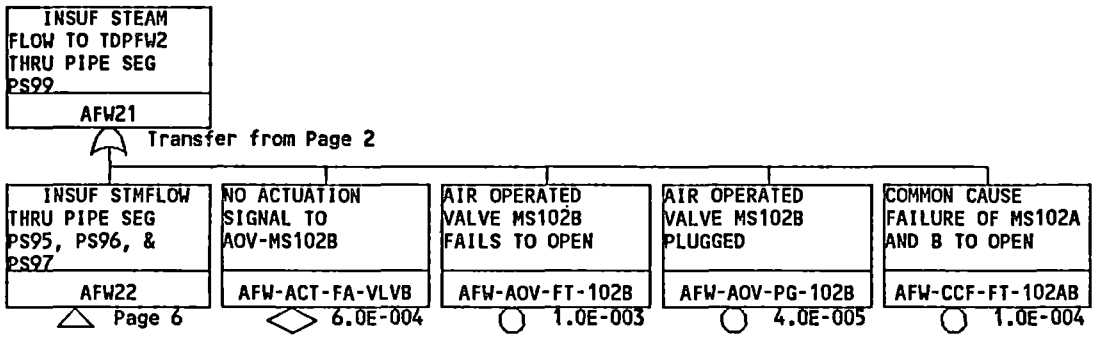
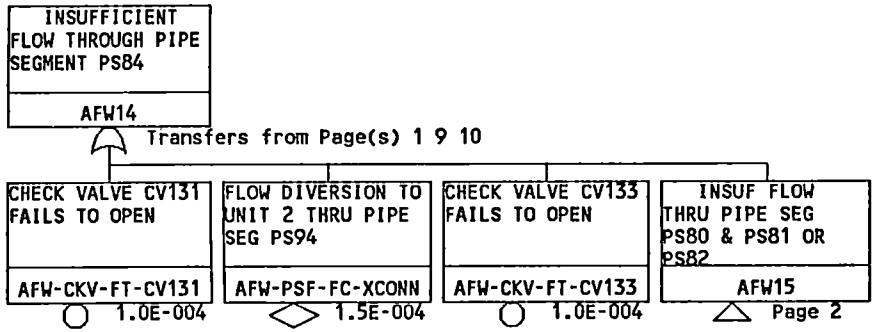

INSUF STMFLOW THRU PIPE SEG PS95, PS96, & PS97
AFW22
Transfers from Page(s) 2 7
INSUF STEAM FLOW THRU PIPE SEG PS95
AFW33
INSUF STEAM FLOW THRU PIPE SEG PS96
AFW34
INSUF S FLOW THRU PIPE SEG PS97
AFW35
CHECK VALVE CV182 FAILS TO OPEN
AFW-CKV-FT-CV182
1.0E-004
MANUAL VALVE XV87 PLUGGED
AFW-XVM-PG-XV87
4.0E-005
CHECK VALVE CV178 FAILS TO OPEN
AFW-CKV-FT-CV178
1.0E-004
MANUAL VALVE XV120 PLUGGED
AFW-XVM-PG-XV120
4.0E-005
CHECK VALVE CV176 FAILS TO OPEN
AFW-CKV-FT-CV176
1.0E-004
MANUAL VALVE XV158 PLUGGED
AFW-XVM-PG-XV158
4.0E-005


INSUF STEAM FLOW TO TDPFW2 THRU PIPE SEG PS99
AFW21
Transfer from Page 2
INSUF STMFLOW THRU PIPE SEG PS95, PS96, & PS97
AFW22
Page 6
NO ACTUATION SIGNAL TO AOV-MS102B
AFW-ACT-FA-VLVB
6.0E-004
AIR OPERATED VALVE MS102B FAILS TO OPEN
AFW-AOV-FT-102B
1.0E-003
AIR OPERATED VALVE MS102B PLUGGED
AFW-AOV-PG-102B
4.0E-005
COMMON CAUSE FAILURE OF MS102A AND B TO OPEN
AFW-CCF-FT-102AB
1.0E-004



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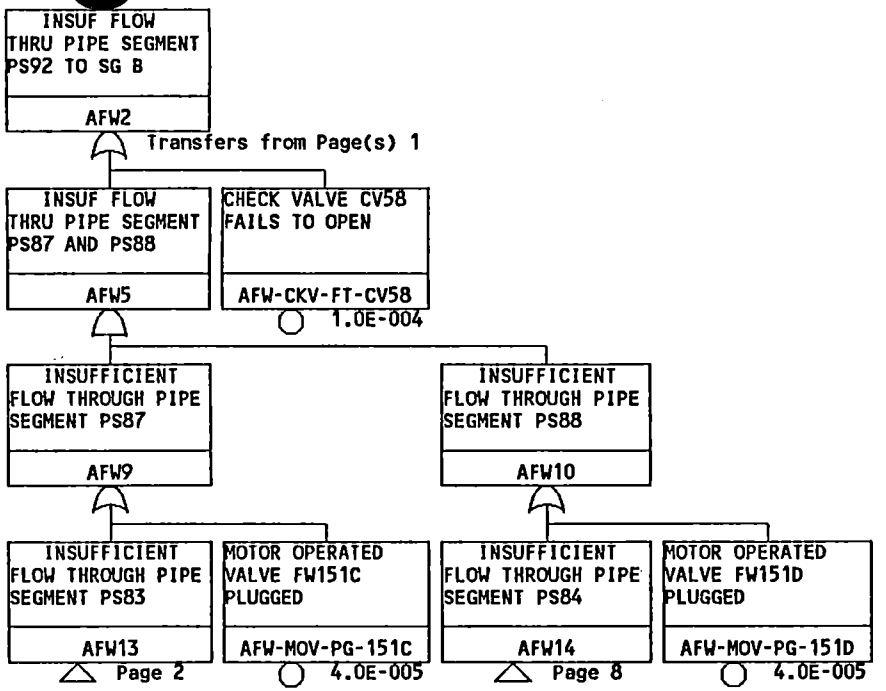
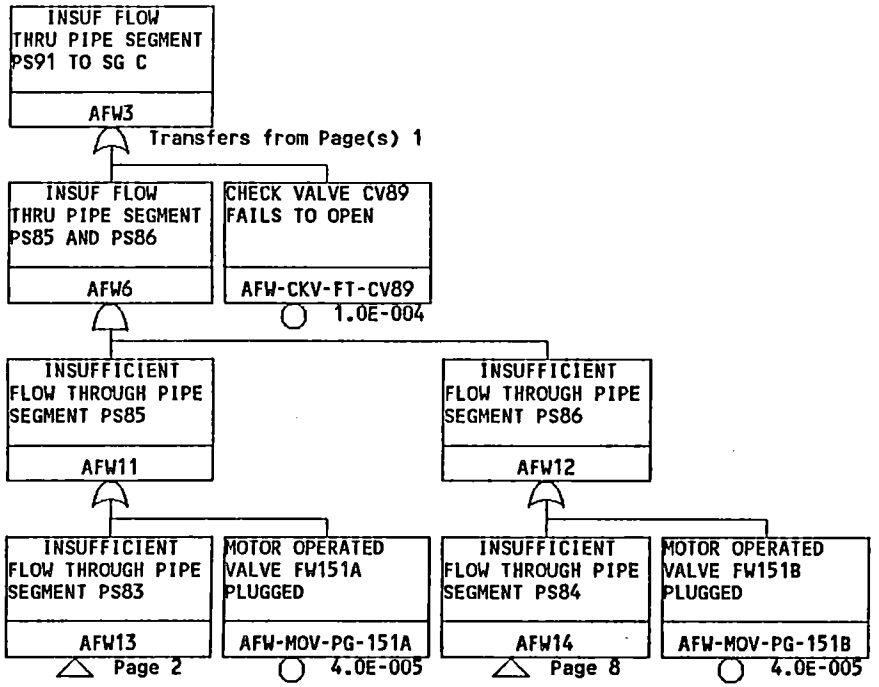
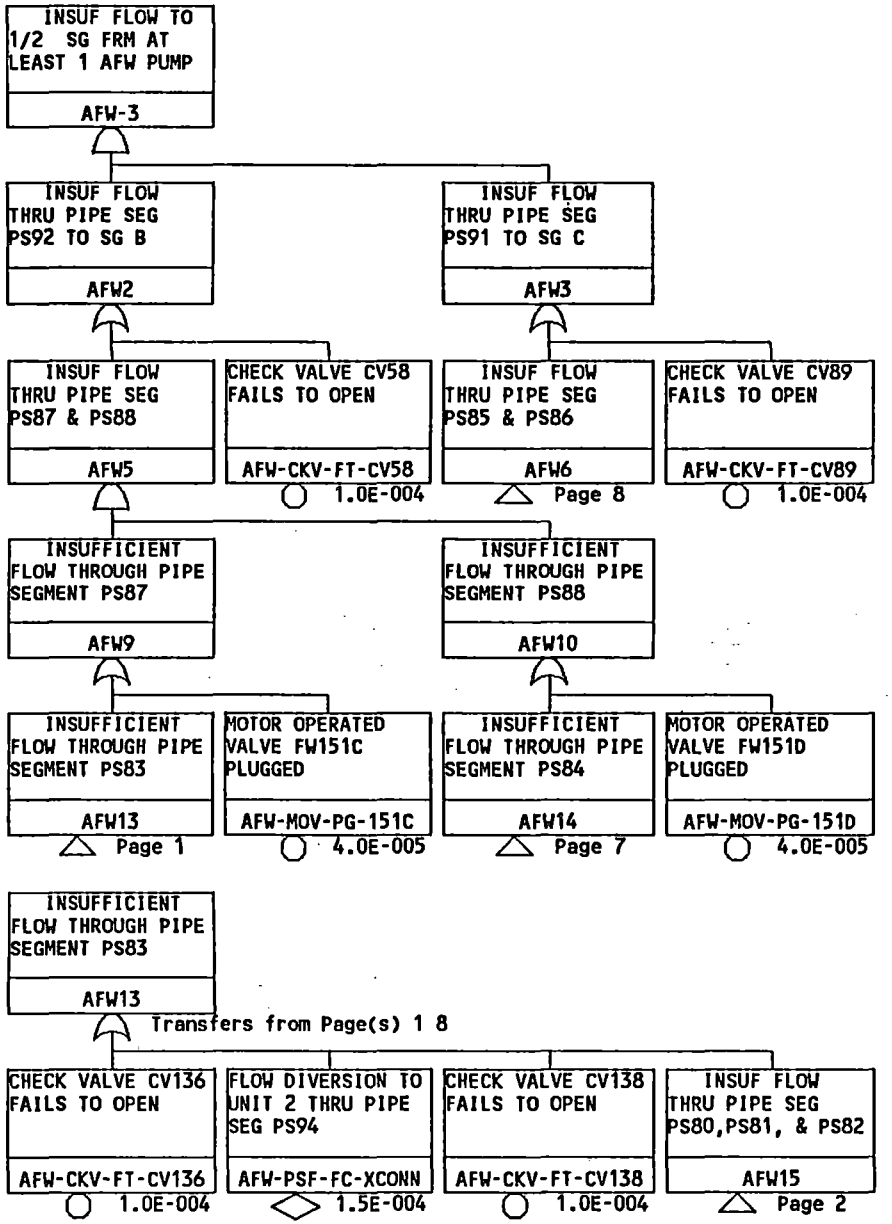
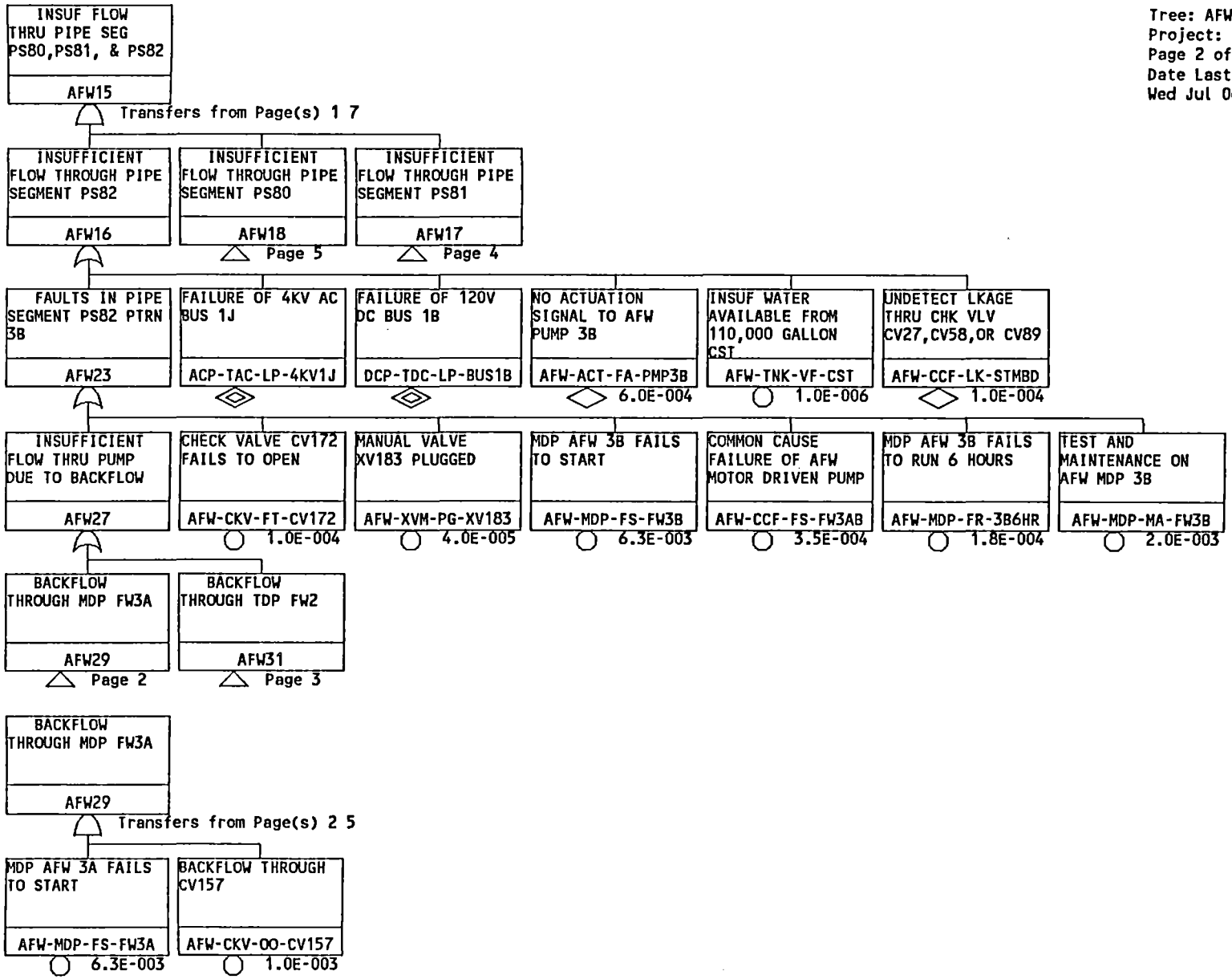
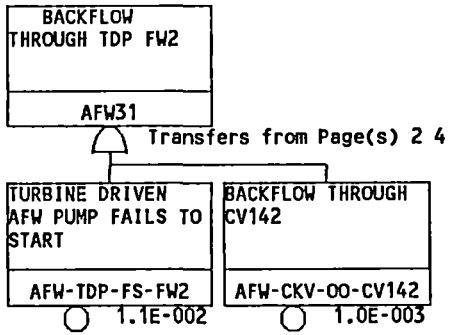

INSUF FLOW THRU PIPE SEGMENT PS92 TO SG B
AFW2
Transfers from Page(s) 1
INSUF FLOW THRU PIPE SEGMENT PS87 AND PS88
AFW5
CHECK VALVE CV58 FAILS TO OPEN
AFW-CKV-FT-CV58
1.0E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS87
AFW9
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS88
AFW10
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS83
AFW13
Page 2
MOTOR OPERATED VALVE FW151C PLUGGED
AFW-MOV-PG-151C
4.0E-005
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS84
AFW14
Page 8
MOTOR OPERATED VALVE FW151D PLUGGED
AFW-MOV-PG-151D
4.0E-005


INSUF FLOW THRU PIPE SEGMENT PS91 TO SG C
AFW3
Transfers from Page(s) 1
INSUF FLOW THRU PIPE SEGMENT PS85 AND PS86
AFW6
CHECK VALVE CV89 FAILS TO OPEN
AFW-CKV-FT-CV89
1.0E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS85
AFW11
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS86
AFW12
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS83
AFW13
Page 2
MOTOR OPERATED VALVE FW151A PLUGGED
AFW-MOV-PG-151A
4.0E-005
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS84
AFW14
Page 8
MOTOR OPERATED VALVE FW151B PLUGGED
AFW-MOV-PG-151B
4.0E-005


INSUF FLOW TO 1/2 SG FRM AT LEAST 1 AFW PUMP
AFW-3
INSUF FLOW THRU PIPE SEG PS92 TO SG B
AFW2
INSUF FLOW THRU PIPE SEG PS91 TO SG C
AFW3
INSUF FLOW THRU PIPE SEG PS87 & PS88
AFW5
CHECK VALVE CV58 FAILS TO OPEN
AFW-CKV-FT-CV58
1.0E-004
INSUF FLOW THRU PIPE SEG PS85 & PS86
AFW6
Page 8
CHECK VALVE CV89 FAILS TO OPEN
AFW-CKV-FT-CV89
1.0E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS87
AFW9
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS88
AFW10
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS83
AFW13
Page 1
MOTOR OPERATED VALVE FW151C PLUGGED
AFW-MOV-PG-151C
4.0E-005
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS84
AFW14
Page 7
MOTOR OPERATED VALVE FW151D PLUGGED
AFW-MOV-PG-151D
4.0E-005
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS83
AFW13
Transfers from Page(s) 1 8
CHECK VALVE CV136 FAILS TO OPEN
AFW-CKV-FT-CV136
1.0E-004
FLOW DIVERSION TO UNIT 2 THRU PIPE SEG PS94
AFW-PSF-FC-XCONN
1.5E-004
CHECK VALVE CV138 FAILS TO OPEN
AFW-CKV-FT-CV138
1.0E-004
INSUF FLOW THRU PIPE SEG PS80,PS81, & PS82
AFW15
Page 2


INSUF FLOW THRU PIPE SEG PS80,PS81, & PS82
AFW15
Transfers from Page(s) 1 7
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS82
AFW16
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS80
AFW18
Page 5
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS81
AFW17
Page 4
FAULTS IN PIPE SEGMENT PS82 PTRN 3B
AFW23
FAILURE OF 4KV AC BUS 1J
ACP-TAC-LP-4KV1J
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
NO ACTUATION SIGNAL TO AFW PUMP 3B
AFW-ACT-FA-PMP3B
6.0E-004
INSUF WATER AVAILABLE FROM 110,000 GALLON CST
AFW-TNK-VF-CST
1.0E-006
UNDETECT LKAGE THRU CHK VLV CV27,CV58,OR CV89
AFW-CCF-LK-STMBD
1.0E-004
INSUFFICIENT FLOW THRU PUMP DUE TO BACKFLOW
AFW27
CHECK VALVE CV172 FAILS TO OPEN
AFW-CKV-FT-CV172
1.0E-004
MANUAL VALVE XV183 PLUGGED
AFW-XVM-PG-XV183
4.0E-005
MDP AFW 3B FAILS TO START
AFW-MDP-FS-FW3B
6.3E-003
COMMON CAUSE FAILURE OF AFW MOTOR DRIVEN PUMP
AFW-CCF-FS-FW3AB
3.5E-004
MDP AFW 3B FAILS TO RUN 6 HOURS
AFW-MDP-FR-3B6HR
1.8E-004
TEST AND MAINTENANCE ON AFW MDP 3B
AFW-MDP-MA-FW3B
2.0E-003
BACKFLOW THROUGH MDP FW3A
AFW29
Page 2
BACKFLOW THROUGH TDP FW2
AFW31
Page 3
BACKFLOW THROUGH MDP FW3A
AFW29
Transfers from Page(s) 2 5
MDP AFW 3A FAILS TO START
AFW-MDP-FS-FW3A
6.3E-003
BACKFLOW THROUGH CV157
AFW-CKV-OO-CV157
1.0E-003



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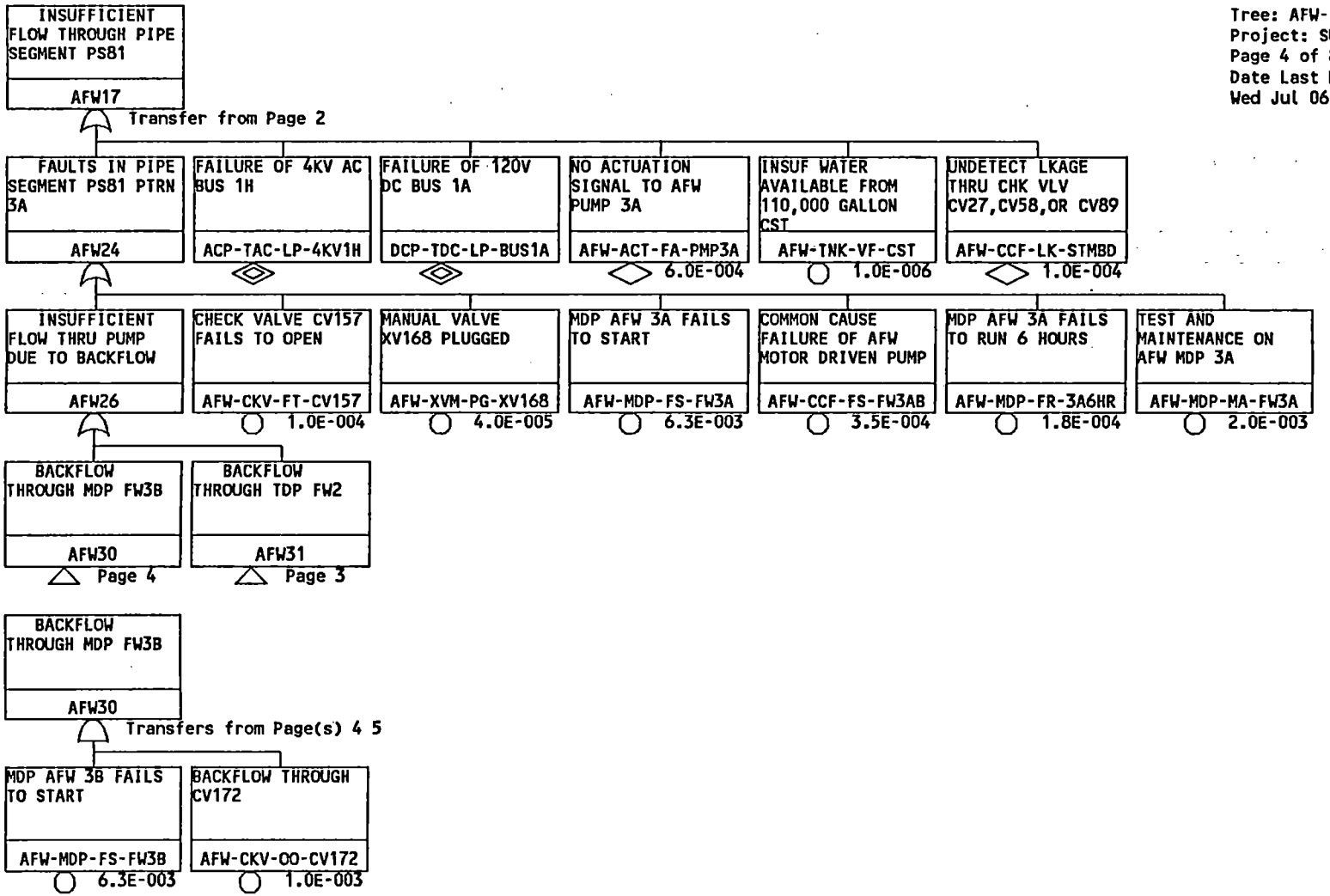

INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS81
AFW17
Transfer from Page 2
FAULTS IN PIPE SEGMENT PS81 PTRN 3A
AFW24
FAILURE OF 4KV AC BUS 1H
ACP-TAC-LP-4KV1H
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
NO ACTUATION SIGNAL TO AFW PUMP 3A
AFW-ACT-FA-PMP3A
6.0E-004
INSUF WATER AVAILABLE FROM 110,000 GALLON CST
AFW-TNK-VF-CST
1.0E-006
UNDETECT LKAGE THRU CHK VLV CV27,CV58,OR CV89
AFW-CCF-LK-STMBD
1.0E-004
INSUFFICIENT FLOW THRU PUMP DUE TO BACKFLOW
AFW26
CHECK VALVE CV157 FAILS TO OPEN
AFW-CKV-FT-CV157
1.0E-004
MANUAL VALVE XV168 PLUGGED
AFW-XVM-PG-XV168
4.0E-005
MDP AFW 3A FAILS TO START
AFW-MDP-FS-FW3A
6.3E-003
COMMON CAUSE FAILURE OF AFW MOTOR DRIVEN PUMP
AFW-CCF-FS-FW3AB
3.5E-004
MDP AFW 3A FAILS TO RUN 6 HOURS
AFW-MDP-FR-3A6HR
1.8E-004
TEST AND MAINTENANCE ON AFW MDP 3A
AFW-MDP-MA-FW3A
2.0E-003
BACKFLOW THROUGH MDP FW3B
AFW30
Page 4
BACKFLOW THROUGH TDP FW2
AFW31
Page 3
BACKFLOW THROUGH MDP FW3B
AFW30
Transfers from Page(s) 4 5
MDP AFW 3B FAILS TO START
AFW-MDP-FS-FW3B
6.3E-003
BACKFLOW THROUGH CV172
AFW-CKV-OO-CV172
1.0E-003

INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS80
AFW18

Transfer from Page 2

FAULTS IN PIPE SEGMENT PS80 TDP TRAIN
AFW25

INSUF WATER AVAILABLE FROM 110,000 GALLON CST
AFW-TNK-VF-CST
1.0E-006

UNDETECT LKAGE THRU CHK VLV CV27,CV58,OR CV89
AFW-CCF-LK-STMBD
1.0E-004

INSUF STM FLOW TO TDPFW2 THRU P SEG PS98,PS99
AFW19

INSUFFICIENT FLOW THRU PUMP DUE TO BACKFLOW
AFW28

CHECK VALVE CV142 FAILS TO OPEN
AFW-CKV-FT-CV142
1.0E-004

MANUAL VALVE XV153 PLUGGED
AFW-XVM-PG-XV153
4.0E-005

TURBINE DRIVEN AFW PUMP FAILS TO START
AFW-TDP-FS-FW2
1.1E-002

TEST AND MAINTENANCE ON AFW TDP 2
AFW-TDP-MA-FW2
1.0E-002

TURBINE DRIVEN PUMP FAILS TO RUN FOR 6 HOURS
AFW-TDP-FR-2P6HR
3.0E-002

INSUF STEAM FLOW TO TDPFW2 THRU PIPE SEG PS98
AFW20

INSUF STEAM FLOW TO TDPFW2 THRU PIPE SEG PS99
AFW21
Page 6

BACKFLOW THROUGH MDP FW3A
AFW29
Page 2

BACKFLOW THROUGH MDP FW3B
AFW30
Page 4

AIR OPERATED VALVE MS102A FAILS TO OPEN
AFW-AOV-FT-102A
1.0E-003

NO ACTUATION SIGNAL TO AOV-MS102A
AFW-ACT-FA-VLVA
6.0E-004

AIR OPERATED VALVE MS102A PLUGGED
AFW-AOV-PG-102A
4.0E-005

COMMON CAUSE FAILURE OF MS102A AND B TO OPEN
AFW-CCF-FT-102AB
1.0E-004

INSUF STM FLOW THRU PIPE SEG PS95,PS96, PS97
AFW22
Page 5

INSUF STM FLOW THRU PIPE SEG PS95,PS96, PS97
AFW22

Transfers from Page(s) 5 6

INSUF STM FLOW THRU PIPE SEG PS95
AFW32

INSUF STM FLOW THRU PIPE SEG PS96
AFW33

INSUF STM FLOW THRU PIPE SEG PS97
AFW34

CHECK VALVE CV182 FAILS TO OPEN
AFW-CKV-FT-CV182
1.0E-004

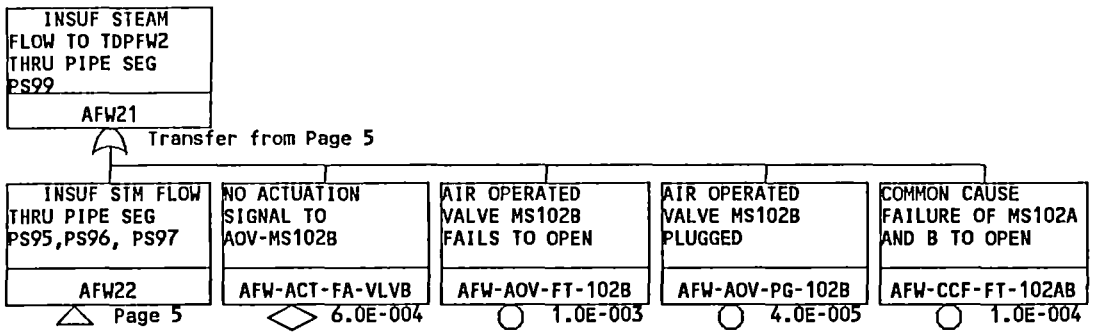
MANUAL VALVE XV87 PLUGGED
AFW-XVM-PG-XV87
4.0E-005

CHECK VALVE CV178 FAILS TO OPEN
AFW-CKV-FT-CV178
1.0E-004

MANUAL VALVE XV120 PLUGGED
AFW-XVM-PG-XV120
4.0E-005

CHECK VALVE CV176 FAILS TO OPEN
AFW-CKV-FT-CV176
1.0E-004

MANUAL VALVE XV158 PLUGGED
AFW-XVM-PG-XV158
4.0E-005



Tree: AFW-L3
Project: SURRY
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Date Last Modified:
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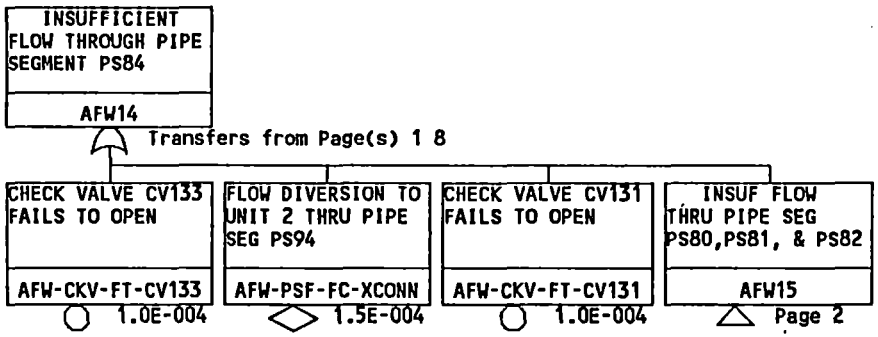
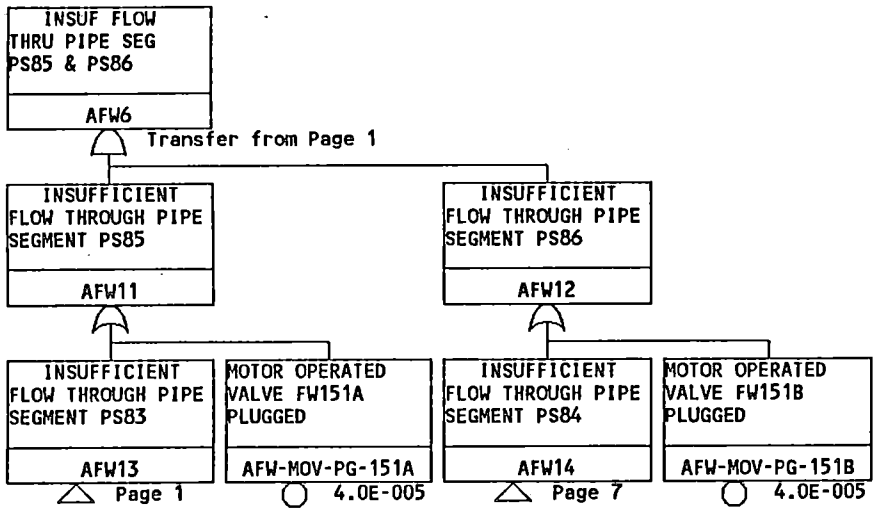

INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS84
AFW14
Transfers from Page(s) 1 8
CHECK VALVE CV133 FAILS TO OPEN
AFW-CKV-FT-CV133
1.0E-004
FLOW DIVERSION TO UNIT 2 THRU PIPE SEG PS94
AFW-PSF-FC-XCONN
1.5E-004
CHECK VALVE CV131 FAILS TO OPEN
AFW-CKV-FT-CV131
1.0E-004
INSUF FLOW THRU PIPE SEG PS80,PS81, & PS82
AFW15
Page 2



Tree: AFW-L3
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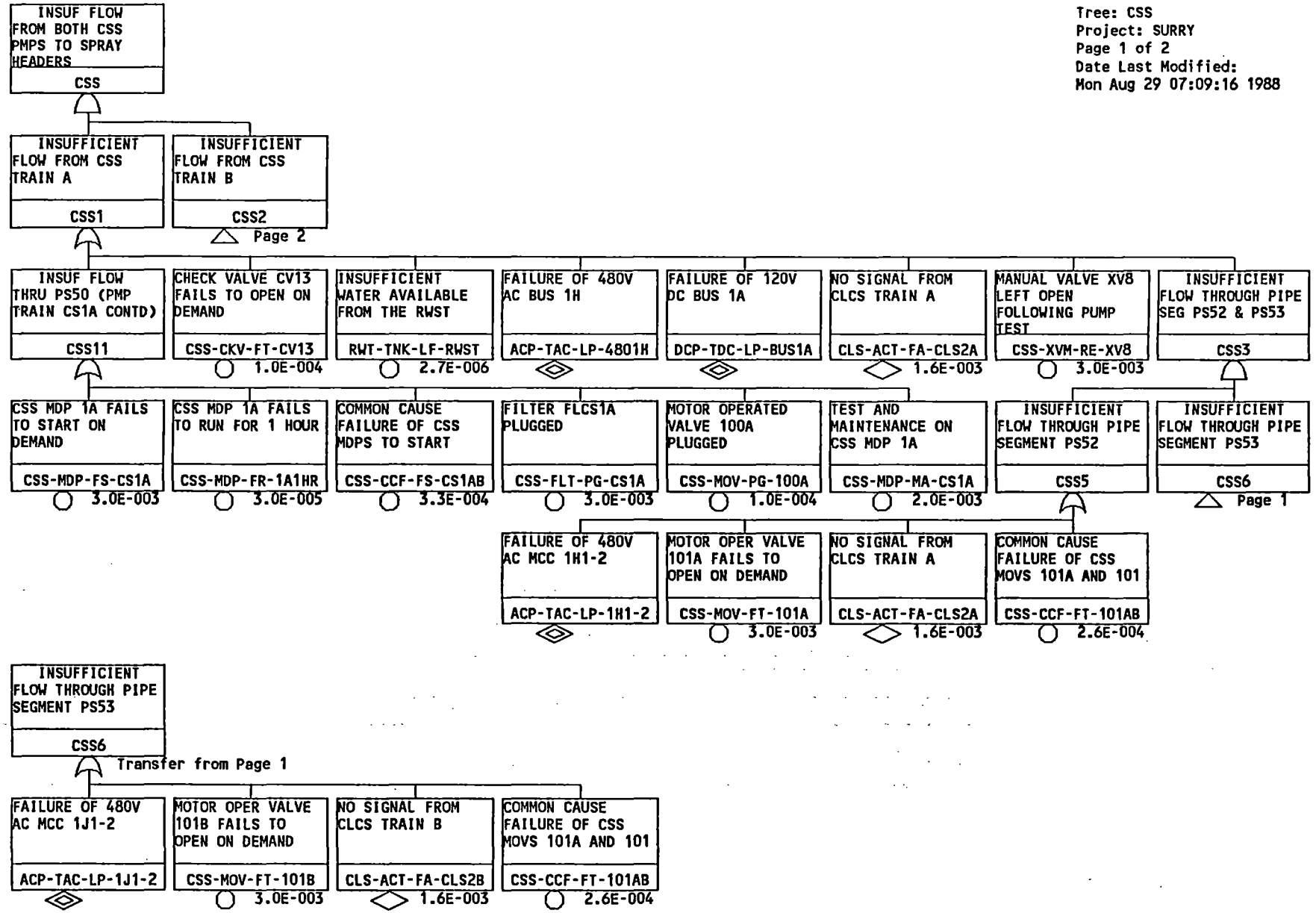
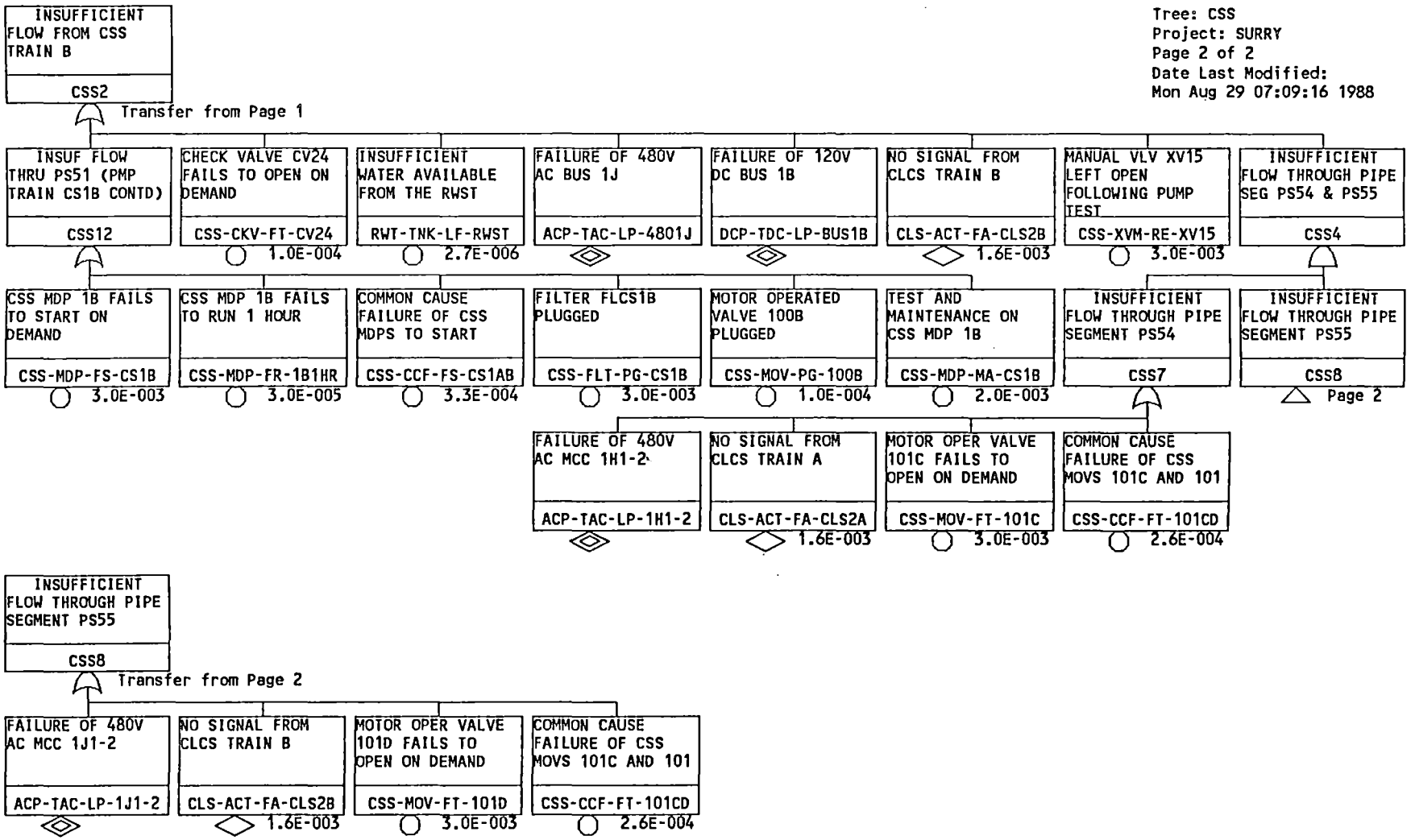

INSUF FLOW FROM BOTH CSS PMPS TO SPRAY HEADERS
CSS
Tree: CSS
Project: SURRY
Page 1 of 2
Date Last Modified:
Mon Aug 29 07:09:16 1988
INSUFFICIENT FLOW FROM CSS TRAIN A
CSS1
INSUFFICIENT FLOW FROM CSS TRAIN B
CSS2
Page 2
INSUF FLOW THRU PS50 (PMP TRAIN CS1A CONTD)
CSS11
CHECK VALVE CV13 FAILS TO OPEN ON DEMAND
CSS-CKV-FT-CV13
1.0E-004
INSUFFICIENT WATER AVAILABLE FROM THE RWST
RWT-TNK-LF-RWST
2.7E-006
FAILURE OF 480V AC BUS 1H
ACP-TAC-LP-4801H
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
NO SIGNAL FROM CLCS TRAIN A
CLS-ACT-FA-CLS2A
1.6E-003
MANUAL VALVE XV8 LEFT OPEN FOLLOWING PUMP TEST
CSS-XVM-RE-XV8
3.0E-003
INSUFFICIENT FLOW THROUGH PIPE SEG PS52 & PS53
CSS3
CSS MDP 1A FAILS TO START ON DEMAND
CSS-MDP-FS-CS1A
3.0E-003
CSS MDP 1A FAILS TO RUN FOR 1 HOUR
CSS-MDP-FR-1A1HR
3.0E-005
COMMON CAUSE FAILURE OF CSS MDPS TO START
CSS-CCF-FS-CS1AB
3.3E-004
FILTER FLCS1A PLUGGED
CSS-FLT-PG-CS1A
3.0E-003
MOTOR OPERATED VALVE 100A PLUGGED
CSS-MOV-PG-100A
1.0E-004
TEST AND MAINTENANCE ON CSS MDP 1A
CSS-MDP-MA-CS1A
2.0E-003
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS52
CSS5
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS53
CSS6
Page 1
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
MOTOR OPER VALVE 101A FAILS TO OPEN ON DEMAND
CSS-MOV-FT-101A
3.0E-003
NO SIGNAL FROM CLCS TRAIN A
CLS-ACT-FA-CLS2A
1.6E-003
COMMON CAUSE FAILURE OF CSS MOVS 101A AND 101
CSS-CCF-FT-101AB
2.6E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS53
CSS6
Transfer from Page 1
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
MOTOR OPER VALVE 101B FAILS TO OPEN ON DEMAND
CSS-MOV-FT-101B
3.0E-003
NO SIGNAL FROM CLCS TRAIN B
CLS-ACT-FA-CLS2B
1.6E-003
COMMON CAUSE FAILURE OF CSS MOVS 101A AND 101
CSS-CCF-FT-101AB
2.6E-004


INSUFFICIENT FLOW FROM CSS TRAIN B
CSS2
Transfer from Page 1
Tree: CSS
Project: SURRY
Page 2 of 2
Date Last Modified:
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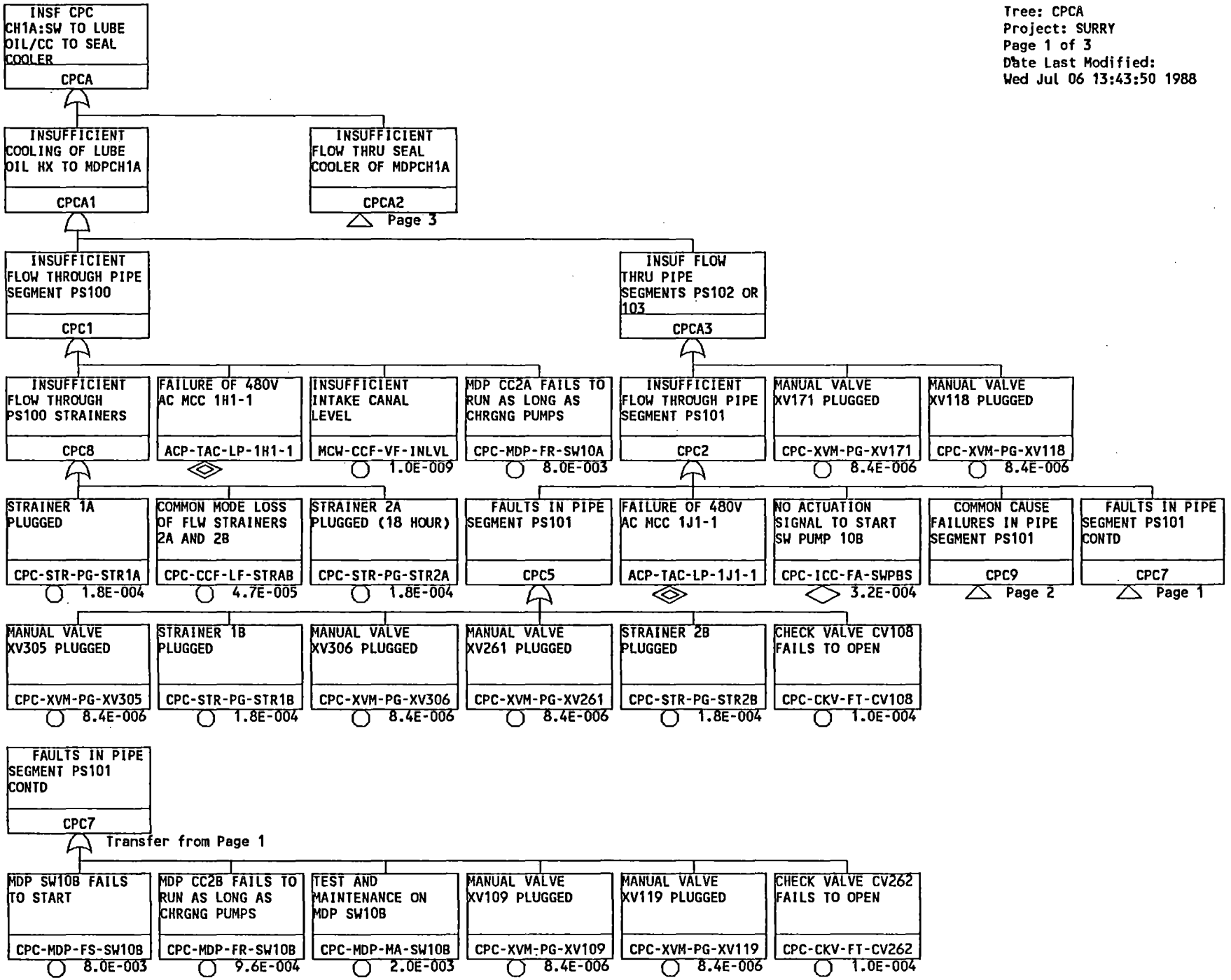
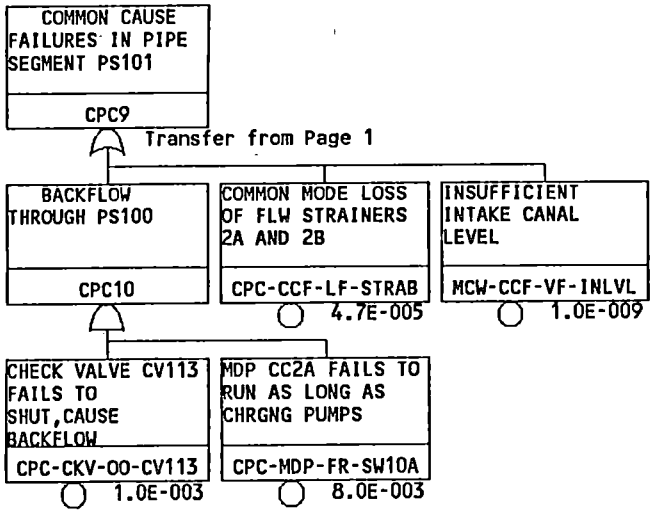
INSUF FLOW THRU PS51 (PMP TRAIN CS1B CONTD)
CSS12
CHECK VALVE CV24 FAILS TO OPEN ON DEMAND
CSS-CKV-FT-CV24
1.0E-004
INSUFFICIENT WATER AVAILABLE FROM THE RWST
RWT-TNK-LF-RWST
2.7E-006
FAILURE OF 480V AC BUS 1J
ACP-TAC-LP-4801J
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
NO SIGNAL FROM CLCS TRAIN B
CLS-ACT-FA-CLS2B
1.6E-003
MANUAL VLV XV15 LEFT OPEN FOLLOWING PUMP TEST
CSS-XVM-RE-XV15
3.0E-003
INSUFFICIENT FLOW THROUGH PIPE SEG PS54 & PS55
CSS4
CSS MDP 1B FAILS TO START ON DEMAND
CSS-MDP-FS-CS1B
3.0E-003
CSS MDP 1B FAILS TO RUN 1 HOUR
CSS-MDP-FR-1B1HR
3.0E-005
COMMON CAUSE FAILURE OF CSS MDPS TO START
CSS-CCF-FS-CS1AB
3.3E-004
FILTER FLCS1B PLUGGED
CSS-FLT-PG-CS1B
3.0E-003
MOTOR OPERATED VALVE 100B PLUGGED
CSS-MOV-PG-100B
1.0E-004
TEST AND MAINTENANCE ON CSS MDP 1B
CSS-MDP-MA-CS1B
2.0E-003
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS54
CSS7
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS55
CSS8
Page 2
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
NO SIGNAL FROM CLCS TRAIN A
CLS-ACT-FA-CLS2A
1.6E-003
MOTOR OPER VALVE 101C FAILS TO OPEN ON DEMAND
CSS-MOV-FT-101C
3.0E-003
COMMON CAUSE FAILURE OF CSS MOVS 101C AND 101
CSS-CCF-FT-101CD
2.6E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS55
CSS8
Transfer from Page 2
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
NO SIGNAL FROM CLCS TRAIN B
CLS-ACT-FA-CLS2B
1.6E-003
MOTOR OPER VALVE 101D FAILS TO OPEN ON DEMAND
CSS-MOV-FT-101D
3.0E-003
COMMON CAUSE FAILURE OF CSS MOVS 101C AND 101
CSS-CCF-FT-101CD
2.6E-004


INSF CPC CH1A:SW TO LUBE OIL/CC TO SEAL COOLER
CPCA
INSUFFICIENT COOLING OF LUBE OIL HX TO MDPCH1A
CPCA1
INSUFFICIENT FLOW THRU SEAL COOLER OF MDPCH1A
CPCA2
Page 3
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS100
CPC1
INSUF FLOW THRU PIPE SEGMENTS PS102 OR 103
CPCA3
INSUFFICIENT FLOW THROUGH PS100 STRAINERS
CPC8
FAILURE OF 480V AC MCC 1H1-1
ACP-TAC-LP-1H1-1
INSUFFICIENT INTAKE CANAL LEVEL
MCW-CCF-VF-INLVL
1.0E-009
MDP CC2A FAILS TO RUN AS LONG AS CHRGNG PUMPS
CPC-MDP-FR-SW10A
8.0E-003
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS101
CPC2
MANUAL VALVE XV171 PLUGGED
CPC-XVM-PG-XV171
8.4E-006
MANUAL VALVE XV118 PLUGGED
CPC-XVM-PG-XV118
8.4E-006
STRAINER 1A PLUGGED
CPC-STR-PG-STR1A
1.8E-004
COMMON MODE LOSS OF FLW STRAINERS 2A AND 2B
CPC-CCF-LF-STRAB
4.7E-005
STRAINER 2A PLUGGED (18 HOUR)
CPC-STR-PG-STR2A
1.8E-004
FAULTS IN PIPE SEGMENT PS101
CPC5
FAILURE OF 480V AC MCC 1J1-1
ACP-TAC-LP-1J1-1
NO ACTUATION SIGNAL TO START SW PUMP 10B
CPC-ICC-FA-SWPBS
3.2E-004
COMMON CAUSE FAILURES IN PIPE SEGMENT PS101
CPC9
Page 2
FAULTS IN PIPE SEGMENT PS101 CONTD
CPC7
Page 1
MANUAL VALVE XV305 PLUGGED
CPC-XVM-PG-XV305
8.4E-006
STRAINER 1B PLUGGED
CPC-STR-PG-STR1B
1.8E-004
MANUAL VALVE XV306 PLUGGED
CPC-XVM-PG-XV306
8.4E-006
MANUAL VALVE XV261 PLUGGED
CPC-XVM-PG-XV261
8.4E-006
STRAINER 2B PLUGGED
CPC-STR-PG-STR2B
1.8E-004
CHECK VALVE CV108 FAILS TO OPEN
CPC-CKV-FT-CV108
1.0E-004
FAULTS IN PIPE SEGMENT PS101 CONTD
CPC7
Transfer from Page 1
MDP SW10B FAILS TO START
CPC-MDP-FS-SW10B
8.0E-003
MDP CC2B FAILS TO RUN AS LONG AS CHRGNG PUMPS
CPC-MDP-FR-SW10B
9.6E-004
TEST AND MAINTENANCE ON MDP SW10B
CPC-MDP-MA-SW10B
2.0E-003
MANUAL VALVE XV109 PLUGGED
CPC-XVM-PG-XV109
8.4E-006
MANUAL VALVE XV119 PLUGGED
CPC-XVM-PG-XV119
8.4E-006
CHECK VALVE CV262 FAILS TO OPEN
CPC-CKV-FT-CV262
1.0E-004


COMMON CAUSE FAILURES IN PIPE SEGMENT PS101
CPC9
Transfer from Page 1
BACKFLOW THROUGH PS100
CPC10
COMMON MODE LOSS OF FLW STRAINERS 2A AND 2B
CPC-CCF-LF-STRAB
4.7E-005
INSUFFICIENT INTAKE CANAL LEVEL
MCW-CCF-VF-INLVL
1.0E-009
CHECK VALVE CV113 FAILS TO SHUT,CAUSE BACKFLOW
CPC-CKV-00-CV113
1.0E-003
MDP CC2A FAILS TO RUN AS LONG AS CHRGNG PUMPS
CPC-MDP-FR-SW10A
8.0E-003

Tree: CPCA
Project: SURRY
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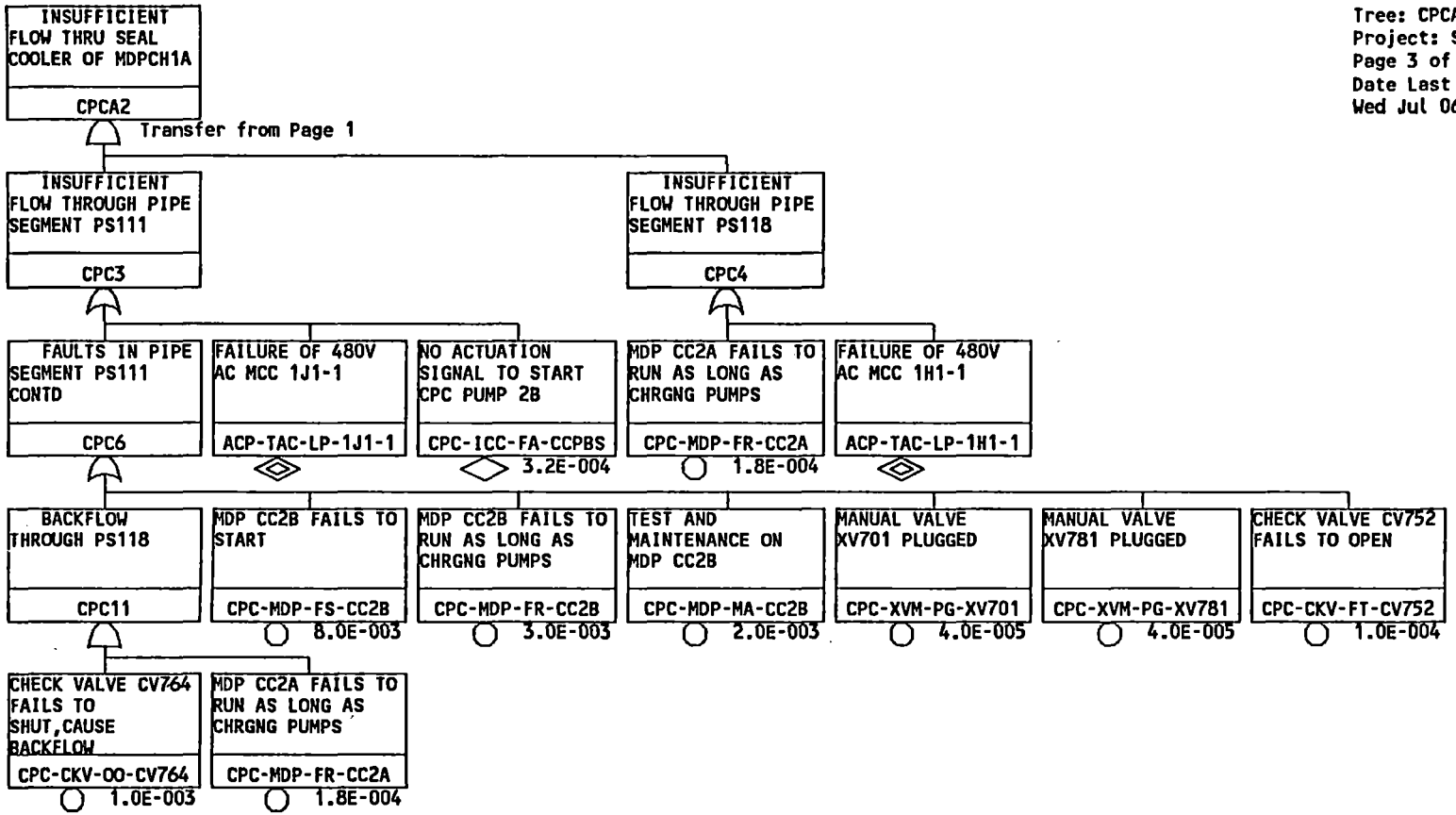

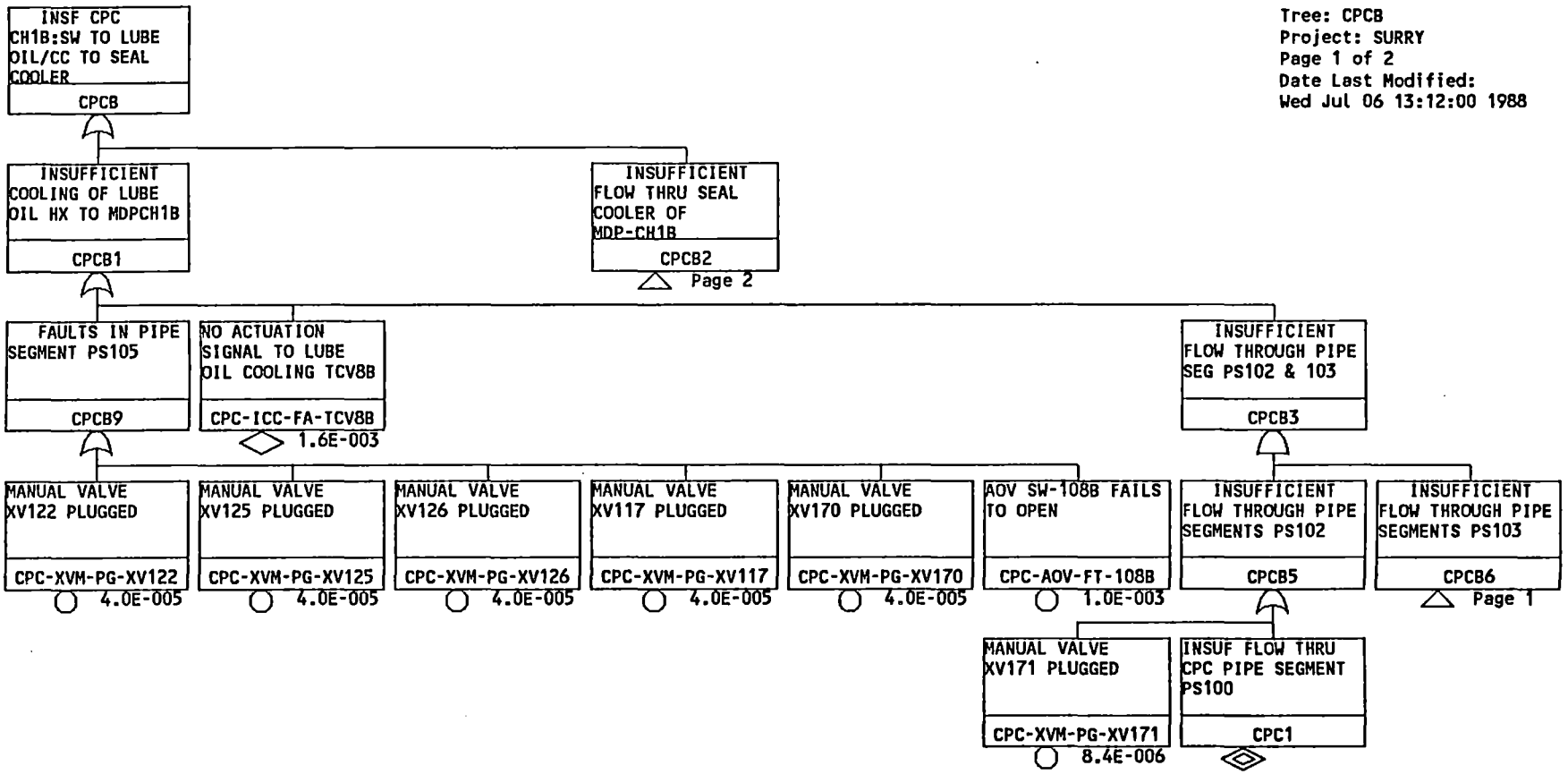
INSF CPC CH1B:SW TO LUBE OIL/CC TO SEAL COOLER
CPCB
Tree: CPCB
Project: SURRY
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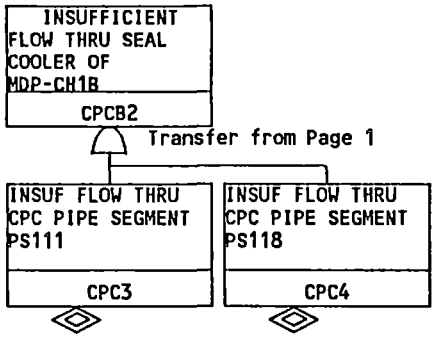
INSUFFICIENT COOLING OF LUBE OIL HX TO MDPCH1B
CPCB1
INSUFFICIENT FLOW THRU SEAL COOLER OF MDP-CH1B
CPCB2
Page 2
FAULTS IN PIPE SEGMENT PS105
CPCB9
NO ACTUATION SIGNAL TO LUBE OIL COOLING TCV8B
CPC-ICC-FA-TCV8B
1.6E-003
INSUFFICIENT FLOW THROUGH PIPE SEG PS102 & 103
CPCB3
MANUAL VALVE XV122 PLUGGED
CPC-XVM-PG-XV122
4.0E-005
MANUAL VALVE XV125 PLUGGED
CPC-XVM-PG-XV125
4.0E-005
MANUAL VALVE XV126 PLUGGED
CPC-XVM-PG-XV126
4.0E-005
MANUAL VALVE XV117 PLUGGED
CPC-XVM-PG-XV117
4.0E-005
MANUAL VALVE XV170 PLUGGED
CPC-XVM-PG-XV170
4.0E-005
AOV SW-108B FAILS TO OPEN
CPC-AOV-FT-108B
1.0E-003
INSUFFICIENT FLOW THROUGH PIPE SEGMENTS PS102
CPCB5
INSUFFICIENT FLOW THROUGH PIPE SEGMENTS PS103
CPCB6
Page 1
MANUAL VALVE XV171 PLUGGED
CPC-XVM-PG-XV171
8.4E-006
INSUF FLOW THRU CPC PIPE SEGMENT PS100
CPC1
INSUFFICIENT FLOW THROUGH PIPE SEGMENTS PS103
CPCB6
Transfer from Page 1
MANUAL VALVE XV118 PLUGGED
CPC-XVM-PG-XV118
8.4E-006
INSUF FLOW THRU CPC PIPE SEGMENT PS101
CPC2



Tree: CPCB
Project: SURRY
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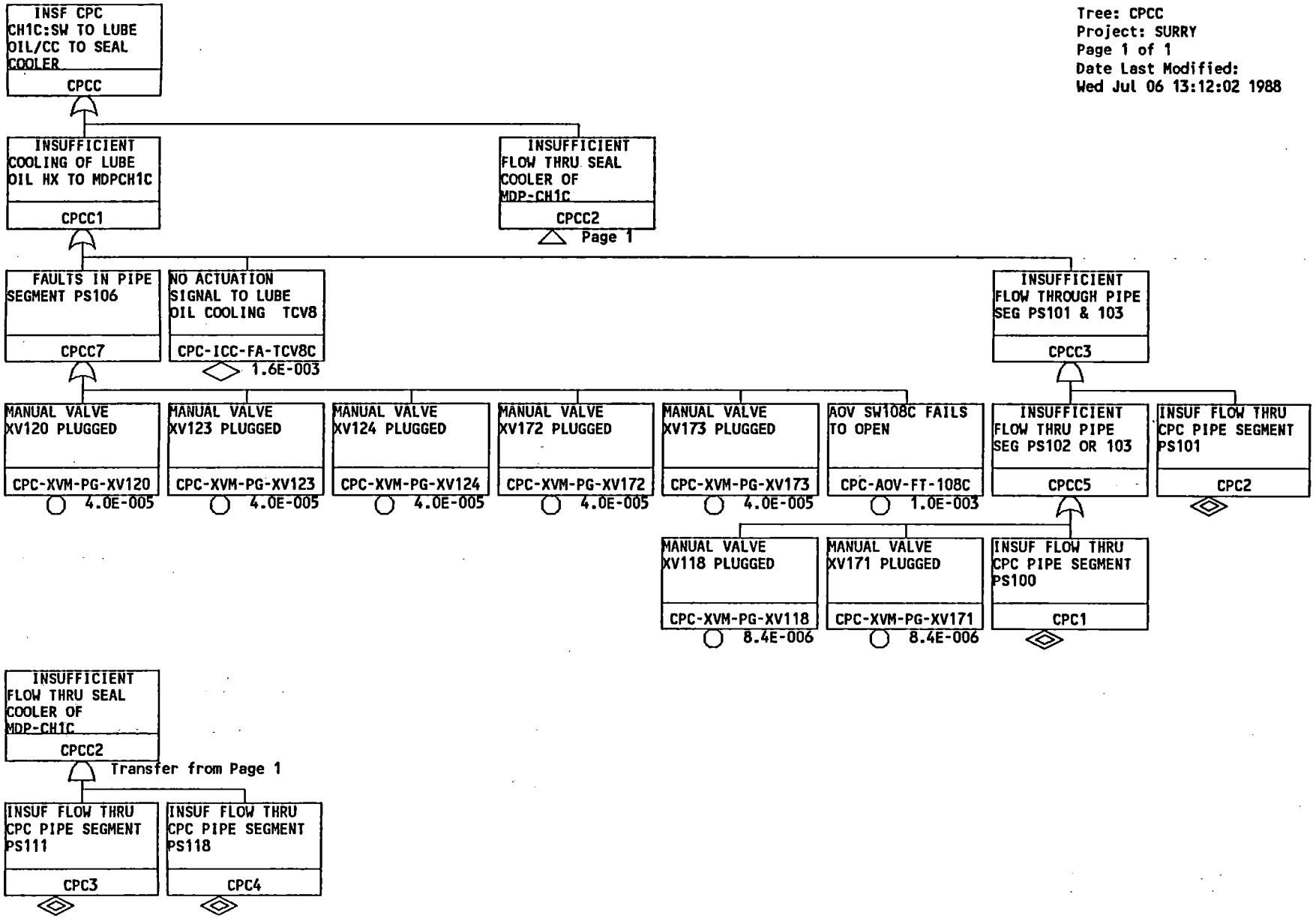
INSF CPC CH1C:SW TO LUBE OIL/CC TO SEAL COOLER
CPCC
Tree: CPCC
Project: SURRY
Page 1 of 1
Date Last Modified:
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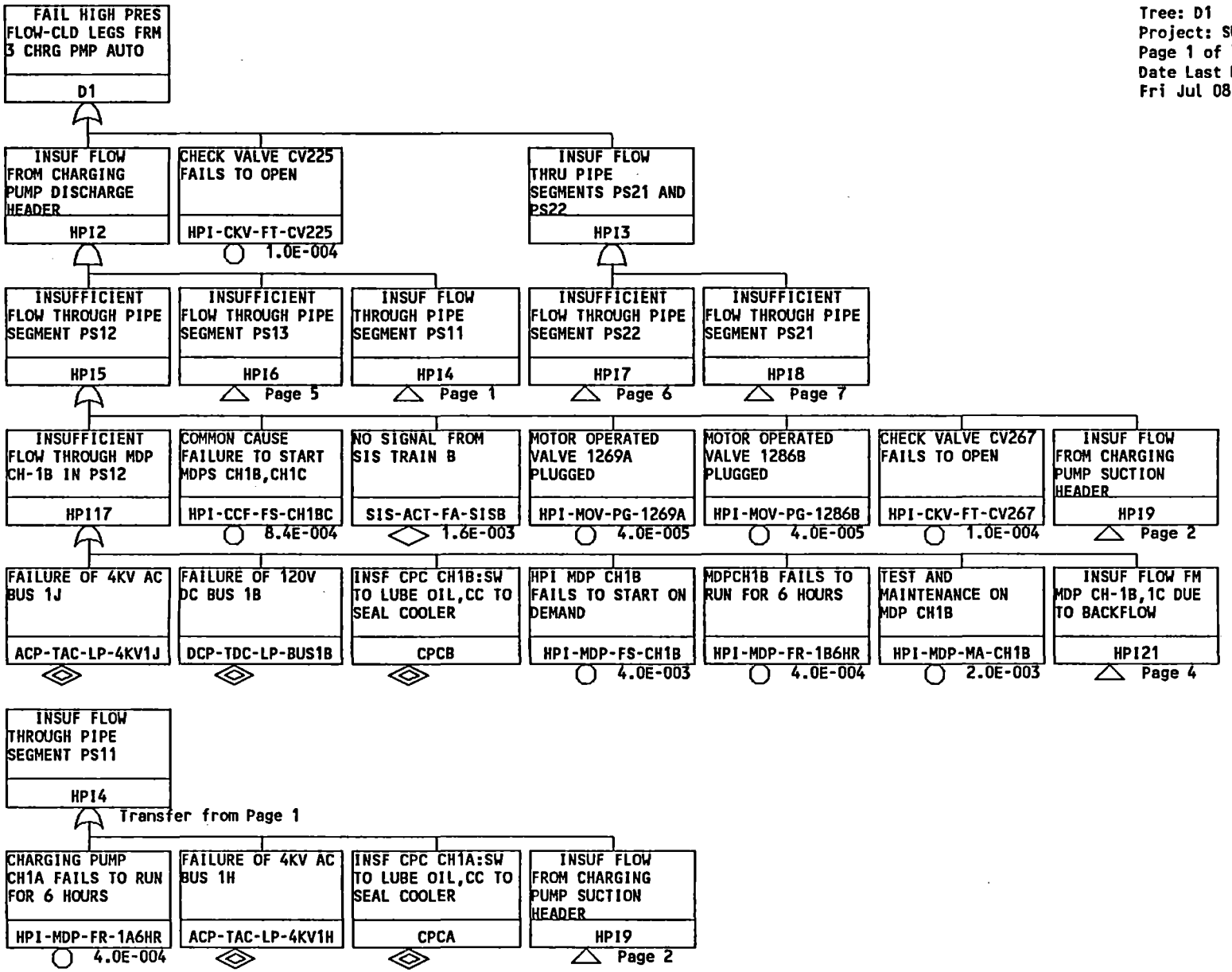
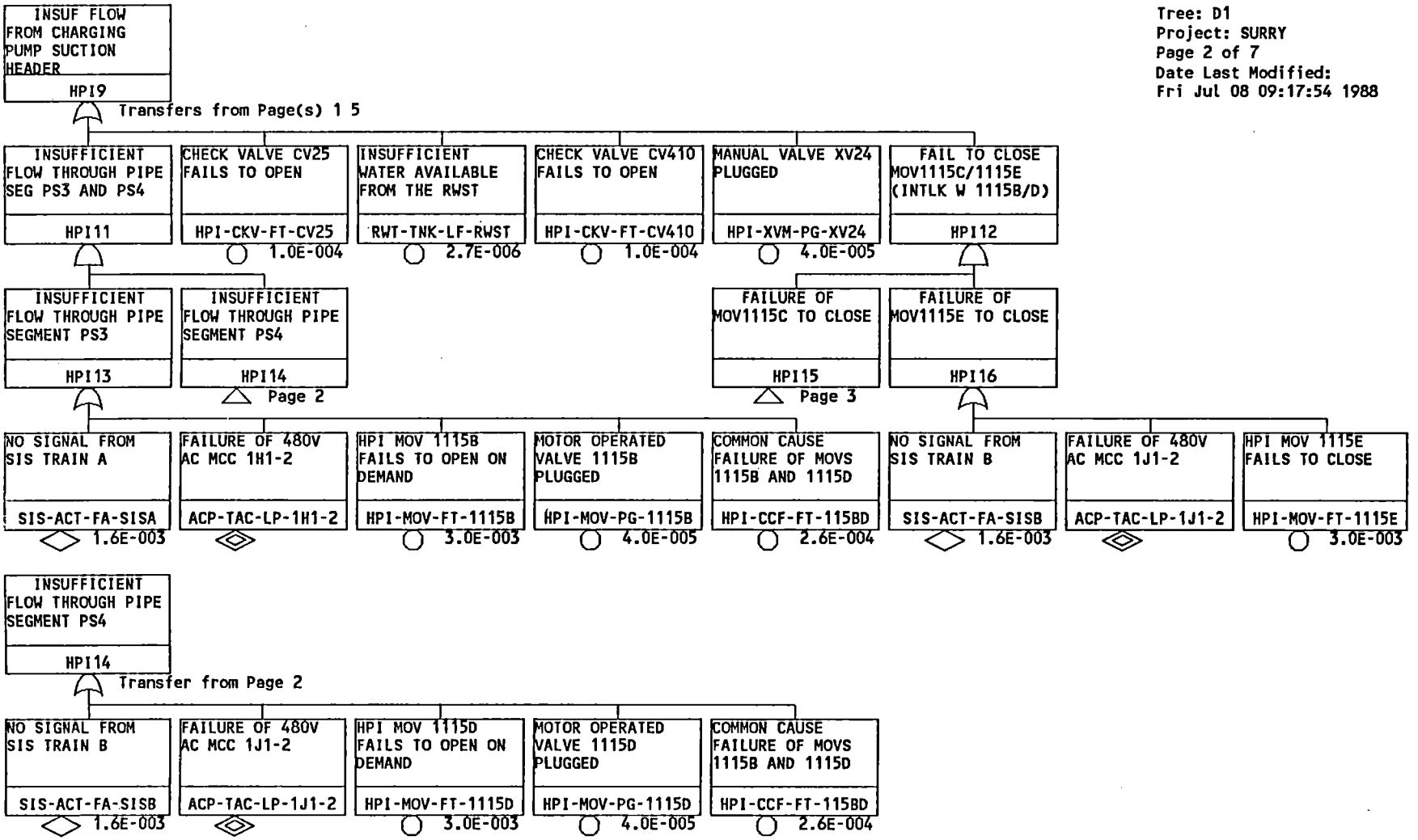
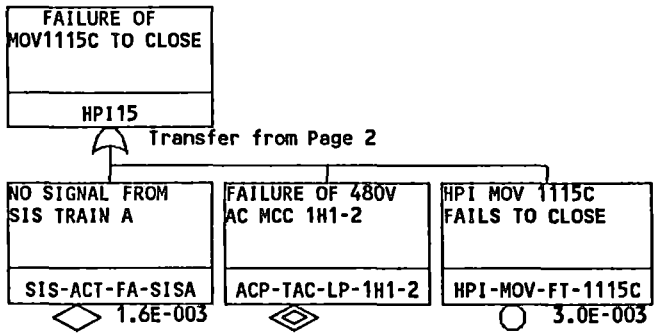
INSUFFICIENT COOLING OF LUBE OIL HX TO MDPCH1C
CPCC1
INSUFFICIENT FLOW THRU SEAL COOLER OF MDP-CH1C
CPCC2
Page 1
FAULTS IN PIPE SEGMENT PS106
CPCC7
NO ACTUATION SIGNAL TO LUBE OIL COOLING TCV8
CPC-ICC-FA-TCV8C
1.6E-003
INSUFFICIENT FLOW THROUGH PIPE SEG PS101 & 103
CPCC3
MANUAL VALVE XV120 PLUGGED
CPC-XVM-PG-XV120
4.0E-005
MANUAL VALVE XV123 PLUGGED
CPC-XVM-PG-XV123
4.0E-005
MANUAL VALVE XV124 PLUGGED
CPC-XVM-PG-XV124
4.0E-005
MANUAL VALVE XV172 PLUGGED
CPC-XVM-PG-XV172
4.0E-005
MANUAL VALVE XV173 PLUGGED
CPC-XVM-PG-XV173
4.0E-005
AOV SW108C FAILS TO OPEN
CPC-AOV-FT-108C
1.0E-003
INSUFFICIENT FLOW THRU PIPE SEG PS102 OR 103
CPCC5
INSUF FLOW THRU CPC PIPE SEGMENT PS101
CPC2
MANUAL VALVE XV118 PLUGGED
CPC-XVM-PG-XV118
8.4E-006
MANUAL VALVE XV171 PLUGGED
CPC-XVM-PG-XV171
8.4E-006
INSUF FLOW THRU CPC PIPE SEGMENT PS100
CPC1
INSUFFICIENT FLOW THRU SEAL COOLER OF MDP-CH1C
CPCC2
Transfer from Page 1
INSUF FLOW THRU CPC PIPE SEGMENT PS111
CPC3
INSUF FLOW THRU CPC PIPE SEGMENT PS118
CPC4


FAIL HIGH PRES FLOW-CLD LEGS FRM 3 CHRG PMP AUTO
D1
INSUF FLOW FROM CHARGING PUMP DISCHARGE HEADER
HPI2
CHECK VALVE CV225 FAILS TO OPEN
HPI-CKV-FT-CV225
1.0E-004
INSUF FLOW THRU PIPE SEGMENTS PS21 AND PS22
HPI3
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS12
HPI5
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS13
HPI6
Page 5
INSUF FLOW THROUGH PIPE SEGMENT PS11
HPI4
Page 1
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS22
HPI7
Page 6
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS21
HPI8
Page 7
INSUFFICIENT FLOW THROUGH MDP CH-1B IN PS12
HPI17
COMMON CAUSE FAILURE TO START MDPS CH1B,CH1C
HPI-CCF-FS-CH1BC
8.4E-004
NO SIGNAL FROM SIS TRAIN B
SIS-ACT-FA-SISB
1.6E-003
MOTOR OPERATED VALVE 1269A PLUGGED
HPI-MOV-PG-1269A
4.0E-005
MOTOR OPERATED VALVE 1286B PLUGGED
HPI-MOV-PG-1286B
4.0E-005
CHECK VALVE CV267 FAILS TO OPEN
HPI-CKV-FT-CV267
1.0E-004
INSUF FLOW FROM CHARGING PUMP SUCTION HEADER
HPI9
Page 2
FAILURE OF 4KV AC BUS 1J
ACP-TAC-LP-4KV1J
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
INSF CPC CH1B:SW TO LUBE OIL,CC TO SEAL COOLER
CPCB
HPI MDP CH1B FAILS TO START ON DEMAND
HPI-MDP-FS-CH1B
4.0E-003
MDPCH1B FAILS TO RUN FOR 6 HOURS
HPI-MDP-FR-1B6HR
4.0E-004
TEST AND MAINTENANCE ON MDP CH1B
HPI-MDP-MA-CH1B
2.0E-003
INSUF FLOW FM MDP CH-1B,1C DUE TO BACKFLOW
HPI21
Page 4
INSUF FLOW THROUGH PIPE SEGMENT PS11
HPI4
Transfer from Page 1
CHARGING PUMP CH1A FAILS TO RUN FOR 6 HOURS
HPI-MDP-FR-1A6HR
4.0E-004
FAILURE OF 4KV AC BUS 1H
ACP-TAC-LP-4KV1H
INSF CPC CH1A:SW TO LUBE OIL,CC TO SEAL COOLER
CPCA
INSUF FLOW FROM CHARGING PUMP SUCTION HEADER
HPI9
Page 2


INSUF FLOW FROM CHARGING PUMP SUCTION HEADER
HPI9
Transfers from Page(s) 1 5
INSUFFICIENT FLOW THROUGH PIPE SEG PS3 AND PS4
HPI11
CHECK VALVE CV25 FAILS TO OPEN
HPI-CKV-FT-CV25
1.0E-004
INSUFFICIENT WATER AVAILABLE FROM THE RWST
RWT-TNK-LF-RWST
2.7E-006
CHECK VALVE CV410 FAILS TO OPEN
HPI-CKV-FT-CV410
1.0E-004
MANUAL VALVE XV24 PLUGGED
HPI-XVM-PG-XV24
4.0E-005
FAIL TO CLOSE MOV1115C/1115E (INTLK W 1115B/D)
HPI12
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS3
HPI13
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS4
HPI14
Page 2
FAILURE OF MOV1115C TO CLOSE
HPI15
Page 3
FAILURE OF MOV1115E TO CLOSE
HPI16
NO SIGNAL FROM SIS TRAIN A
SIS-ACT-FA-SISA
1.6E-003
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
HPI MOV 1115B FAILS TO OPEN ON DEMAND
HPI-MOV-FT-1115B
3.0E-003
MOTOR OPERATED VALVE 1115B PLUGGED
HPI-MOV-PG-1115B
4.0E-005
COMMON CAUSE FAILURE OF MOVS 1115B AND 1115D
HPI-CCF-FT-115BD
2.6E-004
NO SIGNAL FROM SIS TRAIN B
SIS-ACT-FA-SISB
1.6E-003
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
HPI MOV 1115E FAILS TO CLOSE
HPI-MOV-FT-1115E
3.0E-003
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS4
HPI14
Transfer from Page 2
NO SIGNAL FROM SIS TRAIN B
SIS-ACT-FA-SISB
1.6E-003
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
HPI MOV 1115D FAILS TO OPEN ON DEMAND
HPI-MOV-FT-1115D
3.0E-003
MOTOR OPERATED VALVE 1115D PLUGGED
HPI-MOV-PG-1115D
4.0E-005
COMMON CAUSE FAILURE OF MOVS 1115B AND 1115D
HPI-CCF-FT-115BD
2.6E-004



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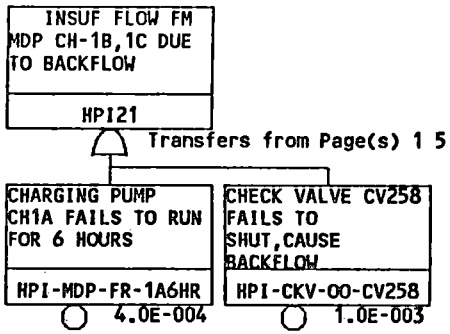

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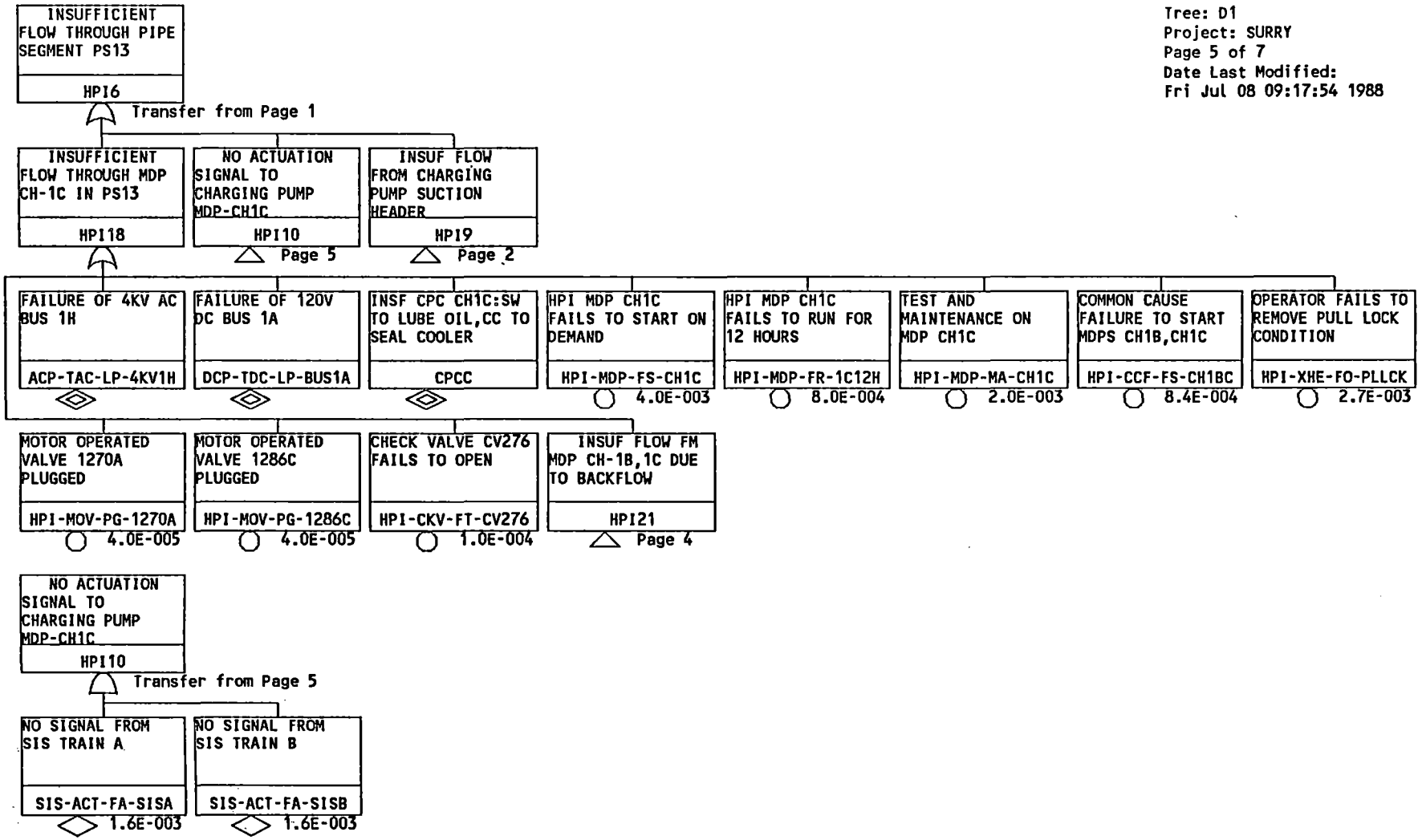
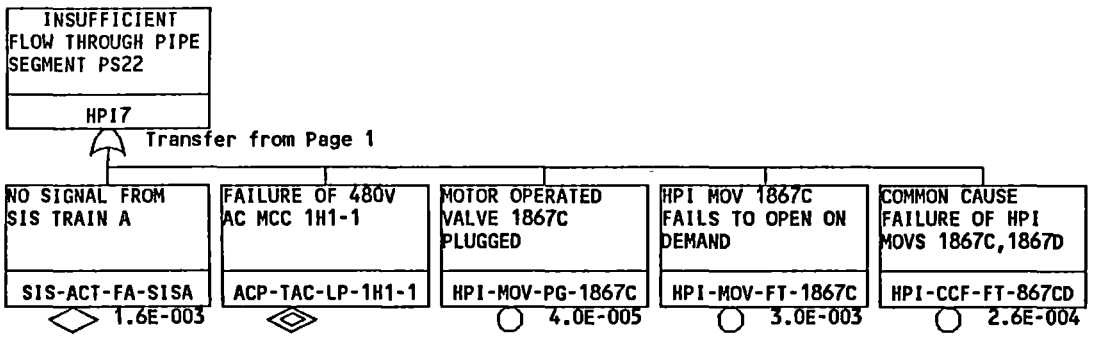

INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS13
HPI6
Transfer from Page 1
INSUFFICIENT FLOW THROUGH MDP CH-1C IN PS13
HPI18
NO ACTUATION SIGNAL TO CHARGING PUMP MDP-CH1C
HPI10
Page 5
INSUF FLOW FROM CHARGING PUMP SUCTION HEADER
HPI9
Page 2
FAILURE OF 4KV AC BUS 1H
ACP-TAC-LP-4KV1H
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
INSF CPC CH1C:SW TO LUBE OIL,CC TO SEAL COOLER
CPCC
HPI MDP CH1C FAILS TO START ON DEMAND
HPI-MDP-FS-CH1C
4.0E-003
HPI MDP CH1C FAILS TO RUN FOR 12 HOURS
HPI-MDP-FR-1C12H
8.0E-004
TEST AND MAINTENANCE ON MDP CH1C
HPI-MDP-MA-CH1C
2.0E-003
COMMON CAUSE FAILURE TO START MDPS CH1B,CH1C
HPI-CCF-FS-CH1BC
8.4E-004
OPERATOR FAILS TO REMOVE PULL LOCK CONDITION
HPI-XHE-FO-PLLCK
2.7E-003
MOTOR OPERATED VALVE 1270A PLUGGED
HPI-MOV-PG-1270A
4.0E-005
MOTOR OPERATED VALVE 1286C PLUGGED
HPI-MOV-PG-1286C
4.0E-005
CHECK VALVE CV276 FAILS TO OPEN
HPI-CKV-FT-CV276
1.0E-004
INSUF FLOW FM MDP CH-1B,1C DUE TO BACKFLOW
HPI21
Page 4
NO ACTUATION SIGNAL TO CHARGING PUMP MDP-CH1C
HPI10
Transfer from Page 5
NO SIGNAL FROM SIS TRAIN A
SIS-ACT-FA-SISA
1.6E-003
NO SIGNAL FROM SIS TRAIN B
SIS-ACT-FA-SISB
1.6E-003



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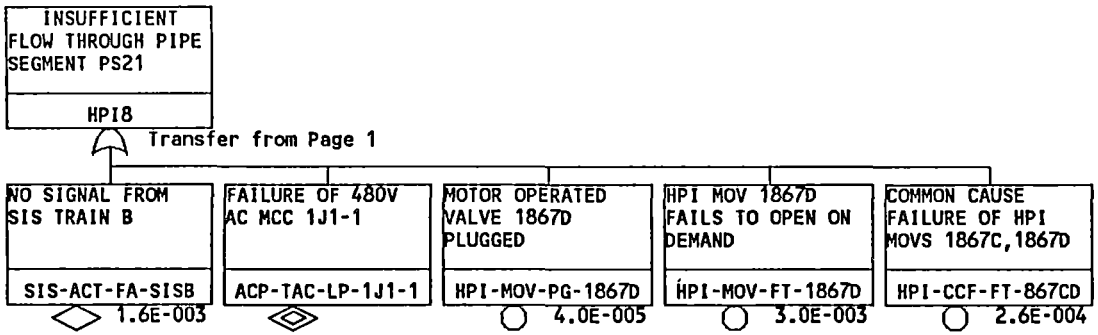

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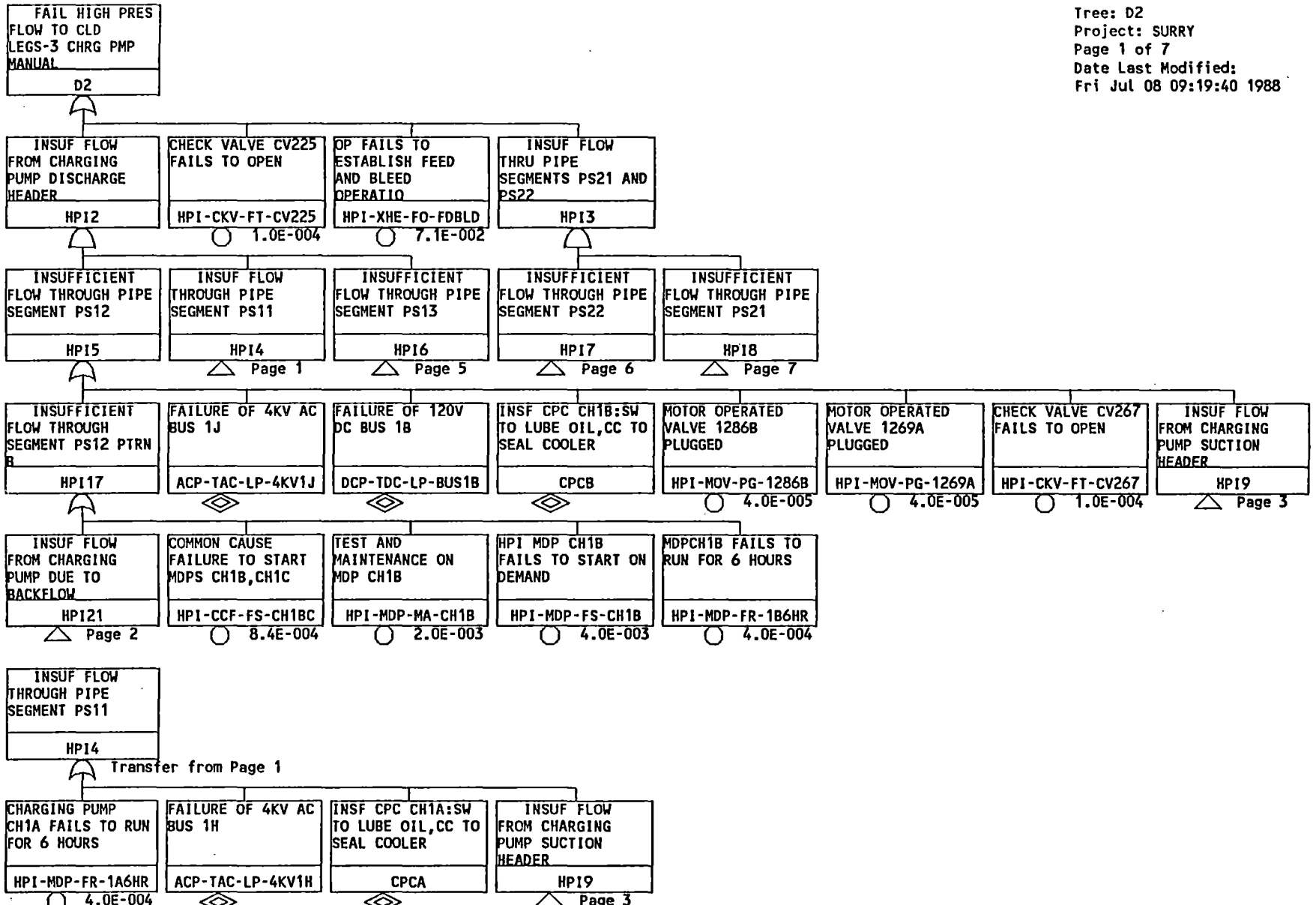

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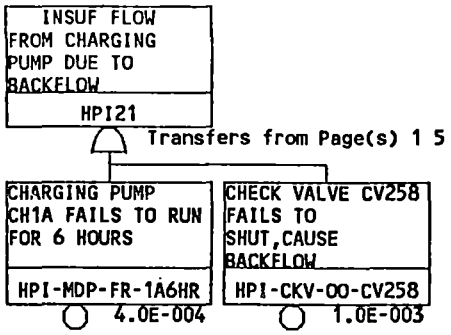

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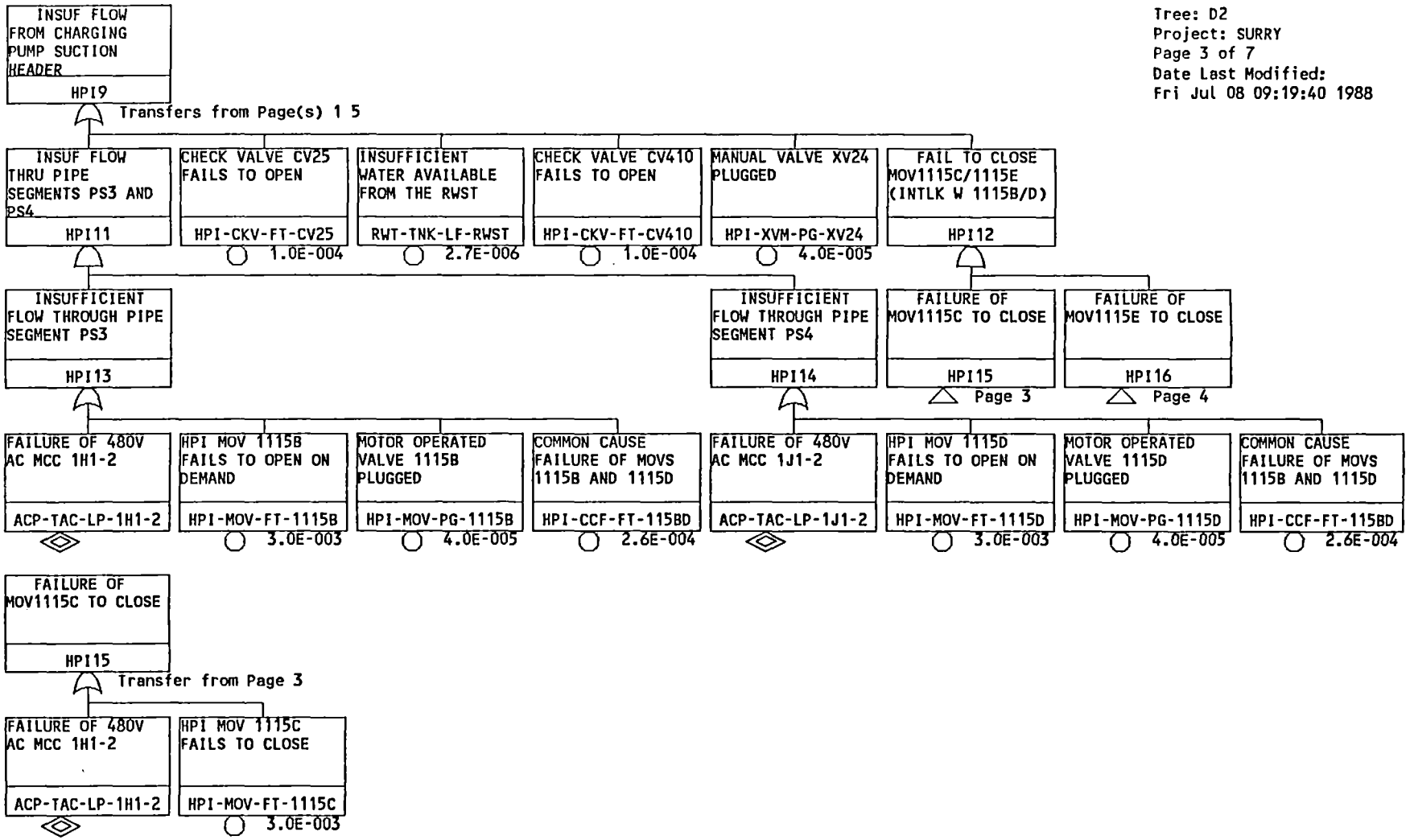
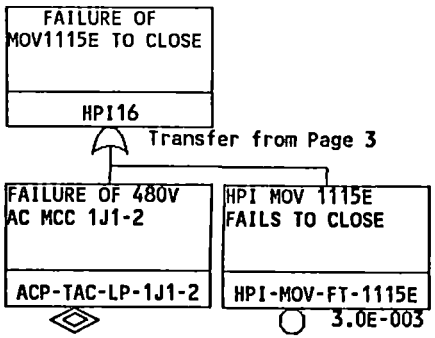

INSUF FLOW FROM CHARGING PUMP SUCTION HEADER
HPI9
Transfers from Page(s) 1 5
INSUF FLOW THRU PIPE SEGMENTS PS3 AND PS4
HPI11
CHECK VALVE CV25 FAILS TO OPEN
HPI-CKV-FT-CV25
1.0E-004
INSUFFICIENT WATER AVAILABLE FROM THE RWST
RWT-TNK-LF-RWST
2.7E-006
CHECK VALVE CV410 FAILS TO OPEN
HPI-CKV-FT-CV410
1.0E-004
MANUAL VALVE XV24 PLUGGED
HPI-XVM-PG-XV24
4.0E-005
FAIL TO CLOSE MOV1115C/1115E (INTLK W 1115B/D)
HPI12
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS3
HPI13
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS4
HPI14
FAILURE OF MOV1115C TO CLOSE
HPI15
Page 3
FAILURE OF MOV1115E TO CLOSE
HPI16
Page 4
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
HPI MOV 1115B FAILS TO OPEN ON DEMAND
HPI-MOV-FT-1115B
3.0E-003
MOTOR OPERATED VALVE 1115B PLUGGED
HPI-MOV-PG-1115B
4.0E-005
COMMON CAUSE FAILURE OF MOVS 1115B AND 1115D
HPI-CCF-FT-115BD
2.6E-004
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
HPI MOV 1115D FAILS TO OPEN ON DEMAND
HPI-MOV-FT-1115D
3.0E-003
MOTOR OPERATED VALVE 1115D PLUGGED
HPI-MOV-PG-1115D
4.0E-005
COMMON CAUSE FAILURE OF MOVS 1115B AND 1115D
HPI-CCF-FT-115BD
2.6E-004
FAILURE OF MOV1115C TO CLOSE
HPI15
Transfer from Page 3
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
HPI MOV 1115C FAILS TO CLOSE
HPI-MOV-FT-1115C
3.0E-003



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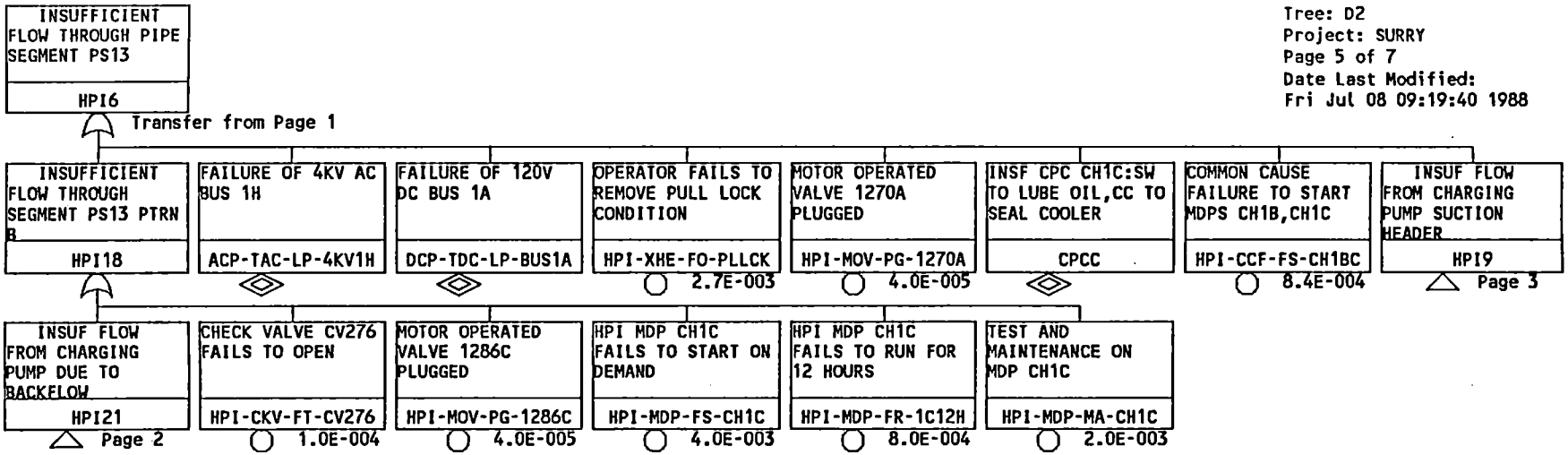
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS13
HPI6
Transfer from Page 1
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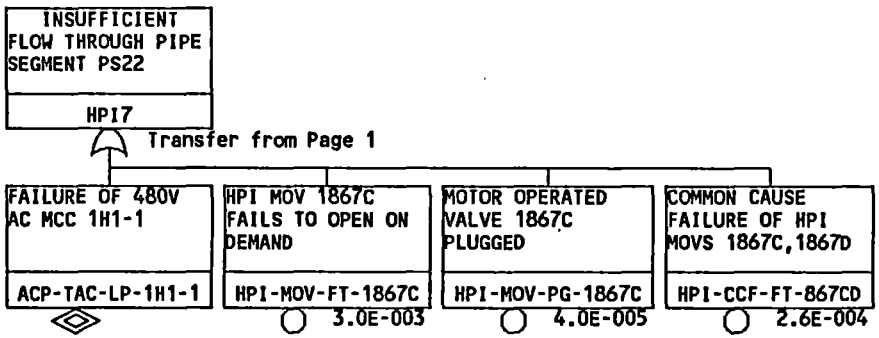
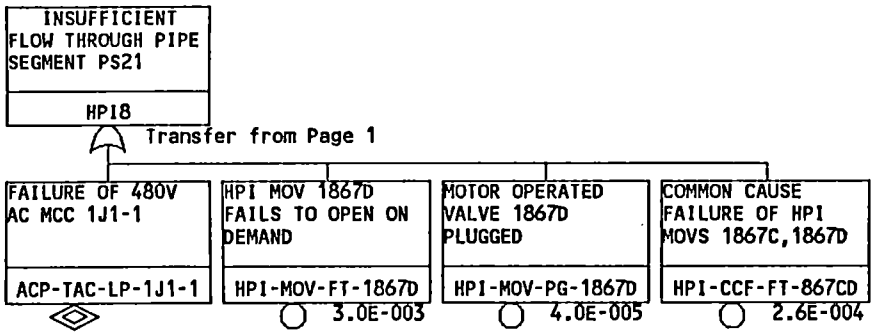
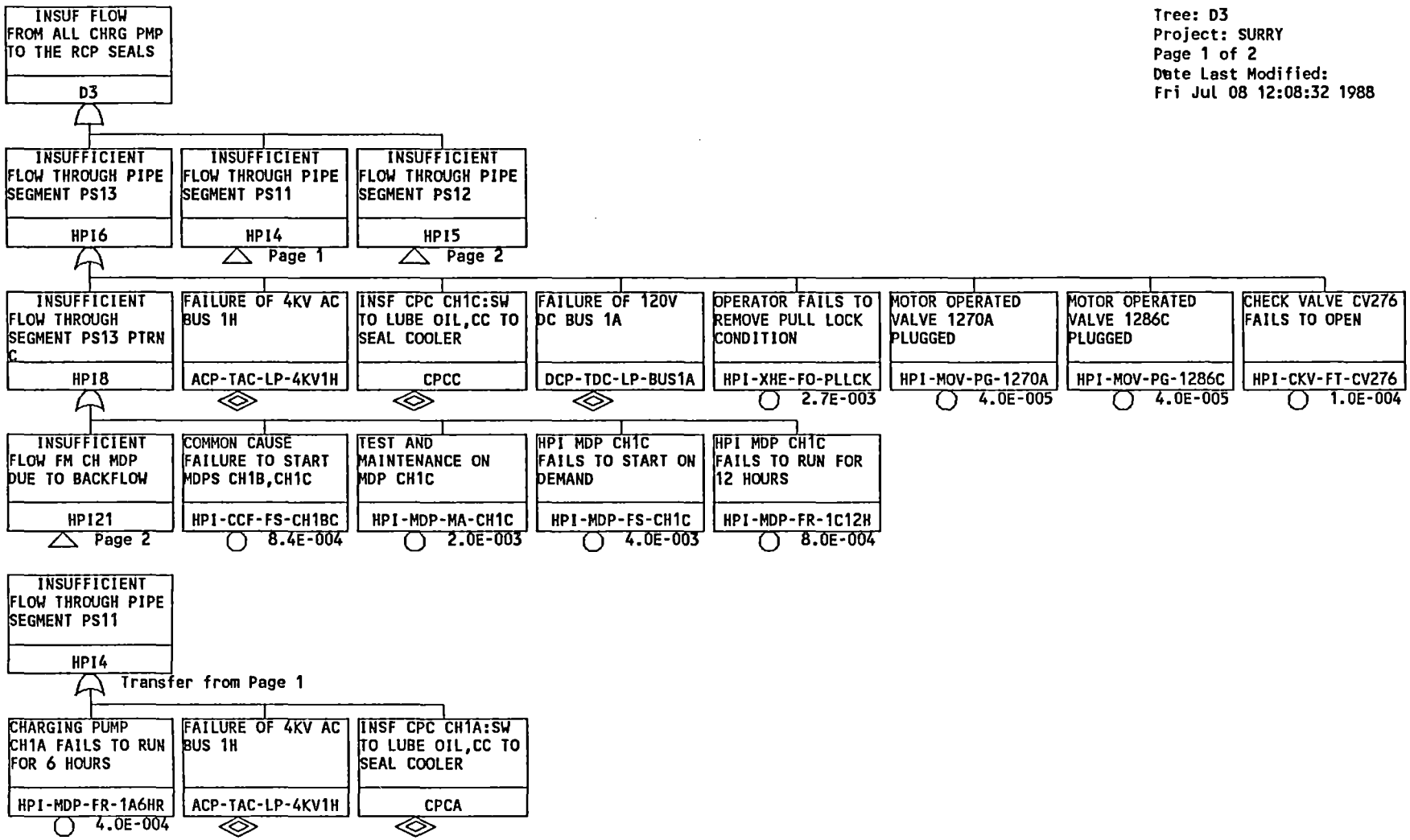
INSUFFICIENT FLOW THROUGH SEGMENT PS13 PTRN B
HPI18
FAILURE OF 4KV AC BUS 1H
ACP-TAC-LP-4KV1H
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
OPERATOR FAILS TO REMOVE PULL LOCK CONDITION
HPI-XHE-FO-PLLCK
2.7E-003
MOTOR OPERATED VALVE 1270A PLUGGED
HPI-MOV-PG-1270A
4.0E-005
INSF CPC CH1C:SW TO LUBE OIL,CC TO SEAL COOLER
CPCC
COMMON CAUSE FAILURE TO START MDPS CH1B,CH1C
HPI-CCF-FS-CH1BC
8.4E-004
INSUF FLOW FROM CHARGING PUMP SUCTION HEADER
HPI9
Page 3
INSUF FLOW FROM CHARGING PUMP DUE TO BACKFLOW
HPI21
Page 2
CHECK VALVE CV276 FAILS TO OPEN
HPI-CKV-FT-CV276
1.0E-004
MOTOR OPERATED VALVE 1286C PLUGGED
HPI-MOV-PG-1286C
4.0E-005
HPI MDP CH1C FAILS TO START ON DEMAND
HPI-MDP-FS-CH1C
4.0E-003
HPI MDP CH1C FAILS TO RUN FOR 12 HOURS
HPI-MDP-FR-1C12H
8.0E-004
TEST AND MAINTENANCE ON MDP CH1C
HPI-MDP-MA-CH1C
2.0E-003


INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS22
HPI7
Transfer from Page 1
FAILURE OF 480V AC MCC 1H1-1
ACP-TAC-LP-1H1-1
HPI MOV 1867C FAILS TO OPEN ON DEMAND
HPI-MOV-FT-1867C
3.0E-003
MOTOR OPERATED VALVE 1867C PLUGGED
HPI-MOV-PG-1867C
4.0E-005
COMMON CAUSE FAILURE OF HPI MOVS 1867C,1867D
HPI-CCF-FT-867CD
2.6E-004


INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS21
HP18
Transfer from Page 1
FAILURE OF 480V AC MCC 1J1-1
ACP-TAC-LP-1J1-1
HPI MOV 1867D FAILS TO OPEN ON DEMAND
HPI-MOV-FT-1867D
3.0E-003
MOTOR OPERATED VALVE 1867D PLUGGED
HPI-MOV-PG-1867D
4.0E-005
COMMON CAUSE FAILURE OF HPI MOVS 1867C,1867D
HPI-CCF-FT-867CD
2.6E-004


INSUF FLOW FROM ALL CHRG PMP TO THE RCP SEALS
D3
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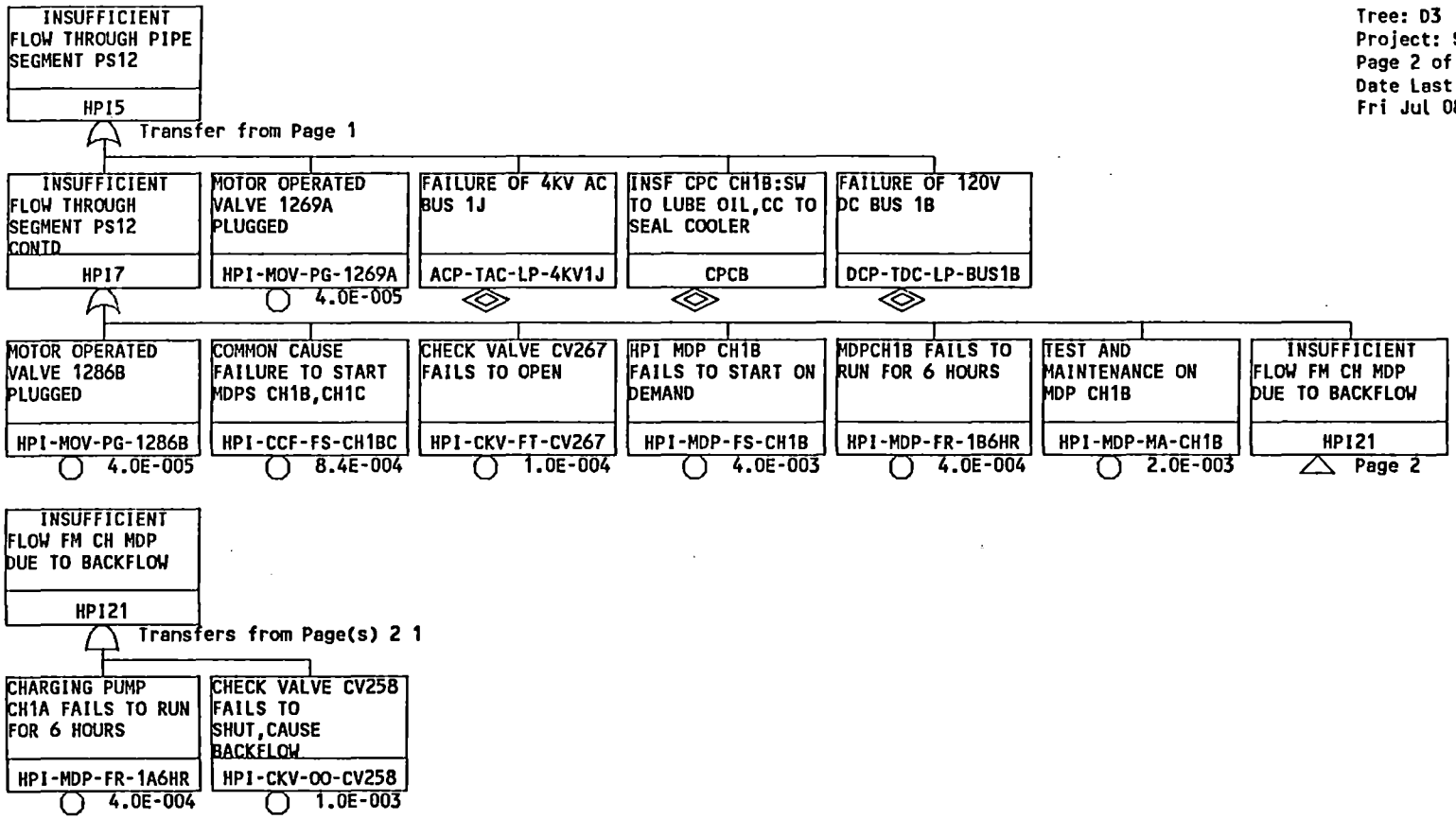
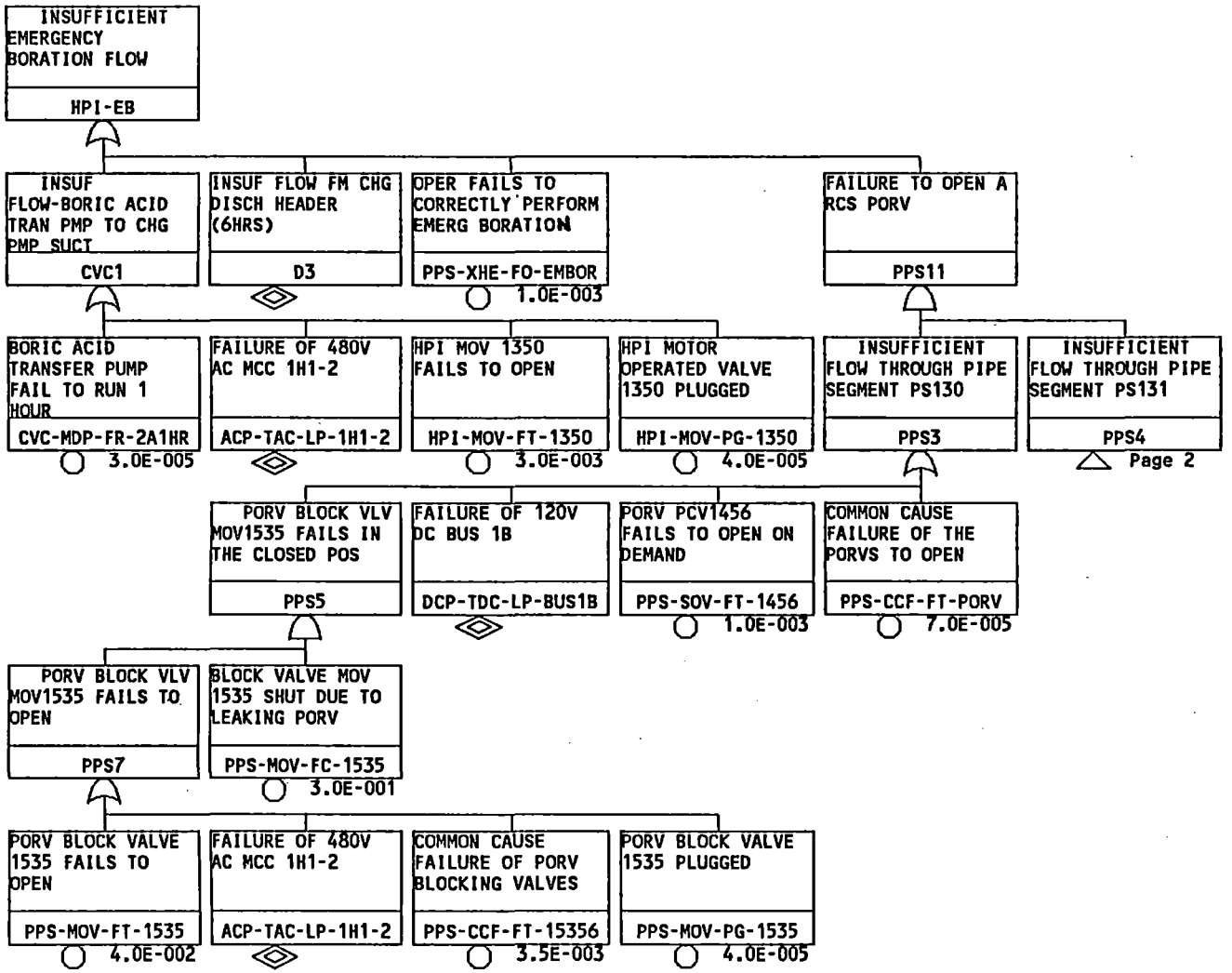
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS13
HPI6
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS11
HPI4
Page 1
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS12
HPI5
Page 2
INSUFFICIENT FLOW THROUGH SEGMENT PS13 PTRN C
HPI8
FAILURE OF 4KV AC BUS 1H
ACP-TAC-LP-4KV1H
INSF CPC CH1C:SW TO LUBE OIL,CC TO SEAL COOLER
CPCC
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
OPERATOR FAILS TO REMOVE PULL LOCK CONDITION
HPI-XHE-FO-PLLCK
2.7E-003
MOTOR OPERATED VALVE 1270A PLUGGED
HPI-MOV-PG-1270A
4.0E-005
MOTOR OPERATED VALVE 1286C PLUGGED
HPI-MOV-PG-1286C
4.0E-005
CHECK VALVE CV276 FAILS TO OPEN
HPI-CKV-FT-CV276
1.0E-004
INSUFFICIENT FLOW FM CH MDP DUE TO BACKFLOW
HPI21
Page 2
COMMON CAUSE FAILURE TO START MDPS CH1B,CH1C
HPI-CCF-FS-CH1BC
8.4E-004
TEST AND MAINTENANCE ON MDP CH1C
HPI-MDP-MA-CH1C
2.0E-003
HPI MDP CH1C FAILS TO START ON DEMAND
HPI-MDP-FS-CH1C
4.0E-003
HPI MDP CH1C FAILS TO RUN FOR 12 HOURS
HPI-MDP-FR-1C12H
8.0E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS11
HPI4
Transfer from Page 1
CHARGING PUMP CH1A FAILS TO RUN FOR 6 HOURS
HPI-MDP-FR-1A6HR
4.0E-004
FAILURE OF 4KV AC BUS 1H
ACP-TAC-LP-4KV1H
INSF CPC CH1A:SW TO LUBE OIL,CC TO SEAL COOLER
CPCA


INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS12
HPI5
Transfer from Page 1
INSUFFICIENT FLOW THROUGH SEGMENT PS12 CONTD
HPI7
MOTOR OPERATED VALVE 1269A PLUGGED
HPI-MOV-PG-1269A
4.0E-005
FAILURE OF 4KV AC BUS 1J
ACP-TAC-LP-4KV1J
INSF CPC CH1B:SW TO LUBE OIL,CC TO SEAL COOLER
CPCB
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
MOTOR OPERATED VALVE 1286B PLUGGED
HPI-MOV-PG-1286B
4.0E-005
COMMON CAUSE FAILURE TO START MDPS CH1B,CH1C
HPI-CCF-FS-CH1BC
8.4E-004
CHECK VALVE CV267 FAILS TO OPEN
HPI-CKV-FT-CV267
1.0E-004
HPI MDP CH1B FAILS TO START ON DEMAND
HPI-MDP-FS-CH1B
4.0E-003
MDPCH1B FAILS TO RUN FOR 6 HOURS
HPI-MDP-FR-1B6HR
4.0E-004
TEST AND MAINTENANCE ON MDP CH1B
HPI-MDP-MA-CH1B
2.0E-003
INSUFFICIENT FLOW FM CH MDP DUE TO BACKFLOW
HPI21
Page 2

INSUFFICIENT FLOW FM CH MDP DUE TO BACKFLOW
HPI21
Transfers from Page(s) 2 1
CHARGING PUMP CH1A FAILS TO RUN FOR 6 HOURS
HPI-MDP-FR-1A6HR
4.0E-004
CHECK VALVE CV258 FAILS TO SHUT,CAUSE BACKFLOW
HPI-CKV-OO-CV258
1.0E-003



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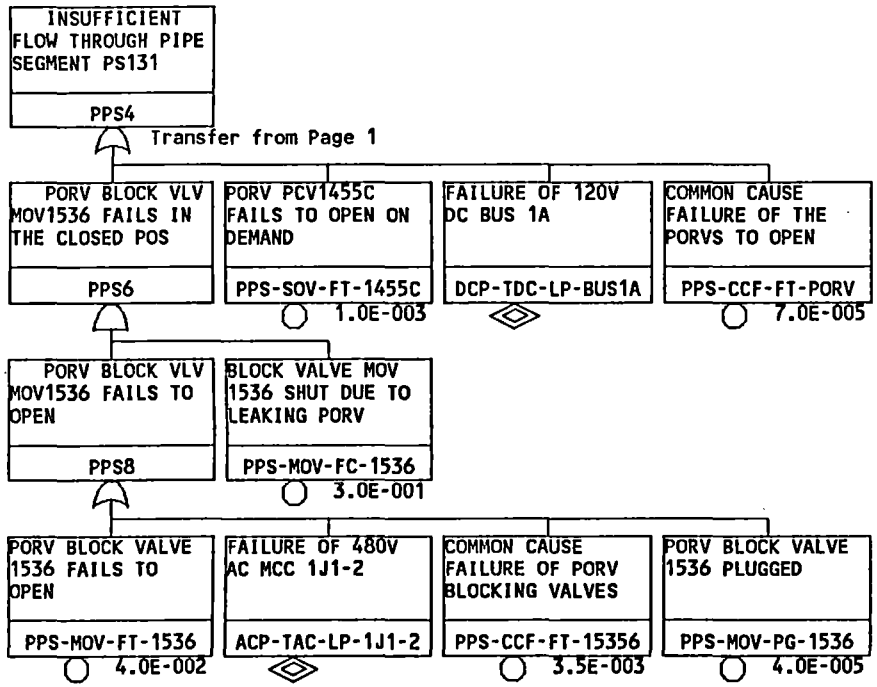

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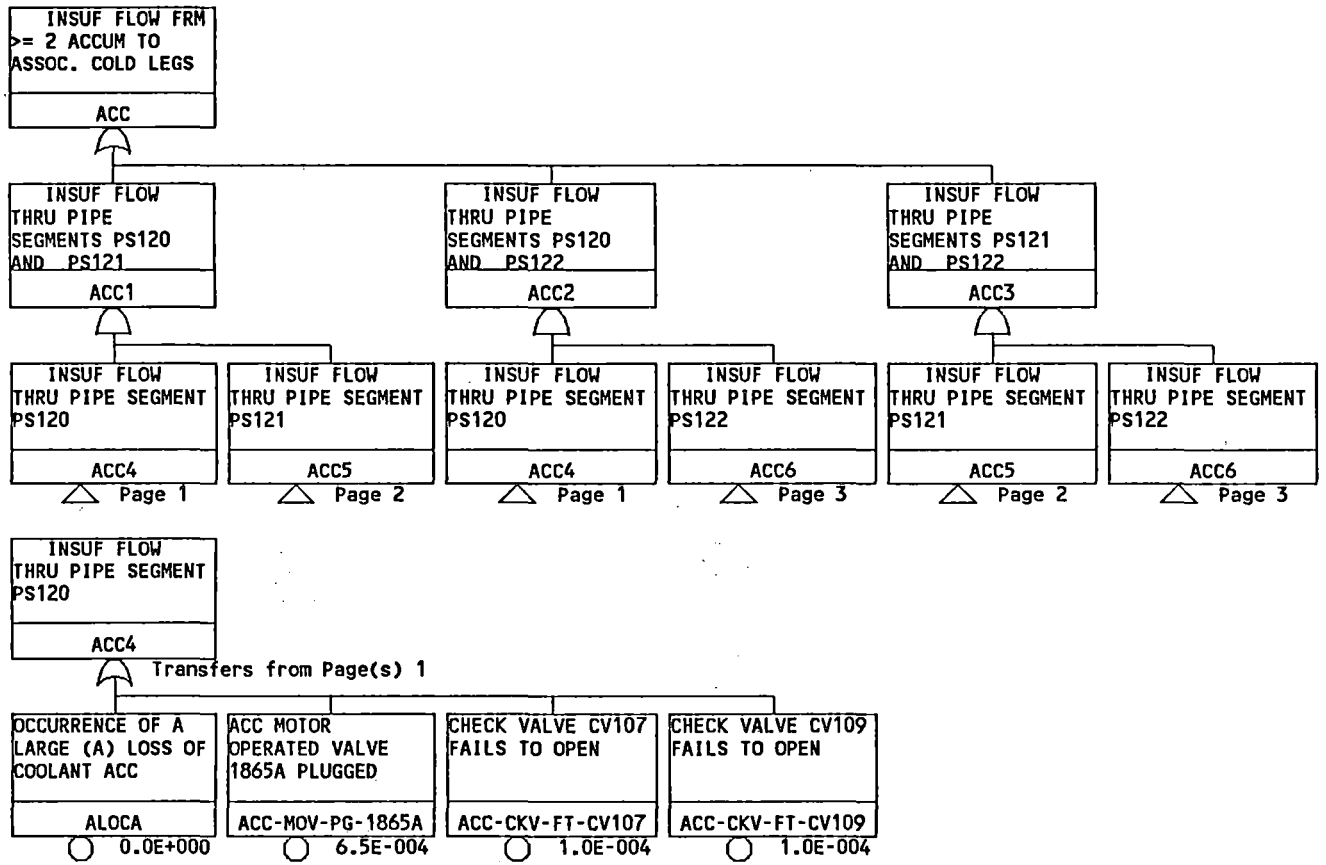

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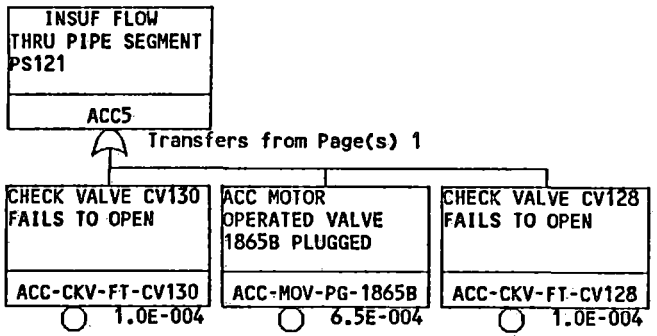

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Project: SURRY
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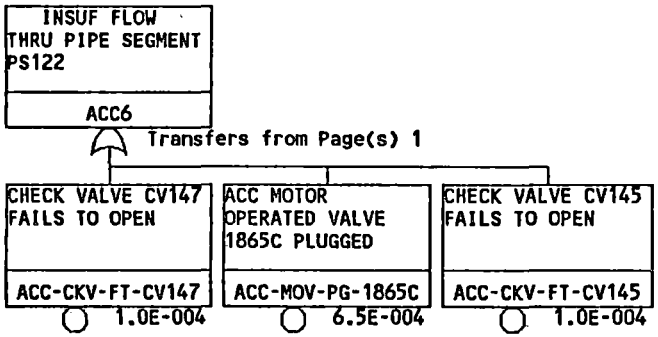

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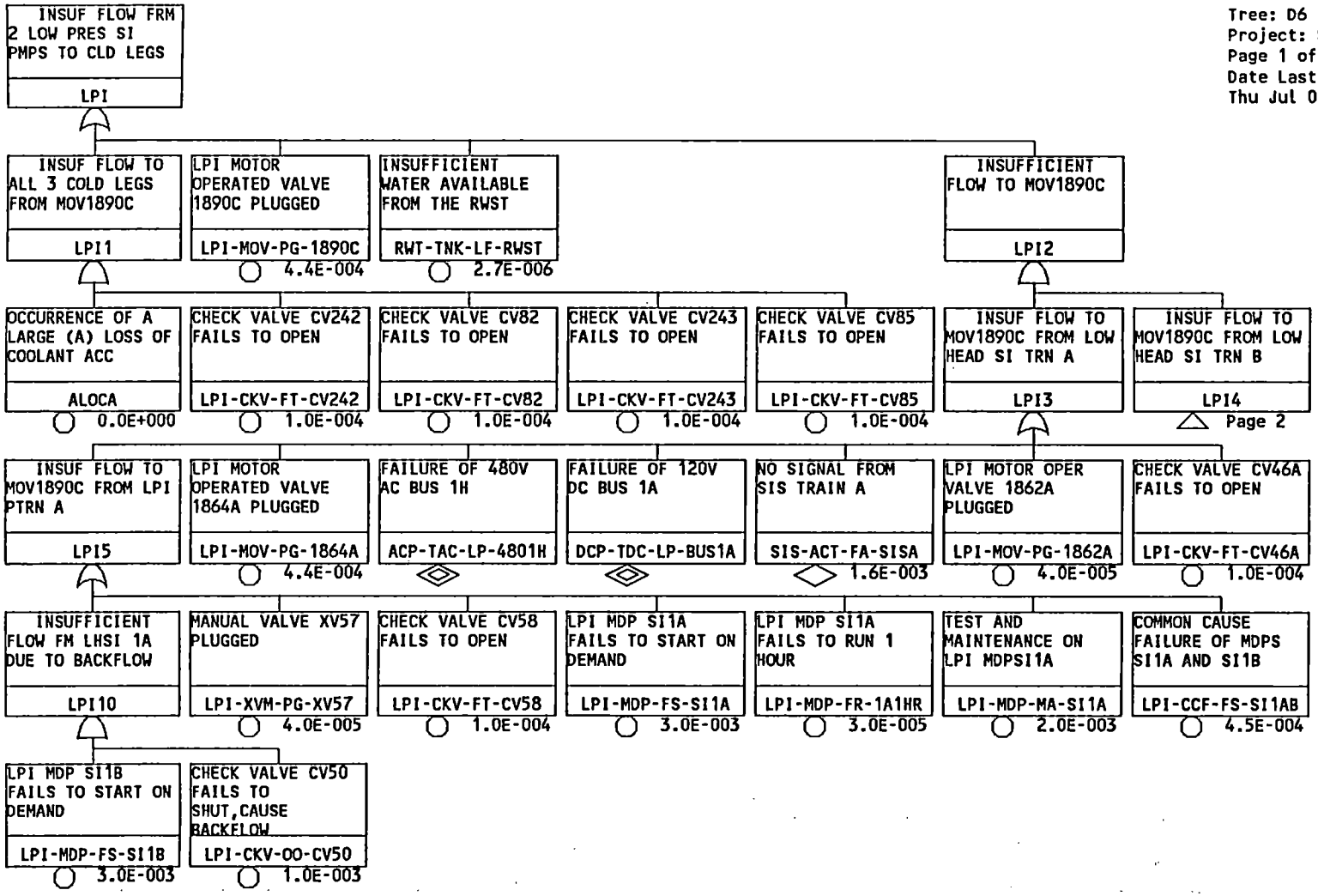

Tree: D6
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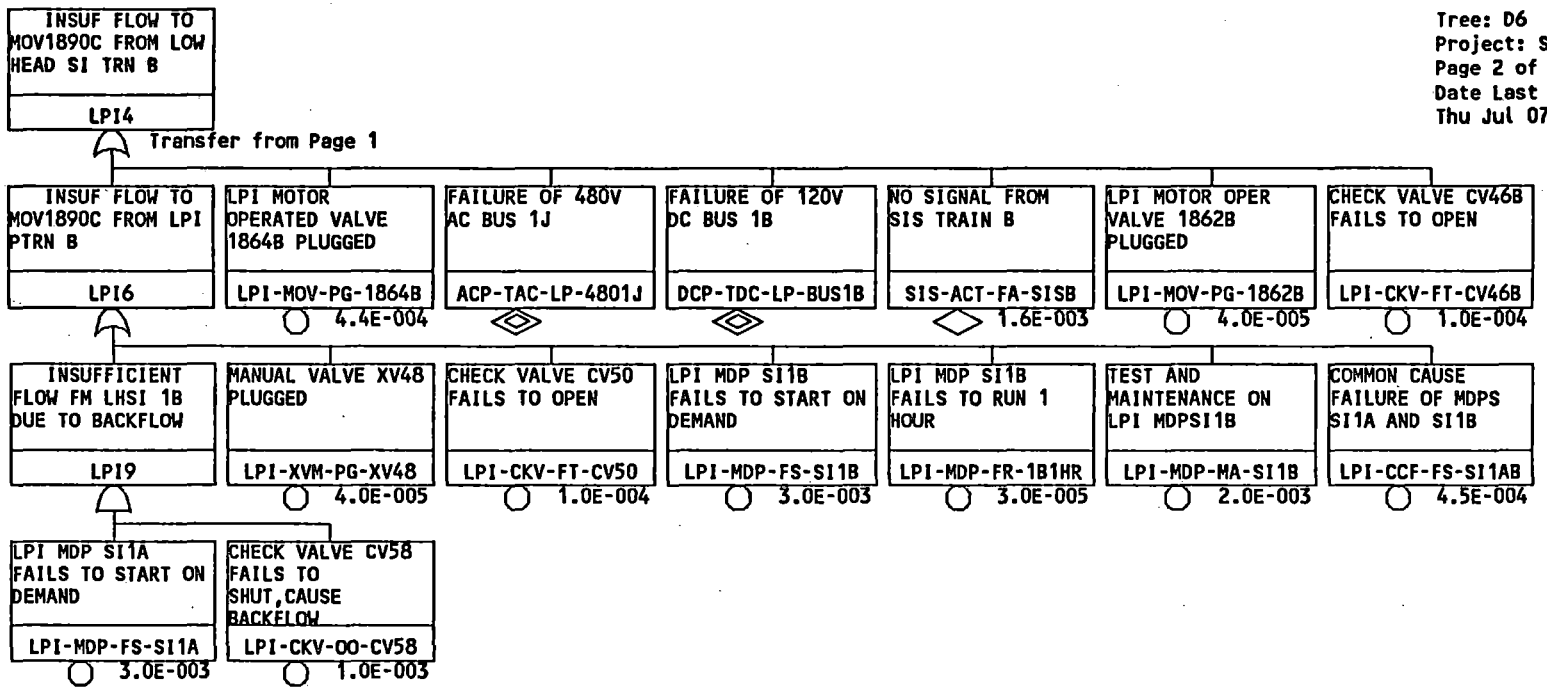
INSUF FLOW TO MOV1890C FROM LOW HEAD SI TRN B
LPI4
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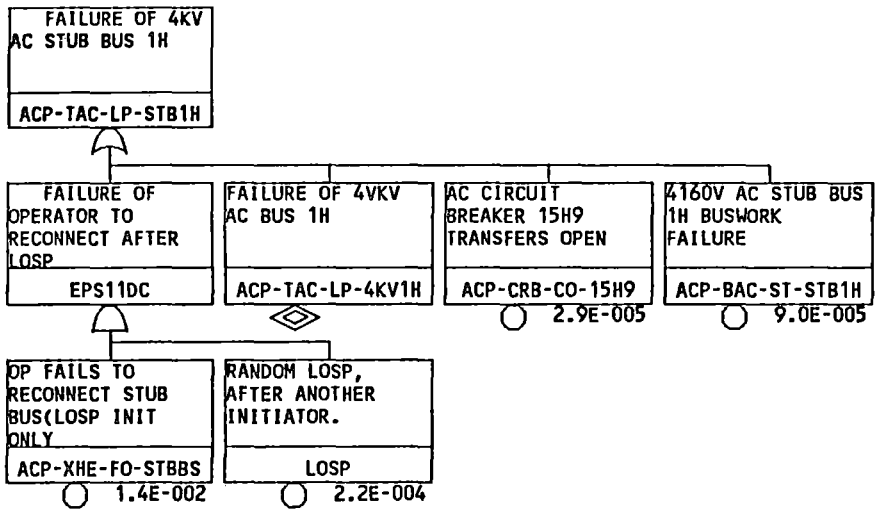
INSUF FLOW TO MOV1890C FROM LPI PTRN B
LPI6
LPI MOTOR OPERATED VALVE 1864B PLUGGED
LPI-MOV-PG-1864B
4.4E-004
FAILURE OF 480V AC BUS 1J
ACP-TAC-LP-4801J
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
NO SIGNAL FROM SIS TRAIN B
SIS-ACT-FA-SISB
1.6E-003
LPI MOTOR OPER VALVE 1862B PLUGGED
LPI-MOV-PG-1862B
4.0E-005
CHECK VALVE CV46B FAILS TO OPEN
LPI-CKV-FT-CV46B
1.0E-004
INSUFFICIENT FLOW FM LHSI 1B DUE TO BACKFLOW
LPI9
MANUAL VALVE XV48 PLUGGED
LPI-XVM-PG-XV48
4.0E-005
CHECK VALVE CV50 FAILS TO OPEN
LPI-CKV-FT-CV50
1.0E-004
LPI MDP SI1B FAILS TO START ON DEMAND
LPI-MDP-FS-SI1B
3.0E-003
LPI MDP SI1B FAILS TO RUN 1 HOUR
LPI-MDP-FR-1B1HR
3.0E-005
TEST AND MAINTENANCE ON LPI MDPSI1B
LPI-MDP-MA-SI1B
2.0E-003
COMMON CAUSE FAILURE OF MDPS SI1A AND SI1B
LPI-CCF-FS-SI1AB
4.5E-004
LPI MDP SI1A FAILS TO START ON DEMAND
LPI-MDP-FS-SI1A
3.0E-003
CHECK VALVE CV58 FAILS TO SHUT,CAUSE BACKFLOW
LPI-CKV-OO-CV58
1.0E-003



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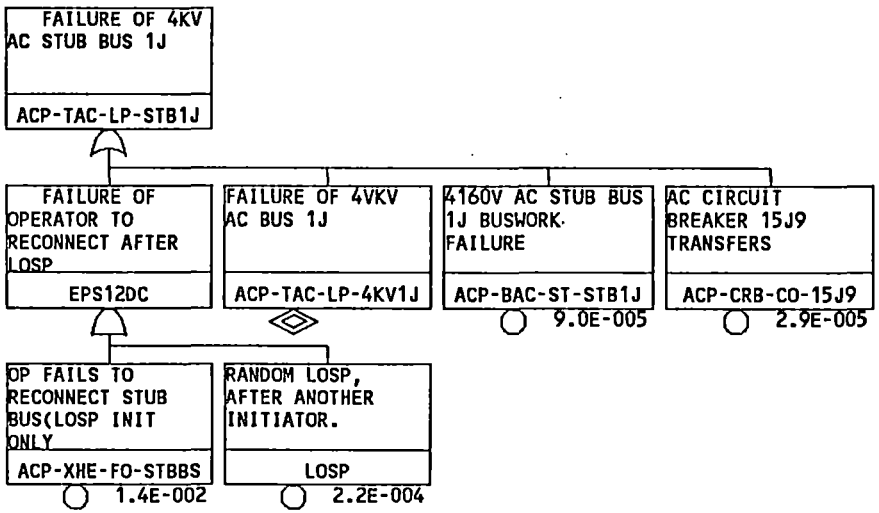

Tree: ESTB1J
Project: SURRY
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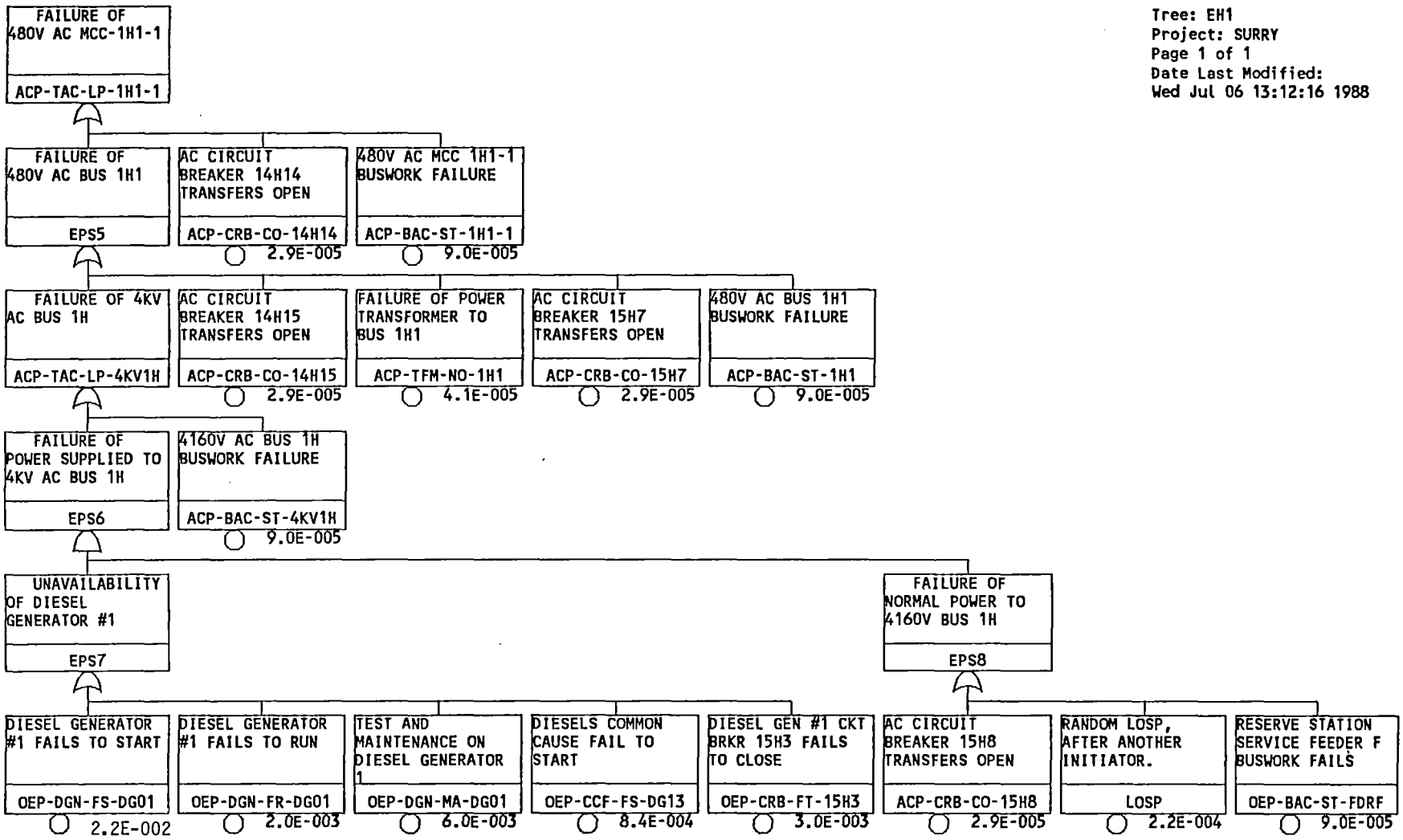

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Tree: EH2
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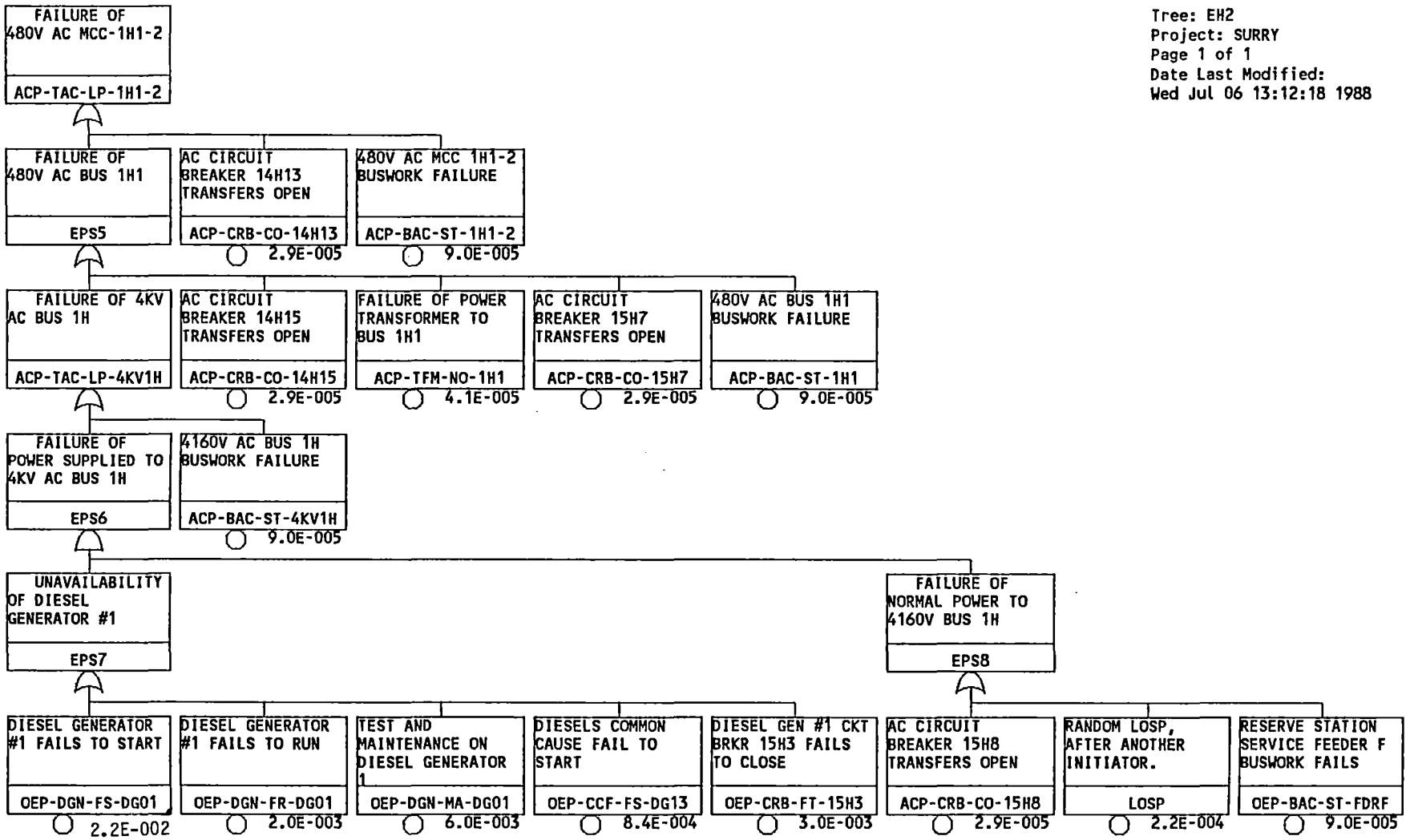

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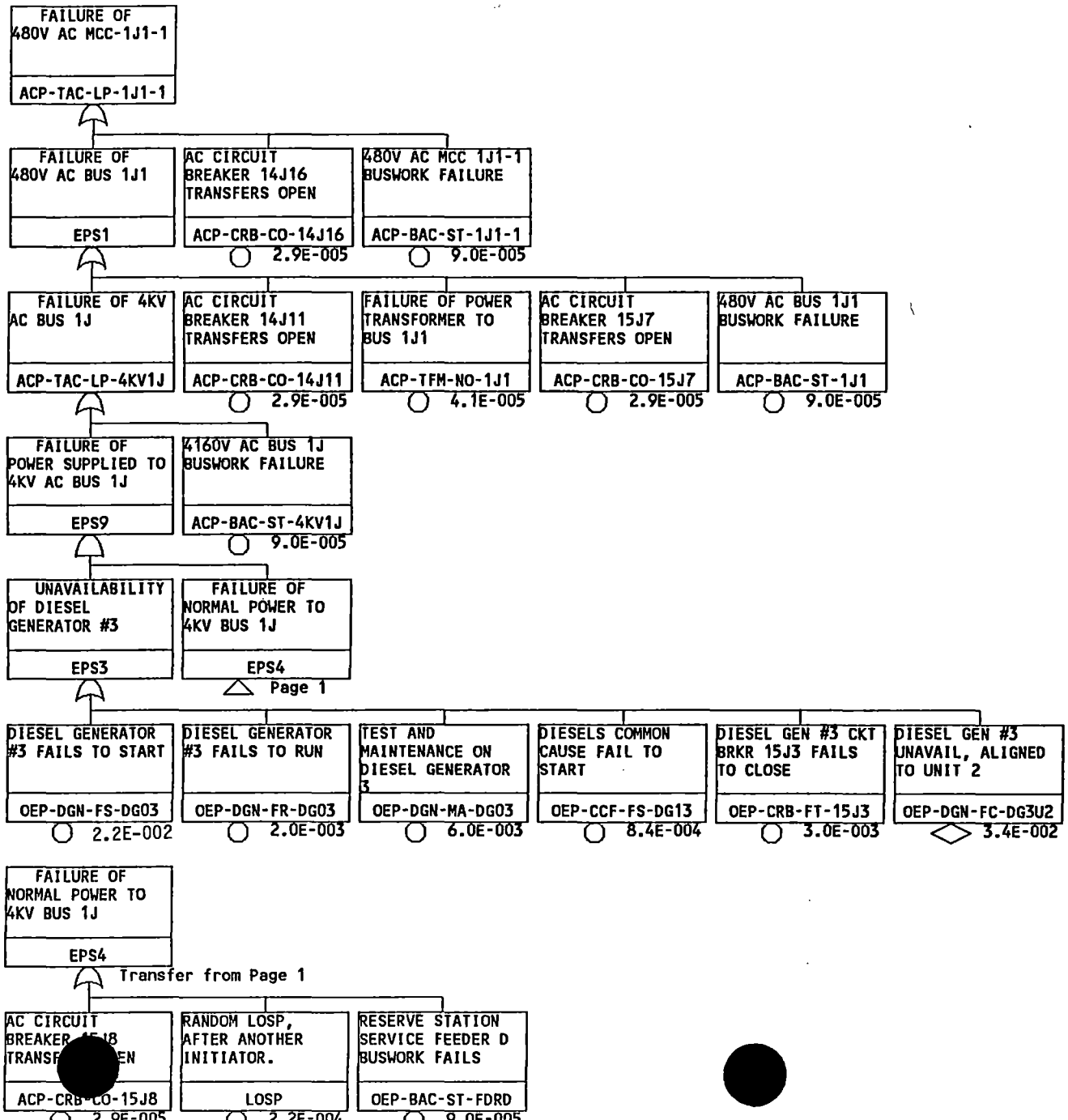
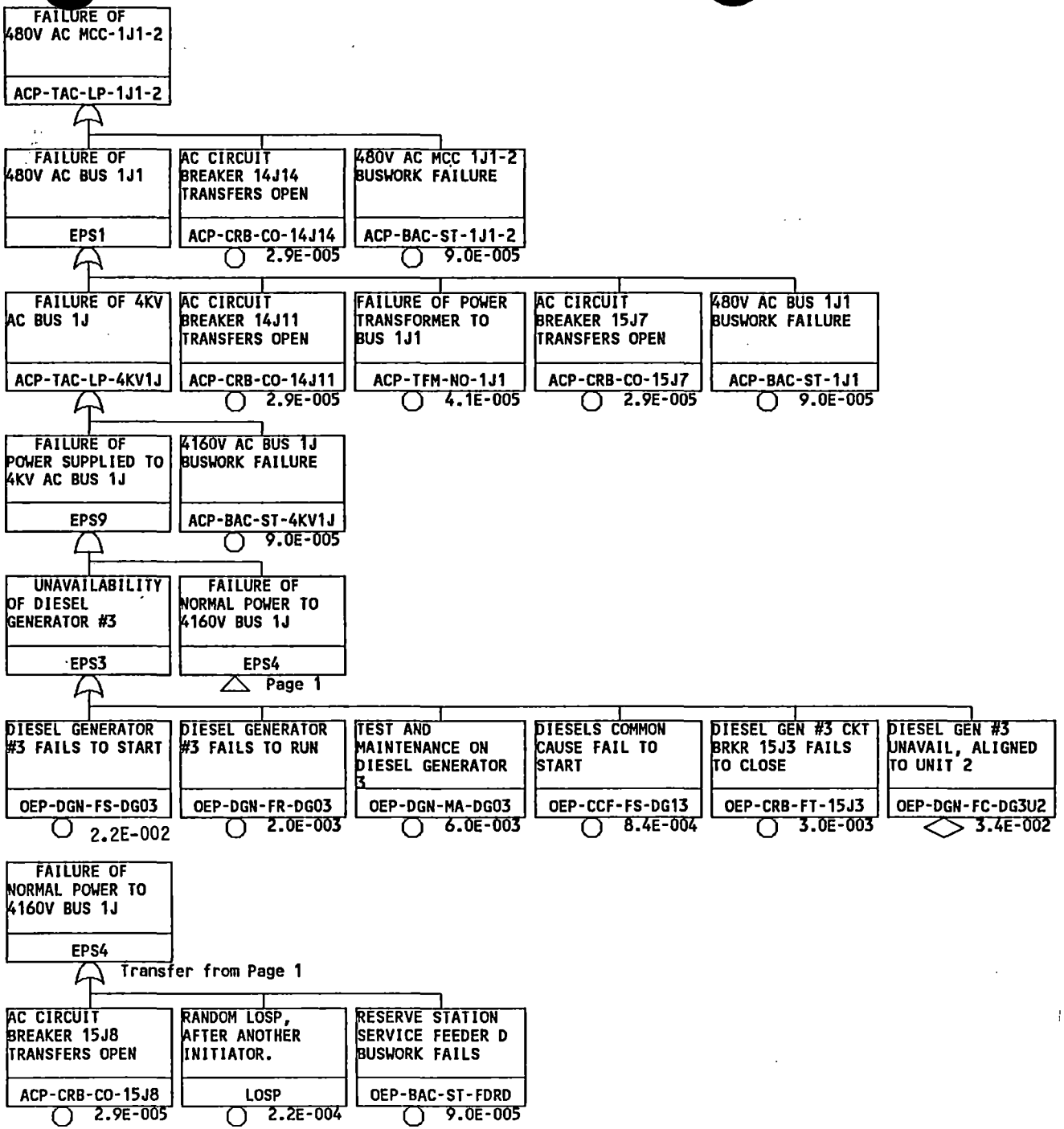
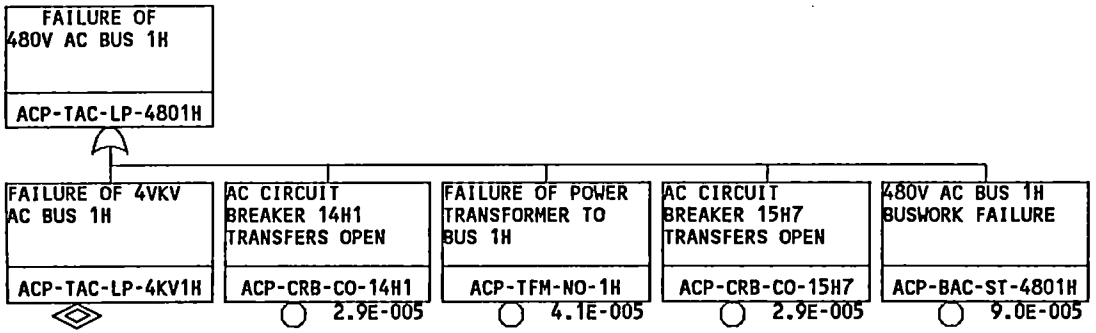



FAILURE OF 480V AC MCC-1J1-2
ACP-TAC-LP-1J1-2
FAILURE OF 480V AC BUS 1J1
EPS1
AC CIRCUIT BREAKER 14J14 TRANSFERS OPEN
ACP-CRB-CO-14J14
2.9E-005
480V AC MCC 1J1-2 BUSWORK FAILURE
ACP-BAC-ST-1J1-2
9.0E-005
FAILURE OF 4KV AC BUS 1J
ACP-TAC-LP-4KV1J
AC CIRCUIT BREAKER 14J11 TRANSFERS OPEN
ACP-CRB-CO-14J11
2.9E-005
FAILURE OF POWER TRANSFORMER TO BUS 1J1
ACP-TFM-NO-1J1
4.1E-005
AC CIRCUIT BREAKER 15J7 TRANSFERS OPEN
ACP-CRB-CO-15J7
2.9E-005
480V AC BUS 1J1 BUSWORK FAILURE
ACP-BAC-ST-1J1
9.0E-005
FAILURE OF POWER SUPPLIED TO 4KV AC BUS 1J
EPS9
4160V AC BUS 1J BUSWORK FAILURE
ACP-BAC-ST-4KV1J
9.0E-005
UNAVAILABILITY OF DIESEL GENERATOR #3
EPS3
FAILURE OF NORMAL POWER TO 4160V BUS 1J
EPS4
Page 1
DIESEL GENERATOR #3 FAILS TO START
OEP-DGN-FS-DG03
2.2E-002
DIESEL GENERATOR #3 FAILS TO RUN
OEP-DGN-FR-DG03
2.0E-003
TEST AND MAINTENANCE ON DIESEL GENERATOR 3
OEP-DGN-MA-DG03
6.0E-003
DIESELS COMMON CAUSE FAIL TO START
OEP-CCF-FS-DG13
8.4E-004
DIESEL GEN #3 CKT BRKR 15J3 FAILS TO CLOSE
OEP-CRB-FT-15J3
3.0E-003
DIESEL GEN #3 UNAVAIL, ALIGNED TO UNIT 2
OEP-DGN-FC-DG3U2
3.4E-002
FAILURE OF NORMAL POWER TO 4160V BUS 1J
EPS4
Transfer from Page 1
AC CIRCUIT BREAKER 15J8 TRANSFERS OPEN
ACP-CRB-CO-15J8
2.9E-005
RANDOM LOSP, AFTER ANOTHER INITIATOR.
LOSP
2.2E-004
RESERVE STATION SERVICE FEEDER D BUSWORK FAILS
OEP-BAC-ST-FDRD
9.0E-005



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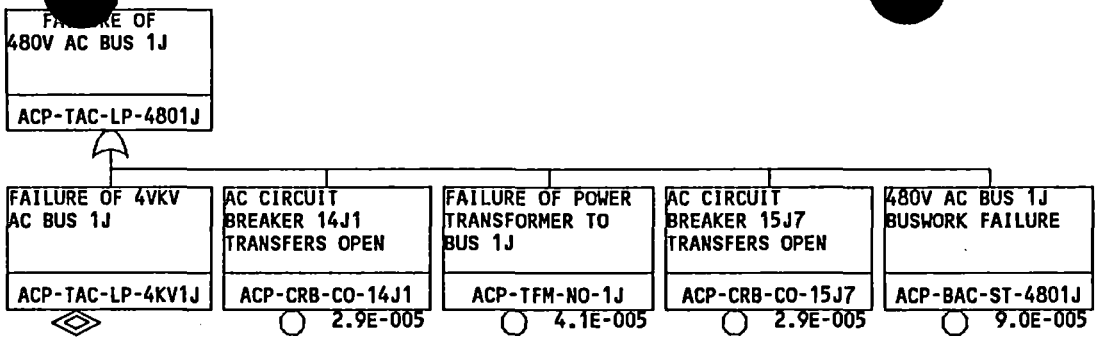

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Tree: E1I
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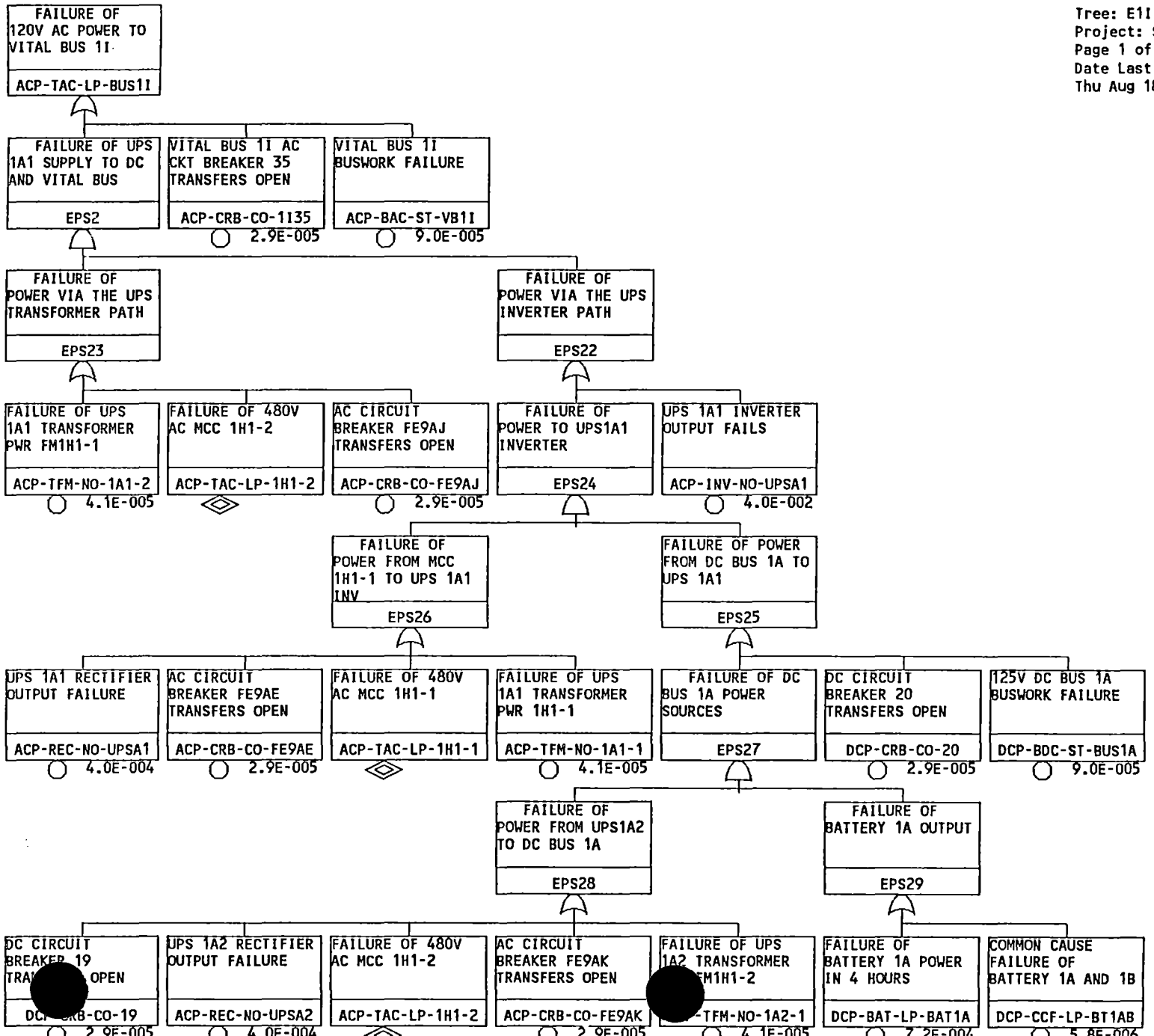

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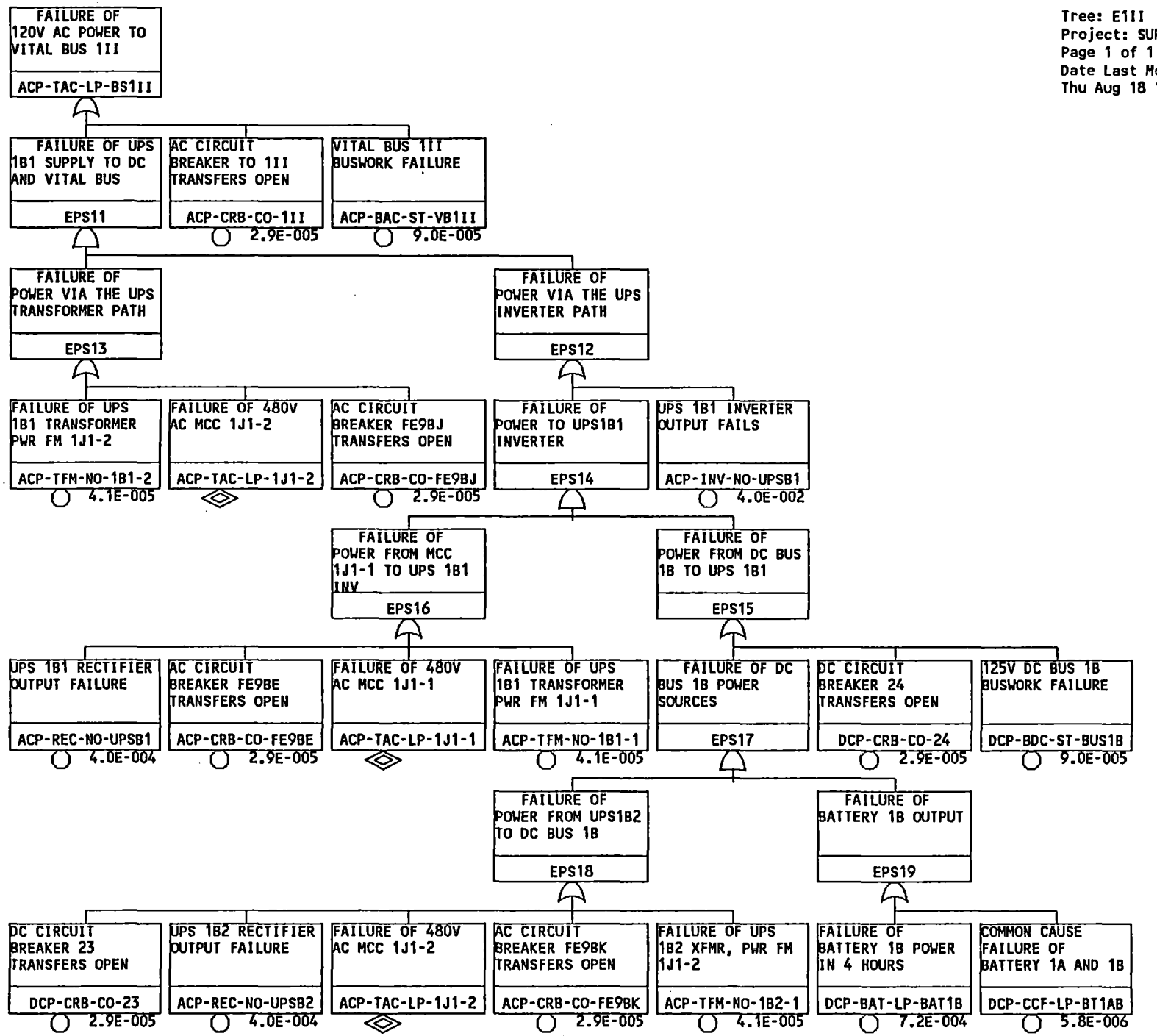

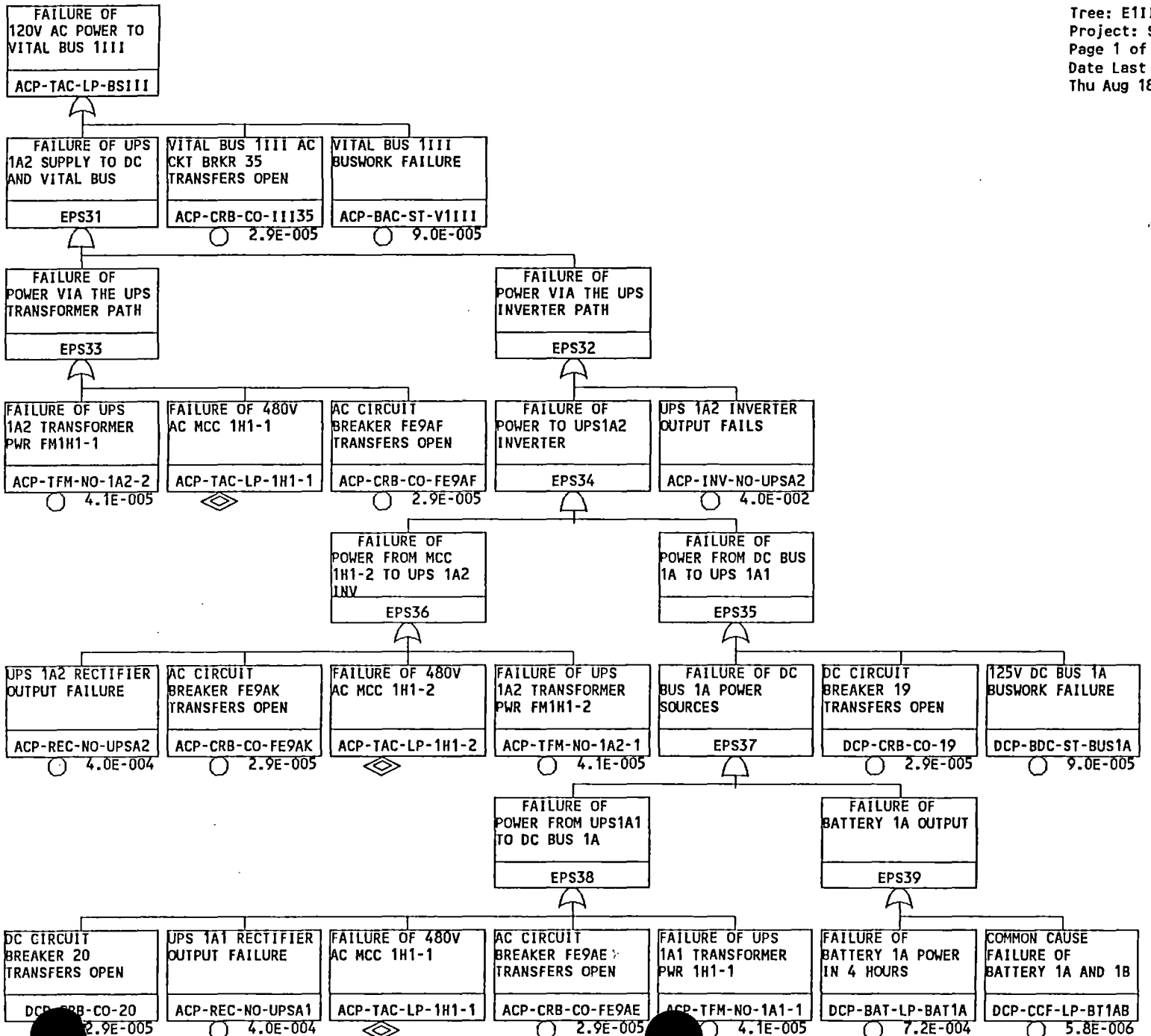
FAILURE OF 120V AC POWER TO VITAL BUS 1III
ACP-TAC-LP-BSIII
FAILURE OF UPS 1A2 SUPPLY TO DC AND VITAL BUS
EPS31
VITAL BUS 1III AC CKT BRKR 35 TRANSFERS OPEN
ACP-CRB-CO-III35
2.9E-005
VITAL BUS 1III BUSWORK FAILURE
ACP-BAC-ST-V1III
9.0E-005
FAILURE OF POWER VIA THE UPS TRANSFORMER PATH
EPS33
FAILURE OF POWER VIA THE UPS INVERTER PATH
EPS32
FAILURE OF UPS 1A2 TRANSFORMER PWR FM1H1-1
ACP-TFM-NO-1A2-2
4.1E-005
FAILURE OF 480V AC MCC 1H1-1
ACP-TAC-LP-1H1-1
AC CIRCUIT BREAKER FE9AF TRANSFERS OPEN
ACP-CRB-CO-FE9AF
2.9E-005
FAILURE OF POWER TO UPS1A2 INVERTER
EPS34
UPS 1A2 INVERTER OUTPUT FAILS
ACP-INV-NO-UPSA2
4.0E-002
FAILURE OF POWER FROM MCC 1H1-2 TO UPS 1A2 INV
EPS36
FAILURE OF POWER FROM DC BUS 1A TO UPS 1A1
EPS35
UPS 1A2 RECTIFIER OUTPUT FAILURE
ACP-REC-NO-UPSA2
4.0E-004
AC CIRCUIT BREAKER FE9AK TRANSFERS OPEN
ACP-CRB-CO-FE9AK
2.9E-005
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
FAILURE OF UPS 1A2 TRANSFORMER PWR FM1H1-2
ACP-TFM-NO-1A2-1
4.1E-005
FAILURE OF DC BUS 1A POWER SOURCES
EPS37
DC CIRCUIT BREAKER 19 TRANSFERS OPEN
DCP-CRB-CO-19
2.9E-005
125V DC BUS 1A BUSWORK FAILURE
DCP-BDC-ST-BUS1A
9.0E-005
FAILURE OF POWER FROM UPS1A1 TO DC BUS 1A
EPS38
FAILURE OF BATTERY 1A OUTPUT
EPS39
DC CIRCUIT BREAKER 20 TRANSFERS OPEN
2.9E-005
UPS 1A1 RECTIFIER OUTPUT FAILURE
ACP-REC-NO-UPSA1
4.0E-004
FAILURE OF 480V AC MCC 1H1-1
ACP-TAC-LP-1H1-1
AC CIRCUIT BREAKER FE9AE TRANSFERS OPEN
ACP-CRB-CO-FE9AE
2.9E-005
FAILURE OF UPS 1A1 TRANSFORMER PWR 1H1-1
ACP-TFM-NO-1A1-1
4.1E-005
FAILURE OF BATTERY 1A POWER IN 4 HOURS
DCP-BAT-LP-BAT1A
7.2E-004
COMMON CAUSE FAILURE OF BATTERY 1A AND 1B
DCP-CCF-LP-BT1AB
5.8E-006

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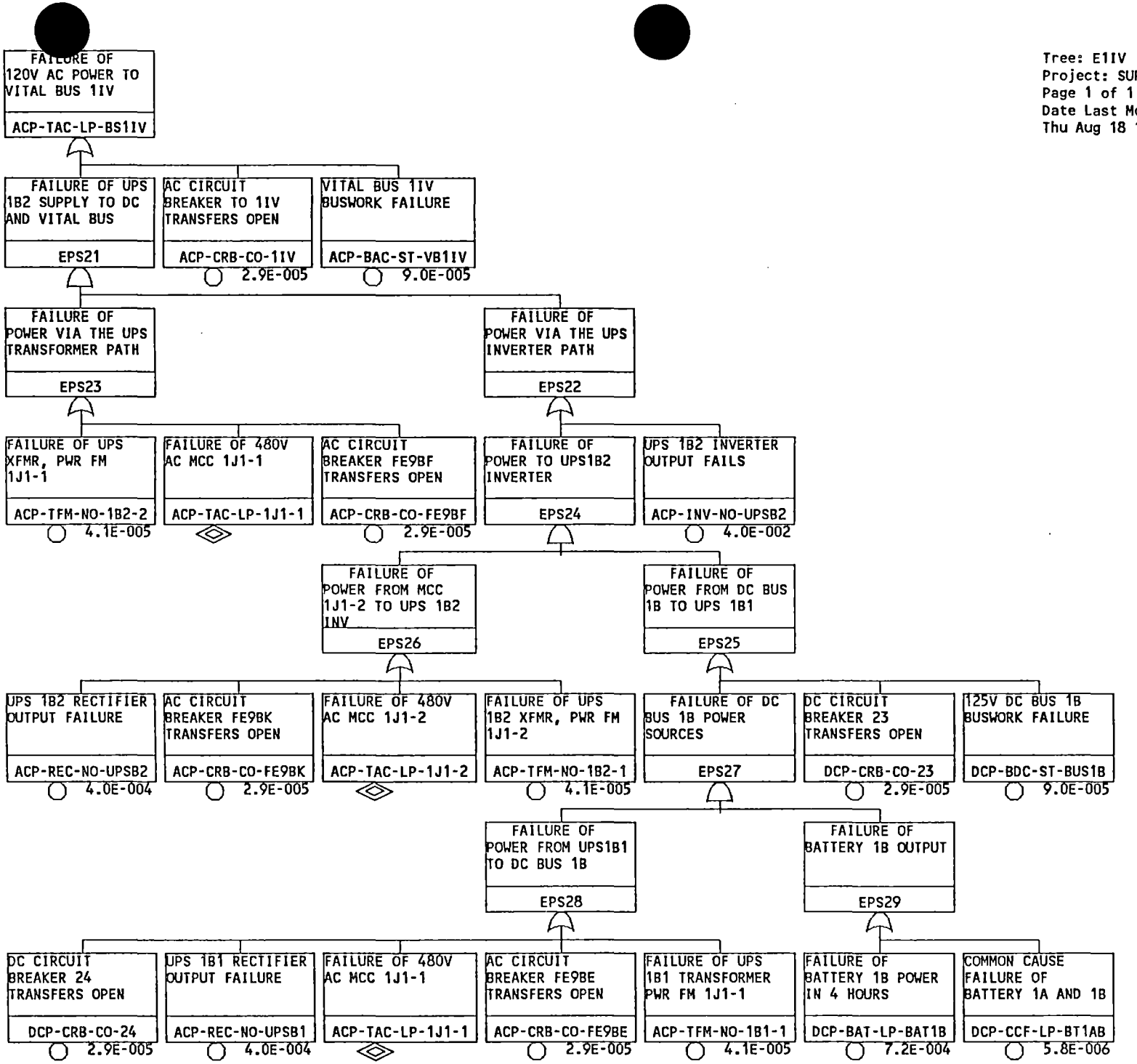

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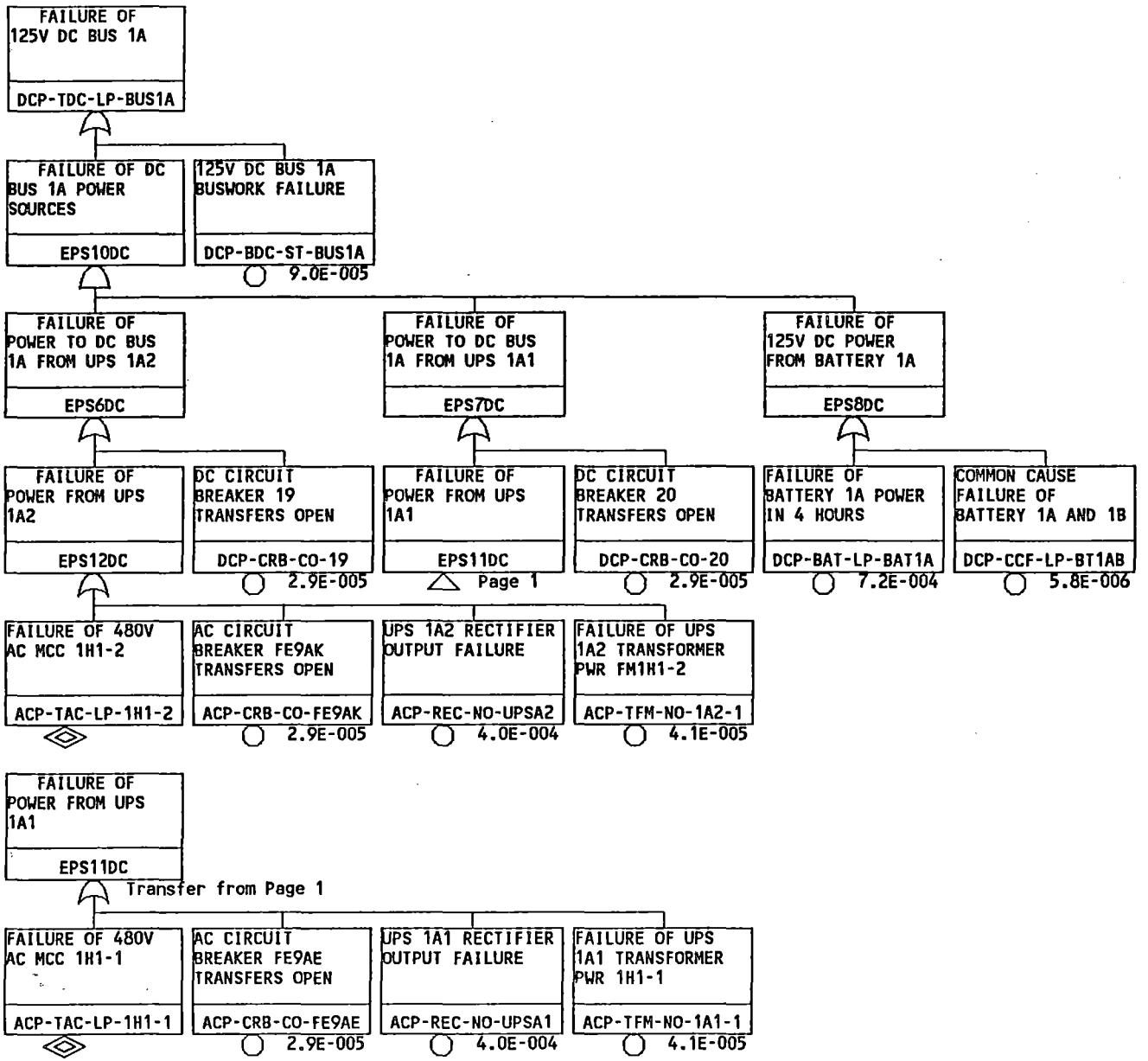

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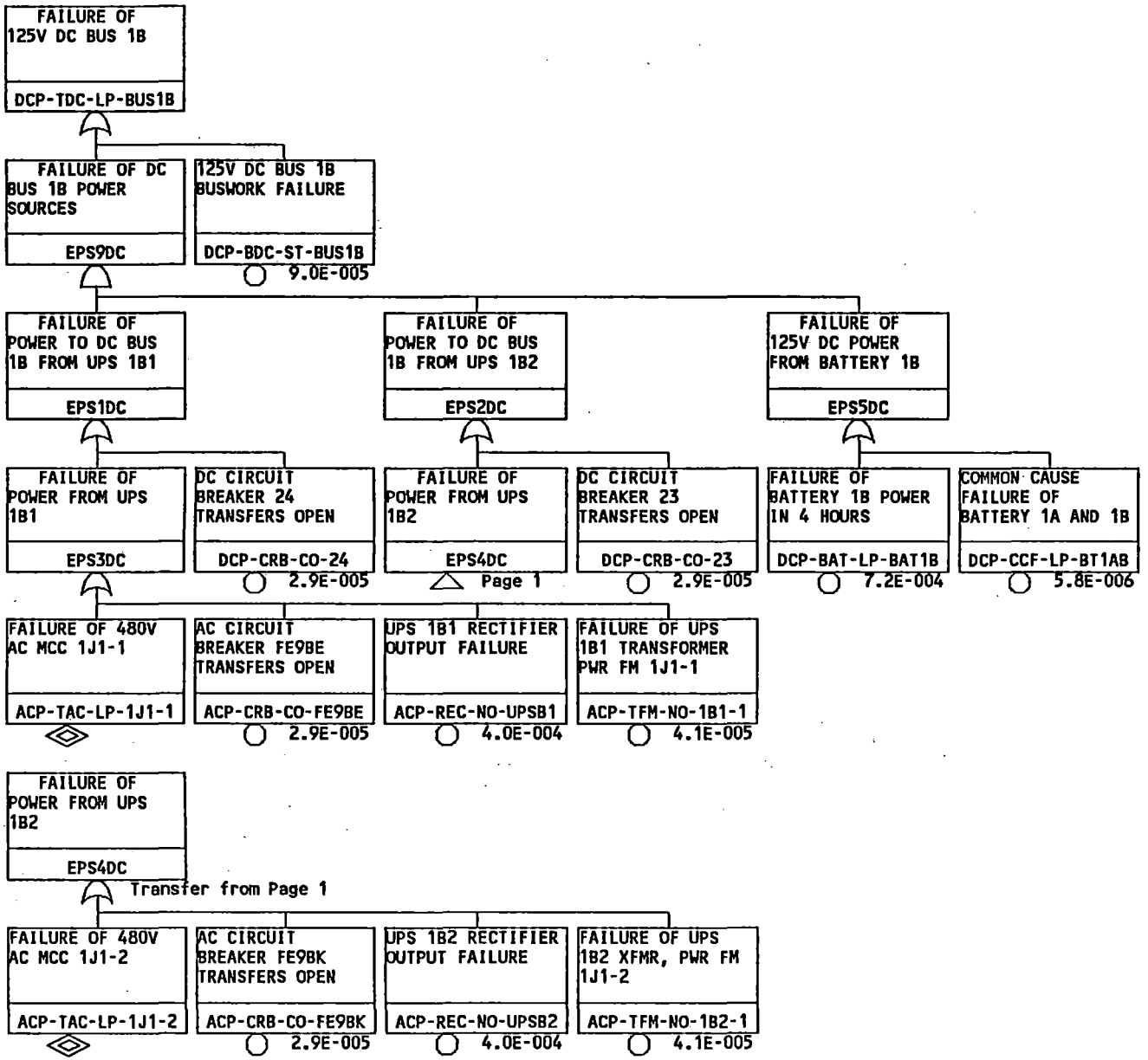

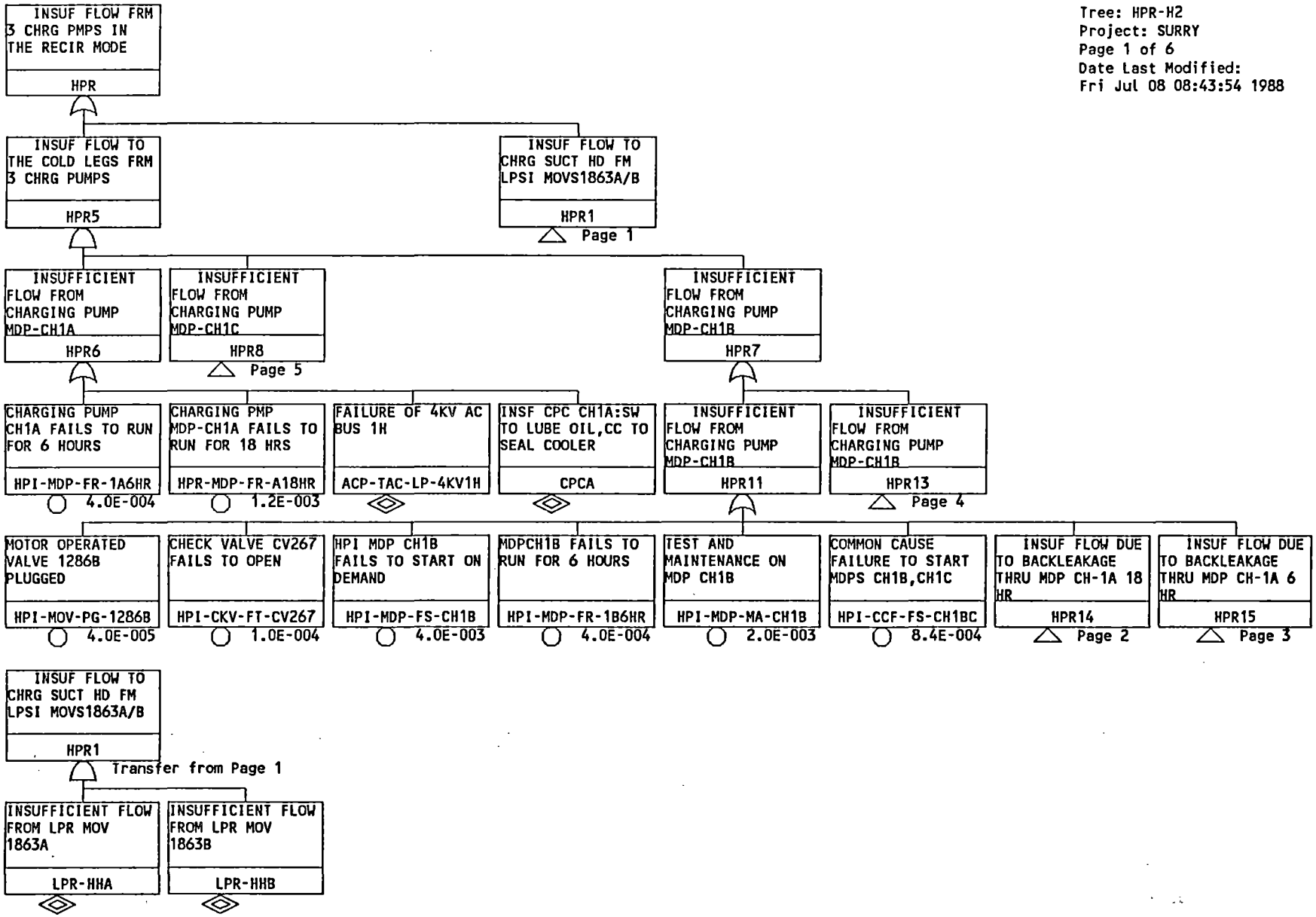
INSUF FLOW FRM 3 CHRG PMPS IN THE RECIR MODE
HPR
Tree: HPR-H2
Project: SURRY
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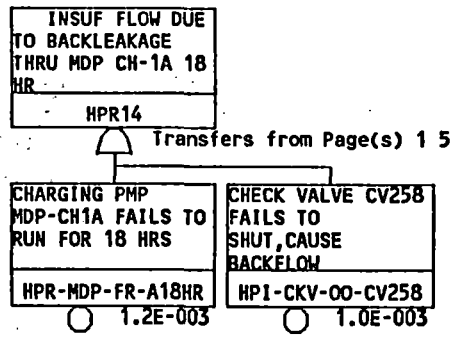
INSUF FLOW TO THE COLD LEGS FRM 3 CHRG PUMPS
HPR5
INSUF FLOW TO CHRG SUCT HD FM LPSI MOVS1863A/B
HPR1
Page 1
INSUFFICIENT FLOW FROM CHARGING PUMP MDP-CH1A
HPR6
INSUFFICIENT FLOW FROM CHARGING PUMP MDP-CH1C
HPR8
Page 5
INSUFFICIENT FLOW FROM CHARGING PUMP MDP-CH1B
HPR7
CHARGING PUMP CH1A FAILS TO RUN FOR 6 HOURS
HPI-MDP-FR-1A6HR
4.0E-004
CHARGING PMP MDP-CH1A FAILS TO RUN FOR 18 HRS
HPR-MDP-FR-A18HR
1.2E-003
FAILURE OF 4KV AC BUS 1H
ACP-TAC-LP-4KV1H
INSF CPC CH1A:SW TO LUBE OIL,CC TO SEAL COOLER
CPCA
INSUFFICIENT FLOW FROM CHARGING PUMP MDP-CH1B
HPR11
INSUFFICIENT FLOW FROM CHARGING PUMP MDP-CH1B
HPR13
Page 4
MOTOR OPERATED VALVE 1286B PLUGGED
HPI-MOV-PG-1286B
4.0E-005
CHECK VALVE CV267 FAILS TO OPEN
HPI-CKV-FT-CV267
1.0E-004
HPI MDP CH1B FAILS TO START ON DEMAND
HPI-MDP-FS-CH1B
4.0E-003
MDPCH1B FAILS TO RUN FOR 6 HOURS
HPI-MDP-FR-1B6HR
4.0E-004
TEST AND MAINTENANCE ON MDP CH1B
HPI-MDP-MA-CH1B
2.0E-003
COMMON CAUSE FAILURE TO START MDPS CH1B,CH1C
HPI-CCF-FS-CH1BC
8.4E-004
INSUF FLOW DUE TO BACKLEAKAGE THRU MDP CH-1A 18 HR
HPR14
Page 2
INSUF FLOW DUE TO BACKLEAKAGE THRU MDP CH-1A 6 HR
HPR15
Page 3
INSUF FLOW TO CHRG SUCT HD FM LPSI MOVS1863A/B
HPR1
Transfer from Page 1
INSUFFICIENT FLOW FROM LPR MOV 1863A
LPR-HHA
INSUFFICIENT FLOW FROM LPR MOV 1863B
LPR-HHB



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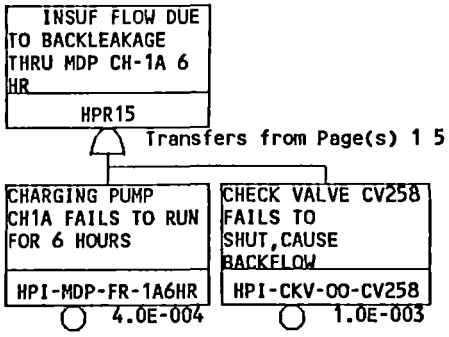

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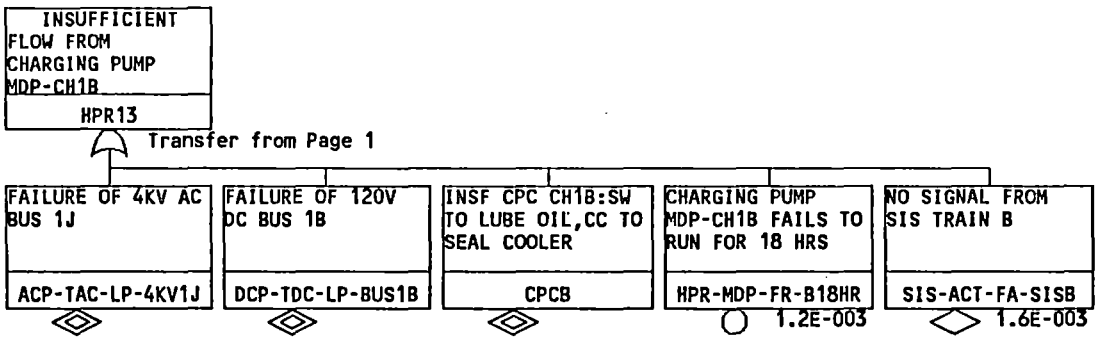
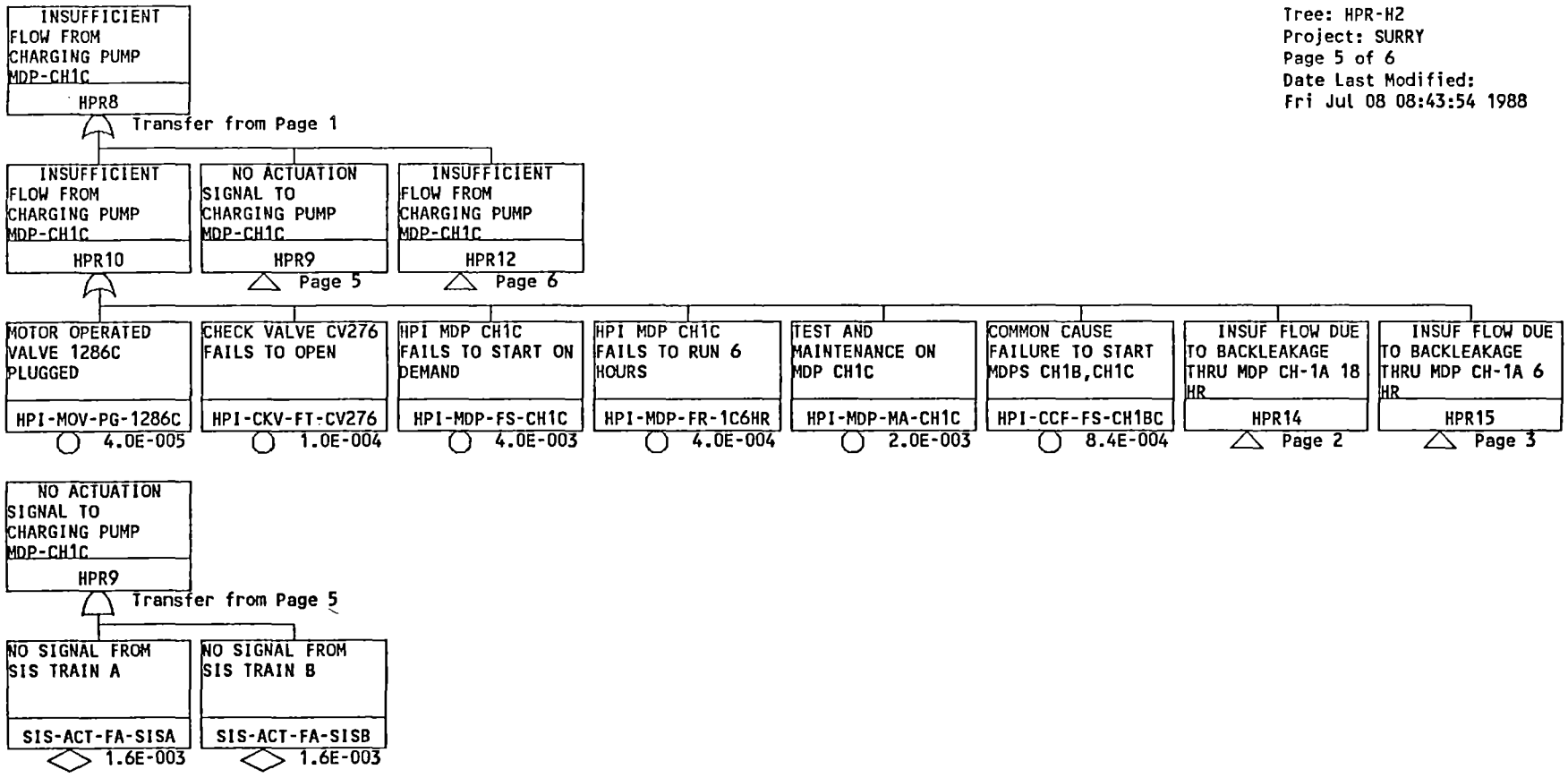
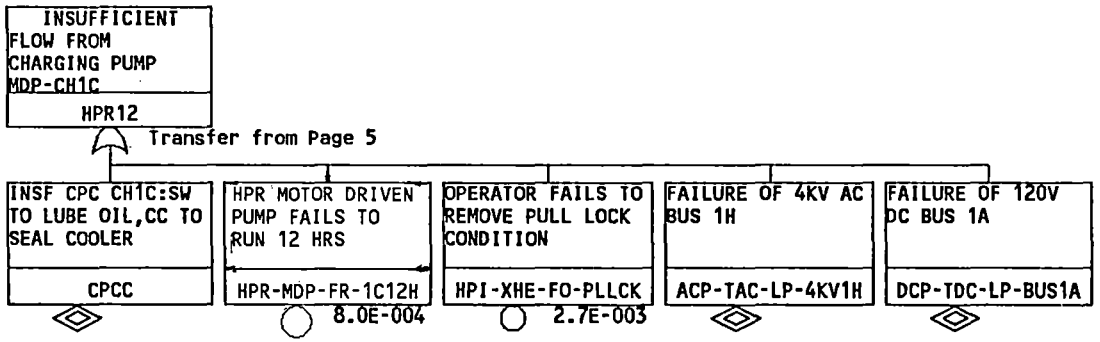

INSUFFICIENT FLOW FROM CHARGING PUMP MDP-CH1B
HPR13
Transfer from Page 1
FAILURE OF 4KV AC BUS 1J
ACP-TAC-LP-4KV1J
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
INSF CPC CH1B:SW TO LUBE OIL,CC TO SEAL COOLER
CPCB
CHARGING PUMP MDP-CH1B FAILS TO RUN FOR 18 HRS
HPR-MDP-FR-B18HR
1.2E-003
NO SIGNAL FROM SIS TRAIN B
SIS-ACT-FA-SISB
1.6E-003


INSUFFICIENT FLOW FROM CHARGING PUMP MDP-CH1C
HPR8
Transfer from Page 1
INSUFFICIENT FLOW FROM CHARGING PUMP MDP-CH1C
HPR10
NO ACTUATION SIGNAL TO CHARGING PUMP MDP-CH1C
HPR9
Page 5
INSUFFICIENT FLOW FROM CHARGING PUMP MDP-CH1C
HPR12
Page 6
MOTOR OPERATED VALVE 1286C PLUGGED
HPI-MOV-PG-1286C
4.0E-005
CHECK VALVE CV276 FAILS TO OPEN
HPI-CKV-FT-CV276
1.0E-004
HPI MDP CH1C FAILS TO START ON DEMAND
HPI-MDP-FS-CH1C
4.0E-003
HPI MDP CH1C FAILS TO RUN 6 HOURS
HPI-MDP-FR-1C6HR
4.0E-004
TEST AND MAINTENANCE ON MDP CH1C
HPI-MDP-MA-CH1C
2.0E-003
COMMON CAUSE FAILURE TO START MDPS CH1B,CH1C
HPI-CCF-FS-CH1BC
8.4E-004
INSUF FLOW DUE TO BACKLEAKAGE THRU MDP CH-1A 18 HR
HPR14
Page 2
INSUF FLOW DUE TO BACKLEAKAGE THRU MDP CH-1A 6 HR
HPR15
Page 3
NO ACTUATION SIGNAL TO CHARGING PUMP MDP-CH1C
HPR9
Transfer from Page 5
NO SIGNAL FROM SIS TRAIN A
SIS-ACT-FA-SISA
1.6E-003
NO SIGNAL FROM SIS TRAIN B
SIS-ACT-FA-SISB
1.6E-003



Tree: HPR-H2
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Tree: LPR-HH
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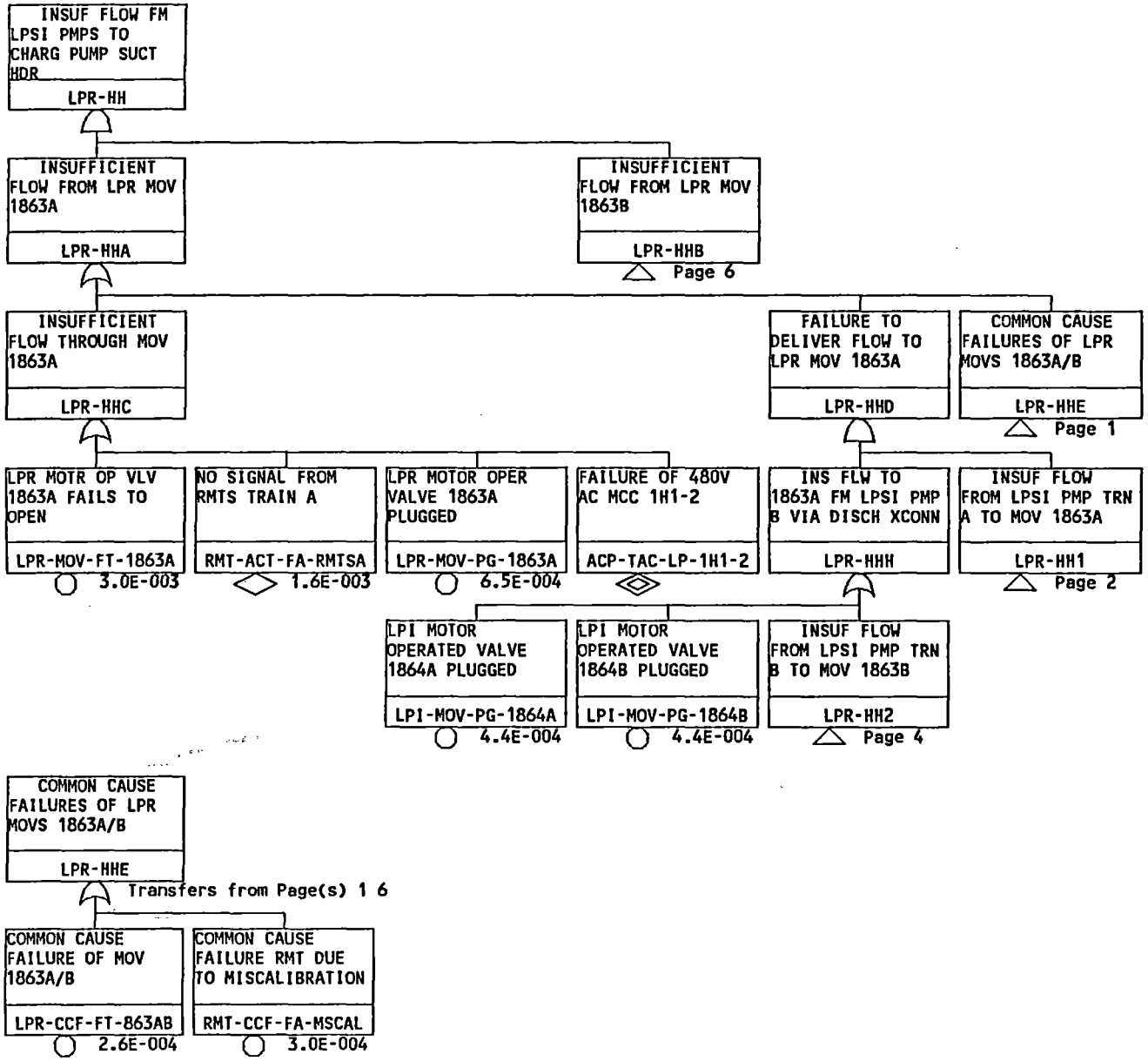
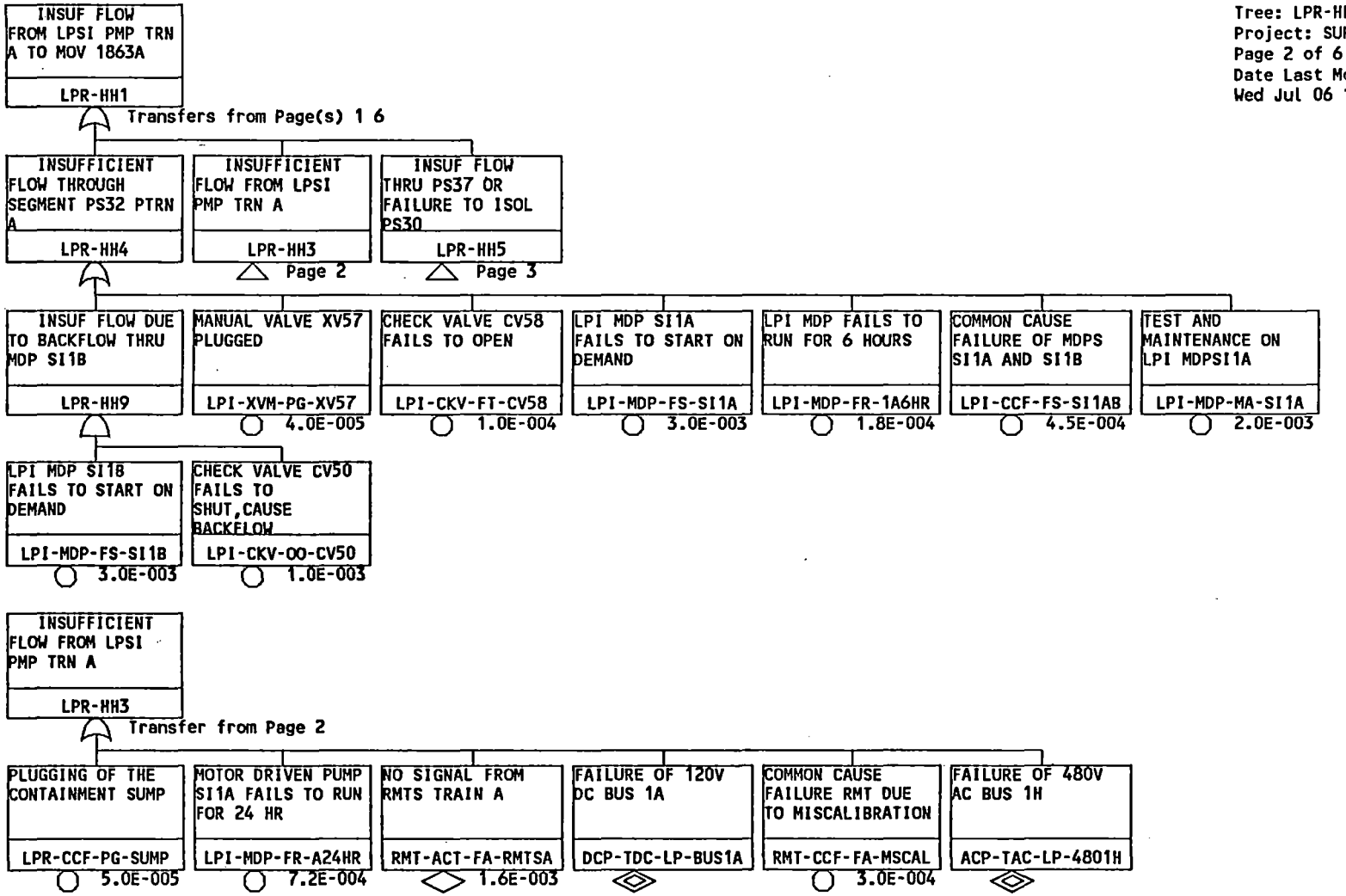
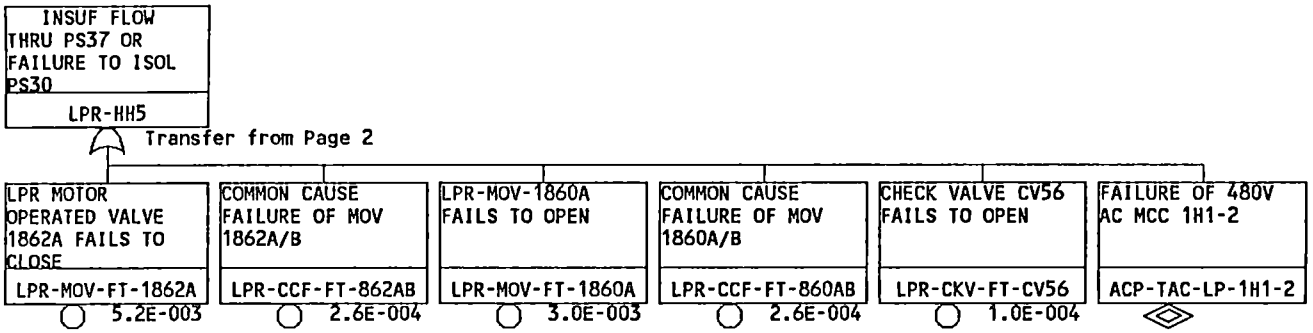



INSUF FLOW FROM LPSI PMP TRN A TO MOV 1863A
LPR-HH1
Transfers from Page(s) 1 6
INSUFFICIENT FLOW THROUGH SEGMENT PS32 PTRN A
LPR-HH4
INSUFFICIENT FLOW FROM LPSI PMP TRN A
LPR-HH3
Page 2
INSUF FLOW THRU PS37 OR FAILURE TO ISOL PS30
LPR-HH5
Page 3
INSUF FLOW DUE TO BACKFLOW THRU MDP SI1B
LPR-HH9
MANUAL VALVE XV57 PLUGGED
LPI-XVM-PG-XV57
4.0E-005
CHECK VALVE CV58 FAILS TO OPEN
LPI-CKV-FT-CV58
1.0E-004
LPI MDP SI1A FAILS TO START ON DEMAND
LPI-MDP-FS-SI1A
3.0E-003
LPI MDP FAILS TO RUN FOR 6 HOURS
LPI-MDP-FR-1A6HR
1.8E-004
COMMON CAUSE FAILURE OF MDPS SI1A AND SI1B
LPI-CCF-FS-SI1AB
4.5E-004
TEST AND MAINTENANCE ON LPI MDPSI1A
LPI-MDP-MA-SI1A
2.0E-003
LPI MDP SI1B FAILS TO START ON DEMAND
LPI-MDP-FS-SI1B
3.0E-003
CHECK VALVE CV50 FAILS TO SHUT,CAUSE BACKFLOW
LPI-CKV-OO-CV50
1.0E-003
INSUFFICIENT FLOW FROM LPSI PMP TRN A
LPR-HH3
Transfer from Page 2
PLUGGING OF THE CONTAINMENT SUMP
LPR-CCF-PG-SUMP
5.0E-005
MOTOR DRIVEN PUMP SI1A FAILS TO RUN FOR 24 HR
LPI-MDP-FR-A24HR
7.2E-004
NO SIGNAL FROM RMTS TRAIN A
RMT-ACT-FA-RMTSA
1.6E-003
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
COMMON CAUSE FAILURE RMT DUE TO MISCALIBRATION
RMT-CCF-FA-MSCAL
3.0E-004
FAILURE OF 480V AC BUS 1H
ACP-TAC-LP-4801H



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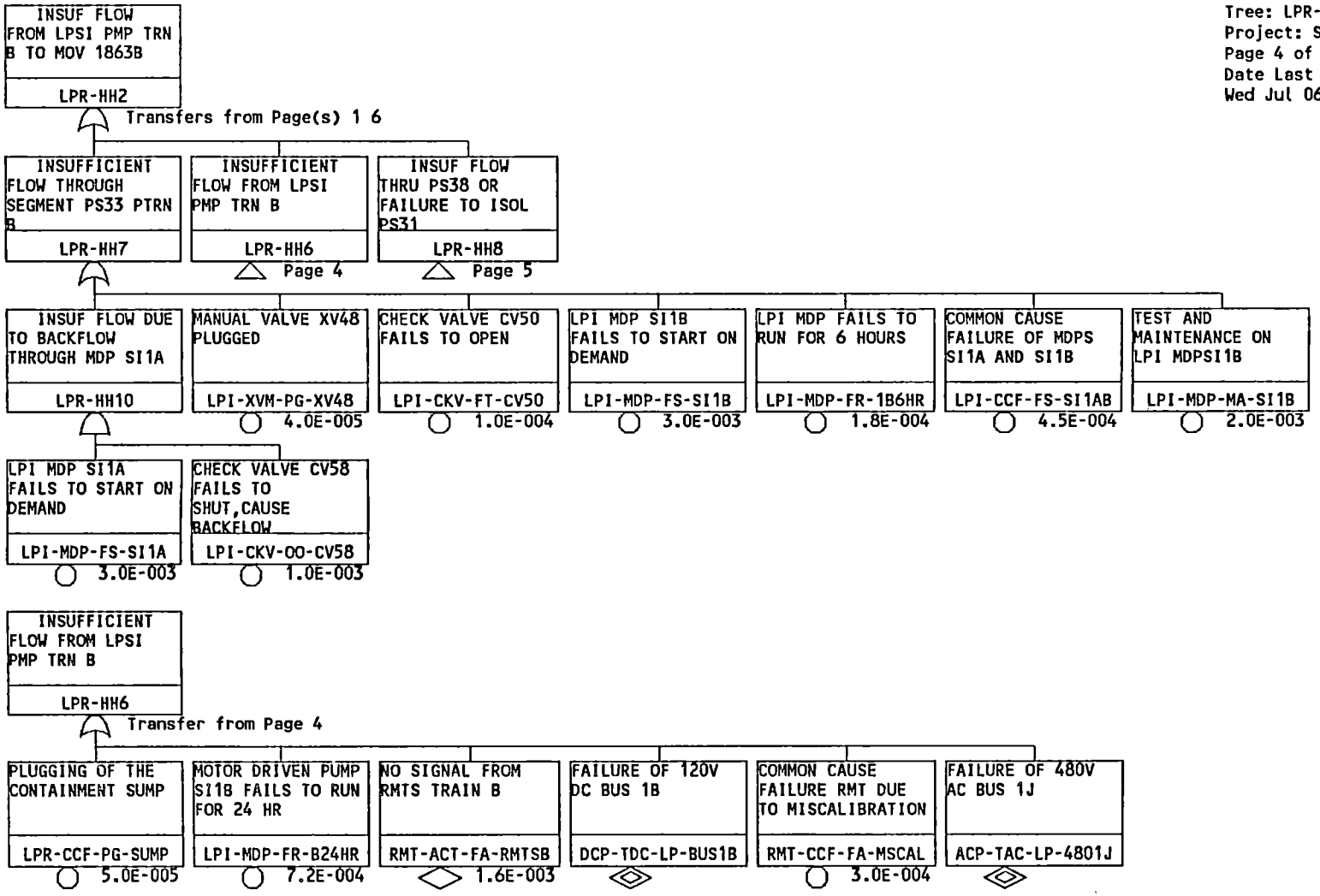

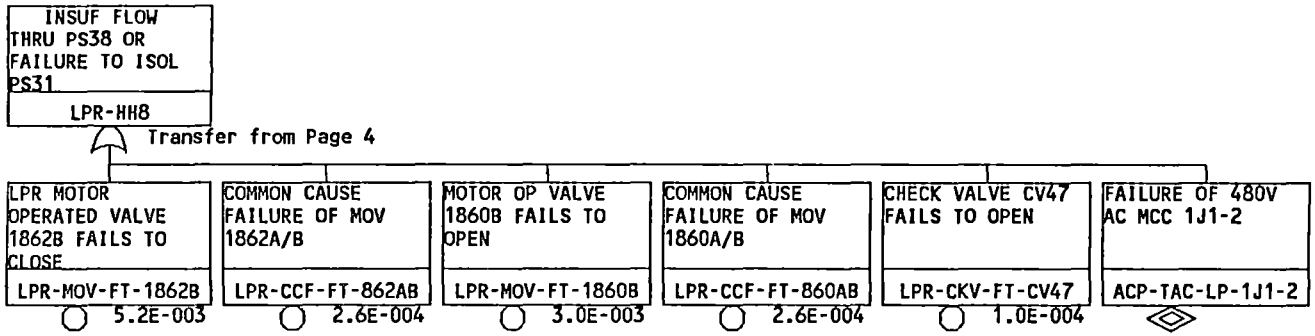

Tree: LPR-HH
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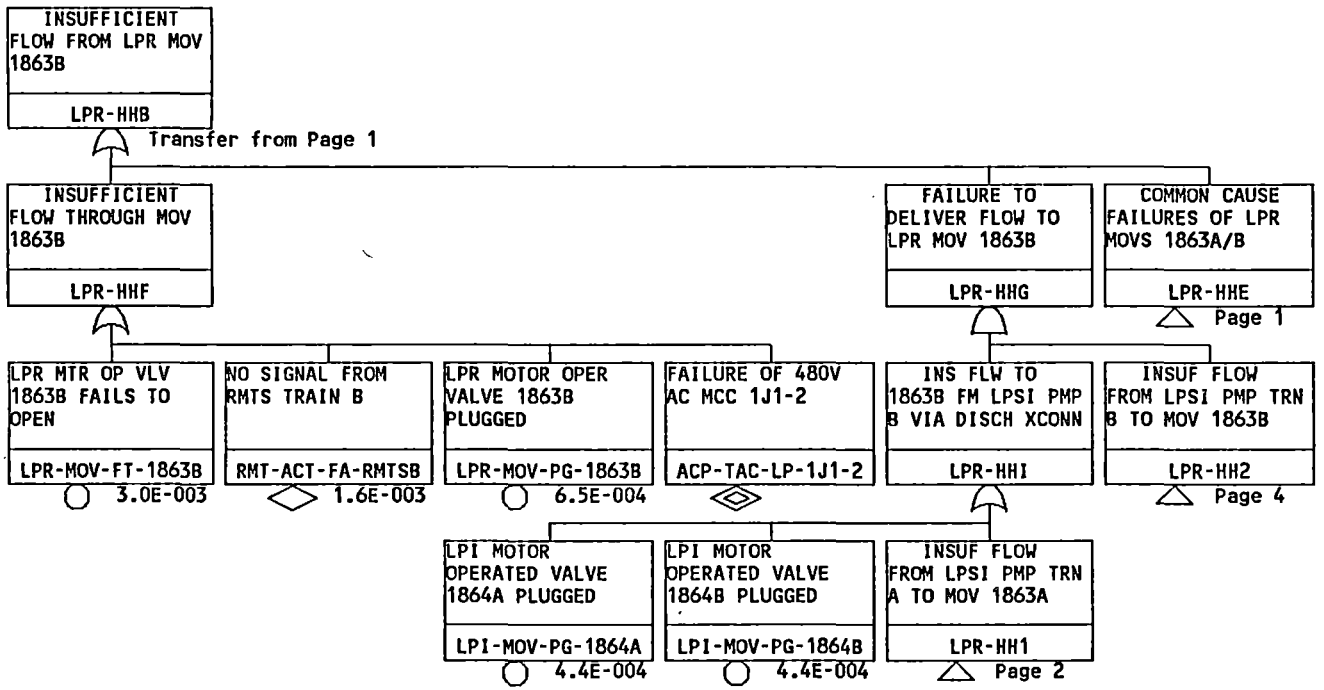
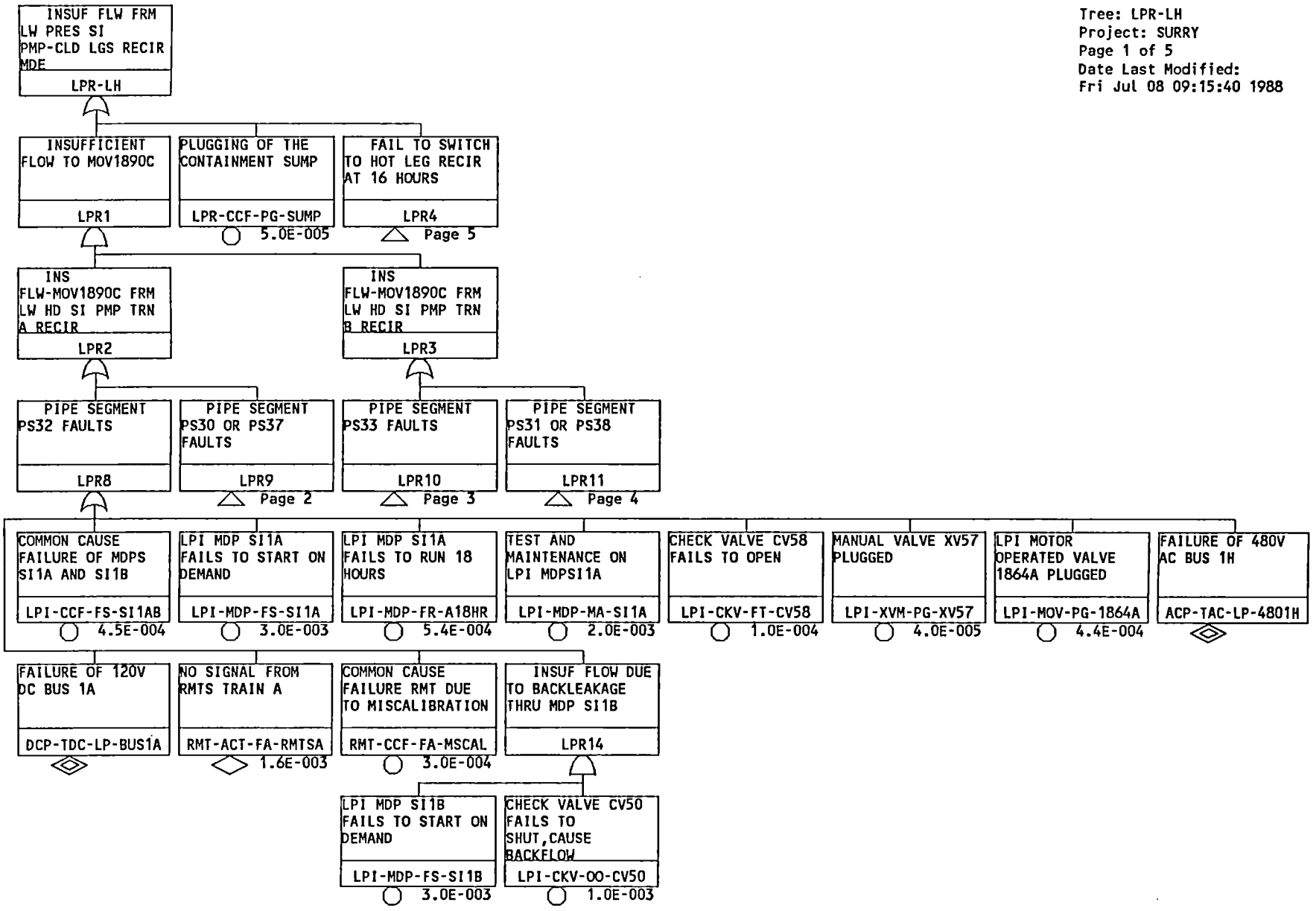

INSUFFICIENT FLOW FROM LPR MOV 1863B
LPR-HHB
Transfer from Page 1
INSUFFICIENT FLOW THROUGH MOV 1863B
LPR-HHF
FAILURE TO DELIVER FLOW TO LPR MOV 1863B
LPR-HHG
COMMON CAUSE FAILURES OF LPR MOVS 1863A/B
LPR-HHE
Page 1
LPR MTR OP VLV 1863B FAILS TO OPEN
LPR-MOV-FT-1863B
3.0E-003
NO SIGNAL FROM RMTS TRAIN B
RMT-ACT-FA-RMTSB
1.6E-003
LPR MOTOR OPER VALVE 1863B PLUGGED
LPR-MOV-PG-1863B
6.5E-004
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
INS FLW TO 1863B FM LPSI PMP B VIA DISCH XCONN
LPR-HHI
INSUF FLOW FROM LPSI PMP TRN B TO MOV 1863B
LPR-HH2
Page 4
LPI MOTOR OPERATED VALVE 1864A PLUGGED
LPI-MOV-PG-1864A
4.4E-004
LPI MOTOR OPERATED VALVE 1864B PLUGGED
LPI-MOV-PG-1864B
4.4E-004
INSUF FLOW FROM LPSI PMP TRN A TO MOV 1863A
LPR-HH1
Page 2

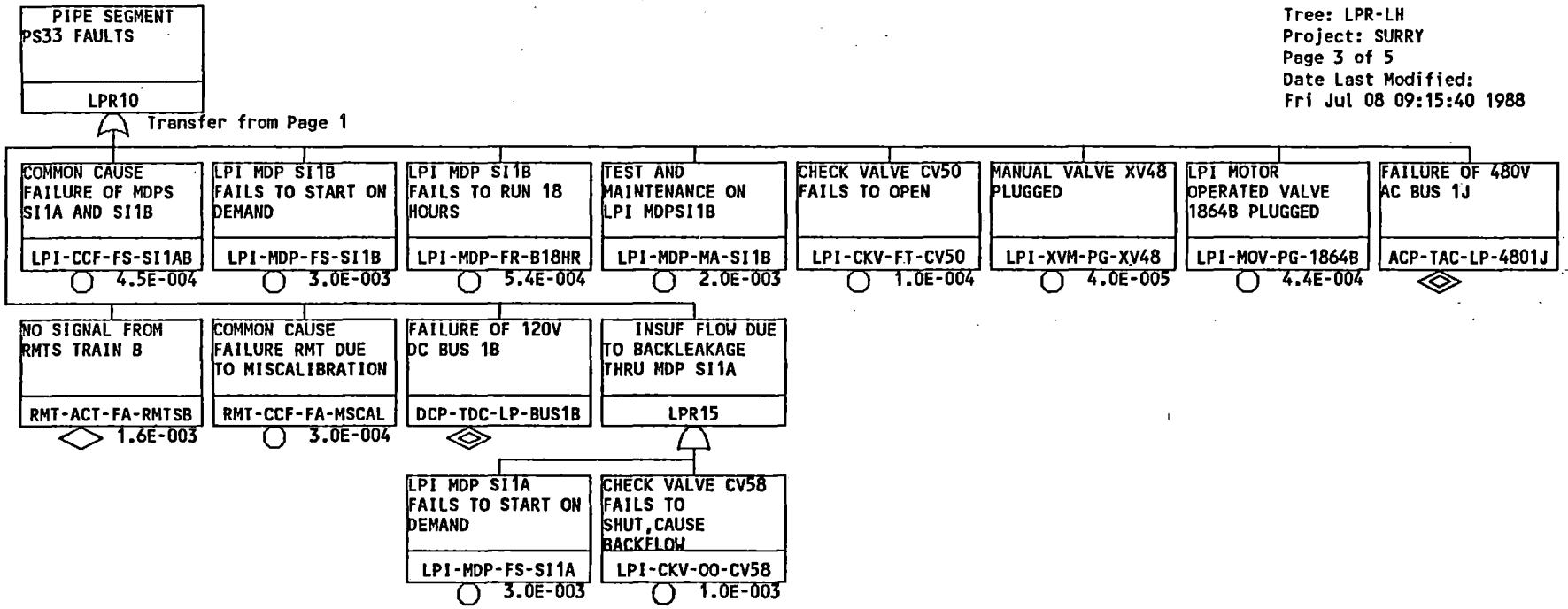

INSUF FLW FRM LW PRES SI PMP-CLD LGS RECIR MDE
LPR-LH
INSUFFICIENT FLOW TO MOV1890C
LPR1
PLUGGING OF THE CONTAINMENT SUMP
LPR-CCF-PG-SUMP
5.0E-005
FAIL TO SWITCH TO HOT LEG RECIR AT 16 HOURS
LPR4
Page 5
INS FLW-MOV1890C FRM LW HD SI PMP TRN A RECIR
LPR2
INS FLW-MOV1890C FRM LW HD SI PMP TRN B RECIR
LPR3
PIPE SEGMENT PS32 FAULTS
LPR8
PIPE SEGMENT PS30 OR PS37 FAULTS
LPR9
Page 2
PIPE SEGMENT PS33 FAULTS
LPR10
Page 3
PIPE SEGMENT PS31 OR PS38 FAULTS
LPR11
Page 4
COMMON CAUSE FAILURE OF MDPS SI1A AND SI1B
LPI-CCF-FS-SI1AB
4.5E-004
LPI MDP SI1A FAILS TO START ON DEMAND
LPI-MDP-FS-SI1A
3.0E-003
LPI MDP SI1A FAILS TO RUN 18 HOURS
LPI-MDP-FR-A18HR
5.4E-004
TEST AND MAINTENANCE ON LPI MDPSI1A
LPI-MDP-MA-SI1A
2.0E-003
CHECK VALVE CV58 FAILS TO OPEN
LPI-CKV-FT-CV58
1.0E-004
MANUAL VALVE XV57 PLUGGED
LPI-XVM-PG-XV57
4.0E-005
LPI MOTOR OPERATED VALVE 1864A PLUGGED
LPI-MOV-PG-1864A
4.4E-004
FAILURE OF 480V AC BUS 1H
ACP-TAC-LP-4801H
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
NO SIGNAL FROM RMTS TRAIN A
RMT-ACT-FA-RMTSA
1.6E-003
COMMON CAUSE FAILURE RMT DUE TO MISCALIBRATION
RMT-CCF-FA-MSCAL
3.0E-004
INSUF FLOW DUE TO BACKLEAKAGE THRU MDP SI1B
LPR14
LPI MDP SI1B FAILS TO START ON DEMAND
LPI-MDP-FS-SI1B
3.0E-003
CHECK VALVE CV50 FAILS TO SHUT,CAUSE BACKFLOW
LPI-CKV-OO-CV50
1.0E-003

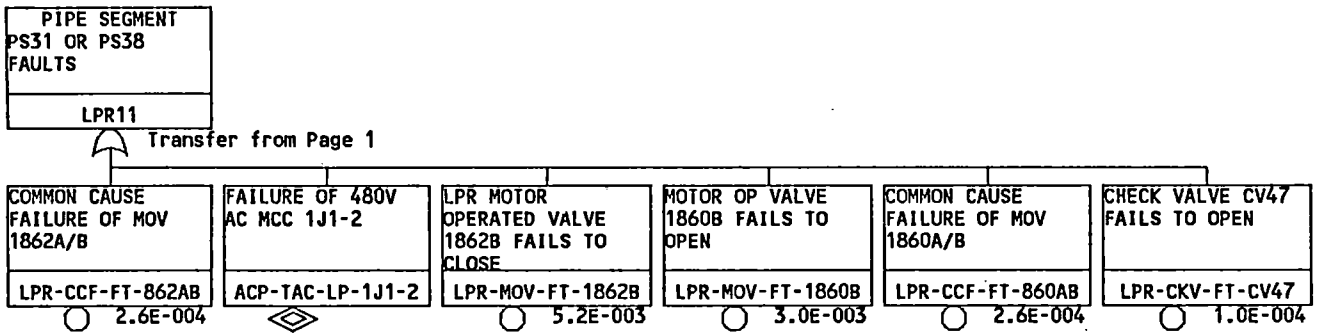
PIPE SEGMENT
PS30 OR PS37
FAULTS

LPR9

Transfer from Page 1

COMMON CAUSE FAILURE OF MOV 1862A/B	FAILURE OF 480V AC MCC 1H1-2	LPR MOTOR OPERATED VALVE 1862A FAILS TO CLOSE	LPR-MOV-1860A FAILS TO OPEN	COMMON CAUSE FAILURE OF MOV 1860A/B	CHECK VALVE CV56 FAILS TO OPEN
LPR-CCF-FT-862AB	ACP-TAC-LP-1H1-2	LPR-MOV-FT-1862A	LPR-MOV-FT-1860A	LPR-CCF-FT-860AB	LPR-CKV-FT-CV56
2.6E-004		5.2E-003	3.0E-003	2.6E-004	1.0E-004


PIPE SEGMENT PS33 FAULTS
LPR10
Transfer from Page 1
COMMON CAUSE FAILURE OF MDPS SI1A AND SI1B
LPI-CCF-FS-SI1AB
4.5E-004
LPI MDP SI1B FAILS TO START ON DEMAND
LPI-MDP-FS-SI1B
3.0E-003
LPI MDP SI1B FAILS TO RUN 18 HOURS
LPI-MDP-FR-B18HR
5.4E-004
TEST AND MAINTENANCE ON LPI MDPSI1B
LPI-MDP-MA-SI1B
2.0E-003
CHECK VALVE CV50 FAILS TO OPEN
LPI-CKV-FT-CV50
1.0E-004
MANUAL VALVE XV48 PLUGGED
LPI-XVM-PG-XV48
4.0E-005
LPI MOTOR OPERATED VALVE 1864B PLUGGED
LPI-MOV-PG-1864B
4.4E-004
FAILURE OF 480V AC BUS 1J
ACP-TAC-LP-4801J
NO SIGNAL FROM RMTS TRAIN B
RMT-ACT-FA-RMTSB
1.6E-003
COMMON CAUSE FAILURE RMT DUE TO MISCALIBRATION
RMT-CCF-FA-MSCAL
3.0E-004
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
INSUF FLOW DUE TO BACKLEAKAGE THRU MDP SI1A
LPR15
LPI MDP SI1A FAILS TO START ON DEMAND
LPI-MDP-FS-SI1A
3.0E-003
CHECK VALVE CV58 FAILS TO SHUT,CAUSE BACKFLOW
LPI-CKV-00-CV58
1.0E-003



Tree: LPR-LH
Project: SURRY
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Date Last Modified:
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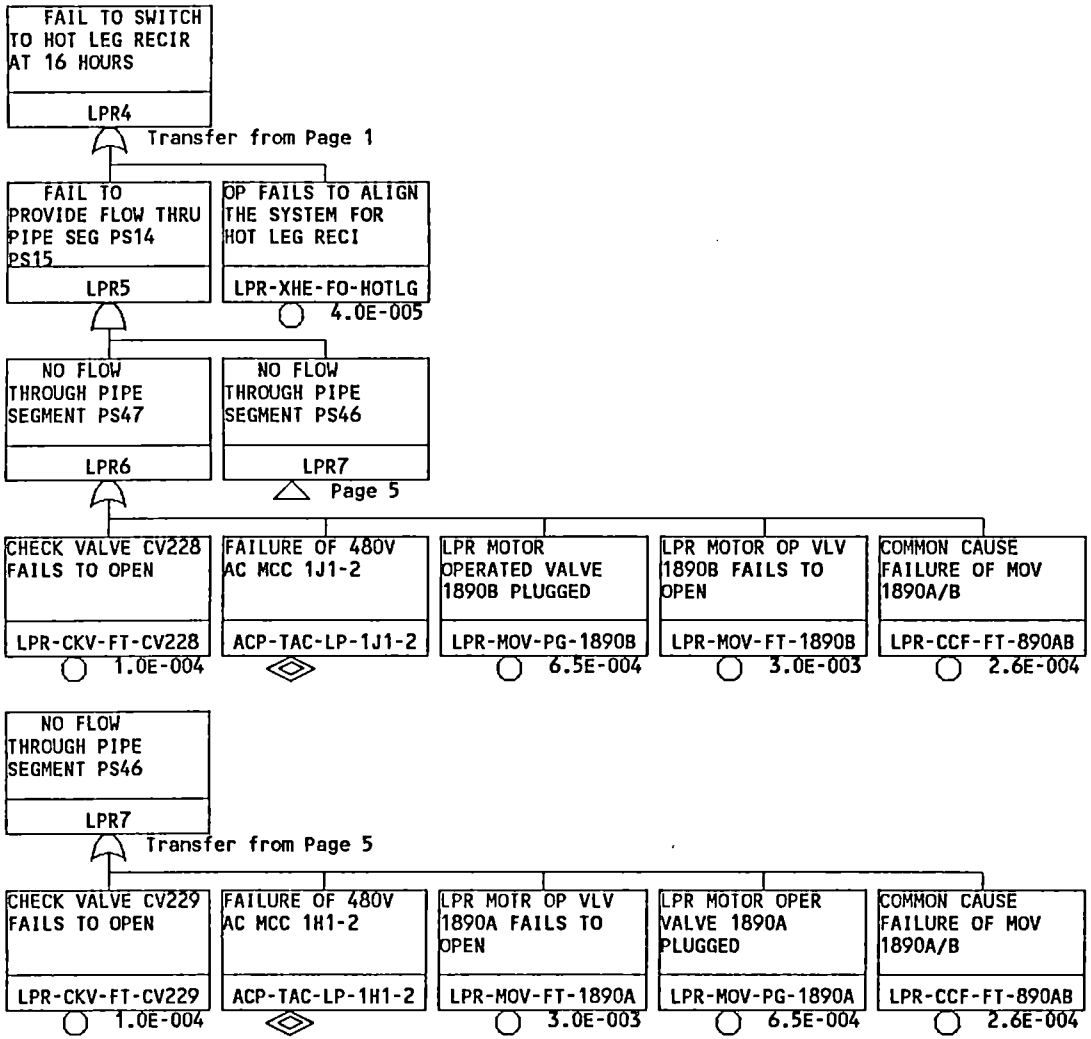
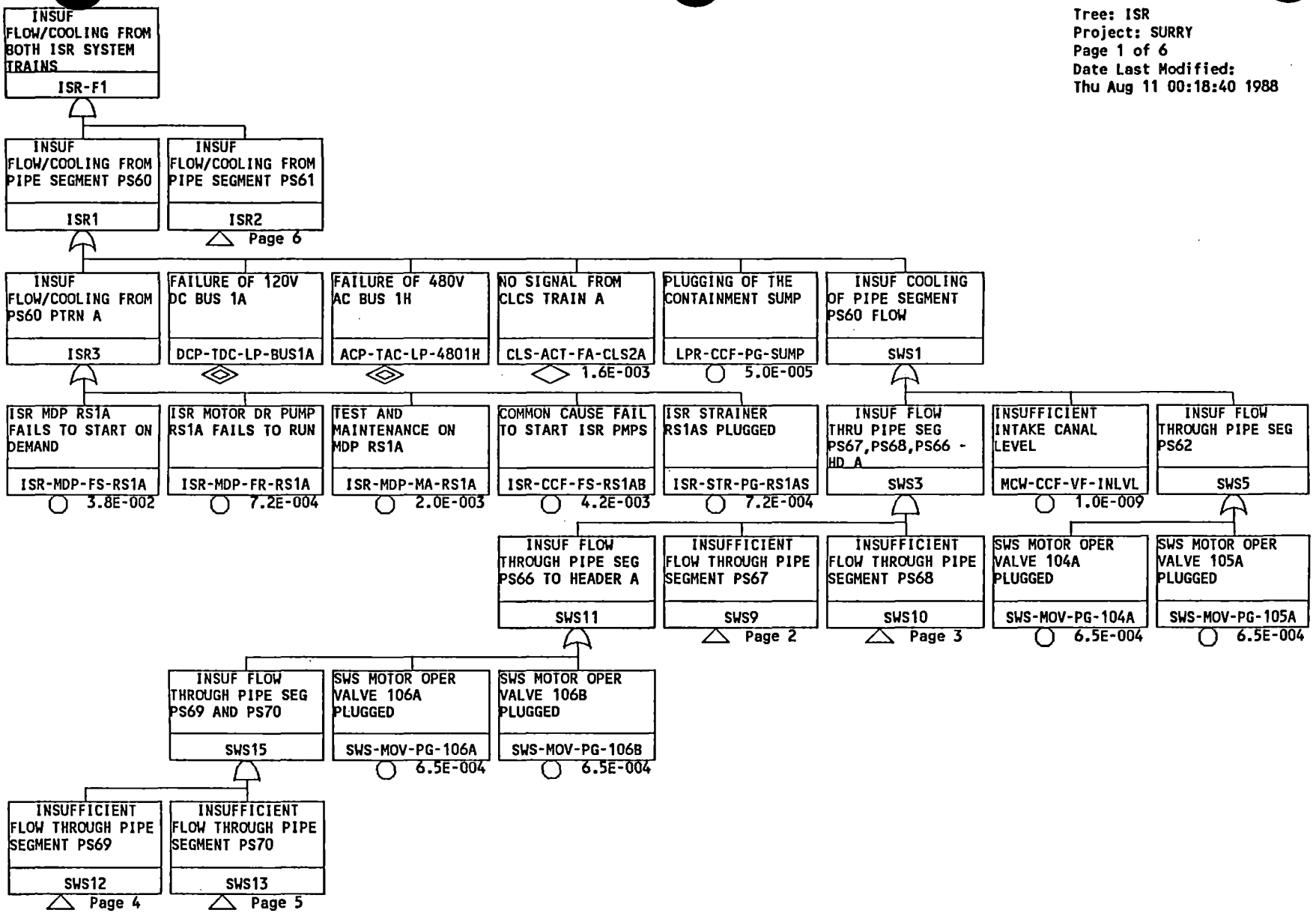

FAIL TO SWITCH TO HOT LEG RECIR AT 16 HOURS
LPR4
Transfer from Page 1
FAIL TO PROVIDE FLOW THRU PIPE SEG PS14 PS15
LPR5
OP FAILS TO ALIGN THE SYSTEM FOR HOT LEG RECI
LPR-XHE-FO-HOTLG
4.0E-005
NO FLOW THROUGH PIPE SEGMENT PS47
LPR6
NO FLOW THROUGH PIPE SEGMENT PS46
LPR7
Page 5
CHECK VALVE CV228 FAILS TO OPEN
LPR-CKV-FT-CV228
1.0E-004
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
LPR MOTOR OPERATED VALVE 1890B PLUGGED
LPR-MOV-PG-1890B
6.5E-004
LPR MOTOR OP VLV 1890B FAILS TO OPEN
LPR-MOV-FT-1890B
3.0E-003
COMMON CAUSE FAILURE OF MOV 1890A/B
LPR-CCF-FT-890AB
2.6E-004
NO FLOW THROUGH PIPE SEGMENT PS46
LPR7
Transfer from Page 5
CHECK VALVE CV229 FAILS TO OPEN
LPR-CKV-FT-CV229
1.0E-004
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
LPR MOTR OP VLV 1890A FAILS TO OPEN
LPR-MOV-FT-1890A
3.0E-003
LPR MOTOR OPER VALVE 1890A PLUGGED
LPR-MOV-PG-1890A
6.5E-004
COMMON CAUSE FAILURE OF MOV 1890A/B
LPR-CCF-FT-890AB
2.6E-004



Tree: ISR
Project: SURRY
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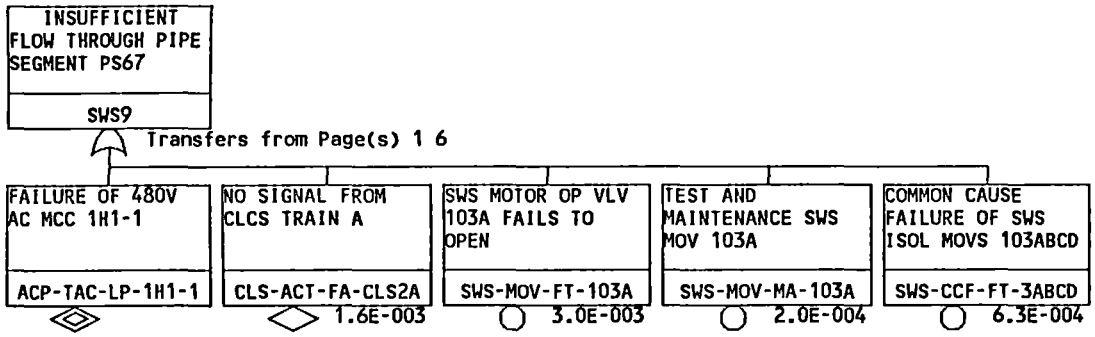
Date Last Modified:
Thu Aug 11 00:18:40 1988



Tree: ISR
Project: SURRY
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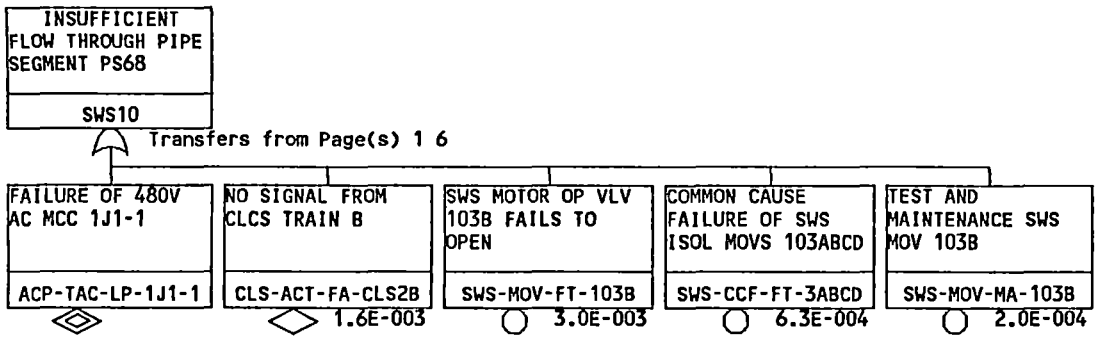
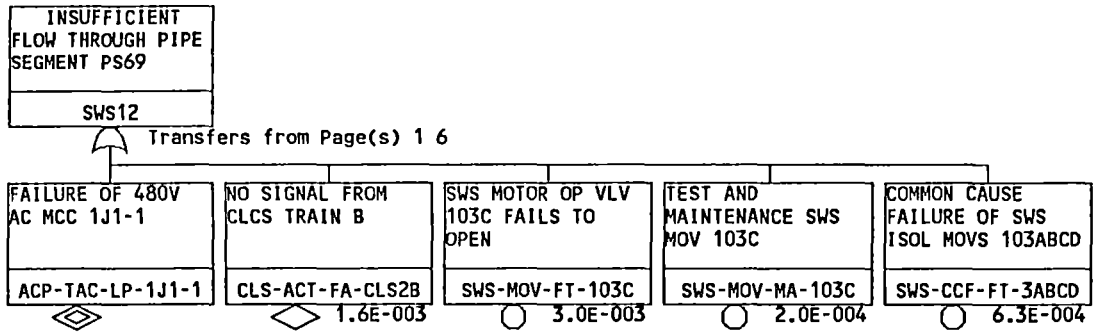
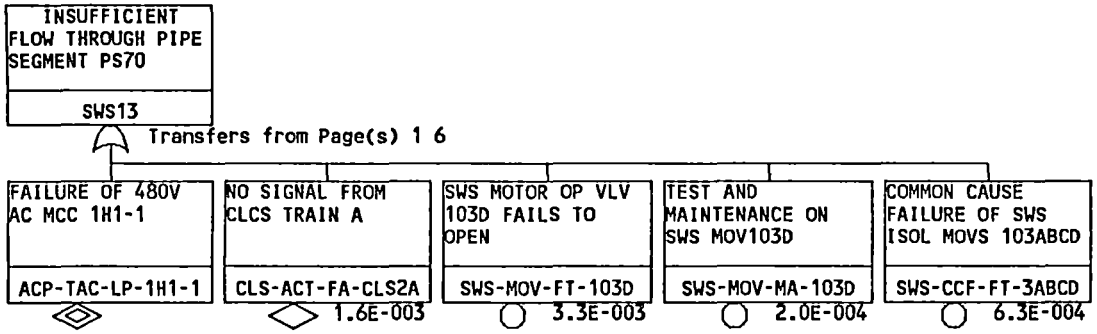

INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS68
SWS10
Transfers from Page(s) 1 6
FAILURE OF 480V AC MCC 1J1-1
ACP-TAC-LP-1J1-1
NO SIGNAL FROM CLCS TRAIN B
CLS-ACT-FA-CLS2B
1.6E-003
SWS MOTOR OP VLV 103B FAILS TO OPEN
SWS-MOV-FT-103B
3.0E-003
COMMON CAUSE FAILURE OF SWS ISOL MOVS 103ABCD
SWS-CCF-FT-3ABCD
6.3E-004
TEST AND MAINTENANCE SWS MOV 103B
SWS-MOV-MA-103B
2.0E-004


INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS69
SWS12
Transfers from Page(s) 1 6
FAILURE OF 480V AC MCC 1J1-1
ACP-TAC-LP-1J1-1
NO SIGNAL FROM CLCS TRAIN B
CLS-ACT-FA-CLS2B
1.6E-003
SWS MOTOR OP VLV 103C FAILS TO OPEN
SWS-MOV-FT-103C
3.0E-003
TEST AND MAINTENANCE SWS MOV 103C
SWS-MOV-MA-103C
2.0E-004
COMMON CAUSE FAILURE OF SWS ISOL MOVS 103ABCD
SWS-CCF-FT-3ABCD
6.3E-004



Tree: ISR
Project: SURRY
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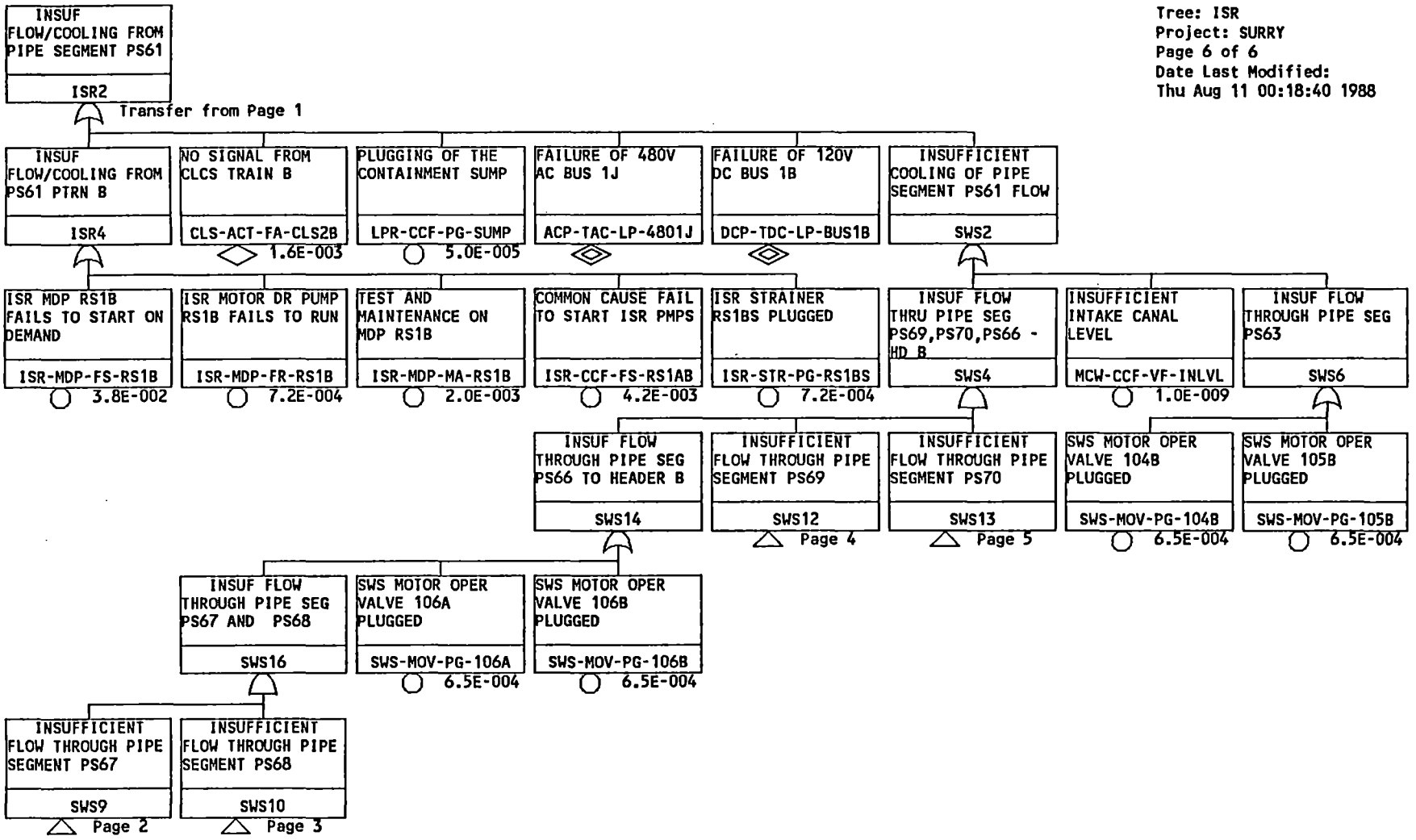
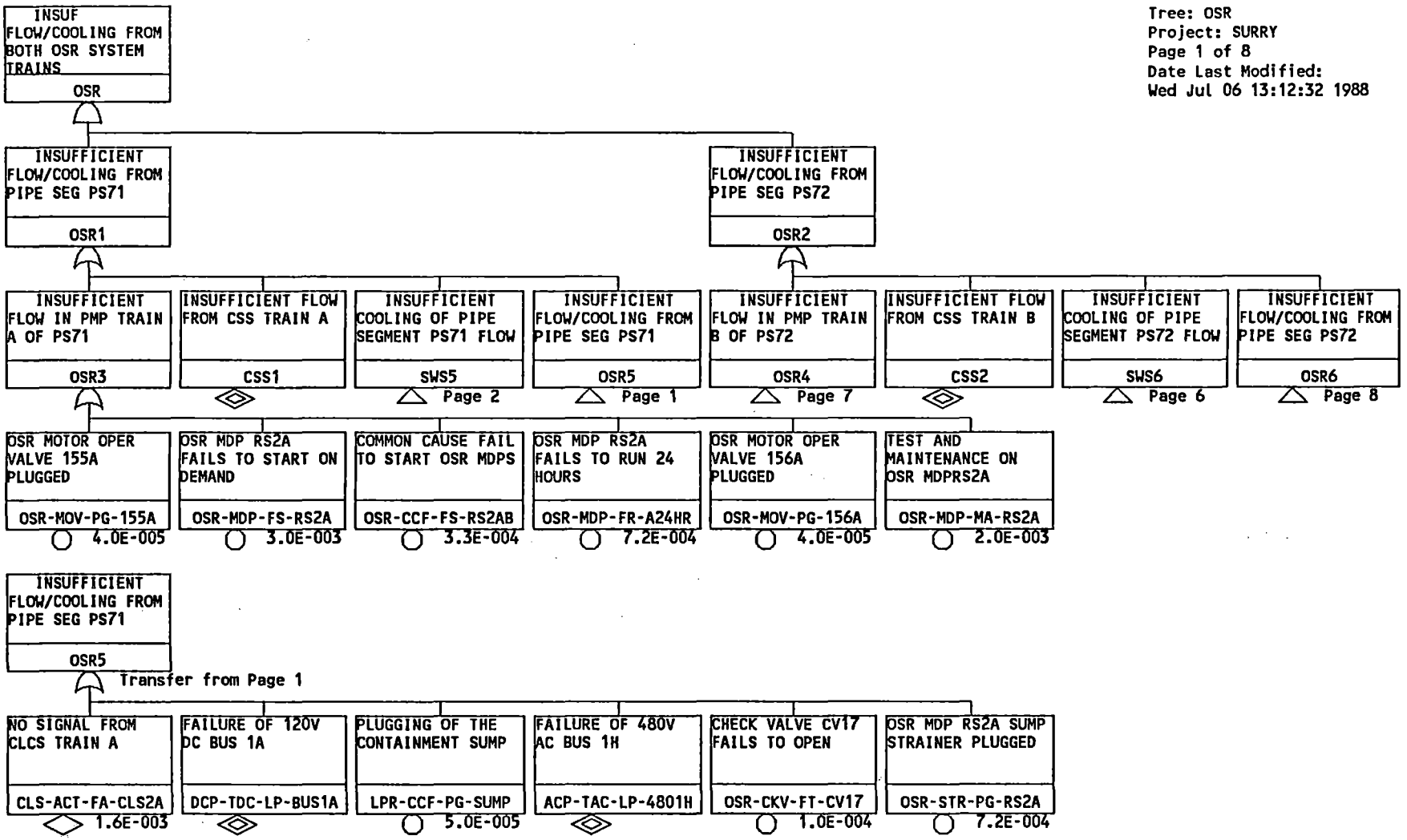

INSUF FLOW/COOLING FROM PIPE SEGMENT PS61
ISR2
Transfer from Page 1
INSUF FLOW/COOLING FROM PS61 PTRN B
ISR4
NO SIGNAL FROM CLCS TRAIN B
CLS-ACT-FA-CLS2B
1.6E-003
PLUGGING OF THE CONTAINMENT SUMP
LPR-CCF-PG-SUMP
5.0E-005
FAILURE OF 480V AC BUS 1J
ACP-TAC-LP-4801J
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
INSUFFICIENT COOLING OF PIPE SEGMENT PS61 FLOW
SWS2
ISR MDP RS1B FAILS TO START ON DEMAND
ISR-MDP-FS-RS1B
3.8E-002
ISR MOTOR DR PUMP RS1B FAILS TO RUN
ISR-MDP-FR-RS1B
7.2E-004
TEST AND MAINTENANCE ON MDP RS1B
ISR-MDP-MA-RS1B
2.0E-003
COMMON CAUSE FAIL TO START ISR PMPS
ISR-CCF-FS-RS1AB
4.2E-003
ISR STRAINER RS1BS PLUGGED
ISR-STR-PG-RS1BS
7.2E-004
INSUF FLOW THRU PIPE SEG PS69,PS70,PS66 - HD B
SWS4
INSUFFICIENT INTAKE CANAL LEVEL
MCW-CCF-VF-INLVL
1.0E-009
INSUF FLOW THROUGH PIPE SEG PS63
SWS6
INSUF FLOW THROUGH PIPE SEG PS66 TO HEADER B
SWS14
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS69
SWS12
Page 4
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS70
SWS13
Page 5
SWS MOTOR OPER VALVE 104B PLUGGED
SWS-MOV-PG-104B
6.5E-004
SWS MOTOR OPER VALVE 105B PLUGGED
SWS-MOV-PG-105B
6.5E-004
INSUF FLOW THROUGH PIPE SEG PS67 AND PS68
SWS16
SWS MOTOR OPER VALVE 106A PLUGGED
SWS-MOV-PG-106A
6.5E-004
SWS MOTOR OPER VALVE 106B PLUGGED
SWS-MOV-PG-106B
6.5E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS67
SWS9
Page 2
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS68
SWS10
Page 3


INSUF FLOW/COOLING FROM BOTH OSR SYSTEM TRAINS
OSR
Tree: OSR
Project: SURRY
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Date Last Modified:
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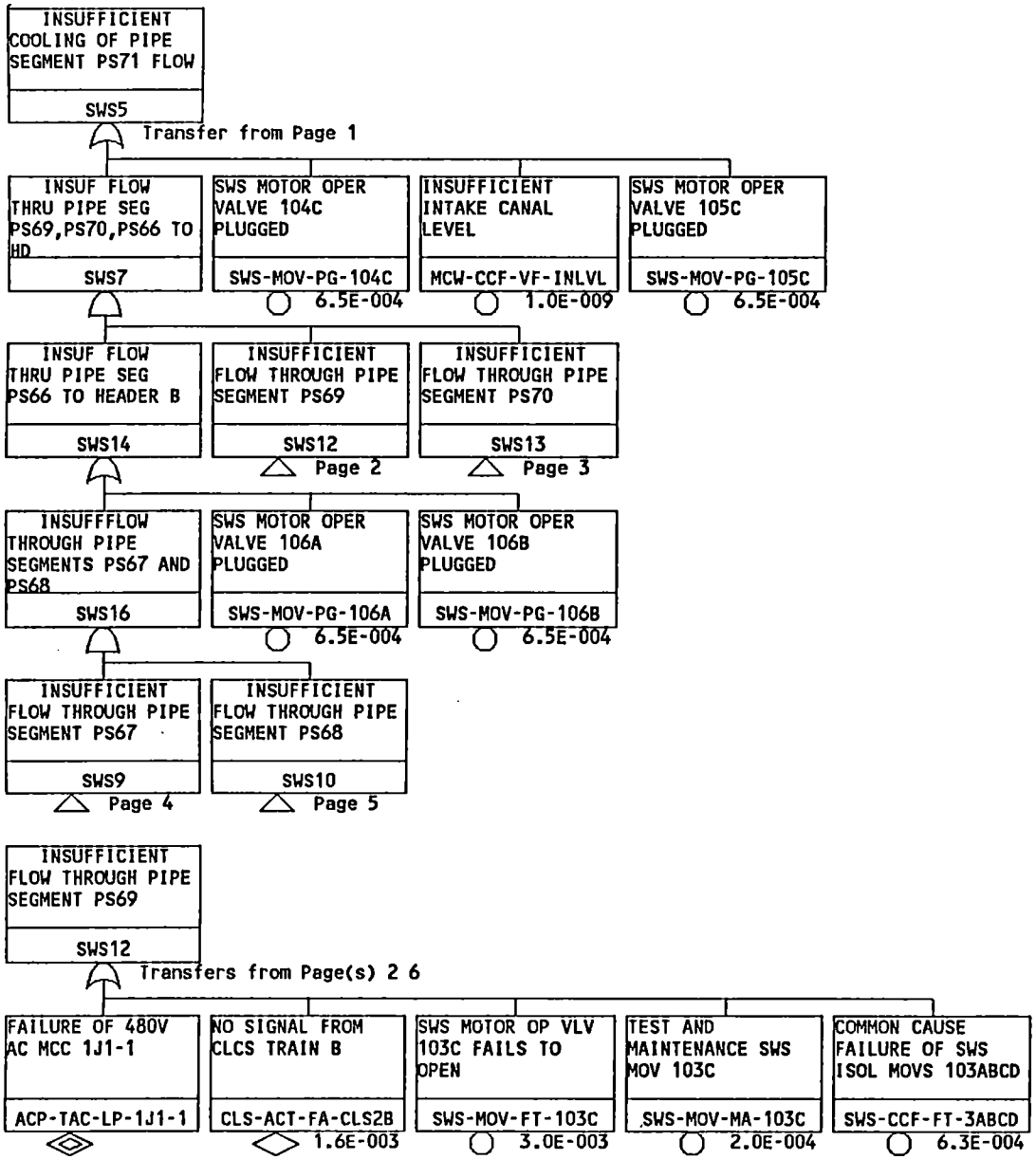
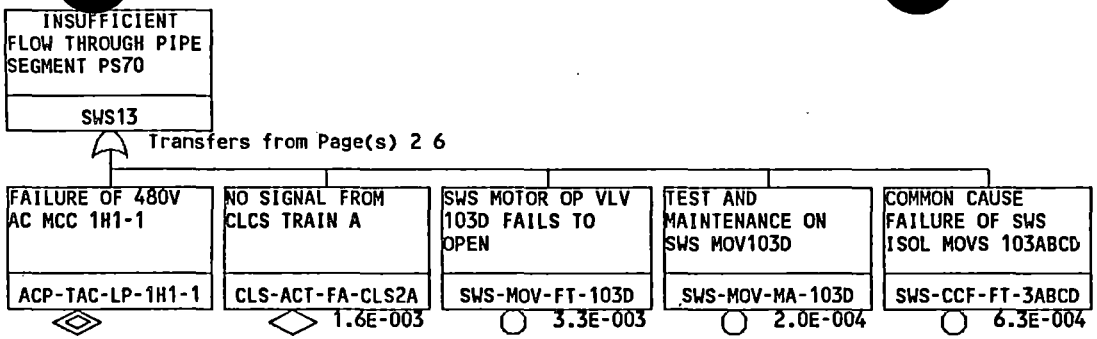
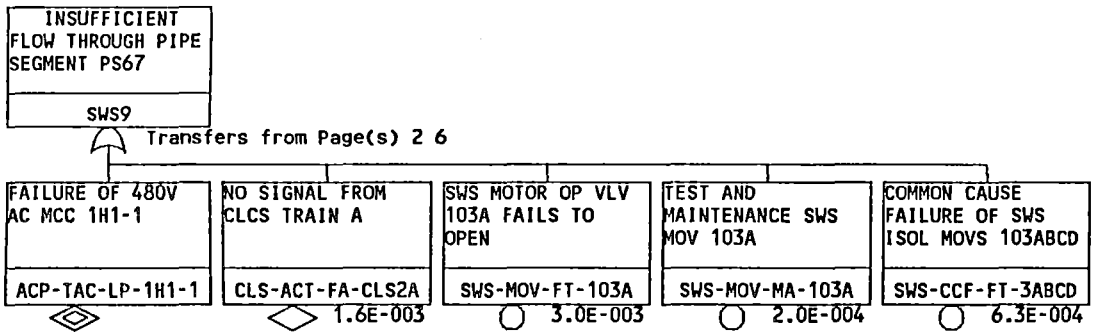
INSUFFICIENT FLOW/COOLING FROM PIPE SEG PS71
OSR1
INSUFFICIENT FLOW/COOLING FROM PIPE SEG PS72
OSR2
INSUFFICIENT FLOW IN PMP TRAIN A OF PS71
OSR3
INSUFFICIENT FLOW FROM CSS TRAIN A
CSS1
INSUFFICIENT COOLING OF PIPE SEGMENT PS71 FLOW
SWS5
Page 2
INSUFFICIENT FLOW/COOLING FROM PIPE SEG PS71
OSR5
Page 1
INSUFFICIENT FLOW IN PMP TRAIN B OF PS72
OSR4
Page 7
INSUFFICIENT FLOW FROM CSS TRAIN B
CSS2
INSUFFICIENT COOLING OF PIPE SEGMENT PS72 FLOW
SWS6
Page 6
INSUFFICIENT FLOW/COOLING FROM PIPE SEG PS72
OSR6
Page 8
OSR MOTOR OPER VALVE 155A PLUGGED
OSR-MOV-PG-155A
4.0E-005
OSR MDP RS2A FAILS TO START ON DEMAND
OSR-MDP-FS-RS2A
3.0E-003
COMMON CAUSE FAIL TO START OSR MDPS
OSR-CCF-FS-RS2AB
3.3E-004
OSR MDP RS2A FAILS TO RUN 24 HOURS
OSR-MDP-FR-A24HR
7.2E-004
OSR MOTOR OPER VALVE 156A PLUGGED
OSR-MOV-PG-156A
4.0E-005
TEST AND MAINTENANCE ON OSR MDPRS2A
OSR-MDP-MA-RS2A
2.0E-003
INSUFFICIENT FLOW/COOLING FROM PIPE SEG PS71
OSR5
Transfer from Page 1
NO SIGNAL FROM CLCS TRAIN A
CLS-ACT-FA-CLS2A
1.6E-003
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
PLUGGING OF THE CONTAINMENT SUMP
LPR-CCF-PG-SUMP
5.0E-005
FAILURE OF 480V AC BUS 1H
ACP-TAC-LP-4801H
CHECK VALVE CV17 FAILS TO OPEN
OSR-CKV-FT-CV17
1.0E-004
OSR MDP RS2A SUMP STRAINER PLUGGED
OSR-STR-PG-RS2A
7.2E-004


INSUFFICIENT COOLING OF PIPE SEGMENT PS71 FLOW
SWS5
Transfer from Page 1
INSUF FLOW THRU PIPE SEG PS69,PS70,PS66 TO HD
SWS7
SWS MOTOR OPER VALVE 104C PLUGGED
SWS-MOV-PG-104C
6.5E-004
INSUFFICIENT INTAKE CANAL LEVEL
MCW-CCF-VF-INLVL
1.0E-009
SWS MOTOR OPER VALVE 105C PLUGGED
SWS-MOV-PG-105C
6.5E-004
INSUF FLOW THRU PIPE SEG PS66 TO HEADER B
SWS14
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS69
SWS12
Page 2
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS70
SWS13
Page 3
INSUFFFLOW THROUGH PIPE SEGMENTS PS67 AND PS68
SWS16
SWS MOTOR OPER VALVE 106A PLUGGED
SWS-MOV-PG-106A
6.5E-004
SWS MOTOR OPER VALVE 106B PLUGGED
SWS-MOV-PG-106B
6.5E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS67
SWS9
Page 4
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS68
SWS10
Page 5
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS69
SWS12
Transfers from Page(s) 2 6
FAILURE OF 480V AC MCC 1J1-1
ACP-TAC-LP-1J1-1
NO SIGNAL FROM CLCS TRAIN B
CLS-ACT-FA-CLS2B
1.6E-003
SWS MOTOR OP VLV 103C FAILS TO OPEN
SWS-MOV-FT-103C
3.0E-003
TEST AND MAINTENANCE SWS MOV 103C
SWS-MOV-MA-103C
2.0E-004
COMMON CAUSE FAILURE OF SWS ISOL MOVS 103ABCD
SWS-CCF-FT-3ABCD
6.3E-004


INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS70
SWS13
Transfers from Page(s) 2 6
FAILURE OF 480V AC MCC 1H1-1
ACP-TAC-LP-1H1-1
NO SIGNAL FROM CLCS TRAIN A
CLS-ACT-FA-CLS2A
1.6E-003
SWS MOTOR OP VLV 103D FAILS TO OPEN
SWS-MOV-FT-103D
3.3E-003
TEST AND MAINTENANCE ON SWS MOV103D
SWS-MOV-MA-103D
2.0E-004
COMMON CAUSE FAILURE OF SWS ISOL MOVS 103ABCD
SWS-CCF-FT-3ABCD
6.3E-004



Tree: OSR
Project: SURRY
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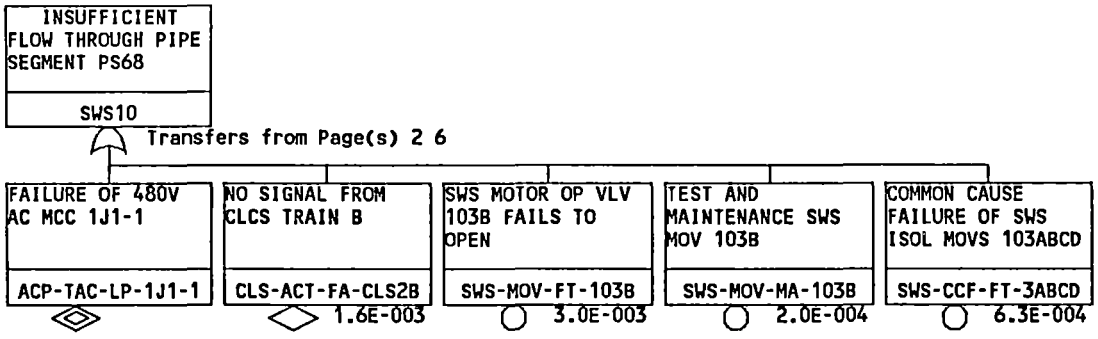
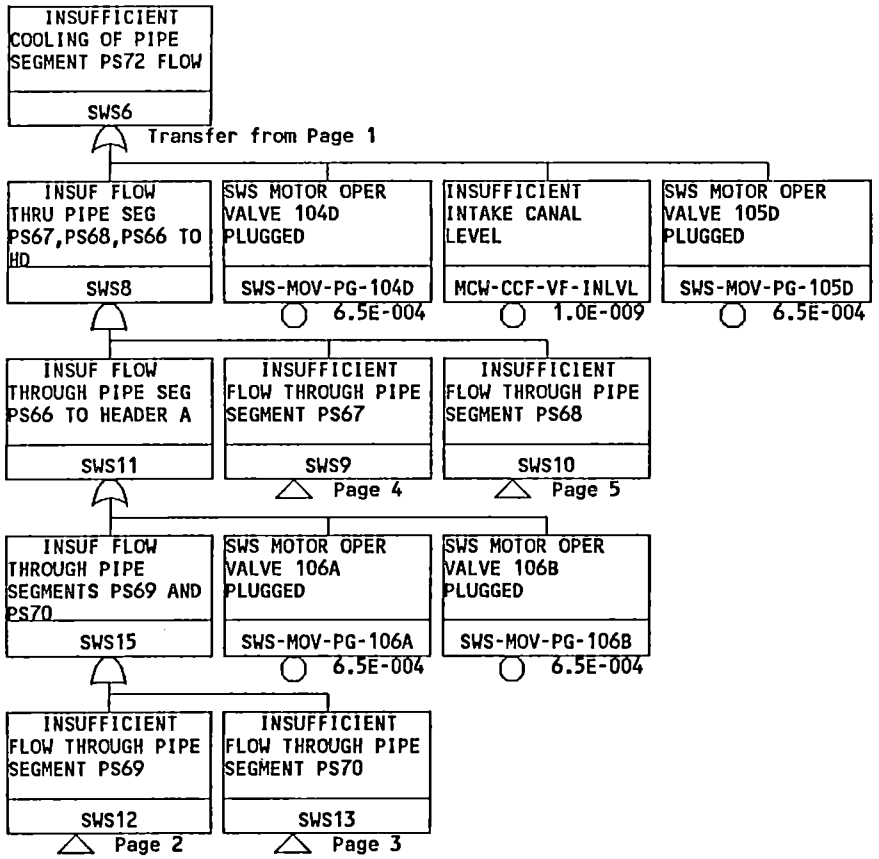
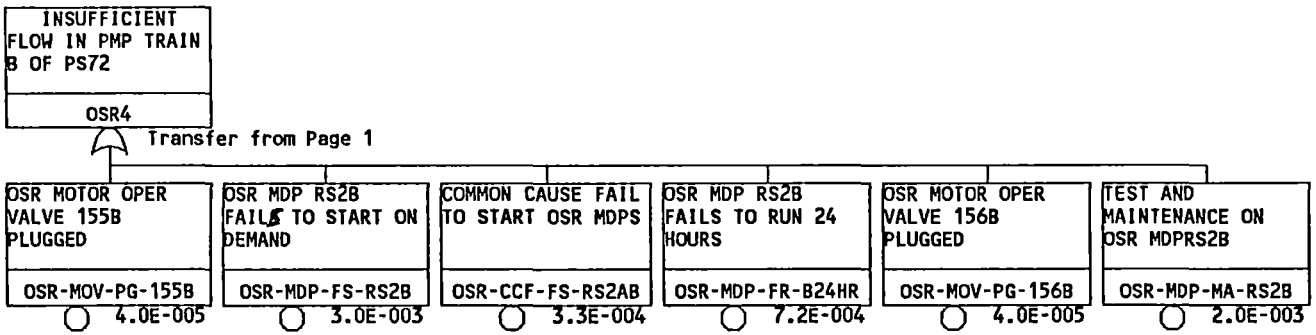
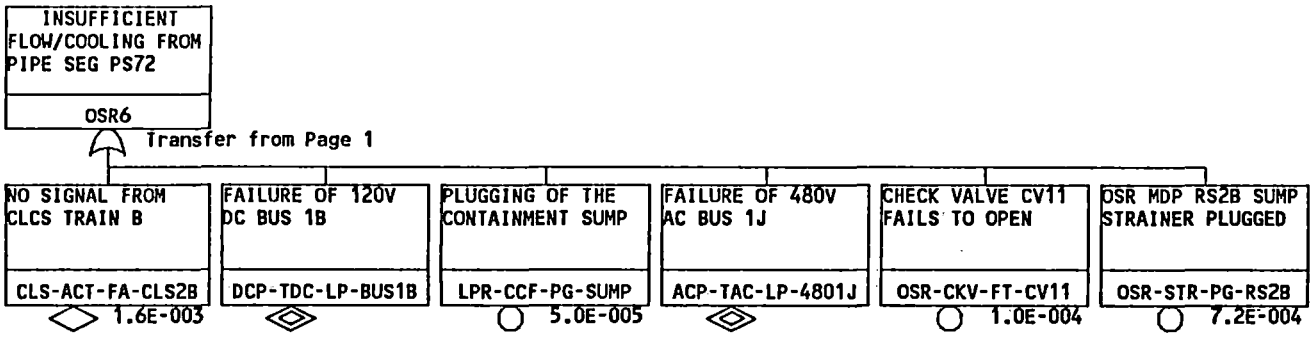
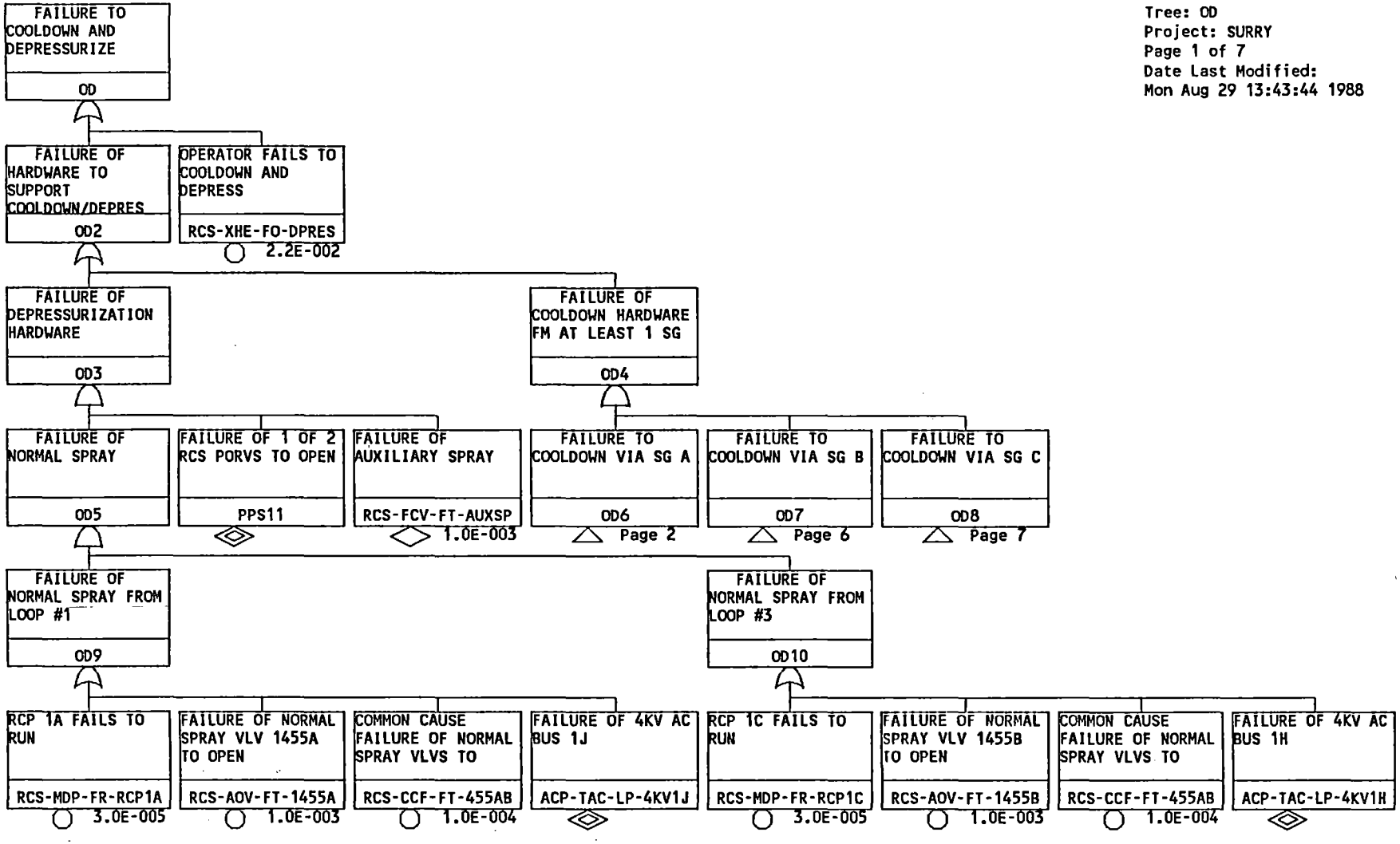

INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS68
SWS10
Transfers from Page(s) 2 6
FAILURE OF 480V AC MCC 1J1-1
ACP-TAC-LP-1J1-1
NO SIGNAL FROM CLCS TRAIN B
CLS-ACT-FA-CLS2B
1.6E-003
SWS MOTOR OP VLV 103B FAILS TO OPEN
SWS-MOV-FT-103B
3.0E-003
TEST AND MAINTENANCE SWS MOV 103B
SWS-MOV-MA-103B
2.0E-004
COMMON CAUSE FAILURE OF SWS ISOL MOVS 103ABCD
SWS-CCF-FT-3ABCD
6.3E-004


INSUFFICIENT COOLING OF PIPE SEGMENT PS72 FLOW
SWS6
Transfer from Page 1
INSUF FLOW THRU PIPE SEG PS67,PS68,PS66 TO HD
SWS8
SWS MOTOR OPER VALVE 104D PLUGGED
SWS-MOV-PG-104D
6.5E-004
INSUFFICIENT INTAKE CANAL LEVEL
MCW-CCF-VF-INLVL
1.0E-009
SWS MOTOR OPER VALVE 105D PLUGGED
SWS-MOV-PG-105D
6.5E-004
INSUF FLOW THROUGH PIPE SEG PS66 TO HEADER A
SWS11
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS67
SWS9
Page 4
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS68
SWS10
Page 5
INSUF FLOW THROUGH PIPE SEGMENTS PS69 AND PS70
SWS15
SWS MOTOR OPER VALVE 106A PLUGGED
SWS-MOV-PG-106A
6.5E-004
SWS MOTOR OPER VALVE 106B PLUGGED
SWS-MOV-PG-106B
6.5E-004
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS69
SWS12
Page 2
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS70
SWS13
Page 3


INSUFFICIENT FLOW IN PMP TRAIN B OF PS72
OSR4
Transfer from Page 1
OSR MOTOR OPER VALVE 155B PLUGGED
OSR-MOV-PG-155B
4.0E-005
OSR MDP RS2B FAILS TO START ON DEMAND
OSR-MDP-FS-RS2B
3.0E-003
COMMON CAUSE FAIL TO START OSR MDPS
OSR-CCF-FS-RS2AB
3.3E-004
OSR MDP RS2B FAILS TO RUN 24 HOURS
OSR-MDP-FR-B24HR
7.2E-004
OSR MOTOR OPER VALVE 156B PLUGGED
OSR-MOV-PG-156B
4.0E-005
TEST AND MAINTENANCE ON OSR MDPRS2B
OSR-MDP-MA-RS2B
2.0E-003


INSUFFICIENT FLOW/COOLING FROM PIPE SEG PS72
OSR6
Transfer from Page 1
NO SIGNAL FROM CLCS TRAIN B
CLS-ACT-FA-CLS2B
1.6E-003
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
PLUGGING OF THE CONTAINMENT SUMP
LPR-CCF-PG-SUMP
5.0E-005
FAILURE OF 480V AC BUS 1J
ACP-TAC-LP-4801J
CHECK VALVE CV11 FAILS TO OPEN
OSR-CKV-FT-CV11
1.0E-004
OSR MDP RS2B SUMP STRAINER PLUGGED
OSR-STR-PG-RS2B
7.2E-004



Tree: OD
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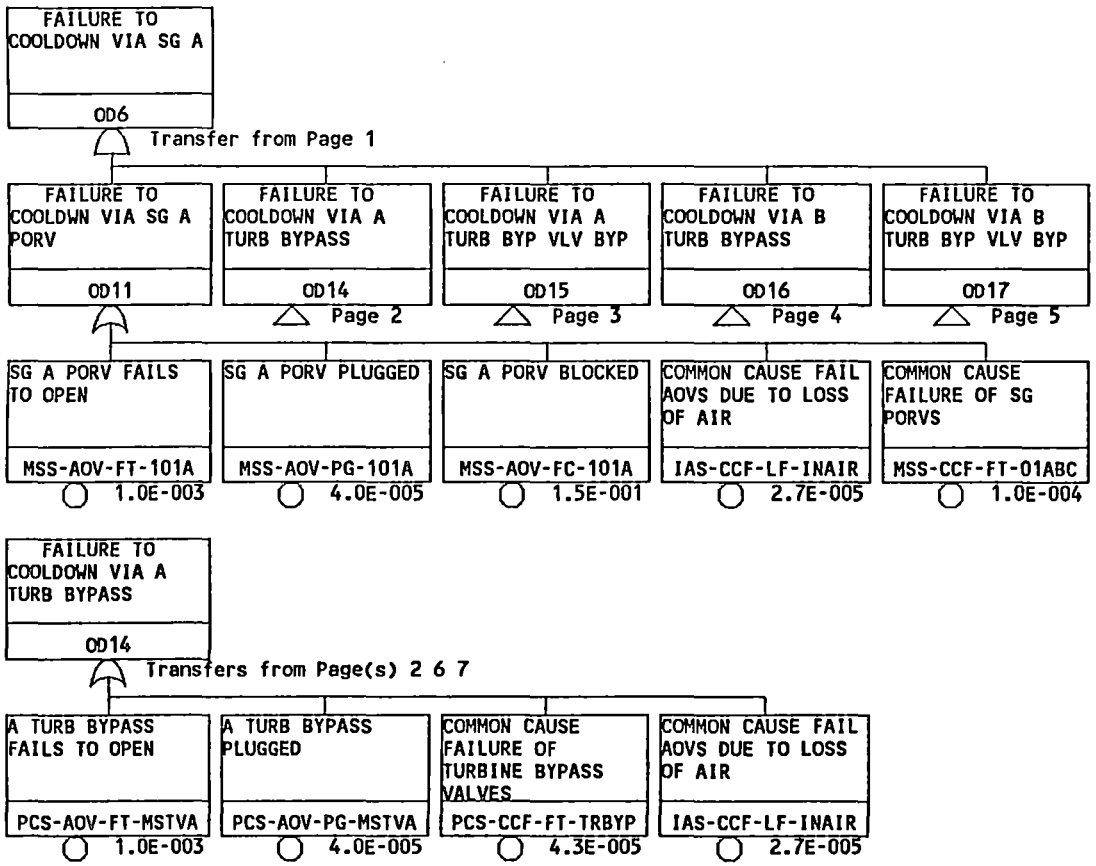
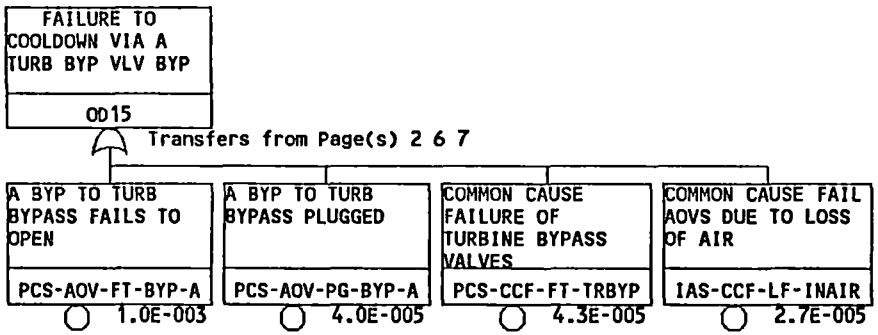

FAILURE TO COOLDOWN VIA SG A
OD6
Transfer from Page 1
FAILURE TO COOLDWN VIA SG A PORV
OD11
FAILURE TO COOLDOWN VIA A TURB BYPASS
OD14
Page 2
FAILURE TO COOLDOWN VIA A TURB BYP VLV BYP
OD15
Page 3
FAILURE TO COOLDOWN VIA B TURB BYPASS
OD16
Page 4
FAILURE TO COOLDOWN VIA B TURB BYP VLV BYP
OD17
Page 5
SG A PORV FAILS TO OPEN
MSS-AOV-FT-101A
1.0E-003
SG A PORV PLUGGED
MSS-AOV-PG-101A
4.0E-005
SG A PORV BLOCKED
MSS-AOV-FC-101A
1.5E-001
COMMON CAUSE FAIL AOVS DUE TO LOSS OF AIR
IAS-CCF-LF-INAIR
2.7E-005
COMMON CAUSE FAILURE OF SG PORVS
MSS-CCF-FT-01ABC
1.0E-004
FAILURE TO COOLDOWN VIA A TURB BYPASS
OD14
Transfers from Page(s) 2 6 7
A TURB BYPASS FAILS TO OPEN
PCS-AOV-FT-MSTVA
1.0E-003
A TURB BYPASS PLUGGED
PCS-AOV-PG-MSTVA
4.0E-005
COMMON CAUSE FAILURE OF TURBINE BYPASS VALVES
PCS-CCF-FT-TRBYP
4.3E-005
COMMON CAUSE FAIL AOVS DUE TO LOSS OF AIR
IAS-CCF-LF-INAIR
2.7E-005



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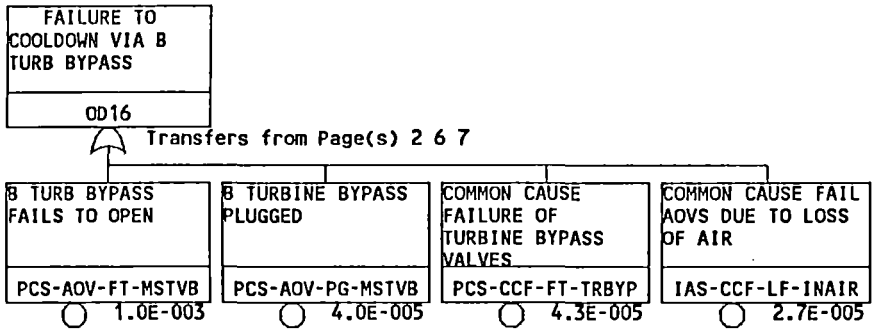

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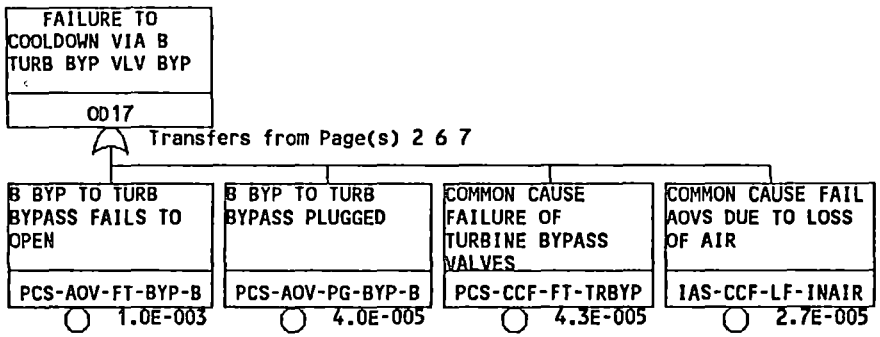
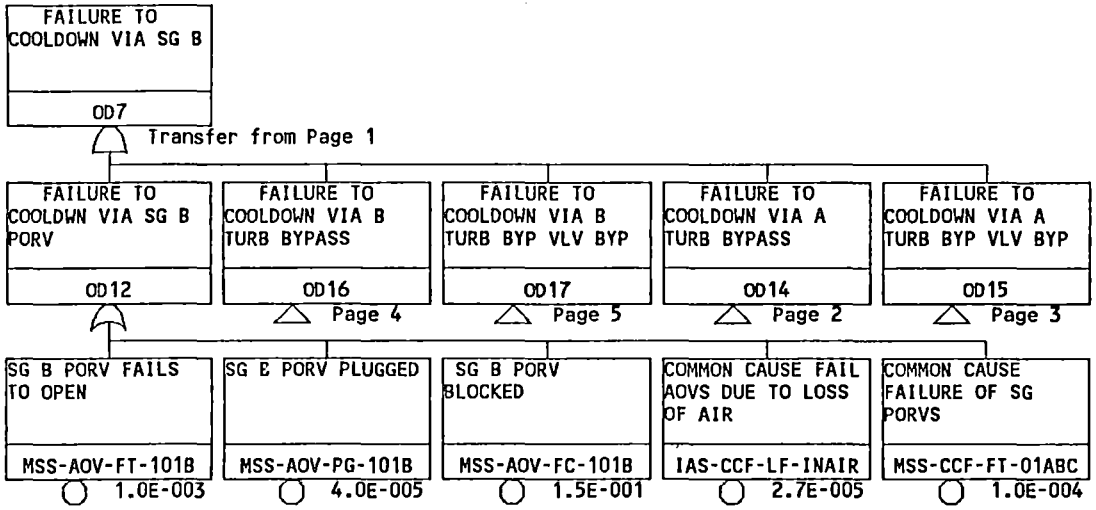

FAILURE TO COOLDOWN VIA B TURB BYP VLV BYP
OD17
Transfers from Page(s) 2 6 7
B BYP TO TURB BYPASS FAILS TO OPEN
PCS-AOV-FT-BYP-B
1.0E-003
B BYP TO TURB BYPASS PLUGGED
PCS-AOV-PG-BYP-B
4.0E-005
COMMON CAUSE FAILURE OF TURBINE BYPASS VALVES
PCS-CCF-FT-TRBYP
4.3E-005
COMMON CAUSE FAIL AOVS DUE TO LOSS OF AIR
IAS-CCF-LF-INAIR
2.7E-005



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Project: SURRY
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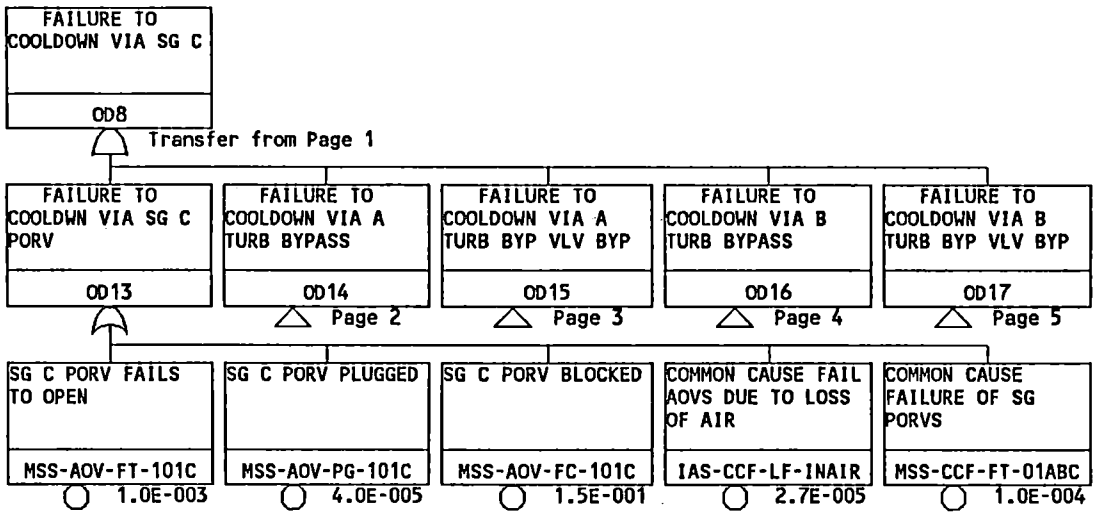

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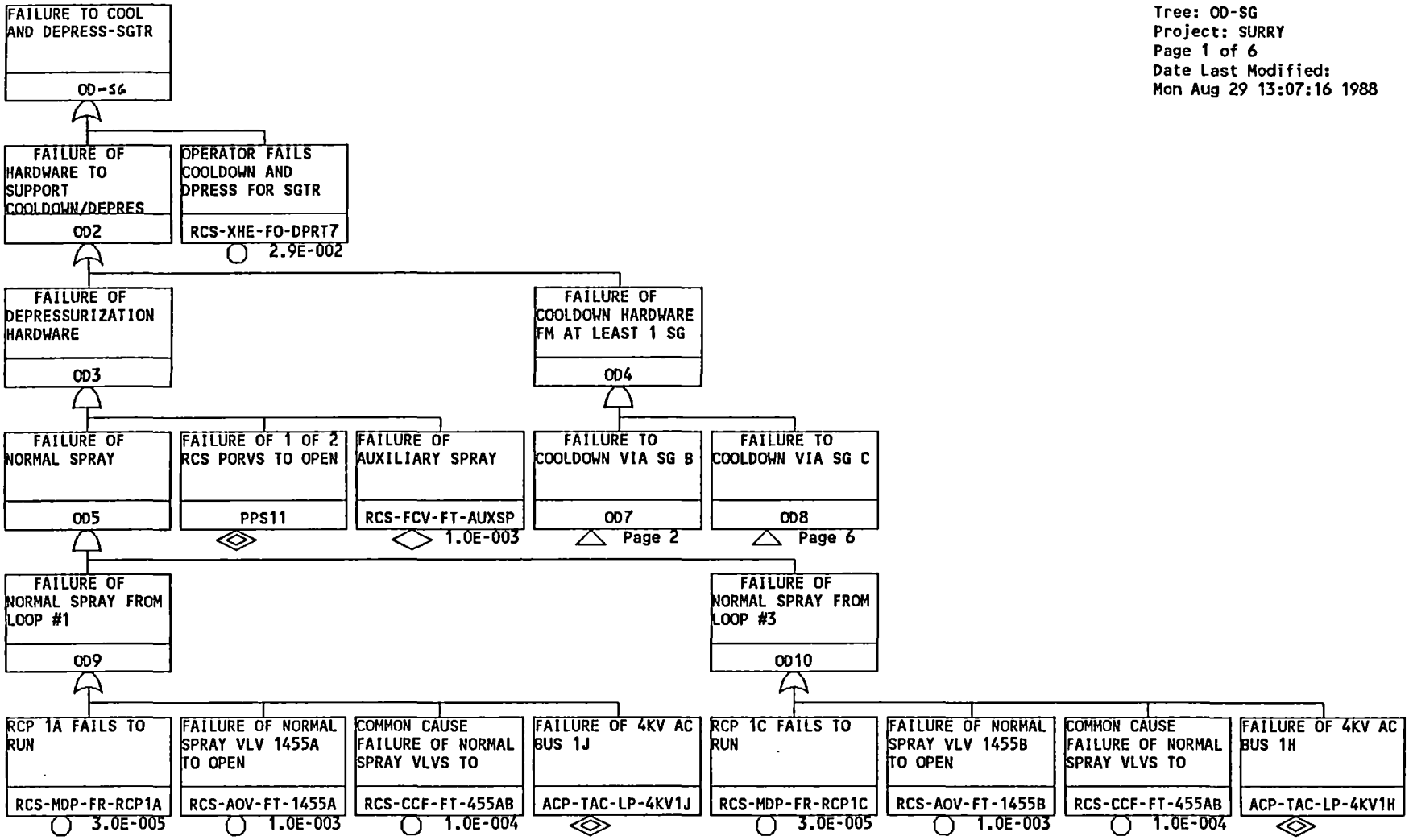

Tree: OD-SG
Project: SURRY
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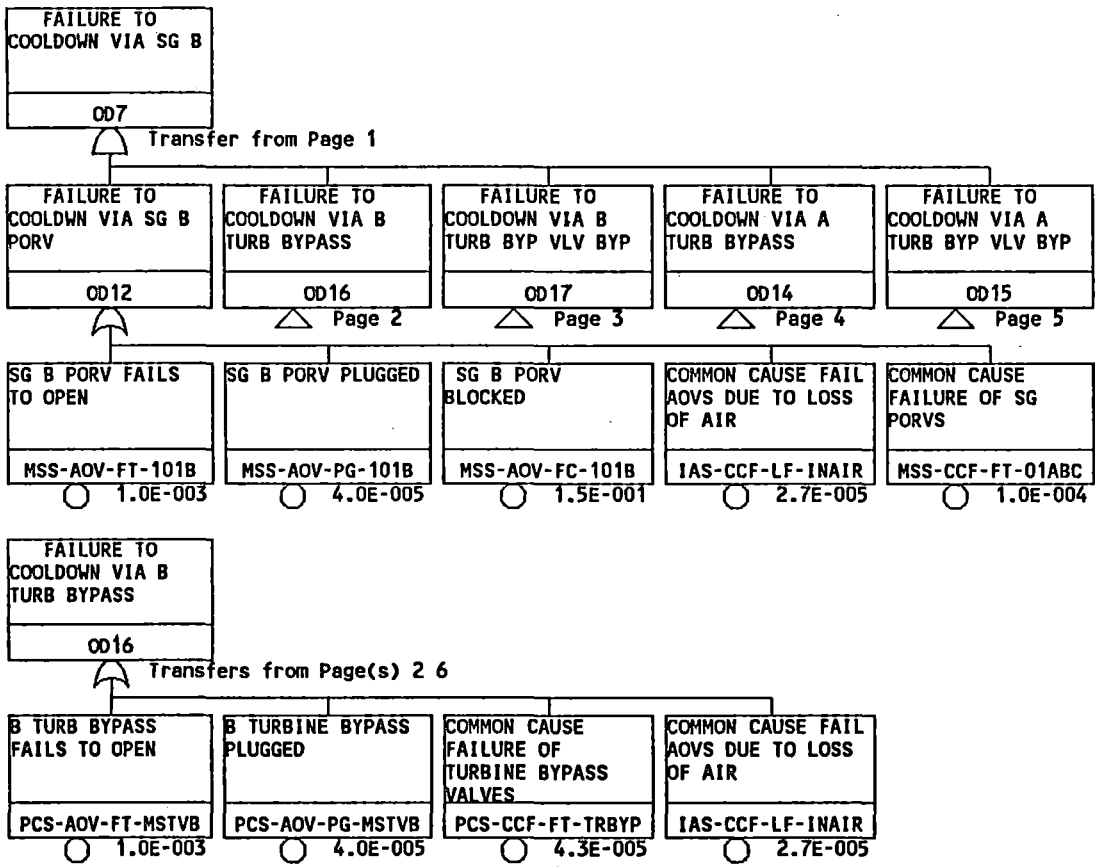
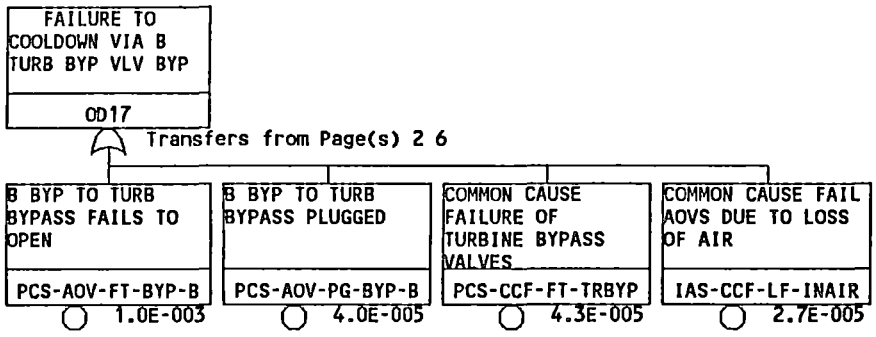

FAILURE TO COOLDOWN VIA SG B
OD7
Transfer from Page 1
FAILURE TO COOLDWN VIA SG B PORV
OD12
FAILURE TO COOLDOWN VIA B TURB BYPASS
OD16
Page 2
FAILURE TO COOLDOWN VIA B TURB BYP VLV BYP
OD17
Page 3
FAILURE TO COOLDOWN VIA A TURB BYPASS
OD14
Page 4
FAILURE TO COOLDOWN VIA A TURB BYP VLV BYP
OD15
Page 5
SG B PORV FAILS TO OPEN
MSS-AOV-FT-101B
1.0E-003
SG B PORV PLUGGED
MSS-AOV-PG-101B
4.0E-005
SG B PORV BLOCKED
MSS-AOV-FC-101B
1.5E-001
COMMON CAUSE FAIL AOVS DUE TO LOSS OF AIR
IAS-CCF-LF-INAIR
2.7E-005
COMMON CAUSE FAILURE OF SG PORVS
MSS-CCF-FT-01ABC
1.0E-004

FAILURE TO COOLDOWN VIA B TURB BYPASS
OD16
Transfers from Page(s) 2 6
B TURB BYPASS FAILS TO OPEN
PCS-AOV-FT-MSTVB
1.0E-003
B TURBINE BYPASS PLUGGED
PCS-AOV-PG-MSTVB
4.0E-005
COMMON CAUSE FAILURE OF TURBINE BYPASS VALVES
PCS-CCF-FT-TRBYP
4.3E-005
COMMON CAUSE FAIL AOVS DUE TO LOSS OF AIR
IAS-CCF-LF-INAIR
2.7E-005



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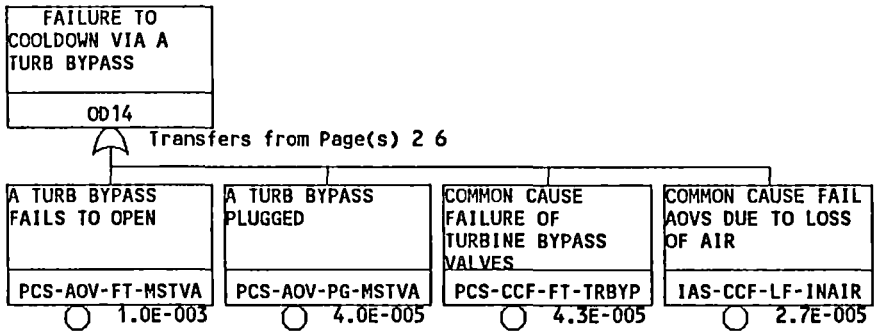
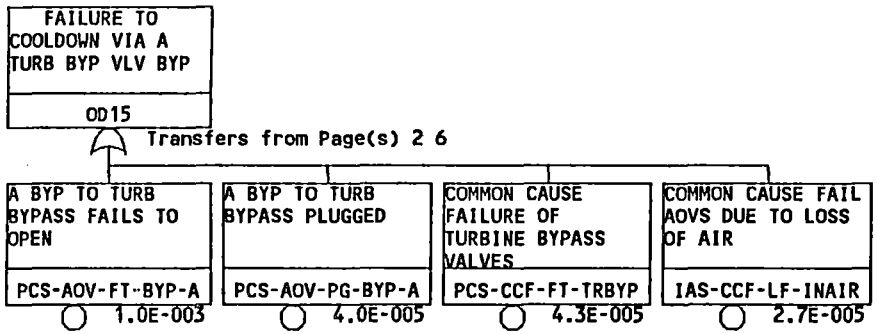

FAILURE TO COOLDOWN VIA A TURB BYPASS
OD14
Transfers from Page(s) 2 6
A TURB BYPASS FAILS TO OPEN
PCS-AOV-FT-MSTVA
1.0E-003
A TURB BYPASS PLUGGED
PCS-AOV-PG-MSTVA
4.0E-005
COMMON CAUSE FAILURE OF TURBINE BYPASS VALVES
PCS-CCF-FT-TRBYP
4.3E-005
COMMON CAUSE FAIL AOVS DUE TO LOSS OF AIR
IAS-CCF-LF-INAIR
2.7E-005



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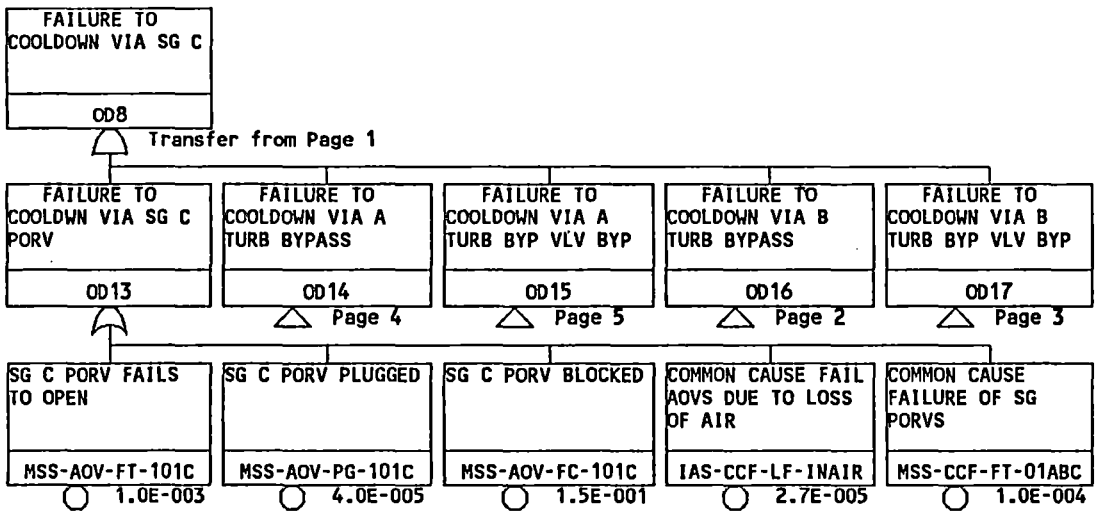

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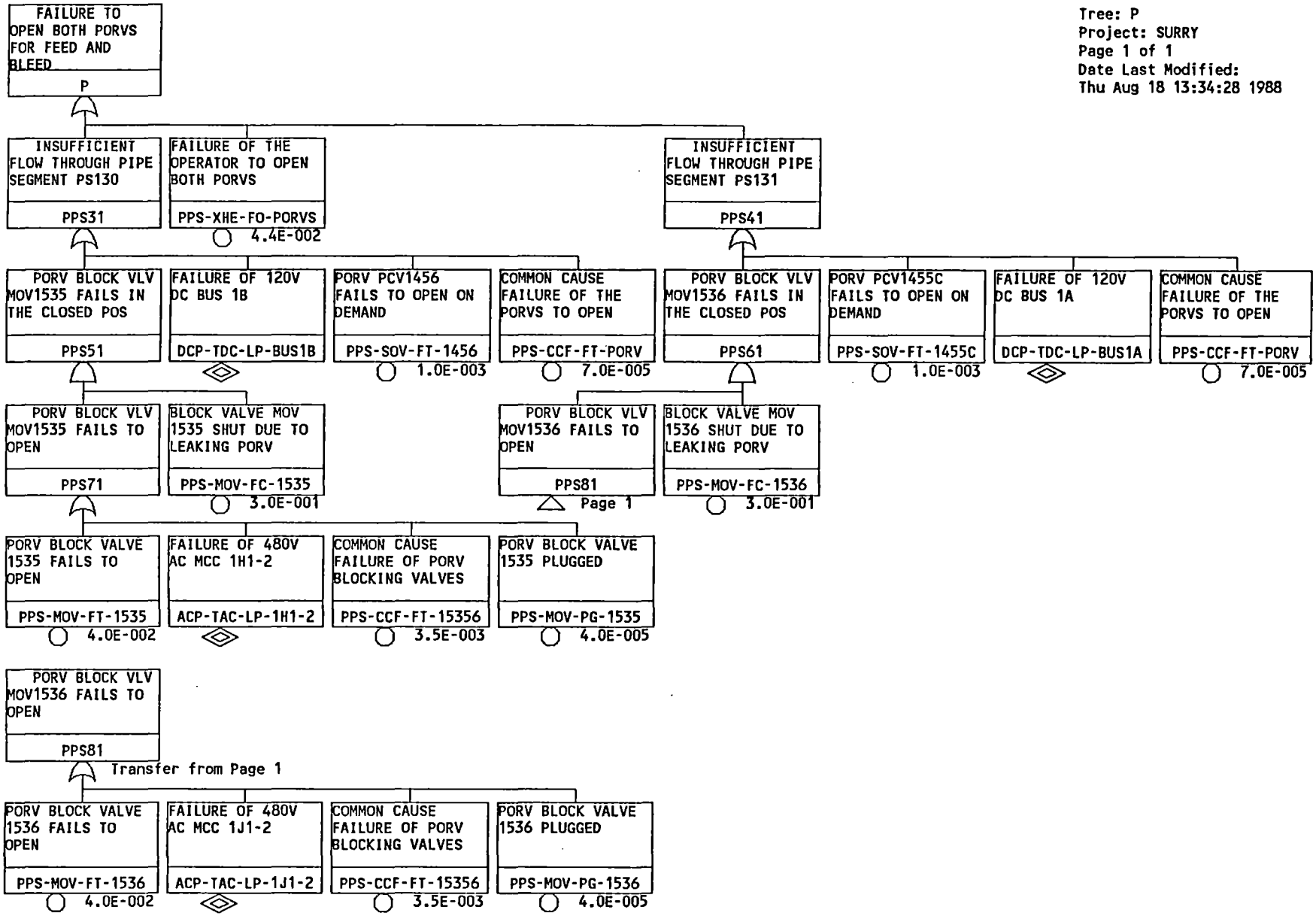
FAILURE TO OPEN BOTH PORVS FOR FEED AND BLEED
P
Tree: P
Project: SURRY
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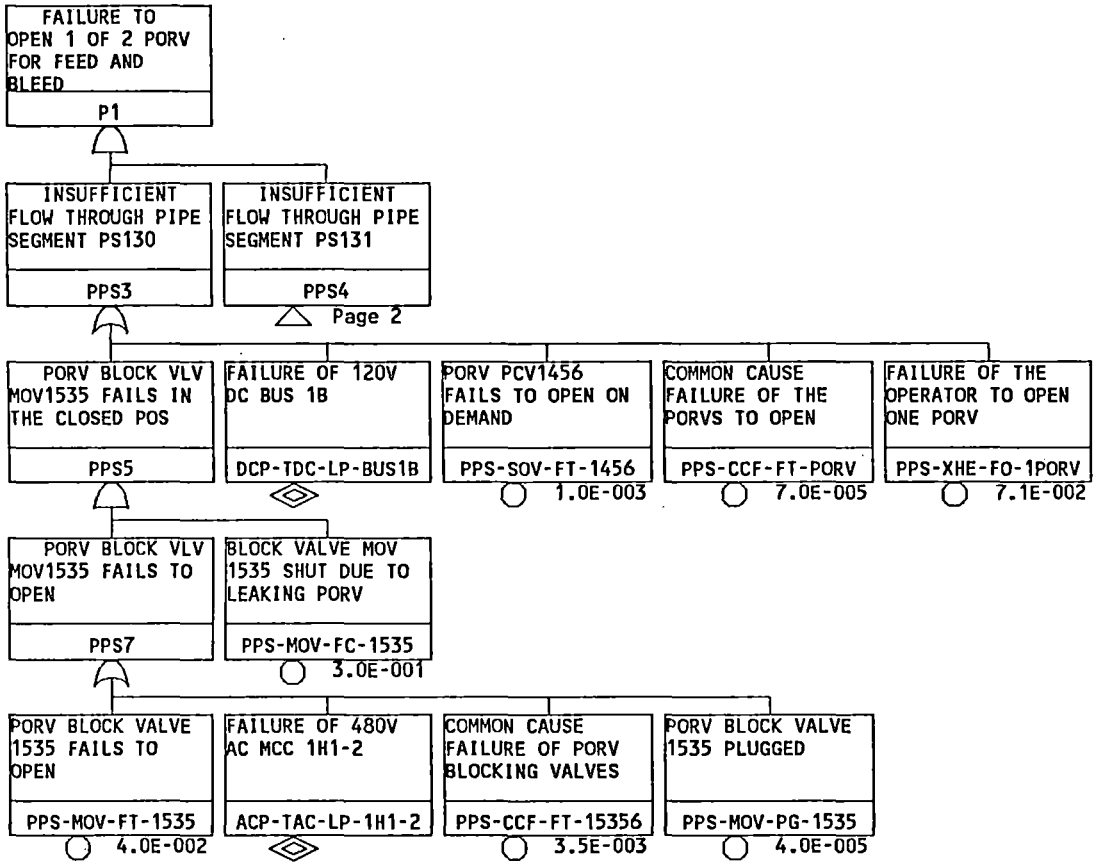
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS130
PPS31
FAILURE OF THE OPERATOR TO OPEN BOTH PORVS
PPS-XHE-FO-PORVS
4.4E-002
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS131
PPS41
PORV BLOCK VLV MOV1535 FAILS IN THE CLOSED POS
PPS51
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
PORV PCV1456 FAILS TO OPEN ON DEMAND
PPS-SOV-FT-1456
1.0E-003
COMMON CAUSE FAILURE OF THE PORVS TO OPEN
PPS-CCF-FT-PORV
7.0E-005
PORV BLOCK VLV MOV1536 FAILS IN THE CLOSED POS
PPS61
PORV PCV1455C FAILS TO OPEN ON DEMAND
PPS-SOV-FT-1455C
1.0E-003
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
COMMON CAUSE FAILURE OF THE PORVS TO OPEN
PPS-CCF-FT-PORV
7.0E-005
PORV BLOCK VLV MOV1535 FAILS TO OPEN
PPS71
BLOCK VALVE MOV 1535 SHUT DUE TO LEAKING PORV
PPS-MOV-FC-1535
3.0E-001
PORV BLOCK VLV MOV1536 FAILS TO OPEN
PPS81
Page 1
BLOCK VALVE MOV 1536 SHUT DUE TO LEAKING PORV
PPS-MOV-FC-1536
3.0E-001
PORV BLOCK VALVE 1535 FAILS TO OPEN
PPS-MOV-FT-1535
4.0E-002
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
COMMON CAUSE FAILURE OF PORV BLOCKING VALVES
PPS-CCF-FT-15356
3.5E-003
PORV BLOCK VALVE 1535 PLUGGED
PPS-MOV-PG-1535
4.0E-005
PORV BLOCK VLV MOV1536 FAILS TO OPEN
PPS81
Transfer from Page 1
PORV BLOCK VALVE 1536 FAILS TO OPEN
PPS-MOV-FT-1536
4.0E-002
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
COMMON CAUSE FAILURE OF PORV BLOCKING VALVES
PPS-CCF-FT-15356
3.5E-003
PORV BLOCK VALVE 1536 PLUGGED
PPS-MOV-PG-1536
4.0E-005



Tree: P1
Project: SURRY
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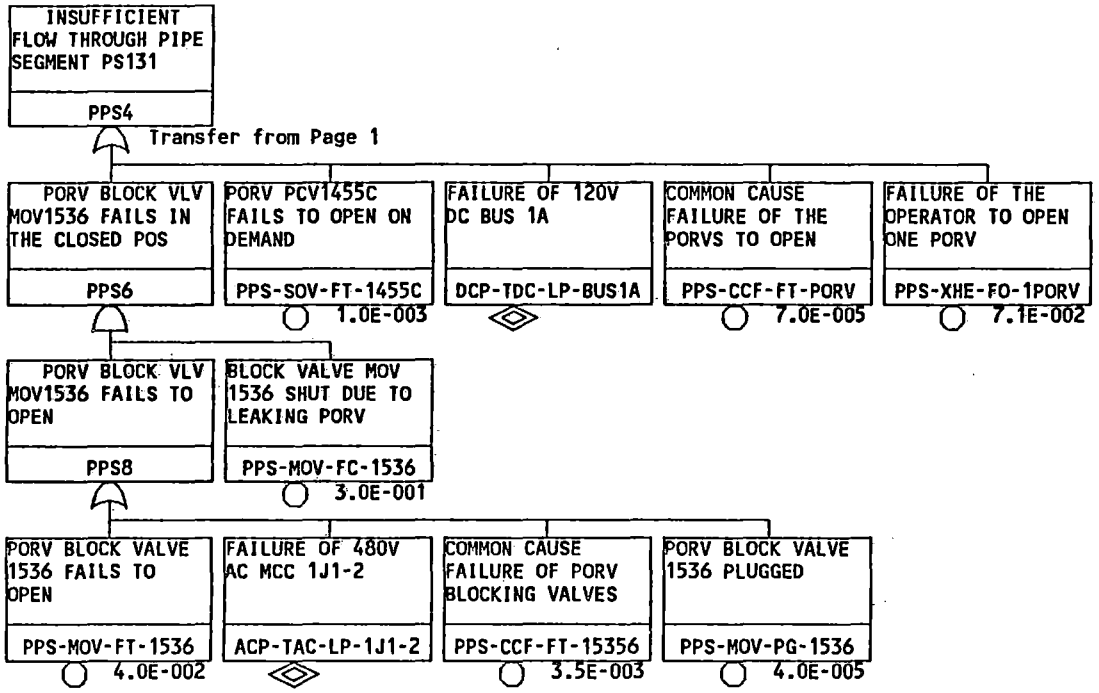

Tree: P1
Project: SURRY
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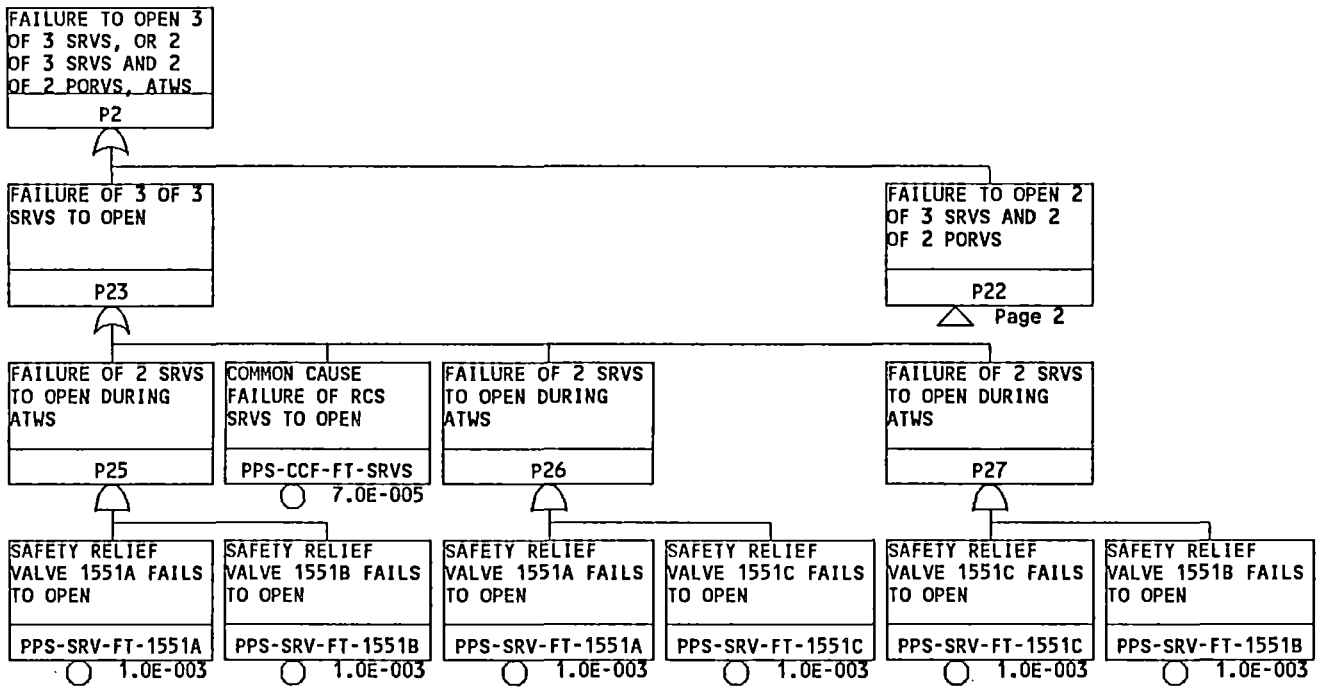
Date Last Modified:
Thu Aug 18 13:35:26 1988



Tree: P2
Project: SURRY
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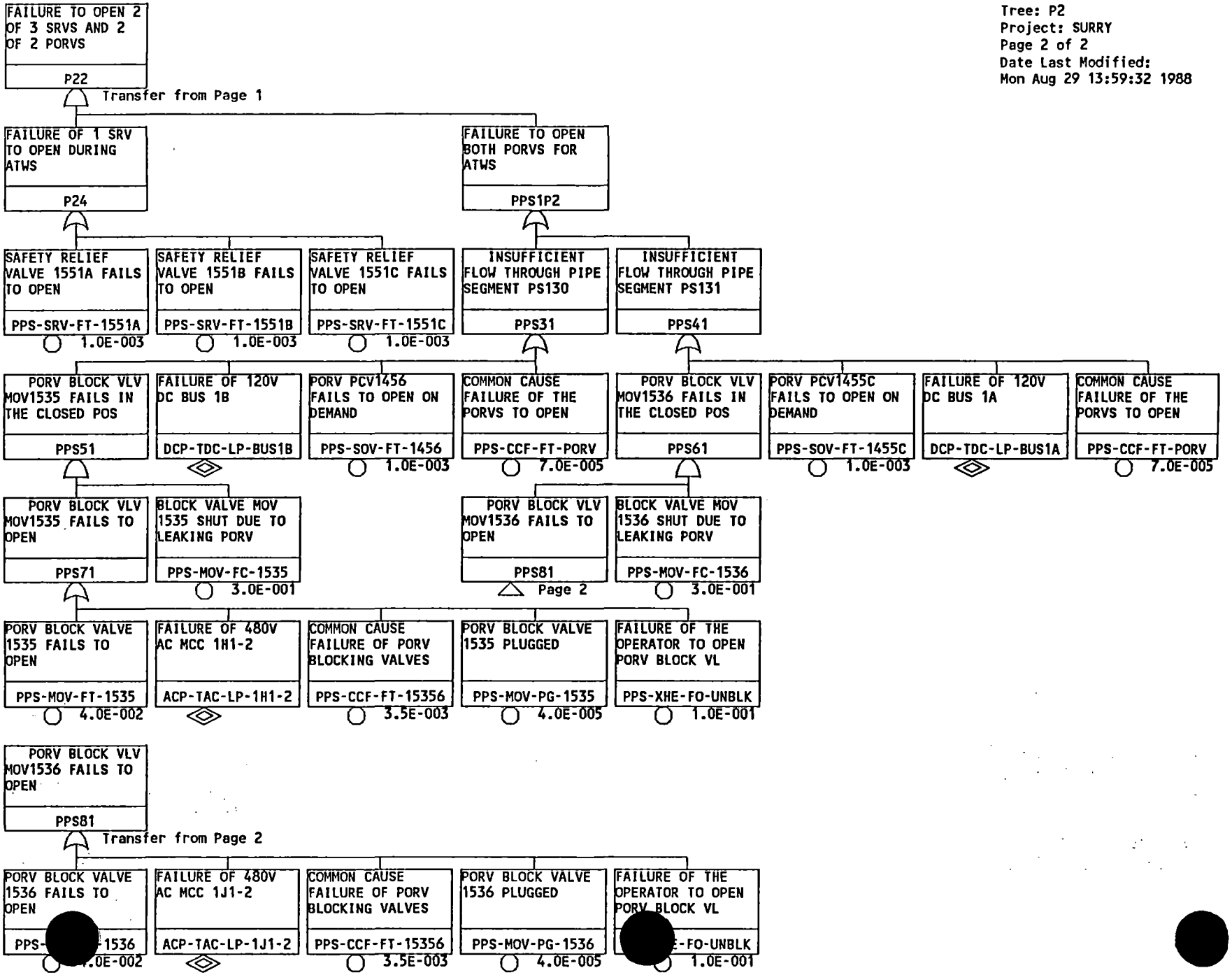
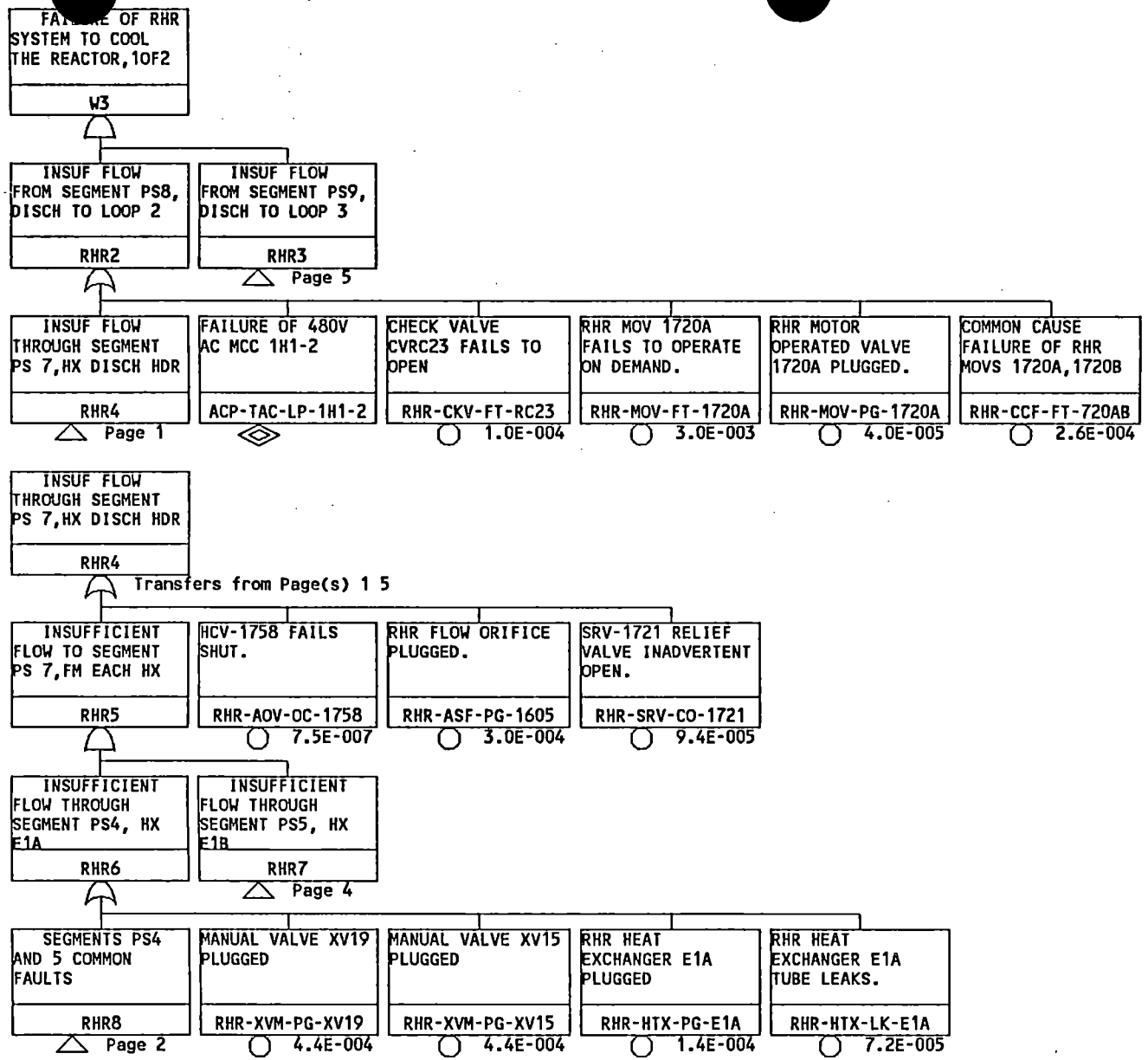
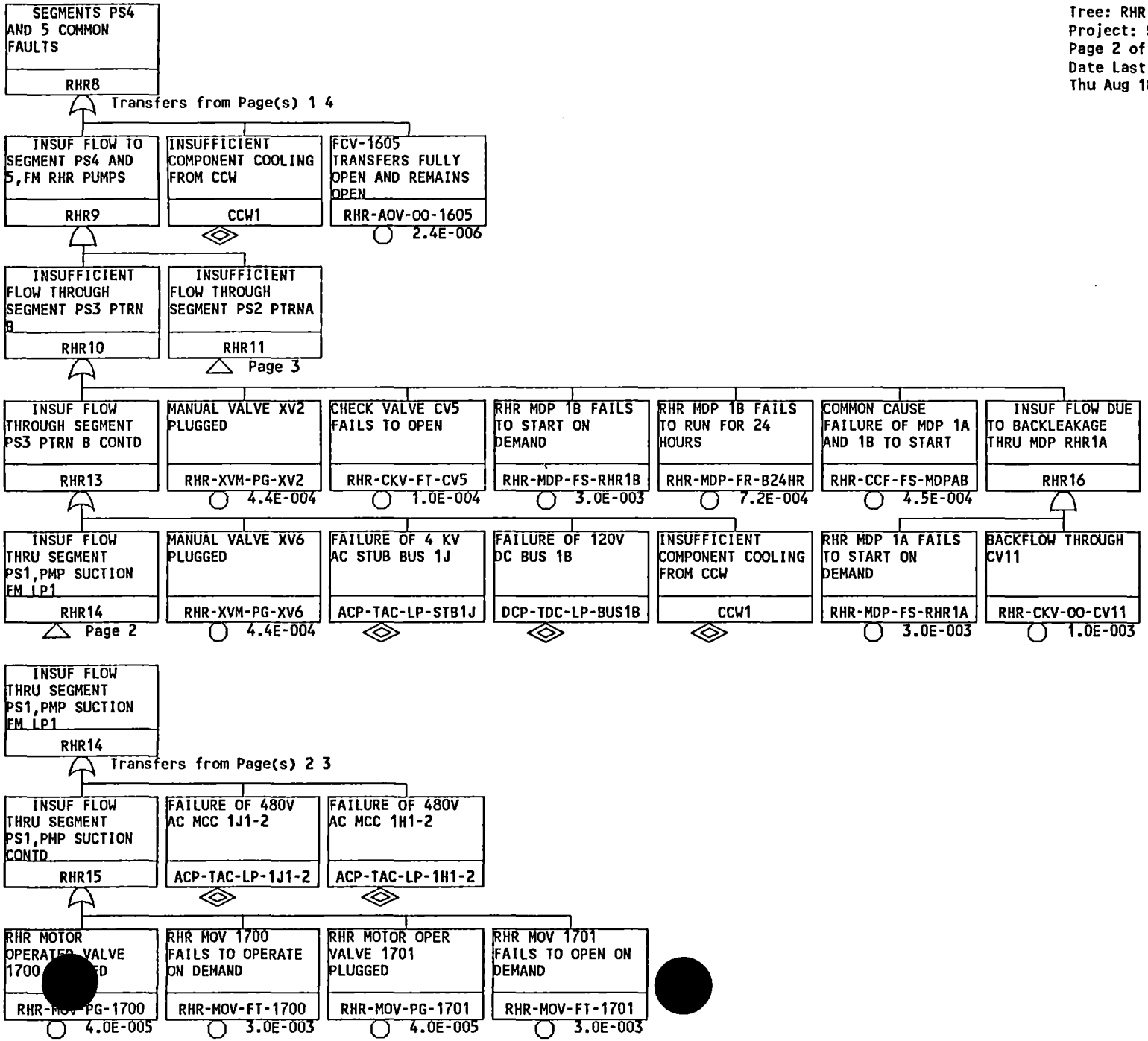
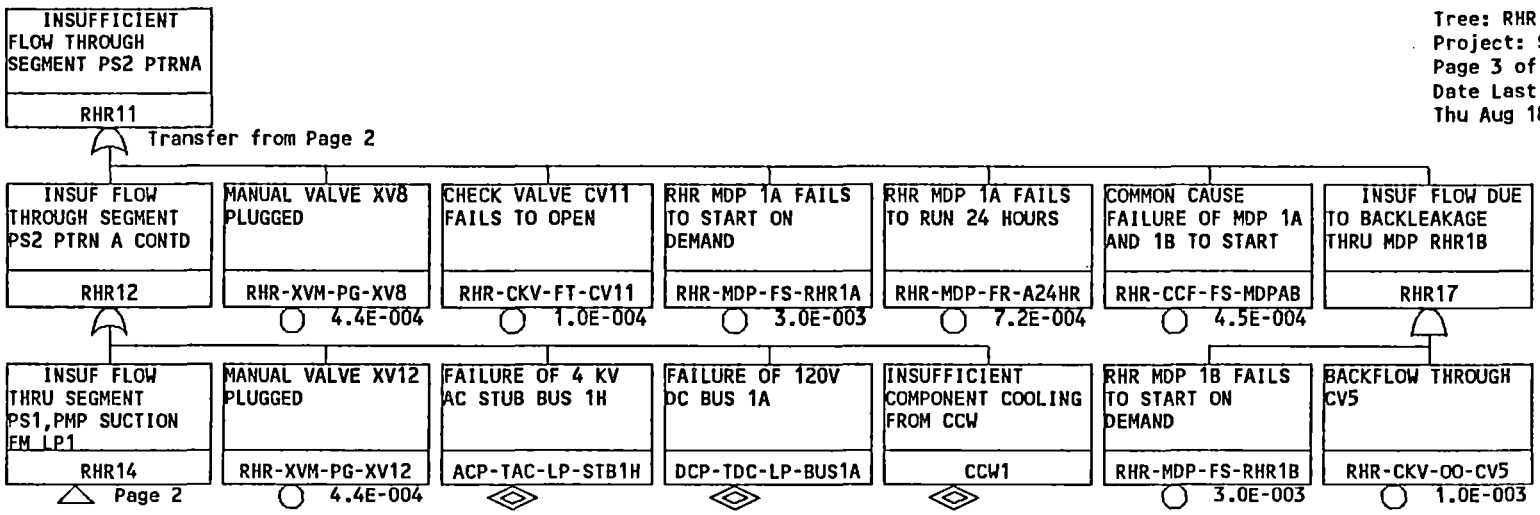

FAILURE TO OPEN 2 OF 3 SRVS AND 2 OF 2 PORVS
P22
Transfer from Page 1
FAILURE OF 1 SRV TO OPEN DURING ATWS
P24
FAILURE TO OPEN BOTH PORVS FOR ATWS
PPS1P2
SAFETY RELIEF VALVE 1551A FAILS TO OPEN
PPS-SRV-FT-1551A
1.0E-003
SAFETY RELIEF VALVE 1551B FAILS TO OPEN
PPS-SRV-FT-1551B
1.0E-003
SAFETY RELIEF VALVE 1551C FAILS TO OPEN
PPS-SRV-FT-1551C
1.0E-003
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS130
PPS31
INSUFFICIENT FLOW THROUGH PIPE SEGMENT PS131
PPS41
PORV BLOCK VLV MOV1535 FAILS IN THE CLOSED POS
PPS51
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
PORV PCV1456 FAILS TO OPEN ON DEMAND
PPS-SOV-FT-1456
1.0E-003
COMMON CAUSE FAILURE OF THE PORVS TO OPEN
PPS-CCF-FT-PORV
7.0E-005
PORV BLOCK VLV MOV1536 FAILS IN THE CLOSED POS
PPS61
PORV PCV1455C FAILS TO OPEN ON DEMAND
PPS-SOV-FT-1455C
1.0E-003
FAILURE OF 120V DC BUS 1A
DCP-TDC-LP-BUS1A
COMMON CAUSE FAILURE OF THE PORVS TO OPEN
PPS-CCF-FT-PORV
7.0E-005
PORV BLOCK VLV MOV1535 FAILS TO OPEN
PPS71
BLOCK VALVE MOV 1535 SHUT DUE TO LEAKING PORV
PPS-MOV-FC-1535
3.0E-001
PORV BLOCK VLV MOV1536 FAILS TO OPEN
PPS81
Page 2
BLOCK VALVE MOV 1536 SHUT DUE TO LEAKING PORV
PPS-MOV-FC-1536
3.0E-001
PORV BLOCK VALVE 1535 FAILS TO OPEN
PPS-MOV-FT-1535
4.0E-002
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
COMMON CAUSE FAILURE OF PORV BLOCKING VALVES
PPS-CCF-FT-15356
3.5E-003
PORV BLOCK VALVE 1535 PLUGGED
PPS-MOV-PG-1535
4.0E-005
FAILURE OF THE OPERATOR TO OPEN PORV BLOCK VL
PPS-XHE-FO-UNBLK
1.0E-001
PORV BLOCK VLV MOV1536 FAILS TO OPEN
PPS81
Transfer from Page 2
PORV BLOCK VALVE 1536 FAILS TO OPEN
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
COMMON CAUSE FAILURE OF PORV BLOCKING VALVES
PPS-CCF-FT-15356
3.5E-003
PORV BLOCK VALVE 1536 PLUGGED
PPS-MOV-PG-1536
4.0E-005
1.0E-001


FAILURE OF RHR SYSTEM TO COOL THE REACTOR,1OF2
W3
INSUF FLOW FROM SEGMENT PS8, DISCH TO LOOP 2
RHR2
INSUF FLOW FROM SEGMENT PS9, DISCH TO LOOP 3
RHR3
Page 5
INSUF FLOW THROUGH SEGMENT PS 7,HX DISCH HDR
RHR4
Page 1
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
CHECK VALVE CVRC23 FAILS TO OPEN
RHR-CKV-FT-RC23
1.0E-004
RHR MOV 1720A FAILS TO OPERATE ON DEMAND.
RHR-MOV-FT-1720A
3.0E-003
RHR MOTOR OPERATED VALVE 1720A PLUGGED.
RHR-MOV-PG-1720A
4.0E-005
COMMON CAUSE FAILURE OF RHR MOVS 1720A,1720B
RHR-CCF-FT-720AB
2.6E-004
INSUF FLOW THROUGH SEGMENT PS 7,HX DISCH HDR
RHR4
Transfers from Page(s) 1 5
INSUFFICIENT FLOW TO SEGMENT PS 7,FM EACH HX
RHR5
HCV-1758 FAILS SHUT.
RHR-AOV-OC-1758
7.5E-007
RHR FLOW ORIFICE PLUGGED.
RHR-ASF-PG-1605
3.0E-004
SRV-1721 RELIEF VALVE INADVERTENT OPEN.
RHR-SRV-CO-1721
9.4E-005
INSUFFICIENT FLOW THROUGH SEGMENT PS4, HX E1A
RHR6
INSUFFICIENT FLOW THROUGH SEGMENT PS5, HX E1B
RHR7
Page 4
SEGMENTS PS4 AND 5 COMMON FAULTS
RHR8
Page 2
MANUAL VALVE XV19 PLUGGED
RHR-XVM-PG-XV19
4.4E-004
MANUAL VALVE XV15 PLUGGED
RHR-XVM-PG-XV15
4.4E-004
RHR HEAT EXCHANGER E1A PLUGGED
RHR-HTX-PG-E1A
1.4E-004
RHR HEAT EXCHANGER E1A TUBE LEAKS.
RHR-HTX-LK-E1A
7.2E-005


SEGMENTS PS4 AND 5 COMMON FAULTS
RHR8
Transfers from Page(s) 1 4
INSUF FLOW TO SEGMENT PS4 AND 5,FM RHR PUMPS
RHR9
INSUFFICIENT COMPONENT COOLING FROM CCW
CCW1
FCV-1605 TRANSFERS FULLY OPEN AND REMAINS OPEN
RHR-AOV-00-1605
2.4E-006
INSUFFICIENT FLOW THROUGH SEGMENT PS3 PTRN B
RHR10
INSUFFICIENT FLOW THROUGH SEGMENT PS2 PTRNA
RHR11
Page 3
INSUF FLOW THROUGH SEGMENT PS3 PTRN B CONTD
RHR13
MANUAL VALVE XV2 PLUGGED
RHR-XVM-PG-XV2
4.4E-004
CHECK VALVE CV5 FAILS TO OPEN
RHR-CKV-FT-CV5
1.0E-004
RHR MDP 1B FAILS TO START ON DEMAND
RHR-MDP-FS-RHR1B
3.0E-003
RHR MDP 1B FAILS TO RUN FOR 24 HOURS
RHR-MDP-FR-B24HR
7.2E-004
COMMON CAUSE FAILURE OF MDP 1A AND 1B TO START
RHR-CCF-FS-MDPAB
4.5E-004
INSUF FLOW DUE TO BACKLEAKAGE THRU MDP RHR1A
RHR16
INSUF FLOW THRU SEGMENT PS1,PMP SUCTION FM LP1
RHR14
Page 2
MANUAL VALVE XV6 PLUGGED
RHR-XVM-PG-XV6
4.4E-004
FAILURE OF 4 KV AC STUB BUS 1J
ACP-TAC-LP-STB1J
FAILURE OF 120V DC BUS 1B
DCP-TDC-LP-BUS1B
INSUFFICIENT COMPONENT COOLING FROM CCW
CCW1
RHR MDP 1A FAILS TO START ON DEMAND
RHR-MDP-FS-RHR1A
3.0E-003
BACKFLOW THROUGH CV11
RHR-CKV-00-CV11
1.0E-003
INSUF FLOW THRU SEGMENT PS1,PMP SUCTION FM LP1
RHR14
Transfers from Page(s) 2 3
INSUF FLOW THRU SEGMENT PS1,PMP SUCTION CONTD
RHR15
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
FAILURE OF 480V AC MCC 1H1-2
ACP-TAC-LP-1H1-2
RHR MOTOR OPERATED VALVE 1700
RHR-MOV-PG-1700
4.0E-005
RHR MOV 1700 FAILS TO OPERATE ON DEMAND
RHR-MOV-FT-1700
3.0E-003
RHR MOTOR OPER VALVE 1701 PLUGGED
RHR-MOV-PG-1701
4.0E-005
RHR MOV 1701 FAILS TO OPEN ON DEMAND
RHR-MOV-FT-1701
3.0E-003



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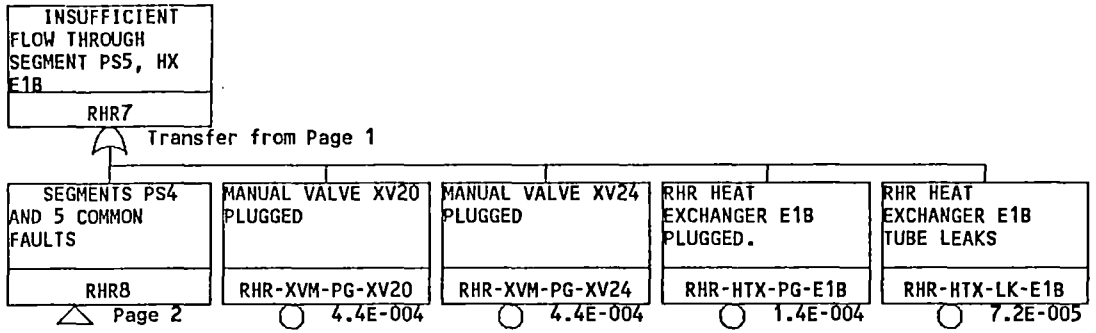
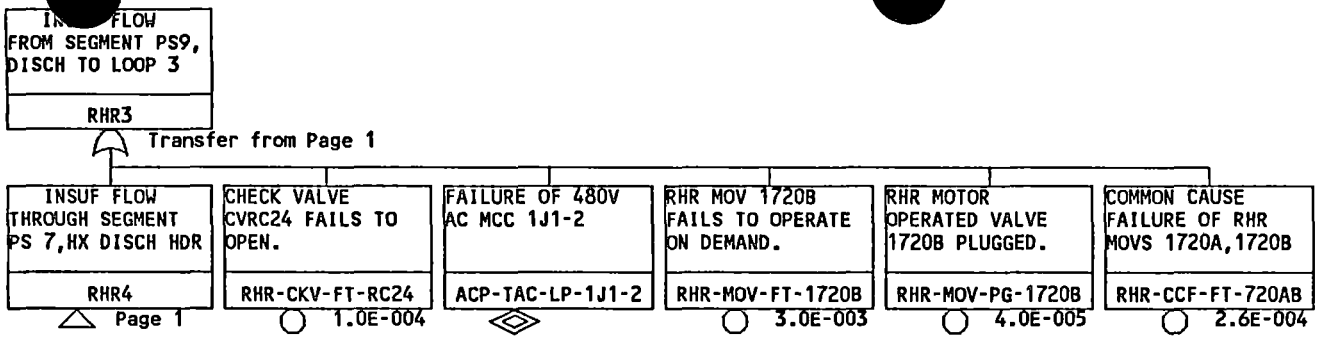
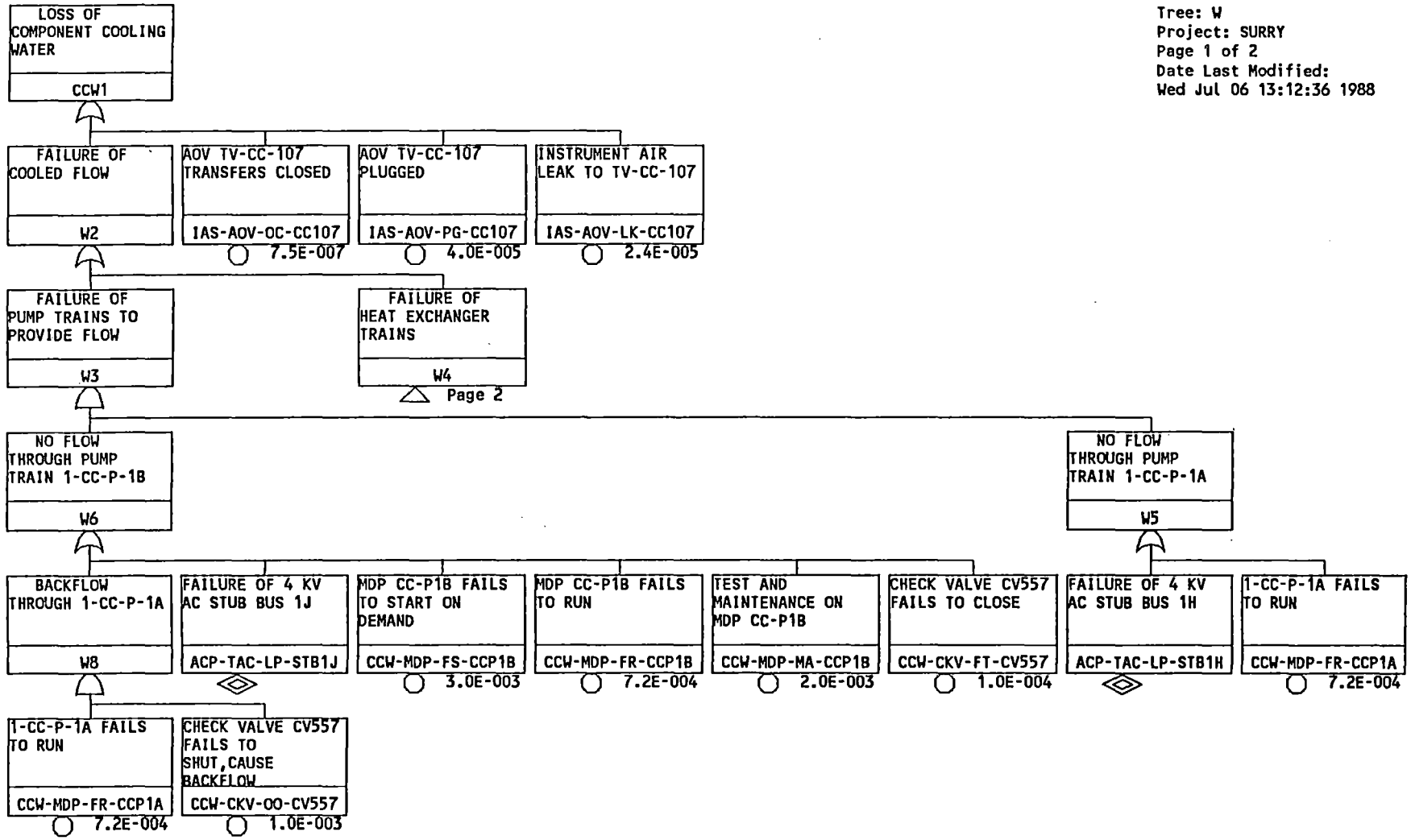

INSUFFICIENT FLOW THROUGH SEGMENT PS5, HX E1B
RHR7
Transfer from Page 1
SEGMENTS PS4 AND 5 COMMON FAULTS
RHR8
Page 2
MANUAL VALVE XV20 PLUGGED
RHR-XVM-PG-XV20
4.4E-004
MANUAL VALVE XV24 PLUGGED
RHR-XVM-PG-XV24
4.4E-004
RHR HEAT EXCHANGER E1B PLUGGED.
RHR-HTX-PG-E1B
1.4E-004
RHR HEAT EXCHANGER E1B TUBE LEAKS
RHR-HTX-LK-E1B
7.2E-005


IN FLOW FROM SEGMENT PS9, DISCH TO LOOP 3
RHR3
Transfer from Page 1
INSUF FLOW THROUGH SEGMENT PS 7,HX DISCH HDR
RHR4
Page 1
CHECK VALVE CVRC24 FAILS TO OPEN.
RHR-CKV-FT-RC24
1.0E-004
FAILURE OF 480V AC MCC 1J1-2
ACP-TAC-LP-1J1-2
RHR MOV 1720B FAILS TO OPERATE ON DEMAND.
RHR-MOV-FT-1720B
3.0E-003
RHR MOTOR OPERATED VALVE 1720B PLUGGED.
RHR-MOV-PG-1720B
4.0E-005
COMMON CAUSE FAILURE OF RHR MOVS 1720A,1720B
RHR-CCF-FT-720AB
2.6E-004



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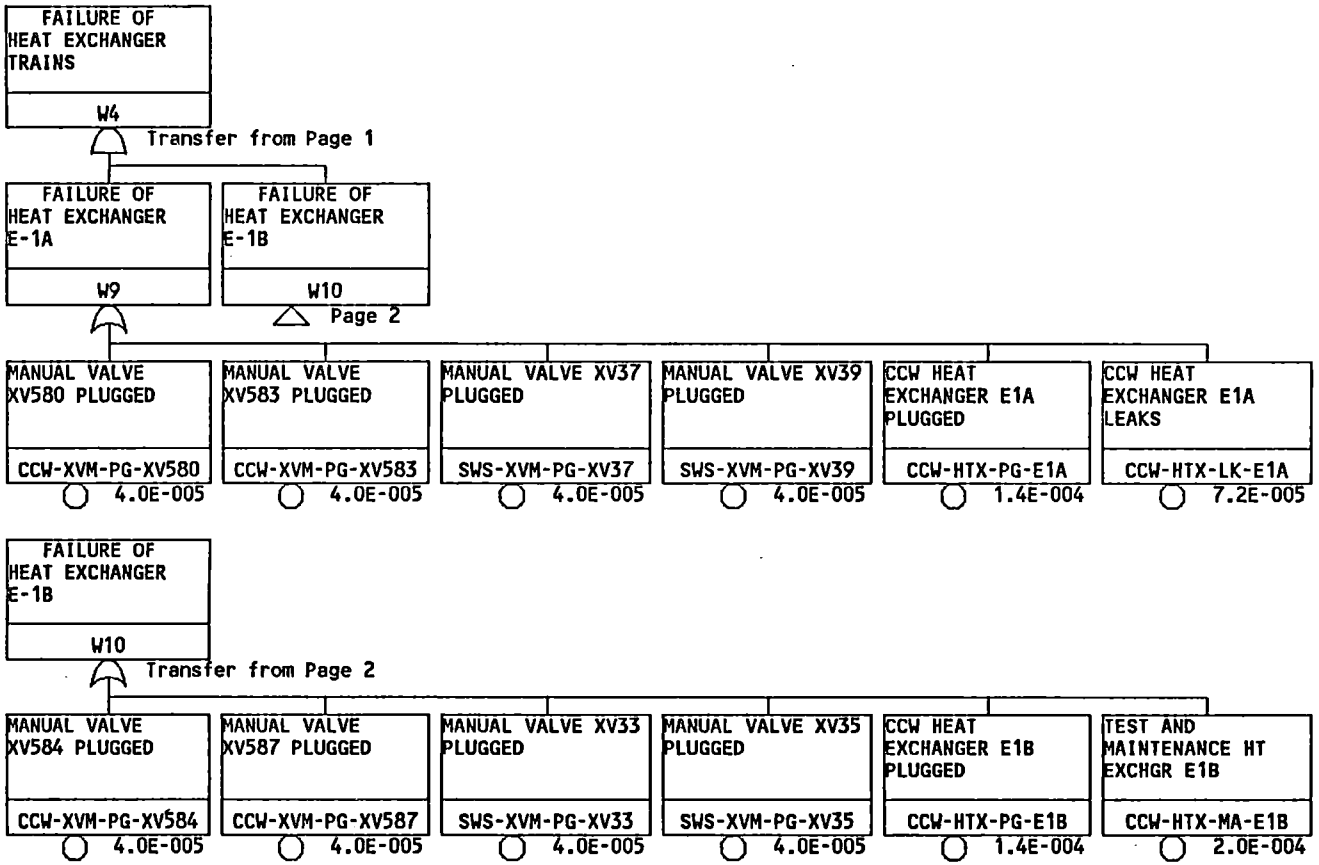
Project: SURRY
Page 1 of 2
Date Last Modified:
Wed Jul 06 13:12:36 1988


FAILURE OF HEAT EXCHANGER TRAINS
W4
Transfer from Page 1
FAILURE OF HEAT EXCHANGER E-1A
W9
FAILURE OF HEAT EXCHANGER E-1B
W10
Page 2
MANUAL VALVE XV580 PLUGGED
CCW-XVM-PG-XV580
4.0E-005
MANUAL VALVE XV583 PLUGGED
CCW-XVM-PG-XV583
4.0E-005
MANUAL VALVE XV37 PLUGGED
SWS-XVM-PG-XV37
4.0E-005
MANUAL VALVE XV39 PLUGGED
SWS-XVM-PG-XV39
4.0E-005
CCW HEAT EXCHANGER E1A PLUGGED
CCW-HTX-PG-E1A
1.4E-004
CCW HEAT EXCHANGER E1A LEAKS
CCW-HTX-LK-E1A
7.2E-005
FAILURE OF HEAT EXCHANGER E-1B
W10
Transfer from Page 2
MANUAL VALVE XV584 PLUGGED
CCW-XVM-PG-XV584
4.0E-005
MANUAL VALVE XV587 PLUGGED
CCW-XVM-PG-XV587
4.0E-005
MANUAL VALVE XV33 PLUGGED
SWS-XVM-PG-XV33
4.0E-005
MANUAL VALVE XV35 PLUGGED
SWS-XVM-PG-XV35
4.0E-005
CCW HEAT EXCHANGER E1B PLUGGED
CCW-HTX-PG-E1B
1.4E-004
TEST AND MAINTENANCE HT EXCHGR E1B
CCW-HTX-MA-E1B
2.0E-004

APPENDIX C

Human Reliability Analysis - Detailed Results

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C. Human Reliability Analysis - Detailed Results

This appendix contains the analysis performed to calculate the probabilities for human actions used in the revised Surry probabilitic risk assessment (PRA). This section presents the detailed results of the Human Reliability Analysis (HRA) described in Section 4.8 of the main report. Two types of human errors, pre-initiator and post initiator, were studied for the PRA.

Pre-initiator error analysis was entirely concerned with miscalibration errors and equipment restoration errors. Human actions which lead to these errors were done under normal plant operating conditions with stress levels appropriate for everyday work environments. The calculation of error probabilities for these actions was concerned with the adequacy of the maintenance and inspection procedures, the dependence of related tasks, and the administrative redundancy of restoration procedures. The pre-initiator analysis is detailed in Section C.1.

The other category of human errors was post-initiator errors. Post-initiator error analysis was concerned with human errors made in response to the mitigation of an initiating event. The human actions from which these errors derive were procedure directed. Calculation of error probabilities for these actions was primarily concerned with the amount of time available to complete the task, the stress level under which the task was performed, and the amount of redundant verification that was possible within the allowable time period. The post-initiator error analysis is detailed in Section C.2.

C.1 Pre-Initiator Error Analysis

The pre-initiator error analysis started with the establishment of a set of screening criteria. The screening criteria determined which systems wre susceptible to pre-initiator errors. Only two pre-initiator errors survived the screening process. These were restoration of the containment spray pump test lines and miscalibration of the RWST level sensors. A more detailed discussion of the screening process and the two pre-initiator errors is contained in Section 4.8 of the main report.

C.2 Post-Initiator Error Analysis

Post-initiator human actions are those operator actions performed after the accident has started. The methodology used to evaluate post-accident human actions is described in detail in reference C-1. In summary, the evaluation was performed in eight major steps:

(1) Identification of the sequence and subsequent accident conditions.

(2) Based on the cut set (and sequence), the timing of the events (i.e., occurrences, failures, alarms, indications, etc.) was established.

(3) Based on the cut set (and sequence), the symptoms and therefore the possible recovery actions (and required activities) were identified.

(4) The time available to the operator to diagnose and perform the action (and activities) was established.

(5) The probability of the operator failing to properly diagnose the accident was determined. This considered operator training, simulator exercises, and other factors.

(6) The type of recovery action (whether 'dynamic' or 'step-by-step') was determined by the plant using symptom-oriented procedures or not, and operator training, etc.

(7) The stress level of the operator was determined, considering the time available, difficulty of the action, and training.

(8) The probability of the operator failing to perform the recovery action was evaluated.

In evaluating the accident sequences for potential recovery credit, the HRA process was documented in a series of eleven tables, as follows:

(1) The first table identifies the accident sequence with a detailed description of the accident scenario.

(2) The second table establishes the timing of the accident: timing of the events, annunciators, and alarms.

(3) Based on Table 1, this third table identifies the symptoms, potential recovery actions, and those activities associated with them.

(4) The time available for the operator to perform the recovery action is determined and shown in Table 4.

(5) The time it takes the operator to perform the action is calculated in Table 5.

(6) The amount of time the operator has to diagnose problems is displayed in Table 6.

(7) Diagnosis error probabilities are evaluated and documented in two tables (Table 7, more than one abnormal event, and Table 8, one abnormal event).

(8) Table 9 identifies the 'type' of action the operator performed.

(9) The 'stress' level of operators, considering the accident sequence, is documented in Table 10.

(10) Using the information from the previous tables, the probability of the operator failing to recover from the faults of the accident sequence is evaluated in Table 11.

The event identifiers with an HRA subscript represent the HRA portion of a recovery action. See Section 4.9 for the hardware contribution and the total unavailability. The event identifiers without subscripts represent basic events whose sole contributor is an HRA unavailability. The notes that describe each column in the tables are presented below.

Table 1 Notes:

(1) This should include a detailed description of the accident sequence under consideration -- what functions and systems are failing and succeeding, what phenomena are occurring because of the failures and successes and their resulting effects, what is the final outcome of the sequence, etc.

(2) The basic accident type is described here.

(3) Because of the accident type and the "symptoms" of the accident, certain immediate conditions, (i.e., entry conditions) are generated (e.g., reactor trip, low reactor water level, high drywell pressure, etc.). These immediate conditions are listed here.

(4) From the accident conditions or symptoms, the operator is immediately directed into certain EOPs. These are listed here. Additionally, other relevant procedures are also listed here.

Table 2 Notes:

* See Step #1, page 6-9 and Step #3, page 8-3 of ASEP HRA procedures.

(1) Identify the major events which are expected to comprise the accident sequence.

(2) Identify the time at which each event is expected to occur, beginning with the initiating event at T=0. Subsequent events are expressed in minutes following the initiating event.

(3) Identify any annunciators or other indicators notifying the operators that each event has occurred.

(4) Provide any additional comments which serve to clarify information on this table, as required.

Table 3 Notes:

* See Step #2, page 6-10 and Step #4, page 8-3 of ASEP HRA procedures.

(1) Identify the principal component functional failures which comprise the cut sets for the accident sequence.

(2) Identify the specific symptoms which will indicate to the operators that the component functional failure has occurred.

(3) Identify all actions which may be taken by the operator in response to each component functional failure.

(4) Identify the individual activities (tasks) which comprise each potential operator action. List only significant operator actions as opposed to decisions, diagnoses, etc.

(5) Any additional comments required to clarify the information on this table.

Table 4 Notes:

(1) The actions listed in Column 3, Table 3, are listed here.

(2) The last possible time at which, if the operator establishes the required function, subsequent core damage is prevented.

(3) In many cases, the operator is not alerted to the failure at the time of the initiator. Lisst the time at which the operator recognizes that the failure has occurred.

(4) The difference between the time in which the operator must successfully perform the action following the initiating event and the time at which the operator recognizes that the action must be taken. Tcd - To = Tm

Table 5 Notes:

* See Step #3, page 6-10 and Steps #5, 6, and 7, pages 8-3 and 8-4 of ASEP HRA procedures.

(1) The major activities (tasks) which comprise the operator actions are listed.

(2) Identify the location in which each activity must be performed.

(3) Identify the travel time required for an operator to transit from his likely location at the time the requirement for the action is recognized to the loction at which the activity must be performed. Assume that the operator knows the proper location.

(4) Identify the time which is required to perform the activity, given that the operator has reached the location at which the activity must be performed. Assume that the operator knows how to perform the required activity. Any anticipated difficulties or complexities should be reflected in this estimate.

Table 6 Notes:

* See Step #4, page 6-10 and Step #7, page 8-4 of the ASEP HRA procedures.

(1) Tm is determined in Table 4.

(2) Ta is determined in Table 5

(3) Time available to disgnoses is equal to Tm less Ta.

(4) Any additional comments required to clarify the information in this table.

Table 7 Notes:

* See Step 9, pages 8-4 to 8-7 of the ASEP HRA procedures.

(1) In order to accomplish the action, if the operator must diagnose for each activity, the probability of mis-diagnosis for each activity needs to be determined.

(2) If the analyst can determine that the probability of the operator failing to diagnose the event is negligible, then remainder table is not applicable. Reasons for determining that the diagnosis error is negligible should be discussed in the comment column.

(3) See Table 3 for definition of abnormal event.

(4) If there is more than one abnormal event, there is the probability that the operator will fail to recognize an additional occurrence of another event. Therefore, the probability that the signal of subsequent abnormal events are not noticed needs to be estimated. These HEPs are added to the final HEP. At the time of the second, third, etc. abnormal event, you need to determine the total number of annunciators being alarmed. Read down the column marked "Number of ANNs" to the total number of annunciators you have determined, then read straight across to the column marked $Pr(F_1)$, this is the HEP that the operator will fail to respond to the signal of the second, etc. abnormal event in the midst of the other annunciators.

(5) Based on Td (from Table 6) an initial HEP for failure to diagnose is selected from Table 8-2. Use mean value.

(6) Indicate whether or not the action is "skill-based" as defined in Table 2-1, Page 2-6 of the ASEP HRA procedures.

(7) It is assumed that mis-diagnosis of scram is "epsilon" (1E-4). The HEP for each action (or activity) should be adjusted accordingly (up or down) depending on whether the event is covered in training, the event is practiced by the operators, the event is well recognized and interviews indicate that all operators are familiar with the accident, the event is practicied by the operators in simulator requalification exercises and the complexity of sequence (e.g., conflicting readings). To adjust the HEP upward and downward, use the associated error factor to adjust.

(8) Any additional comments required to clarify the information in this table.

Table 8 Notes:

* See Step 9, pages 8-4 to 8-7 of the ASEP HRA procedures.

(1) List the actions identified in Table 3, Column 3 which are part of one abnormal event.

(2) If the analyst determines that the probability of the operator failing to diagnose the event is negligible, then the remainder of the table is not applicable. Reasons for determining that the diagnosis error is negligible should be discussed in comment column.

(3) Based on Td (from Table 6), an initial HEP for failure to diagnoses is selected from Figure 8-1. Use mean value.

(4) Indicate whether or not the action is "skill-based" as defined in Table 2-1, page 2-6 of the ASEP HRA procedures.

(5) It is assumed that mis-diagnosis of scram is "epsilon" (_ 1E-4). The initial HEP is adjusted downward (use lower bound) or upward (use upper bound) depending on whether the plant uses symptom-oriented EOPs, event is covered in the EOPs, operators are trained on the EOPs and the EOPs are well designed. Additionally, the HEP for each action (or activity) should be adjusted to reflect any special complexity of the sequence (e.g., conflicting readings).

(6) Any additional comments required to clarify the information in this table.

Table 9 Notes:

* See Step #10, pages 8-7 and 8-8 in the ASEP HRA procedures.

(1) List the actions identified in Table 3, Column 3.

(2) List any safety systems that were functioning and then failed.

(3) Indicate whether or not EOPs are well designed, operators use EOPs, and operators are well trained on procedures.

(4) Indicate whether or not an individual operator performs more than one safety function using a system without good indication (cues) that he must shift from one activity to another.

(5) If any safety systems fail after initially operating (#2), EOP design or training is not adequate (#3), or if operator performs more than one function (#4) without adequate indication, then the action (or activity) should be classified as "dynamic" and not "step-by-step". Generally, step-by-step is defined as a routine, procedurally-guided set of steps when performed one-at-a-time.

(6) Any additional comments required to clarify the information in this table.

Table 10 Notes:

* See Step #10, pages 8-7 and 8-8 in the ASEP HRA procedures.

(1) List the actions identified in Table 3, Column 3.

(2) Indicate whether or not the time available to diagnose and perform the action (activities) is less than two hours.

(3) Indicate whether or not more than two safety systems fail in the course of the sequence.

(4) Indicate whether ot not operator is very experienced in the sequence, regardless of items 2 and 3 above.

(5) Extremely high stress is assessed if the response to Items #2 or #2 is yes and the response to item $3 is no. However. if Item #4 is yes, moderately high stress can be assessed. Additionally, the stress should be adjusted accordingly, taking into account such things as "degree of burden", complexity of action (activity), action (activity) needs to be performed "quickly", action location not easily accessible, etc. Any PWR large LOCA is presumed to involve extremely high stress until recirculation is established.

(6) Any additional comments required to clarify the information in this table.

Table 11 Notes:

* See Table 8-5, pages 8-13 and 8-14 in the ASEP HRA procedures.

(1) List the actions identified in Table 3, Column 3

(2) List the activities (tasks) which comprise each action as identified in Table 3, Column 4.

(3) The failure probability of the original operator performing the activity. The HEP is based on whether the activity is step-by-step, dynamic, moderately high stress, extremely high stress (refer to Tables 9 and 10). The HEP is taken from either Item #3, #4, or #5 of Table 8-5 of the ASEP HRA procedures.

(4) If recovery of the activity (action) made by the original operator is possible, identify the probability that a second person (generally the shift supervisor) fails to correct the original operator. This HEP is based on whether the activity is step-by-step, dynamic, moderately high stress, extremely high stress (refer to Tables 9 and 10). The HEP is taken from either Item #6, #7, or #8 of Table 8-5 of the ASEP HRA procedures.

(5) If the accident sequence is such that a third independent check (e.g., accident management team, second shift, etc.) is performed, the probability for failing to do so is assessed. This HEP is based on whether the activity is step-by-step, dynamic, moderately high stress, extrememly high stress (refer to Tables 9 and 10). The HEP is taken from Item #6, #7 or #8 of Table 8-5 of the ASEP HRA procedures.

(6) The probability of failing to perform an action is the multiplication of the HEPs of Items #3, #4, and #5.

(7) Any comments required to clarify the information in this table.

C. Reference

C-1 A.D. Swain, Accident Sequence Evaluation Program Human Reliability Analysis Procedure, NUREG/CR-4772, February 1987.

Table C-1

Feed and Bleed Cooling Sequences

The following sheets calculate human error probabilities for:

AFW-XHE-FO-UNIT2$_{HRA}$ - Failure to cross connect AFW from Unit 2

HPI-XHE-FO-FDBLD - Failure to initiate HPI for feed and bleed

PPS-XHE-FO-PORVS - Failure to open PORVs for feed and bleed

for S_3, T_2, T_3, and T_1 sequences with two DGs operable.

TABLE 1

ACCIDENT SEQUENCE DESCRIPTION

EVENT TREE: T_1, T_2, T_3

SEQUENCE NUMBER:

SEQUENCE DESIGNATOR: T_1LD_2 / T_1LP / T_2LD_2 / T_2LP / T_3LMD_2 / T_3LMP / S_3LMP

SEQUENCE DESCRIPTION:

(1)

Turbine trip with or without main feedwater is the initiating event. Main feedwater will be isolated when T_{AVE} reaches 543°F - which is shortly after turbine trip. After immediate post trip recovery, operator will attempt to restore MFW via opening of the main feed regulating bypass valves, or will go to AFW. If this is unavailable, he will go to AFW at Unit 2. [AFW from Unit 1 will start automatically on low steam generator water level]. If AFW from Unit 2 is unavailable, he will go to feed and bleed, using at least one charging pump and 2 PORVs.

APPLICABLE PROCEDURES:

(4)

EP 1.0 - Reactor Trip or SI
EP1.01 - Reactor Trip Recovery
FRP H.1 - Loss of Secondary Heat Sink

TABLE 2

SEQUENCE AND CUT SET TIMING*

EVENT/OCCURRENCE (1)	TIME (2)	ANNUNCIATOR/INDICATION (3)	COMMENTS/ SOURCE OF INFORMATION (4)
1. Reactor trip/turbine trip	t = 0	Yes	
2. Main feedwater isolate	t = 3m		
3. Operator attempts to restore MFW thru bypass valve	t = 5m		
4. Lo level in SG	t = 10m	Yes	
5. AFW - Unit 1 fails to start	t = 10m	Yes	
6. Operator attempts AFW from Unit 2	t = 15m		
7. Operator fails to initiate feed and bleed	t = 35m		

TABLE 3

CUT SET FAILURE AND POTENTIAL OPERATOR ACTIONS*

CUT SETS:

DESCRIPTION OF EVENT (1)	SYMPTOMS (2)	POTENTIAL OPERATOR ACTIONS (3)	ACTIVITIES (TASKS) REQUIRED TO PERFORM ACTION AND PROCEDURALIZED (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Loss of MFW		AFW from Unit 1	1) start pumps	
2. Loss of AFW-U1	a) no flow b) lo SG level	AFW from Unit 2	1) close 251 valves at Unit 2 2) open 160 A/B MOV 3) start AFWP at Unit 2	
3. Loss of AFW-U2	a) no flow b) lo SG level	Feed and bleed	1) start charging pump 2) open both PORVs and block valves if necess.	

TABLE 4

SEQUENCE AND CUT SET AVAILABLE TIME

CUT SETS:

ACTION (1)	TIME BY WHICH OPERATOR MUST ACT TO PREVENT SUBSEQUENT CORE DAMAGE (Tcd) (2)	TIME AT WHICH OPERATOR IS ALERTED THAT SYMPTOM HAS OCCURRED (To) (3)	MAXIMUM TIME AVAILABLE TO PERFORM THE IDENTIFIED OPERATOR ACTIVITIES (Tm) (4)	COMMENTS/ SOURCE OF INFORMATION (5)
AFW-XHE-FO-UNIT2$_{HRA}$	35m	10m	25m	
HPI-XHE-FO-FDBLD	35m	15m	20m	
PPS-XHE-FO-PORVS	35m	15m	20m	

TABLE 5

OPERATOR ACTION PERFORMANCE TIME*

CUT SETS:

ACTION	ACTIVITIES (1)	LOCATION (2)	TRAVEL TIME (3)	PERFORMANCE TIME (4)	TOTAL TIME (Ta) (5)	COMMENTS/ SOURCE OF INFORMATION (6)
AFW-XHE-FO-UNIT2$_{HRA}$						
	a) close 251 valves	CR	1m	1m	2m	
	b) open 160 A/B vlv	CR	--	1m	2m	
	c) start AFW P	CR	--	1m	1m	
					4m	- It actually can all be done in 2 minutes or less.
PPS-XHE-FO-PORVS						
	open PORVs	CR	1m	1m	2m	
HPI-XHE-FO-FDBLD						
	start charging pumps	CR	1m	1m	2m	

TABLE 6

DIAGNOSIS TIME OF SEQUENCE CUT SET*

SEQUENCE/CUT SET	MAXIMUM TIME AVAILABLE (Tm) (1)	TOTAL ACTION TIME (Ta) (2)	TIME AVAILABLE TO DIAGNOSIS (Td) (3)	COMMENTS/ SOURCE OF INFORMATION (4)
AFW-XHE-FO-UNIT2$_{HRA}$	25m	2m	23m	
HPI-XHE-FO-FDBLD	20m	2m	18m	
PPS-XHE-FO-PORVS	20m	2m	18m	

TABLE 7

DIAGNOSIS ANALYSIS -- MORE THAN ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	NUMBER OF ABN EVENT (3)	ANNUNCIATOR HEP (Table 8-4) (4)	FAILURE TO DIAGNOSE (Table 8-2) (5)	SKILL-BASED (6)	ADJUSTMENT IN FINAL HEP (7)	COMMENTS/ SOURCE OF INFORMATION (8)

NOT APPLICABLE

TABLE 8

DIAGNOSIS ANALYSIS - ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	FAILURE TO DIAGNOSE (Figure 8-1) (3)	SKILL-BASED (4)	ADJUSTMENT IN FINAL HEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
$AFW\text{-}XHE\text{-}FO\text{-}UNIT2_{HRA}$	Yes				This is procedure directed by FRP H,1; which will be entered directly on low feed flow.
Feed and bleed	Applicable to sequences where F&B is required because of operator errors involving AFW.	2.66E-2			If AFW at Unit 2 is unavailable because of mechanical failures, the operator would recognize this and go to the next steps in the procedure which tell him to feed and bleed. If the operator makes an error in alignment of AFW from U2, then he must diagnose that an error has been made. The STA will be monitoring the core status trees and will have the opportunity to recognize that there is no AFW.

LE 9

POST-DIAGNOSIS ACTION-TYPE IDENTIFICATION*

CUT SETS:

ACTION (Activities) (1)	SAFETY SYSTEMS FAILED (2)	EOPs, TRAINING, USE EOPs, WELL-DESIGNED EOPs (3)	OPERATOR PERFORMS ONE ACTIVITY (4)	DYNAMIC OR STEP-BY-STEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
AFW - U2	1	Yes	Yes	Step by Step	
Feed and bleed	1	Yes	Yes	Step by Step	If AFW has previously failed due to operator error, the time to do feed and bleed is shortened and time stress is present.

TABLE 10

POST-DIAGNOSIS STRESS-LEVEL INDICATION*

CUT SETS:

ACTION (Activities) (1)	Tm 2 h AFTER IE (2)	MORE THEN TWO SAFETY SYSTEMS FAIL (3)	OPERATOR FAMILIAR W/SEQUENCE (4)	STRESS LEVEL (5)	COMMENTS/ SOURCE OF INFORMATION (6)
AFW - Unit 2	NA	No	Yes	Moderate	
Feed and bleed	NA	No	Yes	Moderate	

TABLE 11

POST-DIAGNOSIS ANALYSIS*

CUT SETS:

ACTION (1)	ACTIVITIES (2)	ORIGINAL OPERATOR HEP (3)	SUPERVISOR FAILS TO CORRECT OPERATOR HEP (4)	THIRD INDEPENDENT CHECK/CORRECTION HEP (5)	TOTAL HEP (6)	COMMENTS/ SOURCE OF INFORMATION (7)
AFW - U2	a) close 251 valves	3.2E-2	3.2E-1		1.04E-2	
	b) open 160 valves	3.2E-2	3.2E-1		1.04E-2	
	c) start pumps	3.2E-2	3.2E-1		1.04E-2	
					3.1E-2	
HPI-XHE-FO-FDBLD	start HPI pump	6.4E-2	6.4E-1		4.1E-2	
PPS-XHE-FO-PORVS (after previous oper. error)	open PORV	6.4E-2	6.4E-1		4.1E-2	
HPI-XHE-FO-FDBLD	start HPI pump	3.2E-2	3.2E-1		1.04E-2	
PPS-XHE-FO-PORVS (no previous oper. error)	open PORV	3.2E-2	3.2E-1		1.04E-2	

Table C-2

Station Blackout Sequences

The following sheets calculate human error probabilities for events during a station blackout. These are:

0	- Operator fails to depressurize and cooldown the RCS
AFW-CST-FO-CST2$_{HRA}$	- Operator fails to connect CST #2 to the emergency CST - in the event of a stuck open SG safety valve.
AFW-XHE-FO-U2SBO	- Operator fails to feed both units with one turbine driven AFW pump.
AFW-XHE-FO-U1SBO$_{HRA}$	- Operator fails to cross connect AFW from Unit 2, when U-2 has the TDP and a MDP operable,
REC-XHE-FO-SCOOL	- Operator fails to cross connect seal cooling from Unit 2.
MCW-CCF-VF-SBO$_{HRA}$	- Failure to isolate condenser water box to supply service water to CPC suction.

ACCIDENT SEQUENCE DESCRIPTION

EVENT TREE: T_{1S} - Station Blackout

SEQUENCE NUMBER:

SEQUENCE DESIGNATOR: T_{1S}-L / T_{1S}-Q_S / T_{1S}-O / T_{1S}-W_2

SEQUENCE DESCRIPTION:
(1)

Loss of offsite power is the initiating event. Both diesels are unavailable to Unit 1. For some sequences, Unit 2 may have power. The four sequences listed above involve different failures. In T_{1S}-L, the turbine driven AFW pump from Unit 1 is unavailable. In sequence T_{1S}-Q_S, a SG-SV fails to reclose, leading to uncontrolled blowdown in one SG. This leads to a greater AFW demand. The operator must manually align the normal CST to the emergency CST in order to assure long term feedwater supply. The third sequence (T_{1S}-O) is an extended SBO where the operators fail to cooldown and depressurize the RCS. This is not a critical failure in itself, but does affect the timing of other sequences. The fourth sequence represents failure to provide seal cooling from Unit 2.

APPLICABLE PROCEDURES:
(4)

ECA - 1.0 Loss of all AC power
AP - 11 Station Blackout

TABLE 2

SEQUENCE AND CUT SET TIMING*

CUT SETS:

EVENT/OCCURRENCE (1)	TIME (2)	ANNUNCIATOR/INDICATION (3)	COMMENTS/ SOURCE OF INFORMATION (4)
1. Loss offsite power	t = 0	Yes, Many	
2. All DG unavailable	t = 1m	Yes	
3. AFW-TDP - Unit 1 unavailable	t = 1m	Yes	
4. Stuck open SG-SV	t = 5m, 25m, 45m	Yes	
5. Operator fail to depressurize	t = >1 hr	No	
6. SW intake canal fail to isolate	t = 1m	Yes	

E 3

CUT SET FAILURE AND POTENTIAL OPERATOR ACTIONS*

CUT SETS:

DESCRIPTION OF EVENT (1)	SYMPTOMS (2)	POTENTIAL OPERATOR ACTIONS (3)	ACTIVITIES (TASKS) REQUIRED TO PERFORM ACTION AND PROCEDURALIZED (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Loss AFW-U1	a) TDP not operable b) no AFW flow	cross connect from Unit 2	a) start TDP b) open cross connect valves c) balance flow by manually throttle valves	
2. Stuck open SG-SV	a) continued loud noise in yard b) uncontrolled decrease in SG pressure	cross connect CST to ensure AFW feed supply	a) isolate CST from hotwell b) open CST transfer valves to emergency CST	
3. Station Blackout	No AC power	Operator directed to cooldown RCS	a) manual line up of valves- bypass MSTV, dump to condenser - vent condenser	
	Cross connect RCP seal cooling from Unit 2	a) open valves in cross tie header b) throttle valves on Unit 2 to balance flows between headers. c) Isolate condenser water boxes to provide suction source for CPC pumps	a) assumes only one pump is operable at Unit 2.	

TABLE 4

SEQUENCE AND CUT SET AVAILABLE TIME

CUT SETS:

ACTION (1)	TIME BY WHICH OPERATOR MUST ACT TO PREVENT SUBSEQUENT CORE DAMAGE (Tcd) (2)	TIME AT WHICH OPERATOR IS ALERTED THAT SYMPTOM HAS OCCURRED (To) (3)	MAXIMUM TIME AVAILABLE TO PERFORM THE IDENTIFIED OPERATOR ACTIVITIES (Tm) (4)	COMMENTS/ SOURCE OF INFORMATION (5)
0	NA	NA	NA	
AFW-CST-FO-CST_{HRA}	100m	5m	95m	
AFW-XHE-FO-$U1SBO_{HRA}$ AFW-XHE-FO-U2SBO	35m	5m	30m	
REC-XHE-FO-SCOOL	90m	5m	35m	
MCW-CCF-VF-SBO_{HRA}	90m	5m	85m	

E 5

OPERATOR ACTION PERFORMANCE TIME*

CUT SETS:

ACTION	ACTIVITIES (1)	LOCATION (2)	TRAVEL TIME (3)	PERFORMANCE TIME (4)	TOTAL TIME (Ta) (5)	COMMENTS/ SOURCE OF INFORMATION (6)
0	a) Bypass MSTV	Local	10	10	20	Multiple people perform these tasks. Travel time additive.
	b) Close x-tie	Local	10	10	20	
	c) Open bypass	Local	10	10	20	
	d) Open hoggers	Local	10	10	20	
					30m	
$AFW\text{-}CST\text{-}FO\text{-}CST2_{HRA}$	a) Isolate CST2 from hotwell	Local	10	10	20	Travel time is not additive.
	b) X-tie CST2 to CST1A	Local	10	10	20	
					30	
$AFW\text{-}XHE\text{-}FO\text{-}U1SBO_{HRA}$	a) Isolate headers at Unit 2	CR	1m	5m	6	
	b) Open X-tie valves	CR	1m	2m	3	
AFW-XHE-FO-U2SBO	a) throttle discharge valves to balance flows	Local	10m	continual	NA	
REC-XHE-FO-SCOOL	a) open x-tie valves	Local	10m	10m	20m	
	b) throttle valves at U-2 to balance flow	CR	1m	continual	NA	
$MCW\text{-}CCF\text{-}VF\text{-}SBO_{HRA}$	a) manually close condenser isol. valve	Local	10m	45m	55m	

TABLE 6

DIAGNOSIS TIME OF SEQUENCE CUT SET*

SEQUENCE/CUT SET	MAXIMUM TIME AVAILABLE (Tm) (1)	TOTAL ACTION TIME (Ta) (2)	TIME AVAILABLE TO DIAGNOSIS (Td) (3)	COMMENTS/ SOURCE OF INFORMATION (4)
0	NA	30m	NA	
$AFW\text{-}CST\text{-}FO\text{-}CST2_{HRA}$	95m	30m	65m	
$AFW\text{-}XHE\text{-}FO\text{-}U1SBO_{HRA}$	30m	10m	20m	
AFW-XHE-FO-U2SBO	30m	NA	20m	
REC-XHE-FO-SCOOL	85m	20m	65m	
$MCW\text{-}CCF\text{-}VF\text{-}SBO_{HRA}$	85m	55m	30m	

TABLE 7

DIAGNOSIS ANALYSIS -- MORE THAN ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	NUMBER OF ABN EVENT (3)	ANNUNCIATOR HEP (Table 8-4) (4)	FAILURE TO DIAGNOSE (Table 8-2) (5)	SKILL-BASED (6)	ADJUSTMENT IN FINAL HEP (7)	COMMENTS/ SOURCE OF INFORMATION (8)

NOT APPLICABLE

TABLE 8

DIAGNOSIS ANALYSIS - ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	FAILURE TO DIAGNOSE (Figure 8-1) (3)	SKILL-BASED (4)	ADJUSTMENT IN FINAL HEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
0	Yes				
$AFW\text{-}XHE\text{-}FO\text{-}CST_{HRA}$	Yes				
$AFW\text{-}XHE\text{-}FO\text{-}U1SBO_{HRA}$	No	2.66E-2	No		Diagnosis error included because operator must realize the normal cross connect alignment is not possible. Must figure a way to cross connect with inoperable motor operated valves.
AFW-XHE-FO-U2SBO	Yes				In these events, flow balancing is a continual action. It is considered dynamic due to the circumstances, and thus assigned a higher failure rate. The confusion error is therefore included in the dynamic action error.
REC-XHE-FO-SCOOL	Yes				
$MCW\text{-}CCF\text{-}VF\text{-}SBO_{HRA}$	No	2.66E-2	No		Diagnosis error assigned to account for operator failure to correctly diagnose which condenser should be isolated.

TABLE 9

POST-DIAGNOSIS ACTION TYPE IDENTIFICATION*

CUT SETS:

ACTION (Activities) (1)	SAFETY SYSTEMS FAILED (2)	EOPs, TRAINING, USE EOPs, WELL-DESIGNED EOPs (3)	OPERATOR PERFORMS ONE ACTIVITY (4)	DYNAMIC OR STEP-BY-STEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
0		Yes	No	Step by Step	
$AFW\text{-}XHE\text{-}FO\text{-}CST2_{HRA}$		Yes	No	Step by Step	
$AFW\text{-}XHE\text{-}FO\text{-}U1SBO_{HRA}$		Yes	No	Step by Step	
AFW-XHE-FO-U2SBO			Yes	Dynamic	
REC-XHE-FO-SCOOL			Yes	Dynamic	
$MCW\text{-}CCF\text{-}VF\text{-}SBO_{HRA}$			No	Step by Step	

TABLE 10

POST-DIAGNOSIS STRESS-LEVEL INDICATION*

CUT SETS:

ACTION (Activities) (1)	Tm 2 h AFTER IE (2)	MORE THEN TWO SAFETY SYSTEMS FAIL (3)	OPERATOR FAMILIAR W/SEQUENCE (4)	STRESS LEVEL (5)	COMMENTS/ SOURCE OF INFORMATION (6)
0	No	--	--	Moderate	
AFW-XHE-FO-CST2$_{HRA}$	No	--	--	Moderate	
AFW-XHE-FO-U1SBO$_{HRA}$	No	--	--	Moderate	
AFW-XHE-FO-U2SBO	No	--	--	Moderate	
REC-XHE-FO-SCOOL	No	--	--	Moderate	
MCW-CCF-VF-SBO$_{HRA}$	No	--	--	Moderate	

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POST-DIAGNOSIS ANALYSIS*

CUT SETS:

ACTION (1)	ACTIVITIES (2)	ORIGINAL OPERATOR HEP (3)	SUPERVISOR FAILS TO CORRECT OPERATOR HEP (4)	THIRD INDEPENDENT CHECK/CORRECTION HEP (5)	TOTAL HEP (6)	COMMENTS/ SOURCE OF INFORMATION (7)
0	a) Bypass MSTV	.032	.32	--	.011	
	b) Close x-tie	.032	.32	--	.011	
	c) Open bypass	.032	.32	--	.011	
	d) Open Hoggers	.032	.32	--	.011	
					.044	
AFW-XHE-FO-CST2$_{HRA}$	a) Isolate CST2 from hotwell	.032	--	--	.032	
	b) X-tie CST2 to CST1A	.032	--	--	.032	
					.064	
AFW-XHE-FO-U1SBO$_{HRA}$	a) Isolate headers at U-2	.032	.32	--	.011	
	b) open X-tie valves	.032	.32	--	.011	
					.022	
AFW-XHE-FO-U2SBO	a) open X-tie	.032	.32	--	.011	
	b) throttle discharge vlvs	.08	.8	--	.064	
					.075	
REC-XHE-FO-SCOOL	a) open X-tie	.032	--	--	.032	
	b) close MOV 1287C	.032	.32	--	.0104	
	c) throttle vlvs at U-2 to balance flow	.08	.8	--	.064	
	d) start HPI pp	.032	.32	--	.0104	
	e) start CPC pp	.032	.32	--	.0104	
					.127	
MCW-CCF-VF-SBO$_{HRA}$	a) close condenser isol valves	.032	--	--	.032	

Table C-3

SGTR with a Faulted SG Sequence

These tables explain the derivation of human error probabilities for the following events:

MSS-XHE-FO-BLOCK	- Manually isolate block valve on SG ADV
MSS-XHE-FO-ISAFW$_{HRA}$	- Manually close AFW TDP steam supply valve
MSS-XHE-FO-ISBLDN	- Manually close isolation valve on SG blowdown line
RCS-XHE-FO-DPRT7	- Depressurize RCS in time to prevent pressure relief demand in SG
REC-XHE-FO-DPRES	- Cooldown and depressurize the RCS in time to prevent break flow.

They all appear at various times in $T_7O_DQ_S$ and $T_7O_DQQ_S$

ACCIDENT SEQUENCE DESCRIPTION

EVENT TREE: T_7 - Steam Generator Tube Rupture

SEQUENCE NUMBER:

SEQUENCE DESIGNATOR: $T_7O_DQ_S$, $T_7O_DQQ_S$

SEQUENCE DESCRIPTION:
(1)

Steam generator tube rupture of 600 gpm. Safety injection comes on due to low pressurizer pressure. Ruptured steam generator (SG) starts to be pressurized due to break flow. Operator is expected to close MSIV on high radiation indication. In order to mitigate the accident, the operator must depressurize the reactor to a pressure less than the SG-SV and ADV set point; and isolate all other lines which represent blowdown paths from the SG. In this sequence the operator fails to depressurize the RCS and the ruptured SG loses its integrity (becomes faulted) thus leading to uncontrolled blowdown from the RCS. The operator error in this case represents the failure to depressurize before a SG-RV (SV or ADV) demand. Should this event occur and should there be an uncontrolled blowdown, there is still an additional 8-10 hours to recover. Recovery can be accomplished by isolation of the faulted SG (if possible) or RCS depressurization to a point where the break flow is of little consequence. Additionally, in $T_7O_DQQ_S$ an RCS PORV sticks open.

APPLICABLE PROCEDURES:
(4)

EP 1.0 - Reactor Trip
EP 4.0 - Steam Generator Tube Rupture
EP 3.0 - Faulted Steam Generator Isolation
ECA 4.01 - SGTR with Loss of Reactor Coolant, Subcooled Recovery

TABLE 2

SEQUENCE AND CUT SET TIMING*

$T_7O_DQ_S$, $T_7O_DQQ_S$

EVENT/OCCURRENCE (1)	TIME (2)	ANNUNCIATOR/INDICATION (3)	COMMENTS/ SOURCE OF INFORMATION (4)
1. Steam generator tube rupture	t = 0	high condenser radiation low pressurizer pressure	
2. Safety injection	t = 0 +	many	
3. SG blowdown line fail to close	on SI	indicated in CR	
4. AFW TDP - steam valve fail to close	< 10m	none	
5. SG pressure relief demand	45m after oper closes MSIV	noise opening indicated in CR	Operator assumed to close MSIV soon
6. SG ADV opens and sticks	45m	position indicated in CR	
7. SG SV opens and sticks	45m		

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CUT SET FAILURE AND POTENTIAL OPERATOR ACTIONS*

CUT SETS:

DESCRIPTION OF EVENT (1)	SYMPTOMS (2)	REQUIRED OPERATOR ACTIONS (3)	ACTIVITIES (TASKS) REQUIRED TO PERFORM ACTION AND PROCEDURALIZED (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. SGTR	See Table 2 - #1	Must depressurize RCS to terminate break flow and isolate SG	1. Oper. must cooldown by dumping steam 2. Enhanced AFW is desired, but not necessary 3. After he coolsdown 50°F or more, can begin depressurization 4. Must depressurize using pzr. spray, PORV, or aux spray	
2. Stuck open ADV	a) uncontrolled SG pressure drop b) position indicated in CR c) loud noises in yard	Close block valve or depressurize RCS to terminate inventory loss	1. Locally close valve 2. Cooldown and depressurize within 8 hours	
3. Stuck open SV	a) uncontrolled SG pressure drop b) loud noises in yard	Depressurize RCS to terminate inventory loss	1. Cooldown and depressurize within 8 hours	
4. Stuck open SG blowdown line	a) indicated in CR	a) Manual close valve b) Close block valve c) depressurize	same as column 3	
5. Fail to close AFW-TDP steam supply valve	a) none CR	a) stop TD pump b) close supply valve c) depressurize	same as column 3	

TABLE 4

SEQUENCE AND CUT SET AVAILABLE TIME

ACTION (1)	TIME BY WHICH OPERATOR MUST ACT	TIME AT WHICH OPERATOR IS ALERTED THAT SYMPTOM HAS OCCURRED (To) (3)	MAXIMUM TIME AVAILABLE TO PERFORM THE IDENTIFIED OPERATOR ACTIVITIES (Tm) (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Depressurize to prevent SG pressure relief demand	45m	5m	40m	
2. Close SG ADV block	10hr	50m	9h 10m	
3. Close AFW TDP supply	10hr	15m	9h 45m	
4. Close SG blowdown	10hr	10m	9h 50m	
5. Depressurize to conserve RCS/RWST Inventory	10hr	50m	9h 10m	

TABLE 5

OPERATOR ACTION PERFORMANCE TIME*

CUT SETS:

ACTION	ACTIVITIES (1)	LOCATION (2)	TRAVEL TIME (3)	PERFORMANCE TIME (4)	TOTAL TIME (Ta) (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Depressurize to prevent SG SV/RV demand	a) Open stm dump or SG-PORV	CR	--	1m	25m	Although the actions are very quick and simple, the reactor takes time to depressurize and cooldown. It is estimated that cooldown and depressurization will take 25m. At North Anna it was accomplished in 12m, at Ginna it wasn't done by 27m.
	b) Depressurize RCS via spray or PORV	CR	--	1m	25m	
2. Close SG ADV block	a) manually close valve	local	10m	10m	20m	
3. Close AFW TDP supply	a) close valve	local	10m	10m	20m	
4. Close SG blowdown	a) close valve	local	10m	10m	20m	
5. Depressurize to conserve RCS/RWST inventory	a) open steam dumps	CR	1m	--	5hr	To depressurize enough to terminate RCS leakage, if there is a faulted SG, requires that oper. cooldown to 300°F or so. At 50°/hr, this will take approx. 5hr.
	b) depressurize RCS	CR	1m	--	5hr	

TABLE 6

DIAGNOSIS TIME OF SEQUENCE CUT SET*

ACTION	MAXIMUM TIME AVAILABLE (Tm) (1)	TOTAL ACTION TIME (Ta) (2)	TIME AVAILABLE TO DIAGNOSIS (Td) (3)	COMMENTS/ SOURCE OF INFORMATION (4)
1. Depressurize RCS to prevent SG SV/RV demand	40m	25m	15m	
2. Close SG ADV block	9h - 10m	20m	8hr - 50m	
3. Close AFW TDP supply	9h - 45m	20m	9h 25m	
4. Close SG blowdown line	9h - 50m	20m	9h - 30m	
5. Depressurize to conserve Inventory	9h - 10m	5hr	4h - 10m	

TABLE 7

DIAGNOSIS ANALYSIS -- MORE THAN ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	NUMBER OF ABN EVENT (3)	ANNUNCIATOR HEP (Table 8-4) (4)	FAILURE TO DIAGNOSE (Table 8-2) (5)	SKILL-BASED (6)	ADJUSTMENT IN FINAL HEP (7)	COMMENTS/ SOURCE OF INFORMATION (8)
NOT APPLICABLE							

TABLE 8

DIAGNOSIS ANALYSIS - ONE ABNORMAL EVENT*

	ACTION (1)	DIAGNOSIS NEGLIGIBLE (2)	FAILURE TO DIAGNOSE (Figure 7-1) (3)	SKILL-BASED (4)	ADJUSTMENT IN FINAL HEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1.	Depressurize to prevent SG SV/RV demand	No	6.8E-3		Lower Bound	A diagnosis error is assigned here, even though action is procedure directed because operator must diagnose SGTR and jump into EP 4.0 in order to start depress. in time. Lower bound used because recent North Anna SGTR considered to make operators highly aware of SGTR at VEPCO.
2.	Close SG ADV block	Yes				Procedure directed. Time available to work through procedures.
3.	Close AFW TDP supply	Yes				See above
4.	Close SG blowdown	Yes				See above
5.	Depressurize to conserve inventory	Yes				Operator has 2 hours to initiate cooldown. It is procedure directed. Time available to work through procedures.

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POST-DIAGNOSIS ACTION-TYPE IDENTIFICATION*

ACTION (Activities) (1)	SAFETY SYSTEMS FAILED (2)	EOPs, TRAINING, USE EOPs, WELL-DESIGNED EOPs (3)	OPERATOR PERFORMS ONE ACTIVITY (4)	DYNAMIC OR STEP-BY-STEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Depress. RCS	No	Yes	Yes	Step by Step	
2. Close SG ADV block	No	Yes	Yes	Step by Step	
3. Close AFW TDP supply	No	Yes	Yes	Step by Step	
4. Close SG blowdown line	No	Yes	Yes	Step by Step	
5. Depress. in long term	No	Yes	Yes	Step by Step	

TABLE 10

POST-DIAGNOSIS STRESS-LEVEL INDICATION*

	ACTION (Activities) (1)	Tm 2 h AFTER IE (2)	MORE THEN TWO SAFETY SYSTEMS FAIL (3)	OPERATOR FAMILIAR W/SEQUENCE (4)	STRESS LEVEL (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1.	Depressurize RCS to prevent SG SV-RV demand	NA	No	Yes	Moderate hi	
2.	Close SG ADV block	--	No	Yes	Moderate hi	
3.	Close AFW TDP	--	No	Yes	Moderate hi	
4.	Close SG blowdown line	--	No	Yes	Moderate hi	
5.	Depressurize RCS to conserve inventory	--	No	Yes	Moderate hi	

Table 11

Post-Diagnosis Analysis*

Action (1)	Activities (2)	Original Operator HEP (3)	Supervisor Fails to correct operator HEP (4)	Third Independent check/correction HEP (5)	Total HEP (6)	Comments/ Source of Information (7)
1. Depressurize RCS to prevent SG SV/RV demand	a) Dump steam b) Spray pzr or open PORV	3.2E-2 3.2E-2	3.2E-1 3.2E-1	-- --	1.04E-2 1.04E-2 2.08E-2	
2. Close SG ADV block valve	--	6.4E-2	--	--	6.4E-2	BHEP of .032 was doubled for this event to account for potentially harsh or stressful environmental conditions for this action.
3. Close AFW TDP supply	--	3.2E-2	3.2E-1	3.2E-1	3.3E-3	
4. Close SG blowdown	--	3.2E-2	3.2E-1	3.2E-1	3.3E-3	
5. Depressurize to conserve RCS inventory	-- a) Dump stream b) Spray pzr or open PORV	3.2E-2 3.2E-2	3.2E-1 * 3.2E-1	3.2E-2 x 3.2E-1 =	2.16E-04	The value of 2.1E-4 was not used in the quantification. This action is found in cut sets along with action number 1. The compound human error probability would then be 4E-6. The HRA guidelines for minimum human error probabilities and the guidelines for maximum attempts at one action were consulted to modify the probability of action #5, in order that the overall cut set HEP met these guidelines. The resulting HEP for action #5 was calculated to be 1.4E-2.

Table C-4

SGTR with HPI Failure Sequence

TABLE 1

ACCIDENT SEQUENCE DESCRIPTION

EVENT TREE: T_7 - Steam Generator Tube Rupture

SEQUENCE NUMBER:

SEQUENCE DESIGNATOR: $T_7D_1O_D$

SEQUENCE DESCRIPTION:
(1)

Steam generator tube rupture with subsequent failure of HPI. Operator must cope with the tube rupture and the HPI failure. The tube rupture requires cooldown and depressurization of the primary, while the HPI failure requires opening alternate injecton paths, or cross-connect of HPI from Unit 2. The beginning of the sequence is previously described in the Tables for $T_7O_DQ_S$. However, HPI fails when responding to low pressurizer pressure. At this point, the operator must diagnose two events, and respond to each one. For the purposes of this HRA, the HPI failure was considered to be the first event to be observed and thus the focus of his attention. The tube rupture was the second event.

APPLICABLE PROCEDURES:
(4)

EP 4.0 Steam Generator Tube Rupture
EP 1.0 Reactor Trip, Safety Injection
FRP C.2 Inadequate Core Cooling

TABLE 2

SEQUENCE AND CUT SET TIMING*

CUT SETS:

EVENT/OCCURRENCE (1)	TIME (2)	ANNUNCIATOR/INDICATION (3) SOURCE OF INFORMATION (4)	COMMENTS/
1. Steam Generator Tube Rupture	t = 0		
2. SI signal on low pressurizer	t = 0+	yes	
3. Failure to initiate SI flow	t = 0+	1. SI flow indicates zero 2. Possible indication of mispositioned valves 3. Possible indication of pump failure	

TABLE 3

CUT SET FAILURE AND POTENTIAL OPERATOR ACTIONS*

CUT SETS:

DESCRIPTION OF EVENT (1)	SYMPTOMS (2)	POTENTIAL OPERATOR ACTIONS (3)	ACTIVITIES (TASKS) REQUIRED TO PERFORM ACTION AND PROCEDURALIZED (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. SGTR (T_7)	1. Hi condenser radiation ind. 2. Low pressurizer pressure	1. Operator must cool-down and depressurize RCS to terminate flow 2. Must also isolate SG	1. Open steam dump valves 2. Enhance feed flow 3. Depressurize RCS through pressurizer spray or PORV opening 4. Isolate SG effluent lines.	
2. Failure of HPI (D_1)	1. No indication of SI flow of SI flow 2. Possible valve misposition 3. Possible pump malfunction	1. Open alternate injection paths 2. Cross connect from Unit 2	1. Open alternate paths as necessary 2. Isolate pump at Unit 2 3. Open cross-connect valve locally 4. Start pump Unit 2	

TABLE 4

SEQUENCE AND CUT SET AVAILABLE TIME

CUT SETS:

ACTION (1)	TIME BY WHICH OPERATOR MUST ACT TO PREVENT SUBSEQUENT CORE DAMAGE (Tcd) (2)	TIME AT WHICH OPERATOR IS ALERTED THAT SYMPTOM HAS OCCURRED (To) (3)	MAXIMUM TIME AVAILABLE TO PERFORM THE IDENTIFIED OPERATOR ACTIVITIES (Tm) (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. RCS-XHE-FO-DPT7D	60m	5m	55m	Time in column 2 is longer than for T_7 with HPI.
2. HPI-XHE-FO-ALTS3$_{HRA}$	150m	5m	145m	
3. HPI-XHE-FO-UN2S3$_{HRA}$	150m	5m	145m	

E 5

OPERATOR ACTION PERFORMANCE TIME*

CUT SETS:

ACTION	ACTIVITIES (1)	LOCATION (2)	TRAVEL TIME (3)	PERFORMANCE TIME (4)	TOTAL TIME (Ta) (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. RCS-XHE-FO-DPT7D		CR	--	35m	35m	
2. $HPI\text{-}XHE\text{-}FO\text{-}ALTS3_{HRA}$		CR	--	--	--	
		Local	10m	10m	20m	
3. $HPI\text{-}XHE\text{-}FO\text{-}UN2S3_{HRA}$		CR	--	--	--	
		Local	10m	10m	20m	

TABLE 6

DIAGNOSIS TIME OF SEQUENCE CUT SET*

SEQUENCE/CUT SET	MAXIMUM TIME AVAILABLE (Tm) (1)	TOTAL ACTION TIME (Ta) (2)	TIME AVAILABLE TO DIAGNOSIS (Td) (3)	COMMENTS/ SOURCE OF INFORMATION (4)
1. RCS-XHE-FO-DPT7D	55m	35m	20m	
2. HPI-XHE-FO-ALTS3$_{HRA}$	145m	20m	125m	
3. HPI-XHE-FO-UN2S3$_{HRA}$	145m	20m	125m	

DIAGNOSIS ANALYSIS -- MORE THAN ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	NUMBER OF ABN EVENT (3)	ANNUNCIATOR HEP (Table 8-4) (4)	FAILURE TO DIAGNOSE (Table 8-2) (5)	SKILL-BASED (6)	ADJUSTMENT IN FINAL HEP (7)	COMMENTS/ SOURCE OF INFORMATION (8)
1. RCS-XHE-FO-DPT7D		2	--	2.66E-1	--	--	

TABLE 8

DIAGNOSIS ANALYSIS - ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	FAILURE TO DIAGNOSE (Figure 8-1) (3)	SKILL-BASED (4)	ADJUSTMENT IN FINAL HEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. HPI-XHE-FO-ALTS3$_{HRA}$	Yes	--	Yes		
2. RCS-XHE-FO-DPT7D	No	5.2E-4	--		

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POST-DIAGNOSIS ACTION-TYPE IDENTIFICATION*

CUT SETS:

ACTION (Activities) (1)	SAFETY SYSTEMS FAILED (2)	EOPs, TRAINING, USE EOPs, WELL-DESIGNED EOPs (3)	OPERATOR PERFORMS ONE ACTIVITY (4)	DYNAMIC OR STEP-BY-STEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. RCS-XHE-FO-DPT7D	HPI	--	Yes	Dynamic	
2. $HPI\text{-}XHE\text{-}FO\text{-}ALTS3_{HRA}$	HPI	--	Yes	Step by Step	
3. $HPI\text{-}XHE\text{-}FO\text{-}UN2S3^{HRA}$	HPI	--	Yes	Step by Step	

TABLE 10

POST-DIAGNOSIS STRESS-LEVEL INDICATION*

CUT SETS:

ACTION (Activities) (1)	Tm 2 h AFTER IE (2)	MORE THEN TWO SAFETY SYSTEMS FAIL (3)	OPERATOR FAMILIAR W/SEQUENCE (4)	STRESS LEVEL (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. RCS-XHE-FO-DPT7D	No	No	No	Moderate	
2. HPI-XHE-FO-ALTS3$_{HRA}$	No	No	No	Moderate	
3. HPI-XHE-FO-UN2S3$_{HRA}$	No	No	No	Moderate	

TABLE 11

POST-DIAGNOSIS ANALYSIS*

CUT SETS:

ACTION (1)	ACTIVITIES (2)	ORIGINAL OPERATOR HEP (3)	SUPERVISOR FAILS TO CORRECT OPERATOR HEP (4)	THIRD INDEPENDENT CHECK/CORRECTION HEP (5)	TOTAL HEP (6)	COMMENTS/ SOURCE OF INFORMATION (7)
1.RCS-XHE-FO-DPT7D						
	A. Cooldown	.08	.8	--	.064	
	B. Depressurize	.08	.8	--	.064	
					.128	
2. $HPI\text{-}XHE\text{-}FO\text{-}ALTS3_{HRA}$						
	A. Open local valve	.064	--	--	.064	No independent verification due to local nature of task. BHEP of .032 doubled to account for possible harsh environments
3. $HPI\text{-}XHE\text{-}FO\text{-}UN2S3_{HRA}$						
	A. Isolate charging pump Unit 2	.032	.32	--	.011	
	B. Open cross-connect	.032	.32	--	.011	
	C. Start pump	.032	.32	--	.011	
					.033	

Table C-5

Large and Intermediate LOCA Recirculation Sequences

TABLE 1

ACCIDENT SEQUENCE DESCRIPTION

EVENT TREE: Large and Intermediate LOCA (A and S_1)

SEQUENCE NUMBER:

SEQUENCE DESIGNATOR: AH_1, S_1H_1

SEQUENCE DESCRIPTION:

(1)

Large or intermediate LOCA, which has successfully gone through the ECCS injection phase. RWST is down to 28% and it is time to go to recirculation. The Recirculation Transfer system fails to actuate and the operator must manually activate systems. In the large LOCA scenario, the operator must also switch to hot leg recirculation at 16 hours after the initiator.

APPLICABLE PROCEDURES:

(4)

EP 2.03 - Transfer to cold leg recirc
EP 2.04 - Transfer to hot leg recirc
ECA 2.01 - Loss of emergency coolant recirc

TABLE 2

SEQUENCE AND CUT SET TIMING*

CUT SETS:

EVENT/OCCURRENCE (1)	TIME (2)	ANNUNCIATOR/INDICATION (3)	COMMENTS/ SOURCE OF INFORMATION (4)
Failure of RMT Actuation System	30m	Yes	

TABLE 3

CUT SET FAILURE AND POTENTIAL OPERATOR ACTIONS*

CUT SETS:

DESCRIPTION OF EVENT (1)	SYMPTOMS (2)	POTENTIAL OPERATOR ACTIONS (3)	ACTIVITIES (TASKS) REQUIRED TO PERFORM ACTION AND PROCEDURALIZED (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Failure of RMT actuation systems		1. Manual actuation of valves		
2. 16 hours after LOCA		1. Switch to hot leg recirc		

TABLE 4

SEQUENCE AND CUT SET AVAILABLE TIME

CUT SETS:

ACTION (1)	TIME BY WHICH OPERATOR MUST ACT TO PREVENT SUBSEQUENT CORE DAMAGE (Tcd) (2)	TIME AT WHICH OPERATOR IS ALERTED THAT SYMPTOM HAS OCCURRED (To) (3)	MAXIMUM TIME AVAILABLE TO PERFORM THE IDENTIFIED OPERATOR ACTIVITIES (Tm) (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Manual RMT	45m	30m	15m	
2. Hot leg reclrc	32hr	16hr	16hr	

TABLE 5

OPERATOR ACTION PERFORMANCE TIME*

CUT SETS:

ACTION	ACTIVITIES (1)	LOCATION (2)	TRAVEL TIME (3)	PERFORMANCE TIME (4)	TOTAL TIME (Ta) (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Manual RMT		CR	--	5m	5m	
2. Hot leg recirc		CR	--	20m	20m	

TABLE 6

DIAGNOSIS TIME OF SEQUENCE CUT SET*

SEQUENCE	AVAILABLE (Tm) (1)	TIME (Ta) (2)	TO DIAGNOSIS (Td) (3)	SOURCE OF INFORMATION (4)

NOT APPLICABLE

TABLE 7

DIAGNOSIS ANALYSIS -- MORE THAN ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	NUMBER OF ABN EVENT (3)	ANNUNCIATOR HEP (Table 8-4) (4)	FAILURE TO DIAGNOSE (Table 8-2) (5)	SKILL-BASED (6)	ADJUSTMENT IN FINAL HEP (7)	COMMENTS/ SOURCE OF INFORMATION (8)

NOT APPLICABLE

TABLE 8

DIAGNOSIS ANALYSIS - ONE ABNORMAL EVENT*

CUT SETS:

	ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	FAILURE TO DIAGNOSE (Figure 8-1) (3)	SKILL-BASED (4)	ADJUSTMENT IN FINAL HEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1.	Manual RMT	Yes				Procedure directed ECA 2.01
2.	Hot leg recirc	Yes				Procedure directed in EP 2.04

TABLE 9

POST-DIAGNOSIS ACTION-TYPE IDENTIFICATION*

CUT SETS:

ACTION (Activities) (1)	SAFETY SYSTEMS FAILED (2)	EOPs, TRAINING, USE EOPs, WELL-DESIGNED EOPs (3)	OPERATOR PERFORMS ONE ACTIVITY (4)	DYNAMIC OR STEP-BY-STEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Manual RMT	--	Yes	--	Step by Step	
2. Hot leg recirc	--	Yes	--	Step by Step	

TABLE 10

POST-DIAGNOSIS STRESS-LEVEL INDICATION*

CUT SETS:

ACTION (Activities) (1)	Tm 2 h AFTER IE (2)	MORE THEN TWO SAFETY SYSTEMS FAIL (3)	OPERATOR FAMILIAR W/SEQUENCE (4)	STRESS LEVEL (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Manual RMT	No	--	--	Extreme	Per guidelines in NUREG/CR-4772, extreme stress present in a large LOCA until recirculation complete.
2. Hot leg recirc	Yes	--	--	Low	

POST-DIAGNOSIS ANALYSIS*

CUT SETS:

ACTION (1)	ACTIVITIES (2)	ORIGINAL OPERATOR HEP (3)	SUPERVISOR FAILS TO CORRECT OPERATOR HEP (4)	THIRD INDEPENDENT CHECK/CORRECTION HEP (5)	TOTAL HEP (6)	COMMENTS/ SOURCE OF INFORMATION (7)
1. Manual RMT		.08	.8	--	.064	
2. Switch to hot leg recirc		.02	.02	.1	4E-5	Due to low stress for this event, median value of operator error used. Due to extended timing, three independent checks were postulated.

Table C-6

Small and Very Small LOCA ECCS Sequences

The following sheets present HRA for the following events:

$HPI\text{-}XHE\text{-}FO\text{-}UN2S2_{HRA}$ - Failure to cross connect SI flow from Unit 2 in the event of HPI failure at Unit 1, after an S_2 break

$HPI\text{-}XHE\text{-}FO\text{-}UN2S3_{HRA}$ - Failure to cross connect SI flow from Unit 2 in the event of HPI failure at Unit 1, after an S_3 break

$HPI\text{-}XHE\text{-}FO\text{-}ALTS3_{HRA}$ - Failure to open alternate injection paths for SI flow

$HPI\text{-}XHE\text{-}FO\text{-}UN2H1_{HRA}$ - Failure to recovery emergency coolant recirculation during S_2 events

RCS-XHE-FO-DPRES - Failure to cooldown and depressurize the RCS during S_2 and S_3 events

$HPI\text{-}XHE\text{-}FO\text{-}2ODH2_{HRA}$ - Failure to recover emergency coolant recirculation during S_2 events, after previous failure to depressurize

$HPI\text{-}XHE\text{-}FO\text{-}3ODH2_{HRA}$ - Failure to recover emergency coolant recirculation during S_3 events, after previous failure to depressurize

ACCIDENT SEQUENCE DESCRIPTION

EVENT TREE: Small and Very Small LOCA (S_2, and S_3)

SEQUENCE NUMBER:

SEQUENCE DESIGNATOR: S_2D_1, S_2H_1, $S_2O_DH_2$, S_3D_1, S_3H_1, $S_3O_DH_2$

SEQUENCE DESCRIPTION:

(1)

These sequences involve small and very small LOCAs with failure of emergency coolant injection or emergency coolant recirculation. The failures involve mechanical failures of equipment. Operator depressurization of the RCS is an expected occurrance during small break scenarios. Failure to do this does not lead to core damage, but does affect sequence timing, and impacts other failures.

APPLICABLE PROCEDURES:

(4)

EP 2.0	Loss of Primary or Secondary Coolant
EP 2.02	Post LOCA Cooldown and Depressurization
EP 2.03	Transfer to Cold Leg Recirculation
ECA 2.01	Loss of Emergency Coolant Recirculation

TABLE 2

SEQUENCE AND CUT SET TIMING*

CUT SETS:

EVENT/OCCURRENCE (1)	TIME (2)	ANNUNCIATOR/INDICATION (3)	COMMENTS/ SOURCE OF INFORMATION (4)
1. Break	t = 0	Yes	
2. Failure of HPI	t = 1m	Yes	
3. Operator Depressurize	t = 60m		
4. Failure of Recirculation	t = 4 hours to 12 hours, depending on sequence		

BLE 3

CUT SET FAILURE AND POTENTIAL OPERATOR ACTIONS*

CUT SETS:

DESCRIPTION OF EVENT (1)	SYMPTOMS (2)	POTENTIAL OPERATOR ACTIONS (3)	ACTIVITIES (TASKS) REQUIRED TO PERFORM ACTION AND PROCEDURALIZED (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Failure of HPI	a) no SI flow b) possible valve mispositions c) possible pump malfunctions		i) open alternate injection paths if applicable ii) cross connect from U-2 if applicable	
2. Loss of sump recirculation	same as above		i) cross connect HPI from Unit 2 ii) cross connect RWST from Unit 2	

TABLE 4

SEQUENCE AND CUT SET AVAILABLE TIME

CUT SETS:

ACTION (1)	TIME BY WHICH OPERATOR MUST ACT TO PREVENT SUBSEQUENT CORE DAMAGE (Tcd) (2)	TIME AT WHICH OPERATOR IS ALERTED THAT SYMPTOM HAS OCCURRED (To) (3)	MAXIMUM TIME AVAILABLE TO PERFORM THE IDENTIFIED OPERATOR ACTIVITIES (Tm) (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. $HPI\text{-}XHE\text{-}FO\text{-}ALTS3_{HRA}$	150m	5m	145m	
2. $HPI\text{-}XHE\text{-}FO\text{-}UN2S2_{HRA}$	45m	5m	40m	
3. $HPI\text{-}XHE\text{-}FO\text{-}UN2S3_{HRA}$	150m	5m	145m	
4. $HPI\text{-}XHE\text{-}FO\text{-}UN2H1_{HRA}$	t_f + 60m	t_f + 5	55m	
5. $HPI\text{-}XHE\text{-}FO\text{-}20DH2_{HRA}$	t_f + 60m	t_f +5	55m	
6. $HPI\text{-}XHE\text{-}FO\text{-}30DH2_{HRA}$	t_f + 150	t_f + 5	145m	

TABLE 5

OPERATOR ACTION PERFORMANCE TIME*

CUT SETS:

ACTION	ACTIVITIES (1)	LOCATION (2)	TRAVEL TIME (3)	PERFORMANCE TIME (4)	TOTAL TIME (Ta) (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. HPI-XHE-FO-ALTS3$_{HRA}$						
	a) local valve operation	local	10m	10m	20m	
2. HPI-XHE-FO-UN2S2$_{HRA}$						
	a) open X-tie	local	10m	10m	20m	
	b) isol chp U2	CR	1m	2m	3m	
	c) start chp U2	CR	1m	2m	3m	
					20m	Time is not additive
3. HPI-XHE-FO-UN2S3$_{HRA}$						Same as HPI-XHE-FO-UN2S2$_{HRA}$
4. HPI-XHE-FO-UN2H1$_{HRA}$						Same as HPI-XHE-FO-UN2S2$_{HRA}$ for
for cross connect RWST:						for cross connect of HPI
	a) open 1 of 2	CR	1m	4m	5m	
5. HPI-XHE-FO-20DH2$_{HRA}$						Same as HPI-XHE-FO-UN2H1$_{HRA}$
HPI-XHE-FO-30DH2$_{HRA}$						Same as HPI-XHE-FO-UN2H1$_{HRA}$

TABLE 6

DIAGNOSIS TIME OF SEQUENCE CUT SET*

SEQUENCE/CUT SET	MAXIMUM TIME AVAILABLE (Tm) (1)	TOTAL ACTION TIME (Ta) (2)	TIME AVAILABLE TO DIAGNOSIS (Td) (3)	COMMENTS/ SOURCE OF INFORMATION (4)
1. HPI-XHE-FO-ALTS3$_{HRA}$	145m	20m	125m	
2. HPI-XHE-FO-UN2S2$_{HRA}$	40m	20m	20m	
3. HPI-XHE-FO-UN2S3$_{HRA}$	145m	20m	125m	
4. HPI-XHE-FO-UN2H1$_{HRA}$	55m	25m	30m	
5. HPI-XHE-FO-20DH2$_{HRA}$	55m	25m	30m	
6. HPI-XHE-FO-30DH2$_{HRA}$	145m	25m	120m	

TABLE 7

DIAGNOSIS ANALYSIS -- MORE THAN ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	NUMBER OF ABN EVENT (3)	ANNUNCIATOR HEP (Table 8-4) (4)	FAILURE TO DIAGNOSE (Table 8-2) (5)	SKILL-BASED (6)	ADJUSTMENT IN FINAL HEP (7)	COMMENTS/ SOURCE OF INFORMATION (8)

NOT APPLICABLE

TABLE 8

DIAGNOSIS ANALYSIS - ONE ABNORMAL EVENT*

CUT SETS:

	ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	FAILURE TO DIAGNOSE (Figure 8-1) (3)	SKILL-BASED (4)	ADJUSTMENT IN FINAL HEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1.	$HPI\text{-}XHE\text{-}FO\text{-}ALTS3_{HRA}$	Yes				
2.	$HPI\text{-}XHE\text{-}FO\text{-}UN2S2_{HRA}$	No	.266			Diagnosis error included because x- onnect of HPI is not directly referenced from the EPs. X-connect from U2 is directed in FRP C.1 and FRP C.2, which are entered on conditions of inadequate core cooling. There is insufficient time to hook up x-connect after indications of inadequate core cooling occur. Therefore, need for x-connect must be diagnosed.
3.	$HPI\text{-}XHE\text{-}FO\text{-}UN2S3_{HRA}$	No	5.2E-4			See comment above
4.	$HPI\text{-}XHE\text{-}FO\text{-}UN2H1_{HRA}$	Yes				Procedure directed in ECA 2.01
5.	$HPI\text{-}XHE\text{-}FO\text{-}20DH2_{HRA}$	No	2.66E-3	No		Diagnosis error was included here, because of previous failure to depressurize
6.	$HPI\text{-}XHE\text{-}FO\text{-}30DH2_{HRA}$	No	5.2E-4	No		See above comment

TABLE 9

POST-DIAGNOSIS ACTION-TYPE IDENTIFICATION*

CUT SETS:

ACTION (Activities) (1)	SAFETY SYSTEMS FAILED (2)	EOPs, TRAINING, USE EOPs, WELL-DESIGNED EOPs (3)	OPERATOR PERFORMS ONE ACTIVITY (4)	DYNAMIC OR STEP-BY-STEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. $HPI\text{-}XHE\text{-}FO\text{-}ALTS3_{HRA}$	--	Yes	One	Step by Step	
2. $HPI\text{-}XHE\text{-}FO\text{-}UN2S2_{HRA}$	--	Yes	One	Step by Step	
3. $HPI\text{-}XHE\text{-}FO\text{-}UN2S3_{HRA}$	--	Yes	One	Step by Step	
4. $HPI\text{-}XHE\text{-}FO\text{-}UN2H1_{HRA}$	--	Yes	One	Step by Step	
5. $HPI\text{-}XHE\text{-}FO\text{-}20DH2_{HRA}$	--	Yes	One	Step by Step	
6. $HPI\text{-}XHE\text{-}FO\text{-}30DH2_{HRA}$	--	Yes	One	Step by Step	
7. RCS-XHE-FO-DPRES	--	Yes	One	Step by Step	

TABLE 10

POST-DIAGNOSIS STRESS-LEVEL INDICATION*

CUT SETS:

ACTION (Activities) (1)	Tm 2 h AFTER IE (2)	MORE THEN TWO SAFETY SYSTEMS FAIL (3)	OPERATOR FAMILIAR W/SEQUENCE (4)	STRESS LEVEL (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. $HPI\text{-}XHE\text{-}FO\text{-}ALTS3_{HRA}$	No	No	--	Moderate	
2. $HPI\text{-}XHE\text{-}FO\text{-}UN2S2_{HRA}$	No	No	--	Moderate	
3. $HPI\text{-}XHE\text{-}FO\text{-}UN2S3_{HRA}$	No	No	--	Moderate	
4. $HPI\text{-}XHE\text{-}FO\text{-}UN2H1_{HRA}$	Yes	No	--	Moderate	For RWST x-connect: time stress is present for second operation. This was assumed to be HPI x-connect
5. $HPI\text{-}XHE\text{-}FO\text{-}20DH2_{HRA}$	Yes	No	--	see above	
6. $HPI\text{-}XHE\text{-}FO\text{-}30DH2_{HRA}$	Yes	No	--	see above	
7. RCS-XHE-FO-DPRES	Yes	No	--	Moderate	

TABLE 11

POST-DIAGNOSIS ANALYSIS*

CUT SETS:

ACTION (1)	ACTIVITIES (2)	ORIGINAL OPERATOR HEP (3)	SUPERVISOR FAILS TO CORRECT OPERATOR HEP (4)	THIRD INDEPENDENT CHECK/CORRECTION HEP (5)	TOTAL HEP (6)	COMMENTS/ SOURCE OF INFORMATION (7)
1. $HPI\text{-}XHE\text{-}FO\text{-}ALTS3_{HRA}$	a) open valve locally	.064	--	--	.064	BHEP doubled to account for potential harsh environments.
2. $HPI\text{-}XHE\text{-}FO\text{-}UN2S2_{HRA}$	a) isolate chp	.032	.32	--	.011	
	b) open x-tie	.032	.32	--	.011	
	c) start pump	.032	.32	--	.011	
					.033	
3. $HPI\text{-}XHE\text{-}FO\text{-}UN2S3_{HRA}$	same as #2 above					
4. $HPI\text{-}XHE\text{-}FO\text{-}UN2H1_{HRA}$	a) x-tie RWST b) x-connect	.032	.32	--	.011	
	i) isolate chp	.064	.64	--	.041	time stress present
	ii) open x-tie	.064	.64	--	.041	
	iii) start pp	.064	.64	--	.041	
					.132	
5. $HPI\text{-}XHE\text{-}FO\text{-}20DH2_{HRA}$	- same as #4					
6. $HPI\text{-}XHE\text{-}FO\text{-}30DH2_{HRA}$	- same as #4					
7. RCS-XHE-FO-DPRES						
	a) dump steam	.032	.32	--	.011	
	b) depress.	.032	.32	--	.011	
					.022	

Table C-7

CPC Service Water Failure during LOCA Sequences

ACCIDENT SEQUENCE DESCRIPTION

EVENT TREE: Intermediate, Small, and Very Small LOCA (S_1, S_2, and S_3)

SEQUENCE NUMBER:

SEQUENCE DESIGNATOR: S_1D_1, S_2D_1, S_3D_1

SEQUENCE DESCRIPTION:
(1)

Any size LOCA followed by failure of the high pressure injection system due to failure of component cooling to the HPI pumps.

APPLICABLE PROCEDURES:
(4)

EP 2.0	Loss of Primary or Secondary Coolant
EP 2.02	Post LOCA Cooldown and Depressurization
EP 2.03	Transfer to Cold Leg Recirculation
ECA 2.01	Loss of Emergency Coolant Recirculation

TABLE 2

SEQUENCE AND CUT SET TIMING*

CUT SETS:

EVENT/OCCURRENCE (1)	TIME (2)	ANNUNCIATOR/INDICATION (3)	COMMENTS/ SOURCE OF INFORMATION (4)

NOT APPLICABLE

BLE 3

CUT SET FAILURE AND POTENTIAL OPERATOR ACTIONS*

CUT SETS:

DESCRIPTION OF EVENT (1)	SYMPTOMS (2)	POTENTIAL OPERATOR ACTIONS (3)	ACTIVITIES (TASKS) REQUIRED TO PERFORM ACTION AND PROCEDURALIZED (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Failure of CPC actuation	1. Misposition valves 2. Inoperable pumps 3. High Bearing temperatures	Manual activation		
2. Service water strainer plugging	1. low flow to CPC-SW pumps	Re-align suction of service system		

TABLE 4

SEQUENCE AND CUT SET AVAILABLE TIME

CUT SETS:

ACTION (1)	TIME BY WHICH OPERATOR MUST ACT TO PREVENT SUBSEQUENT CORE DAMAGE (Tcd) (2)	TIME AT WHICH OPERATOR IS ALERTED THAT SYMPTOM HAS OCCURRED (To) (3)	MAXIMUM TIME AVAILABLE TO PERFORM THE IDENTIFIED OPERATOR ACTIVITIES (Tm) (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Manual activation	--	--	30m	
2. Re-align of SW suction	--	--	30m	

BLE 5

OPERATOR ACTION PERFORMANCE TIME*

CUT SETS:

	ACTION	ACTIVITIES (1)	LOCATION (2)	TRAVEL TIME (3)	PERFORMANCE TIME (4)	TOTAL TIME (Ta) (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1.	Manual activation CPC	CR	--	--	1m		
2.	Re-align SW suction	CR	--	--	1m		

TABLE 6

DIAGNOSIS TIME OF SEQUENCE CUT SET*

SEQUENCE/CUT SET	MAXIMUM TIME AVAILABLE (Tm) (1)	TOTAL ACTION TIME (Ta) (2)	TIME AVAILABLE TO DIAGNOSIS (Td) (3)	COMMENTS/ SOURCE OF INFORMATION (4)
1. Manual CPC actuation	30m	1m	30m	
2. Re-align SW suction	30m	1m	30m	

BLE 7

DIAGNOSIS ANALYSIS -- MORE THAN ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	NUMBER OF ABN EVENT (3)	ANNUNCIATOR HEP (Table 8-4) (4)	FAILURE TO DIAGNOSE (Table 8-2) (5)	SKILL-BASED (6)	ADJUSTMENT IN FINAL HEP (7)	COMMENTS/ SOURCE OF INFORMATION (8)

NOT APPLICABLE

TABLE 8

DIAGNOSIS ANALYSIS - ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	FAILURE TO DIAGNOSE (Figure 8-1) (3)	SKILL-BASED (4)	ADJUSTMENT IN FINAL HEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Manual CPC Actuation	No	2.6E-2	No		Used upper bound for diagnosis. This failure may not be visible during a LOCA.
2. Re-align SW Suction	No	2.6E-2	No		Used upper bound for diagnosis. This failure may not be visible during a LOCA.

BLE 9

POST-DIAGNOSIS ACTION-TYPE IDENTIFICATION*

CUT SETS:

ACTION (Activities) (1)	SAFETY SYSTEMS FAILED (2)	EOPs, TRAINING, USE EOPs, WELL-DESIGNED EOPs (3)	OPERATOR PERFORMS ONE ACTIVITY (4)	DYNAMIC OR STEP-BY-STEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Manual CPC Actuation	--	--	one	Step by Step	
2. Re-align Sw Suction	--	--	one	Step by Step	

TABLE 10

POST-DIAGNOSIS STRESS-LEVEL INDICATION*

CUT SETS:

	ACTION (Activities) (1)	Tm 2 h AFTER IE (2)	MORE THEN TWO SAFETY SYSTEMS FAIL (3)	OPERATOR FAMILIAR W/SEQUENCE (4)	STRESS LEVEL (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1.	Manual CPC Actuation	--	--	--	Moderate	
2.	Re-align SW Suction	--	--	--	Moderate	

TABLE 11

POST-DIAGNOSIS ANALYSIS*

CUT SETS:

	ACTION (1)	ACTIVITIES (2)	ORIGINAL OPERATOR HEP (3)	SUPERVISOR FAILS TO CORRECT OPERATOR HEP (4)	THIRD INDEPENDENT CHECK/CORRECTION HEP (5)	TOTAL HEP (6)	COMMENTS/ SOURCE OF INFORMATION (7)
1.	Manual CPC Actuation	a) start pump	.032	.32	--	.011	
2.	Re-align SW Suction	a) open cross-tie valves	.032	--	--	.032	

Table C-8
ATWS Sequences

ACCIDENT SEQUENCE DESCRIPTION

EVENT TREE: ATWS

SEQUENCE NUMBER:

SEQUENCE DESIGNATOR: $TKRD_4$, TKRT, $TKRL_2$

SEQUENCE DESCRIPTION:
(1)

ATWS event for which manual scram has failed. Manual scram has been ineffective either due to operator error (2.7E-3) or failures which are not recoverable by manual scram (.167). The event has progressed for 2 to 5 minutes. Primary pressure has risen to the point that the pressurizer safety valves are open. The operator must initiate emergency boration in order to reduce the primary pressure, thus closing the relief valves and conserving coolant inventory. During some ATWS events, the operator may need to trip the turbine and start AFW, if these actions do not occur automatically.

APPLICABLE PROCEDURES:
(4)

EP 1.0 - Reactor Trip
FRP S.1 - Response to Nuclear Power Generation/ATWS

TABLE 2

SEQUENCE AND CUT SET TIMING*

CUT SETS:

EVENT/OCCURRENCE (1)	TIME (2)	ANNUNCIATOR/INDICATION (3)	COMMENTS/ SOURCE OF INFORMATION (4)
1. Initiator	t = 0		
2. Failure of RPS	t = 0+	Yes	
3. Failure of Manual Scram	t = 1m		
4. Failure of Turbine Trip	t = 1m		
5. Failure of AFW Actuation	t = 1m		

TABLE 3

CUT SET FAILURE AND POTENTIAL OPERATOR ACTIONS*

CUT SETS:

DESCRIPTION OF EVENT (1)	SYMPTOMS (2)	POTENTIAL OPERATOR ACTIONS (3)	ACTIVITIES (TASKS) REQUIRED TO PERFORM ACTION AND PROCEDURALIZED (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Failure of RPS		1. Manual scram	1. Push manual scram	
		2. Emergency boration	1. Open valve from BAT pumps to charging pump suction	
			2. Turn BAT pump to fast speed	
			3. Open PORV	
		3. Trip turbine if necessary		
		4. Start AFW if necessary		

TABLE 4

SEQUENCE AND CUT SET AVAILABLE TIME

CUT SETS:

ACTION (1)	TIME BY WHICH OPERATOR MUST ACT TO PREVENT SUBSEQUENT CORE DAMAGE (Tcd) (2)	TIME AT WHICH OPERATOR IS ALERTED THAT SYMPTOM HAS OCCURRED (To) (3)	MAXIMUM TIME AVAILABLE TO PERFORM THE IDENTIFIED OPERATOR ACTIVITIES (Tm) (4)	COMMENTS/ SOURCE OF INFORMATION (5)
1. Manual scram	NA			
2. Emergency boration	10m	2m	8m	
3. Trip turbine	2m	1m	1m	
4. Start AFW	2m	1m	1m	

TABLE 5

OPERATOR ACTION PERFORMANCE TIME*

CUT SETS:

ACTION	ACTIVITIES (1)	LOCATION (2)	TRAVEL TIME (3)	PERFORMANCE TIME (4)	TOTAL TIME (Ta) (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Manual scram		CR	--	10 sec	10 sec	
2. Turbine trip		CR	--	10 sec	10 sec	
3. Start AFW		CR	--	10 sec	10 sec	
4. Emergency boration	a) open MOV 1350	CR	--			
	b) switch BAT pump to fast	CR	--			
	c) open PORV	CR	--	1m	1m	

TABLE 6

DIAGNOSIS TIME OF SEQUENCE CUT SET*

SEQUENCE/CUT SET	MAXIMUM TIME AVAILABLE (Tm) (1)	TOTAL ACTION TIME (Ta) (2)	TIME AVAILABLE TO DIAGNOSIS (Td) (3)	COMMENTS/ SOURCE OF INFORMATION (4)
NOT APPLICABLE				

TABLE 7

DIAGNOSIS ANALYSIS -- MORE THAN ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	NUMBER OF ABN EVENT (3)	ANNUNCIATOR HEP (Table 8-4) (4)	FAILURE TO DIAGNOSE (Table 8-2) (5)	SKILL-BASED (6)	ADJUSTMENT IN FINAL HEP (7)	COMMENTS/ SOURCE OF INFORMATION (8)

NOT APPLICABLE

TABLE 8

DIAGNOSIS ANALYSIS - ONE ABNORMAL EVENT*

CUT SETS:

ACTION (Symptom) (1)	DIAGNOSIS NEGLIGIBLE (2)	FAILURE TO DIAGNOSE (Figure 8-1) (3)	SKILL-BASED (4)	ADJUSTMENT IN FINAL HEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Manual scram	Yes		Yes		
2. Turbine trip	Yes		Yes		
3. Start AFW	Yes		Yes		
4. Emergency boration	Yes		No		

TABLE 9

POST-DIAGNOSIS ACTION-TYPE IDENTIFICATION*

CUT SETS:

ACTION (Activities) (1)	SAFETY SYSTEMS FAILED (2)	EOPs, TRAINING, USE EOPs, WELL-DESIGNED EOPs (3)	OPERATOR PERFORMS ONE ACTIVITY (4)	DYNAMIC OR STEP-BY-STEP (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1. Emergency Boration	--	Yes	one	Step by Step	

TABLE 10

POST-DIAGNOSIS STRESS-LEVEL INDICATION*

CUT SETS:

	ACTION (Activities) (1)	Tm 2 h AFTER IE (2)	MORE THEN TWO SAFETY SYSTEMS FAIL (3)	OPERATOR FAMILIAR W/SEQUENCE (4)	STRESS LEVEL (5)	COMMENTS/ SOURCE OF INFORMATION (6)
1.	Emergency Boration	No	No	Yes	Moderate	

LE 11

POST-DIAGNOSIS ANALYSIS*

CUT SETS:

ACTION (1)	ACTIVITIES (2)	ORIGINAL OPERATOR HEP (3)	SUPERVISOR FAILS TO CORRECT OPERATOR HEP (4)	THIRD INDEPENDENT CHECK/CORRECTION HEP (5)	TOTAL HEP (6)	COMMENTS/ SOURCE OF INFORMATION (7)
1. Manual scram		2.7E-3	--	--	2.7E-3	
2. Trip turbine		2.7E-3	--	--	2.7E-3	
3. Start AFW		2.7E-3	--	--	2.7E-3	
4. Emergency borate						
	a) open 1350	.032	.032	.32	3.3E-4	
	b) switch BAT pump to fast	.032	.032	.32	3.3E-4	
	c) open PORV	.032	.032	.32	3.3E-4	
					1.0E-3	

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APPENDIX D

D. Plant Specific Analyses

Appendix D contains the details of several plant specific analyses performed in support of the revised Surry probabilistic risk assessment for NUREG-1150. The analyses cover a wide range of areas: from initiating events to the reactor coolant pump (RCP) seal LOCA model to failure data and mission times. This appendix is organized into subappendices as follows:

D.1 Failure Mode and Effect Analysis on Support Systems
D.2 Small Break Initiating Event Frequency Assessment
D.3 T_1 Initiating Event Frequency and Non-Recovery of AC Power Probabilities
D.4 Core Uncovery Time Versus Break Size
D.5 RCP Seal LOCA Model
D.6 Failure Data Development
D.7 Discussion of Mission Time for Diesel Generators for LOSP Initiators

D.1 Failure Mode and Effect Analysis on Support Systems

The effects of the loss of support systems were examined on an individual basis to determine if they should be included as initiating events. This section describes the analysis performed on the support systems as part of the initiating event identification and grouping task, described in Section 4.3 of the main report.

A list of systems at Surry which provide supporting services to components in front line safety systems and normally operating systems was developed. Each of these systems was viewed as a potential initiator. A Failure Mode and Effect Analysis (FMEA) was done on the support systems in order to support this investigation.

The FMEA identifies the failure causes for the support systems. Then, the FMEA qualitatively assesses the impact of each of these failure causes on the unit's front line systems. FMEA's were performed on the following systems:

- Containment Instrument Air
- Component Cooling Water
- Instrument Air
- 120 VAC Power
- 480 VAC Power
- 4160 VAC Power
- Service Water
- Auxiliary Ventilation

The FMEAS follow.

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CIA (Inside Cntmt) UNIT Surry-1
DRAWING NO. 11448-FM-25E, J SHEET 1 of 3

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Entire Inside Containment IA System (All Loads)	CIA compressors fail (1 FTR and 1 FTS) - or - CIA separator or compressor HX rupture and failure to isolate train and start other compressor - or - CIA air dryer rupture and failure to isolate and open cross-connect to other dryer - or - CIA receiver (2A or 2B) ruptures and failure to isolate (or both rupture) - or - CIA supply isolation valve (TV-IA-100) transfers closed - or - CIA suction isolation valve (TV-IA-101A or B) transfers closed and alternate suction (TV-IA-103) fails to open - or - CIA header rupture	CIA pressure ind. (PI-IA-101) < 85 psi Cont instr air compr 4A or 4B alarm Cont instr air hdr lo-press alarm Charging pump regen HX hi-lo flow alarm	If CIA not restored in a reasonable period of time, begin a normal reactor shutdown to a cold shutdown condition (Tech. Spec. 3.8) Prolonged operation with outside air being supplied to containment will increase containment partial pressure	Cross-connect valves (1-IA-1003, 446, and 447) can be opened for IA backup to CIA if air header pressure decreases below 85 psi If IA system is cross-connected to supply CIA, the containment partial air pressure must be monitored Air leaks must be stopped to prevent overheating and tripping of air compressors

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CIA (Inside Cntmt) UNIT Surry-1

DRAWING NO. 11448-FM-25E SHEET 2 of 3

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
PORVs (PCV-1455C, 1456)	Local air line rupture - or - Manual valve plug - or - Check valve transfer shut	Local air leakage	No effect	Alternate supply from high-pressure nitrogen bottles Isolate lines affected by air leak - Check valve to prevent loss from high pressure air
Normal (RCP) Pressurizer Spray Valves (PCV-1455A,B)	Local air line rupture - or - Manual valve plug (2 must plug for each PCV to lose air supply)	Loss of normal pressurizer spray capability Local air leakage	On pressure surge, PORVs may open and possible reactor trip on high pressurizer P, unless one normal spray or aux. spray is available May be able to control pressurizer pressure during hot standby justing SG level	Spray valves fail closed on loss of CIA Isolate lines affected by air leaks. The normal spray valve air supply is isolated separately from aux spray valves supply
Aux (Chg PP) Pressurizer Spray Valve (HCV-1311)	Local air line rupture - or - Manual valve plug	Loss of auxiliary pressurizer spray capability Local air leakage	On pressure surge, PORVs may open and possible reactor trip on high pressurizer P, unless normal sprays available May be able to control pressurizer pressure during hot standby by adjusting SG level	Spray valve fails closed on loss of CIA Isolate lines affected by air leaks - aux spray valve air supply is isolated separately from normal spray valves air supply

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CIA (Inside Cntmt) UNIT Surry-1
DRAWING NO. 11448-FM-25E SHEET 3 of 3

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Letdown Flow To Regen HX (LCV-1460A,B)	Local air line rupture - or - Manual valve plug	Loss of letdown flow	No effect (comply with requirements for restoring letdown flow)	Valves fail closed on loss of IA (valves are in series) Close air line valves or crimp line to isolate leaks
Letdown Orifice Valves (HCV-1200A,B,C)	Local air line rupture - or - Manual valve plug	Charging pump to regen HX low flow alarm	Seal water return is only letdown available, may cause pressurizer level to increase	Valves fail closed on loss of IA (valves are in parallel, A and C normally closed) Close air line valves or crimp line to isolate leaks
Seal Leak Off Lines No. 1 & 2 (HCV-1303A,B,C; HCV-1307)	Local air line rupture - or - Manual valve plug	Local air leakage Reduced seal flow (HCV-1307)	No effect RCP seal flow is functional, but reduced due to full charging flow if FCV-1122 fails open	Valves HCV-1303A,B,C fail open on loss of IA and HCV-1307 fails closed Close air line valves or crimp line to isolate leaks
CCW Load Isolation Valves (Neutron Shield Tank Coolers: FCV-CC-112A,B; 113A,B; Excess LD HX: HCV-CC-108; Prim Drain Clr: HCV-CC-114)	Local air line rupture - or - Manual valve plug	Neutron shield tank cooler flow high temperature Excess letdown flow high temp	No effect Comply with requirements for operation without NST or primary drain cooling Comply with requirements for operation without letdown flow	Valves fail closed on loss of IA Stop letdown flow (close HCV-1200A,B,C) on loss of cooling Close air line valves or crimp line to isolate leaks

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW

DRAWING NO. 11448-FM-22A-D

UNIT Surry - 1

SHEET 1 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD	FAILURE EFFECT ON UNIT	REMARKS
Entire CCW System at Unit 1 (All Loads)	Surge Tank (1-CC-TK-1) rupture -or- Surge tank makeup failure, valve LCV-CC-100 closed -or- Surge tank vent (HCV-CC-100) closed -or- Surge tank level transmitter fail low (LT-CC-100) -or- Surge tank drain opened -or- Operating pump fails and standby pump fails to start (1-CC-P-1A,1B) and Failure to align Pumps 1C or 1D	Surge tank low level Pump motor protection alarm Disch. header low flow Disch. header low pressure RCP flow high temp. Excess letdown flow high temp. Primary shield pen. cooling coils low pressure Primary shield water wall coolers low pressure Neutron shield tank coolers flow high temp.	If CCW flow not re-established immediately: - Stop affected RCP - Trip the reactor - Initiate "Reactor Trip/EP Safety Injection" - Request initiation of "Station Emergency Manager Controlling Procedure" - Prepare to backup containment IA with Turb. Bldg. IA - Cooldown plant using natural circulation and steam dumps	Addressed as event W on T2 event tree CCW pumps trip on low NPSH - caused by low surge tank level RCP must be stopped within 2 minutes or before either upper or lower bearing temps reach 200^{0}F Following loss of offsite power the operator must re-connect the stub bus for CCW pumps If standby CCW pump doesn't start, pumps 1C and 1D which normally supply Unit 2 can supply Unit 1 Surge tank make-up LCV can be hand-operated on loss of IA

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW

UNIT Surry - 1

DRAWING NO. 11448-FM-22A-D

SHEET 2 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD	FAILURE EFFECT ON UNIT	REMARKS
Entire CCW System at Unit 1 (All Loads) (cont'd)	-or- CCW heat exchanger tube rupture or plug and Failure to align standby HX -or- Loss of SW to CCW HXs (refer to SW FMEA) -or- Return/discharge header rupture	Reactor containment air coolers high temp. Non-regen. HX (main coolant) high temp.	(see previous page)	CCW standby heat exchanger must be aligned manually

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW — UNIT Surry - 1

DRAWING NO. 11448-FM-22A — SHEET 3 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Reactor coolant pumps (RCP) 1-RC-P-1A,1B,1C upper bearing lube oil coolers	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut -or- Containment isol. valve closure (TV-CC-105A,B,C) -or- Loss of IA	RCP motor bearings high temp	If CCW flow to RCPs not re-established immediately: - Stop affected RCPs - Trip Reactor - Initiate "Reactor Trip/ EP Safety Injection"	RCP must be stopped within 2 minutes or before either upper or lower bearing temps reach 200°F Containment valve closure will cause loss of all CCW loads inside containment.
RCP lower bearing lube oil coolers	see above	see above	see above	see above
RCP stator coolers	see above	see above	see above	see above
RCP thermal barriers	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut	see above	see above	see above

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW UNIT Surry - 1

DRAWING NO. 11448-FM-22A SHEET 4 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
RCP thermal barriers (cont'd)	-or- Containment valve closure (TV-CC-107) -or- Loss of IA	----------refer to previous page----------		
Reactor shroud cooling coils (1-VS-E-6A,6B,6C)	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut -or- Containment valve closure (TV-CC-105A,B,C) -or- Loss of IA		No effect unless amount of time required to restore exceeds time allowed for operation with shroud coils isolated (Tech. Specs.).	For pipe rupture, isolate affected coils and return unaffected coils to opera- to operation Containment valve closure will cause loss of all CCW inside containment.
Residual heat removal pumps (1-RH-P-1A,1B)	Loss of all CCW -or- Failure to align CCW to pumps -or- Pipe rupture		No effect if RHR not re- quired. Otherwise RNR not available for unit cooldown.	Used for unit cooldown. Isolated during normal operations

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW — UNIT Surry - 1

DRAWING NO. 11448-FM-22A — SHEET 5 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Residual heat removal exchangers (1-RH-E-1A, 1B)	Loss of all CCW -or- Pipe rupture -or- Failure to align CCW to RHR HXs		No effect if RHR not required. Otherwise RHR unavailable for unit cooldown.	Used for unit cooldown. Isolated during normal operations
Primary drain cooler (1-DC-E-1)	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut -or- Valve closure (HCV-CC-114; TV-CC-109B) -or- Loss of IA		No effect unless amount of time required to restore exceeds time allowed for operation with cooler isolated (Tech. Specs.).	For pipe rupture, isolate cooler and return unaffected CCW loads to operation
Excess letdown heat exchanger (1-CH-E-4)	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut -or- Valve closure (HCV-CC-108; TV-CC-109B) -or- Loss of IA	Excess letdown flow high temp	No effect if amount of time required to restore exceeds time allowed for operation without letdown flow, comply with Tech. Specs.	Stop letdown flow by closing valves HCV-1200A, B, C Insure flow is maintained to RCP seals For pipe rupture, isolate HX

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW — UNIT Surry - 1

DRAWING NO. 11448-FM-22A,B — SHEET 6 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Inner pipe penetration cooling coils	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut -or- Valve closure (TV-CC-109B) -or- Loss of IA		No effect unless amount of time required to restore exceeds time allowed for operation with coils isolated (Tech. Specs.).	For pipe rupture, isolate affected coils and return unaffected coils to operation
Outer pipe penetration cooling coils	Pipe rupture -or- Manual valve plug	see above	see above	see above
Reactor containment air recirc coolers (1-VS-E-2A,2B,2C)	Pipe rupture -or- Manual valve plug -or- Check valve(s) transfer shut -or- Valve closure (HCV-CC-101A,B; TV-CC-110A,B,C) -or- Loss of IA	Reactor containment air recirc coolers high temp	No effect unless amount of time required to restore exceeds time allowed for for operation with air coolers isolated (Tech. Specs.).	For pipe rupture, isolate affected coolers and return unaffected coolers to operation For loss of all CCW or closure of HCV-101A or B, shift to chilled component cooling, start chiller and place on chilled component cooling HX

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW

UNIT Surry - 1

DRAWING NO. 11448-FM-22B

SHEET 7 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Primary shield penetration cooling coils (1-CC-E-3A,...,3F)	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut -or- Valve closure (TV-CC-109B) -or- Loss of IA	Primary shield penetration cooling coils low pressure	No effect unless amount of time required to restore exceeds time allowed for operation with shield coils isolated (Tech. Specs.).	For pipe rupture, isolate affected coils and return unaffected coils to operation
Primary shield water wall cooler panel sections (1-NS-E-2A,...,2L)	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut -or- Valve closure (TV-CC-109B) -or- Loss of IA	Primary shield water wall coolers low pressure	see above	see above
Neutron shield tank coolers (1-NS-E-1A, 1B)	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut	Neutron shield tank coolers flow high temp	No effect unless amount of time required to restore exceeds time allowed for operation with NST cooler isolated (Tech. Specs.).	For loss of all CCW or closure of HCV-101A or B, shift to chilled component cooling, start chiller and place on CD HX

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW — UNIT Surry - 1

DRAWING NO. 11448-FM-22B,C,D — SHEET 8 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Neutron shield tank coolers (cont'd)	Valve closure (FCV-CC-112A,B; HCV-CC-101A,B; TV-CC-110A,C) -or- Loss of IA	--------refer to previous page--------		For pipe rupture, isolate affected cooler and align unaffected cooler for operation
Liquid waste disposal system Evap (1-SS-E-7) Cooler (1-LW-E-3) Cond (1-LW-E-2) Dist PP(1-LW-P-4) Circ PP(1-LW-P-8) HLWDT PP(1-LW-P-2A,B)	Pipe rupture -or- Manual valve plug -or- Valve closure (PCV-LW-111; FICV-CC-108A,B FICV-109,110) -or- Loss of IA		No effect unless amount of time required to restore exceeds time allowed for operation without liquid waste disposal, (Tech. Specs.)	For lost LW CCW, shutdown LW disposal by placing pump 1-LW-P-8 to "off" For loss of IA, bypass TCV-CC-105 For pipe rupture, isolate affected sections and return unaffected sections to operation
Boron recovery system Cooler(1-BR-E-2A,B) Cond(1-BR-E-7A,B) Dist PP(1-BR-P-3A,B) Circ PP(1-BR-P-6A,B) Str Circ PP(1-BR-P-7A,B) PDT PP(1-BR-P-4A,B) Ovhd Cond(1-BR-E-8) Chlr Cond(1-BR-E-9) Str Trim Clr(1-BR-E-12)	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut -or- Valve closure (PCV-BR-109A,B; TCV-BR-111A,B; HCV-BR-101D,G; TCV-BR-128,129; FICV-CC-104-107A,B		No effect unless amount of time required to restore exceeds time allowed for operation without boron recovery, (Tech. Specs.)	For lost BR CCW, shutdown boron recovery by placing pumps 1-BR-P-4A,B; and 6A,B to "off" For pipe rupture, isolate affected sections and return unaffected sections to operation

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW — UNIT Surry - 1

DRAWING NO. 11448-FM-22C — SHEET 9 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Boron recovery system (cont'd)	Loss of IA	--------refer to previous page--------		For loss of IA, throttle HCV-BR-101D & G and bypass TCV-BR-129
Sample Coolers RHR(1-SS-E-9) PZR(1-SS-E-10) Gas Str(1-SS-E-5) Cold Leg(1-SS-E-12) Hot Leg(1-SS-E-4) SG BD(1-SS-E-3A,B,C)	Pipe rupture -or- Manual valve plug		No effect unless amount of time required to restore exceeds time allowed for operation with sample coolers isolated (Tech. Specs.).	For pipe rupture, isolate affected coolers and restore unaffected coolers to operation
Recombiner aftercooler (1-GW-HC-1)	Pipe rupture -or- Manual valve plug		No effect unless amount of time required to restore exceeds time allowed for operation without GW disposal, (Tech. Specs.).	Shutdown gaseous waste disposal by placing compressors 1GW-C-2A or B to "stop" For pipe rupture, isolate aftercooler
Fuel pit coolers (1-FC-E-1A-1B)	Pipe Rupture -or- Manual valve plug	Fuel pool water high temp.	No effect unless amount of time required to restore exceeds time allowed for operation with fuel pit cooler isolated, (Tech. Specs.)	For pipe rupture, isolate affected cooler and align unaffected cooper for operation

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW

UNIT Surry - 1

DRAWING NO. 11448-FM-22C,D

SHEET 10 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Non-regenerative heat exchanger (1-CH-E-2)	Pipe rupture -or- Manual valve plug -or- Valve closure (TCV-CC-103)	Non-regen HX (main coolant) high temp	No effect unless amount of time required to restore exceeds time allowed for operation without charging flow, (Tech. Specs.)	Stop charging flow by closing FCV-1122 Insure flow is maintained to RCP seals C or pipe rupture, isolate HX For Loss of IA, throttle TV-CC-103
Seal water heat exchanger (1-CH-E-1)	Pipe rupture -or- Manual valve plug	Seal water high temp.	No effect, unless amount of time required to restore exceeds time allowed for operation without charging flow,(Tech. Specs.)	Stop charging flow by closing FCV-1122 Insure flow is maintained to RCP seals (HCV-1303A,B,C)
Fuel Casks (Decontamination Building)	Loss of all CCW -or- Pipe rupture -or- Failure to align	(refer to loss of all CCW)	None	Isolated during normal operation
Waste gas diaphram compressors (1-GW-C-1A,1B)	Pipe rupture -or- Manual valve plug	Waste gas flow high temp.	No effect, unless amount of time required to restore exceeds time allowed for operation without GW disposal (Tech. Specs.)	Shutdown GW disposal by placing compressors 1-GW-C-2A or B to "stop" For pipe rupture, isolate affected compressor

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM CCW
DRAWING NO. 11448-FM-22,C,D

UNIT Surry -1
SHEET 11 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Refueling water storage tank coolers (1-CD-E-2A,B)	Loss of all CCW -or- Pipe rupture -or- Failure to align	(refer to loss of all CCW)	No effect, possible delay when refueling RWST use by injection systems not affected	Used during refueling - isolated during normal operations
Chilled water system Pumps(1-CD-P-1A,B,C) Cooler(1-CD-E-1A,B,C) Condensate Air EJ(1-CD-EJ-1,2A,B) Circ PPs(1-CD-P-2A,B)	Pipe rupture -or- Manual valve plug -or- Check valve transfer shut	Chilled component cooling water flow high temp.	No effect,unless amount of time to restore exceeds time allowed for operation with components isolated, (Tech. Specs.),	For pipe rupture, isolate affected sections and return unaffected sections to operation

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt)

UNIT Surry-1

DRAWING NO. 11448-FM-25A-D,L

SHEET 1 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Entire IA System Outside Containment (All Loads)	IA compressor failure and loss of service air (SA) to IA rcvr - or - IA aftercooler rupture and loss of SA to IA rcvr - or - IA receiver rupture, or relief valve sticks open, and failure to align SA to IA header - or - IA dehydrator rupture and failure to use bypass - or - IA header rupture	IA press ind (PI-IA-100 < 85 psi Unit 1 IA compr alarm Local air leaks/decr pressure MSIVs closed alarm SG lo-lo level alarm Charging pump to regen HX Hi-Lo flow alarm	RCPs tripped manually due (to loss of CCW to containment) Reactor trip (due to MSIV closure or SG low level) Loss of MFW (due to reg. valves closure) TDAFW pumps start (due to open steam admission valves) (also refer to entries for these individual loads)	CCW from containment isolated MSIVs fail closed, main main feed reg valve fails closed & lo-lo SG level signal given MFW reg valves fail closed TDAFW pump steam admission valves fail open Loss of IA also causes a false lo-lo canal level signal - a signal < 18 FT will cause turbine trip Air leaks must be stopped to prevent overheating & tripping of air compressors SA receiver acts as backup to IA system. SA use can be limited or SA loads isolated to ensure sufficient IA pressure IA from condensate polishing building can be valved in

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt)

UNIT Surry-1

DRAWING NO. 11448-FM-25A-D,L

SHEET 2 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
MFW Regulator Valves (FCV-1478, 1488, 1498)	Local air line rupture - or - Manual Valve Plug	Reg valves(s) fail closed Local leakage	Loss of MFW	MFW loss addressed as initiating event T_2 Feed pumps shift to recirc, operator should secure For air leaks, can isolate air to one or all valves with air line valves, or crimp air line
MFW Minimum Flow Valves (FCV-FW-150A,B)	Local air line rupture - or - Manual valve plug	Min flow valve(s) fail closed Local leakage	No effect - when not in startup or low FW flow (comply with any requirements for min flow valve operability)	Min flow valve(s) used at low FW flow For air leaks, can isolate air to one or all valves with air line valves, or crimp air line
Feedwater Bypass Valves (HCV-FW-155A,B,C)	Local air line rupture - or - Manual valve plug	Unable to open FW bypass valve(s) Local leakage	No effect (comply with any requirements for FW bypass operability)	FW bypass valves normally closed and fail closed on loss of IA For air leaks, can isolate air to one or all valves with air line valves, or crimp air line

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt) UNIT Surry-1

DRAWING NO. 11448-FM-25B SHEET 3 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Condensate Flow Control Valve To Extrac. Steam (LCV-CN-101)	Local air line rupture - or - Manual valve plug	Valve fails closed Local leakage	No effect	Upstream valve (MOV-CP-100) normally closed Flow to extrac. steam available from CST Decreased condenser level control capability Can isolate air leak upstream of LCV or crimp air line
Condenser Level Control Makeup Valves from CST (LCV-CN-102A,B)	Local air line rupture - or - Manual valve plug	Valve(s) fail closed Local leakage	No effect	Can isolate air leak(s) upstream of either LCV or crimp air line
Condensate Recirc To Condenser Flow Control Valve (FCV-CN-107)	Local air line rupture - or - Manual valve plug	Valves fail closed Local leakage	No effect	Condensate pumps functional through air ejector and gland steam condenser to main condenser via FCV-CN-107 Close upstream air valves or crimp line to isolate air leak

SYSTEM IA (Outside Cntmt) UNIT Surry-1

DRAWING NO. 11448-FM-25B, L SHEET 4 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
MSIVs (TV-MS-101A, B,C)	Local air line rupture - or - Manual valve plug - or - Check valve transfer shut	MSIV(s) F.C. High dP between steam line(s) and steam line header	Reactor trip	MSIV closure included as T_2 initiator Operator can bypass around trip valves (1-MS-84, 116, 155) to supply steam to header
SG ADVs (RV-MS-101A,B,C)	Local air line rupture - or - Manual valve plug (2 must plug at ADV) - or - Check valve transfer shut	ADV(s) fail to open if needed Local leakage	None	Two air isol valves for each ADV - Both must be closed to isolate air to ADV, or a single upstream valve closed, or air line crimped
Decay Heat Release Valve (HCV-MS-104)	see above	Unable to open decay ht rel vlv Local leakage	None	Two air line valves, or a single valve upstream must be closed, or air line crimped to isolate air to decay heat release valve.
Turbine Control Valves (PCV-MS-111,..., 114)	Local air line rupture - or - Manual valve plug	Turbine control valve(s) fail closed	Loss of H.P. turbine control Turbine trip on loss of air to turbine	

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt) UNIT Surry-1

DRAWING NO. 11448-FM-25B, L SHEET 5 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Turbine Bypass Valves (TCV-MS-105A,B; 106A,B,107A,B; 108A,B)	Local air line rupture - or - Manual valve plug	Unable to open turbine bypass valve(s) Local leakage	No effect (comply with any requirements for minimum number of operable bypass valves)	Bypass valves normally closed Steam dumps (TCV-MS-105B, 106B) can be hand-operated for temperature control Can isolate air leaks for individual bypass valves and continue to operate with air available to unaffected bypass valves or crimp line
TDAFW Pump Steam Admission Valves (PCV-MS-102A,B)	Local air line rupture - or - Manual valve plug - or - Check valve transfer shut	Steam admission valves fail open TDAFW pump starts	TDAFW pump starts	Can isolate air leaks with a single valve (air to both PCVs isolated) Nitrogen bottle backup to operate PCVs on loss of air IA not needed for AFW operation Maintain SG levels by throttling AFW MOVs and/or securing AFW pumps

SYSTEM IA (Outside Cntmt) UNIT Surry-1

DRAWING NO. 11448-FM-25C SHEET 6 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Makeup Line (HPI/HPR) (FCV-1122)	Local air line rptr - or - Manual valve plug (2 must plug at FCV) - or - Check valve	Unable to close FCV to stop makeup flow	No effect Full charging flow, charging pump recirc is functional but reduced due to full charging flow	Makeup line FCV fails open on loss of IA Can isolate air leaks by closing one or both valves immediately upstream or single valve farther upstream
Fill Line (FCV-1160)	Local air line rupture -or- Manual valve plug	Unable to open FCV for fill	No effect (comply with any requirements for restoring fill capability)	Fill line FCV normally closed and fails closed on loss of IA
Seal Injection Flow Valve (HCV-1186)	Local air line rupture - or - Manual valve plug (2 must plug at HCV) - or - Check valve transfer shut	Unable to close HCV to stop seal injection	No effect. Throttle seal water injection to 6 gpm per pump	Seal Injection HCV fails open on loss of IA Can isolate air leaks by closing one or both valves immediately upstream or single valve farther upstream

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt) UNIT Surry-1
DRAWING NO. 11448-FM-25A-D,L SHEET 7 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Letdown Line (TV-1204)	Local air line rupture - or - Manual valve plug - or - Check valve transfer shut	Loss of letdown flow	Close letdown flow orifice valves (HCV-1200A,B,C, see CIA) Seal water return is only letdown available, may cause pressurizer level to increase	Letdown flow TV fails closed on loss of IA Can isolate air leaks at TV-1204 only, or isolate with other valve(s) air supply at a point farther upstream, or crimp air line
VCT Level Control Valve (LCV-1115A)	Local air line rupture - or - Manual valve plug	Loss of VCT automatic level control VCT hi/low level	No effect	Cycle LCV-1115B&D to maintain VCT level between 14 and 34% Manually vent VCT to primary drain tank

SYSTEM LEVEL FAILU[illegible]DES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt) UNIT Surry-1

DRAWING NO. 11448-FM-25C, D SHEET 8 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
CCW Containment Isolation Valves (TV-CC-105A,B,C; and TV-CC-107)	Local air line rupture - or - Manual valve plug - or - Check valve transfer shut	Valves fail closed RCP increasing bearing temp	Trip RCP(s) manually, and trip reactor.	Loss of CCW to RCP bearing & stator coolers and thermal barrier Loss of air to TV-CC-107 addressed in event W fault tree
CCW Surge Tank Vent and Makeup (HCV-CC-100; LCV-CC-100)	Local air line rupture - or - Manual valve plug - or - Check valve transfer shut	Surge tank low level indication	No effect (refer to CCW FMEA)	Vent and makeup fail closed on loss of IA CC surge tank contains sufficient inventory to handle short term loss of makeup capability Surge tank makeup can be hand-operated Isolate local air leaks
Reactor CNTMT Air Recirc Coolers CCW/ Chilled Water Supply Valves (HCV-CC-101A,B; HCV-CC-102A,B)	Local air line rupture - or - Manual valve plug - or - Check valve transfer shut	Air recirc coolers high temperature indication	No effect (refer to CCW FMEA)	Valves fail closed on loss of IA If only CCW valve(s) close, align chilled water for air recirc cooling, if only chilled water valves lose air - No effect - these are normally closed Can isolate local air leaks upstream of individual valves

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt) UNIT Surry-1

DRAWING NO. 11448-FM-25A-D,L SHEET 9 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
CCW Load Isolation Valves (TCV-CC-103; TV-CC-109A,B; TV-CC-110A,B)	Local air line rupture - or - Manual valve plug (2 must plug for TCV-CC-103) - or - Check valve transfer shut	Non-regen HX (main coolant) decr temp Excess letdown flow high temp Air recirc coolers high temp	No effect If CCW unavailable to RHR, cooldown to cold shutdown not possible Comply with requirements for operation without air recirc cooling	TCV-CC-103 fails open, TV-CC-109A,B; 110A,B,C fail closed on loss of IA Throttle NRHX CCW (TCV-CC-103) Can isolate local air leaks upstream of individual TV/TCVs with one or more valves

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt) UNIT Surry-1

DRAWING NO. 11448-FM-25A-D SHEET 10 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Intake Canal Level Transmitter (LT-CW-101)	Local air line rupture - or - Manual valve plug	False lo-lo canal level signal	Turbine trip and reactor trip on lo-lo canal level signal Condenser inlet and outlet MOVs, BC HX MOVs, and CC HX MOVs close on 18ft signal	Check confirming indications Can isolate air leak upstream of transmitter
Charging Pump Lube Oil Cooler Temp Control Valves (TCV-SW-108A,B,C)	Local air line rupture - or - Manual valve plug - or - Check valve transfer shut	Charging pump bearing decreasing temp	No effect	TCVs fail open on loss of IA Air leaks can be isolated upstream of individual TCVs
Chiller Cond Temp Control Valves (TCV-SW-108A,B,C)	Local air line rupture - or - Manual valve plug	Chilled water unit decreasing temperature	No effect (comply with any requirements for chilled water unit TCVs operability)	Chilled water unit TCVs fail open on loss of IA Isolate air leaks for affected individual valves
Control & Relay Room AC Chillers Temp Control Valves (TCV-SW-100A,B,C)		Room temperature indications	No effect (refer to Auxiliary ventilation FMEA)	Ventilation system is sized to limit temperatures to 100°F in occupied spaces and 120°F in machinery spaces

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt) UNIT Surry-1

DRAWING NO. 11448-FM-25A-D SHEET 11 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Liquid Waste (miscellaneous AOVs)	Local air line rupture -or- Manual valve plug -or- Check valve transfer shut	Discharges to circ. water cease LW evap inoperable	No effect (comply with any requirements for liquid waste operability)	Secure liquid waste evap. bottoms pump and evaporator Line up drain header to low-level LW tanks All discharges to circ water secured on loss of IA
Boron Recovery (miscellaneous AOVs)	Local air line rupture -or- Manual valve plug -or- Check valve transfer shut	Primary drain tank pumps trip due to level transmitter failure Gas stripper pumps trip OVHD Gas compressor inoperable	No effect, (comply with any requirements for boron recovery operability)	Evaporator feed pumps shift to recirc, bottoms draining and circulating is secured, bottoms tank is secured and BRTT discharge is secured on loss of IA Operator should secure boron recovery evap. bottoms pumps & evaporators

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM IA (Outside Cntmt) UNIT Surry - 1
DRAWING NO. 11448-FM-25A-D SHEET 12 of 12

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Gaseous Waste (miscellaneous AOVs)	Local air line rupture -or- Manual valve plug -or- Check valve transfer shut		No effect, (comply with any requirements for gaseous waste operability)	Process vent discharge FCV fails open Feed and bleed to and from AT secured, and WG diaphragm compressors inoperable on loss of IA
Bearing cooling (miscellaneous AOVs)	Local air line rupture -or- Manual valve plug -or- Check valve transfer shut	High BC temp	No effect	BC-2 makeup is secured on loss of IA, BC is supplied to all equipment Makeup available via fire main

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER

UNIT Surry - 1

DRAWING NO.

SHEET 1 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Loss of Vital Bus I (Red)	Bus short -or- Load short -or- UPS failure	Loss of corresponding VB voltage indication Loss of corresponding instrument channel NIS rod drop, turbine runback without IPRI rod drop indication NIS rod drop, rod stop and turbine runback annunciators	Turbine auto runback Low condenser vacuum One SI train lost (not energized) - manual activation available on both trains. One CLS-Hi sensor input activated. One CLS-Hi-Hi sensor input lost. CC to RCP Thermal Barrier isolated. Containment Air isolated.	Loss of air ejectors vent to atmosphere causing low condensor vacuum High RCP bearing temperatures; may necessitate reactor trip

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER
DRAWING NO.

UNIT Surry - 1
SHEET 2 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Loss of Vital Bus II (White)	Bus short -or- Load short -or- UPS failure -or- Loss of Inverter 1-II	Loss of corresponding VB voltage indication Loss of corresponding nuclear instrument channel	Reactor trip required RCP-B trip required Manual primary system pressure control required One SI train lost (not energized) - manual activation available on both trains One CLS-Hi sensor input activated, One CLS-Hi-Hi sensor input lost	Cooling to RCP-B radial bearings lost (TV-CC-105B fails closed) PORVs will not operate in auto Normal letdown flow lost (TV-1204 fails closed) Charging and letdown flow indications inoperable

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER
DRAWING NO.

UNIT Surry - 1
SHEET 3 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Loss of Vital Bus III (Blue)	Bus short -or- Load short -or- Failure of UPS -or-	Loss of corresponding VB voltage Loss of corresponding nuclear instrument	Reactor trip required RCP-A trip required One SI train lost (not energized) manual activation available on both trains One CLS-Hi sensor input activated. One CLS-Hi-Hi sensor input lost FW bypass valves fail shut	Cooling to RCP-A radial bearings lost (TV-CC-105A fails closed) FW bypass valves, AFW flow to SG-C indication, and SG-C WR level indication inoperable Pressurizer level is maintained with letdown orifice bypass valves

SYSTEM 120 VAC POWER
DRAWING NO.

UNIT Surry - 1
SHEET 4 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Loss of Vital Bus IV (Yellow)	Bus short -or- Load short -or UPS failure	Loss of corresponding VB voltage indication Loss of corresponding nuclear instrument channel	Reactor trip required RCP-C trip required Manual pressurizer pressure control required MSW bypass valves fail closed Manual control of charging flow required One SI train lost (not energized) manual activation available on both trains One CLS-Hi sensor input activated. One CLS-Hi-Hi sensor input lost RMT control power lost	Cooling to RCP-C radial bearings lost (TV-CC-105C fails closed) PC-444J input fails low Control charging with FCV-1122; LCV-1460 fails open

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER
DRAWING NO. 11448-ESK-6CD2,3

UNIT Surry - 1
SHEET 5 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
RHR CCW Discharge Valves (TV-CC-109A, B)	109A: VB-I,ckt 16 trip 109B: VB-II, ckt 21 trip	Excess letdown flow high temperature Primary shield coolers low pressure	RHR-CCW unavailable for unit cooldown.	SOVs energized to open valves CLS signal de-energizes SOV on Hi-Hi containment pressure
RCP CCW Discharge Valves (TV-CC-105A, B, C)	105A: VB-III, ckt 18 trip 105B: VB-II, ckt 20 trip 105C: VB-IV, ckt 18 trip	Increasing RCP bearing temperature	RCP must be tripped within 2 minutes of CCW loss or before bearing temperatures reach 200°F Reactor must be tripped	SOVs energized to open valves CLS signal de-energizes SOV on Hi-Hi containment pressure
RCP CCW Thermal Barrier Discharge Valve (TV-CC-107)	VB-I, ckt 13 trip	RCP flow increasing temperature	No effect	SOV from VB-I energized to open valve CLS signal de-energizes SOV on Hi-Hi containment pressure.
Cont. Air Recirc. Coolers CCW Discharge Valves (TV-CC-110A, B, C)	110A: VB-III, ckt 18 trip 110B: VB-II, ckt 20 trip 110C: VB-IV, ckt 16 trip	Reactor containment air recirculation coolers high temperature	None unless amount of time required to restore CCW flow exceeds time allowed for operation without cont. air recirc. cooling, (Tech. Specs.)	SOVs energized to open valves CLS signal de-energizes SOV on Hi-Hi containment pressure

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER
DRAWING NO. 11448-ESK-6EJ,6CD6

UNIT Surry - 1
SHEET 6 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
FW Recirc. Valves (FCV-FW-150A,B)	VB-I, ckt 16 trip	Decrease in FW flow to reactor	No effect. AFW required to feed SGs	SOVs energized to close valves
FW Bypass Valves (HCV-FW-155A,B,C) (2 SOVs per valve)	VB-III, ckt 23 trip and VB-IV, ckt 26 trip	Bypass flow indication	No effect. Feed SGs via bypass valves	Either SOV energized to close associated valve
Containment Instrument Air Suction Valves (TV-IA-101A,B)	101A: VB-I, ckt 27 trip 1-1B: VB-IV, ckt 21 trip	CIA low pressure indication	No effect. Open alternate suction valve (SOV-IA-103) or cross-connect with IA system	SOVs energized to open valves
Containment Instrument Air Alt. Suction Valve (SOV-IA-103)	1-DP-IAC, ckt 1 trip		No effect. Alternate suction valve normally closed	SOV energized to open valve
Containment Instrument Air Discharge Valve (TV-IA-100)	VB-I, ckt 17 trip	CIA header low pressure alarm	No effect. Cross-connect with IA system	SOV energized to open valve

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER
DRAWING NO. 11448-ESK-6CD3,9;6EJ

UNIT Surry - 1
SHEET 7 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
MS Condenser Drain Valve (TV-MS-109)	VB-I, ckt 13 trip	Valve closure	No effect. Loss of main stream line drain flow	SOV energized to open valve
SG Blowoff Tank Drain Valve (TV-MS-110)	VB-I, ckt 13 trip	Valve closure	No effect. Blowdown line manual valves normally closed	SOV energized to open valve
Cond. Air Eject Vent Valve (TV-SV-102A)	VB-IV, ckt 13 trip		No effect. Vent valve normally closed	SOV energized to open valve
Condensate Recirc. Valve (FCV-CN-107)	VB-I, ckt 16 trip		No effect. Valve normally open, unable to regulate recirc. flow to condenser	SOV energized to close valve
Steam Generator Blowdown Valves (SOV-BD-100A,B,C; SOV-BD-102A,B,C; TV-BD-100A,C,E; TV-BD-100B,D,F)	100A,B,C: unident vital bus 102A,B,C: VB-I unident. ckt 100A,C,E: VB-I, ckt 15 trip 100B,D,F: VB-II, ckt 21 trip	Blowdown valve closure	Loss of SG blowdown	100A,B,C: SOVs energized to open valves 102A,B,C: SOVs energized to close valves Trip valves energized to open

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER
DRAWING NO. 11448-ESK-6CD1,5;6FF

UNIT Surry - 1
SHEET 8 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Letdown Line Trip Valve (TV-1204)	VB-II, ckt 21 trip	Loss of normal letdown flow	No effect	SOV energized to open valve
RWST Cross-tie Valves (SOV-SI-102A1,A2; SOV-SI-102B1,B2)	102A1:VB-I, ckt 29 trip 102B1: VB-II, ckt 30 trip 102A2,B2:U-2 VB	None	No effect Cross-tie valves normally closed.	Cross-tie valves fail open on loss of IA or loss of associated VB
N2 Supply Valve (TV-SI-100)	VB-IV, ckt 17 trip			SOV energized to open valve
N2 Relief Trip Valves (TV-SI-101A,B)	101A: VB-I, ckt 15 trip 101B: VB-II, ckt 21 trip	Valve closure	No effect. Control/relief valves HCV-1898 and HCV-1936 normally closed.	SOVs energized to open valves

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER
DRAWING NO. 11448-ESK-6FB,6KD,J

UNIT Surry - 1
SHEET 9 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Control & Relay Room AC Chillers (VS-E-4A,B,C)	4A,C: VB-II, ckt 25 trip 4B: VB-IV, ckt 29 trip	Increased control room temperature Aux. Ventil. Control Panel	No effect Ventilation system is sized to limit temperatures to 120°F in machinery spaces	One chiller can provide sufficient cooling
Cable Vault & MCC Room Ventilation Supply Damper (VS-HV-2)		Aux. Ventil. Control Panel	No effect	Damper energized to close
Aux. Building Chg. PP Cubicle Exhaust Dampers (SOV-VS-107A,B; 116A, 108)	107A,B: VB-I, ckt 19 and VB-II, ckt 33 trip 108: VB-II, ckt 33 trip 116: VB-I, ckt 19 trip	Aux. Ventil. Control Panel	No effect Loss of one circuit, dampers on other circuit remain open to provide sufficient ventilation	107A,B: SOVs energize to to open dampers 108, 116 SOVs energize to close dampers
Charging Pump Cubicle Exhaust Dampers (MOD-VS-101A,B,C)	101A,C: VB-I, ckt 19 trip 101B: VB-II, ckt 33 trip	Aux. Ventil. Control Panel	No effect	Dampers energized to close

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER
DRAWING NO. 11448-ESK-6KH,L,S

UNIT Surry - 1
SHEET 10 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Safeguards Area Exhaust Dampers (MOD-VS-100A,B; SOV-VS-110A,B)	100A,110A: VB-I, ckt 19 trip 100B,110B: VB-II, ckt 33 trip	Aux. Ventil. Control Panel	No effect. Loss of one circuit, AOD fails open and MOD on other circuit remains open to provide sufficient ventilation.	M.O. Dampers energized to open, SOVs energized to close A.O. dampers
Aux. Building Supply Fans (VS-HV-1A,B)	VB-III, ckt 21 trip and VB-IV, ckt 21 trip	Aux. Ventil. Control Panel	No effect. Loss of one circuit, alternate fan still operable	One fan provides sufficient ventilation
Ventilation Vent Stack Isolation Dampers (AOD-VS-112A,B)	112A: VB-I, ckt 19 trip 112B: VB-II, ckt 33 trip	Aux. Ventil. Control Panel	No effect. Utilize bypass flow path(s), as when ventilation vent high radiation detected	SOVs energize to open dampers
Miscellaneous Ventilation System Dampers, Fans & Bypasses	Misc. circuit(s) trip	Aux. Ventil. Control Panel	No effect. Loss of decon or fuel building ventilation - possible contamination	Redundancy for fans, dampers, and bypasses

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 120 VAC POWER
DRAWING NO. 11448-ESK-6EF,G,H

UNIT Surry - 1
SHEET 11 of 11

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(s)	FAILURE EFFECT ON UNIT	REMARKS
Miscellaneous Boron Recovery System Valves	unidentified VB circuit(s) trip	Valve closure	No effect. Comply with requirements for operation with portions of boron recovery inoperable	Operator should secure pumps and tank discharges. Redundancy of some valves
Miscellaneous Gaseous Waste System Valves	VB-II, ckt 29 trip or VB-III, ckt 30 trip	Valve closure	No effect. Comply with requirements for operation without or with reduced capacity of gaseous waste system	SOVs energize valves to open
Miscellaneous Sample System Trip Valves	VB-I, ckt 15 or trip or VB-IV, ckt 17 ot 18 trip	Valve closure	No effect. Comply with requirements for operation without sample systems	Valves energized to open

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 480 VAC POWER (1H1-1) UNIT Surry-1
DRAWING NO. 11448-FE-IL SHEET 1 of 1

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
All MOVs			No immediate effect	MOVs fail as is
Service Water Pump 10A (1-SW-P-10A) (1-SW-P-10A)			Loss of A train charging pump cooling	B train is normally available, or can cross-connect charging pump from Unit 2.
Component Cooling Pump 2A (1-CC-P-2A)			Loss of A train component cooling to to charging pump	B train is normally available
Containment Vacuum Pump (1-CV-P-1A)			No immediate effect Gradual containment pressure increase may lead to Tech Spec violation	
AC Chiller Pump 2A (1-VS-P-2A)			See Aux. Vent. FMEA	
Emergency Makeup Feedwater Pump (1-FW-P-1A)			None	

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 480 VAC POWER (1H)
DRAWING NO. 11448-FE-IF

UNIT Surry-1
SHEET 1 of 1

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Pressurizer Heater Bank (Backup Group)			Reduced pressure heater capacity	B train of heaters is is normally available
Low Head Safety Injection Pump 1A (1-SI-P-1A)			None	LPI pumps in standby during normal operation
Inside Spray Recirc Pump 1A (1-RS-P-1A)			None	ISR pumps in standby during normal operation
Outside Spray Recirc Pump 1A (1-RS-P-2A)			None	OSR pumps in standby during normal operation
Containment Recirc Fan 1A (1-VS-F-1A)			None	
Containment Spray Pump (1-CS-P-1A)			None	CS pumps in standby during normal operation

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 4160 VAC POWER (H Bus) UNIT Surry-1

DRAWING NO. 1148-FE-1D SHEET 1 of 1

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Auxiliary Feedwater Pump (1-FW-P-3A)			None, if unit at power	AFW pump in standby during manual operation
Charging Pump (1-CH-P-1A)			Loss of normal charging and seal injection flow	B pump is normally available and will provide charging flow. If B pump inoperable, C pump required to be operable.
480V Bus Feeders			Loss 480V buses	See 480V Bus FMEA
Component Cooling Pump 1A (1-CC-P-1A)			Loss of one CCW pump	B pump is normally available and will provide CCW flow.
RHR Pump 1A (1-RH-P-1A)			None, if unit at power	RHR pump in standby during normal operation

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM 4160 VAC POWER (H Bus) UNIT Surry-1

DRAWING NO. 1148-FE-1D SHEET 1 of 1

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Auxiliary Feedwater Pump (1-FW-P-3A)			None, if unit at power	AFW pump in standby during manual operation
Charging Pump (1-CH-P-1A)			Loss of normal charging and seal injection flow	B pump is normally available and will provide charging flow. If B pump inoperable, C pump required to be operable.
480V Bus Feeders			Loss 480V buses	See 480V Bus FMEA
Component Cooling Pump 1A (1-CC-P-1A)			Loss of one CCW pump	B pump is normally available and will provide CCW flow.
RHR Pump 1A (1-RH-P-1A)			None, if unit at power	RHR pump in standby during normal operation

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM SW

DRAWING NO. 11448-FM-21A-D

UNIT Surry-1

SHEET 1 of 4

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD	FAILURE EFFECT ON UNIT	REMARKS
Entire SW System (All Loads)	Monumental biofouling - or - Dam Failure - or - LOSP and failure to isolate multiple condensers	Chilled water unit high temp Condenser vacuum priming seal recirc pump low flow Lo canal level SW pump discharge low pressure Component cooling pumps suction high temperature Bearing cooling water HXs outlet high temperature	Low canal level causes: - turbine trip - reactor trip - condenser isol (Trips related to loss of circ water not loss of SW)	Traveling screens must block 80% to fail SW Rupture of 42" SW line - low probability Dam failure not included in internal events analysis

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM SW — UNIT Surry-1
DRAWING NO. 11448-FM-21A — SHEET 2 of 4

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Component Cooling Water Heat Exchangers (1-CC-E-1A,1C) (Standby:1B,1D)	Pipe rupture - or - Manual valve plug - or - MOVs SW-102A&B transfer shut	Component cooling pumps suction high temperature	If RCP motor bearings (CCW load) reach 200°F, stop RCP and trip reactor	Valve plug addressed in event W fault tree Local pipe rupture or valve plug - align standby CCW HX and isol affected HX Both MOVs must close (or CCF) to fail load
Unit 1 Bearing Cooling Water Heat Exchangers (1-BC-E-1A,1C) (Standby:1B)	Pipe rupture - or - Manual valve plug - or - MOVs SW-101A&B transfer shut	Bearing cooling water HX outlet high temperature		Turbine plant equipment designed for max CW temp of 105°F IA compressor jacket may be cooled by fire protection well water Rupture or plug: isol affected HX - align standby HX Both MOVs must close (or CCF) to fail load
Unit 1 Recirc Spray Heat Exchangers (1-RS-E-1A,1B, 1C,1D)	Pipe rupture - or - Check valve(s) fail to transfer - or - MOVs SW-103A,B,C,D all fail to open	(refer to loss of all SW)	Loss of recirc spray cooling	Addressed in ISR and OSR fault trees - events F1 and F2 Recirc spray HXs normally isolated

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM SW
DRAWING NO. 11448-FM-21B

UNIT Surry-1
SHEET 3 of 4

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Charging Pump Intermediate Seal Cooler (1-SW-E-1B) (Standby:1A)	Pipe rupture - or - Manual valve/ strainer plug (1-DS-S-2B, 1-VS-S-1A) - or - Check valve transfer shut - or - Charging pump SW pumps fail (1-SW-P-10A, B)	Charging pump bearing increasing temperature	Loss of charging pump seal cooling, impacts pump operation for seal injection flow and SI flow	Addressed in CPC fault tree Rupture - isol affected cooler and align standby Plugged valve/strainer - align standby loop or X connect from Unit 2 Pump fails/check valve closed - start standby pump
Charging Pump Lube Oil Coolers (1-CH-E-5A,5B, 5C)	(refer to above) - or - Coolers plugged (1-CH-E-5A,5B,5C) - or - TCVs SW-108A,B,C transfer shut	see above	see above	see above Plugged cooler - isolate affected cooler and stop affected pump

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM SW UNIT Surry-1

DRAWING NO. 11448-FM-21C SHEET 4 of 4

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Unit 1 Chiller Condenser (1-CD-REF-1A)	Pipe rupture - or - Check valve transfer shut - or - Manual Valve/ Strainer plug (1-CW-S-4) - or - SW pumps fail (1-SW-P-4A, 4B) - or - TCV-SW-107A Transfers shut	Chilled water unit high temperature SW pumps discharge low pressure	No effect unless amount of time required to restore exceeds the allowed for operation without chilled water unit, (Tech Specs)	Strainer plug - blowdown or rotate Pump fails - start standby Loss of SW - shutdown chilled water unit
Control & Relay Room AC Chiller Condensers (1-VS-E-4A, 4B, 4C)	Pipe rupture - or - Manual valve/ strainer plug (1-VS-S-1A,1B) - or - Pumps fail (1-VS-P-1A,1B,1C) - or - PCVs SW-100A,B,C Transfer shut	High room temperatures		

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM Auxiliary Ventilation UNIT Surry-1

DRAWING NO. _____ SHEET 1 of 5

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Entire System (all ventilation loads)	Loss of all AC	Auxiliary ventilation control panel (VNTX) & annunciator	Possible contamination. No effect on unit operation	One fan can provide 70% capacity exhaust and a step flow reduction capability Parallel arrangement of safety-related filter system provides an effective standby filter Safety-related fans draw air through ECCS equipment areas to safety-related filters Fan inlet dampers fail open on loss of compressed air Exhaust bypasses allow for selective filtration of any exhaust system. Other exhaust systems have dampers in series to provide redundant closure after a LOCA
	Loss of SW		No effect. Degraded filter performance and reduced exhaust flow rate	

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM Auxiliary Ventilation
DRAWING NO. _____

UNIT Surry-1
SHEET 2 of 5

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Control & Relay Room Area	Failure of both air conditioning systems (1 FTR and 1 FTS) -or- Failure of all 3 refrigeration chillers (or CCF) -or- Loss of SW flow to all 3 chiller condensers (1-VS-E-4A,4B,4C) -or- Failure of all 3 condenser SW pumps (1-VS-P-1A,1B,1C) -or- Failure of normal exhaust & makeup and Failure of bottled air supply and Failure of emergency ventilators	Increased control room temperature Auxiliary Ventilation Control Panel (VNTX) & Annunciator	No effect. Ventilation systems sized to limit temperatures to 100°F in occupied spaces and 120°F in normally unoccupied machinery spaces, assuming heat-producing equipment is operating	Each AC system consists of 1 air handling unit for each space (2 for control room & 1 for relay room) One refrigeration chiller can support both AC systems - providing redundant chilled water supplies SW flow provided by 2 independent sources (see SW FMEA) Normally, exhaust & makeup air is provided by other service building ventilation systems During emergency conditions, the control and relay room area is sealed. A 1-hour supply of bottled air provides breathing air and pressurization; upon depletion of bottled air, emergency ventilators supply breathing air and pressurization indefinitely. AC systems continue to operate normally (powered from emergency buses)

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM DRAWING NO. Auxiliary Ventilation

UNIT Surry-1
SHEET 3 of 5

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Auxiliary Building	Both air handling units fail -or- Central area and potentially contaminated general area exhaust fans fail -or- Both exhaust fans to ventilation vent fail -or- Charging pump cubicle(s) exhaust damper(s) fail to open when pump(s) operating -or- Non-safety-related high-head fans fail and General area exhaust stream contaminated	Auxiliary Ventilation Control Panel (VNTX) &	Possible contamination. No effect on unit operation	The supply fans and one exhaust fan for the central area and general area are tripped on ventilation vent hi-radiation from unidentified source If general area exhaust stream is contaminated, it is manually diverted through the non-safety-related filter subsystem by stopping the ventilation vent exhaust fans, realigning dampers, and starting high-head NSR fan
			Possible contamination. No effect on unit operation	
	-or- Heating steam system failure	Auxiliary Building decreasing temperatures	Low Auxiliary Building temperatures	

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM DRAWING NO. Auxiliary Ventilation

UNIT Surry-1
SHEET 4 of 5

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Safeguards Area	Both exhaust fans for potentially contaminated areas fail	Auxiliary Ventilation Control Panel (VNTX) & Annunciator	Possible contamination or area high temperatures (may exceed 120°F in pump cubicles)	Exhaust systems automatically bypassed on CLCS signal to ensure any radioactive leakage is removed
	-or-			
	Intake supply systems fail	Safeguards areas increasing temperatures		Redundant intake systems, exhaust fans and exhaust stream dampers provide flow paths to filters following a LOCA
	-or-			
	Both exhaust stream dampers fail closed			
	-or-			
	Heating steam system fails	Safeguards areas decreasing temperatures		
Service Building	All exhaust fans for potentially contaminated areas fail	Auxiliary Ventilation Control Panel (VNTX) & Annunciator	Possible contamination No effect on unit operation	Ventilation provided for radioactive contamination removal

SYSTEM LEVEL FAILURE MODES AND EFFECTS ANALYSIS

SYSTEM Auxiliary Ventilation — UNIT Surry-1
DRAWING NO. — SHEET 5 of 5

LOAD/ COMPONENT	FAILURE/LOSS OF LOAD CAUSES	DETECTION METHOD(S)	FAILURE EFFECT ON UNIT	REMARKS
Decontamination Building	Supply fan fails -or- Both exhaust fans fail -or- An exhaust duct damper fails closed -or- Heating steam system failure	Auxiliary Ventilation Control Panel (VNTX) & Annunciator Decon building decreasing temperatures	Possible contamination No effect on unit operations	Normally ventilated at 15 air changes per hour Dampers designed to provide redundant closure following a LOCA
Fuel Building	Spent fuel pit supply fan fails -or- Both exhaust fans fail -or- An exhaust duct damper fails closed -or- Heating steam system failure	Auxiliary Ventilation Control Panel (VNTX) & Annunciator Fuel building decreasing temperatures	Possible contamination, buildup of condensation, or spent-fuel pool clouding	During refuel, exhaust is continuously bypassed through filters to ensure radioactivity removal Dampers designed to provide redundant closure following a LOCA

D.2 Assessment of Frequency of Small Breaks, Based on Historical Experience

The original NUREG/CR-4550 analysis used a frequency of 2E-2 for very small breaks. One of the industry comments received during the review cycle indicated that if the value of 2E-2 was accurate, there should have been approximately 20 small breaks in the history of nuclear power. This is based on an accumulated U.S. LWR experience of approximately 350 reactor years for BWRs and 600 reactor years for PWRs. This number of failures would be visible and thus provide an accurate historical basis for calculation of small break frequency. As a results of these comments, a survey of historical experience was done to assess the frequency of small breaks. This survey resulted in the assessment of a frequency of 1.3E-2 per year for this event.

D.2.1 Scope of Search

Very small LOCA is defined as a loss of coolant inventory which is large enough to cause a safety injection signal but not large enough to be put in the S_2 event category. Very small LOCAs could result from the following:

- Reactor Coolant Pump Seal Failures
- Pipe Breaks
- Component Failures

A search of operating experience was made for each of these type of events. The results are summarized in Table D.2-1 and discussed individually in the following sections.

D.2.2 Reactor Coolant Pump Seal Failures

This event category involves LOCAs due to random internal failures of the seal. Seal failures due to loss of cooling are not included in this category. NUREG/CR-4400 (Reference D.2-1) provides a survey of seal failure events from 1974 to January 1984. Five of these events were considered applicable to this effort.

Plant	Date	Leakrate	Total Leakage
Oconee 2	1/74	90 gpm	50,000 gallons
H.B. Robinson	5/75	500 gpm	200,000 gallons
Indian Point 2	7/77	75 gpm	90,000 gallons
Salem 1	10/78	--	15,000 gallons
ANO 1	5/80	400 gpm	60,000 gallons

These five events were applicable due to leak size and total leakage as compared with the other events. A sixth event, at Connecticut Yankee in August 1977, resulted in total leakage of 4020 gallons at an unspecified leak rate. This event was not included as an applicable seal failure because of the limited total leakage, compared with the other events.

The survey in NUREG/CR-4400 covers operational experience up to January 1984. An LER search was performed for all PWR seal LOCA events from January 1984 to January 1988. No events were found. PWR operating experience through January 1984 was calculated to be 418 reactor years. Total PWR experience through January 1988 was calculated to be 610 reactor years.

At first it would seem appropriate to divide 5 failures by 610 years, for a point estimate of 8.2E-3 per year. However, comparison of the dates when the five large seal failures occurred with the dates of all the non-serious seal failures listed in NUREG/CR-4400, it

le D.2-1

SUMMARY OF SMALL BREAK EXPERIENCE

Break Type	LER Survey or Reference	Number of Occurrences	Number of Applicable Occurrences	Number of Reactor Years	Point Estimate Frequency	Comments
RCP Seal LOCA	Ref. D.2-1	Many	5	418		Frequency represents the mean of a Bayesian update of pre '81 data with post '81 data
	LER Survey 1/84 - 1/88	0	0	192	.0039	
Pipe Break	Ref. D.2-2	19	8	741		Combined PWR and BWR experience. Assumed 20% of PWR piping was LOCA sensitive.
	LER Survey 1/85 - 1/88	2	0	216	.0017	
Component Leakage	Ref. D.2-3 (PWR Cat. 5)	20	14	370	.0076	PWR experience only. Assumed 20% LOCA sensitive piping
					.0132	

is clear that seal problems have significantly decreased over the years. The experience was therefore correlated, based on the hypothesis that seal quality has improved over the years, and that seal failures were predominately an early-industry problem. The data was split into two time periods, and the performance of the first time period was combined with the performance of the second time period through Bayesian update, as summarized below:

Time Period	Seal Failures	Reactor Years
1/74 - 1/81	5	281
1/81 - 1/88	0	329

The prior used 5 failures in 281 years with a range factor of 5. The resultant mean frequency, after updating the data was 3.9E-3, error factor 2.7.

D.2.3 Pipe Breaks

NUREG/CR-4407 was reviewed for occurrences of pipe break events. Pipe breaks are different from component failures as described in the next section. This category represents failures in pipes themselves rather than pumps, heat exchangers, valves or thermocouples. NUREG/CR-4407 reports on pipe failures in nuclear grade systems, including steam generator systems, steam, and feedwater systems. The survey shows that through 1985, 19 pipe failures had occurred. An LER search was done to survey experience through 1988. This yielded two additional failures; a Surry MFW pipe failure and a Farley charging system pipe crack. Of these 21 failures, none have occurred in LOCA sensitive piping connected to the reactor coolant system. The failures have occurred in steam generator, feedwater, steam systems, and non-LOCA sensitive portions of the primary systems. It was therefore necessary to correlate the total number of failures and apportion the frequency to LOCA sensitive piping.

This apportioning was based on the following estimates of pipe lengths in a typical Westinghouse PWR. The values below are based on Table 6 in NUREG/CR-4407.

		Pipe Length (ft)
A.	Reactor Coolant System	960
B.	High Pressure Injection System	2280
C.	Residual Heat Removal System	2380
D.	Chemical Volume and Control System	6110
E.	Main Steam System	4300
F.	Main Feedwater System	1000

For purposes of determining the percentage of LOCA sensitive piping, it was considered that 100% of A, 33% of B and C, and 10% of D were LOCA sensitive. This yields an over all ratio of 18% (or approximately 20%) for LOCA sensitive piping.

Of the 19 pipe failures in Reference D.2-2, eight were classified as large (greater than 15 gpm), and occurring during startup or power operation. None were assumed to be large enough to be a larger size LOCA. Of the two additional failures uncovered by the LER search, only the Surry MFW break was categorized as large. However, it is clearly too large to be counted as a very small break. Therefore, there were eight applicable failures in 957 reactor years. Multiplying by the 20% LOCA sensitive ratio results in an estimate of 1.7E-3 for pipe break frequency in LOCA sensitive piping.

D.2.4 Component Boundary Failures

NUREG/CR-3862 was surveyed for component boundary failures. The referenced document lists 41 categories for PWR transient initiators. PWR category 5 was considered applicable to this evaluation. Category 5 is "leakage in primary system." Category 4, "leakage from control rods" was initially examined, but it was concluded that it was not physically possible to get control rod leakage of sufficient magnitude to require safety injection flow (i.e., definition of a LOCA). NUREG/CR-3862 surveys experience through January 1984, accounting for 418 PWR years. Twenty events are reported in category 5. Of these, 6 were eliminated. Two events were seal LOCAs at ANO-1 and Salem, which have been previously counted in Section D.2.2. Four other events occurred in the first year of reactor operation and were eliminated on that basis. Fourteen events in 370 reactor years (i.e., eliminate first year), times 20% LOCA sensitive piping = 7.6E-3 per year.

D.2.5 References

D.2-1 Azarm, M.A., Boccio, J.L., Mitra, S., The Impact of Mechanical and Maintenance Induced Failures of Main Reactor Coolant Pump Seals on Plant Safety, NUREG/CR-4400, Brookhaven National Laboratory, Upton, New York, December 1985.

D.2-2 Wright, R.E., Steverson, J.A., Suroff, W.F., Pipe Break Frequency Estimation for Nuclear Power Plants, NUREG/CR-4407, EG&G Idaho, Inc., May 1987.

D.2-3 Mackowiak, D.P., et al, Development of Initiating Event Frequencies for Use in Probabilistic Risk Assessments, NUREG/CR-3862, EG&G Idaho Inc., May 1985.

D.3 Development of the T_1 Initiating Event Frequency and Non-Recovery Probabilities for Offsite AC Power

A Bayesian statistical analysis was performed in support of NUREG-1150, in order to derive a plant specific frequency for loss of offsite AC power and the probabilities for non-recovery of offsite power by various times. The methodology and supporting data for this analysis is described in detail in Reference D.3-1. This section provides a summary of the methodology, the plant specific data used in the calculation, and the results.

Reference D.3-1 provides a statistical analysis of 63 loss of offsite power events at nuclear plants in 721 calendar years. The 721 calendar years represent 503 operating years of experience. For each of the 63 events, the actual time for recovery of offsite power is known. The 63 events are divided into three categories, based on the cause of power loss. The categories and events are

- 43 plant centered events: caused by faults in the switchyard
- 7 weather related events: grid failure due to severe weather
- 13 grid related events: grid failures or instabilities.

The plant centered events were further divided into three categories, based on switchyard configuration. These groups are I1, I2 and I3 as described in NUREG-1032. The number of events in each category are:

- 14 events for group I1
- 13 events for group I2
- 16 events for group I3

A generic distribution for frequency of loss of offsite power was generated, based on a two component model. The plant centered component included 43 events in 503 operating years. The grid/weather component included 20 events in 721 calendar years. Each part of the two component model was analyzed using Bayesian methods to generate a plant specific distribution. The two components were combined to form the cumulative distribution for frequency of loss of offsite power at Surry. The Surry specific experience is zero plant centered failures in 12.3 operating years and zero grid/weather failures in 15.1 calendar years. The resultant distribution for loss of offsite power frequency is shown in Figure D.3-1. The statistical characteristics are shown in Table D.3-1.

A three component model for probability of non-recovery of AC power was similarly developed. However, it was not possible to include plant specific experience in this model. Rather, a model was developed for each switchyard type. All plants with a particular switchyard type can be represented by the same non-recovery curve. The non-recovery model included grid and weather components applicable to all plants, and a plant centered component representative of the switchyard. Surry has an I3 switchyard configuration. The resultant recovery curve is shown in Figure D.3-2.

D.3.1 Reference

Iman, R.L., Hora, S.D., Modeling Time to Recovery and Initiating Event Frequency for Loss of Off-Site Power Incidents at Nuclear Power Plants, NUREG/CR-5032, January 1988.

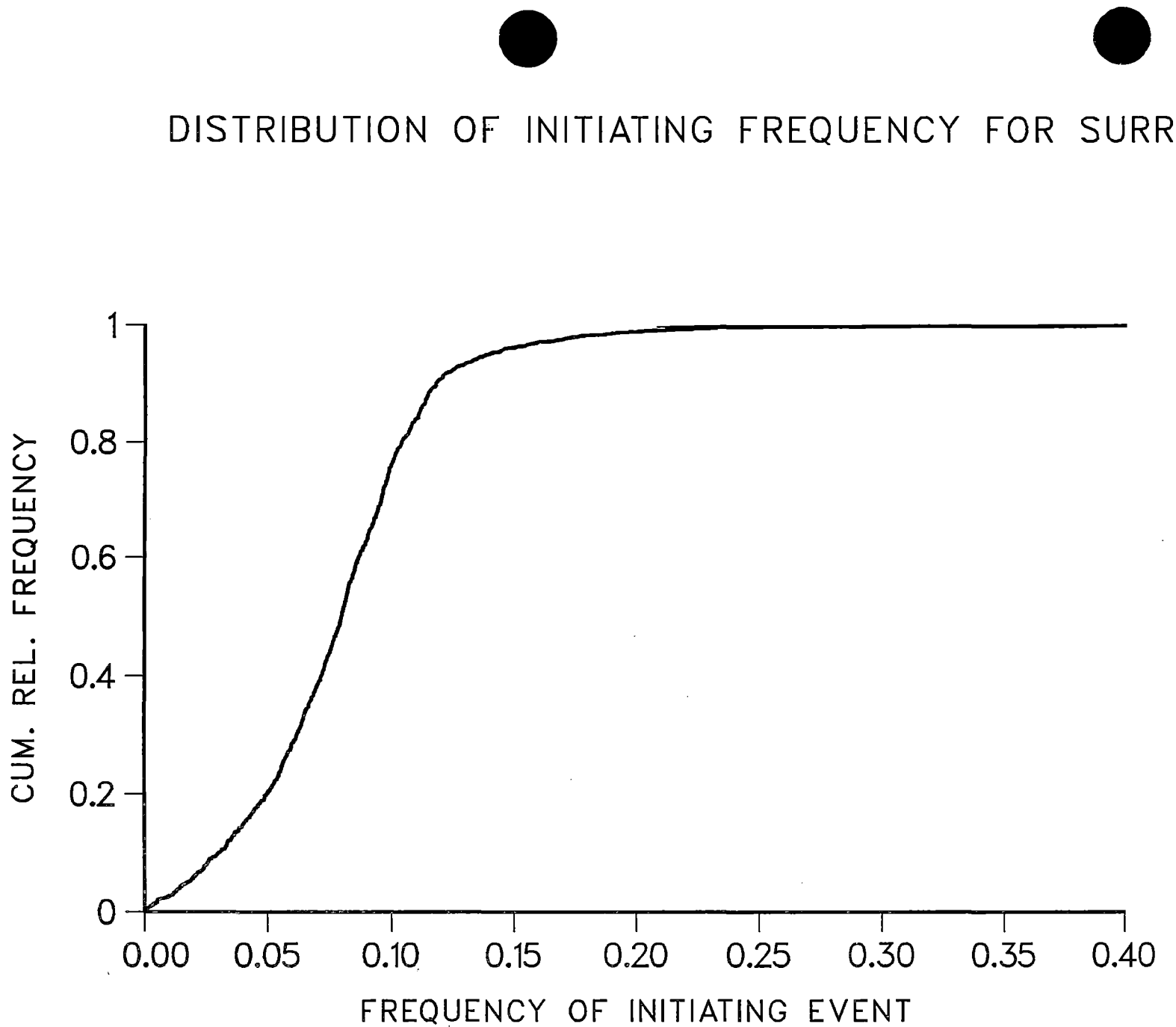
DISTRIBUTION OF INITIATING FREQUENCY FOR SURRY
CUM. REL. FREQUENCY
1
0.8
0.6
0.4
0.2
0
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
FREQUENCY OF INITIATING EVENT

Figure D.3-1

Table D.3-1

DISTRIBUTION OF INITIATING EVENT FREQUENCY FOR SURRY 1
9:56 TUESDAY, JANUARY 12, 1988

UNIVARIATE

VARIABLE=FREQ

MOMENTS

N	1000	SUM WGTS	1000
MEAN	0.0768503	SUM	76.8503
STD DEV	0.0389527	VARIANCE	0.00151732
SKEWNESS	0.728448	KURTOSIS	1.87615
USS	7.42177	CSS	1.5158
CV	50.6865	STD MEAN	0.00123179
T:MEAN=0	62.3889	PROB>|T|	0.0001
SGN RANK	250250	PROB>|S|	0.0001
NUM 0	1000		

QUANTILES(DEF=4)

100% MAX	0.284425	99%	0.198115
75% Q3	0.0983122	95%	0.140835
50% MED	0.0766992	90%	0.120537
25% Q1	0.0514392	10%	0.0270755
0% MIN	0.00026496	5%	0.0156033
		1%	0.00202154
RANGE	0.284399		
Q3-Q1	0.046873		
MODE	0.236011		

EXTREMES

LOWEST	HIGHEST
.00026496	0.226843
.00029286	0.236011
.00045951	0.236011
.00051039	0.24271
.00081148E	0.284425

RECOVERY CURVE FOR SURRY

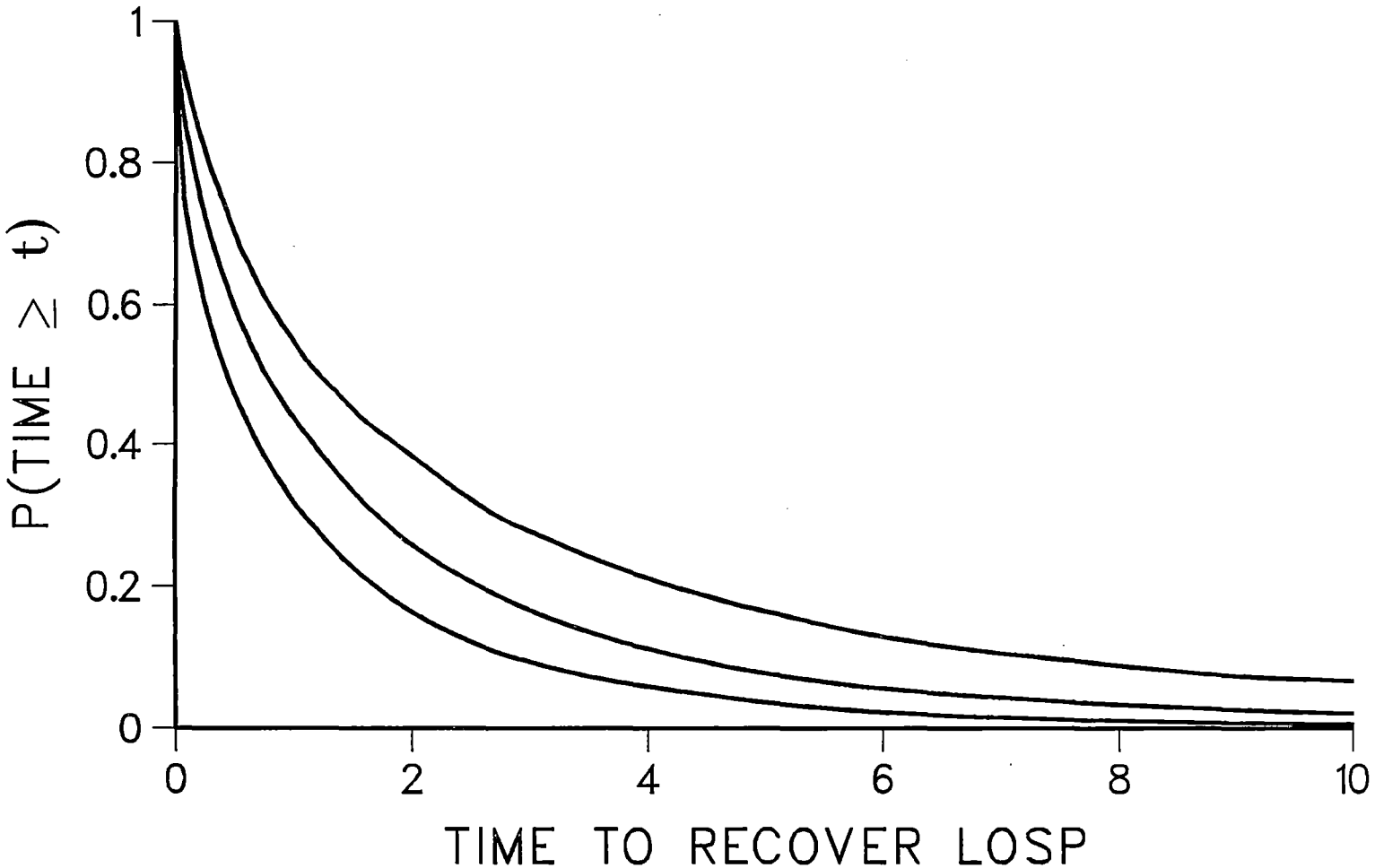

Figure D.3-2

D.4 Core Uncovery Time Versus Break Size

Core uncovery times versus break size for sequences with no high pressure makeup were developed based on a survey of existing analyses on Surry, Sequoyah and generic Westinghouse plants. Based on the results of the survey, it was decided that modeling assumptions and computer code differences produced greater variations in results than plant-to-plant variability could produce. All analysis on Westinghouse plants was therefore considered applicable to this generic evaluation. The applicable data (i.e., small break sequences) listed in Table D.4-1 plus results from in NUREG-1032, WCAP 9763, and Westinghouse seal LOCA analysis have formed the basis for the development of the core uncovery curve.

The times to core uncovery and core damage of the individual analyses were plotted versus break size. The distinction between core uncovery and core damage was retained in the correlation of data. In addition, some analyses report break size and some report flow rate. A mass flux constant of 11,000 $lb/s\text{-}ft^2$ was used to put the data on a consistent basis. This value is taken from the Moody critical flow chart, saturated water at 2200 psi. The plot of core uncovery time versus break size is shown in Figure D.4-1.

A curve was constructed for core uncovery, and another curve was constructed for core melt. The uncovery curve, not the core melt curve, became the basis for determining recovery times in the recovery analysis. The next step was to develop a curve which included the effect of operator induced depressurization of the primary system. The data points in Figure D.4-1 represent analysis with no operator depressurization.

The effect of operator induced depressurization on the extension of core uncovery times depends upon when depressurization begins, how fast it occurs, and how low the RCS pressure is reduced. These parameters are sequence and reactor specific. In order to provide a generic estimate, the depressurization curve was based on results from a Westinghouse seal LOCA analysis (Ref. D.4-3), which developed uncovery times with and without depressurization. The percent increase in uncovery time for specific break size from the Westinghouse analysis was used to develop the uncovery curve shown in Figure D.4-2.

D.4.1 References

D.4-1 WCAP-9763 - Inadequate Core Cooling Studies of Scenarios with Feedwater Available, Using the NOTRUMP Computer Code, Westinghouse Electric Corp., Pittsburgh, Pennsylvania, November 1980.

D.4-2 Baranowsky, P., Evaluation of Station Blackout Accidents at Nuclear Power Plants, NUREG-1032, U.S. Nuclear Regulatory Commission, May 1985.

D.4-3 Presentation to NUREG-1150 Expert Elicitation Meeting by M. Hitchler, Westinghouse Electric Corporation, November 1987.

Table D.4-1

Times from Start of Accident to Core Uncovery

Plant	Sequence	Time to Uncovery (Min)	Source
Surry	TMLB'	95.5	BMI-2104
Surry	S2D	27.8	BMI-2104
Surry	V	20.6	BMI-2104
Surry	AB (2 Vol.)	9.4	BMI-2104
Surry	AB (4 Vol.)	7.1	BMI-2104
Surry	AG	3081.	BMI-2139
Surry	TMLB'	97.2	BMI-2139
Surry	S2D	28.5	BMI-2139
Surry	S3B	87.6	BMI-2160
Sequoyah	S3HF	272.4	BMI-2139
Sequoyah	S3HF	273.7	BMI-2160
Sequoyah	S3B	236.6	BMI-2139
Sequoyah	S3B (delayed)	362.	BMI-2160
Sequoyah	TMLU-SGTR	104.0	BMI-2139
Sequoyah	TBA	517.8	BMI-2139
Seabrook	TMLB' (fast)	120.	W MAAP
Seabrook	TMLB' (slow)	420. after FW loss	W MAAP
Sequoyah	S2D	48.	Idcor MAAP
Sequoyah	S2H	78.	Idcor MAAP
Sequoyah	S2HF	72.	Idcor MAAP
Sequoyah	TMLB'	105.	Idcor MAAP
Sequoyah	T23ML	90.	Idcor MAAP
Sequoyah	TMLB'	97.8	BMI-2104
Sequoyah	S_2HF	163.	BMI-2104
Sequoyah	TML	97.2	BMI-2104

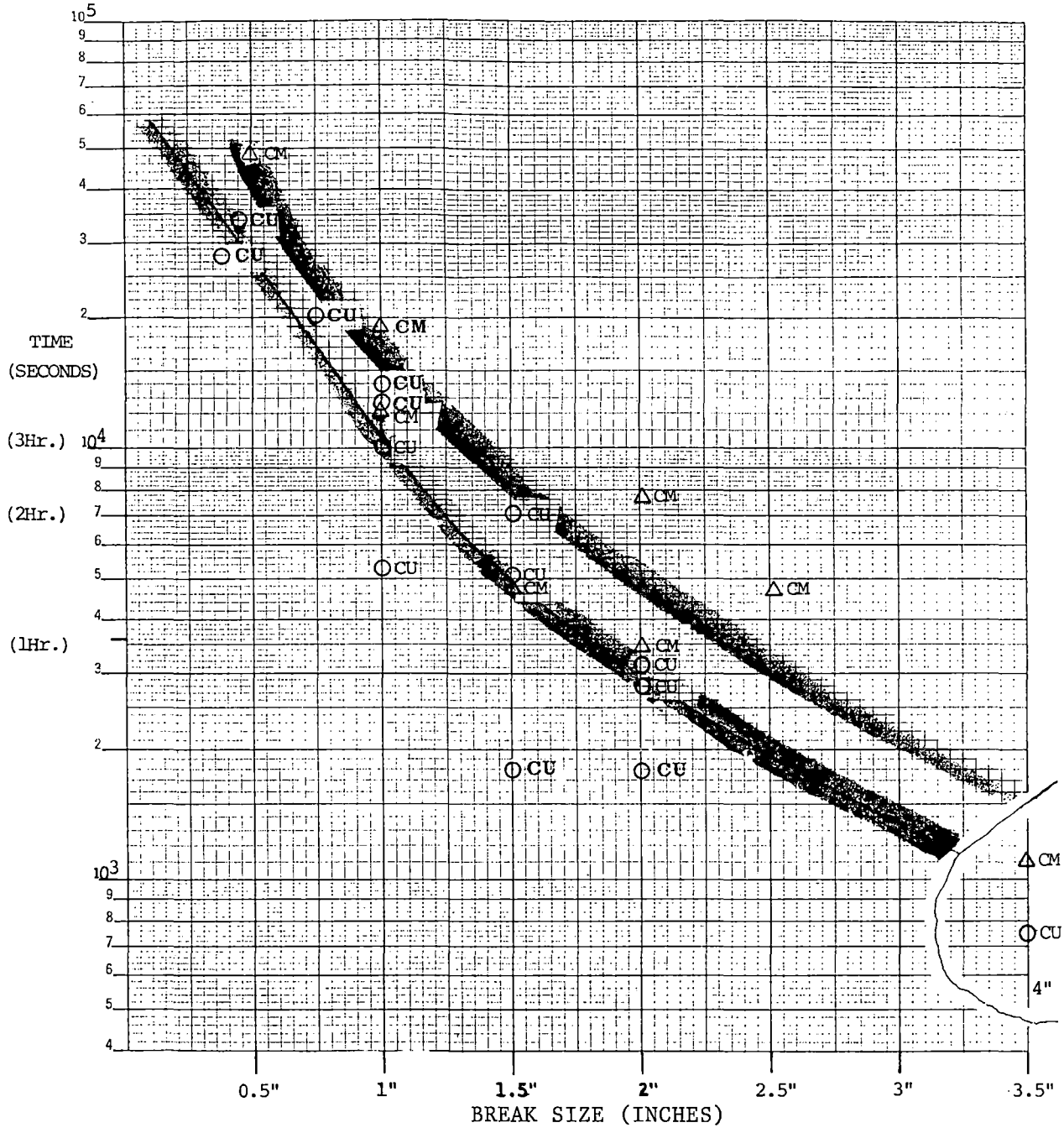

Figure D.4-1. Time to Core Uncovery and Core Melt Variation With LOCA Break Size

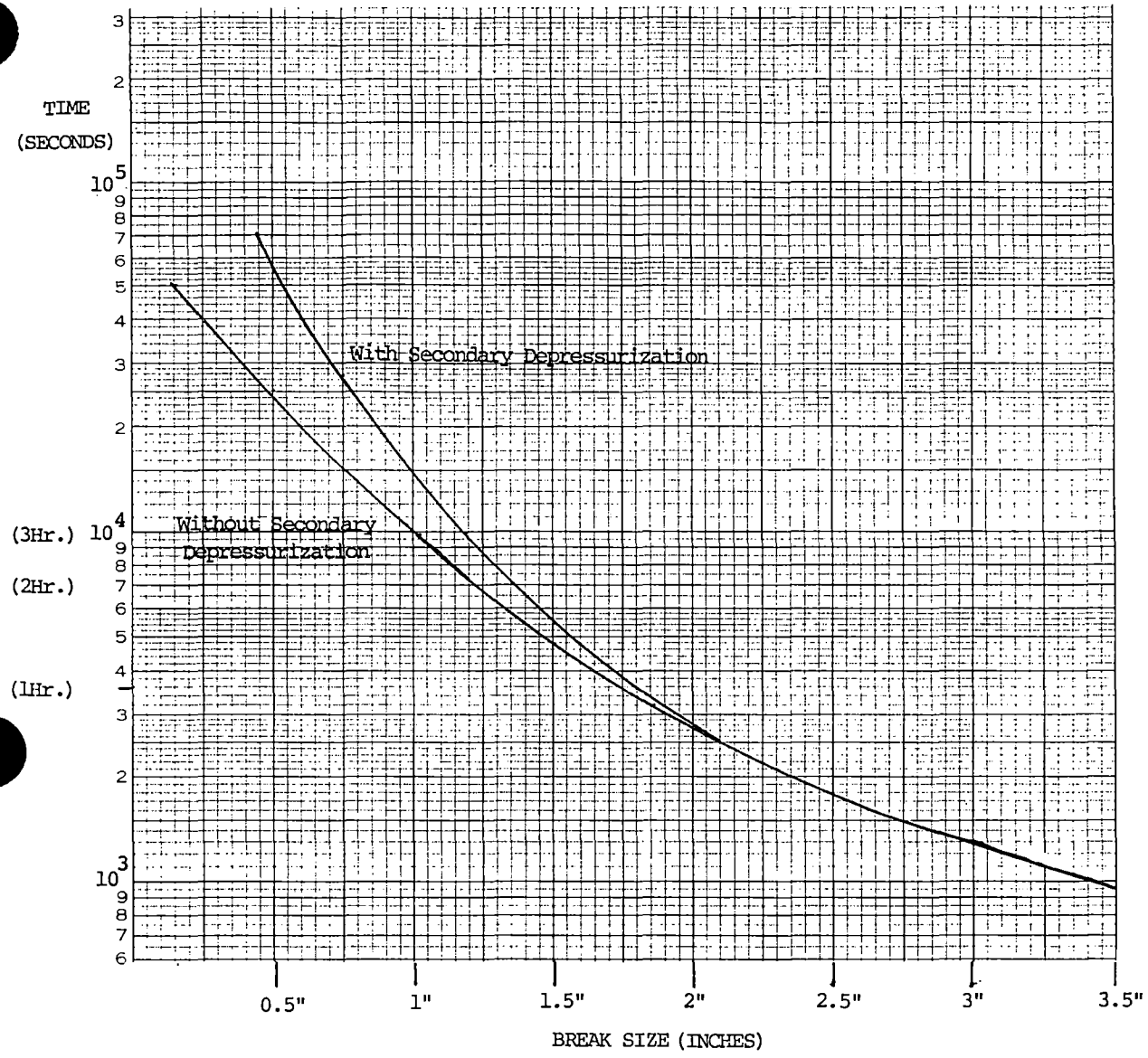

Figure D.4-2. Time to Core Uncovery Variation With LOCA Break Size and Secondary Depressurization

D.5 Integration of Reactor Coolant Pump Seal LOCA Model into Station Blackout Sequences

Prediction of reactor coolant pump seal behavior under loss of all seal cooling conditions is an integral part of station blackout model development. Due to the unavailability of seal performance data to this project, the issue of seal performance was resolved through expert elicitation. The process of this elicitation and the results are presented in NUREG/CR-4550, Volume 2, Revision 1. This section provides a discussion of how the elicitation results were used to develop a plant specific model and how this model was integrated into the event tree analysis and quantification process.

The expert elicitation process resulted in a series of leak rates, probabilities, and times for seal failure. This information became the starting point for seal LOCA model development. Table C.4-9. from Volume 2, Rev. 1 presents these results. This table is included here as Table D.5-1. It shows probabilities of RCS leak rates for various times after loss of seal cooling. The leak rates represent total leakage from all three pumps. The three pumps were not necessarily postulated to fail in the same manner, thus they may have different leak rates. The probabilities for a given leak rate changed with time in a manner that indicates that the leak rates increase with time. The experts generally considered seal behavior to be dynamic with loss of seal integrity increasing with time. Each seal stage was modeled individually, and each seal stage was allowed to fail in different modes, thus resulting in different leak rates through that stage. Overall leak rate was dependent on the combination of each stage failure. A series of individual seal LOCA scenarios was therefore possible, each scenario being a distinct combination and progression of seal stage failures.

In order to incorporate this information into the sequence models, it is necessary to calculate a time of initial seal failure and a core uncovery time for each possible failure scenario. Therefore, it is necessary to define a series of individual scenarios which identify the time of seal failure, the initial leak rate, the progression of the leak rate, and the probability of the scenario. The data in Table D.5-1 were used to develop these scenarios.

A total of 20 scenarios were identified and are shown in Table D.5-2. They include the initial leak rate, the time of initial seal failure, any increases in leak rate, the time at which the leak rate increases, and the probability. These 20 scenarios were used to develop point estimate probabilities (i.e., no uncertainty stated) for seal failure and core uncovery. These values were not used in the uncertainty analysis. In order to calculate the probability distributions for seal LOCA sequences, the 20 scenarios were consolidated into eight states. There are seven failure states and one success state (the 63 gpm state is a success state). The eight seal states are summarized below:

Leak Path (gpm)	Time to Transfer	Probability
750*	1 1/2	.5302
183 - 750	2 1/2	.1270
183*	2 1/2	.0161
183*	3 1/2	.0161
1440*	1 1/2	.0043
183*	1 1/2	.0140
372 - 750	2 1/2	.0062
63* (success)		.274

* Constant leak rate

Table D.5-1 Aggregated RCP Seal LOCA Probabilities - Three Pumps

Leak Rate (gpm)	Old O-Rings Time (Hrs.) 1.5	2.5	3.5	4.5	5.5	New O-Rings Time (Hrs.) 1.5	2.5	3.5	4.5	5.5
63	.306	.290	.274	.274(.258)*	.274(.241)	.817	.816	.814	.812	.811
103	-	-	-	-	-	7.7E-3	7.7E-3	7.7E-3	7.7E-3	7.7E-3
183/224	.148	.0370	.0502	.0478(.0640)	.0466(.0790)	.0136	.0142	.0157	.0173	.019
294	-	-	-	-	-	1.9E-3	1.9E-3	1.9E-3	1.9E-3	1.9E-3
372	8.5E-3	5.0E-3	4.5E-3	3.7E-3	3.3E-3	4.5E-4	5.0E-3	5.3E-3	5.7E-3	6.0E-3
425	-	-	-	-	-	1.9E-3	1.9E-3	1.9E-3	1.9E-3	1.9E-3
516/526/546	3.5E-4	3.4E-4	3.2E-4	3.2E-4	3.2E-4	.145	.145	.145	.145	.145
602/614	.001	0	0	0	0	4.7E-4	4.7E-4	4.7E-4	4.7E-4	4.7E-4
750	.530	.660	.660	.660	.660	7.7E-3	7.7E-3	7.7E-3	7.7E-3	7.7E-3
1440	4.3E-3	4.3E-3	4.3E-3	4.3E-3	4.3E-3	5.0E-3	5.0E-3	5.0E-3	5.0E-3	5.0E-3

*Parentheses denote calculations which change if no depressurization is assumed.

These values are the probabilities of being at a particular leak rate at a particular time.

Table D.5-2

Surry RCP Seal LOCA Model Paths

Leak Path (Gpm)	Time to Transfer (Hours)	Probability
63*	-	.274
63 - 183	2 1/2	.0161
63 - 183	3 1/2	.0161
183*	-	.0140
183 - 372	2 1/2	.0005
183 - 372	3 1/2	.0005
183 - 750	2 1/2	.1270
183 - 750	3 1/2	.0024
183 - 750	4 1/2	.0024
183-750	5 1/2	.0012
372*	-	.0022
372 - 750	2 1/2	.0040
372 - 750	3 1/2	.0009
372 - 750	4 1/2	.0009
372 - 750	5 1/2	.0005
530*	-	.0003
602 - 980	2 1/2	.0010
750*	-	.5302
980*	-	.0013
1440*	-	.0043
Total		1.006

* Constant Leak Rate

This probability distribution is interpreted as a representation of the experts collective degrees of belief in the eight states that represent possible outcomes for seal LOCA. The occurrence of a seal LOCA is therefore treated as a modeling uncertainty with respect to time and size. These states were sampled as either a zero or unity probability in the TEMAC uncertainty analysis. The following discussion illustrates how the seal LOCA model was integrated into the station blackout event trees. Two constraining criteria were applied to this task: 1) the event heading for non-recovery of AC power would be separate from the event heading for seal LOCA, and 2) a minimum number of headings for seal failure and non recovery would be used.

The conclusion of the expert panel was that at 90 minutes after loss of all seal cooling, the seal temperatures have increased enough to be at risk of failure. Prior to 90 minutes, there is no risk of seal failure. If AC power is restored before 90 minutes, seal failure is averted. After 90 minutes, with no cooling, the seal may fail or may remain intact. It may develop a small leak which increases with time, or may have a constant leak rate. If a seal failure occurs, core uncovery can be averted if AC power is restored in sufficient time, thus enabling restoration of safety injection flow.

The mathematical development of the core damage probability due to seal LOCA is given as a weighted average of the 20 seal states as follows:

	Prob. at	Prob.	Prob. no
Prob. Core =	risk for *	SLOCA *	recovery AC
Damage	SLOCA	occurs	prior to core uncovery

The probability of being at risk for a seal LOCA is the probability that AC power has not been restored (within 90 minutes after loss of seal cooling). The probability of a seal LOCA is given by the results of the expert elicitation. There are 20 seal LOCA scenarios, each with a characteristic uncovery time and a specific probability. All seal scenarios start at 90 minutes from loss of cooling. Finally, the probability of not recovering is just the probability of non-recovery of AC power prior to the characteristic core uncovery time associated with each seal scenario. Note that in developing the probabilities for this equation, the non-recovery term must be conditional on non-recovery of AC power in the first 90 minutes. The core damage (CD) equation can be written as:

$$\text{Prob. CD} = \sum_{i=1}^{20} P_{NRAC}(t) * f_{sl_i}(t) * C_{NRAC}(t + \lambda_i)$$

where i = seal LOCA scenario index, and t, in this case, equals 90 minutes.

λ_i = core uncovery time associated with the i^{th} scenario.

$f_{sl_i}(t)$ = probability of ith seal LOCA scenario.

$P_{NRAC}(t)$ = probability of non-recovery of AC power by time t, given loss of power at t = 0 (shown in Figure D.3-2). $P_{NRAC}(t) = 1 - F_{NRAC}(t)$, where F is the cumulative probability of recovery of AC power.

$C_{NRAC}(t + \lambda)$ = conditional probability of non-recovery of AC power by time $t+\lambda$, given no recovery at time t.

$$C_{NRAC}(t+\lambda) = \frac{P_{NRAC}(t+\lambda)}{P_{NRAC}(t)} = \frac{1 - F_{NRAC}(t+\lambda)}{1 - F_{NRAC}(t)}$$

recognizing the form for C_{NRAC}, the equation reduces to:

$$\sum_{i=1}^{20} f_{sl_i}(t) * P_{NRAC}(t + \lambda_i)$$

The values for f_{sl_i}, λ_i, and $P_{NRAC}(t + \lambda_i)$ are shown in Table D.5-3. Core uncovery times were calculated for the case with and without secondary depressurization. The core uncovery times were calculated from the data in Appendix D.4.

Table D.5-3

Surry RCP Seal LOCA Model[1]

Leak Path (Gpm)	Time to Transfer (Hours)	Prob.	Time to CU (Hrs) (with secondary depressurization)	Time to RAC (Hrs) (with secondary depressurization)	Prob. NRAC (with secondary depressurization)	Prob. CD (with secondary depressurization)	Time to CU (Hrs) (without secondary depressurization)	Time to RAC (Hrs) (without secondary depressurization)	Prob NRAC (without secondary depressurization)	Prob CD (without secondary depressurization)
63 C	-	.274	24	24	.05	-	10.6	10.6	.05	-
63 - 183	2 1/2	.0161	12.0	13.5	.05	.00081	6.3	7.8	.05	.00081
63 - 183	3 1/2	.0161	12.2	13.7	.05	.00081	6.9	8.4	.05	.00081
183 C	-	.0140	10.9	12.4	.05	.00070	5.6	7.1	.05	.00070
183 - 372	2 1/2	.0005	5.81	7.3	.05	.00003	3.87	5.4	.077	.00004
183 - 372	3 1/2	.0005	6.32	7.8	.05	.00003	4.38	5.9	.067	.00003
183 - 750	2 1/2	.1270	2.75	4.3	.108	.01372	2.61	4.1	.115	.01461
183 - 750	3 1/2	.0024	3.51	5.0	.086	.00021	3.36	4.9	.088	.00021
183 - 750	4 1/2	.0024	4.34	5.8	.070	.00017	4.12	5.6	0.72	.00017
183 - 750	5 1/2	.0012	5.17	6.7	.054	.00006	4.88	6.4	.058	.00007
372 C	-	.0022	5.23	6.7	.054	.00012	3.73	5.2	.082	.00018
372 - 750	2 1/2	.0040	2.6	4.1	.115	.00047	2.36	3.9	.123	.00049
372 - 750	3 1/2	.0009	3.14	4.6	.096	.00008	2.86	4.4	.104	.00009
372 - 750	4 1/2	.0009	3.79	5.3	.08	.00007	3.36	4.9	.008	.00008
372 - 750	5 1/2	.0005	4.44	5.9	.067	.00003	3.73	5.2	.082	.00004
530 C	-	.0003	3.15	4.7	.093	.00003	2.62	4.1	.115	.00004
602 - 980	2 1/2	.0010	1.88	3.4	.147	.00015	1.80	3.3	.15	.00015
750 C	-	.5302	2.07	3.6	.138	.07317	1.85	3.35	.15	.07953
980 C	-	.0013	1.4	2.9	.18	.00024	1.4	2.9	.18	.00024
1440 C	-	.0043	.97	2.5	.21	.00091	.97	2.5	.21	.00091
Total		1.006				.09181				.09920

Table D.5-3 (Cont'd)

Surry RCP Seal LOCA Model

Notes to Table D.5-3

(1) Abbreviations used:

C	Constant Leak Rate
CD	Core Damage
CU	Core Uncovery
GPM	Gallon Per Minute
Hrs	Hours
NRAC	Non-Recovery of AC Power
Prob.	Probability
RAC	Recover AC Power

D.6 Failure Data Development

The derivation of selected event failure probabilities is detailed in the following sections. In addition, failure rates calculated from plant specific data are discussed. Undeveloped events from the fault trees and "black box" events from the event trees are also detailed.

D.6.1 Mission Times

An event in a fault tree may have several different unavailability values, depending on the accident scenario in which the fault tree is involved. The length of time that a system is required to run for the different accident initiators is defined as the mission time. The mission times used in the Surry analysis are shown in Table D.6-1. The electrical power system components (except diesel generators) were required to remain operating for 24 hours, regardless of the accident sequence they were involved in. Selection of the mission time for Diesel Generators for Loss of Offsite Power Initiators is discussed in Appendix D.7.

D.6.2 Failure Rates from Plant Specific Data

Surry maintenance records for the five years preceeding this study were searched in order to get plant specific failure history on selected components at both Units 1 and 2. The number of demands and hours of use for these components was estimated. Failure probability distributions for the plant specific data were developed as follows. First, it was assumed that all components could be represented by log normal failure distributions.

The 95% upper bound of the log normal distribution was determined by the 95% Chi-square value associated with the component data. The number of degrees of freedom used was 2n+2, where n is the number of failures. For example, the AFW motor driven pumps experienced six failures in 960 demands. The 95% Chi-square value for 14 degrees of freedom is 23.68. The 95% upper bound is then $\frac{23.68}{2 \times 40 \times 24}$ or 1.2E-2/D.

The mean of the log normal distribution was determined to be the point estimate, or the number of failures divided by the number of demands (or hours). In the AFW motor driven pump example, this is 6 failures divided by 960 demands (40D/c-y x 24c-y/AFW pump) or 6.E-3/D.

Finally, the median and error factor of the log normal distribution was calculated from the known mean and 95% upper bound. For the AFW motor driven pump example, the 95% upper bound is 1.2E-2D and the mean is 6.3E-3/D. The error factor comes out to be 2.2 and the median 5.6E-3/D.

The results of the quantification of the plant specific data are displayed in Table D.6-2.

D.6.3 AFW Actuation

AFW-ACT-FA-PMP3A AFW-ACT-FA-PMP3B
AFW-ACT-FA-VLVA AFW-ACT-FA-VLVB

The AFW actuation circuitry is much simpler than the RMT/CLS/SIS actuation circuitry. Therefore, it was not considered appropriate to use the generic failure probability of 1.6E-3. A value of 6.0E-4 was estimated for AFW pump and valve actuation

Table D.6-1

Mission Times (Hours)

Event Tree Heading	T_1	SBO	T_2	T_3	T_5	T_7	A	S_1	S_2	S_3	ATWS
C	1	-	1	1	1	-	1/2	1	1	1	1
D1	-	-	-	-	-	24	-	3	6	24	-
D2	6	-	6	6	6	-	-	-	-	-	-
D3	6	-	6	6	6	-	-	-	-	-	-
D4	-	-	-	-	-	-	-	-	-	-	1
D5	-	-	-	-	-	-	DMD	DMD	-	-	-
D6	-	-	-	-	-	-	1/2	3	-	-	-
F1	24	-	24	24	24	-	24	24	24	24	24
F2	24	-	24	24	24	-	24	24	24	24	24
H1	18	-	18	18	18	-	24	21	24	24	-
H2	18	-	18	18	18	-	-	-	18	18	-
L	24	6	24	24	6	-	-	-	6	24	-
L2	-	-	-	-	-	-	-	-	-	-	1
L3	-	-	-	-	-	24	-	-	-	-	-
K	DMD	-	DMD	DMD	DMD	DMD	-	DMD	DMD	DMD	-
M	-	-	-	6	-	-	-	-	-	24	1

Event Tree Heading	T_1	SBO	T_2	T_3	T_5	T_7	A	S_1	S_2	S_3	ATWS
P	24	-	24	24	24	-	-	-	-	24	-
P1	-	-	-	-	-	-	-	-	6	-	-
P2	-	-	-	-	-	-	-	-	-	-	1
Q	DMD	DMD	DMD	DMD	DMD	-	-	-	-	DMD	-
R	-	-	-	-	-	DMD	-	-	-	-	DMD
T	-	-	-	-	-	-	-	-	-	-	DMD
W	24	-	24	24	24	-	-	-	-	-	-
W2	-	6	-	-	-	-	-	-	-	-	-
W3	-	-	-	-	-	-	-	-	-	24	-
Z	-	-	-	-	-	-	-	-	-	-	DMD

Table D.6-2

Plant Specific Failure Data[1]

Component	Failure Mode	Number of Failures	Components in Population	Component Cal. Yrs. (C-Y)	Demands or Hours Per C-Y	95% X^2	Mean	Median	EF
AFW Motor Driven Pump	FS	6	4	24	40D	1.2E-2/D	6.3E-3/D	5.6E-3/D	2.2
AFW Turbine Driven Pump	FS/FR	2	2	6	30.2D	3.5E-2/D	1.1E-2/D	7.5E-3/D	4.6
CPC Service Water Pump	FS	3	4	20	19.1D	2.0E-2/D	7.9E-3/D	5.9E-3/D	3.5
	FR	15	4	20	4380H	2.6E-4/H	1.7E-4/H	1.6E-4/H	1.6
Charging Pump	FS	3	6	30	23.8D	1.1E-2/D	4.2E-3/D	3.1E-3/D	3.5
	FR	4	6	30	1920H	1.6E-4/H	6.9E-5/H	5.6E-5/H	2.9
Diesel Generator	FS	11	3	-	484D	-	2.2E-3	-	1.7
Inside Spray Recirc. Pump	FS	10	4	20	13D	6.5E-2/D	3.8E-2/D	3.6E-2	1.8
PORV Block Valve	FT	5	4	20	6.1D	8.6E-2	4.1E-2	3.6E-2	2.4

Note 1

C-Y - Calendar Year
D - Demand
EF - Error Factor
FS - Fail to Start
FR - Fail to Run
FT - Failure to Transfer Open
H - Hours
X^2 - Chi-Square

unavailability, based on the number of relays and switches which must operate. An error factor of five was assigned, to be consistent with SIS actuation.

D.6.4 AFW Condensate Storage Tank

AFW-TNK-VF-CST AFW-TNK-VF-U2CST

An unavailability of 1.0E-6 was selected based on engineering judgment. The Condensate Storage Tank can be filled from multiple water sources. An error factor of three was assigned.

D.6.5 AFW Diversion Flow

AFW-PSF-FC-XCONN

Diversion of the AFW flow from of Unit 1 to Unit 2 via the cross connect header was calculated to have an unavailability of 1.5E-4/demand. This was based on spurious transfer of one of two motor operated valves at a failure rate of 3E-6 per hour per valve over 24 hours. The failure rate of 3E-6 was selected based on a survey of other PRA (references D.6-1 through D.6-6) values for the probability of spurious transfer of a MOV. The probabilities ranged from 9.7E-8 at Indian Point to 4.6E-6 for Millstone.

D.6.6 AFW Pumps

AFW-MDP-FS-FW3A AFW-MDP-FS-FW3B
AFW-TDP-FS-FW2 AFW-TDP-FS-U2FW2

AFW Motor Driven Pump Fail to Start.

Sufficient plant specific data was gathered to determine a plant specific failure rate for the AFW pump failure to start on demand. A mean value of 6.3E-3/D was derived based on plant specific data of six failures in 960 demands to start. A 95% upper bound of 1.2E-2 and an error factor of 2.2 were calculated. An error factor of 3 was assigned.

AFW Turbine Driven Pump Fail to Start.

Sufficient plant specific data also existed to calculate the unavailability of the AFW turbine driven pump to start on demand. A mean unavailability of 1.1E-2 was derived for failure of the AFW turbine driven pump to start on demand. This was based on two failures in 181 demands. The 95% upper bound was calculated to be 3.5E-2.

An error factor of ten was assigned, consistent with ASEP generic turbine driven pump error factors.

D.6.7 AFW Steambinding

AFW-CCF-LK-STMBD AFW-CCF-LK-2STMB

Reference D.6-4 indicates steambinding of AFW pumps may be a generic problem at PWRs. The report was reviewed for its applicability to Surry. Three instances of steambinding in the AFW system occurred at Surry during the years of the survey, 1981 through 1983, inclusive. One occurrence failed two pumps and the other two occurrences failed one pump. The three events occurred very close in time and all occurred at Surry Unit 2. This indicates that it was a plant specific problem, which is consistent with the

Surry troubleshooting that found steam cuts on the valve seats of the AFW check valves. The valves were rebuilt, and other remedial measures were taken, such as shiftly checking of the AFW discharge piping temperature, and removal of piping insulation to aid in condensation of any steam which did appear in the system. No subsequent steambinding has occurred.

Although the reported occurrences of steambinding at Surry appear to be specifically caused by leaking check valves, and the problem appears to have been corrected, AFW failure due to steambinding was included in the AFW system model. The problem appears to be widespread, based on the referenced report and the causes of steambinding at other plants may appear at Surry. In addition, steambinding can potentially be a common cause failure of all AFW pumps and therefore may be dominant even though it has a low probability. For these reasons, it was desired to include steambinding in the AFW model. Steambinding was conservatively assumed to be a common cause failure of all three AFW pumps in the AFW model.

The probability of steambinding was calculated based on generic data in NRC report AEOD/C404.

The data is as follows:

- 22 occurrences of steambinding of an AFW pump,
- 3 years of operating experience -- 1981 - 1983,
- 47 operating units in this 3-year period,
- 38 estimated AFW demands per unit per year. This includes 8 per year for reactor trip, 30 per year for monthly pump testing. All testing is staggered.

This data results in a point estimate for steambinding of:

$$\frac{22 \text{ events}}{47 \times 3 \times 38} = 4.1\text{E-}3/\text{demand}$$

The root cause of steambinding is considered to be check valve leakage, which is properly modeled with an hourly failure rate. The value of .0041 demand shows the probability that check valve leakage occurred between pump demands. In order to find an hourly failure rate, it was necessary to calculate a demand period.

Each reactor had averaged 38 AFW demands per year. This is an average demand period of 9.6 days. The hourly check valve failure rate is therefore:

$$\frac{.0041/\text{demand}}{231 \text{ hours/demand}} = 1.8\text{E-}5/\text{hr}$$

Accounting for the shiftly (eight hours) check, the probability of steambinding being undetected during a random AFW demand is:

$$1.8\text{E-}5/\text{hr} \times 8 \text{ hr} = 1.4\text{E-}4/\text{demand}$$

This was rounded to 1E-4 for use in the fault tree quantification. An error factor of 30 was subjectively chosen. The large error factor reflects the estimation in this calculational process.

D.6.8 Beta for Common Cause Failure of CPC Service Water Strainers

BETA - STR
CPC-CCF-LF-STR1H CPC-CCF-LF-STRAB
CPC-CCF-LF-STR6H CPC-CCF-LF-STR3H
CPC-CCF-LF-STR24 CPC-CCF-LF-STR18

The components of interest here are the passive strainers in the suction of the dedicated HPI service water system. An LER review of Surry 1 and Surry 2 indicated several instances of degraded flow through the CPC service water strainers 2A and 2B (2A is in the A train and 2B is in the B train). Degraded flow was considered to be insufficient flow through the strainers, or strainer failure. Note that it is conservative to assume that the strainer has failed when flow is only degraded. Between 1980 and 1984, there were nine instances of single strainer failure and three instances of of both strainers (common cause) failing. Each of these failures was due to plugging. In 1984, the strainers were replaced with duplex strainers. Between 1984 and 1987 there were no instances of single train strainer failure, but two instances involving dual train strainer failure (common cause). These two instances were due to air binding of the CPC Service Water pump due to improper venting of the duplex strainer. Because there have been no single train strainer failures while using the duplex strainers, generic data (3E-5hr) was used for the single strainer failure rate.

However, since there have been five instances of common cause failure out of 19 total individual strainer (common cause and random independent) failures, a plant specific Beta factor of 0.263 (5/19) was calculated. A maximum entropy distribution was assigned to the Beta with a lower bound of 2.6E-2 and an upper bound at 1.0. This Beta only applies to CPC Service Water (duplex) Strainers 2A and 2B. The 1A and 1B CPC service water strainers and rotating basket type strainers with no history of degraded flow.

D.6.9 Service Water Isolation Valve Common Cause Failure

BETA-SW SWS-CCF-FT-3ABCD

An LER review of Surry 1 and 2 identified one occurrence of common cause failure of the four containment spray heat exchanger service water valves to open when activated from the control room. This occurrence formed the basis for inclusion of common cause failure of these valves in the ISR and OSR fault trees.

The one failure incident occurred in 1983. Since that time, the test interval on the valve has been reduced from yearly to quarterly. Also, the valves have been replaced with an improved design and new material. Although the valves have been replaced, they still operate in the same brackish water environment, which is thought to be the root cause of the 1983 failure. As such, they are considered to be more susceptible to failure than the generic motor operated valve that works in a fresh water environment. Therefore, the Beta factor for common cause failure of these valves was set equal to the 95% upper bound of the generic beta (or .21).

D.6.10 Charging/HPI/HPR Pumps

HPI-MDP-FS-CH1B	HPI-MDP-FS-CH1C
HPI-MDP-FS-CH2A	HPI-MDP-FS-CH2C
HPI-MDP-FR-1A3HR	HPI-MDP-FR-1B3HR
HPI-MDP-FR-1C3HR	HPI-MDP-FR-1A6HR
HPI-MDP-FR-1B6HR	HPI-MDP-FR-1C6HR
HPI-MDP-FR-2A6HR	HPI-MDP-FR-2C6HR
HPI-MDP-FR-1C12H	HPI-MDP-FR-C12HR
HPR-MDP-FR-A18HR	HPR-MDP-FR-B18HR
HPR-MDP-FR-C18HR	HPI-MDP-FR-1A24H
HPI-MDP-FR-1B24H	HPI-MDP-FR-1C24H

Plant specific data was also available for the charging pumps (the HPI/HPR pumps) failure to start and failure to run. A failure to start on demand mean probability of 4E-3 was calculated based on three failures in 714 demands.

The 95% upper bound was found to be 1.1E-2 and the error factor 3.5, using the method described in section D.6.3.

A mean failure rate of 6.9E-5/hr for failure to run was calculated based on four failures in 57,400 hours. The 95% upper bound was determined to be 1.6E-4/hr, and the error factor 2.9. The error factor was rounded off to 3.0.

D.6.11 CPC Actuation

CPC-ICC-FA-CCPBS	CPC-ICC-FA-SWPBS
CPC-ICC-FA-TCV8B	CPC-ICC-FA-TCV8C

CPC Pump Actuation (CPC-ICC-FA-CCPBS, CPC-ICC-FA-SWPBS)

The CPC actuation was approximated as a simple circuit with a single switch and a single relay. Both the switch and the relay were assumed to have a median failure probability of 1E-4 with an error factor of 5. Thus, the total unavailability was 3.2E-4.

CPC Containment Isolation Valve Actuation (CPC-ICC-FA-TCV8B, CPC-ICC-FA-TCV8C).

Assumed to be the same as CLS actuation, which is a containment isolation actuation system. An unavailability of 1.6E-3 with an error factor of 5 was assigned using the ASEP generic data.

D.6.12 CPC Service Water Pump

CPC-MDP-FS-SW10A	CPC-MDP-FS-SW10B
CPC-MDP-FS-SW20A	CPC-MDP-FR-SW10A
CPC-MDP-FR-SW10B	CPC-MDP-FR-SWA3H
CPC-MDP-FR-SWB3H	CPC-MDP-FR-SWA6H
CPC-MDP-FR-SWB6H	CPC-MDP-FR-SWA18
CPC-MDP-FR-SWB18	CPC-MDP-FR-SWA24
CPC-MDP-FR-SWB24	

Plant specific data was available for the CPC service water pump failure to start and failure to run. A mean failure to start on demand probability of 7.9E-3 was calculated based on three failures in 382 demands. The 95% upper bound was calculated to be 2.0E-

2/D, and the error factor 3.5. The procedure for calculating these values is described in Section D.6.3.

A probability of 1.7E-4/hr for failure to run was calculated based on 15 failures in 87,600 hours. The 95% upper bound was determined to be 2.64E-4/hr, and the error factor 1.6. An error factor of 3 was assigned to failure to run, to be consistent with the generic error factor for motor driven pump fail to run.

D.6.13 Diesel Generator

OEP-DGN-FS-DG01 OEP-DGN-FS-DG02
OEP-DGN-FS-DG03 OEP-DGN-FC-DGU3
DGN-FTO

Plant specific data was available to calculate the emergency diesel generator failure to start probability. Between 1980 and 1988, there were a total of 19 diesel generator failures to start. Seven of the eleven failures occurred when the plant was in cold shutdown, with the diesel generator not required by Technical Specification. These failures were included even though the diesels were not required administratively because 1) they were honest failures and 2) it was not possible to partition the number of demands into corresponding categories. Post-maintenance testing failures were excluded. This left eleven failures to start in 484 start demands. From this a failure to start probability of 2.2E-2 was derived. The ratio of the 95% Chi square and the 50% Chi square (mean) of eleven failures in 484 demands yields an error approximation of 1.56. The error factor was then conservatively assigned to be 3.

Events DGN-FTO and OEP-DGN-FC-DG3U2 are failures of diesel generator #3 to supply Unit 1, due to being aligned to Unit 2. The probability of these events was calculated based on faults (failure to start and failure to run) with Unit 2's diesel generator #2. The sum of the unavailabilities for diesel generator #2 failure to start and failure to run equals 3.4E-2. An error factor of 3 was assigned based on the failure to start.

D.6.14 ISR Pump

ISR-MDP-FS-RS1A ISR-MDP-FS-RS1B

The ISR motor driven pumps had plant specific data from which a failure to start on demand probability was calculated. The ten failures in 260 start demands yielded a mean unavailability of 3.8E-2. An error factor of 1.8 was calculated, as described in Section D.6.3. An error factor of 3 was assigned. The 95% upper bound was determined to be 6.5E-2.

D.6.15 Instrument Air

IAS-CCF-LF-INAIR IAS-AOV-LK-CC107 IAS-AOV-OC-CC107

Event IAS-CCF-LF-INAIR, common cause loss of instrument air to air operated valves, was assumed to be caused by total loss of instrument air. Probability was calculated as follows:

$$\frac{(0.01 \text{ incidents/yr})}{(8760 \text{ hr/yr})} \frac{(24 \text{ hr})}{} = 2.7E\text{-}5$$

Event IAS-AOV-LK-CC107, leak in the air supply to containment isolation valve TVCC-107, was calculated by assuming a 1E-6/hr leak rate and applying a 24-hour mission time.

The probability of spurious transfer for TVCC-107 (IAS-AOV-OV-CC107) was determined by surveying several other PRAs for the probability of an air operated valve to transfer closed. Values ranged from 1.7E-7 in the Indian Point PRA to 8.0E-7 for the Oconee PRA. The other sources surveyed were Zion, Seabrook, Millstone 3, and IREP (references D.6-1 through D.6.6). A median value of 6E-7 with an error factor of 3 was chosen, resulting in a mean value of 7.5E-7.

D.6.16 Insufficient Canal Level

MCW-CCF-VF-INLVL MCW-CCF-VF-SBO

An unavailability of 1E-9 was assumed for insufficient canal level from non external event sources to supply service water during normal plant operations (MCW-CCF-VF-INLVL). During station blackout the unavailability of for insufficient canal level is made up of two parts, 5.86E-2 is the HRA contribution and 9E-4 is for failure of one diesel driven pump to start. The 1E-3 failure probability is from the ASEP generic data base.

D.6.17 LPR Motor Operated Valve

LPR-MOV-FT-1862A LPR-MOV-FT-1862B

LPR motor operated valves 1862A and 1862B event probabilities include failure to transfer and plugging. The flow test interval for these valves is once every five years. Thus 3E-3/D for failure to transfer plus 1/2 (1E-7/hr) (5 yr) (8760 hr/yr) equals 5.2E-3/D. An error factor of 10 was assigned to be consistent with the failure to transfer error factor.

D.6.18 Main Feedwater Event

M

The event tree heading representing failure of Main Feedwater was modeled by failure of two motor driven pumps to run, failure of the feed regulating valves and their bypasses, and operator failure to feed the steam generators with Main Feedwater. A total unavailability of 2.9E-3 was derived as follows:

M = MFW-MDP-FR-PMP1 * MFW-MDP-FR-PMP2 +
MFW-AOV-FT-FRVBYP1 * MFW-AOV-FT-FRVBP2 +
MFW-CCF-FT-FRVBYP +
Loss of Instrument Air +
MFW-XHE-FO-FLOW.

(3E-5/HR)24HR * (3E-5/HR)24Hr +
(1E-3) * (1E-3) +
(1E-3) 0.1 +
$\frac{(0.01/YR)(24HR)}{8760\ HR/YR}$ +
2.7E-3

M = 2.9E-3

D.6.19 Time Averaged Non-Recovery of AC Power

NRAC-6HR-AVG NRAC-24HR-AVG

Time averaged non-recovery of AC power was calculated for use in the station blackout cut sets where the AFW turbine driven pump failed to run. This was done to estimate more accurately the average unavailability of the AFW turbine driven pump and AC power. Using a half hour after loss of feed flow for steam generator dryout, the time averaged non-recovery value was derived as follows:

Let 6HR-SUM-TOTAL = (AFW-TDP-FR)1st HR * (NRAC 1 HR) +
(AFW-TDP-FR)2nd HR * (NRAC 2 HR) +
(AFW-TDP-FR)3rd HR * (NRAC 3 HR) +
(AFW-TDP-FR)4th HR * (NRAC 4 HR) +
(AFW-TDP-FR)5th HR * (NRAC 5 HR) +
(AFW-TDP-FR)6th HR * (NRAC 6 HR)
= 5.82E-3

Where AFW-TDP-FR = Hourly Failure Rate for the AFW-TDP(5E-3/hr)

NRAC 1 HR = The probability of non-recovery of AC power by 1 hour after the LOSP. Taken from Appendix D-3. The other NRAC factors are determined in a similar manner.

The 6HR-SUM-TOTAL = the probability of: AFW-TDP-FR-2P6HR * NRAC-6HR-AVG

and since AFW-TDP-FR-2P6HR is 3.00E-2,

$$\text{NRAC-6HR-AVG} = \frac{5.82\text{E-}3}{3.00\text{E-}2} = 1.94\text{E-}1$$

Similarly, the 24-hour time averaged non-recovery factor can be calculated:

Let 24HR-SUM-TOTAL = (AFW-TDP-FR)1HR * (NRAC 1 HR) +
(AFW-TDP-FR)2HR * (NRAC 2 HR) +
. . . . . .
. . . . . .
. . . . . .
(AFW-TDP-FR)24HR * (NRAC 24 HR)

Then, $\text{NRAC-24-AVG} = \frac{7.32\text{E-}2}{1.2\text{E-}1} = 6.1\text{E-}2$

D.6.20 PPRS Block Valves

PPS-MOV-FC-1535 PPS-MOV-FC-1536
PPS-MOV-FT-1535 PPS-MOV-FT-1536
PPS-MOV-OO-1535 PPS-MOV-OO-1536

The RCS power operated relief valves have historically had occasional leakage requiring the associated block valve to be shut. Based on plant experience from 1982-1987, the probability of an RCS PORV being blocked is estimated at 0.3, and was assigned to events PPS-MOV-FC-1535 and PPS-MOV-FC-1536.

Plant specific data was available for failure of the block valve to transfer. A mean unavailability of 4E-2/demand was derived from five failures in 122 demands. The 95% upper bound was determined to be 8.6E-2. An error factor of 2.4 was calculated, but an error factor of 3 was conservatively assigned. The identifiers PPS-MOV-OO-1535 and PPS-MOV-OO-1536 for these events mean failure to shut the valves. The PPS-MOV-FT-1535 and PPS-MOV-FT-1536 identifiers mean failure to open the valves.

D.6.21 RCS PORV Failure to Reclose Event

Qc

Event Qc is failure of the RCS PORV to reshut during an S_3 LOCA. During the very small LOCA, the HPI capacity exceeds the LOCA leak rate and demands the PORV if the operator fails to control injection flow. Therefore,

Qc = (PROB OPER FAIL TO CONTROL SI) * (PROB PORV NOT BLOCKED) *
.1 0.9

(PROB PORV FAILS TO RECLOSE) * (PROB OPERATOR SHUTS BLOCK VALVE
3E-2 2.7E-3
+ PROB BLOCK VALVE FAILS TO CLOSE).
.04

= 1.2E-4

The action of the operator to shut the block valve was considered to be a skill-based action, and thus accorded a probability of 2.7E-3, independent of the previous operator error.

D.6.22 Station Blackout Relief Demand Rate

SBO-PORV-DMD SBO-SGSRV-DMD QS-SBO

The probability for pressurizer PORV demand during station blackout was assessed to be 1.0, due to the unavailability of the SG ADV. It was necessary to calculate a per valve demand basis. The probability of having at least one PORV unblocked is 1-(0.3) * (0.3) or 0.91. The probability for each PORV opening then is $\frac{0.91}{2}$ = SBO-PORV-DMD.

A maximum entropy distribution was assigned with an upper bound of 1.0 and a lower bound of 4.5E-2.

The probability for a SG PORV to be demanded during station blackout was estimated to be one SG PORV demanded every 20 minutes on each steam generator for one hour. Thus, there are 9 demands on a SG PORV.

The probability of a SG PORV being demanded and failing to reclose (QS-SBO) is the number of demands times the probability for failure to reclose.

QS-SBO = (9 Demands) (3E-2) = 2.7E-1. A maximum entropy distribution was assigned with an upper bound of 1.0 and a lower bound of 2.7E-2.

D.6.23 SG Tube Rupture Relief Valve Demand Rate

SGTR-SGSRV-DMD SGTR-SGADV-DMD
SGTR-SGSRV-ODMD1 SGTR-SGADV-ODMD
SGTR-SGSRV-ODMD2

The probability of a SG PORV (ADV) being demanded during a SG tube rupture (SGTR) transient was estimated to be 0.3 if the operator depressurized the RCS and controlled safety injection flow (SGTR-SGADV-DMD). If the operator failed to depressurize the RCS, the demand probability was assumed to be 1.0 (SGTR-SGADV-ODMD).

The probability of a SG safety relief valve (SRV) being demanded during SGTR with operator depressurization was also estimated to be 0.3 (SGTR-SGSRV-DMD) if the ADV is blocked. If the operator failed to depressurize the RCS and the PORV is not blocked, the demand probability was assumed to be 0.15 (SGTR-SGSRV-ODMD2). If the operator failed to depressurize the RCS and if the PORV is blocked, then it was estimated (conservatively) that the demand probability for the SG SRV is 1.00 (SGTR-SGSRV-ODMD1). Each was assigned a maximum entropy distribution with an upper bound of 1.0 and a lower bound of one-tenth the failure rate.

D.6.24 SG Relief Block Valves)

MSS-AOV-FC-101A MSS-AOV-FC-101B MS-AOV-FC-101C

The steam generator power operated relief valves (MSS-101A, MSS-101B, MSS-101C) have historically had occasional leakage requiring the associated block valve to be shut. Based on plant data from 1984-1987, the probability of a SG PORV being blocked is 0.15. This number is a point estimate only, and an error factor was not assigned.

D.6.25 SWS Cross Connect Plugging

SWS-PSF-LF-XCONN

The probability of Service Water flow being lost through the cross connect is equal to plugging of either one of two motor operated valves, or 2E-4. An error factor of 3 was assigned, to be consistent with generic MOV plugging.

D.6.26 References

D.6-1 Oconee PRA, A Probabilistic Risk Assessment of Oconee Unit 3, NSAC-60, Electric Power Research Institute, June 1984.

D.6-2 Zion Probabilistic Safety Study, Commonwealth Edison Company, 1981.

D.6-3 Seabrook Station Probabilistic Safety Assessment, PLG-0300; Pickard, Lowe and Garrick, Inc., Irvine, CA. December 1983.

D.6-4 Millstone Unit 3 Probabilistic Safety Study, Northeast Utilities Company, August 1983.

D.6-5 Indian Point Probabilistic Safety Study, Power Authority of the State of New York and Consolidated Edison Co., 1982.

D.7 Discussion of Mission Time for Diesel Generators for Loss of Offsite Power Initiators

D.7.1 Introduction

Modeling for loss of offsite power (LOSP) initiators involves two important parts. One is the AC power status model and the other is the plant response model. The two parts must be integrated to calculate accident sequence frequencies. The nature of LOSP is such that the characteristics of the plant response model determine features of the power status model and vice versa.

D.7.2 Power Status Model

The power status model has three states: a) offsite power restored, b) onsite emergency power available, c) and station blackout. In general, if offsite power is restored, the initiator is considered to be successfully terminated and no further analysis is done. The second state, availability of onsite emergency power, is an interim state which can flip to the first state if offsite power is restored, or can lead to station blackout if the diesel generators fail to provide emergency power. Plant response for this state is similar to loss of main feedwater with offsite power available. Station blackout is an undesirable state in that the plant response model has constraining characteristics such that AC power must be restored in a given time or else core damage occurs. The maximum allowable duration of station blackout is determined by the plant response model.

Development of the power status model involves modeling of the diesel generators (DG) fail to start, fail to run, and maintenance outage, as well as recovery of offsite power, onsite non-diesel generator sources of AC power, and recovery of diesel generator failures.

D.7.3 Plant Response Model

The plant response model characterizes the response of the plant to reduced power availability. The plant response to the onsite-AC-available state is quite similar to other transients. The plant response to station blackout is very different from any other transient. For typical PWRs, there are four major station blackout types of scenarios with potential for core damage. These are a) stuck open PORVs, b) unavailability of auxiliary feedwater, c) RCP seal LOCA, and d) battery depletion. Each scenario has two important timing considerations; the time at which the critical failure occurs, and the duration for which the failure can continue unmitigated without resulting in core uncovery. Typical times for PWRs, for station blackouts occurring at the time of LOSP, are shown below:

	Time Critical Failure Incurred	Time to Core Uncovery from Failure Occurrence
PORV Open	5m	1 1/2 hr
AFW Fail	5m	1 hr
RCP Seal LOCA	1 1/2 hr	2 hr (approx)
Battery Depletion	4 hr	3 hr

These response times are only applicable for station blackouts occurring at the time of the LOSP (t = 0). If a LOSP originally went into the DG available state, and then slipped into the blackout state at 6 hours, the plant response model would be quite different. After six hours on diesel generators, the plant may be cooled down, depressurized, or

possibly in shutdown cooling. If so, the PORV scenario would not apply and the seal LOCA scenario would not apply. If the plant was in shutdown cooling, the AFW scenarios would not apply, but other scenarios involving failure of shutdown cooling systems may be appropriate. A rigorous plant response model could include plant response at several time phases throughout the event.

D.7.4 Discussion of Six Hour Mission Time

The previous discussion has been provided as background information. The following discusses the power state modeling for the Surry study, and shows that a six-hour mission time for diesel generators is acceptable for station blackout.

The power status model for this study calculates the total probability of both diesel generators failing at any time in the first six hours after LOSP. The probabilities for all failure combinations are lumped together and modeled as if all DG failures occurred at time zero (hereafter referred to as the lumping method). All station blackout occurrences are thus integrated with the time zero plant response model. Some refinements were made to the cut sets, such as removing the long term failures (fail to run) from the blackout frequency associated with the PORV scenarios. The PORV scenario only occurs during the initial scram. Recovery of offsite AC power and recovery of diesel generator failures were applied to the lumped SBO frequency, as a function from time zero. Since recovery of offsite power is more probable as time goes on, this technique underestimates recovery for the long term diesel failures.

The adequacy of the six-hour mission time for diesel generators has been questioned. It is possible that a significant portion of diesel generator failures which could occur after six hours are being omitted from the calculation. Previous attempts to justify mission time have been directed only at the power status model. That is, the justification is only in terms of the DG failure probabilities and the AC power non-recovery probabilities. Addressing this issue is better done on the basis of the overall core damage frequencies, thus including the impact of the plant response model. This discussion will show that extension of mission time beyond six hours is not necessary, even though a substantial portion of diesel generator failures are omitted. The reason for this is that a significant portion of the SBO frequency is incurred at time zero. That is, the fail-to-start and maintenance terms are very large compared to the hourly fail-to-run terms. AT time periods when the fail-to-run terms approach the magnitude of the initial unavailability, the recovery of AC power becomes so probable that these failure combinations present an ever decreasing contribution to SBO. In addition, it will be shown that the method chosen for this study underestimates recovery of AC power and thus tends to compensate for any core damage frequency omitted by selection a six-hour mission time.

The following calculations are based on a two train DG model. The Surry plant has a 3 DG-4 train power system, and thus the numbers quoted below may not be the same as found in the PRA study. The simpler model is used here for purposes of illustration.

Using Surry specific failure probabilities for diesel generators, the probability of both diesel generators being unavailable at time zero is 1.6E-3. AFter six hours, the probability of both DGs being failed in 2.2E-3, and after 24 hours it is 6.5E-3. Including the probability of non-recovery of offsite power, the conditional probability (given LOSP) of being in station blackout at one hour is 7.6E-4. At six hours after the event, the (cumulative) probability of having been in a station blackout at any time is 2.2E-3; and the (cumulative) probability of having been in an SBO at 24 hours is 3.25E-3 (note, the probability of being in SBO at six hours is 1.6E-4 and the probability at 24 hours is 2.7E-5). It is clear that a significant portion of diesel generator failures are neglected. However, the following discussion will show that

when the plant response model is combined with the power status model, core damage frequency is not underestimated.

D.7.5 Comparison of Modeling Methods and Mission Times

In order to provide a comparison of results it is necessary to choose a specific core damage scenario. Of the four scenarios discussed in the plant response model, the battery depletion scenario is used here for demonstration.

The "lumping" method used in this study generates cut sets, representing core damage due to battery depletion, which combine diesel failures at six hours with non-recovery of offsite AC at seven hours. Obviously, if SBO is entered six hours after LOSP, offsite AC power does not need to be recovered until 13 hours to prevent core uncovery. An accurate recovery for this cut set would be non-recovery of AC by 13 hours. In the lumped model, it is recovered with a probability of 5E-2, (NRAC-7hr) when accurate recovery would be 1.7E-2 (NRAC-13hr). This cut set accounts for 7% of the total SBO frequency. A similar situation exists for the 5-hour cut set which accounts for 6.7% of the total frequency and is under recovered by .05/.02. Sample calculations were made to determine the extent of underestimation of recovery and the impact of DG mission time.

The results are shown in Table D.7-1. Calculations of core uncovery probability were made using one-hour, six-hour, and 24-hour diesel generator mission times combined with the lumped and actual recovery methods. Method A represents what was done in this study. Method A underestimates the total probability of DG failure, but also underestimates the probability of recovery of offsite AC power (i.e., one counters the other). Method B provides accurate estimation of recovery probabilities, but underestimates the total diesel failure probability. Method C is obviously the most conservative. Method C includes the total diesel generator failure probability in the first 24 hours, but provides recovery on the lumped frequency, thus underestimating the true probability of recovery of offsite AC power. As expected, the representative core uncovery frequency for Method C is the highest. Method D can be considered the most accurate method. It includes all of the diesel failure probability in 24 hours, and provides actual non-recovery probabilities. Method E was used to provide a lower bound core uncovery frequency. Method E only counts the initial diesel generator failures, so obviously it underestimates the true station blackout frequency. Because only initial DG failures are included, lumped recovery and actual recovery are the same. Therefore, recovery is actual in Method E.

D.7.5 Summary

Method E represents the lower bound and Method C represents the upper bound. Method C is obviously conservative, because it provides unrealistic recovery, and Method E is obviously non conservative because it only accounts for initial DG failures. Method D is the most accurate and will be considered as a baseline for comparison. Although Method D is the most accurate, it was not used in the PRA because it is the most time consuming, significantly increasing the number of cut sets in the SBO sequences.

Method A was used for this study because it offers a convenient technique advantage. It typically understimates core uncovery frequency, but not significantly, as can be seen by comparison with the results of Method D.

It should be noted that the numbers in Table D.7-1 were calculated using Surry specific event probabilities, and that use of different event probabilities would result in different numbers and possibly different conclusions.

However, the conclusions for Surry are that, for long term scenarios, selection of six-hour mission time in combination with the lumped recovery method leads to acceptable results for SBO modeling. This is because 1) for reasonably short mission times, diesel generator failure probability is determined by initial unavailability and 2) in the long term, recovery of offsite power is so probable that the impact of later diesel failures on core damage is minimal.

Table D.7-1

Typical Core Uncovery Frequency Due to Battery Depletion During Station Blackout and the Effect of Modeling Considerations

Method	Conditional Prob. of SBO	Average Prob. for Non-Recovery of AC Power in 7 hrs from SBO	Prob. Core Uncovery
A. Six hour mission time, lumped at t=0. Recovery on lumped frequency.	2.2E-3	.05	1.11E-4
B. Six hour mission time. Failures recovered at actual time.	2.2E-3	.046	1.00E-4
C. 24 hour mission time, lumped at t=0. Recovery on lumped frequency.	6.5E-3	.050	3.25E-4
D. 24 hour mission time. Failures recovered at actual time.	6.5E-3	.018	1.20E-4
E. 1 hour mission time.	1.7E-3	.050	8.50E-5

APPENDIX E

Importance Values and Cut Sets for the Dominant Accident Sequences and Plant Damage State Groups

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Importance Values and Top Cut Sets for Each Plant Damage State Group

APPENDIX E

E. Importance Values and Cut Sets for the Dominant Accident Sequences and Plant Damage State Groups.

This appendix presents the results of the TEMAC importance measures and uncertainty analysis. There are three levels of detail used in documenting the TEMAC results. First, the top twenty events (in terms of importance) and the top page of cut sets for the total core damage frequency (CDF) model are shown and discussed in Section 5 of the main report. Second, an intermediate level is presented in this appendix, which gives all events for each importance measure and nearly all of the cut sets contributing to the core damage frequency; at least those cut sets contributing 90% or more of the frequency. Last, the complete listing of events and cut sets for the total core damage frequency, each accident sequence, and each plant damage state is available on diskettes from the the NRC upon request. This complete listing also includes other lists with the results sorted differently.

The purpose for not providing all the TEMAC output is to reduce the size of the document, especially since only a very limited number of readers will want the additional detail contained on the diskettes.

There are five lists given in this appendix. The following table shows the extent of each list provided in this appendix.

	Total CDF	Each Accident Sequence	Each Plant Damage State Group
1. Descriptive Statistics	All (1 Page)	All (1 Page)	All (1 Page)
2. Risk Reduction	All (5 Pages)	All (1 Page)	All (1 Page)
3. Risk Increase	All (4 Pages)	All (1 Page)	All (1 Page)
4. Uncertainty Importance	All (5 Pages)	All (1 Page)	All (1 Page)
5. Ranked Cut Sets	All Cut Sets Above 9.2E-10 (52 Pages)	8 Pages Max.	12 Pages Max.

All of the importance measure results are included for the total Surry core damage frequency, each accident sequences, and each plant damage state group. However, the number of cut sets presented was limited in a few instances as shown above. Detailed explanations of the risk measures are given in Section 4.12.

Tables E-1 and E-2 show a summary of the accident sequence and plant damage state group frequencies. The accident sequence results are arranged in order of descending frequency, as shown in Table E-1. Plant damage state results are for all plant damage state groups and are arranged numerically.

Table E-1

SURRY ACCIDENT SEQUENCE CORE DAMAGE FREQUENCIES

Accident Sequence	Description	5%	Median	Mean	95%	% of Total
SBO-BATT	STATION BLACKOUT (U1) - BATTERY DEPLETION	2.4E-7	3.3E-6	1.1E-5	4.1E-5	26.0
SBO-SLOCA	STATION BLACKOUT (SBO) (U1)-RCP SEAL LOCA	0	1.0E-6	5.3E-6	2.0E-5	13.1
SBO-L	STATION BLACKOUT (U1) - AFW FAILURE	7.9E-8	1.3E-6	4.7E-6	2.1E-5	11.6
SBO-SLOCA2	STATION BLACKOUT (U1, U2) - RCP SEAL LOCA	0	1.1E-6	3.3E-6	1.4E-5	8.2
SBO-Q	STATION BLACKOUT (U1) - STUCK OPEN PORV	9.1E-9	3.4E-7	2.2E-6	8.7E-6	5.4
S_1H_1	MEDIUM LOCA - RECIRCULATION FAILURE	1.1E-7	7.7E-7	1.7E-6	5.6E-6	4.2
V	INTERFACING LOCA	3.8E-11	4.9E-8	1.6E-6	5.3E-6	4.0
$T_7O_DQ_S$	SGTR - NO DEPRESS. - SG INTEGRITY FAILS	3.4E-8	3.7E-7	1.4E-6	5.1E-6	3.5
T_2LD_2	LOSS OF MFW/AFW - FEED AND BLEED FAILS	1.4E-8	2.0E-7	9.8E-7	2.5E-6	2.4
S_1D_1	MEDIUM LOCA - INJECTION FAILURE	1.1E-7	4.6E-7	8.6E-7	2.4E-6	2.1
TKRZ	ATWS - UNFAVORABLE MOD. TEMP. COEFF.	6.3E-9	1.5E-7	8.2E-7	3.2E-6	2.0
AH_1	LARGE LOCA - RECIRCULATION FAILURE	6.3E-8	3.8E-7	8.2E-7	3.0E-6	2.0
T_2LP	LOSS OF MFW/AFW - FLEED AND BLEED FAILS	2.3E-8	2.6E-7	7.4E-7	2.6E-6	1.8
S_1D_6	MEDIUM LOCA - INJECTION FAILURE	4.2E-8	2.3E-7	6.7E-7	2.2E-6	1.7
$SBO-L_2$	SBO (U1, U2) - AFW FAILURE	1.7E-8	2.3E-7	6.5E-7	2.6E-6	1.6
AD_5	LARGE LOCA - ACCUMULATOR FAILURE	1.1E-7	4.6E-7	6.4E-7	1.8E-6	1.6
$TKRD_4$	ATWS - EMERGENCY BORATION FAILURE	9.5E-9	1.5E-7	6.4E-7	2.8E-6	1.6
S_3D_1	VERY SMALL LOCA - INJECTION FAILURE	4.2E-8	2.7E-7	6.3E-7	2.4E-6	1.5
S_2D_1	SMALL LOCA - INJECTION FAILURE	4.2E-8	2.3E-7	4.4E-7	1.4E-6	1.1
SBO-BATT2	SBO (U1, U2) - BATTERY DEPLETION	0	0	4.3E-7	1.7E-6	1.1
SBO-Q2	SBO (U1, U2) - STUCK OPEN PORV	1.8E-9	5.9E-8	3.2E-7	1.3E-6	0.8
AD_6	LARGE LOCA - INJECTION FAILURE	2.1E-8	1.2E-7	3.1E-7	1.1E-6	0.8
$T_7D_1O_D$	SGTR - INJECTION FAILURE - NO DEPRESS	6.6E-9	7.0E-8	2.1E-7	7.7E-7	0.5
$T_{5A}LP$	LOSS OF DC BUS-FAIL AFW-NO FEED AND BLEED	1.1E-9	2.6E-8	1.3E-7	4.5E-7	0.3
$T_{5B}LP$	LOSS OF DC BUS-FAIL AFW-NO FEED AND BLEED	1.1E-9	2.6E-8	1.3E-7	4.5E-7	0.3
T_7L_3	SGTR - AFW FAILURE	4.8E-9	4.1E-8	1.1E-7	3.4E-7	0.3
$T_7O_DQQ_S$	SGTR-NO DEPRESS-SG INTEG FAILS,PORV FAILS	8.8E-10	2.1E-8	1.1E-7	5.0E-7	0.3
T_7KR	SGTR - ATWS	3.2E-9	3.4E-8	1.0E-7	4.0E-7	0.2
	TOTAL CORE DAMAGE FREQUENCY			4.0E-5		100

Table E-2
Surry Plant Damage State Frequencies

Plant Damage State Group	Description	Frequency				% of Total
		5%	Median	Mean	95%	
PDS-1	Long Term Station Blackout	6.1E-7	8.2E-6	2.2E-5	9.5E-5	54.6
PDS-2	LOCA - Injection/Recirculation Failure	1.2E-6	3.8E-6	6.0E-6	1.6E-5	14.7
PDS-3	Station Blackout - AFW Failure	1.1E-7	1.7E-6	5.4E-6	2.3E-5	13.3
PDS-4	Interfacing LOCA	3.8E-11	4.9E-8	1.6E-6	5.3E-6	4.0
PDS-5	Transient - AFW and Feed/Bleed Failure	7.2E-8	6.9E-7	2.1E-6	6.0E-6	4.8
PDS-6	Anticipated Transient without Scram	3.2E-8	4.2E-7	1.6E-6	5.9E-6	3.8
PDS-7	Steam Generator Tube Rupture	1.2E-7	7.4E-7	1.8E-6	6.0E-6	4.8
	Total Plant Damage State Frequency			4.0E-5		

SURRY TOTAL CORE DAMAGE MODEL

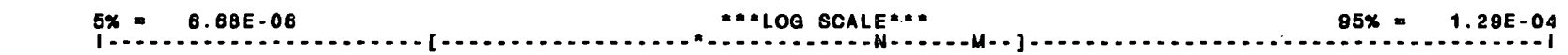
TOP EVENT SURRY-TOTAL CONTAINS 222 EVENTS IN 2774 CUT SETS

THE FREQUENCY OF TOP EVENT SURRY-TOTAL IS 3.30E-05

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT SURRY-TOTAL

N	1000
MEAN	4.01E-05
STD DEV	5.73E-05
LOWER 5%	6.68E-06
LOWER 25%	1.35E-05
MEDIAN	2.28E-05
UPPER 25%	4.36E-05
UPPER 5%	1.29E-04

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)



NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SURRY TOTAL CORE DAMAGE MODAL
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
NOTQ	2307	9.73E-01	(6.0)	1.79E-05	(1.0)		
NOTL-SBOU1	1316	9.93E-01	(5.0)	1.33E-05	(2.0)		
OEP-DGN-FS-DG01	725	2.20E-02	(79.5)	8.22E-06	(3.0)	2.38E-07	4.38E-05
NRAC-7HR	986	5.00E-02	(60.0)	8.04E-06	(4.0)	2.64E-07	4.26E-05
NOTW2	54	8.15E-01	(10.0)	7.15E-06	(5.0)		
REC-XHE-FO-DGHWB	159	6.00E-01	(14.5)	6.90E-06	(6.0)	2.16E-07	3.66E-05
REC-XHE-FO-DGHWS	1407	8.00E-01	(11.0)	5.98E-06	(7.0)	0.00E+00	2.97E-05
REC-XHE-FO-DGEN	382	9.00E-01	(8.0)	5.68E-06	(8.0)	1.21E-07	2.67E-05
RCP-LOCA-750-90M	262	5.30E-01	(16.0)	5.20E-06	(9.0)	0.00E+00	3.16E-05
NRAC-216M	200	1.38E-01	(41.0)	5.00E-06	(10.0)	0.00E+00	2.99E-05
OEP-DGN-FS	299	2.20E-02	(79.5)	4.88E-06	(11.0)	2.08E-07	1.82E-05
OEP-DGN-FS-DG02	521	2.20E-02	(79.5)	4.38E-06	(12.0)	1.31E-07	2.36E-05
OEP-DGN-FS-DG03	526	2.20E-02	(79.5)	4.38E-06	(13.0)	1.32E-07	2.36E-05
NRAC-1HR	157	4.40E-01	(21.0)	4.24E-06	(14.0)	5.39E-08	2.15E-05
OEP-DGN-FR-6HDG1	639	1.20E-02	(91.0)	4.08E-06	(15.0)	2.80E-08	2.97E-05
NOTL-SBOU1U2	842	9.68E-01	(7.0)	3.24E-06	(16.0)		
QS-SBO	2435	2.70E-01	(28.5)	3.04E-06	(17.0)	5.45E-08	1.75E-05
REC-XHE-FO-SCOOL	597	1.25E-01	(43.0)	2.89E-06	(18.0)	3.71E-08	1.61E-05
BETA-2MOV	25	8.80E-02	(48.0)	2.72E-06	(19.0)	1.08E-07	8.72E-06
BETA-3DG	59	1.80E-02	(83.0)	2.66E-06	(20.0)	7.41E-08	1.08E-05
OEP-DGN-FR-6HDG3	467	1.20E-02	(91.0)	2.32E-06	(21.0)	1.58E-08	1.87E-05
SBO-PORV-DMD	128	4.50E-01	(20.0)	2.27E-06	(22.0)	1.17E-08	9.56E-06
BETA-2DG	271	3.80E-02	(69.0)	2.25E-06	(23.0)	8.69E-08	8.32E-06
NOTDG-CCF	240	5.20E-01	(17.0)	2.22E-06	(24.0)		
OEP-DGN-FR-6HDG2	458	1.20E-02	(91.0)	2.09E-06	(25.0)	1.48E-08	1.48E-05
AFW-XHE-FO-CST2	33	6.50E-02	(55.0)	1.97E-06	(26.0)	2.39E-08	1.16E-05
AFW-XHE-FO-UNIT2	151	3.60E-02	(70.0)	1.94E-06	(27.0)	8.10E-08	6.20E-06
OEP-DGN-MA-DG01	393	6.00E-03	(102.0)	1.85E-06	(28.0)	1.42E-08	7.34E-06
R	16	1.70E-01	(35.0)	1.51E-06	(29.5)	3.23E-08	5.87E-06
K	16	6.00E-05	(195.0)	1.51E-06	(29.5)	3.23E-08	5.87E-06
RCS-XHE-FO-DPRT7	15	2.90E-02	(77.0)	1.48E-06	(31.0)		
MCW-CCF-VF-SBO	573	6.00E-02	(58.0)	1.38E-06	(32.0)	1.51E-08	7.92E-06
REC-XHE-FO-DPRES	3	1.40E-02	(87.5)	1.35E-06	(33.0)	2.06E-08	4.88E-06
MSS-SRV-OO-ODSRV	12	1.00E+00	(2.5)	1.25E-06	(34.0)		
HPI-MOV-FT	8	3.00E-03	(121.0)	1.20E-06	(35.0)	2.03E-08	3.97E-06
PPS-SOV-OO-1455C	69	3.00E-02	(74.5)	1.20E-06	(36.5)	1.02E-08	5.12E-06
PPS-SOV-OO-1456	69	3.00E-02	(74.5)	1.20E-06	(36.5)	1.02E-08	5.12E-06
NRAC-HALFHR	182	6.00E-01	(14.5)	1.09E-06	(38.0)	1.83E-08	5.85E-06
OEP-CRB-FT-15H3	418	3.00E-03	(121.0)	1.06E-06	(39.0)	8.40E-09	4.22E-06
OEP-DGN-MA-DG02	279	6.00E-03	(102.0)	1.01E-06	(40.0)	7.46E-09	4.01E-06
RCP-LOCA-467-150	262	1.27E-01	(42.0)	9.74E-07	(41.0)	0.00E+00	6.42E-06
OEP-DGN-MA-DG03	273	6.00E-03	(102.0)	9.58E-07	(42.0)	7.13E-09	3.85E-06
NRAC-258M	200	1.08E-01	(47.0)	9.38E-07	(43.0)	0.00E+00	6.16E-06
AFW-PSF-FC-XCONN	25	1.50E-04	(176.0)	8.75E-07	(44.0)	3.74E-08	3.07E-06
Z	1	1.40E-02	(87.5)	8.43E-07	(45.0)	6.29E-09	3.16E-06
PORV-NOT-BLK	10	8.50E-01	(9.0)	8.30E-07	(46.0)	2.21E-08	3.30E-06
LPR-MOV-FT-1862A	13	5.20E-03	(105.5)	7.95E-07	(47.0)	1.60E-08	3.59E-06

NSLOCA	146	2.70E-01	(28.5)	7.25E-07	(48.0)	0.00E+00	3.90E-06
HPI-XHE-FO-FDBLD	14	7.10E-02	(52.0)	7.10E-07	(49.0)	1.42E-08	2.45E-06
PORV-BLK	6	1.50E-01	(38.5)	6.77E-07	(50.5)	1.15E-08	2.35E-06
SGTR-SGSRV-ODMD1	6	1.00E+00	(2.5)	6.77E-07	(50.5)		
LPI-MDP-FS	2	3.00E-03	(121.0)	6.75E-07	(52.5)	1.26E-08	2.53E-06
BETA-LPI	2	1.50E-01	(38.5)	6.75E-07	(52.5)	1.26E-08	2.53E-06
AFW-TDP-FR-2P6HR	92	3.00E-02	(74.5)	6.60E-07	(54.0)	5.15E-09	3.16E-06
LPI-MOV-PG-1890C	2	4.40E-04	(170.0)	6.60E-07	(55.0)	2.56E-08	3.97E-07
AFW-TDP-FS-FW2	104	1.10E-02	(93.5)	6.42E-07	(56.0)	6.45E-09	3.58E-06
AFW-CCF-LK-STMBD	21	1.00E-04	(181.5)	5.82E-07	(57.0)	8.09E-10	1.55E-06
SGTR-SGSRV-ODMD2	6	1.50E-01	(38.5)	5.75E-07	(58.0)	9.88E-09	2.10E-06
AFW-TDP-MA-FW2	97	1.00E-02	(95.5)	5.75E-07	(59.0)	4.70E-09	2.99E-06
OEP-CRB-FT-15J3	273	3.00E-03	(121.0)	5.65E-07	(60.0)	4.30E-09	2.37E-06
NRAC-6HR-AVG	77	1.94E-01	(34.0)	5.29E-07	(61.0)	1.64E-09	2.72E-06
PPS-XHE-FO-PORVS	11	4.40E-02	(62.5)	4.91E-07	(62.0)	1.09E-08	1.84E-06
LPR-MOV-FT-1860A	12	3.00E-03	(121.0)	4.58E-07	(63.0)	8.90E-09	1.63E-06
RMT-CCF-FA-MSCAL	2	3.00E-04	(172.0)	4.50E-07	(64.0)	1.41E-08	1.86E-06
PPS-MOV-FC-1536	30	3.00E-01	(26.0)	4.31E-07	(65.0)	1.35E-08	1.82E-06
PPS-MOV-FC-1535	27	3.00E-01	(26.0)	4.26E-07	(66.0)	1.33E-08	1.79E-06
LPR-MOV-FT-1890A	4	3.00E-03	(121.0)	4.09E-07	(67.0)	7.30E-09	1.52E-06
HPI-XHE-FO-UN2S3	18	4.40E-02	(62.5)	4.02E-07	(68.0)	2.28E-08	1.52E-06
PPS-MOV-FT-1535	16	4.00E-02	(66.0)	3.87E-07	(69.0)	1.20E-08	1.70E-06
HPI-XHE-FO-ALTS3	2	7.40E-02	(51.0)	3.32E-07	(70.0)	2.67E-09	1.24E-06
ACC-MOV-PG-1865C	1	6.50E-04	(162.5)	3.25E-07	(71.5)	3.03E-08	6.51E-07
ACC-MOV-PG-1865B	1	6.50E-04	(162.5)	3.25E-07	(71.5)	3.03E-08	6.51E-07
HPI-XHE-FO-ALT	2	8.10E-01	(13.0)	3.22E-07	(73.0)	3.64E-09	1.07E-06
AFW-XHE-FO-U1SBO	73	8.20E-02	(49.0)	2.84E-07	(74.0)	2.62E-09	1.58E-06
REC-XHE-FO-DGTMB	18	5.00E-01	(18.5)	2.78E-07	(75.0)	6.63E-10	9.35E-07
MSS-XHE-FO-BLOCK	4	6.40E-02	(56.5)	2.54E-07	(77.0)	5.03E-09	8.31E-07
MSS-SOV-OO-ODADV	4	1.00E+00	(2.5)	2.54E-07	(77.0)		
SGTR-SGADV-ODMD	4	1.00E+00	(2.5)	2.54E-07	(77.0)		
HPI-CKV-FT-CV225	5	1.00E-04	(181.5)	2.10E-07	(79.0)	3.77E-08	5.82E-07
HPI-CKV-FT-CV410	5	1.00E-04	(181.5)	2.06E-07	(80.5)	3.52E-08	5.90E-07
HPI-CKV-FT-CV25	5	1.00E-04	(181.5)	2.06E-07	(80.5)	3.52E-08	5.90E-07
HPI-MOV-FT-1350	1	3.00E-03	(121.0)	2.02E-07	(82.0)	8.17E-10	7.56E-07
NRAC-201M	62	1.50E-01	(38.5)	1.95E-07	(83.0)	0.00E+00	1.00E-06
RCS-XHE-FO-DPT7D	12	4.00E-01	(22.0)	1.95E-07	(84.0)	6.57E-09	7.72E-07
AFW-MDP-FS	26	6.30E-03	(99.0)	1.73E-07	(85.5)	2.52E-09	7.08E-07
BETA-AFW	26	5.60E-02	(59.0)	1.73E-07	(85.5)	2.52E-09	7.08E-07
REC-XHE-FO-DGTMS	217	7.00E-01	(12.0)	1.66E-07	(87.0)	0.00E+00	6.86E-07
HPI-XHE-FO-UN2S2	7	3.10E-01	(24.0)	1.63E-07	(88.0)	7.61E-09	6.53E-07
PPS-MOV-FT-1536	15	4.00E-02	(66.0)	1.45E-07	(89.0)	3.02E-09	5.02E-07
AFW-TDP-FR-2P24H	23	1.20E-01	(45.0)	1.26E-07	(90.0)	1.57E-09	5.07E-07
RCS-PORV-ODMD	10	5.00E-01	(18.5)	1.22E-07	(91.0)	8.79E-10	5.04E-07
LPR-MOV-FT-1862B	11	5.20E-03	(105.5)	1.09E-07	(92.0)	1.02E-09	8.24E-07
OEP-DGN-FR-DG01	23	2.00E-03	(136.5)	1.02E-07	(93.0)	1.89E-10	3.52E-07
AFW-MDP-FS-FW3A	24	6.30E-03	(99.0)	1.00E-07	(94.0)	2.39E-09	3.39E-07
AFW-MDP-FS-FW3B	23	6.30E-03	(99.0)	9.93E-08	(95.0)	2.25E-09	3.36E-07
HPI-XVM-PG-XV24	4	4.00E-05	(199.5)	8.23E-08	(96.0)	1.40E-08	2.26E-07
LPR-CCF-PG-SUMP	5	5.00E-05	(196.0)	7.75E-08	(97.0)	2.02E-09	2.87E-07
LPI-MDP-FS-SI1B	14	3.00E-03	(121.0)	7.41E-08	(98.5)	1.12E-09	3.67E-07
LPI-MDP-FS-SI1A	14	3.00E-03	(121.0)	7.41E-08	(98.5)	1.12E-09	3.67E-07
NRAC-24BM	262	1.15E-01	(46.0)	6.74E-08	(100.0)	0.00E+00	1.60E-07
PPS-XHE-FO-EMBOR	1	1.00E-03	(152.0)	6.73E-08	(101.0)	2.58E-10	2.40E-07
NRAC-150M	262	2.10E-01	(32.5)	6.40E-08	(102.5)	0.00E+00	0.00E+00
RCP-LOCA-1440-90	262	4.30E-03	(107.0)	6.40E-08	(102.5)	0.00E+00	0.00E+00

LPR-MOV-FT-1860B	10	3.00E-03	(121.0)	6.24E-08	(104.0)	6.67E-10	4.25E-07
AFW-CKV-OO-CV142	8	1.00E-03	(152.0)	6.10E-08	(105.0)	4.56E-10	2.55E-07
LPR-XHE-FO-HOTLG	2	4.00E-05	(199.5)	6.00E-08	(106.0)	1.78E-09	2.16E-07
PPS-MOV-OO-1536	3	4.00E-02	(66.0)	5.78E-08	(107.5)	4.23E-10	2.43E-07
PPS-MOV-OO-1535	3	4.00E-02	(66.0)	5.78E-08	(107.5)	4.23E-10	2.43E-07
RCP-LOCA-183-210	262	1.61E-02	(84.5)	5.70E-08	(109.5)	0.00E+00	0.00E+00
RCP-LOCA-183-150	262	1.61E-02	(84.5)	5.70E-08	(109.5)	0.00E+00	0.00E+00
RWT-TNK-LF-RWST	5	2.70E-06	(207.0)	5.27E-08	(111.0)	1.26E-09	2.01E-07
OEP-DGN-FR-DG02	14	2.00E-03	(136.5)	5.13E-08	(112.0)	8.00E-11	1.78E-07
AFW-CKV-OO-CV172	23	1.00E-03	(152.0)	5.09E-08	(113.0)	3.10E-09	1.90E-07
OEP-DGN-FR-DG03	12	2.00E-03	(136.5)	5.06E-08	(114.0)	8.06E-11	1.76E-07
ACC-CKV-FT-CV145	1	1.00E-04	(181.5)	5.00E-08	(116.5)	6.43E-09	1.63E-07
ACC-CKV-FT-CV128	1	1.00E-04	(181.5)	5.00E-08	(116.5)	6.43E-09	1.63E-07
ACC-CKV-FT-CV130	1	1.00E-04	(181.5)	5.00E-08	(116.5)	6.43E-09	1.63E-07
ACC-CKV-FT-CV147	1	1.00E-04	(181.5)	5.00E-08	(116.5)	6.43E-09	1.63E-07
RCP-LOCA-183-90	262	1.40E-02	(87.5)	4.96E-08	(119.0)	0.00E+00	0.00E+00
PPS-MOV-FT	7	4.00E-02	(66.0)	4.22E-08	(120.0)	8.06E-10	1.68E-07
LPI-MDP-MA-SI1B	10	2.00E-03	(136.5)	4.04E-08	(121.5)	6.04E-10	1.58E-07
LPI-MDP-MA-SI1A	10	2.00E-03	(136.5)	4.04E-08	(121.5)	6.04E-10	1.58E-07
IAS-CCF-LF-INAIR	3	2.70E-05	(205.0)	3.72E-08	(123.0)	5.11E-10	1.35E-07
AFW-TDP-FR-6HRU2	22	3.00E-02	(74.5)	3.58E-08	(124.0)	3.12E-11	3.18E-07
BETA-STR	5	2.63E-01	(30.0)	3.34E-08	(125.0)	8.46E-09	1.01E-07
RCP-LOCA-581-150	262	4.00E-03	(108.5)	3.27E-08	(126.0)	0.00E+00	0.00E+00
SIS-ACT-FA-SISA	8	1.60E-03	(144.0)	2.86E-08	(127.5)	7.94E-10	2.16E-07
SIS-ACT-FA-SISB	8	1.60E-03	(144.0)	2.86E-08	(127.5)	7.94E-10	2.16E-07
AFW-CKV-OO-CV157	7	1.00E-03	(152.0)	2.56E-08	(129.0)	7.36E-10	8.48E-08
OEP-CRB-FT-25H3	106	3.00E-03	(121.0)	2.46E-08	(130.0)	2.20E-11	1.45E-07
CPC-STR-PG-3HR	1	9.00E-05	(190.5)	2.37E-08	(131.0)		
REC-XHE-FO-GAGRV	2	3.00E-01	(26.0)	2.25E-08	(132.0)	1.79E-10	7.97E-08
HPI-CKV-OO-CV258	2	1.00E-03	(152.0)	2.24E-08	(133.0)	1.96E-09	7.24E-08
AFW-TDP-FS-U2FW2	22	1.10E-02	(93.5)	2.18E-08	(134.0)	3.56E-11	1.98E-07
HPI-MDP-FR-1A24H	2	1.60E-03	(144.0)	2.16E-08	(135.0)	1.95E-09	6.93E-08
AFW-MDP-MA-FW3B	7	2.00E-03	(136.5)	2.12E-08	(136.5)	4.79E-11	6.59E-08
AFW-MDP-MA-FW3A	7	2.00E-03	(136.5)	2.12E-08	(136.5)	4.79E-11	6.59E-08
HPI-MOV-FT-1115B	5	3.00E-03	(121.0)	1.92E-08	(138.0)	5.07E-11	2.29E-07
AFW-TDP-MA-U2FW2	20	1.00E-02	(95.5)	1.89E-08	(139.0)	3.37E-11	1.26E-07
HPI-MOV-FT-1115E	3	3.00E-03	(121.0)	1.69E-08	(141.0)	1.47E-11	2.20E-07
HPI-MOV-FT-1115D	3	3.00E-03	(121.0)	1.69E-08	(141.0)	1.47E-11	2.20E-07
HPI-MOV-FT-1115C	3	3.00E-03	(121.0)	1.69E-08	(141.0)	1.47E-11	2.20E-07
LPR-MOV-FT-1890B	2	3.00E-03	(121.0)	1.35E-08	(143.0)	1.23E-11	1.59E-07
UNIT2-LOW-POWER	20	3.50E-01	(23.0)	1.29E-08	(144.0)		
ACP-BAC-ST-4KV1H	5	9.00E-05	(190.5)	1.18E-08	(145.0)	3.81E-10	4.74E-08
CPC-XHE-FO-REALN	5	7.00E-02	(53.5)	1.10E-08	(146.0)	4.93E-10	4.35E-08
HPI-MOV-FT-1867D	5	3.00E-03	(121.0)	1.07E-08	(147.0)	1.59E-10	3.96E-08
PPS-SOV-FT-1456	4	1.00E-03	(152.0)	1.07E-08	(148.5)	3.66E-10	3.54E-08
PPS-SOV-FT-1455C	4	1.00E-03	(152.0)	1.07E-08	(148.5)	3.66E-10	3.54E-08
ACP-BAC-ST-1H1	3	9.00E-05	(190.5)	1.06E-08	(150.0)	2.77E-10	3.90E-08
CON-VFC-RP-COREM	6	2.00E-02	(82.0)	1.01E-08	(151.0)	7.48E-10	3.17E-08
HPI-XHE-FO-ALTIN	2	5.70E-03	(104.0)	9.69E-09	(152.0)	1.54E-10	4.34E-08
LPI-MDP-FR-B21HR	4	6.30E-04	(165.0)	8.32E-09	(153.5)	9.43E-11	2.93E-08
LPI-MDP-FR-A21HR	4	6.30E-04	(165.0)	8.32E-09	(153.5)	9.43E-11	2.93E-08
MSS-XHE-FO-ISDHR	1	1.40E-02	(87.5)	8.12E-09	(155.5)	1.24E-10	3.09E-08
MSS-CKV-FT-SGDHR	1	2.00E-03	(136.5)	8.12E-09	(155.5)	1.24E-10	3.09E-08
CPC-STR-PG-24H	1	7.20E-04	(159.5)	7.58E-09	(157.0)		
SWS-XHE-FO-OPEN	3	2.40E-01	(31.0)	7.56E-09	(158.5)	4.66E-10	2.42E-08
SWS[redacted]-FT-3ABCD	3	6.30E-04	(165.0)	7.56E-09	(158.5)		

PPS-MOV-FC-OPER	4	2.70E-03	(131.0)	6.52E-09	(160.0)	1.33E-11	2.76E-08
ACP-BAC-ST-1H1-2	1	9.00E-05	(190.5)	6.06E-09	(161.0)	6.02E-11	2.23E-08
CPC-MDP-FS-SW10B	3	8.00E-03	(97.0)	5.78E-09	(162.0)	4.30E-10	1.96E-08
AFW-ACT-FA-PMP3B	3	6.00E-04	(167.5)	5.51E-09	(163.5)	1.69E-11	1.60E-08
AFW-ACT-FA-PMP3A	3	6.00E-04	(167.5)	5.51E-09	(163.5)	1.69E-11	1.60E-08
OEP-DGN-FC-DG3U2	3	3.40E-02	(71.0)	5.42E-09	(165.0)	8.97E-11	1.95E-08
CPC-MDP-FR-SWA3H	2	4.80E-04	(169.0)	4.80E-09	(166.0)	3.38E-10	1.50E-08
LPI-MDP-FR-B24HR	4	7.20E-04	(159.5)	4.75E-09	(167.5)	5.27E-11	1.99E-08
LPI-MDP-FR-A24HR	4	7.20E-04	(159.5)	4.75E-09	(167.5)	5.27E-11	1.99E-08
BETA-SRV	1	7.00E-02	(53.5)	4.71E-09	(169.5)	5.25E-11	1.74E-08
PPS-SOV-FT	1	1.00E-03	(152.0)	4.71E-09	(169.5)	5.25E-11	1.74E-08
LPI-CKV-OO-CV58	2	1.00E-03	(152.0)	4.50E-09	(171.5)	8.17E-11	1.91E-08
LPI-CKV-OO-CV50	2	1.00E-03	(152.0)	4.50E-09	(171.5)	8.17E-11	1.91E-08
RMT-ACT-FA-RMTSB	3	1.60E-03	(144.0)	4.37E-09	(173.5)	7.13E-11	3.79E-08
RMT-ACT-FA-RMTSA	3	1.60E-03	(144.0)	4.37E-09	(173.5)	7.13E-11	3.79E-08
ACP-TFM-NO-1H1	2	4.00E-05	(199.5)	4.25E-09	(175.0)	1.78E-10	1.63E-08
CPC-MDP-FR-SWA24	3	3.80E-03	(110.5)	3.97E-09	(176.0)	1.35E-10	1.56E-08
DCP-BDC-ST-BUS1B	3	9.00E-05	(190.5)	3.52E-09	(177.5)	3.33E-11	1.35E-08
DCP-BDC-ST-BUS1A	3	9.00E-05	(190.5)	3.52E-09	(177.5)	3.33E-11	1.35E-08
QS-UNIT2	6	1.80E-01	(36.0)	3.31E-09	(179.0)	2.89E-11	1.74E-08
AFW-TNK-VF-CST	3	1.00E-06	(208.0)	2.76E-09	(180.0)	8.44E-11	1.05E-08
HPI-MOV-PG-1350	1	4.00E-05	(199.5)	2.69E-09	(181.0)	4.77E-11	1.08E-08
HPI-MOV-FT-1867C	2	3.00E-03	(121.0)	2.23E-09	(182.0)	9.41E-12	7.51E-09
CPC-CKV-OO-CV113	1	1.00E-03	(152.0)	2.17E-09	(183.0)	7.76E-11	8.77E-09
CPC-MDP-FR-CCA24	2	7.20E-04	(159.5)	2.06E-09	(184.0)	8.97E-12	6.85E-09
CVC-MDP-FR-2A1HR	1	3.00E-05	(203.5)	2.02E-09	(185.0)	8.51E-12	6.51E-09
MSS-XHE-FO-ISAFW	1	6.80E-06	(206.0)	1.97E-09	(186.0)	4.39E-11	7.32E-09
AFW-MDP-FR-3B6HR	3	1.80E-04	(174.0)	1.65E-09	(187.5)	1.83E-12	4.44E-09
AFW-MDP-FR-3A6HR	3	1.80E-04	(174.0)	1.65E-09	(187.5)	1.83E-12	4.44E-09
O	1300	4.90E-02	(61.0)	1.65E-09	(189.0)	-9.53E-08	8.02E-08
CPC-STR-PG-6HR	2	1.80E-04	(174.0)	1.61E-09	(190.0)		
HPI-MDP-FR-1A6HR	1	4.00E-04	(171.0)	1.60E-09	(191.0)	5.94E-11	5.71E-09
CPC-MDP-FS-CC2B	1	3.00E-03	(121.0)	1.24E-09	(192.0)	2.69E-12	4.35E-09
NRAC-234M	62	1.23E-01	(44.0)	1.21E-09	(193.0)	0.00E+00	0.00E+00
ACP-BAC-ST-4KV1J	2	9.00E-05	(190.5)	1.18E-09	(194.0)	9.07E-12	3.83E-09
RMT-XHE-FO-MANS1	2	8.40E-02	(56.5)	1.06E-09	(195.0)	5.10E-12	3.57E-09
AFW-XHE-FO-U2SBO	4	7.50E-02	(50.0)	1.06E-09	(196.0)	6.60E-12	4.72E-09
CPC-MDP-MA-SW10B	1	2.00E-03	(136.5)	9.60E-10	(197.0)	1.51E-11	3.61E-09
CPC-MDP-MA-CC2B	1	2.00E-03	(136.5)	8.24E-10	(198.0)	1.35E-12	2.64E-09
BETA-HPI	1	2.10E-01	(32.5)	7.69E-10	(199.5)	1.80E-11	3.14E-09
HPI-MDP-FS	1	4.00E-03	(108.5)	7.69E-10	(199.5)	1.80E-11	3.14E-09
CPC-STR-PG-2A3HR	1	9.00E-05	(190.5)	7.20E-10	(201.0)	9.84E-12	2.43E-09
CPC-MDP-FR-SWB24	1	3.80E-03	(110.5)	5.78E-10	(202.0)	5.84E-12	3.57E-09
AFW-CKV-FT-CV157	1	1.00E-04	(181.5)	5.40E-10	(203.5)	1.01E-12	1.80E-09
AFW-CKV-FT-CV172	1	1.00E-04	(181.5)	5.40E-10	(203.5)	1.01E-12	1.80E-09
CPC-STR-PG-1HR	1	3.00E-05	(203.5)	5.31E-10	(205.0)		
AFW-XVM-PG-XV183	1	4.00E-05	(199.5)	2.16E-10	(206.5)	4.05E-13	6.29E-10
AFW-XVM-PG-XV168	1	4.00E-05	(199.5)	2.16E-10	(206.5)	4.05E-13	6.29E-10
DGN-FTO	1460	3.39E-02	(72.0)	-5.19E-07	(208.0)	-2.96E-06	-8.17E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%

IE-T1	2463	7.70E-02 (4.0)	2.02E-05 (1.0)	9.09E-07	1.12E-04
IE-S1	57	1.00E-03 (9.5)	3.31E-08 (2.0)	3.58E-07	9.73E-06
IE-A	49	5.00E-04 (11.0)	2.10E-06 (3.0)	2.80E-07	5.49E-06
IE-T7	39	1.00E-02 (6.0)	1.92E-06 (4.0)	1.42E-07	6.12E-06
IE-T2	65	9.40E-01 (3.0)	1.48E-06 (5.0)	4.82E-08	4.88E-06
IE-TN	1	5.90E+00 (2.0)	8.43E-07 (6.0)	6.29E-09	3.16E-06
IE-S3	20	1.30E-02 (5.0)	6.39E-07 (7.0)	4.24E-08	2.35E-06
IE-T	14	6.60E+00 (1.0)	5.65E-07 (8.0)	9.48E-09	2.82E-06
IE-S2	13	1.00E-03 (9.5)	4.33E-07 (9.0)	4.35E-08	1.39E-06
IE-V-TRAIN-3	1	4.00E-07 (13.0)	4.00E-07 (11.0)	1.27E-11	1.82E-06
IE-V-TRAIN-2	1	4.00E-07 (13.0)	4.00E-07 (11.0)	1.27E-11	1.82E-06
IE-V-TRAIN-1	1	4.00E-07 (13.0)	4.00E-07 (11.0)	1.27E-11	1.82E-06
IE-T5B	25	5.00E-03 (7.5)	1.38E-07 (13.5)	1.20E-09	4.52E-07
IE-T5A	25	5.00E-03 (7.5)	1.38E-07 (13.5)	1.20E-09	4.52E-07

SURRY TOTAL CORE DAMAGE MODAL
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
K	16	6.00E-05	(195.0)	2.52E-02	(1.0)	1.45E-03	9.56E-02
RWT-TNK-LF-RWST	5	2.70E-06	(207.0)	1.95E-02	(2.0)	7.93E-03	3.88E-02
AFW-PSF-FC-XCONN	25	1.50E-04	(176.0)	5.83E-03	(3.0)	4.48E-04	1.89E-02
AFW-CCF-LK-STMBD	21	1.00E-04	(181.5)	5.82E-03	(4.0)	4.48E-04	1.88E-02
AFW-TNK-VF-CST	3	1.00E-06	(208.0)	2.76E-03	(5.0)	1.45E-04	1.00E-02
HPI-CKV-FT-CV225	5	1.00E-04	(181.5)	2.10E-03	(6.0)	8.68E-04	4.13E-03
HPI-CKV-FT-CV25	5	1.00E-04	(181.5)	2.06E-03	(7.5)	7.31E-04	4.36E-03
HPI-CKV-FT-CV410	5	1.00E-04	(181.5)	2.06E-03	(7.5)	7.31E-04	4.36E-03
HPI-XVM-PG-XV24	4	4.00E-05	(199.5)	2.06E-03	(9.0)	7.13E-04	4.35E-03
LPR-CCF-PG-SUMP	5	5.00E-05	(196.0)	1.55E-03	(10.0)	8.08E-04	3.05E-03
LPR-XHE-FO-HOTLG	2	4.00E-05	(199.5)	1.50E-03	(11.0)	5.89E-04	2.98E-03
RMT-CCF-FA-MSCAL	2	3.00E-04	(172.0)	1.50E-03	(12.0)	5.89E-04	2.98E-03
LPI-MOV-PG-1890C	2	4.40E-04	(170.0)	1.50E-03	(13.0)	5.89E-04	2.98E-03
IAS-CCF-LF-INAIR	3	2.70E-05	(205.0)	1.38E-03	(14.0)	1.59E-04	4.35E-03
ACC-CKV-FT-CV130	1	1.00E-04	(181.5)	5.00E-04	(16.5)	1.33E-04	1.20E-03
ACC-CKV-FT-CV128	1	1.00E-04	(181.5)	5.00E-04	(16.5)	1.33E-04	1.20E-03
ACC-CKV-FT-CV145	1	1.00E-04	(181.5)	5.00E-04	(16.5)	1.33E-04	1.20E-03
ACC-CKV-FT-CV147	1	1.00E-04	(181.5)	5.00E-04	(16.5)	1.33E-04	1.20E-03
ACC-MOV-PG-1865B	1	6.50E-04	(162.5)	5.00E-04	(19.5)	1.33E-04	1.20E-03
ACC-MOV-PG-1865C	1	6.50E-04	(162.5)	5.00E-04	(19.5)	1.33E-04	1.20E-03
HPI-MOV-FT	8	3.00E-03	(121.0)	3.98E-04	(21.0)	7.12E-05	1.07E-03
OEP-DGN-FS-DG01	725	2.20E-02	(79.5)	3.65E-04	(22.0)	2.26E-05	1.12E-03
OEP-CRB-FT-15H3	418	3.00E-03	(121.0)	3.54E-04	(23.0)	2.25E-05	1.12E-03
OEP-DGN-FR-6HDG1	639	1.20E-02	(91.0)	3.36E-04	(24.0)	2.33E-05	1.04E-03
OEP-DGN-MA-DG01	393	6.00E-03	(102.0)	3.07E-04	(25.0)	1.78E-05	1.01E-03
MSS-XHE-FO-ISAFW	1	6.80E-06	(206.0)	2.90E-04	(26.0)	7.74E-05	6.97E-04
CPC-STR-PG-3HR	1	9.00E-05	(190.5)	2.63E-04	(27.0)		
LPI-MDP-FS	2	3.00E-03	(121.0)	2.24E-04	(28.0)	3.90E-05	6.03E-04
OEP-DGN-FS	299	2.20E-02	(79.5)	2.17E-04	(29.0)	1.52E-05	6.54E-04
OEP-DGN-FS-DG02	521	2.20E-02	(79.5)	1.95E-04	(30.0)	1.25E-05	6.02E-04
OEP-DGN-FS-DG03	526	2.20E-02	(79.5)	1.95E-04	(31.0)	1.27E-05	6.00E-04
OEP-DGN-FR-6HDG3	467	1.20E-02	(91.0)	1.91E-04	(32.0)	1.38E-05	6.11E-04
OEP-CRB-FT-15J3	273	3.00E-03	(121.0)	1.88E-04	(33.0)	1.34E-05	6.04E-04
OEP-DGN-FR-6HDG2	458	1.20E-02	(91.0)	1.72E-04	(34.0)	1.04E-05	5.32E-04
OEP-DGN-MA-DG02	279	6.00E-03	(102.0)	1.68E-04	(35.0)	9.77E-06	5.67E-04
OEP-DGN-MA-DG03	273	6.00E-03	(102.0)	1.59E-04	(36.0)	9.16E-06	5.56E-04
NRAC-7HR	986	5.00E-02	(60.0)	1.53E-04	(37.0)	8.19E-06	8.47E-04
LPR-MOV-FT-1860A	12	3.00E-03	(121.0)	1.52E-04	(38.0)	3.23E-05	3.92E-04
LPR-MOV-FT-1862A	13	5.20E-03	(105.5)	1.52E-04	(39.0)	3.22E-05	3.92E-04
BETA-3DG	59	1.80E-02	(83.0)	1.45E-04	(40.0)	6.07E-06	5.00E-04
LPR-MOV-FT-1890A	4	3.00E-03	(121.0)	1.36E-04	(41.0)	2.41E-05	3.66E-04
ACP-BAC-ST-4KV1H	5	9.00E-05	(190.5)	1.31E-04	(42.0)	1.34E-05	4.02E-04
ACP-BAC-ST-1H1	3	9.00E-05	(190.5)	1.18E-04	(43.0)	8.94E-06	3.82E-04
ACP-TFM-NO-1H1	2	4.00E-05	(199.5)	1.06E-04	(44.0)	7.55E-06	3.46E-04
REC-XHE-FO-DPRES	3	1.40E-02	(87.5)	9.49E-05	(45.0)	1.53E-05	2.62E-04
CVC-MDP-FR-2A1HR	1	3.00E-05	(203.5)	6.73E-05	(46.5)	1.80E-06	2.49E-04
HPI-MOV-PG-1350	1	4.00E-05	(199.5)	6.73E-05	(46.5)	1.80E-06	2.49E-04

ACP-BAC-ST-1H1-2	1	9.00E-05	(190.5)	6.73E-05	(48.0)	1.80E-08	2.49E-04
PPS-XHE-FO-EMBOR	1	1.00E-03	(152.0)	6.73E-05	(49.0)	1.79E-08	2.48E-04
HPI-MOV-FT-1350	1	3.00E-03	(121.0)	6.71E-05	(50.0)	1.80E-08	2.48E-04
AFW-CKV-OO-CV142	8	1.00E-03	(152.0)	6.09E-05	(51.0)	5.79E-07	2.43E-04
Z	1	1.40E-02	(87.5)	5.93E-05	(52.0)	1.60E-08	2.16E-04
AFW-TDP-FS-FW2	104	1.10E-02	(93.5)	5.77E-05	(53.0)	5.41E-08	2.42E-04
AFW-TDP-MA-FW2	97	1.00E-02	(95.5)	5.69E-05	(54.0)	3.87E-08	2.51E-04
BETA-2DG	271	3.80E-02	(69.0)	5.69E-05	(55.0)	3.16E-08	1.85E-04
AFW-XHE-FO-UN1T2	151	3.60E-02	(70.0)	5.20E-05	(56.0)	8.60E-08	1.57E-04
OEP-DGN-FR-DG01	23	2.00E-03	(136.5)	5.10E-05	(57.0)	5.27E-07	1.85E-04
AFW-CKV-OO-CV172	23	1.00E-03	(152.0)	5.09E-05	(58.0)	5.70E-08	1.80E-04
RCS-XHE-FO-DPRT7	15	2.90E-02	(77.0)	4.95E-05	(59.0)		
DCP-BDC-ST-BUS1A	3	9.00E-05	(190.5)	3.91E-05	(60.5)	1.05E-08	1.49E-04
DCP-BDC-ST-BUS1B	3	9.00E-05	(190.5)	3.91E-05	(60.5)	1.05E-08	1.49E-04
PPS-SOV-OO-1455C	69	3.00E-02	(74.5)	3.87E-05	(62.5)	2.38E-08	1.79E-04
PPS-SOV-OO-1456	69	3.00E-02	(74.5)	3.87E-05	(62.5)	2.38E-08	1.79E-04
NRAC-216M	200	1.38E-01	(41.0)	3.13E-05	(64.0)	0.00E+00	1.96E-04
AFW-XHE-FO-CST2	33	6.50E-02	(55.0)	2.83E-05	(65.0)	7.87E-07	1.38E-04
BETA-2MOV	25	8.80E-02	(48.0)	2.82E-05	(66.0)	2.21E-08	9.84E-05
AFW-MDP-FS	26	6.30E-03	(99.0)	2.74E-05	(67.0)	8.22E-07	1.09E-04
OEP-DGN-FR-DG02	14	2.00E-03	(136.5)	2.56E-05	(68.0)	1.82E-07	9.71E-05
AFW-CKV-OO-CV157	7	1.00E-03	(152.0)	2.55E-05	(69.0)	1.20E-08	9.30E-05
OEP-DGN-FR-DG03	12	2.00E-03	(136.5)	2.53E-05	(70.0)	1.83E-07	9.02E-05
LPI-MDP-FS-SI1B	14	3.00E-03	(121.0)	2.46E-05	(71.5)	4.22E-06	6.98E-05
LPI-MDP-FS-SI1A	14	3.00E-03	(121.0)	2.46E-05	(71.5)	4.22E-06	6.98E-05
HPI-CKV-OO-CV258	2	1.00E-03	(152.0)	2.24E-05	(73.0)	3.70E-06	6.78E-05
MCW-CCF-VF-SBO	573	6.00E-02	(58.0)	2.16E-05	(74.0)	4.62E-07	1.26E-04
AFW-TDP-FR-2P6HR	92	3.00E-02	(74.5)	2.13E-05	(75.0)	1.18E-08	9.66E-05
LPR-MOV-FT-1862B	11	5.20E-03	(105.5)	2.08E-05	(76.0)	2.79E-06	6.36E-05
LPR-MOV-FT-1860B	10	3.00E-03	(121.0)	2.07E-05	(77.0)	2.74E-06	6.46E-05
REC-XHE-FO-SCOOL	597	1.25E-01	(43.0)	2.02E-05	(78.0)	3.91E-07	1.10E-04
LPI-MDP-MA-SI1B	10	2.00E-03	(136.5)	2.01E-05	(79.5)	2.81E-08	5.71E-05
LPI-MDP-MA-SI1A	10	2.00E-03	(136.5)	2.01E-05	(79.5)	2.81E-08	5.71E-05
SIS-ACT-FA-SISA	8	1.60E-03	(144.0)	1.79E-05	(81.5)	2.76E-08	5.46E-05
SIS-ACT-FA-SISB	8	1.60E-03	(144.0)	1.79E-05	(81.5)	2.76E-08	5.46E-05
CPC-STR-PG-1HR	1	3.00E-05	(203.5)	1.77E-05	(83.0)		
AFW-MDP-FS-FW3A	24	6.30E-03	(99.0)	1.58E-05	(84.0)	7.09E-07	4.99E-05
AFW-MDP-FS-FW3B	23	6.30E-03	(99.0)	1.57E-05	(85.0)	6.62E-07	4.98E-05
RCP-LOCA-1440-90	262	4.30E-03	(107.0)	1.48E-05	(86.0)	5.15E-07	7.58E-05
HPI-MDP-FR-1A24H	2	1.60E-03	(144.0)	1.35E-05	(87.0)	1.84E-06	3.93E-05
LPI-MDP-FR-B21HR	4	6.30E-04	(165.0)	1.32E-05	(88.5)	1.30E-06	4.11E-05
LPI-MDP-FR-A21HR	4	6.30E-04	(165.0)	1.32E-05	(88.5)	1.30E-06	4.11E-05
ACP-BAC-ST-4KV1J	2	9.00E-05	(190.5)	1.31E-05	(90.0)	3.06E-07	4.46E-05
SWS-CCF-FT-3ABCD	3	6.30E-04	(165.0)	1.20E-05	(91.0)		
PPS-SOV-FT-1456	4	1.00E-03	(152.0)	1.07E-05	(92.5)	6.57E-07	3.57E-05
PPS-SOV-FT-1455C	4	1.00E-03	(152.0)	1.07E-05	(92.5)	6.57E-07	3.57E-05
PPS-XHE-FO-PORVS	11	4.40E-02	(62.5)	1.07E-05	(94.0)	5.15E-07	3.47E-05
AFW-MDP-MA-FW3B	7	2.00E-03	(136.5)	1.06E-05	(95.5)	1.63E-07	3.36E-05
AFW-MDP-MA-FW3A	7	2.00E-03	(136.5)	1.06E-05	(95.5)	1.63E-07	3.36E-05
CPC-STR-PG-24H	1	7.20E-04	(159.5)	1.05E-05	(97.0)		
CPC-MDP-FR-SWA3H	2	4.80E-04	(169.0)	1.00E-05	(98.0)	1.23E-06	3.25E-05
PPS-MOV-FT-1535	16	4.00E-02	(66.0)	9.30E-06	(99.0)	4.59E-07	4.24E-05
HPI-XHE-FO-FDBLD	14	7.10E-02	(52.0)	9.29E-06	(100.0)	4.25E-07	2.89E-05
AFW-MDP-FR-3B6HR	3	1.80E-04	(174.0)	9.18E-06	(101.5)	6.33E-08	2.95E-05
AFW-MDP-FR-3A6HR	3	1.80E-04	(174.0)	9.18E-06	(101.5)	6.33E-08	2.95E-05
AFW-ACT-FA-PMP3B	3	6.00E-04	(167.5)	9.17E-06	(103.5)	6.33E-08	2.95E-05

AFW-ACT-FA-PMP3A	3	6.00E-04	(167.5)	9.17E-06	(103.5)	6.33E-08	2.95E-05
CPC-STR-PG-6HR	2	1.80E-04	(174.0)	8.95E-06	(105.0)		
HPI-XHE-FO-UN2S3	18	4.40E-02	(62.5)	8.74E-06	(106.0)	1.26E-06	2.57E-05
QS-SBO	2435	2.70E-01	(28.5)	8.21E-06	(107.0)	2.14E-07	3.92E-05
OEP-CRB-FT-25H3	106	3.00E-03	(121.0)	8.19E-06	(108.0)	3.00E-08	4.93E-05
RCP-LOCA-561-150	262	4.00E-03	(108.5)	8.14E-06	(109.0)	3.59E-07	4.29E-05
CPC-STR-PG-2A3HR	1	9.00E-05	(190.5)	8.00E-06	(110.0)	9.10E-07	2.73E-05
NRAC-258M	200	1.08E-01	(47.0)	7.75E-06	(111.0)	0.00E+00	5.03E-05
R	16	1.70E-01	(35.0)	7.37E-06	(112.0)	3.46E-07	3.12E-05
RCP-LOCA-467-150	262	1.27E-01	(42.0)	6.70E-06	(113.0)	0.00E+00	3.68E-05
LPI-MDP-FR-B24HR	4	7.20E-04	(159.5)	6.60E-06	(114.5)	6.52E-07	2.15E-05
LPI-MDP-FR-A24HR	4	7.20E-04	(159.5)	6.60E-06	(114.5)	6.52E-07	2.15E-05
HPI-MOV-FT-1115B	5	3.00E-03	(121.0)	6.37E-06	(116.0)	3.66E-07	2.35E-05
HPI-MOV-FT-1115D	3	3.00E-03	(121.0)	5.63E-06	(118.0)	1.25E-07	2.09E-05
HPI-MOV-FT-1115E	3	3.00E-03	(121.0)	5.63E-06	(118.0)	1.25E-07	2.09E-05
HPI-MOV-FT-1115C	3	3.00E-03	(121.0)	5.63E-06	(118.0)	1.25E-07	2.09E-05
AFW-XVM-PG-XV183	1	4.00E-05	(199.5)	5.40E-06	(120.5)	1.45E-08	1.81E-05
AFW-XVM-PG-XV168	1	4.00E-05	(199.5)	5.40E-06	(120.5)	1.45E-08	1.81E-05
AFW-CKV-FT-CV157	1	1.00E-04	(181.5)	5.40E-06	(122.5)	1.45E-08	1.81E-05
AFW-CKV-FT-CV172	1	1.00E-04	(181.5)	5.40E-06	(122.5)	1.45E-08	1.81E-05
NRAC-1HR	157	4.40E-01	(21.0)	5.39E-06	(124.0)	7.06E-08	3.05E-05
PPS-SOV-FT	1	1.00E-03	(152.0)	4.71E-06	(125.0)	8.54E-08	1.69E-05
RCP-LOCA-750-90M	262	5.30E-01	(18.0)	4.61E-06	(126.0)	0.00E+00	2.89E-05
REC-XHE-FO-DGHWB	159	6.00E-01	(14.5)	4.60E-06	(127.0)	6.18E-08	2.27E-05
LPI-CKV-OO-CV58	2	1.00E-03	(152.0)	4.50E-06	(128.5)	1.45E-07	1.69E-05
LPI-CKV-OO-CV50	2	1.00E-03	(152.0)	4.50E-06	(128.5)	1.45E-07	1.69E-05
LPR-MOV-FT-1890B	2	3.00E-03	(121.0)	4.49E-06	(130.0)	1.12E-07	1.72E-05
HPI-XHE-FO-ALTS3	2	7.40E-02	(51.0)	4.16E-06	(131.0)	7.18E-08	1.59E-05
MSS-CKV-FT-SGDHR	1	2.00E-03	(136.5)	4.05E-06	(132.0)	1.00E-07	1.67E-05
HPI-MDP-FR-1A6HR	1	4.00E-04	(171.0)	4.00E-06	(133.0)	2.30E-07	1.29E-05
PORV-BLK	6	1.50E-01	(38.5)	3.84E-06	(134.0)	1.41E-07	1.25E-05
BETA-LPI	2	1.50E-01	(38.5)	3.83E-06	(135.0)	1.11E-07	1.49E-05
MSS-XHE-FO-BLOCK	4	6.40E-02	(56.5)	3.72E-06	(136.0)	1.52E-07	1.18E-05
HPI-MOV-FT-1867D	5	3.00E-03	(121.0)	3.57E-06	(137.0)	4.57E-07	1.12E-05
RCP-LOCA-183-90	262	1.40E-02	(87.5)	3.49E-06	(138.0)	1.27E-07	2.03E-05
RCP-LOCA-183-210	262	1.61E-02	(84.5)	3.49E-06	(139.5)	8.75E-08	1.99E-05
RCP-LOCA-183-150	262	1.61E-02	(84.5)	3.49E-06	(139.5)	9.22E-08	2.03E-05
PPS-MOV-FT-1536	15	4.00E-02	(66.0)	3.48E-06	(141.0)	1.24E-07	1.18E-05
SGTR-SGSRV-ODMD2	6	1.50E-01	(38.5)	3.26E-06	(142.0)	1.18E-07	1.01E-05
AFW-XHE-FO-U1SBO	73	8.20E-02	(49.0)	3.18E-06	(143.0)	5.48E-08	1.67E-05
BETA-AFW	26	5.60E-02	(59.0)	2.92E-06	(144.0)	7.09E-08	1.21E-05
CPC-MDP-FR-CCA24	2	7.20E-04	(159.5)	2.86E-06	(145.0)	7.55E-08	1.08E-05
SBO-PORV-DMD	128	4.50E-01	(20.0)	2.77E-06	(146.0)	1.31E-08	1.29E-05
RMT-ACT-FA-RMTSB	3	1.60E-03	(144.0)	2.73E-06	(147.5)	2.79E-07	8.82E-06
RMT-ACT-FA-RMTSA	3	1.60E-03	(144.0)	2.73E-06	(147.5)	2.79E-07	8.82E-06
PPS-MOV-FC-OPER	4	2.70E-03	(131.0)	2.41E-06	(149.0)	2.51E-08	1.03E-05
NRAC-6HR-AVG	77	1.94E-01	(34.0)	2.20E-06	(150.0)	1.15E-08	9.32E-06
CPC-CKV-OO-CV113	1	1.00E-03	(152.0)	2.17E-06	(151.0)	1.18E-07	8.73E-06
NOTDG-CCF	240	5.20E-01	(17.0)	2.05E-06	(152.0)		
AFW-TDP-FS-U2FW2	22	1.10E-02	(93.5)	1.96E-06	(153.0)	3.25E-08	1.01E-05
NSLOCA	146	2.70E-01	(28.5)	1.96E-06	(154.0)	0.00E+00	1.06E-05
AFW-TDP-MA-U2FW2	20	1.00E-02	(95.5)	1.87E-06	(155.0)	2.94E-08	8.97E-06
HPI-XHE-FO-ALTIN	2	5.70E-03	(104.0)	1.69E-06	(156.0)	2.75E-07	4.99E-06
NOTW2	54	8.15E-01	(10.0)	1.62E-06	(157.0)		
REC-XHE-FO-DGHWS	1407	8.00E-01	(11.0)	1.49E-06	(158.0)	0.00E+00	7.99E-06
PPS-MOV-OO-1536	3	4.00E-02	(66.0)	1.39E-06	(159.5)	1.51E-08	5.96E-06

PPS-MOV-OO-1535	3	4.00E-02	(66.0)	1.39E-06	(159.5)	1.51E-08	5.96E-06
AFW-TDP-FR-6HRU2	22	3.00E-02	(74.5)	1.16E-06	(161.0)	9.19E-09	6.27E-06
NRAC-201M	62	1.50E-01	(38.5)	1.11E-06	(162.0)	0.00E+00	6.38E-06
CPC-MDP-FR-SWA24	3	3.80E-03	(110.5)	1.04E-06	(163.0)	6.32E-08	3.81E-06
PPS-MOV-FT	7	4.00E-02	(66.0)	1.01E-06	(164.0)	3.07E-08	4.26E-06
PPS-MOV-FC-1536	30	3.00E-01	(26.0)	1.01E-06	(165.0)	5.19E-08	3.07E-06
PPS-MOV-FC-1535	27	3.00E-01	(26.0)	9.93E-07	(166.0)	4.90E-08	3.02E-06
AFW-TDP-FR-2P24H	23	1.20E-01	(45.0)	9.21E-07	(167.0)	2.09E-08	3.91E-06
HPI-MOV-FT-1867C	2	3.00E-03	(121.0)	7.42E-07	(168.0)	1.60E-08	2.47E-06
NRAC-HALFHR	182	6.00E-01	(14.5)	7.24E-07	(169.0)	1.07E-08	3.98E-06
CPC-MDP-FS-SW10B	3	8.00E-03	(97.0)	7.16E-07	(170.0)	1.11E-07	2.09E-06
REC-XHE-FO-DGEN	382	9.00E-01	(8.0)	6.31E-07	(171.0)	3.01E-09	2.96E-06
MSS-XHE-FO-ISDHR	1	1.40E-02	(87.5)	5.72E-07	(172.0)	7.83E-08	1.62E-06
NRAC-246M	262	1.15E-01	(46.0)	5.18E-07	(173.0)	0.00E+00	1.30E-06
NOTQ	2307	9.73E-01	(6.0)	4.96E-07	(174.0)		
CON-VFC-RP-COREM	6	2.00E-02	(82.0)	4.93E-07	(175.0)	6.78E-08	1.33E-06
CPC-MDP-MA-SW10B	1	2.00E-03	(136.5)	4.79E-07	(176.0)	6.83E-08	1.43E-06
CPC-MDP-MA-CC2B	1	2.00E-03	(136.5)	4.11E-07	(177.0)	4.82E-09	1.70E-06
CPC-MDP-FS-CC2B	1	3.00E-03	(121.0)	4.11E-07	(178.0)	4.82E-09	1.70E-06
HPI-XHE-FO-UN2S2	7	3.10E-01	(24.0)	3.62E-07	(179.0)	2.74E-08	1.25E-06
RCS-XHE-FO-DPT7D	12	4.00E-01	(22.0)	2.92E-07	(180.0)	1.07E-08	1.08E-06
REC-XHE-FO-DGTMB	18	5.00E-01	(18.5)	2.78E-07	(181.0)	5.61E-10	1.14E-06
NRAC-150M	262	2.10E-01	(32.5)	2.41E-07	(182.0)	0.00E+00	0.00E+00
HPI-XHE-FO-ALT	2	6.10E-01	(13.0)	2.06E-07	(183.0)	1.18E-09	7.78E-07
HPI-MDP-FS	1	4.00E-03	(108.5)	1.91E-07	(184.0)	7.96E-09	7.31E-07
OEP-DGN-FC-DG3U2	3	3.40E-02	(71.0)	1.54E-07	(185.0)	4.12E-09	5.61E-07
CPC-MDP-FR-SWB24	1	3.80E-03	(110.5)	1.52E-07	(186.0)	3.31E-09	6.45E-07
PORV-NOT-BLK	10	8.50E-01	(9.0)	1.46E-07	(187.0)	8.89E-10	5.93E-07
CPC-XHE-FO-REALN	5	7.00E-02	(53.5)	1.46E-07	(188.0)	1.52E-08	5.28E-07
RCS-PORV-ODMD	10	5.00E-01	(18.5)	1.22E-07	(189.0)	7.02E-10	4.79E-07
NOTL-SBOU1U2	842	9.68E-01	(7.0)	1.07E-07	(190.0)		
NOTL-SBOU1	1316	9.93E-01	(5.0)	9.40E-08	(191.0)		
BETA-STR	5	2.63E-01	(30.0)	9.36E-08	(192.0)	2.52E-08	2.24E-07
REC-XHE-FO-DGTMS	217	7.00E-01	(12.0)	7.11E-08	(193.0)	0.00E+00	2.45E-07
BETA-SRV	1	7.00E-02	(53.5)	6.26E-08	(194.0)	1.12E-09	2.36E-07
REC-XHE-FO-GAGRV	2	3.00E-01	(26.0)	5.24E-08	(195.0)	6.04E-10	2.04E-07
O	1300	4.90E-02	(61.0)	3.19E-08	(196.0)	-1.83E-06	1.42E-06
UNIT2-LOW-POWER	20	3.50E-01	(23.0)	2.40E-08	(197.0)		
SWS-XHE-FO-OPEN	3	2.40E-01	(31.0)	2.39E-08	(198.0)	3.85E-09	6.38E-08
QS-UNIT2	6	1.60E-01	(36.0)	1.74E-08	(199.0)	1.86E-10	1.28E-07
RMT-XHE-FO-MANS1	2	6.40E-02	(56.5)	1.56E-08	(200.0)	1.46E-10	6.27E-08
AFW-XHE-FO-U2SBO	4	7.50E-02	(50.0)	1.30E-08	(201.0)	1.87E-10	5.49E-08
NRAC-234M	62	1.23E-01	(44.0)	8.62E-09	(202.0)	0.00E+00	0.00E+00
BETA-HPI	1	2.10E-01	(32.5)	2.89E-08	(203.0)	7.81E-11	1.10E-08
MSS-SRV-OO-ODSRV	12	1.00E+00	(2.5)	0.00E+00	(205.5)		
MSS-SOV-OO-ODADV	4	1.00E+00	(2.5)	0.00E+00	(205.5)		
SGTR-SGSRV-ODMD1	8	1.00E+00	(2.5)	0.00E+00	(205.5)		
SGTR-SGADV-ODMD	4	1.00E+00	(2.5)	0.00E+00	(205.5)		
DGN-FTO	1460	3.39E-02	(72.0)	-1.48E-05	(208.0)	-8.84E-05	-4.94E-07

SURRY TOTAL CORE DAMAGE MODAL
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
OEP-DGN-FS	299	2.20E-02	(79.5)	20.7	(2.5)	1.23	0.75
OEP-DGN-FS-DG02	521	2.20E-02	(79.5)	20.7	(2.5)	1.23	0.75
OEP-DGN-FS-DG01	725	2.20E-02	(79.5)	20.7	(2.5)	1.23	0.75
OEP-DGN-FS-DG03	526	2.20E-02	(79.5)	20.7	(2.5)	1.23	0.75
OEP-DGN-FR-DG02	14	2.00E-03	(136.5)	18.9	(6.0)	1.00	1.00
OEP-DGN-FR-DG03	12	2.00E-03	(136.5)	18.9	(6.0)	1.00	1.00
OEP-DGN-FR-DG01	23	2.00E-03	(136.5)	18.9	(6.0)	1.00	1.00
OEP-DGN-FR-6HDG1	639	1.20E-02	(91.0)	18.9	(9.0)	1.14	0.80
OEP-DGN-FR-6HDG3	467	1.20E-02	(91.0)	18.9	(9.0)	1.14	0.80
OEP-DGN-FR-6HDG2	458	1.20E-02	(91.0)	18.9	(9.0)	1.14	0.80
NRAC-7HR	986	5.00E-02	(60.0)	5.4	(11.0)	1.04	0.99
NRAC-201M	62	1.50E-01	(38.5)	5.1	(12.0)	1.00	1.00
NRAC-216M	200	1.38E-01	(41.0)	5.0	(13.0)	1.01	0.99
NRAC-234M	62	1.23E-01	(44.0)	5.0	(14.0)	1.00	1.00
NRAC-258M	200	1.08E-01	(47.0)	4.9	(15.0)	1.00	1.00
NRAC-246M	262	1.15E-01	(46.0)	4.9	(16.0)	1.00	1.00
NRAC-HALFHR	182	6.00E-01	(14.5)	4.9	(17.0)	1.01	1.00
NRAC-1HR	157	4.40E-01	(21.0)	4.9	(18.0)	1.01	0.99
NRAC-150M	262	2.10E-01	(32.5)	4.7	(19.0)	1.00	1.00
Z	1	1.40E-02	(87.5)	4.4	(20.0)	1.04	0.99
OEP-DGN-MA-DG03	273	6.00E-03	(102.0)	3.6	(22.0)	1.03	1.04
OEP-DGN-MA-DG02	279	6.00E-03	(102.0)	3.6	(22.0)	1.03	1.04
OEP-DGN-MA-DG01	393	6.00E-03	(102.0)	3.6	(22.0)	1.03	1.04
HPI-MOV-FT-1115E	3	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
LPR-MOV-FT-1890B	2	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
LPR-MOV-FT-1860A	12	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
HPI-MOV-FT-1867C	2	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
LPR-MOV-FT-1860B	10	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
HPI-MOV-FT-1867D	5	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
HPI-MOV-FT-1115B	5	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
HPI-MOV-FT-1115C	3	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
HPI-MOV-FT-1350	1	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
HPI-MOV-FT-1115D	3	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
LPR-MOV-FT-1890A	4	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
HPI-MOV-FT	8	3.00E-03	(121.0)	3.6	(29.5)	1.12	0.98
REC-XHE-FO-DGHWS	1407	8.00E-01	(11.0)	3.1	(36.0)	1.01	1.00
REC-XHE-FO-DGTMB	18	5.00E-01	(18.5)	3.1	(37.0)	1.00	1.00
REC-XHE-FO-DGHWB	159	6.00E-01	(14.5)	3.1	(38.0)	1.02	1.00
REC-XHE-FO-DGEN	382	9.00E-01	(8.0)	2.9	(39.0)	1.01	1.01
REC-XHE-FO-DGTMS	217	7.00E-01	(12.0)	2.8	(40.0)	1.00	1.00
QS-UNIT2	8	1.60E-01	(36.0)	2.3	(41.0)	1.00	1.00
PPS-SOV-OO-1455C	69	3.00E-02	(74.5)	2.2	(42.5)	1.03	0.99
PPS-SOV-OO-1456	69	3.00E-02	(74.5)	2.2	(42.5)	1.03	0.99
QS-SBO	2435	2.70E-01	(28.5)	2.1	(44.0)	1.03	1.02
AFW-XHE-FO-UNIT2	151	3.60E-02	(70.0)	1.9	(45.0)	1.06	1.00
REC-XHE-FO-GAGRV	2	3.00E-01	(26.0)	1.7	(46.0)	1.00	1.00
AFW-CCF-LK-STMBD	21	1.00E-04	(181.5)	1.5	(47.0)	1.05	1.00

BETA-SRV	1	7.00E-02	(53.5)	1.5	(48.0)	1.00	1.00
NSLOCA	146	2.70E-01	(28.5)	1.5	(49.0)	0.99	1.01
ACP-TFM-NO-1H1	2	4.00E-05	(199.5)	1.4	(50.0)	1.00	1.00
OEP-CRB-FT-25H3	106	3.00E-03	(121.0)	1.3	(52.0)	1.00	0.98
OEP-CRB-FT-15J3	273	3.00E-03	(121.0)	1.3	(52.0)	1.00	0.98
OEP-CRB-FT-15H3	418	3.00E-03	(121.0)	1.3	(52.0)	1.00	0.98
LPR-MOV-FT-1862A	13	5.20E-03	(105.5)	1.3	(54.5)	1.03	1.01
LPR-MOV-FT-1862B	11	5.20E-03	(105.5)	1.3	(54.5)	1.03	1.01
PORV-BLK	6	1.50E-01	(38.5)	1.2	(56.0)	1.02	1.00
O	1300	4.90E-02	(61.0)	1.1	(57.0)	1.00	1.00
REC-XHE-FO-SCOOL	597	1.25E-01	(43.0)	1.0	(58.0)	1.01	0.99
PPS-MOV-FC-1536	30	3.00E-01	(26.0)	1.0	(59.5)	0.99	1.00
PPS-MOV-FC-1535	27	3.00E-01	(26.0)	1.0	(59.5)	0.99	1.00
R	16	1.70E-01	(35.0)	1.0	(61.0)	1.00	0.99
REC-XHE-FO-DPRES	3	1.40E-02	(87.5)	1.0	(62.0)	1.08	1.00
AFW-ACT-FA-PMP3B	3	6.00E-04	(167.5)	0.9	(63.5)	1.00	1.00
AFW-ACT-FA-PMP3A	3	6.00E-04	(167.5)	0.9	(63.5)	1.00	1.00
PPS-XHE-FO-EMBOR	1	1.00E-03	(152.0)	0.9	(65.0)	1.00	1.00
BETA-2DG	271	3.80E-02	(69.0)	0.9	(66.0)	1.01	1.02
MSS-XHE-FO-ISDHR	1	1.40E-02	(87.5)	0.9	(67.0)	1.00	1.00
RCP-LOCA-750-90M	262	5.30E-01	(16.0)	0.9	(68.0)	1.04	0.97
NRAC-6HR-AVG	77	1.94E-01	(34.0)	0.8	(69.0)	1.00	1.01
PPS-XHE-FO-PORVS	11	4.40E-02	(62.5)	0.8	(70.0)	1.00	1.00
BETA-2MOV	25	8.80E-02	(48.0)	0.8	(71.0)	1.04	1.00
AFW-MDP-MA-FW3A	7	2.00E-03	(136.5)	0.8	(74.5)	1.00	1.00
CPC-MDP-MA-SW10B	1	2.00E-03	(136.5)	0.8	(74.5)	1.00	1.00
CPC-MDP-MA-CC2B	1	2.00E-03	(136.5)	0.8	(74.5)	1.00	1.00
AFW-MDP-MA-FW3B	7	2.00E-03	(136.5)	0.8	(74.5)	1.00	1.00
LPI-MDP-MA-SI1B	10	2.00E-03	(136.5)	0.8	(74.5)	1.00	1.00
LPI-MDP-MA-SI1A	10	2.00E-03	(136.5)	0.8	(74.5)	1.00	1.00
AFW-PSF-FC-XCONN	25	1.50E-04	(176.0)	0.7	(78.0)	1.00	1.00
RCS-XHE-FO-DPT7D	12	4.00E-01	(22.0)	0.7	(79.0)	1.00	1.00
MCW-CCF-VF-SBO	573	6.00E-02	(58.0)	0.7	(80.0)	1.00	1.00
HPI-XHE-FO-FDBLD	14	7.10E-02	(52.0)	0.7	(81.0)	1.02	0.99
SBO-PORV-DMD	128	4.50E-01	(20.0)	0.7	(82.0)	0.99	1.00
BETA-3DG	59	1.80E-02	(83.0)	0.7	(83.0)	1.00	0.99
CPC-STR-PG-2A3HR	1	9.00E-05	(190.5)	0.7	(84.0)	1.00	1.00
AFW-XVM-PG-XV168	1	4.00E-05	(199.5)	0.7	(86.0)	1.00	1.00
HPI-XVM-PG-XV24	4	4.00E-05	(199.5)	0.7	(86.0)	1.00	1.00
AFW-XVM-PG-XV183	1	4.00E-05	(199.5)	0.7	(86.0)	1.00	1.00
CVC-MDP-FR-2A1HR	1	3.00E-05	(203.5)	0.7	(88.0)	1.00	1.00
LPI-MDP-FS-SI1A	14	3.00E-03	(121.0)	0.6	(90.5)	1.04	1.00
CPC-MDP-FS-CC2B	1	3.00E-03	(121.0)	0.6	(90.5)	1.04	1.00
LPI-MDP-FS-SI1B	14	3.00E-03	(121.0)	0.6	(90.5)	1.04	1.00
LPI-MDP-FS	2	3.00E-03	(121.0)	0.6	(90.5)	1.04	1.00
SWS-XHE-FO-OPEN	3	2.40E-01	(31.0)	0.6	(93.0)	1.00	1.00
AFW-MDP-FR-3B6HR	3	1.80E-04	(174.0)	0.6	(94.5)	1.00	1.00
AFW-MDP-FR-3A6HR	3	1.80E-04	(174.0)	0.6	(94.5)	1.00	1.00
RCP-LOCA-183-150	262	1.61E-02	(84.5)	0.6	(96.0)	1.00	1.00
HPI-XHE-FO-ALTS3	2	7.40E-02	(51.0)	0.5	(97.0)	1.00	1.00
MSS-XHE-FO-ISAFW	1	6.80E-06	(206.0)	0.5	(98.0)	1.00	1.00
LPI-MDP-FR-B21HR	4	6.30E-04	(165.0)	0.5	(99.5)	1.00	1.00
LPI-MDP-FR-A21HR	4	6.30E-04	(165.0)	0.5	(99.5)	1.00	1.00
ACP-BAC-ST-1H1	3	9.00E-05	(190.5)	0.5	(103.5)		
ACP-BAC-ST-4KV1J	2	9.00E-05	(190.5)	0.5	(103.5)		
ACP-BAC-ST-4KV1H	5	9.00E-05	(190.5)	0.5	(103.5)		

DCP-BDC-ST-BUS1B	3	9.00E-05	(190.5)	0.5	(103.5)
DCP-BDC-ST-BUS1A	3	9.00E-05	(190.5)	0.5	(103.5)
ACP-BAC-ST-1H1-2	1	9.00E-05	(190.5)	0.5	(103.5)
LPI-MDP-FR-A24HR	4	7.20E-04	(159.5)	0.5	(108.0)
CPC-MDP-FR-CCA24	2	7.20E-04	(159.5)	0.5	(108.0)
LPI-MDP-FR-B24HR	4	7.20E-04	(159.5)	0.5	(108.0)
HPI-XHE-FO-UN2S3	18	4.40E-02	(62.5)	0.5	(110.0)
AFW-MDP-FS-FW3B	23	6.30E-03	(99.0)	0.5	(112.0)
AFW-MDP-FS-FW3A	24	6.30E-03	(99.0)	0.5	(112.0)
AFW-MDP-FS	26	6.30E-03	(99.0)	0.5	(112.0)
LPI-MOV-PG-1890C	2	4.40E-04	(170.0)	0.5	(114.0)
BETA-AFW	26	5.60E-02	(59.0)	0.4	(115.0)
CPC-MDP-FS-SW10B	3	8.00E-03	(97.0)	0.4	(116.0)
SGTR-SGSRV-ODMD2	6	1.50E-01	(38.5)	0.4	(117.0)
AFW-CKV-FT-CV157	1	1.00E-04	(181.5)	0.4	(122.0)
ACC-CKV-FT-CV145	1	1.00E-04	(181.5)	0.4	(122.0)
ACC-CKV-FT-CV128	1	1.00E-04	(181.5)	0.4	(122.0)
HPI-CKV-FT-CV410	5	1.00E-04	(181.5)	0.4	(122.0)
HPI-CKV-FT-CV25	5	1.00E-04	(181.5)	0.4	(122.0)
HPI-CKV-FT-CV225	5	1.00E-04	(181.5)	0.4	(122.0)
ACC-CKV-FT-CV130	1	1.00E-04	(181.5)	0.4	(122.0)
AFW-CKV-FT-CV172	1	1.00E-04	(181.5)	0.4	(122.0)
ACC-CKV-FT-CV147	1	1.00E-04	(181.5)	0.4	(122.0)
RMT-CCF-FA-MSCAL	2	3.00E-04	(172.0)	0.4	(127.0)
DGN-FTO	1460	3.39E-02	(72.0)	0.4	(128.0)
BETA-LPI	2	1.50E-01	(38.5)	0.4	(129.0)
MSS-CKV-FT-SGDHR	1	2.00E-03	(136.5)	0.4	(130.0)
HPI-XHE-FO-ALTIN	2	5.70E-03	(104.0)	0.4	(131.0)
CPC-MDP-FR-SWB24	1	3.80E-03	(110.5)	0.4	(132.5)
CPC-MDP-FR-SWA24	3	3.80E-03	(110.5)	0.4	(132.5)
CPC-CKV-OO-CV113	1	1.00E-03	(152.0)	0.4	(137.0)
LPI-CKV-OO-CV58	2	1.00E-03	(152.0)	0.4	(137.0)
LPI-CKV-OO-CV50	2	1.00E-03	(152.0)	0.4	(137.0)
AFW-CKV-OO-CV172	23	1.00E-03	(152.0)	0.4	(137.0)
AFW-CKV-OO-CV157	7	1.00E-03	(152.0)	0.4	(137.0)
HPI-CKV-OO-CV258	2	1.00E-03	(152.0)	0.4	(137.0)
AFW-CKV-OO-CV142	8	1.00E-03	(152.0)	0.4	(137.0)
MSS-XHE-FO-BLOCK	4	6.40E-02	(56.5)	0.3	(141.0)
AFW-TDP-FR-2P24H	23	1.20E-01	(45.0)	0.3	(142.0)
AFW-TDP-MA-U2FW2	20	1.00E-02	(95.5)	0.3	(143.5)
AFW-TDP-MA-FW2	97	1.00E-02	(95.5)	0.3	(143.5)
ACC-MOV-PG-1865C	1	6.50E-04	(162.5)	0.3	(145.5)
ACC-MOV-PG-1865B	1	6.50E-04	(162.5)	0.3	(145.5)
AFW-XHE-FO-CST2	33	6.50E-02	(55.0)	0.2	(147.0)
AFW-XHE-FO-U1SBO	73	8.20E-02	(49.0)	0.2	(148.0)
RCP-LOCA-561-150	262	4.00E-03	(108.5)	0.2	(149.0)
PORV-NOT-BLK	10	8.50E-01	(9.0)	0.2	(150.0)
RCP-LOCA-467-150	262	1.27E-01	(42.0)	0.2	(151.0)
HPI-MDP-FS	1	4.00E-03	(108.5)	0.2	(152.0)
PPS-SOV-FT-1456	4	1.00E-03	(152.0)	0.1	(154.0)
PPS-SOV-FT-1455C	4	1.00E-03	(152.0)	0.1	(154.0)
PPS-SOV-FT	1	1.00E-03	(152.0)	0.1	(154.0)
RCP-LOCA-183-210	262	1.61E-02	(84.5)	0.0	(156.0)
RCP-LOCA-1440-90	262	4.30E-03	(107.0)	0.0	(157.0)
RCP-LOCA-183-90	262	1.40E-02	(87.5)	0.0	(158.0)
AFW-TDP-FS-FW2	104	1.10E-02	(93.5)	0.0	(175.5)

AFW-TDP-FR-6HRU2	22	3.00E-02	(74.5)	0.0	(175.5)
AFW-TDP-FR-2P6HR	92	3.00E-02	(74.5)	0.0	(175.5)
LPR-XHE-FO-HOTLG	2	4.00E-05	(199.5)	0.0	(175.5)
CPC-MDP-FR-SWA3H	2	4.80E-04	(169.0)	0.0	(175.5)
LPR-CCF-PG-SUMP	5	5.00E-05	(196.0)	0.0	(175.5)
SIS-ACT-FA-SISB	8	1.60E-03	(144.0)	0.0	(175.5)
SIS-ACT-FA-SISA	8	1.60E-03	(144.0)	0.0	(175.5)
CON-VFC-RP-COREM	6	2.00E-02	(82.0)	0.0	(175.5)
RWT-TNK-LF-RWST	5	2.70E-06	(207.0)	0.0	(175.5)
RMT-XHE-FO-MANS1	2	6.40E-02	(56.5)	0.0	(175.5)
BETA-STR	5	2.63E-01	(30.0)	0.0	(175.5)
RMT-ACT-FA-RMTSB	3	1.60E-03	(144.0)	0.0	(175.5)
RMT-ACT-FA-RMTSA	3	1.60E-03	(144.0)	0.0	(175.5)
K	16	6.00E-05	(195.0)	0.0	(175.5)
IAS-CCF-LF-INAIR	3	2.70E-05	(205.0)	0.0	(175.5)
BETA-HPI	1	2.10E-01	(32.5)	0.0	(175.5)
RCS-PORV-ODMD	10	5.00E-01	(18.5)	0.0	(175.5)
HPI-XHE-FO-UN2S2	7	3.10E-01	(24.0)	0.0	(175.5)
HPI-XHE-FO-ALT	2	6.10E-01	(13.0)	0.0	(175.5)
HPI-MOV-PG-1350	1	4.00E-05	(199.5)	0.0	(175.5)
PPS-MOV-OO-1536	3	4.00E-02	(66.0)	0.0	(175.5)
PPS-MOV-OO-1535	3	4.00E-02	(66.0)	0.0	(175.5)
PPS-MOV-FT-1536	15	4.00E-02	(66.0)	0.0	(175.5)
PPS-MOV-FT-1535	16	4.00E-02	(66.0)	0.0	(175.5)
PPS-MOV-FT	7	4.00E-02	(66.0)	0.0	(175.5)
PPS-MOV-FC-OPER	4	2.70E-03	(131.0)	0.0	(175.5)
AFW-XHE-FO-U2SBO	4	7.50E-02	(50.0)	0.0	(175.5)
HPI-MDP-FR-1A6HR	1	4.00E-04	(171.0)	0.0	(175.5)
HPI-MDP-FR-1A24H	2	1.60E-03	(144.0)	0.0	(175.5)
OEP-DGN-FC-DG3U2	3	3.40E-02	(71.0)	0.0	(175.5)
AFW-TNK-VF-CST	3	1.00E-06	(208.0)	0.0	(175.5)
CPC-XHE-FO-REALN	5	7.00E-02	(53.5)	0.0	(175.5)
AFW-TDP-FS-U2FW2	22	1.10E-02	(93.5)	0.0	(175.5)
NOTW2	54	8.15E-01	(10.0)		
CPC-STR-PG-3HR	1	9.00E-05	(190.5)		
NOTQ	2307	9.73E-01	(8.0)		
NOTL-SBOU1U2	842	9.68E-01	(7.0)		
NOTL-SBOU1	1316	9.93E-01	(5.0)		
NOTDG-CCF	240	5.20E-01	(17.0)		
CPC-STR-PG-24H	1	7.20E-04	(159.5)		
CPC-STR-PG-1HR	1	3.00E-05	(203.5)		
MSS-SRV-OO-ODSRV	12	1.00E+00	(2.5)		
MSS-SOV-OO-ODADV	4	1.00E+00	(2.5)		
UNIT2-LOW-POWER	20	3.50E-01	(23.0)		
SWS-CCF-FT-3ABCD	3	6.30E-04	(165.0)		
SGTR-SGSRV-ODMD1	8	1.00E+00	(2.5)		
SGTR-SGADV-ODMD	4	1.00E+00	(2.5)		
RCS-XHE-FO-DPRT7	15	2.90E-02	(77.0)		
CPC-STR-PG-6HR	2	1.80E-04	(174.0)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

% REDUCTION IN
THE UNCERTAINTY

INIT EVENT	OCCUR	FREQ	(RANK)	OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	2463	7.70E-02	(4.0)	12.8	(1.0)	1.19	0.99
IE-V-TRAIN-3	1	4.00E-07	(13.0)	4.5	(3.0)	1.16	1.00
IE-V-TRAIN-1	1	4.00E-07	(13.0)	4.5	(3.0)	1.16	1.00
IE-V-TRAIN-2	1	4.00E-07	(13.0)	4.5	(3.0)	1.16	1.00
IE-S1	57	1.00E-03	(9.5)	0.8	(5.0)	1.04	0.99
IE-A	49	5.00E-04	(11.0)	0.7	(6.0)	1.06	1.01
IE-TN	1	5.90E+00	(2.0)	0.6	(7.0)	1.01	1.01
IE-T	14	6.60E+00	(1.0)	0.4	(8.0)		
IE-T7	39	1.00E-02	(6.0)	0.4	(9.0)		
IE-T2	65	9.40E-01	(3.0)	0.0	(12.0)		
IE-S2	13	1.00E-03	(9.5)	0.0	(12.0)		
IE-T5B	25	5.00E-03	(7.5)	0.0	(12.0)		
IE-T5A	25	5.00E-03	(7.5)	0.0	(12.0)		
IE-S3	20	1.30E-02	(5.0)	0.0	(12.0)		

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SURRY TOTAL CORE DAMAGE MODEL

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT SURRY-TOTAL WITH TOP EVENT FREQUENCY 3.30E-05

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1805	10	1.17E-06	0.03537	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
3					NRAC-216M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
4					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
5	2589	4	8.43E-07	0.06092	IE-TN	*	K	*	R	*	Z	+
6	141	10	6.21E-07	0.07974	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
7					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
8					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
9	140	10	6.21E-07	0.09857	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
10					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
11					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
12	2764	6	6.09E-07	0.11703	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	RCS-XHE-FO-DPRT7	*
13					REC-XHE-FO-DPRES	*	SGTR-SGSRV-ODMD1	+				
14	142	10	5.77E-07	0.13453	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
15					NOTQ	*	NOTW2	*	NRAC-7HR	*	OEP-DGN-FS	*
16					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
17	2765	6	5.18E-07	0.15023	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	RCS-XHE-FO-DPRT7	*
18					REC-XHE-FO-DPRES	*	SGTR-SGSRV-ODMD2	+				
19	79	3	4.58E-07	0.16410	BETA-2MOV	*	IE-S1	*	LPR-MOV-FT-1862A	+		
20	1806	9	4.54E-07	0.17786	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
21					NRAC-216M	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-750-90M	*
22					REC-XHE-FO-DGHWS	+						
23	64	3	4.50E-07	0.19150	BETA-LPI	*	IE-S1	*	LPI-MDP-FS	+		
24	65	2	4.40E-07	0.20484	IE-S1	*	LPI-MOV-PG-1890C	+				
25	2773	1	4.00E-07	0.21697	IE-V-TRAIN-2	+						
26	2772	1	4.00E-07	0.22910	IE-V-TRAIN-1	+						
27	2774	1	4.00E-07	0.24123	IE-V-TRAIN-3	+						
28	2618	4	3.60E-07	0.25215	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	IE-T2	+
29	144	10	3.39E-07	0.26242	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
30					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
31					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
32	146	10	3.39E-07	0.27269	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
33					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
34					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
35	145	10	3.39E-07	0.28296	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
36					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
37					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
38	143	10	3.39E-07	0.29323	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
39					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
40					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
41	1	2	3.25E-07	0.30308	ACC-MOV-PG-1865C	*	IE-A	+				
42	2	2	3.25E-07	0.31293	ACC-MOV-PG-1865B	*	IE-A	+				
43	147	9	3.08E-07	0.32227	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
44					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
45					/QS-SBO	+						
46	77	2	3.00E-07	0.33136	IE-S1	*	RMT-CCF-FA-MSCAL	+				

47	50	3	2.64E-07	0.33937	BETA-2MOV	*	HPI-MOV-FT	*	IE-S1	+				
48	78	3	2.64E-07	0.34737	BETA-2MOV	*	IE-S1	*	LPR-MOV-FT-1860A	+				
49	80	3	2.64E-07	0.35538	BETA-2MOV	*	IE-S1	*	LPR-MOV-FT-1890A	+				
50	120	4	2.54E-07	0.36308	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALTS3	*	IE-S3	+		
51	341	9	2.43E-07	0.37046	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
52					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
53					REC-XHE-FO-DGEN	+								
54	340	9	2.43E-07	0.37784	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
55					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*		
56					REC-XHE-FO-DGEN	+								
57	2575	6	2.42E-07	0.38519	IE-T	*	K	*	PPS-MOV-FC-1535	*	PPS-MOV-FC-1536	*		
58					PPS-MOV-FT-1535	*	R	+						
59	2619	4	2.40E-07	0.39247	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	IE-T2	+		
60	148	10	2.30E-07	0.39944	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
61					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
62					QS-SBO	*	REC-XHE-FO-DGHWB	+						
63	149	10	2.30E-07	0.40640	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
64					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
65					QS-SBO	*	REC-XHE-FO-DGHWB	+						
66	24	3	2.29E-07	0.41334	BETA-2MOV	*	IE-A	*	LPR-MOV-FT-1862A	+				
67	342	9	2.26E-07	0.42020	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*		
68					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	*	QS-SBO	*		
69					REC-XHE-FO-DGEN	+								
70	7	3	2.25E-07	0.42702	BETA-LPI	*	IE-A	*	LPI-MDP-FS	+				
71	2639	4	2.23E-07	0.43379	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-XHE-FO-PORVS	+		
72	2766	7	2.21E-07	0.44049	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	PORV-NOT-BLK	*		
73					RCS-XHE-FO-DPRT7	*	REC-XHE-FO-DPRES	*	SGTR-SGADV-ODMD	+				
74	8	2	2.20E-07	0.44716	IE-A	*	LPI-MOV-PG-1890C	+						
75	1915	10	2.19E-07	0.45379	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*		
76					NRAC-258M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*		
77					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+						
78	150	10	2.14E-07	0.46027	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*		
79					NOTQ	*	NOTW2	*	NRAC-7HR	*	OEP-DGN-FS	*		
80					QS-SBO	*	REC-XHE-FO-DGHWB	+						
81	2576	4	2.02E-07	0.46639	HPI-MOV-FT-1350	*	IE-T	*	K	*	R	+		
82	151	10	1.85E-07	0.47199	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
83					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*		
84					/QS-SBO	*	REC-XHE-FO-DGHWB	+						
85	742	12	1.77E-07	0.47735	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
86					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
87					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
88	741	12	1.77E-07	0.48270	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
89					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
90					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
91	152	10	1.69E-07	0.48783	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
92					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*		
93					/QS-SBO	*	REC-XHE-FO-DGHWB	+						
94	155	10	1.69E-07	0.49297	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
95					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*		
96					/QS-SBO	*	REC-XHE-FO-DGHWB	+						
97	154	10	1.69E-07	0.49810	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
98					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*		
99					/QS-SBO	*	REC-XHE-FO-DGHWB	+						
100	153	10	1.69E-07	0.50324	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
101					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*		
102					/QS-SBO	*	REC-XHE-FO-DGHWB	+						

103	743	12	1.64E-07	0.50822	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
104					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS	*
105					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
106	300	10	1.61E-07	0.51311	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
107					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS	*
108					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
109	51	4	1.61E-07	0.51800	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALT	*	IE-S1	+
110	107	4	1.61E-07	0.52288	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALT	*	IE-S2	+
111	121	4	1.51E-07	0.52746	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-UN2S3	*	IE-S3	+
112	22	2	1.50E-07	0.53200	IE-A	*	RMT-CCF-FA-MSCAL	+				
113	2640	4	1.49E-07	0.53652	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-XHE-FO-PORVS	+
114	617	10	1.40E-07	0.54075	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
115					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*
116					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
117	619	10	1.40E-07	0.54498	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
118					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
119					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
120	620	10	1.40E-07	0.54921	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
121					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
122					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
123	618	10	1.40E-07	0.55344	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
124					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
125					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
126	345	9	1.33E-07	0.55747	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
127					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
128					REC-XHE-FO-DGEN	+						
129	344	9	1.33E-07	0.56149	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
130					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*
131					REC-XHE-FO-DGEN	+						
132	346	9	1.33E-07	0.56552	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
133					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
134					REC-XHE-FO-DGEN	+						
135	343	9	1.33E-07	0.56955	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
136					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
137					REC-XHE-FO-DGEN	+						
138	25	3	1.32E-07	0.57355	BETA-2MOV	*	IE-A	*	LPR-MOV-FT-1890A	+		
139	23	3	1.32E-07	0.57755	BETA-2MOV	*	IE-A	*	LPR-MOV-FT-1860A	+		
140	622	10	1.30E-07	0.58148	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
141					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
142					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
143	621	10	1.30E-07	0.58542	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
144					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*	/QS-SBO	*
145					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
146	158	10	1.25E-07	0.58921	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
147					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
148					QS-SBO	*	REC-XHE-FO-DGHWB	+				
149	157	10	1.25E-07	0.59301	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
150					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
151					QS-SBO	*	REC-XHE-FO-DGHWB	+				
152	156	10	1.25E-07	0.59681	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
153					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
154					QS-SBO	*	REC-XHE-FO-DGHWB	+				
155	159	10	1.25E-07	0.60061	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
156					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
157					QS-SBO	*	REC-XHE-FO-DGHWB	+				
158	710	9	1.15E-07	0.60410	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*

159					OEP-DGN-FS	*	PPS-SOV-OO-1456	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
160					SBO-PORV-DMD	+							
161	709	9	1.15E-07	0.60759	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*
162					OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
163					SBO-PORV-DMD	+							
164	160	9	1.14E-07	0.61105	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
165					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
166					QS-SBO	+							
167	2745	3	1.02E-07	0.61414	IE-T7	*	K	*	R	+		
168	52	2	1.00E-07	0.61717	HPI-CKV-FT-CV25	*	IE-S1	+				
169	108	2	1.00E-07	0.62020	HPI-CKV-FT-CV225	*	IE-S2	+				
170	54	2	1.00E-07	0.62323	HPI-CKV-FT-CV410	*	IE-S1	+				
171	53	2	1.00E-07	0.62627	HPI-CKV-FT-CV225	*	IE-S1	+				
172	746	12	9.63E-08	0.62919	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
173					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
174					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
175	745	12	9.63E-08	0.63211	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
176					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
177					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
178	747	12	9.63E-08	0.63503	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
179					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
180					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
181	744	12	9.63E-08	0.63795	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
182					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
183					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
184	162	10	9.24E-08	0.64075	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
185					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
186					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
187	161	10	9.24E-08	0.64355	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
188					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
189					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
190	1916	9	8.51E-08	0.64613	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
191					NRAC-258M	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-467-150	*
192					REC-XHE-FO-DGHWS	+						
193	749	12	8.48E-08	0.64870	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
194					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*
195					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
196	748	12	8.48E-08	0.65127	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
197					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*
198					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
199	165	10	8.47E-08	0.65384	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
200					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
201					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
202	163	10	8.47E-08	0.65641	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
203					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
204					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
205	164	10	8.47E-08	0.65897	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
206					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
207					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
208	109	4	8.18E-08	0.66146	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-UN2S2	*	IE-S2	+
209	347	8	8.05E-08	0.66390	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
210					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+
211	750	12	7.88E-08	0.66629	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*
212					NOTL-SBOU1	*	NOTQ	*	NRAC-216M	*	/O	*
213					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
214	2733	5	7.81E-08	0.66865	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALTS3	*	IE-T7	*

215					RCS-XHE-FO-DPT7D +				
216	167	10	7.70E-08	0.67099	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	
217					NOTW2 *	NRAC-7HR *	OEP-DGN-FR-6HDG1 *	OEP-DGN-MA-DG03 *	
218					/QS-SBO *	REC-XHE-FO-DGTMB +			
219	168	9	7.70E-08	0.67332	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	
220					NOTW2 *	NRAC-7HR *	OEP-CRB-FT-15H3 *	OEP-DGN-FR-6HDG3 *	
221					/QS-SBO +				
222	166	10	7.70E-08	0.67566	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	
223					NOTW2 *	NRAC-7HR *	OEP-DGN-FR-6HDG3 *	OEP-DGN-MA-DG01 *	
224					/QS-SBO *	REC-XHE-FO-DGTMB +			
225	169	9	7.70E-08	0.67799	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	
226					NOTW2 *	NRAC-7HR *	OEP-CRB-FT-15J3 *	OEP-DGN-FR-6HDG1 *	
227					/QS-SBO +				
228	348	9	7.24E-08	0.68019	AFW-XHE-FO-CST2 *	/DGN-FTO *	IE-T1 *	NOTQ *	
229					NRAC-1HR *	OEP-DGN-FR-6HDG1 *	OEP-DGN-FR-6HDG2 *	QS-SBO *	
230					REC-XHE-FO-DGEN +				
231	751	11	6.87E-08	0.68227	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	
232					NRAC-216M *	OEP-DGN-FS-DG01 *	OEP-DGN-FS-DG02 *	QS-SBO *	
233					RCP-LOCA-750-90M *	REC-XHE-FO-DGHWS *	REC-XHE-FO-SCOOL +		
234	752	11	6.87E-08	0.68435	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	
235					NRAC-216M *	OEP-DGN-FS-DG01 *	OEP-DGN-FS-DG03 *	QS-SBO *	
236					RCP-LOCA-750-90M *	REC-XHE-FO-DGHWS *	REC-XHE-FO-SCOOL +		
237	170	10	6.83E-08	0.68642	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	
238					NOTW2 *	NRAC-7HR *	OEP-DGN-FR-6HDG1 *	OEP-DGN-FR-6HDG2 *	
239					QS-SBO *	REC-XHE-FO-DGHWB +			
240	2577	4	6.73E-08	0.68846	IE-T *	K *	PPS-XHE-FO-EMBOR *	R +	
241	351	9	6.64E-08	0.69048	AFW-XHE-FO-CST2 *	/DGN-FTO *	IE-T1 *	NOTQ *	
242					NRAC-1HR *	OEP-DGN-FS-DG01 *	OEP-DGN-MA-DG03 *	QS-SBO *	
243					REC-XHE-FO-DGEN +				
244	350	9	6.64E-08	0.69249	AFW-XHE-FO-CST2 *	/DGN-FTO *	IE-T1 *	NOTQ *	
245					NRAC-1HR *	OEP-DGN-FS-DG02 *	OEP-DGN-MA-DG01 *	QS-SBO *	
246					REC-XHE-FO-DGEN +				
247	352	9	6.64E-08	0.69450	AFW-XHE-FO-CST2 *	/DGN-FTO *	IE-T1 *	NOTQ *	
248					NRAC-1HR *	OEP-DGN-FS-DG03 *	OEP-DGN-MA-DG01 *	QS-SBO *	
249					REC-XHE-FO-DGEN +				
250	349	9	6.64E-08	0.69652	AFW-XHE-FO-CST2 *	/DGN-FTO *	IE-T1 *	NOTQ *	
251					NRAC-1HR *	OEP-DGN-FS-DG01 *	OEP-DGN-MA-DG02 *	QS-SBO *	
252					REC-XHE-FO-DGEN +				
253	753	11	6.57E-08	0.69851	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	
254					NRAC-216M *	/O *	OEP-DGN-FR-6HDG1 *	OEP-DGN-FR-6HDG3 *	
255					/QS-SBO *	RCP-LOCA-750-90M *	REC-XHE-FO-SCOOL +		
256	1807	10	6.53E-08	0.70049	BETA-3DG *	IE-T1 *	NOTL-SBOU1U2 *	NOTQ *	
257					NRAC-201M *	O *	OEP-DGN-FS *	/QS-SBO *	
258					RCP-LOCA-750-90M *	REC-XHE-FO-DGHWS +			
259	754	11	6.39E-08	0.70243	BETA-2DG *	IE-T1 *	NOTDG-CCF *	NOTL-SBOU1 *	
260					NOTQ *	NRAC-216M *	OEP-DGN-FS *	QS-SBO *	
261					RCP-LOCA-750-90M *	REC-XHE-FO-DGHWS *	REC-XHE-FO-SCOOL +		
262	2641	6	6.30E-08	0.70434	AFW-MDP-FS *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *	BETA-AFW *	
263					IE-T2 *	PPS-XHE-FO-PORVS +			
264	301	9	6.28E-08	0.70624	BETA-3DG *	IE-T1 *	NOTL-SBOU1U2 *	NOTQ *	
265					NRAC-7HR *	NSLOCA *	OEP-DGN-FS *	QS-SBO *	
266					REC-XHE-FO-DGHWB +				
267	174	10	6.26E-08	0.70814	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	
268					NOTW2 *	NRAC-7HR *	OEP-DGN-FS-DG03 *	OEP-DGN-MA-DG01 *	
269					QS-SBO *	REC-XHE-FO-DGHWB +			
	171	10	6.26E-08	0.71004	/DGN-FTO *	IE-T1 *	NOTL-SBOU1 *	NOTQ *	

271					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
272					QS-SBO	*	REC-XHE-FO-DGHWB	+				
273	173	10	6.26E-08	0.71194	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
274					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*
275					QS-SBO	*	REC-XHE-FO-DGHWB	+				
276	172	10	6.26E-08	0.71384	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
277					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
278					QS-SBO	*	REC-XHE-FO-DGHWB	+				
279	2642	5	6.09E-08	0.71568	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1535	*
280					PPS-MOV-FT-1535	+						
281	2643	5	6.09E-08	0.71753	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1536	*
282					PPS-MOV-FT-1536	+						
283	123	3	5.72E-08	0.71927	HPI-CKV-FT-CV25	*	HPI-XHE-FO-UN2S3	*	IE-S3	+		
284	122	3	5.72E-08	0.72100	HPI-CKV-FT-CV410	*	HPI-XHE-FO-UN2S3	*	IE-S3	+		
285	353	9	5.62E-08	0.72270	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
286					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
287					REC-XHE-FO-DGEN	+						
288	354	9	5.62E-08	0.72441	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
289					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
290					REC-XHE-FO-DGEN	+						
291	2746	3	5.40E-08	0.72604	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T7	+		
292	755	12	5.26E-08	0.72764	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
293					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
294					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
295	355	9	5.22E-08	0.72922	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
296					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*
297					REC-XHE-FO-DGEN	+						
298	623	10	5.16E-08	0.73079	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
299					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*
300					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
301	625	10	5.16E-08	0.73235	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
302					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*
303					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
304	626	10	5.16E-08	0.73391	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
305					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*
306					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
307	624	10	5.16E-08	0.73548	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
308					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*
309					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
310	357	9	5.11E-08	0.73703	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
311					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
312					REC-XHE-FO-DGEN	+						
313	356	9	5.11E-08	0.73858	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
314					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
315					REC-XHE-FO-DGEN	+						
316	6	2	5.00E-08	0.74009	ACC-CKV-FT-CV130	*	IE-A	+				
317	4	2	5.00E-08	0.74161	ACC-CKV-FT-CV147	*	IE-A	+				
318	3	2	5.00E-08	0.74312	ACC-CKV-FT-CV128	*	IE-A	+				
319	81	2	5.00E-08	0.74464	IE-S1	*	LPR-CCF-PG-SUMP	+				
320	5	2	5.00E-08	0.74616	ACC-CKV-FT-CV145	*	IE-A	+				
321	374	9	4.95E-08	0.74766	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
322					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
323					REC-XHE-FO-DGEN	+						
324	375	9	4.95E-08	0.74916	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
325					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
326					REC-XHE-FO-DGEN	+						

327	758	12	4.82E-08	0.75062	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
328					NRAC-216M	*	/O	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	
329					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
330	759	12	4.82E-08	0.75208	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
331					NRAC-216M	*	/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	
332					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
333	756	12	4.82E-08	0.75354	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
334					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	
335					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
336	757	12	4.82E-08	0.75500	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
337					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	
338					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
339	628	10	4.80E-08	0.75646	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
340					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*	QS-SBO	*	
341					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
342	627	10	4.80E-08	0.75791	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
343					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
344					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
345	362	9	4.75E-08	0.75935	AFW-TDP-MA-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	
346					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*	
347					REC-XHE-FO-DGEN	+							
348	2734	5	4.65E-08	0.76076	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-UN2S3	*	IE-T7	*	
349					RCS-XHE-FO-DPT7D	+							
350	763	12	4.62E-08	0.76216	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
351					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	
352					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
353	762	12	4.62E-08	0.76357	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
354					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	
355					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
356	761	12	4.62E-08	0.76497	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
357					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	
358					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
359	760	12	4.62E-08	0.76637	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
360					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*	
361					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
362	175	10	4.62E-08	0.76777	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
363					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	
364					/QS-SBO	*	REC-XHE-FO-DGHWB	+					
365	376	9	4.61E-08	0.76917	AFW-TDP-FR-2P6HR	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	
366					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	QS-SBO	*	
367					REC-XHE-FO-DGEN	+							
368	711	9	4.26E-08	0.77046	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	
369					OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	QS-SBO	*	REC-XHE-FO-DGEN	*	
370					SBO-PORV-DMD	+							
371	712	9	4.26E-08	0.77175	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	
372					OEP-DGN-FS	*	PPS-SOV-OO-1456	*	QS-SBO	*	REC-XHE-FO-DGEN	*	
373					SBO-PORV-DMD	+							
374	2644	5	4.06E-08	0.77298	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1536	*	
375					PPS-MOV-FT-1536	+							
376	2645	5	4.06E-08	0.77421	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1535	*	
377					PPS-MOV-FT-1535	+							
378	82	2	4.00E-08	0.77543	IE-S1	*	LPR-XHE-FO-HOTLG	+					
379	55	2	4.00E-08	0.77664	HPI-XVM-PG-XV24	*	IE-S1	+					
380	631	10	3.81E-08	0.77779	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
381					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
382					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					

383	636	10	3.81E-08	0.77895	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
384					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
385					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
386	633	10	3.81E-08	0.78010	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
387					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
388					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
389	634	10	3.81E-08	0.78125	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
390					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
391					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
392	632	10	3.81E-08	0.78241	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
393					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
394					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
395	635	10	3.81E-08	0.78356	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
396					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
397					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
398	629	10	3.81E-08	0.78471	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
399					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
400					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
401	630	10	3.81E-08	0.78587	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
402					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
403					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
404	766	11	3.75E-08	0.78700	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
405					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*		
406					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
407	767	11	3.75E-08	0.78814	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
408					NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*		
409					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
410	765	11	3.75E-08	0.78928	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
411					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
412					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
413	764	11	3.75E-08	0.79041	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
414					NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*		
415					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
416	361	9	3.62E-08	0.79151	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
417					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*		
418					REC-XHE-FO-DGEN	+								
419	358	9	3.62E-08	0.79261	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
420					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
421					REC-XHE-FO-DGEN	+								
422	359	9	3.62E-08	0.79371	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
423					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*		
424					REC-XHE-FO-DGEN	+								
425	360	9	3.62E-08	0.79481	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
426					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
427					REC-XHE-FO-DGEN	+								
428	2747	3	3.60E-08	0.79590	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T7	+				
429	124	2	3.51E-08	0.79696	IE-S3	*	RWT-TNK-LF-RWST	+						
430	177	10	3.42E-08	0.79800	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
431					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*		
432					QS-SBO	*	REC-XHE-FO-DGHWB	+						
433	176	10	3.42E-08	0.79903	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
434					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*		
435					QS-SBO	*	REC-XHE-FO-DGHWB	+						
436	2683	4	3.40E-08	0.80006	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
437	2708	4	3.40E-08	0.80110	AFW-MDP-FS-FW3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
438	365	9	3.32E-08	0.80210	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		

439					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*
440					REC-XHE-FO-DGEN	+						
441	363	9	3.32E-08	0.80311	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
442					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*
443					REC-XHE-FO-DGEN	+						
444	364	9	3.32E-08	0.80412	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
445					NRAC-1HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
446					REC-XHE-FO-DGEN	+						
447	894	12	3.31E-08	0.80512	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
448					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
449					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
450	893	12	3.31E-08	0.80612	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
451					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
452					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
453	768	11	3.30E-08	0.80712	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
454					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
455					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
456	769	11	3.30E-08	0.80812	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
457					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
458					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
459	770	11	3.15E-08	0.80908	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
460					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*
461					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	RCP-LOCA-750-90M	+		
462	1808	11	3.14E-08	0.81003	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
463					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*
464					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
465	179	10	3.13E-08	0.81098	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
466					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
467					QS-SBO	*	REC-XHE-FO-DGHWB	+				
468	178	10	3.13E-08	0.81193	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
469					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
470					QS-SBO	*	REC-XHE-FO-DGHWB	+				
471	180	10	3.13E-08	0.81288	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
472					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
473					QS-SBO	*	REC-XHE-FO-DGHWB	+				
474	110	3	3.10E-08	0.81382	HPI-CKV-FT-CV410	*	HPI-XHE-FO-UN2S2	*	IE-S2	+		
475	111	3	3.10E-08	0.81478	HPI-CKV-FT-CV25	*	HPI-XHE-FO-UN2S2	*	IE-S2	+		
476	895	12	3.08E-08	0.81569	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
477					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS	*
478					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
479	771	11	3.07E-08	0.81662	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*
480					NOTL-SBOU1	*	NOTQ	*	NRAC-216M	*	OEP-DGN-FS	*
481					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
482	366	9	3.06E-08	0.81755	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
483					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
484					REC-XHE-FO-DGEN	+						
485	368	9	3.06E-08	0.81848	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
486					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
487					REC-XHE-FO-DGEN	+						
488	367	9	3.06E-08	0.81941	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
489					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
490					REC-XHE-FO-DGEN	+						
491	181	10	2.85E-08	0.82027	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
492					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*
493					QS-SBO	*	REC-XHE-FO-DGTMB	+				
494	184	9	2.85E-08	0.82114	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*

495					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*
496					QS-SBO	+							
497	183	9	2.85E-08	0.82200	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
498					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*
499					QS-SBO	+							
500	182	10	2.85E-08	0.82286	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
501					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*
502					QS-SBO	*	REC-XHE-FO-DGTMB	+				
503	372	9	2.79E-08	0.82371	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
504					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
505					REC-XHE-FO-DGEN	+						
506	371	9	2.79E-08	0.82455	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
507					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*
508					REC-XHE-FO-DGEN	+						
509	370	9	2.79E-08	0.82540	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
510					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
511					REC-XHE-FO-DGEN	+						
512	369	9	2.79E-08	0.82624	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
513					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
514					REC-XHE-FO-DGEN	+						
515	83	3	2.70E-08	0.82706	IE-S1	*	LPR-MOV-FT-1862A	*	LPR-MOV-FT-1862B	+		
516	392	9	2.70E-08	0.82788	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
517					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
518					REC-XHE-FO-DGEN	+						
519	391	9	2.70E-08	0.82870	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
520					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
521					REC-XHE-FO-DGEN	+						
522	390	9	2.70E-08	0.82952	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
523					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*
524					REC-XHE-FO-DGEN	+						
525	389	9	2.70E-08	0.83034	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
526					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
527					REC-XHE-FO-DGEN	+						
528	2709	3	2.70E-08	0.83116	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
529	2684	3	2.70E-08	0.83198	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
530	2620	5	2.64E-08	0.83278	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*
531					IE-T2	+						
532	773	12	2.63E-08	0.83357	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
533					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
534					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
535	772	12	2.63E-08	0.83437	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
536					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
537					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
538	2755	8	2.61E-08	0.83516	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-OO-1536	*
539					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
540	2754	8	2.61E-08	0.83595	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-OO-1535	*
541					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
542	774	10	2.55E-08	0.83673	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
543					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	*
544					RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+				
545	2621	6	2.54E-08	0.83750	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
546					HPI-XHE-FO-FDBLD	*	IE-T2	+				
547	775	12	2.52E-08	0.83826	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
548					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*
549					OEP-DGN-FR-6HDG2	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
550	26	2	2.50E-08	0.83902	IE-A	*	LPR-CCF-PG-SUMP	+				

551	186	12	2.45E-08	0.83976	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*	
552					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+	
553													
554	185	12	2.45E-08	0.84050	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*	
555					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+	
556													
557	776	12	2.41E-08	0.84123	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	
558					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
559													
560	778	12	2.41E-08	0.84196	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	
561					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
562													
563	777	12	2.41E-08	0.84269	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
					NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	
564					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
565													
566	56	3	2.37E-08	0.84341	BETA-STR	*	CPC-STR-PG-3HR	*	IE-S1	+			
567	780	12	2.31E-08	0.84411	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	
568					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
569													
570	782	12	2.31E-08	0.84481	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG02	*	
571					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
572													
573	781	12	2.31E-08	0.84552	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG03	*	
574					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
575													
576	779	12	2.31E-08	0.84622	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	
577					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
578													
579	187	10	2.31E-08	0.84692	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	
580					/QS-SBO	*	REC-XHE-FO-DGHWB	+					
581													
582	784	12	2.30E-08	0.84761	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	
583					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+	
584													
585	783	12	2.30E-08	0.84831	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	
586					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+	
587													
588	125	3	2.29E-08	0.84900	HPI-XHE-FO-UN2S3	*	HPI-XVM-PG-XV24	*	IE-S3	+			
589	188	12	2.27E-08	0.84969	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*	
590					OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+	
591													
592	2756	8	2.22E-08	0.85037	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-OO-1535	*	
					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+	
593													
594	2757	8	2.22E-08	0.85104	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-OO-1536	*	
					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+	
595													
596	2578	7	2.13E-08	0.85169	BETA-2MOV	*	IE-T	*	K	*	PPS-MOV-FC-1535	*	
					PPS-MOV-FC-1536	*	PPS-MOV-FT	*	R	+			
597													
598	302	9	2.09E-08	0.85232	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
					NSLOCA	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
599					REC-XHE-FO-DGHWB	+							
600													
601	126	3	2.08E-08	0.85295	HPI-CKV-OO-CV258	*	HPI-MDP-FR-1A24H	*	IE-S3	+			
602	785	11	2.04E-08	0.85357	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*	
603					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
604													
605	27	2	2.00E-08	0.85418	IE-A	*	LPR-XHE-FO-HOTLG	+					
606	191	9	1.92E-08	0.85476	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	

607					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-CRB-FT-15J3	*
608					/QS-SBO	+							
609	190	10	1.92E-08	0.85534	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
610					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*
611					/QS-SBO	*	REC-XHE-FO-DGTMB	+				
612	189	10	1.92E-08	0.85593	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
613					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*
614					/QS-SBO	*	REC-XHE-FO-DGTMB	+				
615	639	10	1.90E-08	0.85650	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
616					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
617					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
618	641	10	1.90E-08	0.85708	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
619					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*
620					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
621	640	10	1.90E-08	0.85766	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
622					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
623					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
624	637	10	1.90E-08	0.85823	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
625					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
626					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
627	642	10	1.90E-08	0.85881	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
628					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
629					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
630	638	10	1.90E-08	0.85939	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
631					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*
632					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
633	788	11	1.87E-08	0.85996	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
634					NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*
635					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
636	786	11	1.87E-08	0.86052	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
637					NRAC-216M	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*
638					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
639	787	11	1.87E-08	0.86109	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
640					NRAC-216M	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*
641					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
642	789	11	1.87E-08	0.86166	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
643					NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*
644					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
645	377	8	1.86E-08	0.86222	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
646					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+
647	2590	4	1.83E-08	0.86278	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-XHE-FO-PORVS	+
648	373	9	1.81E-08	0.86333	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
649					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
650					REC-XHE-FO-DGEN	+						
651	896	12	1.81E-08	0.86388	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
652					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
653					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
654	899	12	1.81E-08	0.86442	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
655					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
656					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
657	897	12	1.81E-08	0.86497	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
658					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
659					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
660	898	12	1.81E-08	0.86552	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
661					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
662					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+

663	2710	3	1.80E-08	0.86606	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+				
664	2685	3	1.80E-08	0.86661	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+				
665	793	11	1.80E-08	0.86716	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
666					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*		
667					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
668	791	11	1.80E-08	0.86770	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
669					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*		
670					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
671	790	11	1.80E-08	0.86825	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
672					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*		
673					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
674	792	11	1.80E-08	0.86879	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
675					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*		
676					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
677	2736	4	1.76E-08	0.86933	HPI-CKV-FT-CV25	*	HPI-XHE-FO-UN2S3	*	IE-T7	*	RCS-XHE-FO-DPT7D	+		
678	2735	4	1.76E-08	0.86986	HPI-CKV-FT-CV410	*	HPI-XHE-FO-UN2S3	*	IE-T7	*	RCS-XHE-FO-DPT7D	+		
679	2646	7	1.72E-08	0.87038	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*		
680					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+				
681	2647	7	1.72E-08	0.87090	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*		
682					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+				
683	1809	11	1.71E-08	0.87142	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
684					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*		
685					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
686	1810	11	1.71E-08	0.87194	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
687					/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
688					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
689	1811	11	1.71E-08	0.87246	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
690					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
691					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
692	192	10	1.71E-08	0.87298	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
693					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*		
694					QS-SBO	*	REC-XHE-FO-DGHWB	+						
695	378	8	1.69E-08	0.87349	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
696					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+		
697	379	9	1.67E-08	0.87399	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
698					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*		
699					REC-XHE-FO-DGEN	+								
700	794	11	1.64E-08	0.87449	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
701					NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*		
702					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+				
703	795	11	1.64E-08	0.87499	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
704					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*		
705					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+				
706	2648	5	1.64E-08	0.87549	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T2	*		
707					PPS-XHE-FO-PORVS	+								
708	404	8	1.64E-08	0.87598	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
709					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+		
710	901	12	1.59E-08	0.87647	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
711					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*		
712					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
713	900	12	1.59E-08	0.87695	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
714					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*		
715					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
716	84	3	1.56E-08	0.87742	IE-S1	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1862B	+				
717	85	3	1.56E-08	0.87789	IE-S1	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1862A	+				
718	86	3	1.56E-08	0.87837	IE-S1	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1862B	+				

719	87	3	1.56E-08	0.87884	IE-S1	*	LPR-MOV-FT-1860B	*	LPR-MOV-FT-1862A	+			
720	1814	12	1.54E-08	0.87931	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
721					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	
722					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
723	1813	12	1.54E-08	0.87977	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
724					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*	
725					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
726	1812	12	1.54E-08	0.88024	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
727					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	
728					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
729	382	9	1.53E-08	0.88070	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
730					NRAC-HALFHR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
731					REC-XHE-FO-DGEN	+							
732	381	9	1.53E-08	0.88117	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
733					NRAC-HALFHR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
734					REC-XHE-FO-DGEN	+							
735	380	9	1.53E-08	0.88163	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
736					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*	
737					REC-XHE-FO-DGEN	+							
738	383	9	1.53E-08	0.88210	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
739					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*	
740					REC-XHE-FO-DGEN	+							
741	384	9	1.52E-08	0.88256	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
742					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*	
743					REC-XHE-FO-DGEN	+							
744	2622	5	1.51E-08	0.88302	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	
745					IE-T2	+							
746	2623	5	1.51E-08	0.88347	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	
747					IE-T2	+							
748	902	12	1.48E-08	0.88392	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*	
749					NOTL-SBOU1	*	NOTQ	*	NRAC-258M	*	/O	*	
750					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+	
751	409	9	1.47E-08	0.88437	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
752					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*	
753					REC-XHE-FO-DGEN	+							
754	2770	6	1.47E-08	0.88481	IAS-CCF-LF-INAIR	*	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	
755					PORV-NOT-BLK	*	SGTR-SGADV-ODMD	+					
756	2245	10	1.44E-08	0.88525	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	
757					NRAC-150M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*	
758					RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	+					
759	646	10	1.41E-08	0.88568	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
760					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*	
761					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
762	647	10	1.41E-08	0.88610	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
763					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
764					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
765	645	10	1.41E-08	0.88653	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
766					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*	
767					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
768	648	10	1.41E-08	0.88696	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
769					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*	
770					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
771	650	10	1.41E-08	0.88738	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
772					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
773					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
774	649	10	1.41E-08	0.88781	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	

775					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*
776					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
777	643	10	1.41E-08	0.88824	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
778					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*
779					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
780	644	10	1.41E-08	0.88866	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
781					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*
782					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
783	388	9	1.39E-08	0.88909	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
784					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*
785					REC-XHE-FO-DGEN	+						
786	386	9	1.39E-08	0.88951	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
787					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*
788					REC-XHE-FO-DGEN	+						
789	385	9	1.39E-08	0.88993	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
790					NRAC-HALFHR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*
791					REC-XHE-FO-DGEN	+						
792	387	9	1.39E-08	0.89035	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
793					NRAC-HALFHR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*
794					REC-XHE-FO-DGEN	+						
795	28	3	1.35E-08	0.89076	IE-A	*	LPR-MOV-FT-1862A	*	LPR-MOV-FT-1862B	+		
796	418	9	1.35E-08	0.89117	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
797					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*
798					REC-XHE-FO-DGEN	+						
799	417	9	1.35E-08	0.89158	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
800					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*
801					REC-XHE-FO-DGEN	+						
802	419	9	1.35E-08	0.89199	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
803					NRAC-6HR-AVG	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*
804					REC-XHE-FO-DGEN	+						
805	420	9	1.35E-08	0.89240	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
806					NRAC-6HR-AVG	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*
807					REC-XHE-FO-DGEN	+						
808	195	12	1.33E-08	0.89281	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
809					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG3	*
810					OEP-DGN-FS-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
811	193	12	1.33E-08	0.89321	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
812					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*
813					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
814	196	12	1.33E-08	0.89362	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
815					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*
816					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
817	194	12	1.33E-08	0.89402	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
818					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG2	*
819					OEP-DGN-FS-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
820	796	12	1.31E-08	0.89442	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
821					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*
822					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
823	903	11	1.29E-08	0.89481	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
824					NRAC-256M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
825					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
826	904	11	1.29E-08	0.89520	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
827					NRAC-256M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
828					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
829	2135	10	1.28E-08	0.89559	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
830					NRAC-7HR	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*

831					RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	+						
832	2025	10	1.28E-08	0.89598	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*		
833					NRAC-7HR	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*		
834					RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	+						
835	658	10	1.27E-08	0.89636	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
836					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
837					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
838	654	10	1.27E-08	0.89675	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
839					OEP-DGN-FR-DG03	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
840					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
841	657	10	1.27E-08	0.89713	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
842					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
843					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
844	656	10	1.27E-08	0.89752	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
845					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
846					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
847	651	10	1.27E-08	0.89790	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
848					OEP-DGN-FR-DG02	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
849					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
850	655	10	1.27E-08	0.89829	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
851					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
852					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
853	652	10	1.27E-08	0.89867	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
854					OEP-DGN-FR-DG02	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
855					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
856	653	10	1.27E-08	0.89905	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
857					OEP-DGN-FR-DG03	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
858					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
859	797	12	1.26E-08	0.89944	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
860					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*		
861					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
862	798	12	1.26E-08	0.89982	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
863					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*		
864					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
865	2686	4	1.25E-08	0.90020	AFW-MDP-FS-FW3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
866	2711	4	1.25E-08	0.90058	AFW-MDP-FS-FW3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
867	393	10	1.25E-08	0.90095	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
868					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
869					/QS-SBO	*	REC-XHE-FO-DGEN	+						
870	394	10	1.25E-08	0.90133	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
871					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
872					/QS-SBO	*	REC-XHE-FO-DGEN	+						
873	112	3	1.24E-08	0.90171	HPI-XHE-FO-UN2S2	*	HPI-XVM-PG-XV24	*	IE-S2	+				
874	905	11	1.23E-08	0.90208	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
875					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*		
876					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-SCOOL	+				
877	799	10	1.23E-08	0.90245	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
878					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*		
879					QS-SBO	*	RCP-LOCA-750-90M	+						
880	1815	10	1.22E-08	0.90282	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
881					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
882					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+						
883	2591	4	1.22E-08	0.90319	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-XHE-FO-PORVS	+		
884	2767	6	1.22E-08	0.90356	IAS-CCF-LF-INAIR	*	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*		
885					REC-XHE-FO-GAGRV	*	SGTR-SGSRV-ODMD1	+						
886	197	11	1.21E-08	0.90393	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		

887					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*		
888					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	REC-XHE-FO-SCOOL	+				
889	1917	10	1.20E-08	0.90429	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*		
890					NRAC-246M	*	O	*	OEP-DGN-FS	*	/QS-SBO	*		
891					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+						
892	906	11	1.20E-08	0.90466	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*		
893					NOTQ	*	NRAC-258M	*	OEP-DGN-FS	*	QS-SBO	*		
894					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
895	198	12	1.17E-08	0.90501	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
896					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*		
897					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
898	199	12	1.17E-08	0.90537	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
899					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*		
900					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
901	396	10	1.16E-08	0.90572	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*		
902					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*		
903					/QS-SBO	*	REC-XHE-FO-DGEN	+						
904	801	12	1.16E-08	0.90607	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
905					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*		
906					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
907	800	12	1.16E-08	0.90642	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
908					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*		
909					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
910	802	12	1.16E-08	0.90677	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
911					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*		
912					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
913	2712	4	1.13E-08	0.90711	AFW-MDP-FS-FW3A	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
914	2687	4	1.13E-08	0.90746	AFW-MDP-FS-FW3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
915	397	10	1.13E-08	0.90780	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
916					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
917					/QS-SBO	*	REC-XHE-FO-DGEN	+						
918	398	10	1.13E-08	0.90814	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
919					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
920					/QS-SBO	*	REC-XHE-FO-DGEN	+						
921	2355	10	1.12E-08	0.90848	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*		
922					NRAC-7HR	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*		
923					RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	+						
924	803	12	1.10E-08	0.90882	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
925					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*		
926					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+		
927	804	12	1.10E-08	0.90915	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
928					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*		
929					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+		
930	425	10	1.10E-08	0.90948	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
931					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
932					/QS-SBO	*	REC-XHE-FO-DGEN	+						
933	426	10	1.10E-08	0.90982	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
934					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
935					/QS-SBO	*	REC-XHE-FO-DGEN	+						
936	200	12	1.09E-08	0.91015	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*		
937					NOTL-SBOU1	*	NOTQ	*	NRAC-7HR	*	NSLOCA	*		
938					/O	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
939	2737	3	1.08E-08	0.91048	IE-T7	*	RCS-XHE-FO-DPT7D	*	RWT-TNK-LF-RWST	+				
940	2713	4	1.08E-08	0.91080	AFW-MDP-MA-FW3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
941	2688	4	1.08E-08	0.91113	AFW-MDP-MA-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
	399	10	1.05E-08	0.91145	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*		

943					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*
944					/QS-SBO	*	REC-XHE-FO-DGEN	+				
945	89	3	1.04E-08	0.91177	IE-S1	*	LPI-MDP-MA-S11A	*	LPR-MOV-FT-1862B	+		
946	88	3	1.04E-08	0.91208	IE-S1	*	LPI-MDP-MA-S11B	*	LPR-MOV-FT-1862A	+		
947	2768	6	1.03E-08	0.91239	IAS-CCF-LF-INAIR	*	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*
948					REC-XHE-FO-GAGRV	*	SGTR-SGSRV-ODMD2	+				
949	2738	4	1.02E-08	0.91270	IE-T7	*	RCS-XHE-FO-DPT7D	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+
950	806	11	1.02E-08	0.91301	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
951					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*
952					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
953	805	11	1.02E-08	0.91332	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
954					NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*
955					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
956	430	10	1.02E-08	0.91363	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*
957					NOTDG-CCF	*	NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*
958					/QS-SBO	*	REC-XHE-FO-DGEN	+				
959	808	12	9.89E-09	0.91393	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
960					NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
961					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
962	809	12	9.89E-09	0.91423	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
963					NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
964					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
965	907	12	9.86E-09	0.91453	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
966					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
967					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
968	807	11	9.81E-09	0.91483	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
969					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
970					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
971	202	11	9.51E-09	0.91512	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
972					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
973					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
974	201	11	9.51E-09	0.91541	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
975					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
976					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
977	2759	9	9.47E-09	0.91569	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	PORV-NOT-BLK	*
978					PPS-MOV-OO-1536	*	PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*
979					SGTR-SGADV-ODMD	+						
980	2758	9	9.47E-09	0.91598	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	PORV-NOT-BLK	*
981					PPS-MOV-OO-1535	*	PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*
982					SGTR-SGADV-ODMD	+						
983	811	11	9.37E-09	0.91626	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
984					NRAC-216M	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
985					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
986	810	11	9.37E-09	0.91655	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
987					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*
988					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
989	812	11	9.37E-09	0.91683	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
990					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*
991					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
992	1818	11	9.33E-09	0.91712	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
993					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
994					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
995	1816	11	9.33E-09	0.91740	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
996					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*
997					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
998	1817	11	9.33E-09	0.91768	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*

999					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*
1000					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
1001	2624	6	9.32E-09	0.91798	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
1002					HPI-XHE-FO-FDBLD	*	IE-T2	+				
1003	813	12	9.20E-09	0.91824	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
1004					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS	*
1005					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
1006	395	9	9.05E-09	0.91852	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1007					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	QS-SBO	*
1008					REC-XHE-FO-DGEN	+						
1009	911	12	9.03E-09	0.91879	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1010					NRAC-258M	*	/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
1011					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
1012	909	12	9.03E-09	0.91907	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1013					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*
1014					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
1015	908	12	9.03E-09	0.91934	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1016					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
1017					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
1018	910	12	9.03E-09	0.91961	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1019					NRAC-258M	*	/O	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
1020					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
1021	90	3	9.00E-09	0.91989	IE-S1	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1860A	+		
1022	57	3	9.00E-09	0.92016	HPI-MOV-FT-1115C	*	HPI-MOV-FT-1115E	*	IE-S1	+		
1023	92	3	9.00E-09	0.92043	IE-S1	*	LPR-MOV-FT-1890A	*	LPR-MOV-FT-1890B	+		
1024	91	3	9.00E-09	0.92070	IE-S1	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1860B	+		
1025	93	3	9.00E-09	0.92098	IE-S1	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1860B	+		
1026	66	3	9.00E-09	0.92125	IE-S1	*	LPI-MDP-FS-SI1A	*	LPI-MDP-FS-SI1B	+		
1027	58	3	9.00E-09	0.92152	HPI-MOV-FT-1115B	*	HPI-MOV-FT-1115D	*	IE-S1	+		
1028	817	11	8.99E-09	0.92180	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1029					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*
1030					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
1031	815	11	8.99E-09	0.92207	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1032					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
1033					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
1034	816	11	8.99E-09	0.92234	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1035					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
1036					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
1037	814	11	8.99E-09	0.92261	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1038					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
1039					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
1040	818	11	8.94E-09	0.92289	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1041					NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*
1042					RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+		
1043	819	11	8.94E-09	0.92316	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1044					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*
1045					RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+		
1046	203	11	8.84E-09	0.92342	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
1047					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS	*
1048					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
1049	912	12	8.67E-09	0.92369	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1050					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG2	*
1051					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
1052	915	12	8.67E-09	0.92395	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1053					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*
					OEP-DGN-FS-DG	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+

1055	914	12	8.67E-09	0.92421	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1056					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*		
1057					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
1058	913	12	8.67E-09	0.92448	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1059					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG3	*		
1060					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
1061	1821	11	8.56E-09	0.92474	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
1062					/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*		
1063					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1064	1820	11	8.56E-09	0.92499	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
1065					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*		
1066					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1067	1819	11	8.56E-09	0.92525	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
1068					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*		
1069					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1070	204	10	8.54E-09	0.92551	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1071					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*		
1072					QS-SBO	*	REC-XHE-FO-DGHWB	+						
1073	2625	6	8.48E-09	0.92577	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*		
1074					HPI-XHE-FO-FDBLD	*	IE-T2	+						
1075	403	9	8.36E-09	0.92602	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1076					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
1077					REC-XHE-FO-DGEN	+								
1078	400	9	8.36E-09	0.92628	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1079					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*		
1080					REC-XHE-FO-DGEN	+								
1081	402	9	8.36E-09	0.92653	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1082					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
1083					REC-XHE-FO-DGEN	+								
1084	401	9	8.36E-09	0.92678	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1085					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*		
1086					REC-XHE-FO-DGEN	+								
1087	303	10	8.32E-09	0.92704	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*		
1088					NRAC-7HR	*	NSLOCA	*	O	*	OEP-DGN-FS	*		
1089					/QS-SBO	*	REC-XHE-FO-DGHWB	+						
1090	2769	4	8.12E-09	0.92728	IE-T7	*	MSS-CKV-FT-SGDHR	*	MSS-XHE-FO-ISDHR	*	RCS-XHE-FO-DPRT7	+		
1091	821	11	7.88E-09	0.92752	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1092					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*		
1093					OEP-DGN-FR-6HDG1	*	/QS-SBO	*	RCP-LOCA-750-90M	+				
1094	820	11	7.88E-09	0.92776	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1095					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*		
1096					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	RCP-LOCA-750-90M	+				
1097	556	9	7.84E-09	0.92800	AFW-XHE-FO-CST2	*	BETA-2DG	*	BETA-3DG	*	IE-T1	*		
1098					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	*	QS-SBO	*		
1099					REC-XHE-FO-DGEN	+								
1100	30	3	7.80E-09	0.92823	IE-A	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1862A	+				
1101	32	3	7.80E-09	0.92847	IE-A	*	LPR-MOV-FT-1860B	*	LPR-MOV-FT-1862A	+				
1102	29	3	7.80E-09	0.92871	IE-A	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1862B	+				
1103	31	3	7.80E-09	0.92894	IE-A	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1862B	+				
1104	1823	12	7.68E-09	0.92918	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
1105					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS	*		
1106					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
1107	1824	12	7.68E-09	0.92941	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
1108					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS	*		
1109					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
1110	1822	12	7.68E-09	0.92964	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		

1111					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS	*
1112					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
1113	408	9	7.60E-09	0.92987	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1114					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*
1115					REC-XHE-FO-DGEN	+						
1116	407	9	7.60E-09	0.93010	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1117					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*
1118					REC-XHE-FO-DGEN	+						
1119	406	9	7.60E-09	0.93033	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1120					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*
1121					REC-XHE-FO-DGEN	+						
1122	405	9	7.60E-09	0.93056	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1123					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*
1124					REC-XHE-FO-DGEN	+						
1125	127	5	7.58E-09	0.93079	BETA-STR	*	CPC-STR-PG-24H	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S3	*
1126					IE-S3	+						
1127	128	3	7.41E-09	0.93102	HPI-CKV-FT-CV225	*	HPI-XHE-FO-ALTIN	*	IE-S3	+		
1128	437	9	7.37E-09	0.93124	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1129					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*
1130					REC-XHE-FO-DGEN	+						
1131	436	9	7.37E-09	0.93147	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1132					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*
1133					REC-XHE-FO-DGEN	+						
1134	439	9	7.37E-09	0.93169	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1135					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*
1136					REC-XHE-FO-DGEN	+						
1137	438	9	7.37E-09	0.93191	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1138					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*
1139					REC-XHE-FO-DGEN	+						
1140	2465	10	7.34E-09	0.93214	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
1141					NRAC-246M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
1142					RCP-LOCA-561-150	*	REC-XHE-FO-DGHWS	+				
1143	205	12	7.28E-09	0.93236	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1144					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*
1145					OEP-DGN-FR-6HDG2	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
1146	208	9	7.12E-09	0.93257	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1147					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-CRB-FT-15J3	*
1148					QS-SBO	+						
1149	206	10	7.12E-09	0.93279	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1150					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*
1151					QS-SBO	*	REC-XHE-FO-DGTMB	+				
1152	207	10	7.12E-09	0.93300	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1153					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*
1154					QS-SBO	*	REC-XHE-FO-DGTMB	+				
1155	2739	4	7.04E-09	0.93322	HPI-XHE-FO-UN2S3	*	HPI-XVM-PG-XV24	*	IE-T7	*	RCS-XHE-FO-DPT7D	+
1156	661	10	7.04E-09	0.93343	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
1157					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*
1158					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
1159	662	10	7.04E-09	0.93364	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
1160					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*
1161					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
1162	659	10	7.04E-09	0.93386	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
1163					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*
1164					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
1165	660	10	7.04E-09	0.93407	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
1166					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*

1167					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
1168	663	10	7.04E-09	0.93428	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
1169					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*		
1170					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
1171	664	10	7.04E-09	0.93450	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
1172					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*		
1173					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
1174	916	11	7.03E-09	0.93471	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1175					NRAC-258M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*		
1176					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
1177	917	11	7.03E-09	0.93492	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1178					NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
1179					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
1180	919	11	7.03E-09	0.93514	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1181					NRAC-258M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*		
1182					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
1183	918	11	7.03E-09	0.93535	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1184					NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*		
1185					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
1186	411	9	6.97E-09	0.93556	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1187					NRAC-HALFHR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*		
1188					REC-XHE-FO-DGEN	+								
1189	410	9	6.97E-09	0.93577	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1190					NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*		
1191					REC-XHE-FO-DGEN	+								
1192	412	9	6.97E-09	0.93598	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1193					NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
1194					REC-XHE-FO-DGEN	+								
1195	416	10	6.79E-09	0.93619	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
1196					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*		
1197					/QS-SBO	*	REC-XHE-FO-DGEN	+						
1198	414	10	6.79E-09	0.93639	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
1199					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*		
1200					/QS-SBO	*	REC-XHE-FO-DGEN	+						
1201	415	10	6.79E-09	0.93660	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
1202					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*		
1203					/QS-SBO	*	REC-XHE-FO-DGEN	+						
1204	413	10	6.79E-09	0.93681	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
1205					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*		
1206					/QS-SBO	*	REC-XHE-FO-DGEN	+						
1207	447	9	6.76E-09	0.93701	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1208					NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
1209					REC-XHE-FO-DGEN	+								
1210	445	9	6.76E-09	0.93722	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1211					NRAC-6HR-AVG	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*		
1212					REC-XHE-FO-DGEN	+								
1213	446	9	6.76E-09	0.93742	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
1214					NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*		
1215					REC-XHE-FO-DGEN	+								
1216	210	12	6.67E-09	0.93762	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1217					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*		
1218					OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
1219	211	12	6.67E-09	0.93783	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1220					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*		
1221					OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
1222	209	12	6.67E-09	0.93803	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		

1223					NRAC-7HR	NSLOCA	/O	OEP-DGN-FS-DG02
1224					OEP-DGN-MA-DG01	/QS-SBO	REC-XHE-FO-DGHWB	REC-XHE-FO-SCOOL +
1225	212	12	6.67E-09	0.93823	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
1226					NRAC-7HR	NSLOCA	/O	OEP-DGN-FS-DG03
1227					OEP-DGN-MA-DG01	/QS-SBO	REC-XHE-FO-DGHWB	REC-XHE-FO-SCOOL +
1228	1826	10	6.65E-09	0.93843	IE-T1	NOTL-SBOU1U2	NOTQ	NRAC-216M
1229					OEP-DGN-FR-6HDG1	OEP-DGN-FS-DG02	OEP-DGN-FS-DG03	QS-SBO
1230					RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +		
1231	1825	10	6.65E-09	0.93863	IE-T1	NOTL-SBOU1U2	NOTQ	NRAC-216M
1232					OEP-DGN-FR-6HDG3	OEP-DGN-FS-DG01	OEP-DGN-FS-DG02	QS-SBO
1233					RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +		
1234	1827	10	6.65E-09	0.93884	IE-T1	NOTL-SBOU1U2	NOTQ	NRAC-216M
1235					OEP-DGN-FR-6HDG2	OEP-DGN-FS-DG01	OEP-DGN-FS-DG03	QS-SBO
1236					RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +		
1237	822	12	6.57E-09	0.93903	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
1238					NRAC-216M	/O	OEP-CRB-FT-15H3	OEP-DGN-MA-DG02
1239					/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +
1240	215	12	6.40E-09	0.93923	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
1241					NOTQ	NRAC-7HR	NSLOCA	/O
1242					OEP-DGN-FR-6HDG3	OEP-DGN-FS-DG01	/QS-SBO	REC-XHE-FO-DGHWB +
1243	216	12	6.40E-09	0.93942	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
1244					NOTQ	NRAC-7HR	NSLOCA	/O
1245					OEP-DGN-FR-6HDG1	OEP-DGN-FS-DG03	/QS-SBO	REC-XHE-FO-DGHWB +
1246	214	12	6.40E-09	0.93962	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
1247					NOTQ	NRAC-7HR	NSLOCA	/O
1248					OEP-DGN-FR-6HDG1	OEP-DGN-FS-DG02	/QS-SBO	REC-XHE-FO-DGHWB +
1249	213	12	6.40E-09	0.93981	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
1250					NOTQ	NRAC-7HR	NSLOCA	/O
1251					OEP-DGN-FR-6HDG2	OEP-DGN-FS-DG01	/QS-SBO	REC-XHE-FO-DGHWB +
1252	823	10	6.39E-09	0.94000	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
1253					NRAC-216M	OEP-CRB-FT-15H3	OEP-DGN-FR-6HDG3	QS-SBO
1254					RCP-LOCA-750-90M	REC-XHE-FO-SCOOL +		
1255	824	10	6.39E-09	0.94020	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
1256					NRAC-216M	OEP-CRB-FT-15J3	OEP-DGN-FR-6HDG1	QS-SBO
1257					RCP-LOCA-750-90M	REC-XHE-FO-SCOOL +		
1258	1828	10	6.36E-09	0.94039	IE-T1	NOTL-SBOU1U2	NOTQ	NRAC-216M
1259					/O	OEP-DGN-FR-6HDG1	OEP-DGN-FR-6HDG2	OEP-DGN-FR-6HDG3
1260					/QS-SBO	RCP-LOCA-750-90M +		
1261	825	12	6.31E-09	0.94058	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
1262					NOTQ	NRAC-216M	/O	OEP-CRB-FT-15H3
1263					OEP-DGN-FR-6HDG2	/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +
1264	921	11	6.18E-09	0.94077	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
1265					NOTQ	NRAC-258M	OEP-DGN-FS-DG01	OEP-DGN-FS-DG03
1266					QS-SBO	RCP-LOCA-467-150	REC-XHE-FO-DGHWS +	
1267	920	11	6.18E-09	0.94096	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
1268					NOTQ	NRAC-258M	OEP-DGN-FS-DG01	OEP-DGN-FS-DG02
1269					QS-SBO	RCP-LOCA-467-150	REC-XHE-FO-DGHWS +	
1270	421	10	6.18E-09	0.94114	AFW-TDP-MA-FW2	AFW-XHE-FO-U1SBO	/DGN-FTO	IE-T1
1271					NOTQ	NRAC-HALFHR	OEP-DGN-FR-6HDG2	OEP-DGN-FS-DG01
1272					/QS-SBO	REC-XHE-FO-DGEN +		
1273	423	10	6.18E-09	0.94133	AFW-TDP-MA-FW2	AFW-XHE-FO-U1SBO	/DGN-FTO	IE-T1
1274					NOTQ	NRAC-HALFHR	OEP-DGN-FR-6HDG1	OEP-DGN-FS-DG03
1275					/QS-SBO	REC-XHE-FO-DGEN +		
1276	424	10	6.18E-09	0.94152	AFW-TDP-MA-FW2	AFW-XHE-FO-U1SBO	/DGN-FTO	IE-T1
1277					NOTQ	NRAC-HALFHR	OEP-DGN-FR-6HDG3	OEP-DGN-FS-DG01
1278					/QS-SBO	REC-XHE-FO-DGEN +		

1279	422	10	6.18E-09	0.94171	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
1280					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*		
1281					/QS-SBO	*	REC-XHE-FO-DGEN	+						
1282	2579	4	6.06E-09	0.94189	ACP-BAC-ST-1H1-2	*	IE-T	*	K	*	R	+		
1283	2580	4	6.06E-09	0.94207	ACP-BAC-ST-4KV1H	*	IE-T	*	K	*	R	+		
1284	2581	4	6.06E-09	0.94226	ACP-BAC-ST-1H1	*	IE-T	*	K	*	R	+		
1285	94	3	6.00E-09	0.94244	IE-S1	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1860B	+				
1286	95	3	6.00E-09	0.94262	IE-S1	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1860A	+				
1287	68	3	6.00E-09	0.94280	IE-S1	*	LPI-MDP-FS-SI1A	*	LPI-MDP-MA-SI1B	+				
1288	67	3	6.00E-09	0.94299	IE-S1	*	LPI-MDP-FS-SI1B	*	LPI-MDP-MA-SI1A	+				
1289	455	10	5.99E-09	0.94317	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
1290					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*		
1291					/QS-SBO	*	REC-XHE-FO-DGEN	+						
1292	454	10	5.99E-09	0.94335	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
1293					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*		
1294					/QS-SBO	*	REC-XHE-FO-DGEN	+						
1295	453	10	5.99E-09	0.94353	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
1296					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*		
1297					/QS-SBO	*	REC-XHE-FO-DGEN	+						
1298	452	10	5.99E-09	0.94371	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
1299					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*		
1300					/QS-SBO	*	REC-XHE-FO-DGEN	+						
1301	1829	11	5.98E-09	0.94389	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
1302					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*		
1303					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1304	1831	11	5.98E-09	0.94407	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
1305					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*		
1306					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1307	1830	11	5.98E-09	0.94426	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
1308					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*		
1309					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1310	922	11	5.91E-09	0.94444	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1311					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*		
1312					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	RCP-LOCA-467-150	+				
1313	1918	11	5.88E-09	0.94461	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*		
1314					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*		
1315					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
1316	217	11	5.82E-09	0.94479	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1317					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*		
1318					OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	/QS-SBO	+				
1319	923	11	5.75E-09	0.94496	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*		
1320					NOTL-SBOU1	*	NOTQ	*	NRAC-258M	*	OEP-DGN-FS	*		
1321					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
1322	826	12	5.75E-09	0.94514	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1323					NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*		
1324					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+		
1325	827	12	5.75E-09	0.94531	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1326					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*		
1327					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+		
1328	2246	9	5.60E-09	0.94548	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*		
1329					NRAC-150M	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-1440-90	*		
1330					REC-XHE-FO-DGHWS	+								
1331	568	9	5.54E-09	0.94565	AFW-XHE-FO-CST2	*	IE-T1	*	NOTQ	*	NRAC-1HR	*		
1332					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
1333					REC-XHE-FO-DGEN	+								
1334	828	12	5.40E-09	0.94581	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		

1335					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
1336					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1337	831	12	5.40E-09	0.94598	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1338					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
1339					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1340	830	12	5.40E-09	0.94614	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1341					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	
1342					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1343	829	12	5.40E-09	0.94631	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1344					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
1345					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1346	2649	6	5.36E-09	0.94647	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2	*	
1347					PPS-MOV-FC-1536	*	PPS-MOV-FT	+					
1348	2650	6	5.36E-09	0.94663	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2	*	
1349					PPS-MOV-FC-1535	*	PPS-MOV-FT	+					
1350	34	3	5.20E-09	0.94679	IE-A	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1862B	+			
1351	33	3	5.20E-09	0.94695	IE-A	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1862A	+			
1352	668	10	5.19E-09	0.94710	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1353					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
1354					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1355	667	10	5.19E-09	0.94726	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1356					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
1357					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1358	669	10	5.19E-09	0.94742	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1359					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
1360					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1361	670	10	5.19E-09	0.94757	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1362					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
1363					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1364	666	10	5.19E-09	0.94773	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1365					OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
1366					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1367	665	10	5.19E-09	0.94789	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1368					OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
1369					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1370	221	11	5.19E-09	0.94805	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1371					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
1372					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+			
1373	220	11	5.19E-09	0.94820	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1374					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	
1375					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+			
1376	218	11	5.19E-09	0.94836	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1377					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
1378					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+			
1379	219	11	5.19E-09	0.94852	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1380					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
1381					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+			
1382	2592	6	5.16E-09	0.94868	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*	
1383					IE-T1	*	PPS-XHE-FO-PORVS	+					
1384	129	4	5.15E-09	0.94883	HPI-MOV-FT-1115C	*	HPI-MOV-FT-1115E	*	HPI-XHE-FO-UN2S3	*	IE-S3	+	
1385	130	4	5.15E-09	0.94899	HPI-MOV-FT-1115B	*	HPI-MOV-FT-1115D	*	HPI-XHE-FO-UN2S3	*	IE-S3	+	
1386	832	11	5.11E-09	0.94914	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1387					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*	
1388					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
[illegible]	429	9	5.11E-09	0.94930	AFW-CKV-OO-CV172	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*	

1391					REC-XHE-FO-DGEN	+							
1392	428	9	5.11E-09	0.94945	AFW-CKV-OO-CV172	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
1393					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
1394					REC-XHE-FO-DGEN	+							
1395	427	9	5.11E-09	0.94961	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
1396					NRAC-HALFHR	*	OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
1397					REC-XHE-FO-DGEN	+							
1398	2652	4	5.08E-09	0.94976	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1455C	+	
1399	2651	4	5.08E-09	0.94991	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1456	+	
1400	2026	9	4.99E-09	0.95007	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	
1401					NRAC-7HR	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-183-150	*	
1402					REC-XHE-FO-DGHWS	+							
1403	2136	9	4.99E-09	0.95022	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	
1404					NRAC-7HR	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-183-210	*	
1405					REC-XHE-FO-DGHWS	+							
1406	2593	5	4.99E-09	0.95037	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-MOV-FC-1536	*	
1407					PPS-MOV-FT-1536	+							
1408	2594	5	4.99E-09	0.95052	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-MOV-FC-1535	*	
1409					PPS-MOV-FT-1535	+							
1410	924	12	4.93E-09	0.95067	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1411					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	
1412					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1413	925	12	4.93E-09	0.95082	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1414					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	
1415					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1416	834	11	4.91E-09	0.95097	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1417					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	
1418					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1419	833	11	4.91E-09	0.95112	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1420					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	
1421					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1422	69	3	4.80E-09	0.95126	IE-S1	*	LPI-MDP-FS-SI1A	*	SIS-ACT-FA-SISB	+			
1423	70	3	4.80E-09	0.95141	IE-S1	*	LPI-MDP-FS-SI1B	*	SIS-ACT-FA-SISA	+			
1424	926	10	4.79E-09	0.95156	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1425					NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	*	
1426					RCP-LOCA-467-150	*	REC-XHE-FO-SCOOL	+					
1427	431	9	4.75E-09	0.95170	AFW-CKV-OO-CV172	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	
1428					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*	
1429					REC-XHE-FO-DGEN	+							
1430	836	12	4.75E-09	0.95184	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1431					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	
1432					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
1433	835	12	4.75E-09	0.95198	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1434					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	
1435					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
1436	927	12	4.73E-09	0.95213	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1437					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	
1438					OEP-DGN-FR-6HDG2	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+	
1439	222	10	4.72E-09	0.95227	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1440					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	
1441					QS-SBO	*	REC-XHE-FO-SCOOL	+					
1442	2582	5	4.71E-09	0.95241	BETA-SRV	*	IE-T	*	K	*	PPS-SOV-FT	*	
1443					R	+							
1444	676	10	4.69E-09	0.95256	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1445					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
1446					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					

1447	678	10	4.69E-09	0.95270	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1448					OEP-DGN-FR-DG03	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
1449					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1450	671	10	4.69E-09	0.95284	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1451					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*	
1452					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1453	673	10	4.69E-09	0.95298	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1454					OEP-DGN-FR-DG03	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*	
1455					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1456	674	10	4.69E-09	0.95313	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1457					OEP-DGN-FR-DG02	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
1458					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1459	677	10	4.69E-09	0.95327	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1460					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
1461					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1462	672	10	4.69E-09	0.95341	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1463					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*	
1464					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1465	675	10	4.69E-09	0.95355	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1466					OEP-DGN-FR-DG02	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*	
1467					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1468	1833	11	4.67E-09	0.95369	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1469					/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	
1470					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1471	1837	11	4.67E-09	0.95383	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1472					/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	
1473					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1474	1836	11	4.67E-09	0.95398	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1475					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	
1476					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1477	1832	11	4.67E-09	0.95412	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1478					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*	
1479					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1480	1835	11	4.67E-09	0.95426	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1481					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	
1482					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1483	1834	11	4.67E-09	0.95440	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1484					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*	
1485					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1486	224	11	4.56E-09	0.95454	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1487					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*	
1488					OEP-DGN-FS-DG03	*	QS-SBO	*	REC-XHE-FO-DGHWB	+			
1489	223	11	4.56E-09	0.95468	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1490					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*	
1491					OEP-DGN-FS-DG02	*	QS-SBO	*	REC-XHE-FO-DGHWB	+			
1492	929	12	4.52E-09	0.95481	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1493					NRAC-258M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	
1494					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1495	928	12	4.52E-09	0.95495	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1496					NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	
1497					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1498	930	12	4.52E-09	0.95509	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1499					NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	
1500					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1501	37	3	4.50E-09	0.95522	IE-A	*	LPR-MOV-FT-1890A	*	LPR-MOV-FT-1890B	+			
1502	36	3	4.50E-09	0.95536	IE-A	*	LPI-MDP-FS-S11A	*	LPR-MOV-FT-1860B	+			

1503	9	3	4.50E-09	0.95550	IE-A	*	LPI-MDP-FS-SI1A	*	LPI-MDP-FS-SI1B	+				
1504	35	3	4.50E-09	0.95563	IE-A	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1860A	+				
1505	38	3	4.50E-09	0.95577	IE-A	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1860B	+				
1506	839	11	4.50E-09	0.95591	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1507					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*		
1508					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1509	837	11	4.50E-09	0.95604	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1510					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*		
1511					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1512	838	11	4.50E-09	0.95618	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1513					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*		
1514					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1515	2654	6	4.47E-09	0.95631	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T2	*		
1516					PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+						
1517	2653	6	4.47E-09	0.95645	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T2	*		
1518					PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+						
1519	840	12	4.41E-09	0.95658	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*		
1520					NOTL-SBOU1	*	NOTQ	*	NRAC-201M	*	O	*		
1521					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
1522	304	11	4.34E-09	0.95672	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*		
1523					NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
1524					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+				
1525	2356	9	4.34E-09	0.95685	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*		
1526					NRAC-7HR	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-183-90	*		
1527					REC-XHE-FO-DGHWS	+								
1528	932	12	4.34E-09	0.95698	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1529					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*		
1530					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
1531	934	12	4.34E-09	0.95711	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1532					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG02	*		
1533					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
1534	933	12	4.34E-09	0.95724	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1535					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG03	*		
1536					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
1537	931	12	4.34E-09	0.95737	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1538					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*		
1539					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
1540	936	12	4.31E-09	0.95750	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1541					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*		
1542					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+		
1543	935	12	4.31E-09	0.95763	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
1544					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*		
1545					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+		
1546	841	11	4.29E-09	0.95777	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1547					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*		
1548					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+				
1549	842	11	4.29E-09	0.95790	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
1550					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*		
1551					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+				
1552	1840	11	4.28E-09	0.95802	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
1553					/O	*	OEP-CRB-FT-25H3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
1554					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1555	1838	11	4.28E-09	0.95815	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
1556					/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
1557					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
1558	1839	11	4.28E-09	0.95828	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		

1559					/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*			
1560					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
1561	225	11	4.24E-09	0.95841	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*			
1562					NOTL-SBOU1	*	NOTQ	*	NRAC-7HR	*	NSLOCA	*			
1563					OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGHWB	+					
1564	432	9	4.12E-09	0.95854	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*			
1565					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*			
1566					/QS-SBO	+									
1567	843	11	4.11E-09	0.95866	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
1568					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-CRB-FT-15J3	*			
1569					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+					
1570	458	10	4.02E-09	0.95878	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*			
1571					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*			
1572					/QS-SBO	*	REC-XHE-FO-DGEN	+							
1573	457	10	4.02E-09	0.95891	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*			
1574					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*			
1575					/QS-SBO	*	REC-XHE-FO-DGEN	+							
1576	2689	4	3.96E-09	0.95903	AFW-MDP-MA-FW3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+			
1577	2748	4	3.96E-09	0.95915	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T7	+			
1578	2714	4	3.96E-09	0.95927	AFW-MDP-MA-FW3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+			
1579	59	3	3.84E-09	0.95938	CPC-MDP-FR-SWA3H	*	CPC-MDP-FS-SW10B	*	IE-S1	+					
1580	937	11	3.83E-09	0.95950	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
1581					NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*			
1582					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+					
1583	2749	5	3.81E-09	0.95961	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*			
1584					IE-T7	+									
1585	433	9	3.80E-09	0.95973	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*			
1586					NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*			
1587					REC-XHE-FO-DGEN	+									
1588	434	9	3.74E-09	0.95984	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*			
1589					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*			
1590					/QS-SBO	+									
1591	464	10	3.74E-09	0.95996	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	BETA-2DG	*	IE-T1	*			
1592					NOTDG-CCF	*	NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*			
1593					/QS-SBO	*	REC-XHE-FO-DGEN	+							
1594	435	10	3.71E-09	0.96007	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*			
1595					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*			
1596					/QS-SBO	*	REC-XHE-FO-DGEN	+							
1597	465	9	3.69E-09	0.96018	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*			
1598					NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*			
1599					REC-XHE-FO-DGEN	+									
1600	844	11	3.68E-09	0.96029	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
1601					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*			
1602					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+					
1603	227	12	3.64E-09	0.96040	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
1604					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*			
1605					OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+			
1606	226	12	3.64E-09	0.96051	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
1607					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG2	*			
1608					OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+			
1609	466	9	3.63E-09	0.96062	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*			
1610					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*			
1611					/QS-SBO	+									
1612	1842	10	3.63E-09	0.96073	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
1613					OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*	QS-SBO	*			
1614					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+							

1615	1841	10	3.63E-09	0.96084	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1616					OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*	
1617					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
1618	1843	10	3.63E-09	0.96095	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1619					OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*	QS-SBO	*	
1620					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
1621	2715	4	3.60E-09	0.96106	AFW-MDP-MA-FW3A	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+	
1622	2690	4	3.60E-09	0.96117	AFW-MDP-MA-FW3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+	
1623	2656	6	3.57E-09	0.96128	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2	*	
1624					PPS-MOV-FC-1535	*	PPS-MOV-FT	+					
1625	2655	6	3.57E-09	0.96139	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2	*	
1626					PPS-MOV-FC-1536	*	PPS-MOV-FT	+					
1627	940	11	3.51E-09	0.96149	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1628					NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*	
1629					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
1630	938	11	3.51E-09	0.96160	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1631					NRAC-258M	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
1632					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
1633	939	11	3.51E-09	0.96171	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1634					NRAC-258M	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
1635					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
1636	941	11	3.51E-09	0.96181	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1637					NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*	
1638					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
1639	131	3	3.51E-09	0.96192	ACP-BAC-ST-4KV1H	*	HPI-MOV-FT-1867D	*	IE-S3	+			
1640	132	3	3.51E-09	0.96203	ACP-BAC-ST-1H1	*	HPI-MOV-FT-1867D	*	IE-S3	+			
1641	228	12	3.49E-09	0.96213	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1642					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*	
1643					OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+	
1644	685	10	3.46E-09	0.96224	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1645					OEP-DGN-FR-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
1646					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1647	679	10	3.46E-09	0.96234	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1648					OEP-DGN-FR-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
1649					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1650	680	10	3.46E-09	0.96245	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1651					OEP-DGN-FR-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
1652					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1653	686	10	3.46E-09	0.96255	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1654					OEP-DGN-FR-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
1655					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1656	684	10	3.46E-09	0.96266	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1657					OEP-DGN-FR-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
1658					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1659	683	10	3.46E-09	0.96276	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1660					OEP-DGN-FR-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
1661					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1662	682	10	3.46E-09	0.96287	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1663					OEP-DGN-FR-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
1664					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1665	681	10	3.46E-09	0.96297	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
1666					OEP-DGN-FR-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
1667					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
1668	443	10	3.40E-09	0.96307	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1669					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	
1670					/QS-SBO	*	REC-XHE-FO-DGEN	+					

1671	440	10	3.40E-09	0.96318	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1672					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	
1673					/QS-SBO	*	REC-XHE-FO-DGEN	+					
1674	441	10	3.40E-09	0.96328	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1675					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	
1676					/QS-SBO	*	REC-XHE-FO-DGEN	+					
1677	442	10	3.40E-09	0.96338	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1678					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	
1679					/QS-SBO	*	REC-XHE-FO-DGEN	+					
1680	2658	4	3.38E-09	0.96349	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1456	+	
1681	2657	4	3.38E-09	0.96359	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1455C	+	
1682	943	11	3.37E-09	0.96369	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1683					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
1684					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
1685	942	11	3.37E-09	0.96379	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1686					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
1687					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
1688	944	11	3.37E-09	0.96390	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1689					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
1690					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
1691	945	11	3.37E-09	0.96400	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1692					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	
1693					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
1694	444	10	3.37E-09	0.96410	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1695					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	
1696					/QS-SBO	*	REC-XHE-FO-DGEN	+					
1697	230	12	3.33E-09	0.96420	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1698					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-CRB-FT-15H3	*	
1699					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+	
1700	229	12	3.33E-09	0.96430	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1701					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-CRB-FT-15H3	*	
1702					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+	
1703	231	12	3.33E-09	0.96440	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1704					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-CRB-FT-15J3	*	
1705					OEP-DGN-FS-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+	
1706	1846	10	3.33E-09	0.96450	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1707					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*	QS-SBO	*	
1708					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
1709	1844	10	3.33E-09	0.96460	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1710					OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
1711					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
1712	1845	10	3.33E-09	0.96471	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1713					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*	QS-SBO	*	
1714					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
1715	2596	5	3.33E-09	0.96481	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-MOV-FC-1536	*	
1716					PPS-MOV-FT-1536	+							
1717	2595	5	3.33E-09	0.96491	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-MOV-FC-1535	*	
1718					PPS-MOV-FT-1535	+							
1719	97	3	3.28E-09	0.96501	IE-S1	*	LPI-MDP-FR-B21HR	*	LPR-MOV-FT-1862A	+			
1720	96	3	3.28E-09	0.96511	IE-S1	*	LPI-MDP-FR-A21HR	*	LPR-MOV-FT-1862B	+			
1721	476	10	3.27E-09	0.96521	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1722					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	
1723					/QS-SBO	*	REC-XHE-FO-DGEN	+					
1724	2716	4	3.24E-09	0.96530	AFW-ACT-FA-PMP3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+	
1725	2691	4	3.24E-09	0.96540	AFW-ACT-FA-PMP3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+	
1726	1921	11	3.21E-09	0.96550	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*	

1727					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
1728					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
1729	1919	11	3.21E-09	0.96560	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*
1730					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*
1731					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
1732	1920	11	3.21E-09	0.96569	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*
1733					/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
1734					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
1735	235	12	3.20E-09	0.96579	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1736					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
1737					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
1738	234	12	3.20E-09	0.96589	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1739					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
1740					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
1741	232	12	3.20E-09	0.96598	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1742					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
1743					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
1744	233	12	3.20E-09	0.96608	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1745					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
1746					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
1747	71	3	3.20E-09	0.96618	IE-S1	*	LPI-MDP-MA-SI1B	*	SIS-ACT-FA-SISA	+		
1748	72	3	3.20E-09	0.96628	IE-S1	*	LPI-MDP-MA-SI1A	*	SIS-ACT-FA-SISB	+		
1749	845	12	3.15E-09	0.96637	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1750					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*
1751					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
1752	714	10	3.10E-09	0.96647	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*
1753					OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
1754					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
1755	713	10	3.10E-09	0.96656	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*
1756					OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
1757					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
1758	451	10	3.09E-09	0.96665	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
1759					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*
1760					/QS-SBO	*	REC-XHE-FO-DGEN	+				
1761	450	10	3.09E-09	0.96675	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
1762					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
1763					/QS-SBO	*	REC-XHE-FO-DGEN	+				
1764	449	10	3.09E-09	0.96684	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
1765					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
1766					/QS-SBO	*	REC-XHE-FO-DGEN	+				
1767	448	10	3.09E-09	0.96693	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
1768					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
1769					/QS-SBO	*	REC-XHE-FO-DGEN	+				
1770	946	11	3.08E-09	0.96703	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1771					NRAC-258M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*
1772					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-SCOOL	+		
1773	947	11	3.08E-09	0.96712	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1774					NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*
1775					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-SCOOL	+		
1776	847	10	3.07E-09	0.96721	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1777					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*
1778					QS-SBO	*	RCP-LOCA-750-90M	+				
1779	846	10	3.07E-09	0.96731	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1780					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*
1781					QS-SBO	*	RCP-LOCA-750-90M	+				
1782	239	11	3.03E-09	0.96740	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*

1783					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-CRB-FT-15J3	*	
1784					OEP-DGN-FR-6HDG1	*	/QS-SBO	*	REC-XHE-FO-SCOOL	+			
1785	236	12	3.03E-09	0.96749	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1786					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	
1787					OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGTMB	*	REC-XHE-FO-SCOOL	+	
1788	238	11	3.03E-09	0.96758	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1789					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-CRB-FT-15H3	*	
1790					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	REC-XHE-FO-SCOOL	+			
1791	237	12	3.03E-09	0.96767	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1792					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG3	*	
1793					OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGTMB	*	REC-XHE-FO-SCOOL	+	
1794	573	9	3.02E-09	0.96777	AFW-XHE-FO-CST2	*	IE-T1	*	NOTQ	*	NRAC-1HR	*	
1795					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*	
1796					REC-XHE-FO-DGEN	+							
1797	572	9	3.02E-09	0.96786	AFW-XHE-FO-CST2	*	IE-T1	*	NOTQ	*	NRAC-1HR	*	
1798					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
1799					REC-XHE-FO-DGEN	+							
1800	574	9	3.02E-09	0.96795	AFW-XHE-FO-CST2	*	IE-T1	*	NOTQ	*	NRAC-1HR	*	
1801					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
1802					REC-XHE-FO-DGEN	+							
1803	119	4	3.02E-09	0.96804	CON-VFC-RP-COREM	*	IE-S2	*	SWS-CCF-FT-3ABCD	*	SWS-XHE-FO-OPEN	+	
1804	76	4	3.02E-09	0.96813	CON-VFC-RP-COREM	*	IE-S1	*	SWS-CCF-FT-3ABCD	*	SWS-XHE-FO-OPEN	+	
1805	40	3	3.00E-09	0.96822	IE-A	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1860A	+			
1806	73	3	3.00E-09	0.96831	IE-S1	*	LPI-CKV-OO-CV50	*	LPI-MDP-FS-SI1B	+			
1807	74	3	3.00E-09	0.96841	IE-S1	*	LPI-CKV-OO-CV58	*	LPI-MDP-FS-SI1A	+			
1808	39	3	3.00E-09	0.96850	IE-A	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1860B	+			
1809	11	3	3.00E-09	0.96859	IE-A	*	LPI-MDP-FS-SI1A	*	LPI-MDP-MA-SI1B	+			
1810	10	3	3.00E-09	0.96868	IE-A	*	LPI-MDP-FS-SI1B	*	LPI-MDP-MA-SI1A	+			
1811	465	10	3.00E-09	0.96877	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1812					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	
1813					/QS-SBO	*	REC-XHE-FO-DGEN	+					
1814	467	10	3.00E-09	0.96886	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1815					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	
1816					/QS-SBO	*	REC-XHE-FO-DGEN	+					
1817	468	10	3.00E-09	0.96895	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1818					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	
1819					/QS-SBO	*	REC-XHE-FO-DGEN	+					
1820	466	10	3.00E-09	0.96904	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
1821					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	
1822					/QS-SBO	*	REC-XHE-FO-DGEN	+					
1823	1848	11	2.99E-09	0.96913	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
1824					NOTQ	*	NRAC-216M	*	OEP-DGN-FS	*	OEP-DGN-MA-DG02	*	
1825					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1826	1847	11	2.99E-09	0.96922	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
1827					NOTQ	*	NRAC-216M	*	OEP-DGN-FS	*	OEP-DGN-MA-DG03	*	
1828					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1829	1849	11	2.99E-09	0.96931	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
1830					NOTQ	*	NRAC-216M	*	OEP-DGN-FS	*	OEP-DGN-MA-DG01	*	
1831					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1832	848	12	2.94E-09	0.96940	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
1833					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	
1834					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
1835	1923	12	2.88E-09	0.96949	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
1836					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG2	*	
1837					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+	
1838	1924	12	2.88E-09	0.96958	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	

1839					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*
1840					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
1841	1922	12	2.88E-09	0.96966	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
1842					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG3	*
1843					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
1844	2626	6	2.86E-09	0.96975	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*
1845					HPI-XHE-FO-FDBLD	*	IE-T2	+				
1846	2466	9	2.85E-09	0.96984	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
1847					NRAC-246M	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-561-150	*
1848					REC-XHE-FO-DGHWS	+						
1849	240	11	2.83E-09	0.96992	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1850					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
1851					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
1852	114	4	2.79E-09	0.97001	HPI-MOV-FT-1115B	*	HPI-MOV-FT-1115D	*	HPI-XHE-FO-UN2S2	*	IE-S2	+
1853	113	4	2.79E-09	0.97009	HPI-MOV-FT-1115C	*	HPI-MOV-FT-1115E	*	HPI-XHE-FO-UN2S2	*	IE-S2	+
1854	456	9	2.79E-09	0.97018	AFW-CKV-OO-CV172	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
1855					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
1856					REC-XHE-FO-DGEN	+						
1857	850	12	2.76E-09	0.97026	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1858					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*
1859					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+
1860	849	12	2.76E-09	0.97034	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
1861					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*
1862					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+
1863	576	10	2.72E-09	0.97043	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
1864					NOTQ	*	NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*
1865					QS-SBO	*	REC-XHE-FO-DGEN	+				
1866	577	10	2.72E-09	0.97051	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
1867					NOTQ	*	NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*
1868					QS-SBO	*	REC-XHE-FO-DGEN	+				
1869	575	10	2.72E-09	0.97059	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
1870					NOTQ	*	NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*
1871					QS-SBO	*	REC-XHE-FO-DGEN	+				
1872	60	2	2.70E-09	0.97067	IE-S1	*	RWT-TNK-LF-RWST	+				
1873	115	2	2.70E-09	0.97076	IE-S2	*	RWT-TNK-LF-RWST	+				
1874	852	12	2.70E-09	0.97084	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1875					NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*
1876					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
1877	854	12	2.70E-09	0.97092	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1878					NRAC-201M	*	O	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
1879					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
1880	853	12	2.70E-09	0.97100	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1881					NRAC-201M	*	O	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
1882					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
1883	851	12	2.70E-09	0.97108	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1884					NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
1885					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
1886	2584	4	2.69E-09	0.97116	ACP-TFM-NO-1H1	*	IE-T	*	K	*	R	+
1887	2583	4	2.69E-09	0.97125	HPI-MOV-PG-1350	*	IE-T	*	K	*	R	+
1888	242	11	2.59E-09	0.97132	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1889					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
1890					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
1891	243	11	2.59E-09	0.97140	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
1892					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*
1893					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
1894	244	11	2.59E-09	0.97148	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*

1895					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*			
1896					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+					
1897	241	11	2.59E-09	0.97156	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
1898					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*			
1899					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+					
1900	856	12	2.59E-09	0.97164	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
1901					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FR-6HDG2	*	REC-XHE-FO-DGHWS	+	
1902					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1903	855	12	2.59E-09	0.97172	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
1904					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*			
1905					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1906	857	12	2.59E-09	0.97180	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
1907					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FR-6HDG3	*			
1908					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1909	858	12	2.59E-09	0.97187	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
1910					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*			
1911					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1912	116	3	2.56E-09	0.97195	IE-S2	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+					
1913	61	3	2.56E-09	0.97203	IE-S1	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+					
1914	98	3	2.56E-09	0.97211	IE-S1	*	RMT-ACT-FA-RMTSA	*	RMT-ACT-FA-RMTSB	+					
1915	2662	6	2.56E-09	0.97218	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T2	*			
1916					PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+							
1917	2660	6	2.56E-09	0.97226	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T2	*			
1918					PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+							
1919	2659	6	2.56E-09	0.97234	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T2	*			
1920					PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+							
1921	2661	6	2.56E-09	0.97242	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T2	*			
1922					PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+							
1923	859	11	2.55E-09	0.97249	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
1924					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	QS-SBO	*			
1925					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+					
1926	2597	6	2.54E-09	0.97257	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*			
1927					OEP-DGN-FC-DG3U2	*	PPS-MOV-FC-1536	+							
1928	247	11	2.49E-09	0.97265	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
1929					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*			
1930					OEP-DGN-FS-DG03	*	QS-SBO	*	REC-XHE-FO-DGHWB	+					
1931	248	11	2.49E-09	0.97272	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
1932					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG3	*			
1933					OEP-DGN-FS-DG01	*	QS-SBO	*	REC-XHE-FO-DGHWB	+					
1934	246	11	2.49E-09	0.97280	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
1935					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*			
1936					OEP-DGN-FS-DG02	*	QS-SBO	*	REC-XHE-FO-DGHWB	+					
1937	245	11	2.49E-09	0.97287	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
1938					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG2	*			
1939					OEP-DGN-FS-DG01	*	QS-SBO	*	REC-XHE-FO-DGHWB	+					
1940	1650	9	2.47E-09	0.97295	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
1941					OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	QS-SBO	*			
1942					RCP-LOCA-750-90M	+									
1943	948	12	2.46E-09	0.97302	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
1944					NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*			
1945					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
1946	860	11	2.45E-09	0.97310	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
1947					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*			
1948					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
1949	2627	4	2.40E-09	0.97317	AFW-TNK-VF-CST	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	IE-T2	+			
1950	13	3	2.40E-09	0.97324	IE-A	*	LPI-MDP-FS-SI1B	*	SIS-ACT-FA-SISA	+					

1951	12	3	2.40E-09	0.97332	IE-A	*	LPI-MDP-FS-SI1A	*	SIS-ACT-FA-SISB	+			
1952	306	11	2.37E-09	0.97339	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
1953					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
1954					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
1955	305	11	2.37E-09	0.97346	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
1956					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
1957					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
1958	307	11	2.37E-09	0.97353	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
1959					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
1960					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
1961	949	12	2.37E-09	0.97360	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1962					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	
1963					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+	
1964	950	12	2.37E-09	0.97368	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1965					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG2	*	
1966					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+	
1967	1852	11	2.33E-09	0.97375	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1968					/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*	
1969					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1970	1851	11	2.33E-09	0.97382	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1971					/O	*	OEP-CRB-FT-25H3	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	
1972					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1973	1855	11	2.33E-09	0.97389	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1974					/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
1975					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1976	1853	11	2.33E-09	0.97396	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1977					/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*	
1978					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1979	1854	11	2.33E-09	0.97403	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1980					/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
1981					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1982	1856	11	2.33E-09	0.97410	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
1983					/O	*	OEP-CRB-FT-25H3	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
1984					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
1985	2663	5	2.30E-09	0.97417	AFW-MDP-FS-FW3A	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1B	*	
1986					IE-T2	+							
1987	2664	5	2.30E-09	0.97424	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1A	*	
1988					IE-T2	+							
1989	951	10	2.30E-09	0.97431	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1990					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	
1991					QS-SBO	*	RCP-LOCA-467-150	+					
1992	1925	10	2.29E-09	0.97438	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*	
1993					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
1994					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+					
1995	2740	4	2.28E-09	0.97445	HPI-CKV-FT-CV225	*	HPI-XHE-FO-ALTIN	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
1996	2751	4	2.27E-09	0.97452	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T7	+	
1997	2750	4	2.27E-09	0.97459	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T7	+	
1998	249	10	2.26E-09	0.97465	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
1999					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*	
2000					OEP-DGN-FR-6HDG3	*	QS-SBO	+					
2001	862	11	2.24E-09	0.97472	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2002					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*	QS-SBO	*	
2003					RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+			
2004	861	11	2.24E-09	0.97479	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2005					NRAC-216M	*	OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
2006					RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+			

2007	1857	11	2.23E-09	0.97486	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
2008					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*			
2009					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+					
2010	1858	11	2.23E-09	0.97492	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
2011					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG03	*			
2012					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+					
2013	1859	11	2.23E-09	0.97499	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
2014					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG02	*			
2015					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+					
2016	498	10	2.19E-09	0.97506	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*			
2017					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*			
2018					/QS-SBO	*	REC-XHE-FO-DGEN	+							
2019	497	10	2.19E-09	0.97512	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*			
2020					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*			
2021					/QS-SBO	*	REC-XHE-FO-DGEN	+							
2022	500	10	2.19E-09	0.97519	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*			
2023					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*			
2024					/QS-SBO	*	REC-XHE-FO-DGEN	+							
2025	499	10	2.19E-09	0.97526	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*			
2026					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*			
2027					/QS-SBO	*	REC-XHE-FO-DGEN	+							
2028	1350	12	2.18E-09	0.97532	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2029					NRAC-150M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*			
2030					/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2031	1349	12	2.18E-09	0.97539	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2032					NRAC-150M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*			
2033					/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2034	133	4	2.17E-09	0.97546	CPC-CKV-OO-CV113	*	CPC-MDP-FR-SWA24	*	HPI-XHE-FO-UN2S3	*	IE-S3	+			
2035	954	12	2.17E-09	0.97552	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
2036					NOTQ	*	NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*			
2037					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
2038	953	12	2.17E-09	0.97559	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
2039					NOTQ	*	NRAC-258M	*	/O	*	OEP-CRB-FT-15J3	*			
2040					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
2041	952	12	2.17E-09	0.97565	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
2042					NOTQ	*	NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*			
2043					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
2044	309	12	2.13E-09	0.97572	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
2045					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*			
2046					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
2047	308	12	2.13E-09	0.97578	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
2048					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*			
2049					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
2050	310	12	2.13E-09	0.97585	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
2051					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*			
2052					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
2053	956	12	2.07E-09	0.97591	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
2054					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG3	*			
2055					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	+			
2056	955	12	2.07E-09	0.97597	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
2057					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*			
2058					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	+			
2059	1351	12	2.03E-09	0.97603	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*			
2060					NOTQ	*	NRAC-150M	*	/O	*	OEP-DGN-FS	*			
2061					/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2062	2585	4	2.02E-09	0.97609	CVC-MDP-FR-2A1HR	*	IE-T	*	K	*	R	+			

2063	2692	4	1.98E-09	0.97615	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+			
2064	2717	4	1.98E-09	0.97621	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+			
2065	2771	3	1.97E-09	0.97627	IE-T7	*	MSS-XHE-FO-ISAFW	*	RCS-XHE-FO-DPRT7	+					
2066	863	11	1.97E-09	0.97633	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
2067					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*			
2068					OEP-CRB-FT-15J3	*	/QS-SBO	*	RCP-LOCA-750-90M	+					
2069	1198	12	1.94E-09	0.97639	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2070					NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*			
2071					/QS-SBO	*	RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2072	1197	12	1.94E-09	0.97645	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2073					NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*			
2074					/QS-SBO	*	RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2075	1046	12	1.94E-09	0.97651	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2076					NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*			
2077					/QS-SBO	*	RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2078	1045	12	1.94E-09	0.97657	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2079					NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*			
2080					/QS-SBO	*	RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2081	2665	7	1.93E-09	0.97663	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*			
2082					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+					
2083	2666	7	1.93E-09	0.97669	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*			
2084					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+					
2085	690	9	1.92E-09	0.97675	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*			
2086					OEP-CRB-FT-15J3	*	OEP-DGN-FR-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*			
2087					SBO-PORV-DMD	+									
2088	689	9	1.92E-09	0.97680	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*			
2089					OEP-CRB-FT-15H3	*	OEP-DGN-FR-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*			
2090					SBO-PORV-DMD	+									
2091	687	9	1.92E-09	0.97686	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*			
2092					OEP-CRB-FT-15H3	*	OEP-DGN-FR-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*			
2093					SBO-PORV-DMD	+									
2094	688	9	1.92E-09	0.97692	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*			
2095					OEP-CRB-FT-15J3	*	OEP-DGN-FR-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*			
2096					SBO-PORV-DMD	+									
2097	692	10	1.92E-09	0.97698	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*			
2098					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*			
2099					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+							
2100	691	10	1.92E-09	0.97704	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*			
2101					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*			
2102					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+							
2103	958	11	1.92E-09	0.97710	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2104					NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*			
2105					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+					
2106	957	11	1.92E-09	0.97715	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2107					NRAC-258M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*			
2108					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+					
2109	2718	5	1.91E-09	0.97721	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*			
2110					IE-T5B	+									
2111	2693	5	1.91E-09	0.97727	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*			
2112					IE-T5A	+									
2113	459	9	1.90E-09	0.97733	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*			
2114					NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	QS-SBO	*			
2115					REC-XHE-FO-DGEN	+									
2116	102	3	1.89E-09	0.97738	IE-S1	*	LPI-MDP-FR-B21HR	*	LPR-MOV-FT-1860A	+					
2117	101	3	1.89E-09	0.97744	IE-S1	*	LPI-MDP-FR-A21HR	*	LPI-MDP-FS-S11B	+					
2118	100	3	1.89E-09	0.97750	IE-S1	*	LPI-MDP-FR-A21HR	*	LPR-MOV-FT-1860B	+					

2119	99	3	1.89E-09	0.97756	IE-S1	*	LPI-MDP-FR-B21HR	*	LPI-MDP-FS-S11A	+				
2120	42	3	1.87E-09	0.97761	IE-A	*	LPI-MDP-FR-B24HR	*	LPR-MOV-FT-1862A	+				
2121	41	3	1.87E-09	0.97767	IE-A	*	LPI-MDP-FR-A24HR	*	LPR-MOV-FT-1862B	+				
2122	463	10	1.85E-09	0.97773	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2123					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*		
2124					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2125	462	10	1.85E-09	0.97778	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2126					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*		
2127					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2128	461	10	1.85E-09	0.97784	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2129					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*		
2130					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2131	460	10	1.85E-09	0.97789	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2132					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*		
2133					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2134	507	9	1.84E-09	0.97795	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
2135					NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	QS-SBO	*		
2136					REC-XHE-FO-DGEN	+								
2137	959	11	1.84E-09	0.97801	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
2138					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*		
2139					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2140	250	12	1.82E-09	0.97806	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
2141					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-CRB-FT-15H3	*		
2142					OEP-DGN-FR-6HDG2	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
2143	960	12	1.82E-09	0.97812	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
2144					NRAC-246M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
2145					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
2146	961	12	1.82E-09	0.97817	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
2147					NRAC-246M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
2148					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
2149	1863	10	1.81E-09	0.97823	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
2150					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*	QS-SBO	*		
2151					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+						
2152	1861	10	1.81E-09	0.97828	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
2153					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*	QS-SBO	*		
2154					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+						
2155	1860	10	1.81E-09	0.97834	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
2156					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
2157					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+						
2158	1865	10	1.81E-09	0.97839	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
2159					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*		
2160					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+						
2161	1864	10	1.81E-09	0.97845	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
2162					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*		
2163					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+						
2164	1862	10	1.81E-09	0.97850	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
2165					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
2166					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+						
2167	557	9	1.81E-09	0.97856	AFW-TDP-FS-FW2	*	BETA-2DG	*	BETA-3DG	*	IE-T1	*		
2168					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*		
2169					REC-XHE-FO-DGEN	+								
2170	1047	12	1.81E-09	0.97861	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*		
2171					NOTQ	*	NRAC-7HR	*	/O	*	OEP-DGN-FS	*		
2172					/QS-SBO	*	RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
2173	1199	12	1.81E-09	0.97867	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*		
2174					NOTQ	*	NRAC-7HR	*	/O	*	OEP-DGN-FS	*		

2175					/QS-SBO	*	RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
2176	864	11	1.77E-09	0.97872	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
2177					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*		
2178					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	RCP-LOCA-750-90M	+				
2179	2761	8	1.76E-09	0.97877	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-FC-OPER	*		
2180					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+		
2181	2760	8	1.76E-09	0.97883	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-FC-OPER	*		
2182					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+		
2183	1866	11	1.76E-09	0.97888	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-201M	*		
2184					O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*		
2185					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
2186	964	11	1.76E-09	0.97893	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
2187					NRAC-258M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
2188					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
2189	963	11	1.76E-09	0.97899	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
2190					NRAC-258M	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*		
2191					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
2192	962	11	1.76E-09	0.97904	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
2193					NRAC-258M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*		
2194					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
2195	1928	11	1.75E-09	0.97909	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*		
2196					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*		
2197					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2198	1926	11	1.75E-09	0.97914	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*		
2199					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*		
2200					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2201	1927	11	1.75E-09	0.97920	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*		
2202					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*		
2203					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2204	251	12	1.75E-09	0.97925	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
2205					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*		
2206					OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
2207	252	12	1.75E-09	0.97930	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
2208					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*		
2209					OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
2210	694	10	1.73E-09	0.97936	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
2211					OEP-CRB-FT-15H3	*	OEP-DGN-FR-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
2212					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
2213	693	10	1.73E-09	0.97941	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
2214					OEP-CRB-FT-15H3	*	OEP-DGN-FR-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
2215					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
2216	558	10	1.71E-09	0.97946	AFW-TDP-FS-FW2	*	BETA-2DG	*	BETA-3DG	*	IE-T1	*		
2217					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*		
2218					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
2219	469	10	1.70E-09	0.97951	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2220					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*		
2221					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2222	468	10	1.70E-09	0.97956	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2223					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*		
2224					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2225	467	10	1.70E-09	0.97961	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2226					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*		
2227					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2228	2598	6	1.70E-09	0.97967	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*		
2229					OEP-DGN-FC-DG3U2	*	PPS-MOV-FC-1536	+						
2230	1502	12	1.69E-09	0.97972	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		

2231					NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03 *
2232					/QS-SBO	*	RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL +
2233	1501	12	1.69E-09	0.97977	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ *
2234					NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02 *
2235					/QS-SBO	*	RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL +
2236	965	12	1.69E-09	0.97982	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1 *
2237					NOTQ	*	NRAC-246M	*	O	*	OEP-DGN-FS *
2238					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL +
2239	311	10	1.69E-09	0.97987	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR *
2240					NSLOCA	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03 *
2241					QS-SBO	*	REC-XHE-FO-DGHWB +				
2242	968	11	1.69E-09	0.97992	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1 *
2243					NOTQ	*	NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02 *
2244					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS +		
2245	966	11	1.69E-09	0.97997	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1 *
2246					NOTQ	*	NRAC-258M	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01 *
2247					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS +		
2248	967	11	1.69E-09	0.98002	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1 *
2249					NOTQ	*	NRAC-258M	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01 *
2250					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS +		
2251	969	11	1.69E-09	0.98008	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1 *
2252					NOTQ	*	NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03 *
2253					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS +		
2254	473	10	1.68E-09	0.98013	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1 *
2255					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02 *
2256					/QS-SBO	*	REC-XHE-FO-DGEN +				
2257	471	10	1.68E-09	0.98018	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1 *
2258					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03 *
2259					/QS-SBO	*	REC-XHE-FO-DGEN +				
2260	470	10	1.68E-09	0.98023	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1 *
2261					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01 *
2262					/QS-SBO	*	REC-XHE-FO-DGEN +				
2263	472	10	1.68E-09	0.98028	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1 *
2264					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01 *
2265					/QS-SBO	*	REC-XHE-FO-DGEN +				
2266	971	11	1.68E-09	0.98033	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ *
2267					NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO *
2268					RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL +		
2269	970	11	1.68E-09	0.98038	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ *
2270					NRAC-258M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO *
2271					RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL +		
2272	474	10	1.67E-09	0.98043	AFW-TDP-FS-FW2	*	AFW-TDP-FS-U2FW2	*	/DGN-FTO	*	IE-T1 *
2273					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03 *
2274					/QS-SBO	*	REC-XHE-FO-DGEN +				
2275	475	10	1.67E-09	0.98048	AFW-TDP-FS-FW2	*	AFW-TDP-FS-U2FW2	*	/DGN-FTO	*	IE-T1 *
2276					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02 *
2277					/QS-SBO	*	REC-XHE-FO-DGEN +				
2278	1868	10	1.66E-09	0.98053	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M *
2279					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO *
2280					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS +				
2281	1867	10	1.66E-09	0.98058	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M *
2282					OEP-CRB-FT-25H3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO *
2283					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS +				
2284	1869	10	1.66E-09	0.98063	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M *
2285					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO *
2286					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS +				

2287	2600	6	1.65E-09	0.98068	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*
2288					OEP-DGN-FS-DG01	*	PPS-MOV-FC-1535	+				
2289	2599	6	1.65E-09	0.98073	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*
2290					OEP-DGN-FS-DG03	*	PPS-MOV-FC-1536	+				
2291	559	9	1.64E-09	0.98078	AFW-TDP-MA-FW2	*	BETA-2DG	*	BETA-3DG	*	IE-T1	*
2292					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*
2293					REC-XHE-FO-DGEN	+						
2294	524	10	1.63E-09	0.98083	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2295					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*
2296					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2297	523	10	1.63E-09	0.98088	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2298					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
2299					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2300	522	10	1.63E-09	0.98093	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2301					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*
2302					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2303	521	10	1.63E-09	0.98098	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2304					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
2305					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2306	1930	11	1.60E-09	0.98103	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*
2307					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*
2308					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
2309	1929	11	1.60E-09	0.98108	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*
2310					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*
2311					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
2312	1931	11	1.60E-09	0.98113	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*
2313					/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
2314					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
2315	253	12	1.60E-09	0.98118	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2316					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
2317					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
2318	254	12	1.60E-09	0.98123	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2319					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
2320					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
2321	255	12	1.60E-09	0.98127	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2322					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
2323					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
2324	14	3	1.60E-09	0.98132	IE-A	*	LPI-MDP-MA-SI1B	*	SIS-ACT-FA-SISA	+		
2325	15	3	1.60E-09	0.98137	IE-A	*	LPI-MDP-MA-SI1A	*	SIS-ACT-FA-SISB	+		
2326	2741	4	1.60E-09	0.98142	HPI-CKV-OO-CV258	*	HPI-MDP-FR-1A6HR	*	IE-T7	*	RCS-XHE-FO-DPT7D	+
2327	865	10	1.60E-09	0.98147	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2328					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-CRB-FT-15J3	*	QS-SBO	*
2329					RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+				
2330	561	9	1.59E-09	0.98152	AFW-TDP-FR-2P6HR	*	BETA-2DG	*	BETA-3DG	*	IE-T1	*
2331					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	QS-SBO	*
2332					REC-XHE-FO-DGEN	+						
2333	1872	10	1.59E-09	0.98156	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
2334					/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*
2335					/QS-SBO	*	RCP-LOCA-750-90M	+				
2336	1871	10	1.59E-09	0.98161	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
2337					/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
2338					/QS-SBO	*	RCP-LOCA-750-90M	+				
2339	1870	10	1.59E-09	0.98166	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
2340					/O	*	OEP-CRB-FT-25H3	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
2341					/QS-SBO	*	RCP-LOCA-750-90M	+				
2342	2667	7	1.58E-09	0.98171	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*

2343					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+				
2344	2668	7	1.58E-09	0.98176	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*		
2345					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+				
2346	1503	12	1.57E-09	0.98180	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*		
2347					NOTQ	*	NRAC-7HR	*	/O	*	OEP-DGN-FS	*		
2348					/QS-SBO	*	RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
2349	134	3	1.56E-09	0.98185	ACP-TFM-NO-1H1	*	HPI-MOV-FT-1867D	*	IE-S3	+				
2350	560	10	1.56E-09	0.98190	AFW-TDP-MA-FW2	*	BETA-2DG	*	BETA-3DG	*	IE-T1	*		
2351					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*		
2352					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
2353	477	10	1.55E-09	0.98195	AFW-TDP-FS-FW2	*	AFW-TDP-FS-U2FW2	*	BETA-2DG	*	IE-T1	*		
2354					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*		
2355					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2356	480	10	1.54E-09	0.98199	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2357					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*		
2358					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2359	479	10	1.54E-09	0.98204	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2360					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*		
2361					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2362	478	10	1.54E-09	0.98209	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2363					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*		
2364					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2365	484	10	1.52E-09	0.98213	AFW-TDP-FS-FW2	*	AFW-TDP-MA-U2FW2	*	/DGN-FTO	*	IE-T1	*		
2366					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
2367					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2368	482	10	1.52E-09	0.98218	AFW-TDP-FS-U2FW2	*	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*		
2369					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
2370					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2371	481	10	1.52E-09	0.98222	AFW-TDP-FS-FW2	*	AFW-TDP-MA-U2FW2	*	/DGN-FTO	*	IE-T1	*		
2372					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
2373					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2374	483	10	1.52E-09	0.98227	AFW-TDP-FS-U2FW2	*	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*		
2375					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
2376					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2377	720	11	1.52E-09	0.98232	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
2378					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*		
2379					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
2380	719	11	1.52E-09	0.98236	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
2381					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*		
2382					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
2383	718	11	1.52E-09	0.98241	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
2384					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*		
2385					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
2386	717	11	1.52E-09	0.98245	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
2387					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*		
2388					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
2389	716	11	1.52E-09	0.98250	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
2390					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*		
2391					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
2392	715	11	1.52E-09	0.98255	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
2393					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*		
2394					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
2395	2670	8	1.51E-09	0.98259	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*		
2396					BETA-AFW	*	IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT	+		
2397	2669	8	1.51E-09	0.98264	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*		
2398					BETA-AFW	*	IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT	+		

2399	21	4	1.51E-09	0.98268	CON-VFC-RP-COREM	*	IE-A	*	SWS-CCF-FT-3ABCD	*	SWS-XHE-FO-OPEN	+
2400	563	10	1.51E-09	0.98273	AFW-TDP-FR-2P6HR	*	BETA-2DG	*	BETA-3DG	*	IE-T1	*
2401					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*
2402					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+				
2403	17	3	1.50E-09	0.98278	IE-A	*	LPI-CKV-OO-CV58	*	LPI-MDP-FS-SI1A	+		
2404	16	3	1.50E-09	0.98282	IE-A	*	LPI-CKV-OO-CV50	*	LPI-MDP-FS-SI1B	+		
2405	531	10	1.50E-09	0.98287	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2406					NOTQ	*	NRAC-6HR-AVG	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
2407					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2408	530	10	1.50E-09	0.98291	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2409					NOTQ	*	NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
2410					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2411	529	10	1.50E-09	0.98296	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2412					NOTQ	*	NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
2413					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2414	2762	8	1.50E-09	0.98300	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-FC-OPER	*
2415					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+
2416	2763	8	1.50E-09	0.98305	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-FC-OPER	*
2417					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+
2418	972	11	1.48E-09	0.98309	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2419					NOTQ	*	NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*
2420					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	RCP-LOCA-467-150	+		
2421	973	11	1.48E-09	0.98314	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2422					NOTQ	*	NRAC-258M	*	/O	*	OEP-CRB-FT-15J3	*
2423					OEP-DGN-FR-6HDG1	*	/QS-SBO	*	RCP-LOCA-467-150	+		
2424	534	10	1.47E-09	0.98318	AFW-TDP-FR-6HRU2	*	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*
2425					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
2426					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2427	535	10	1.47E-09	0.98323	AFW-TDP-FR-2P6HR	*	AFW-TDP-FS-U2FW2	*	/DGN-FTO	*	IE-T1	*
2428					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
2429					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2430	533	10	1.47E-09	0.98327	AFW-TDP-FR-6HRU2	*	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*
2431					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
2432					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2433	532	10	1.47E-09	0.98332	AFW-TDP-FR-2P6HR	*	AFW-TDP-FS-U2FW2	*	/DGN-FTO	*	IE-T1	*
2434					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
2435					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2436	867	12	1.47E-09	0.98336	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2437					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
2438					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2439	866	12	1.47E-09	0.98341	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2440					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
2441					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2442	257	12	1.46E-09	0.98345	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2443					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
2444					OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGTMB	+
2445	258	11	1.46E-09	0.98349	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2446					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
2447					OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*	/QS-SBO	+		
2448	259	11	1.46E-09	0.98354	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2449					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
2450					OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*	/QS-SBO	+		
2451	256	12	1.46E-09	0.98358	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2452					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
2453					OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGTMB	+
2454	1934	12	1.44E-09	0.98363	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*

2455					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS	*
2456					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
2457	1933	12	1.44E-09	0.98367	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
2458					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS	*
2459					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
2460	1932	12	1.44E-09	0.98371	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
2461					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS	*
2462					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
2463	2672	6	1.43E-09	0.98376	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
2464					IE-T2	*	PPS-SOV-FT-1455C	+				
2465	2671	6	1.43E-09	0.98380	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
2466					IE-T2	*	PPS-SOV-FT-1456	+				
2467	2674	7	1.43E-09	0.98384	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
2468					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+		
2469	2673	7	1.43E-09	0.98389	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
2470					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+		
2471	261	11	1.41E-09	0.98393	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2472					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
2473					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
2474	260	11	1.41E-09	0.98397	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2475					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
2476					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
2477	868	12	1.41E-09	0.98402	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2478					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*
2479					OEP-DGN-FR-6HDG2	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
2480	489	10	1.41E-09	0.98406	AFW-TDP-FS-FW2	*	AFW-TDP-MA-U2FW2	*	BETA-2DG	*	IE-T1	*
2481					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*
2482					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2483	490	10	1.41E-09	0.98410	AFW-TDP-FS-U2FW2	*	AFW-TDP-MA-FW2	*	BETA-2DG	*	IE-T1	*
2484					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*
2485					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2486	2602	7	1.41E-09	0.98414	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
2487					IE-T1	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+		
2488	2601	7	1.41E-09	0.98419	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
2489					IE-T1	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+		
2490	2752	5	1.40E-09	0.98423	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
2491					IE-T7	+						
2492	491	9	1.39E-09	0.98427	AFW-CKV-OO-CV172	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
2493					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*
2494					REC-XHE-FO-DGEN	+						
2495	493	10	1.38E-09	0.98431	AFW-TDP-MA-FW2	*	AFW-TDP-MA-U2FW2	*	/DGN-FTO	*	IE-T1	*
2496					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
2497					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2498	492	10	1.38E-09	0.98435	AFW-TDP-MA-FW2	*	AFW-TDP-MA-U2FW2	*	/DGN-FTO	*	IE-T1	*
2499					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
2500					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2501	537	10	1.37E-09	0.98440	AFW-TDP-FR-2P6HR	*	AFW-TDP-FS-U2FW2	*	BETA-2DG	*	IE-T1	*
2502					NOTDG-CCF	*	NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*
2503					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2504	536	10	1.37E-09	0.98444	AFW-TDP-FR-6HRU2	*	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	*
2505					NOTDG-CCF	*	NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*
2506					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2507	262	11	1.36E-09	0.98448	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2508					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*
2509					OEP-DGN-FR-6HDG2	*	QS-SBO	*	REC-XHE-FO-DGHWB	+		
2510	580	10	1.36E-09	0.98452	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*

2511					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG02	*
2512					QS-SBO	*	REC-XHE-FO-DGEN	+				
2513	581	10	1.36E-09	0.98456	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
2514					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG01	*
2515					QS-SBO	*	REC-XHE-FO-DGEN	+				
2516	579	10	1.36E-09	0.98460	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
2517					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG03	*
2518					QS-SBO	*	REC-XHE-FO-DGEN	+				
2519	18	2	1.35E-09	0.98464	IE-A	*	RWT-TNK-LF-RWST	+				
2520	871	12	1.35E-09	0.98468	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2521					NRAC-201M	*	O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
2522					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2523	870	12	1.35E-09	0.98473	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2524					NRAC-201M	*	O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
2525					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2526	869	12	1.35E-09	0.98477	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2527					NRAC-201M	*	O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
2528					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2529	2603	5	1.34E-09	0.98481	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T1	*
2530					PPS-XHE-FO-PORVS	+						
2531	2629	5	1.34E-09	0.98485	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	HPI-MOV-FT-1867C	*
2532					IE-T2	+						
2533	2628	5	1.34E-09	0.98489	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	HPI-MOV-FT-1115B	*
2534					IE-T2	+						
2535	541	10	1.34E-09	0.98493	AFW-TDP-FR-6HRU2	*	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*
2536					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
2537					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2538	540	10	1.34E-09	0.98497	AFW-TDP-FR-2P6HR	*	AFW-TDP-MA-U2FW2	*	/DGN-FTO	*	IE-T1	*
2539					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
2540					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2541	539	10	1.34E-09	0.98501	AFW-TDP-FR-2P6HR	*	AFW-TDP-MA-U2FW2	*	/DGN-FTO	*	IE-T1	*
2542					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
2543					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2544	538	10	1.34E-09	0.98505	AFW-TDP-FR-6HRU2	*	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*
2545					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
2546					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2547	263	11	1.30E-09	0.98509	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2548					NRAC-7HR	*	NSLOCA	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
2549					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
2550	265	11	1.30E-09	0.98513	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2551					NRAC-7HR	*	NSLOCA	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
2552					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
2553	264	11	1.30E-09	0.98517	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2554					NRAC-7HR	*	NSLOCA	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
2555					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
2556	875	12	1.30E-09	0.98521	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2557					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS-DG02	*
2558					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
2559	874	12	1.30E-09	0.98525	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2560					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*
2561					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
2562	873	12	1.30E-09	0.98529	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2563					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS-DG03	*
2564					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
2565	872	12	1.30E-09	0.98533	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2566					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*

2567					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
2568	313	11	1.29E-09	0.98536	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
2569					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	
2570					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
2571	314	11	1.29E-09	0.98540	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
2572					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	
2573					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
2574	312	11	1.29E-09	0.98544	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
2575					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	
2576					OEP-DGN-FS-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
2577	877	12	1.29E-09	0.98548	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2578					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	
2579					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+	
2580	876	12	1.29E-09	0.98552	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2581					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	
2582					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+	
2583	494	10	1.28E-09	0.98556	AFW-TDP-MA-FW2	*	AFW-TDP-MA-U2FW2	*	BETA-2DG	*	IE-T1	*	
2584					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	
2585					/QS-SBO	*	REC-XHE-FO-DGEN	+					
2586	696	9	1.28E-09	0.98560	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2587					OEP-DGN-FR-DG01	*	OEP-DGN-FR-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
2588					SBO-PORV-DMD	+							
2589	695	9	1.28E-09	0.98564	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2590					OEP-DGN-FR-DG01	*	OEP-DGN-FR-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
2591					SBO-PORV-DMD	+							
2592	43	3	1.28E-09	0.98568	IE-A	*	RMT-ACT-FA-RMTSA	*	RMT-ACT-FA-RMTSB	+			
2593	19	3	1.28E-09	0.98572	IE-A	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+			
2594	704	10	1.28E-09	0.98575	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2595					OEP-DGN-FR-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*	
2596					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
2597	703	10	1.28E-09	0.98579	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2598					OEP-DGN-FR-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
2599					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
2600	702	10	1.28E-09	0.98583	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2601					OEP-DGN-FR-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
2602					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
2603	701	10	1.28E-09	0.98587	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2604					OEP-DGN-FR-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*	
2605					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
2606	700	10	1.28E-09	0.98591	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2607					OEP-DGN-FR-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*	
2608					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
2609	699	10	1.28E-09	0.98595	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2610					OEP-DGN-FR-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
2611					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
2612	698	10	1.28E-09	0.98599	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2613					OEP-DGN-FR-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
2614					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
2615	697	10	1.28E-09	0.98603	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
2616					OEP-DGN-FR-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*	
2617					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
2618	2753	5	1.27E-09	0.98606	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*	
2619					IE-T7	+							
2620	104	3	1.26E-09	0.98610	IE-S1	*	LPI-MDP-FR-A21HR	*	LPI-MDP-MA-SI1B	+			
2621	103	3	1.26E-09	0.98614	IE-S1	*	LPI-MDP-FR-B21HR	*	LPI-MDP-MA-SI1A	+			
2622	267	12	1.26E-09	0.98618	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	

2623					NRAC-7HR	*	NSLOCA	*	O	*	OEP-DGN-FS-DG01	*
2624					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
2625	266	12	1.26E-09	0.98622	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2626					NRAC-7HR	*	NSLOCA	*	O	*	OEP-DGN-FS-DG01	*
2627					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
2628	1937	10	1.25E-09	0.98626	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*
2629					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
2630					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2631	1936	10	1.25E-09	0.98629	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*
2632					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*
2633					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2634	1935	10	1.25E-09	0.98633	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*
2635					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
2636					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2637	546	10	1.25E-09	0.98637	AFW-TDP-FR-2P6HR	*	AFW-TDP-MA-U2FW2	*	BETA-2DG	*	IE-T1	*
2638					NOTDG-CCF	*	NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*
2639					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2640	547	10	1.25E-09	0.98641	AFW-TDP-FR-6HRU2	*	AFW-TDP-MA-FW2	*	BETA-2DG	*	IE-T1	*
2641					NOTDG-CCF	*	NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*
2642					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2643	269	11	1.24E-09	0.98644	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2644					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*
2645					OEP-DGN-MA-DG03	*	QS-SBO	*	REC-XHE-FO-DGHWB	+		
2646	270	11	1.24E-09	0.98648	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2647					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG02	*
2648					OEP-DGN-MA-DG01	*	QS-SBO	*	REC-XHE-FO-DGHWB	+		
2649	271	11	1.24E-09	0.98652	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2650					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG03	*
2651					OEP-DGN-MA-DG01	*	QS-SBO	*	REC-XHE-FO-DGHWB	+		
2652	268	11	1.24E-09	0.98656	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2653					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*
2654					OEP-DGN-MA-DG02	*	QS-SBO	*	REC-XHE-FO-DGHWB	+		
2655	135	4	1.24E-09	0.98659	CPC-MDP-FR-CCA24	*	CPC-MDP-FS-CC2B	*	HPI-XHE-FO-UN2S3	*	IE-S3	+
2656	974	12	1.23E-09	0.98663	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2657					NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*
2658					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2659	878	11	1.23E-09	0.98667	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2660					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*
2661					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
2662	136	5	1.22E-09	0.98671	CPC-MDP-FR-SWA24	*	CPC-MDP-FS-SW10B	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S3	*
2663					IE-S3	+						
2664	586	10	1.21E-09	0.98674	AFW-TDP-FS-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*
2665					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	/QS-SBO	*
2666					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+				
2667	975	10	1.20E-09	0.98678	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2668					NRAC-258M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*	QS-SBO	*
2669					RCP-LOCA-467-150	*	REC-XHE-FO-SCOOL	+				
2670	976	10	1.20E-09	0.98682	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2671					NRAC-258M	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*	QS-SBO	*
2672					RCP-LOCA-467-150	*	REC-XHE-FO-SCOOL	+				
2673	549	10	1.20E-09	0.98685	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*
2674					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
2675					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2676	548	10	1.20E-09	0.98689	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*
2677					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
2678					/QS-SBO	*	REC-XHE-FO-DGEN	+				

2679	1938	10	1.19E-09	0.98692	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*			
2680					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*			
2681					/QS-SBO	*	RCP-LOCA-467-150	+							
2682	1352	12	1.19E-09	0.98696	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2683					NRAC-150M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*			
2684					/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2685	1355	12	1.19E-09	0.98700	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2686					NRAC-150M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*			
2687					/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2688	1354	12	1.19E-09	0.98703	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2689					NRAC-150M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*			
2690					/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2691	1353	12	1.19E-09	0.98707	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2692					NRAC-150M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*			
2693					/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
2694	2719	4	1.19E-09	0.98710	AFW-ACT-FA-PMP3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+			
2695	2694	4	1.19E-09	0.98714	AFW-ACT-FA-PMP3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+			
2696	315	11	1.18E-09	0.98718	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*			
2697					NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*			
2698					OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+					
2699	316	11	1.18E-09	0.98721	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*			
2700					NSLOCA	*	/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*			
2701					OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+					
2702	317	11	1.18E-09	0.98725	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*			
2703					NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*			
2704					OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+					
2705	977	12	1.18E-09	0.98728	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
2706					NOTQ	*	NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*			
2707					OEP-DGN-FR-6HDG2	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
2708	272	11	1.18E-09	0.98732	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2709					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*			
2710					QS-SBO	*	REC-XHE-FO-DGTMB	*	REC-XHE-FO-SCOOL	+					
2711	273	11	1.18E-09	0.98736	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2712					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*			
2713					QS-SBO	*	REC-XHE-FO-DGTMB	*	REC-XHE-FO-SCOOL	+					
2714	275	10	1.18E-09	0.98739	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2715					NRAC-7HR	*	NSLOCA	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*			
2716					QS-SBO	*	REC-XHE-FO-SCOOL	+							
2717	274	10	1.18E-09	0.98743	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
2718					NRAC-7HR	*	NSLOCA	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*			
2719					QS-SBO	*	REC-XHE-FO-SCOOL	+							
2720	2604	7	1.18E-09	0.98746	AFW-MDP-FS-FW3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T1	*			
2721					NRAC-HALFHR	*	OEP-DGN-FC-DG3U2	*	PPS-MOV-FC-1536	+					
2722	318	10	1.17E-09	0.98750	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*			
2723					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*			
2724					OEP-DGN-FR-6HDG3	*	/QS-SBO	+							
2725	276	12	1.17E-09	0.98753	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*			
2726					NOTQ	*	NRAC-7HR	*	NSLOCA	*	O	*			
2727					OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+			
2728	1878	11	1.17E-09	0.98757	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
2729					/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*			
2730					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
2731	1877	11	1.17E-09	0.98760	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
2732					/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*			
2733					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
2734	1876	11	1.17E-09	0.98764	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			

2735					/O	*	OEP-CRB-FT-25H3	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*		
2736					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
2737	1874	11	1.17E-09	0.98768	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
2738					/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*		
2739					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
2740	1873	11	1.17E-09	0.98771	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
2741					/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*		
2742					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
2743	1875	11	1.17E-09	0.98775	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*		
2744					/O	*	OEP-CRB-FT-25H3	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*		
2745					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
2746	706	10	1.15E-09	0.98778	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
2747					OEP-DGN-FR-DG01	*	OEP-DGN-FR-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
2748					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
2749	705	10	1.15E-09	0.98782	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*		
2750					OEP-DGN-FR-DG01	*	OEP-DGN-FR-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
2751					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
2752	722	10	1.15E-09	0.98785	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*		
2753					OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*		
2754					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
2755	721	10	1.15E-09	0.98789	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*		
2756					OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*		
2757					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
2758	2721	4	1.13E-09	0.98792	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
2759	2695	4	1.13E-09	0.98795	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
2760	2696	4	1.13E-09	0.98799	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
2761	2720	4	1.13E-09	0.98802	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
2762	496	10	1.13E-09	0.98806	AFW-CKV-OO-CV172	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2763					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
2764					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2765	495	10	1.13E-09	0.98809	AFW-CKV-OO-CV172	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
2766					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
2767					/QS-SBO	*	REC-XHE-FO-DGEN	+						
2768	614	9	1.13E-09	0.98813	AFW-TDP-FR-2P6HR	*	IE-T1	*	NOTQ	*	NRAC-6HR-AVG	*		
2769					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
2770					REC-XHE-FO-DGEN	+								
2771	1940	11	1.12E-09	0.98816	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
2772					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*		
2773					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2774	1939	11	1.12E-09	0.98819	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
2775					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*		
2776					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2777	1941	11	1.12E-09	0.98823	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
2778					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*		
2779					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
2780	1654	12	1.11E-09	0.98826	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
2781					NRAC-246M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
2782					/QS-SBO	*	RCP-LOCA-561-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
2783	1653	12	1.11E-09	0.98829	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
2784					NRAC-246M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
2785					/QS-SBO	*	RCP-LOCA-561-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
2786	588	10	1.10E-09	0.98833	AFW-TDP-MA-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*		
2787					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	/QS-SBO	*		
2788					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
2789	2605	6	1.10E-09	0.98836	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*		
2790					OEP-DGN-FS-DG01	*	PPS-MOV-FC-1535	+						

2791	2606	6	1.10E-09	0.98839	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*	
2792					OEP-DGN-FS-DG03	*	PPS-MOV-FC-1536	+					
2793	551	10	1.10E-09	0.98843	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*	
2794					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	
2795					/QS-SBO	*	REC-XHE-FO-DGEN	+					
2796	554	10	1.10E-09	0.98846	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*	
2797					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	
2798					/QS-SBO	*	REC-XHE-FO-DGEN	+					
2799	553	10	1.10E-09	0.98849	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*	
2800					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	
2801					/QS-SBO	*	REC-XHE-FO-DGEN	+					
2802	552	10	1.10E-09	0.98853	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	/DGN-FTO	*	IE-T1	*	
2803					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	
2804					/QS-SBO	*	REC-XHE-FO-DGEN	+					
2805	47	3	1.08E-09	0.98856	IE-A	*	LPI-MDP-FR-B24HR	*	LPR-MOV-FT-1860A	+			
2806	46	3	1.08E-09	0.98859	IE-A	*	LPI-MDP-FR-A24HR	*	LPI-MDP-FS-SI1B	+			
2807	45	3	1.08E-09	0.98863	IE-A	*	LPI-MDP-FR-A24HR	*	LPR-MOV-FT-1860B	+			
2808	44	3	1.08E-09	0.98866	IE-A	*	LPI-MDP-FR-B24HR	*	LPI-MDP-FS-SI1A	+			
2809	2743	4	1.08E-09	0.98869	ACP-BAC-ST-4KV1H	*	HPI-MOV-FT-1867D	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
2810	2742	4	1.08E-09	0.98872	ACP-BAC-ST-1H1	*	HPI-MOV-FT-1867D	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
2811	2722	4	1.08E-09	0.98876	AFW-ACT-FA-PMP3A	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+	
2812	2697	4	1.08E-09	0.98879	AFW-ACT-FA-PMP3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+	
2813	978	12	1.08E-09	0.98882	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2814					NRAC-258M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*	
2815					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+	
2816	979	12	1.08E-09	0.98885	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2817					NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*	
2818					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+	
2819	880	11	1.07E-09	0.98889	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
2820					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*	
2821					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+			
2822	879	11	1.07E-09	0.98892	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
2823					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*	
2824					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+			
2825	321	12	1.06E-09	0.98895	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
2826					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*	
2827					OEP-DGN-FS	*	OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+	
2828	320	12	1.06E-09	0.98898	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
2829					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*	
2830					OEP-DGN-FS	*	OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+	
2831	319	12	1.06E-09	0.98902	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
2832					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*	
2833					OEP-DGN-FS	*	OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+	
2834	1201	12	1.06E-09	0.98905	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2835					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
2836					/QS-SBO	*	RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2837	1203	12	1.06E-09	0.98908	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2838					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	
2839					/QS-SBO	*	RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2840	1200	12	1.06E-09	0.98911	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2841					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
2842					/QS-SBO	*	RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2843	1202	12	1.06E-09	0.98915	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2844					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
2845					/QS-SBO	*	RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
28[redacted]	1051	12	1.06E-09	0.98918	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	

2847					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	
2848					/QS-SBO	*	RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2849	1050	12	1.06E-09	0.98921	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2850					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
2851					/QS-SBO	*	RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2852	1049	12	1.06E-09	0.98924	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2853					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
2854					/QS-SBO	*	RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2855	1048	12	1.06E-09	0.98927	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2856					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
2857					/QS-SBO	*	RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2858	501	10	1.05E-09	0.98931	AFW-CKV-OO-CV172	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*	
2859					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	
2860					/QS-SBO	*	REC-XHE-FO-DGEN	+					
2861	2630	6	1.05E-09	0.98934	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	
2862					HPI-XHE-FO-FDBLD	*	IE-T2	+					
2863	1356	12	1.05E-09	0.98937	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
2864					NOTQ	*	NRAC-150M	*	/O	*	OEP-DGN-FS-DG01	*	
2865					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	+	
2866	1357	12	1.05E-09	0.98940	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
2867					NOTQ	*	NRAC-150M	*	/O	*	OEP-DGN-FS-DG01	*	
2868					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	+	
2869	1655	12	1.03E-09	0.98943	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
2870					NOTQ	*	NRAC-246M	*	/O	*	OEP-DGN-FS	*	
2871					/QS-SBO	*	RCP-LOCA-561-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2872	502	9	1.03E-09	0.98946	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
2873					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*	
2874					/QS-SBO	+							
2875	503	9	1.03E-09	0.98949	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
2876					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*	
2877					/QS-SBO	+							
2878	117	5	1.03E-09	0.98953	BETA-STR	*	CPC-STR-PG-6HR	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S2	*	
2879					IE-S2	+							
2880	118	3	1.00E-09	0.98956	CON-VFC-RP-COREM	*	IE-S2	*	LPR-CCF-PG-SUMP	+			
2881	75	3	1.00E-09	0.98959	CON-VFC-RP-COREM	*	IE-S1	*	LPR-CCF-PG-SUMP	+			
2882	983	12	9.91E-10	0.98962	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2883					NRAC-246M	*	O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
2884					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2885	980	12	9.91E-10	0.98965	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2886					NRAC-246M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
2887					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2888	981	12	9.91E-10	0.98968	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2889					NRAC-246M	*	O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
2890					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2891	982	12	9.91E-10	0.98971	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
2892					NRAC-246M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	
2893					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
2894	1358	12	9.73E-10	0.98974	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*	
2895					NOTL-SBOU1	*	NOTQ	*	NRAC-150M	*	/O	*	
2896					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	+	
2897	2723	4	9.72E-10	0.98977	AFW-MDP-FR-3A6HR	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+	
2898	2698	4	9.72E-10	0.98980	AFW-MDP-FR-3B6HR	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+	
2899	62	3	9.60E-10	0.98982	CPC-MDP-FR-SWA3H	*	CPC-MDP-MA-SW10B	*	IE-S1	+			
2900	1881	11	9.58E-10	0.98985	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-201M	*	
2901					O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	
2902					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			

2903	1880	11	9.58E-10	0.98988	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-201M	*
2904					O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*
2905					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
2906	1879	11	9.58E-10	0.98991	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-201M	*
2907					O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
2908					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
2909	984	11	9.58E-10	0.98994	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2910					NRAC-258M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
2911					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
2912	2631	6	9.54E-10	0.98997	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*
2913					HPI-XHE-FO-FDBLD	*	IE-T2	+				
2914	504	9	9.36E-10	0.99000	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2915					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*
2916					/QS-SBO	+						
2917	505	9	9.36E-10	0.99003	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2918					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*
2919					/QS-SBO	+						
2920	1204	12	9.33E-10	0.99005	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2921					NOTQ	*	NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*
2922					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	+
2923	1205	12	9.33E-10	0.99008	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2924					NOTQ	*	NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*
2925					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	+
2926	1053	12	9.33E-10	0.99011	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2927					NOTQ	*	NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*
2928					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	+
2929	1052	12	9.33E-10	0.99014	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2930					NOTQ	*	NRAC-7HR	*	/O	*	OEP-DGN-FS-DG01	*
2931					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	+
2932	508	10	9.27E-10	0.99017	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
2933					NOTQ	*	NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*
2934					/QS-SBO	*	REC-XHE-FO-DGEN	+				
2935	1507	12	9.22E-10	0.99020	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2936					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
2937					/QS-SBO	*	RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2938	1506	12	9.22E-10	0.99022	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2939					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
2940					/QS-SBO	*	RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2941	1505	12	9.22E-10	0.99025	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2942					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
2943					/QS-SBO	*	RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2944	1504	12	9.22E-10	0.99028	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
2945					NRAC-7HR	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
2946					/QS-SBO	*	RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
2947	324	10	9.21E-10	0.99031	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
2948					NSLOCA	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
2949					QS-SBO	*	REC-XHE-FO-DGHWB	+				
2950	323	10	9.21E-10	0.99034	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
2951					NSLOCA	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
2952					QS-SBO	*	REC-XHE-FO-DGHWB	+				
2953	322	10	9.21E-10	0.99036	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
2954					NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*
2955					QS-SBO	*	REC-XHE-FO-DGHWB	+				
2956	985	11	9.20E-10	0.99039	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
2957					NOTQ	*	NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
2958					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		

SEQUENCE SBO-BATT

TOP EVENT SBO-BATT CONTAINS 27 EVENTS IN 160 CUT SETS

THE FREQUENCY OF TOP EVENT SBO-BATT IS 7.57E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT SBO-BATT

N	1000
MEAN	1.05E-05
STD DEV	2.44E-05
LOWER 5%	2.44E-07
LOWER 25%	1.25E-06
MEDIAN	3.33E-06
UPPER 25%	9.56E-06
UPPER 5%	4.08E-05

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE SBO-BATT
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
NRAC-7HR	160	5.00E-02	(11.0)	7.57E-06	(2.0)	2.44E-07	4.08E-05
NOTQ	160	9.73E-01	(2.0)	7.57E-06	(2.0)		
NOTL-SBOU1	160	9.93E-01	(1.0)	7.57E-06	(2.0)		
NOTW2	54	8.15E-01	(3.0)	7.15E-06	(4.0)		
REC-XHE-FO-DGHWB	120	6.00E-01	(4.0)	6.60E-06	(5.0)	1.94E-07	3.53E-05
OEP-DGN-FS-DG01	48	2.20E-02	(16.5)	3.40E-06	(6.0)	8.45E-08	1.74E-05
OEP-DGN-FR-6HDG1	45	1.20E-02	(20.0)	2.06E-06	(7.0)	1.30E-08	1.47E-05
OEP-DGN-FS-DG02	27	2.20E-02	(16.5)	1.76E-06	(8.5)	4.28E-08	8.77E-06
OEP-DGN-FS-DG03	27	2.20E-02	(16.5)	1.76E-06	(8.5)	4.28E-08	8.77E-06
OEP-DGN-FR-6HDG3	26	1.20E-02	(20.0)	1.16E-06	(10.0)	7.06E-09	8.64E-06
OEP-DGN-FR-6HDG2	24	1.20E-02	(20.0)	9.61E-07	(11.0)	5.84E-09	5.88E-06
NOTDG-CCF	8	5.20E-01	(5.0)	8.39E-07	(13.0)		
OEP-DGN-FS	8	2.20E-02	(16.5)	8.39E-07	(13.0)	2.82E-08	3.37E-06
BETA-2DG	8	3.80E-02	(13.0)	8.39E-07	(13.0)	2.82E-08	3.37E-06
OEP-DGN-MA-DG01	27	6.00E-03	(23.0)	7.64E-07	(15.0)	4.46E-09	3.05E-06
OEP-CRB-FT-15H3	32	3.00E-03	(25.5)	5.11E-07	(16.0)	3.44E-09	2.27E-06
NSLOCA	106	2.70E-01	(7.5)	4.27E-07	(17.0)	0.00E+00	2.65E-06
OEP-DGN-MA-DG02	15	6.00E-03	(23.0)	4.12E-07	(18.0)	2.47E-09	1.72E-06
OEP-DGN-MA-DG03	15	6.00E-03	(23.0)	3.84E-07	(19.0)	2.32E-09	1.55E-06
REC-XHE-FO-SCOOL	58	1.25E-01	(9.0)	2.91E-07	(20.0)	0.00E+00	1.88E-06
OEP-CRB-FT-15J3	18	3.00E-03	(25.5)	2.89E-07	(21.0)	2.00E-09	1.36E-06
REC-XHE-FO-DGTMB	18	5.00E-01	(6.0)	2.78E-07	(22.0)	6.63E-10	9.35E-07
MCW-CCF-VF-SBO	48	6.00E-02	(10.0)	1.36E-07	(23.0)	0.00E+00	7.18E-07
QS-SBO	160	2.70E-01	(7.5)	9.20E-10	(24.0)	-5.96E-10	3.85E-09
O	61	4.90E-02	(12.0)	-6.75E-09	(25.0)	-2.82E-08	0.00E+00
DGN-FTO	152	3.39E-02	(14.0)	-2.36E-07	(26.0)	-1.33E-06	-3.05E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T1	160	7.70E-02	(1.0)	7.57E-06	(1.0)	2.44E-07	4.08E-05

SEQUENCE SBO-BATT
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
OEP-CRB-FT-15H3	32	3.00E-03	(25.5)	1.70E-04	(1.0)	9.67E-06	5.30E-04
OEP-DGN-FR-6HDG1	45	1.20E-02	(20.0)	1.69E-04	(2.0)	9.67E-06	5.22E-04
OEP-DGN-FS-DG01	48	2.20E-02	(16.5)	1.51E-04	(3.0)	7.62E-06	4.50E-04
NRAC-7HR	160	5.00E-02	(11.0)	1.44E-04	(4.0)	5.90E-06	7.99E-04
OEP-DGN-MA-DG01	27	6.00E-03	(23.0)	1.27E-04	(5.0)	5.78E-06	4.06E-04
OEP-CRB-FT-15J3	18	3.00E-03	(25.5)	9.60E-05	(6.0)	5.96E-06	3.17E-04
OEP-DGN-FR-6HDG3	26	1.20E-02	(20.0)	9.57E-05	(7.0)	6.21E-06	3.13E-04
OEP-DGN-FR-6HDG2	24	1.20E-02	(20.0)	7.91E-05	(8.0)	3.93E-06	2.43E-04
OEP-DGN-FS-DG03	27	2.20E-02	(16.5)	7.84E-05	(9.5)	3.91E-06	2.40E-04
OEP-DGN-FS-DG02	27	2.20E-02	(16.5)	7.84E-05	(9.5)	3.91E-06	2.40E-04
OEP-DGN-MA-DG02	15	6.00E-03	(23.0)	6.83E-05	(11.0)	3.14E-06	2.20E-04
OEP-DGN-MA-DG03	15	6.00E-03	(23.0)	6.37E-05	(12.0)	2.82E-06	2.12E-04
OEP-DGN-FS	8	2.20E-02	(16.5)	3.73E-05	(13.0)	1.78E-06	1.22E-04
BETA-2DG	8	3.80E-02	(13.0)	2.12E-05	(14.0)	1.06E-06	7.19E-05
REC-XHE-FO-DGHWB	120	6.00E-01	(4.0)	4.40E-06	(15.0)	6.15E-08	2.20E-05
MCW-CCF-VF-SBO	48	6.00E-02	(10.0)	2.14E-06	(16.0)	0.00E+00	1.30E-05
REC-XHE-FO-SCOOL	58	1.25E-01	(9.0)	2.04E-06	(17.0)	0.00E+00	1.20E-05
NOTW2	54	8.15E-01	(3.0)	1.62E-06	(18.0)		
NSLOCA	106	2.70E-01	(7.5)	1.16E-06	(19.0)	0.00E+00	6.02E-06
NOTDG-CCF	8	5.20E-01	(5.0)	7.75E-07	(20.0)		
REC-XHE-FO-DGTMB	18	5.00E-01	(6.0)	2.78E-07	(21.0)	5.61E-10	1.14E-06
NOTQ	160	9.73E-01	(2.0)	2.10E-07	(22.0)		
NOTL-SBOU1	160	9.93E-01	(1.0)	5.34E-08	(23.0)		
QS-SBO	160	2.70E-01	(7.5)	2.49E-09	(24.0)	-2.40E-09	1.52E-08
O	61	4.90E-02	(12.0)	-1.31E-07	(25.0)	-5.12E-07	0.00E+00
DGN-FTO	152	3.39E-02	(14.0)	-6.74E-06	(26.0)	-3.76E-05	-1.74E-07

SEQUENCE SBO-BATT
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
OEP-DGN-FR-6HDG2	24	1.20E-02	(20.0)	21.8	(2.0)	1.79	0.70
OEP-DGN-FR-6HDG1	45	1.20E-02	(20.0)	21.8	(2.0)	1.79	0.70
OEP-DGN-FR-6HDG3	26	1.20E-02	(20.0)	21.8	(2.0)	1.79	0.70
OEP-DGN-FS-DG03	27	2.20E-02	(16.5)	21.6	(5.5)	1.45	0.73
OEP-DGN-FS	8	2.20E-02	(16.5)	21.6	(5.5)	1.45	0.73
OEP-DGN-FS-DG02	27	2.20E-02	(16.5)	21.6	(5.5)	1.45	0.73
OEP-DGN-FS-DG01	48	2.20E-02	(16.5)	21.6	(5.5)	1.45	0.73
REC-XHE-FO-DGTMB	18	5.00E-01	(6.0)	13.3	(8.0)	0.99	1.00
REC-XHE-FO-DGHWB	120	6.00E-01	(4.0)	13.0	(9.0)	1.27	1.00
NRAC-7HR	160	5.00E-02	(11.0)	11.6	(10.0)	1.25	1.05
OEP-DGN-MA-DG03	15	6.00E-03	(23.0)	3.3	(12.0)	1.10	1.02
OEP-DGN-MA-DG01	27	6.00E-03	(23.0)	3.3	(12.0)	1.10	1.02
OEP-DGN-MA-DG02	15	6.00E-03	(23.0)	3.3	(12.0)	1.10	1.02
OEP-CRB-FT-15J3	18	3.00E-03	(25.5)	1.9	(14.5)	1.07	1.00
OEP-CRB-FT-15H3	32	3.00E-03	(25.5)	1.9	(14.5)	1.07	1.00
BETA-2DG	8	3.80E-02	(13.0)	1.1	(16.0)	0.96	0.98
O	61	4.90E-02	(12.0)	0.9	(17.0)	1.00	1.00
REC-XHE-FO-SCOOL	58	1.25E-01	(9.0)	0.6	(18.0)	1.01	0.99
QS-SBO	160	2.70E-01	(7.5)	0.4	(19.0)		
NSLOCA	106	2.70E-01	(7.5)	0.0	(20.0)		
MCW-CCF-VF-SBO	48	6.00E-02	(10.0)	0.0	(21.5)		
DGN-FTO	152	3.39E-02	(14.0)	0.0	(21.5)		
NOTW2	54	8.15E-01	(3.0)				
NOTQ	160	9.73E-01	(2.0)				
NOTL-SBOU1	160	9.93E-01	(1.0)				
NOTDG-CCF	8	5.20E-01	(5.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	160	7.70E-02	(1.0)	27.4	(1.0)	1.76	0.99

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE SBO-BATT

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT SBO-BATT WITH TOP EVENT FREQUENCY 7.57E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	10	6.21E-07	0.08197	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
3					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
4					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
5	2	10	6.21E-07	0.16394	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
6					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
7					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
8	3	10	5.77E-07	0.24015	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
9					NOTQ	*	NOTW2	*	NRAC-7HR	*	OEP-DGN-FS	*
10					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
11	6	10	3.39E-07	0.28487	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
12					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
13					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
14	5	10	3.39E-07	0.32958	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
15					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
16					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
17	7	10	3.39E-07	0.37429	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
18					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
19					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
20	4	10	3.39E-07	0.41900	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
21					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
22					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
23	8	9	3.08E-07	0.45965	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
24					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
25					/QS-SBO	+						
26	10	10	2.30E-07	0.48997	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
27					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
28					QS-SBO	*	REC-XHE-FO-DGHWB	+				
29	9	10	2.30E-07	0.52029	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
30					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
31					QS-SBO	*	REC-XHE-FO-DGHWB	+				
32	11	10	2.14E-07	0.54847	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
33					NOTQ	*	NOTW2	*	NRAC-7HR	*	OEP-DGN-FS	*
34					QS-SBO	*	REC-XHE-FO-DGHWB	+				
35	12	10	1.85E-07	0.57286	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
36					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
37					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
38	15	10	1.69E-07	0.59522	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
39					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*
40					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
41	14	10	1.69E-07	0.61757	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
42					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
43					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
44	13	10	1.69E-07	0.63993	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
45					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
46					/QS-SBO	*	REC-XHE-FO-DGHWB	+				

47	16	10	1.69E-07	0.66229	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
48					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
49					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
50	20	10	1.25E-07	0.67882	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
51					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
52					QS-SBO	*	REC-XHE-FO-DGHWB	+				
53	18	10	1.25E-07	0.69536	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
54					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
55					QS-SBO	*	REC-XHE-FO-DGHWB	+				
56	17	10	1.25E-07	0.71190	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
57					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
58					QS-SBO	*	REC-XHE-FO-DGHWB	+				
59	19	10	1.25E-07	0.72844	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
60					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
61					QS-SBO	*	REC-XHE-FO-DGHWB	+				
62	21	9	1.14E-07	0.74347	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
63					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
64					QS-SBO	+						
65	23	10	9.24E-08	0.75566	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
66					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
67					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
68	22	10	9.24E-08	0.76786	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
69					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
70					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
71	26	10	8.47E-08	0.77904	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
72					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
73					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
74	25	10	8.47E-08	0.79021	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
75					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
76					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
77	24	10	8.47E-08	0.80139	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
78					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
79					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
80	28	10	7.70E-08	0.81155	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
81					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*
82					/QS-SBO	*	REC-XHE-FO-DGTMB	+				
83	29	9	7.70E-08	0.82172	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
84					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*
85					/QS-SBO	+						
86	27	10	7.70E-08	0.83188	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
87					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*
88					/QS-SBO	*	REC-XHE-FO-DGTMB	+				
89	30	9	7.70E-08	0.84204	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
90					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*
91					/QS-SBO	+						
92	31	10	6.83E-08	0.85106	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
93					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
94					QS-SBO	*	REC-XHE-FO-DGHWB	+				
95	32	10	6.26E-08	0.85933	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
96					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
97					QS-SBO	*	REC-XHE-FO-DGHWB	+				
98	35	10	6.26E-08	0.86760	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
99					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
100					QS-SBO	*	REC-XHE-FO-DGHWB	+				
101	33	10	6.26E-08	0.87587	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
102					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*

103					QS-SBO	*	REC-XHE-FO-DGHWB	+						
104	34	10	6.26E-08	0.88414	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
105					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*		
106					QS-SBO	*	REC-XHE-FO-DGHWB	+						
107	36	10	4.62E-08	0.89023	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
108					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*		
109					/QS-SBO	*	REC-XHE-FO-DGHWB	+						
110	38	10	3.42E-08	0.89474	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
111					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*		
112					QS-SBO	*	REC-XHE-FO-DGHWB	+						
113	37	10	3.42E-08	0.89925	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
114					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*		
115					QS-SBO	*	REC-XHE-FO-DGHWB	+						
116	41	10	3.13E-08	0.90339	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
117					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*		
118					QS-SBO	*	REC-XHE-FO-DGHWB	+						
119	40	10	3.13E-08	0.90752	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
120					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*		
121					QS-SBO	*	REC-XHE-FO-DGHWB	+						
122	39	10	3.13E-08	0.91166	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
123					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*		
124					QS-SBO	*	REC-XHE-FO-DGHWB	+						
125	45	9	2.85E-08	0.91541	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
126					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*		
127					QS-SBO	+								
128	44	9	2.85E-08	0.91917	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
129					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*		
130					QS-SBO	+								
131	43	10	2.85E-08	0.92293	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
132					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*		
133					QS-SBO	*	REC-XHE-FO-DGTMB	+						
134	42	10	2.85E-08	0.92669	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
135					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*		
136					QS-SBO	*	REC-XHE-FO-DGTMB	+						
137	47	12	2.45E-08	0.92992	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
138					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*		
139					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
140	46	12	2.45E-08	0.93315	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
141					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*		
142					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
143	48	10	2.31E-08	0.93619	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
144					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*		
145					/QS-SBO	*	REC-XHE-FO-DGHWB	+						
146	49	12	2.27E-08	0.93920	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*		
147					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*		
148					OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+		
149	52	9	1.92E-08	0.94174	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
150					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-CRB-FT-15J3	*		
151					/QS-SBO	+								
152	51	10	1.92E-08	0.94428	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
153					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*		
154					/QS-SBO	*	REC-XHE-FO-DGTMB	+						
155	50	10	1.92E-08	0.94682	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
156					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*		
157					/QS-SBO	*	REC-XHE-FO-DGTMB	+						
158	53	10	1.71E-08	0.94907	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		

SEQUENCE SBO-SLOCA

TOP EVENT SBO-SLOCA CONTAINS 38 EVENTS IN 1064 CUT SETS

THE FREQUENCY OF TOP EVENT SBO-SLOCA IS 3.84E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT SBO-SLOCA

N	1000
MEAN	5.31E-06
STD DEV	1.67E-05
LOWER 5%	0.00E+00
LOWER 25%	0.00E+00
MEDIAN	1.01E-06
UPPER 25%	4.13E-06
UPPER 5%	1.99E-05

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE SBO-SLOCA
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
NOTQ	1064	9.73E-01	(2.0)	3.84E-06	(1.5)		
NOTL-SBOU1	1064	9.93E-01	(1.0)	3.84E-06	(1.5)		
REC-XHE-FO-DGHWS	777	8.00E-01	(3.0)	3.42E-06	(3.0)	0.00E+00	1.72E-05
RCP-LOCA-750-90M	152	5.30E-01	(5.0)	3.10E-06	(4.0)	0.00E+00	1.73E-05
NRAC-216M	107	1.38E-01	(10.0)	2.99E-06	(5.0)	0.00E+00	1.65E-05
REC-XHE-FO-SCOOL	539	1.25E-01	(12.0)	2.60E-06	(6.0)	0.00E+00	1.43E-05
OEP-DGN-FS-DG01	294	2.20E-02	(22.5)	1.76E-06	(7.0)	0.00E+00	1.05E-05
MCW-CCF-VF-SBO	525	6.00E-02	(16.0)	1.25E-06	(8.0)	0.00E+00	7.40E-06
OEP-DGN-FR-6HDG1	294	1.20E-02	(29.0)	9.97E-07	(9.0)	0.00E+00	5.62E-06
OEP-DGN-FS-DG03	168	2.20E-02	(22.5)	9.14E-07	(10.5)	0.00E+00	5.29E-06
OEP-DGN-FS-DG02	168	2.20E-02	(22.5)	9.14E-07	(10.5)	0.00E+00	5.29E-06
RCP-LOCA-467-150	152	1.27E-01	(11.0)	5.82E-07	(12.0)	0.00E+00	3.71E-06
NRAC-258M	107	1.08E-01	(15.0)	5.60E-07	(13.0)	0.00E+00	3.50E-06
OEP-DGN-FR-6HDG3	168	1.20E-02	(29.0)	5.33E-07	(14.0)	0.00E+00	3.06E-06
OEP-DGN-FR-6HDG2	161	1.20E-02	(29.0)	4.98E-07	(15.0)	0.00E+00	2.79E-06
OEP-DGN-FS	42	2.20E-02	(22.5)	4.35E-07	(17.0)	0.00E+00	2.17E-06
BETA-2DG	42	3.80E-02	(19.0)	4.35E-07	(17.0)	0.00E+00	2.17E-06
NOTDG-CCF	42	5.20E-01	(6.0)	4.35E-07	(17.0)		
OEP-DGN-MA-DG01	196	6.00E-03	(32.0)	4.00E-07	(19.0)	0.00E+00	1.60E-06
OEP-CRB-FT-15H3	238	3.00E-03	(36.5)	2.46E-07	(20.0)	0.00E+00	9.65E-07
OEP-DGN-MA-DG02	112	6.00E-03	(32.0)	2.14E-07	(21.0)	0.00E+00	8.91E-07
OEP-DGN-MA-DG03	112	6.00E-03	(32.0)	2.03E-07	(22.0)	0.00E+00	8.51E-07
REC-XHE-FO-DGTMS	133	7.00E-01	(4.0)	1.50E-07	(23.0)	0.00E+00	5.67E-07
OEP-CRB-FT-15J3	133	3.00E-03	(36.5)	1.31E-07	(24.0)	0.00E+00	5.64E-07
NRAC-201M	45	1.50E-01	(9.0)	1.18E-07	(25.0)	0.00E+00	5.45E-07
NRAC-7HR	456	5.00E-02	(17.0)	9.77E-08	(26.0)	0.00E+00	0.00E+00
NRAC-246M	152	1.15E-01	(14.0)	4.05E-08	(27.0)	0.00E+00	8.93E-08
NRAC-150M	152	2.10E-01	(8.0)	3.82E-08	(28.5)	0.00E+00	0.00E+00
RCP-LOCA-1440-90	152	4.30E-03	(34.0)	3.82E-08	(28.5)	0.00E+00	0.00E+00
RCP-LOCA-183-210	152	1.61E-02	(25.5)	3.41E-08	(30.5)	0.00E+00	0.00E+00
RCP-LOCA-183-150	152	1.61E-02	(25.5)	3.41E-08	(30.5)	0.00E+00	0.00E+00
RCP-LOCA-183-90	152	1.40E-02	(27.0)	2.96E-08	(32.0)	0.00E+00	0.00E+00
RCP-LOCA-561-150	152	4.00E-03	(35.0)	1.95E-08	(33.0)	0.00E+00	0.00E+00
O	893	4.90E-02	(18.0)	8.66E-09	(34.0)	-3.06E-09	5.29E-08
NRAC-234M	45	1.23E-01	(13.0)	7.33E-10	(35.0)	0.00E+00	0.00E+00
QS-SBO	1064	2.70E-01	(7.0)	-4.15E-09	(36.0)	-3.22E-08	0.00E+00
DGN-FTO	1022	3.39E-02	(20.0)	-1.20E-07	(37.0)	-6.62E-07	0.00E+00

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T1	1064	7.70E-02	(1.0)	3.84E-06	(1.0)	0.00E+00	1.99E-05

SEQUENCE SBO-SLOCA
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
OEP-DGN-FR-6HDG1	294	1.20E-02	(29.0)	8.21E-05	(1.0)	0.00E+00	3.17E-04
OEP-CRB-FT-15H3	238	3.00E-03	(36.5)	8.18E-05	(2.0)	0.00E+00	3.22E-04
OEP-DGN-FS-DG01	294	2.20E-02	(22.5)	7.84E-05	(3.0)	0.00E+00	3.06E-04
OEP-DGN-MA-DG01	196	6.00E-03	(32.0)	6.63E-05	(4.0)	0.00E+00	2.69E-04
OEP-DGN-FR-6HDG3	168	1.20E-02	(29.0)	4.39E-05	(5.0)	0.00E+00	1.68E-04
OEP-CRB-FT-15J3	133	3.00E-03	(36.5)	4.36E-05	(6.0)	0.00E+00	1.71E-04
OEP-DGN-FR-6HDG2	161	1.20E-02	(29.0)	4.10E-05	(7.0)	0.00E+00	1.63E-04
OEP-DGN-FS-DG03	168	2.20E-02	(22.5)	4.06E-05	(8.5)	0.00E+00	1.60E-04
OEP-DGN-FS-DG02	168	2.20E-02	(22.5)	4.06E-05	(8.5)	0.00E+00	1.60E-04
OEP-DGN-MA-DG02	112	6.00E-03	(32.0)	3.54E-05	(10.0)	0.00E+00	1.42E-04
OEP-DGN-MA-DG03	112	6.00E-03	(32.0)	3.37E-05	(11.0)	0.00E+00	1.36E-04
MCW-CCF-VF-SBO	525	6.00E-02	(16.0)	1.95E-05	(12.0)	0.00E+00	1.14E-04
OEP-DGN-FS	42	2.20E-02	(22.5)	1.93E-05	(13.0)	0.00E+00	7.98E-05
NRAC-216M	107	1.38E-01	(10.0)	1.86E-05	(14.0)	0.00E+00	1.12E-04
REC-XHE-FO-SCOOL	539	1.25E-01	(12.0)	1.82E-05	(15.0)	0.00E+00	1.01E-04
BETA-2DG	42	3.80E-02	(19.0)	1.10E-05	(16.0)	0.00E+00	4.51E-05
RCP-LOCA-1440-90	152	4.30E-03	(34.0)	8.85E-06	(17.0)	1.90E-07	4.90E-05
RCP-LOCA-561-150	152	4.00E-03	(35.0)	4.86E-06	(18.0)	1.28E-07	2.63E-05
NRAC-258M	107	1.08E-01	(15.0)	4.62E-06	(19.0)	0.00E+00	2.81E-05
RCP-LOCA-467-150	152	1.27E-01	(11.0)	4.00E-06	(20.0)	0.00E+00	2.15E-05
RCP-LOCA-750-90M	152	5.30E-01	(5.0)	2.75E-06	(21.0)	0.00E+00	1.66E-05
RCP-LOCA-183-90	152	1.40E-02	(27.0)	2.09E-06	(22.0)	4.73E-08	1.11E-05
RCP-LOCA-183-210	152	1.61E-02	(25.5)	2.08E-06	(23.5)	3.72E-08	1.08E-05
RCP-LOCA-183-150	152	1.61E-02	(25.5)	2.08E-06	(23.5)	3.44E-08	1.11E-05
NRAC-7HR	456	5.00E-02	(17.0)	1.86E-06	(25.0)	0.00E+00	0.00E+00
REC-XHE-FO-DGHWS	777	8.00E-01	(3.0)	8.55E-07	(26.0)	0.00E+00	4.96E-06
NRAC-201M	45	1.50E-01	(9.0)	6.71E-07	(27.0)	0.00E+00	3.63E-06
NOTDG-CCF	42	5.20E-01	(6.0)	4.01E-07	(28.0)		
NRAC-246M	152	1.15E-01	(14.0)	3.12E-07	(29.0)	0.00E+00	7.04E-07
O	693	4.90E-02	(18.0)	1.68E-07	(30.0)	-9.58E-08	1.12E-06
NRAC-150M	152	2.10E-01	(8.0)	1.44E-07	(31.0)	0.00E+00	0.00E+00
NOTQ	1064	9.73E-01	(2.0)	1.07E-07	(32.0)		
REC-XHE-FO-DGTMS	133	7.00E-01	(4.0)	6.44E-08	(33.0)	0.00E+00	2.21E-07
NOTL-SBOU1	1084	9.93E-01	(1.0)	2.71E-08	(34.0)		
NRAC-234M	45	1.23E-01	(13.0)	5.23E-09	(35.0)	0.00E+00	0.00E+00
QS-SBO	1064	2.70E-01	(7.0)	-1.12E-08	(36.0)	-9.57E-08	0.00E+00
DGN-FTO	1022	3.39E-02	(20.0)	-3.41E-06	(37.0)	-1.82E-05	0.00E+00

SEQUENCE SBO-SLOCA
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
RCP-LOCA-750-90M	152	5.30E-01	(5.0)	44.3	(1.0)	NA	1.12
RCP-LOCA-467-150	152	1.27E-01	(11.0)	5.0	(2.0)	NA	0.99
OEP-DGN-FS-DG01	294	2.20E-02	(22.5)	2.3	(4.5)	NA	0.88
OEP-DGN-FS	42	2.20E-02	(22.5)	2.3	(4.5)	NA	0.88
OEP-DGN-FS-DG03	168	2.20E-02	(22.5)	2.3	(4.5)	NA	0.88
OEP-DGN-FS-DG02	168	2.20E-02	(22.5)	2.3	(4.5)	NA	0.88
OEP-DGN-FR-6HDG1	294	1.20E-02	(29.0)	2.0	(8.0)	NA	1.00
OEP-DGN-FR-6HDG2	161	1.20E-02	(29.0)	2.0	(8.0)	NA	1.00
OEP-DGN-FR-6HDG3	168	1.20E-02	(29.0)	2.0	(8.0)	NA	1.00
NRAC-216M	107	1.38E-01	(10.0)	1.5	(10.0)	NA	1.07
NRAC-150M	152	2.10E-01	(8.0)	1.3	(11.0)	NA	1.00
NRAC-7HR	456	5.00E-02	(17.0)	1.3	(12.0)	NA	1.00
NRAC-246M	152	1.15E-01	(14.0)	1.3	(13.0)	NA	1.00
NRAC-201M	45	1.50E-01	(9.0)	1.3	(14.0)	NA	1.03
NRAC-234M	45	1.23E-01	(13.0)	1.3	(15.0)	NA	1.00
NRAC-258M	107	1.08E-01	(15.0)	1.3	(16.0)	NA	1.00
REC-XHE-FO-DGTMS	133	7.00E-01	(4.0)	1.2	(17.0)	NA	1.00
REC-XHE-FO-DGHWS	777	8.00E-01	(3.0)	1.1	(18.0)	NA	1.02
RCP-LOCA-1440-90	152	4.30E-03	(34.0)	0.8	(19.0)	NA	1.01
O	693	4.90E-02	(18.0)	0.8	(20.0)	NA	1.00
OEP-CRB-FT-15H3	238	3.00E-03	(36.5)	0.8	(21.5)	NA	1.00
OEP-CRB-FT-15J3	133	3.00E-03	(36.5)	0.8	(21.5)	NA	1.00
MCW-CCF-VF-SBO	525	6.00E-02	(16.0)	0.7	(23.0)	NA	1.01
OEP-DGN-MA-DG03	112	6.00E-03	(32.0)	0.7	(25.0)	NA	1.08
OEP-DGN-MA-DG02	112	6.00E-03	(32.0)	0.7	(25.0)	NA	1.08
OEP-DGN-MA-DG01	196	6.00E-03	(32.0)	0.7	(25.0)	NA	1.08
DGN-FTO	1022	3.39E-02	(20.0)	0.5	(27.0)		
RCP-LOCA-183-210	152	1.61E-02	(25.5)	0.4	(28.0)		
REC-XHE-FO-SCOOL	539	1.25E-01	(12.0)	0.3	(29.0)		
BETA-2DG	42	3.80E-02	(19.0)	0.3	(30.0)		
RCP-LOCA-561-150	152	4.00E-03	(35.0)	0.2	(31.0)		
RCP-LOCA-183-150	152	1.61E-02	(25.5)	0.1	(32.0)		
RCP-LOCA-183-90	152	1.40E-02	(27.0)	0.1	(33.0)		
QS-SBO	1064	2.70E-01	(7.0)	0.0	(34.0)		
NOTQ	1064	9.73E-01	(2.0)				
NOTL-SBOU1	1064	9.93E-01	(1.0)				
NOTDG-CCF	42	5.20E-01	(6.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	1064	7.70E-02	(6.0)	1.6	(36.0)	NA	1.04

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS

SEQUENCE SBO-SLOCA

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT SBO-SLOCA WITH TOP EVENT FREQUENCY 3.84E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	12	1.77E-07	0.04599	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
3					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
4					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
5	2	12	1.77E-07	0.09197	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
6					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
7					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
8	3	12	1.64E-07	0.13472	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*		
9					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS	*		
10					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
11	6	12	9.63E-08	0.15981	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
12					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*		
13					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
14	5	12	9.63E-08	0.18489	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
15					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*		
16					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
17	4	12	9.63E-08	0.20997	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
18					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*		
19					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
20	7	12	9.63E-08	0.23505	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
21					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*		
22					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
23	8	12	8.48E-08	0.25713	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
24					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*		
25					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
26	9	12	8.48E-08	0.27920	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*		
27					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*		
28					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
29	10	12	7.88E-08	0.29972	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*		
30					NOTL-SBOU1	*	NOTQ	*	NRAC-216M	*	/O	*		
31					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
32	12	11	6.87E-08	0.31761	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
33					NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
34					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
35	11	11	6.87E-08	0.33549	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
36					NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*		
37					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
38	13	11	6.57E-08	0.35259	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
39					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*		
40					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+				
41	14	11	6.39E-08	0.36922	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*		
42					NOTQ	*	NRAC-216M	*	OEP-DGN-FS	*	QS-SBO	*		
43					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+				
44	15	12	5.26E-08	0.38290	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*		
45					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*		
46					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		

47	17	12	4.82E-08	0.39544	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
48					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	
49					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
50	19	12	4.82E-08	0.40798	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
51					NRAC-216M	*	/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	
52					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
53	16	12	4.82E-08	0.42053	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
54					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	
55					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
56	18	12	4.82E-08	0.43307	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
57					NRAC-216M	*	/O	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	
58					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
59	23	12	4.62E-08	0.44511	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
60					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	
61					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
62	20	12	4.62E-08	0.45715	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
63					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*	
64					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
65	22	12	4.62E-08	0.46919	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
66					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	
67					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
68	21	12	4.62E-08	0.48123	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
69					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	
70					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
71	24	11	3.75E-08	0.49098	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
72					NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*	
73					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
74	25	11	3.75E-08	0.50074	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
75					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
76					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
77	26	11	3.75E-08	0.51049	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
78					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*	
79					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
80	27	11	3.75E-08	0.52025	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
81					NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*	
82					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
83	154	12	3.31E-08	0.52887	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
84					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	
85					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
86	153	12	3.31E-08	0.53750	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
87					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	
88					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
89	29	11	3.30E-08	0.54608	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
90					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	
91					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
92	28	11	3.30E-08	0.55466	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
93					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	
94					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
95	30	11	3.15E-08	0.56287	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
96					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	
97					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	RCP-LOCA-750-90M	+			
98	155	12	3.08E-08	0.57089	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
99					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS	*	
100					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
101	31	11	3.07E-08	0.57887	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*	
102					NOTL-SBOU1	*	NOTQ	*	NRAC-216M	*	OEP-DGN-FS	*	

103					QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +	
104	32	12	2.63E-08	0.58571	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
105					NRAC-216M	/O	OEP-DGN-FR-6HDG1	OEP-DGN-MA-DG02
106					/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +
107	33	12	2.63E-08	0.59255	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
108					NRAC-216M	/O	OEP-DGN-FR-6HDG2	OEP-DGN-MA-DG01
109					/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +
110	34	10	2.55E-08	0.59920	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
111					NRAC-216M	OEP-DGN-FR-6HDG1	OEP-DGN-FR-6HDG3	QS-SBO
112					RCP-LOCA-750-90M	REC-XHE-FO-SCOOL +		
113	35	12	2.52E-08	0.60577	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
114					NOTQ	NRAC-216M	/O	OEP-DGN-FR-6HDG1
115					OEP-DGN-FR-6HDG2	/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +
116	38	12	2.41E-08	0.61204	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
117					NRAC-216M	/O	OEP-CRB-FT-15H3	OEP-DGN-FS-DG02
118					/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +
119	37	12	2.41E-08	0.61831	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
120					NRAC-216M	/O	OEP-CRB-FT-15J3	OEP-DGN-FS-DG01
121					/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +
122	36	12	2.41E-08	0.62458	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
123					NRAC-216M	/O	OEP-CRB-FT-15H3	OEP-DGN-FS-DG03
124					/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +
125	39	12	2.31E-08	0.63060	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
126					NOTQ	NRAC-216M	/O	OEP-DGN-FS-DG01
127					OEP-DGN-MA-DG02	/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +
128	42	12	2.31E-08	0.63662	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
129					NOTQ	NRAC-216M	/O	OEP-DGN-FS-DG02
130					OEP-DGN-MA-DG01	/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +
131	40	12	2.31E-08	0.64264	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
132					NOTQ	NRAC-216M	/O	OEP-DGN-FS-DG01
133					OEP-DGN-MA-DG03	/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +
134	41	12	2.31E-08	0.64866	/DGN-FTO	IE-T1	MCW-CCF-VF-SBO	NOTL-SBOU1
135					NOTQ	NRAC-216M	/O	OEP-DGN-FS-DG03
136					OEP-DGN-MA-DG01	/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGHWS +
137	44	12	2.30E-08	0.65465	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
138					NRAC-216M	/O	OEP-DGN-FR-6HDG1	OEP-DGN-MA-DG03
139					/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGTMS	REC-XHE-FO-SCOOL +
140	43	12	2.30E-08	0.66063	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
141					NRAC-216M	/O	OEP-DGN-FR-6HDG3	OEP-DGN-MA-DG01
142					/QS-SBO	RCP-LOCA-750-90M	REC-XHE-FO-DGTMS	REC-XHE-FO-SCOOL +
143	45	11	2.04E-08	0.66596	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
144					NRAC-216M	OEP-DGN-FR-6HDG1	OEP-DGN-FR-6HDG2	QS-SBO
145					RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +	
146	48	11	1.87E-08	0.67083	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
147					NRAC-216M	OEP-DGN-FS-DG01	OEP-DGN-MA-DG02	QS-SBO
148					RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +	
149	49	11	1.87E-08	0.67571	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
150					NRAC-216M	OEP-DGN-FS-DG01	OEP-DGN-MA-DG03	QS-SBO
151					RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +	
152	47	11	1.87E-08	0.68059	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
153					NRAC-216M	OEP-DGN-FS-DG03	OEP-DGN-MA-DG01	QS-SBO
154					RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +	
155	46	11	1.87E-08	0.68547	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ
156					NRAC-216M	OEP-DGN-FS-DG02	OEP-DGN-MA-DG01	QS-SBO
157					RCP-LOCA-750-90M	REC-XHE-FO-DGHWS	REC-XHE-FO-SCOOL +	
	157	12	1.81E-08	0.69017	/DGN-FTO	IE-T1	NOTL-SBOU1	NOTQ

159					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
160					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
161	156	12	1.81E-08	0.69487	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
162					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
163					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
164	158	12	1.81E-08	0.69958	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
165					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
166					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
167	159	12	1.81E-08	0.70428	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
168					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
169					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
170	51	11	1.80E-08	0.70896	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
171					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
172					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
173	50	11	1.80E-08	0.71365	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
174					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
175					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
176	53	11	1.80E-08	0.71833	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
177					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
178					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
179	52	11	1.80E-08	0.72301	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
180					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
181					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
182	55	11	1.64E-08	0.72729	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
183					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*
184					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+		
185	54	11	1.64E-08	0.73156	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
186					NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*
187					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+		
188	160	12	1.59E-08	0.73570	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
189					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*
190					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
191	161	12	1.59E-08	0.73984	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
192					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*
193					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
194	162	12	1.48E-08	0.74369	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*
195					NOTL-SBOU1	*	NOTQ	*	NRAC-258M	*	/O	*
196					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
197	56	12	1.31E-08	0.74711	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
198					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*
199					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
200	163	11	1.29E-08	0.75046	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
201					NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
202					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
203	164	11	1.29E-08	0.75382	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
204					NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
205					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
206	57	12	1.26E-08	0.75710	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
207					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*
208					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
209	58	12	1.26E-08	0.76039	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
210					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*
211					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
212	165	11	1.23E-08	0.76359	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
213					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
214					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-SCOOL	+		

215	59	10	1.23E-08	0.76679	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
216					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	
217					QS-SBO	*	RCP-LOCA-750-90M	+					
218	166	11	1.20E-08	0.76990	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
219					NOTQ	*	NRAC-258M	*	OEP-DGN-FS	*	QS-SBO	*	
220					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
221	62	12	1.16E-08	0.77291	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
222					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	
223					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
224	60	12	1.16E-08	0.77592	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
225					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	
226					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
227	61	12	1.16E-08	0.77893	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
228					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*	
229					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
230	64	12	1.10E-08	0.78181	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
231					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	
232					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+	
233	63	12	1.10E-08	0.78468	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
234					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	
235					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+	
236	65	11	1.02E-08	0.78734	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
237					NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
238					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
239	66	11	1.02E-08	0.79000	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
240					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*	
241					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
242	68	12	9.89E-09	0.79258	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
243					NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	
244					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
245	69	12	9.89E-09	0.79515	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
246					NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	
247					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
248	167	12	9.86E-09	0.79772	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
249					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	
250					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
251	67	11	9.81E-09	0.80027	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
252					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	
253					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
254	71	11	9.37E-09	0.80271	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
255					NRAC-216M	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*	
256					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
257	72	11	9.37E-09	0.80515	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
258					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
259					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
260	70	11	9.37E-09	0.80759	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
261					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*	
262					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
263	73	12	9.20E-09	0.80998	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
264					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS	*	
265					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
266	168	12	9.03E-09	0.81233	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
267					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	
268					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
269	169	12	9.03E-09	0.81469	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
270					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	

271					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
272	171	12	9.03E-09	0.81704	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
273					NRAC-258M	*	/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
274					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
275	170	12	9.03E-09	0.81939	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
276					NRAC-258M	*	/O	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
277					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
278	77	11	8.99E-09	0.82173	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
279					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*
280					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
281	75	11	8.99E-09	0.82407	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
282					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
283					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
284	74	11	8.99E-09	0.82641	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
285					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
286					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
287	76	11	8.99E-09	0.82875	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
288					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
289					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
290	79	11	8.94E-09	0.83108	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
291					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*
292					RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+		
293	78	11	8.94E-09	0.83341	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
294					NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*
295					RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+		
296	174	12	8.67E-09	0.83567	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
297					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*
298					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
299	173	12	8.67E-09	0.83793	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
300					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG3	*
301					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
302	172	12	8.67E-09	0.84018	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
303					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG2	*
304					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
305	175	12	8.67E-09	0.84244	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
306					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*
307					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
308	81	11	7.88E-09	0.84449	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
309					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*
310					OEP-DGN-FR-6HDG1	*	/QS-SBO	*	RCP-LOCA-750-90M	+		
311	80	11	7.88E-09	0.84655	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
312					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*
313					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	RCP-LOCA-750-90M	+		
314	177	11	7.03E-09	0.84838	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
315					NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*
316					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
317	176	11	7.03E-09	0.85020	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
318					NRAC-258M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
319					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
320	178	11	7.03E-09	0.85203	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
321					NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
322					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
323	179	11	7.03E-09	0.85386	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
324					NRAC-258M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
325					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
326	82	12	6.57E-09	0.85557	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*

327					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*
328					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
329	83	10	6.39E-09	0.85724	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
330					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*	QS-SBO	*
331					RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+				
332	84	10	6.39E-09	0.85890	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
333					NRAC-216M	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*	QS-SBO	*
334					RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+				
335	85	12	6.31E-09	0.86054	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
336					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*
337					OEP-DGN-FR-6HDG2	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
338	181	11	6.18E-09	0.86215	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
339					NOTQ	*	NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
340					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
341	180	11	6.18E-09	0.86376	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
342					NOTQ	*	NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
343					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
344	182	11	5.91E-09	0.86530	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
345					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*
346					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	RCP-LOCA-467-150	+		
347	183	11	5.75E-09	0.86680	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*
348					NOTL-SBOU1	*	NOTQ	*	NRAC-258M	*	OEP-DGN-FS	*
349					QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+		
350	87	12	5.75E-09	0.86829	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
351					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*
352					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+
353	88	12	5.75E-09	0.86979	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
354					NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*
355					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+
356	91	12	5.40E-09	0.87119	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
357					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
358					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
359	90	12	5.40E-09	0.87260	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
360					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
361					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
362	86	12	5.40E-09	0.87400	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
363					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
364					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
365	89	12	5.40E-09	0.87541	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
366					NRAC-201M	*	O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
367					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
368	92	11	5.11E-09	0.87674	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
369					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
370					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
371	184	12	4.93E-09	0.87802	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
372					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
373					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
374	185	12	4.93E-09	0.87931	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
375					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
376					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
377	93	11	4.91E-09	0.88058	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
378					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
379					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
380	94	11	4.91E-09	0.88186	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
381					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
382					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		

383	186	10	4.79E-09	0.88311	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
384					NRAC-258M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	*
385					RCP-LOCA-467-150	*	REC-XHE-FO-SCOOL	+				
386	95	12	4.75E-09	0.88434	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
387					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*
388					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
389	96	12	4.75E-09	0.88558	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
390					NOTQ	*	NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*
391					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
392	187	12	4.73E-09	0.88681	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
393					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*
394					OEP-DGN-FR-6HDG2	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
395	188	12	4.52E-09	0.88799	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
396					NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
397					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
398	190	12	4.52E-09	0.88916	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
399					NRAC-258M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
400					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
401	189	12	4.52E-09	0.89034	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
402					NRAC-258M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
403					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
404	99	11	4.50E-09	0.89151	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
405					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
406					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
407	97	11	4.50E-09	0.89268	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
408					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
409					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
410	98	11	4.50E-09	0.89385	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
411					NOTQ	*	NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
412					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
413	100	12	4.41E-09	0.89500	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*
414					NOTL-SBOU1	*	NOTQ	*	NRAC-201M	*	O	*
415					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
416	193	12	4.34E-09	0.89613	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
417					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG03	*
418					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
419	194	12	4.34E-09	0.89726	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
420					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG02	*
421					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
422	191	12	4.34E-09	0.89839	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
423					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*
424					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
425	192	12	4.34E-09	0.89952	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
426					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*
427					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+
428	195	12	4.31E-09	0.90064	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
429					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*
430					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+
431	196	12	4.31E-09	0.90176	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
432					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*
433					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+
434	102	11	4.29E-09	0.90288	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
435					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*
436					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+		
437	101	11	4.29E-09	0.90399	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
438					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*

SEQUENCE SBO-L

TOP EVENT SBO-L CONTAINS 32 EVENTS IN 216 CUT SETS

THE FREQUENCY OF TOP EVENT SBO-L IS 3.50E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT SBO-L

N	1000
MEAN	4.72E-06
STD DEV	1.34E-05
LOWER 5%	7.92E-08
LOWER 25%	3.87E-07
MEDIAN	1.31E-06
UPPER 25%	3.68E-06
UPPER 5%	2.05E-05

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE SBO-L

RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
NOTQ	216	9.73E-01	(1.0)	3.50E-06	(1.0)		
REC-XHE-FO-DGEN	203	9.00E-01	(2.0)	3.36E-06	(2.0)	7.62E-08	1.76E-05
QS-SBO	216	2.70E-01	(6.0)	3.01E-06	(3.0)	5.41E-08	1.74E-05
NRAC-1HR	22	4.40E-01	(5.0)	1.93E-06	(4.5)	2.34E-08	1.13E-05
AFW-XHE-FO-CST2	22	6.50E-02	(9.0)	1.93E-06	(4.5)	2.34E-08	1.13E-05
OEP-DGN-FS-DG01	86	2.20E-02	(15.5)	1.70E-06	(6.0)	3.09E-08	8.82E-06
NRAC-HALFHR	127	6.00E-01	(3.0)	1.05E-06	(7.0)	1.49E-08	5.68E-06
OEP-DGN-FS-DG02	45	2.20E-02	(15.5)	8.72E-07	(8.0)	1.66E-08	4.58E-06
OEP-DGN-FR-6HDG1	59	1.20E-02	(19.0)	8.64E-07	(9.0)	4.30E-09	5.58E-06
OEP-DGN-FS-DG03	45	2.20E-02	(15.5)	8.46E-07	(10.0)	1.61E-08	4.43E-06
NRAC-6HR-AVG	67	1.94E-01	(7.0)	5.24E-07	(11.0)	1.56E-09	2.70E-06
AFW-TDP-MA-FW2	63	1.00E-02	(23.5)	5.17E-07	(12.0)	2.38E-09	2.64E-06
AFW-TDP-FR-2P6HR	61	3.00E-02	(12.5)	5.15E-07	(13.0)	1.53E-09	2.69E-06
AFW-TDP-FS-FW2	58	1.10E-02	(21.5)	5.13E-07	(14.0)	2.41E-09	2.59E-06
OEP-DGN-FR-6HDG2	34	1.20E-02	(19.0)	4.69E-07	(15.0)	2.42E-09	2.96E-06
OEP-DGN-FR-6HDG3	32	1.20E-02	(19.0)	4.56E-07	(16.0)	2.33E-09	3.03E-06
NOTDG-CCF	18	5.20E-01	(4.0)	4.25E-07	(18.0)		
OEP-DGN-FS	18	2.20E-02	(15.5)	4.25E-07	(18.0)	8.99E-09	1.66E-06
BETA-2DG	18	3.80E-02	(10.0)	4.25E-07	(18.0)	8.99E-09	1.66E-06
OEP-DGN-MA-DG01	30	6.00E-03	(26.0)	3.69E-07	(20.0)	1.89E-09	1.43E-06
AFW-XHE-FO-U1SBO	73	8.20E-02	(8.0)	2.84E-07	(21.0)	2.62E-09	1.58E-06
OEP-DGN-MA-DG02	19	6.00E-03	(26.0)	1.99E-07	(22.0)	1.08E-09	7.85E-07
OEP-DGN-MA-DG03	15	6.00E-03	(26.0)	1.84E-07	(23.0)	9.44E-10	7.14E-07
OEP-CRB-FT-15H3	22	3.00E-03	(28.5)	1.45E-07	(24.0)	7.36E-10	5.51E-07
OEP-CRB-FT-15J3	8	3.00E-03	(28.5)	5.36E-08	(25.0)	3.09E-10	2.11E-07
AFW-TDP-FR-6HRU2	19	3.00E-02	(12.5)	3.56E-08	(26.0)	3.11E-11	3.17E-07
AFW-CKV-OO-CV172	12	1.00E-03	(31.0)	2.49E-08	(27.0)	6.43E-10	1.14E-07
AFW-TDP-FS-U2FW2	19	1.10E-02	(21.5)	2.17E-08	(28.0)	3.54E-11	1.96E-07
AFW-TDP-MA-U2FW2	17	1.00E-02	(23.5)	1.87E-08	(29.0)	3.32E-11	1.25E-07
OEP-DGN-FR-DG01	1	2.00E-03	(30.0)	5.11E-09	(30.0)	6.69E-12	1.41E-08
DGN-FTO	198	3.39E-02	(11.0)	-1.08E-07	(31.0)	-6.13E-07	-8.91E-10

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T1	216	7.70E-02	(1.0)	3.50E-06	(1.0)	7.92E-08	2.05E-05

SEQUENCE SBO-L
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
OEP-DGN-FS-DG01	86	2.20E-02	(15.5)	7.54E-05	(1.0)	2.84E-06	2.86E-04
OEP-DGN-FR-6HDG1	59	1.20E-02	(19.0)	7.12E-05	(2.0)	2.64E-06	2.58E-04
OEP-DGN-MA-DG01	30	6.00E-03	(26.0)	6.11E-05	(3.0)	2.05E-06	2.26E-04
AFW-TDP-MA-FW2	63	1.00E-02	(23.5)	5.11E-05	(4.0)	2.15E-08	2.46E-04
OEP-CRB-FT-15H3	22	3.00E-03	(28.5)	4.83E-05	(5.0)	1.71E-06	1.69E-04
AFW-TDP-FS-FW2	58	1.10E-02	(21.5)	4.62E-05	(6.0)	1.88E-06	2.29E-04
OEP-DGN-FS-DG02	45	2.20E-02	(15.5)	3.88E-05	(7.0)	1.49E-06	1.45E-04
OEP-DGN-FR-6HDG2	34	1.20E-02	(19.0)	3.86E-05	(8.0)	1.46E-06	1.43E-04
OEP-DGN-FS-DG03	45	2.20E-02	(15.5)	3.76E-05	(9.0)	1.40E-06	1.40E-04
OEP-DGN-FR-6HDG3	32	1.20E-02	(19.0)	3.76E-05	(10.0)	1.40E-06	1.33E-04
OEP-DGN-MA-DG02	19	6.00E-03	(26.0)	3.29E-05	(11.0)	1.15E-06	1.23E-04
OEP-DGN-MA-DG03	15	6.00E-03	(26.0)	3.06E-05	(12.0)	1.03E-06	1.13E-04
AFW-XHE-FO-CST2	22	6.50E-02	(9.0)	2.78E-05	(13.0)	7.74E-07	1.36E-04
AFW-CKV-OO-CV172	12	1.00E-03	(31.0)	2.49E-05	(14.0)	9.30E-07	1.22E-04
OEP-DGN-FS	18	2.20E-02	(15.5)	1.89E-05	(15.0)	6.96E-07	7.39E-05
OEP-CRB-FT-15J3	8	3.00E-03	(28.5)	1.78E-05	(16.0)	5.95E-07	6.65E-05
AFW-TDP-FR-2P6HR	61	3.00E-02	(12.5)	1.67E-05	(17.0)	2.97E-07	8.96E-05
BETA-2DG	18	3.80E-02	(10.0)	1.08E-05	(18.0)	3.49E-07	4.24E-05
QS-SBO	216	2.70E-01	(6.0)	8.14E-06	(19.0)	2.29E-07	3.90E-05
AFW-XHE-FO-U1SBO	73	8.20E-02	(8.0)	3.18E-06	(20.0)	5.48E-08	1.67E-05
OEP-DGN-FR-DG01	1	2.00E-03	(30.0)	2.55E-06	(21.0)	1.74E-08	9.69E-06
NRAC-1HR	22	4.40E-01	(5.0)	2.46E-06	(22.0)	3.02E-08	1.41E-05
NRAC-6HR-AVG	67	1.94E-01	(7.0)	2.18E-06	(23.0)	1.12E-08	9.13E-06
AFW-TDP-FS-U2FW2	19	1.10E-02	(21.5)	1.95E-06	(24.0)	3.20E-08	9.99E-06
AFW-TDP-MA-U2FW2	17	1.00E-02	(23.5)	1.86E-06	(25.0)	2.92E-08	8.88E-06
AFW-TDP-FR-6HRU2	19	3.00E-02	(12.5)	1.15E-06	(26.0)	9.08E-09	6.15E-06
NRAC-HALFHR	127	6.00E-01	(3.0)	6.98E-07	(27.0)	8.10E-09	3.80E-06
NOTDG-CCF	18	5.20E-01	(4.0)	3.92E-07	(28.0)		
REC-XHE-FO-DGEN	203	9.00E-01	(2.0)	3.73E-07	(29.0)	1.76E-09	1.58E-06
NOTQ	216	9.73E-01	(1.0)	9.73E-08	(30.0)		
DGN-FTO	198	3.39E-02	(11.0)	-3.08E-06	(31.0)	-1.90E-05	-5.73E-08

SEQUENCE SBO-L
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
OEP-DGN-FS-DG02	45	2.20E-02	(14.5)	20.6	(2.5)	1.89	0.70
OEP-DGN-FS-DG03	45	2.20E-02	(14.5)	20.6	(2.5)	1.89	0.70
OEP-DGN-FS-DG01	86	2.20E-02	(14.5)	20.6	(2.5)	1.89	0.70
OEP-DGN-FS	18	2.20E-02	(14.5)	20.6	(2.5)	1.89	0.70
OEP-DGN-FR-6HDG2	34	1.20E-02	(18.0)	16.9	(6.0)	1.58	0.71
OEP-DGN-FR-6HDG1	59	1.20E-02	(18.0)	16.9	(6.0)	1.58	0.71
OEP-DGN-FR-6HDG3	32	1.20E-02	(18.0)	16.9	(6.0)	1.58	0.71
OEP-DGN-FR-DG01	1	2.00E-03	(29.0)	16.4	(8.0)	1.00	1.00
QS-SBO	216	2.70E-01	(5.0)	16.3	(9.0)	1.73	0.87
AFW-XHE-FO-CST2	22	6.50E-02	(8.0)	10.6	(10.0)	1.43	0.80
OEP-DGN-MA-DG02	19	6.00E-03	(25.0)	3.0	(12.0)	1.22	0.87
OEP-DGN-MA-DG01	30	6.00E-03	(25.0)	3.0	(12.0)	1.22	0.87
OEP-DGN-MA-DG03	15	6.00E-03	(25.0)	3.0	(12.0)	1.22	0.87
AFW-TDP-MA-U2FW2	17	1.00E-02	(22.5)	2.2	(14.5)	1.23	1.03
AFW-TDP-MA-FW2	63	1.00E-02	(22.5)	2.2	(14.5)	1.23	1.03
AFW-TDP-FS-U2FW2	19	1.10E-02	(20.5)	2.0	(16.5)	1.15	0.97
AFW-TDP-FS-FW2	58	1.10E-02	(20.5)	2.0	(16.5)	1.15	0.97
REC-XHE-FO-DGEN	203	9.00E-01	(2.0)	1.3	(18.0)	1.01	0.98
NRAC-6HR-AVG	67	9.60E-02	(6.0)	1.2	(19.0)	1.13	1.00
AFW-CKV-OO-CV172	12	1.00E-03	(30.0)	0.8	(20.0)	0.99	1.00
BETA-2DG	18	3.80E-02	(9.0)	0.8	(21.0)	0.97	0.99
OEP-CRB-FT-15J3	8	3.00E-03	(27.5)	0.6	(22.5)	1.10	1.00
OEP-CRB-FT-15H3	22	3.00E-03	(27.5)	0.6	(22.5)	1.10	1.00
DGN-FTO	198	3.39E-02	(10.0)	0.4	(24.0)		
NRAC-HALFHR	149	6.00E-01	(3.0)	0.3	(25.0)		
AFW-TDP-FR-6HRU2	19	3.00E-02	(11.5)	0.0	(27.0)		
AFW-XHE-FO-U1SBO	73	8.20E-02	(7.0)	0.0	(27.0)		
AFW-TDP-FR-2P6HR	61	3.00E-02	(11.5)	0.0	(27.0)		
NOTQ	216	9.73E-01	(1.0)				
NOTDG-CCF	18	5.20E-01	(4.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	216	7.70E-02	(1.0)	23.1	(1.0)	1.95	0.98

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE SBO-L

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT SBO-L WITH TOP EVENT FREQUENCY 3.50E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	2	9	2.43E-07	0.06947	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
3					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	* QS-SBO *
4					REC-XHE-FO-DGEN	+				
5	1	9	2.43E-07	0.13893	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
6					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	* QS-SBO *
7					REC-XHE-FO-DGEN	+				
8	3	9	2.26E-07	0.20351	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	* NOTDG-CCF *
9					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	* QS-SBO *
10					REC-XHE-FO-DGEN	+				
11	6	9	1.33E-07	0.24140	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
12					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	* QS-SBO *
13					REC-XHE-FO-DGEN	+				
14	5	9	1.33E-07	0.27929	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
15					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	* QS-SBO *
16					REC-XHE-FO-DGEN	+				
17	4	9	1.33E-07	0.31718	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
18					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	* QS-SBO *
19					REC-XHE-FO-DGEN	+				
20	7	9	1.33E-07	0.35507	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
21					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	* QS-SBO *
22					REC-XHE-FO-DGEN	+				
23	8	8	8.05E-08	0.37804	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
24					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	* QS-SBO +
25	9	9	7.24E-08	0.39871	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
26					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	* QS-SBO *
27					REC-XHE-FO-DGEN	+				
28	11	9	6.64E-08	0.41765	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
29					NRAC-1HR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	* QS-SBO *
30					REC-XHE-FO-DGEN	+				
31	10	9	6.64E-08	0.43660	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
32					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	* QS-SBO *
33					REC-XHE-FO-DGEN	+				
34	13	9	6.64E-08	0.45554	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
35					NRAC-1HR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	* QS-SBO *
36					REC-XHE-FO-DGEN	+				
37	12	9	6.64E-08	0.47449	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	* NOTQ *
38					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	* QS-SBO *
39					REC-XHE-FO-DGEN	+				
40	15	9	5.62E-08	0.49052	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	* NOTQ *
41					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	* QS-SBO *
42					REC-XHE-FO-DGEN	+				
43	14	9	5.62E-08	0.50655	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	* NOTQ *
44					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	* QS-SBO *
45					REC-XHE-FO-DGEN	+				
46	16	9	5.22E-08	0.52145	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	* NOTDG-CCF *

47					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*
48					REC-XHE-FO-DGEN	+						
49	17	9	5.11E-08	0.53602	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
50					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
51					REC-XHE-FO-DGEN	+						
52	18	9	5.11E-08	0.55060	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
53					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
54					REC-XHE-FO-DGEN	+						
55	36	9	4.95E-08	0.56473	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
56					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
57					REC-XHE-FO-DGEN	+						
58	35	9	4.95E-08	0.57887	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
59					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
60					REC-XHE-FO-DGEN	+						
61	23	9	4.75E-08	0.59242	AFW-TDP-MA-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
62					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*
63					REC-XHE-FO-DGEN	+						
64	37	9	4.61E-08	0.60556	AFW-TDP-FR-2P6HR	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
65					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	QS-SBO	*
66					REC-XHE-FO-DGEN	+						
67	22	9	3.62E-08	0.61589	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
68					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*
69					REC-XHE-FO-DGEN	+						
70	21	9	3.62E-08	0.62623	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
71					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*
72					REC-XHE-FO-DGEN	+						
73	20	9	3.62E-08	0.63656	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
74					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*
75					REC-XHE-FO-DGEN	+						
76	19	9	3.62E-08	0.64690	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
77					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*
78					REC-XHE-FO-DGEN	+						
79	24	9	3.32E-08	0.65637	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
80					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*
81					REC-XHE-FO-DGEN	+						
82	25	9	3.32E-08	0.66584	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
83					NRAC-1HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
84					REC-XHE-FO-DGEN	+						
85	26	9	3.32E-08	0.67531	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
86					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*
87					REC-XHE-FO-DGEN	+						
88	28	9	3.06E-08	0.68406	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
89					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
90					REC-XHE-FO-DGEN	+						
91	29	9	3.06E-08	0.69280	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
92					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
93					REC-XHE-FO-DGEN	+						
94	27	9	3.06E-08	0.70155	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
95					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
96					REC-XHE-FO-DGEN	+						
97	33	9	2.79E-08	0.70949	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
98					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
99					REC-XHE-FO-DGEN	+						
100	32	9	2.79E-08	0.71744	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
101					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*
102					REC-XHE-FO-DGEN	+						

103	30	9	2.79E-08	0.72539	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
104					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
105					REC-XHE-FO-DGEN	+						
106	31	9	2.79E-08	0.73334	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
107					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
108					REC-XHE-FO-DGEN	+						
109	53	9	2.70E-08	0.74105	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
110					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
111					REC-XHE-FO-DGEN	+						
112	51	9	2.70E-08	0.74876	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
113					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*
114					REC-XHE-FO-DGEN	+						
115	52	9	2.70E-08	0.75647	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
116					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
117					REC-XHE-FO-DGEN	+						
118	50	9	2.70E-08	0.76418	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
119					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
120					REC-XHE-FO-DGEN	+						
121	38	8	1.86E-08	0.76948	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
122					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+
123	34	9	1.81E-08	0.77465	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
124					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
125					REC-XHE-FO-DGEN	+						
126	39	8	1.69E-08	0.77947	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
127					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+
128	40	9	1.67E-08	0.78424	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
129					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
130					REC-XHE-FO-DGEN	+						
131	65	8	1.64E-08	0.78891	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
132					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+
133	43	9	1.53E-08	0.79328	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
134					NRAC-HALFHR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*
135					REC-XHE-FO-DGEN	+						
136	41	9	1.53E-08	0.79765	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
137					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*
138					REC-XHE-FO-DGEN	+						
139	44	9	1.53E-08	0.80203	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
140					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*
141					REC-XHE-FO-DGEN	+						
142	42	9	1.53E-08	0.80640	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
143					NRAC-HALFHR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*
144					REC-XHE-FO-DGEN	+						
145	45	9	1.52E-08	0.81073	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
146					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
147					REC-XHE-FO-DGEN	+						
148	70	9	1.47E-08	0.81494	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
149					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
150					REC-XHE-FO-DGEN	+						
151	46	9	1.39E-08	0.81891	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
152					NRAC-HALFHR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*
153					REC-XHE-FO-DGEN	+						
154	49	9	1.39E-08	0.82289	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
155					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*
156					REC-XHE-FO-DGEN	+						
157	48	9	1.39E-08	0.82686	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
158					NRAC-HALFHR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*

159					REC-XHE-FO-DGEN	+						
160	47	9	1.39E-08	0.83084	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
161					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*
162					REC-XHE-FO-DGEN	+						
163	81	9	1.35E-08	0.83469	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
164					NRAC-6HR-AVG	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*
165					REC-XHE-FO-DGEN	+						
166	80	9	1.35E-08	0.83855	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
167					NRAC-6HR-AVG	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*
168					REC-XHE-FO-DGEN	+						
169	79	9	1.35E-08	0.84240	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
170					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*
171					REC-XHE-FO-DGEN	+						
172	78	9	1.35E-08	0.84626	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
173					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*
174					REC-XHE-FO-DGEN	+						
175	55	10	1.25E-08	0.84981	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
176					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
177					/QS-SBO	*	REC-XHE-FO-DGEN	+				
178	54	10	1.25E-08	0.85337	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
179					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
180					/QS-SBO	*	REC-XHE-FO-DGEN	+				
181	57	10	1.16E-08	0.85667	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*
182					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*
183					/QS-SBO	*	REC-XHE-FO-DGEN	+				
184	59	10	1.13E-08	0.85990	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
185					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
186					/QS-SBO	*	REC-XHE-FO-DGEN	+				
187	58	10	1.13E-08	0.86313	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
188					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
189					/QS-SBO	*	REC-XHE-FO-DGEN	+				
190	86	10	1.10E-08	0.86627	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
191					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
192					/QS-SBO	*	REC-XHE-FO-DGEN	+				
193	87	10	1.10E-08	0.86940	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
194					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
195					/QS-SBO	*	REC-XHE-FO-DGEN	+				
196	60	10	1.05E-08	0.87240	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*
197					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*
198					/QS-SBO	*	REC-XHE-FO-DGEN	+				
199	91	10	1.02E-08	0.87532	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*
200					NOTDG-CCF	*	NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*
201					/QS-SBO	*	REC-XHE-FO-DGEN	+				
202	56	9	9.05E-09	0.87790	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
203					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	QS-SBO	*
204					REC-XHE-FO-DGEN	+						
205	63	9	8.36E-09	0.88029	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
206					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*
207					REC-XHE-FO-DGEN	+						
208	61	9	8.36E-09	0.88267	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
209					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*
210					REC-XHE-FO-DGEN	+						
211	62	9	8.36E-09	0.88506	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
212					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*
213					REC-XHE-FO-DGEN	+						
214	64	9	8.36E-09	0.88744	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*

215					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	* QS-SBO *
216					REC-XHE-FO-DGEN	+				
217	69	9	7.60E-09	0.88961	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	* NOTQ *
218					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	* QS-SBO *
219					REC-XHE-FO-DGEN	+				
220	68	9	7.60E-09	0.89178	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	* NOTQ *
221					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	* QS-SBO *
222					REC-XHE-FO-DGEN	+				
223	67	9	7.60E-09	0.89394	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	* NOTQ *
224					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	* QS-SBO *
225					REC-XHE-FO-DGEN	+				
226	66	9	7.60E-09	0.89611	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	* NOTQ *
227					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	* QS-SBO *
228					REC-XHE-FO-DGEN	+				
229	98	9	7.37E-09	0.89822	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	* NOTQ *
230					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	* QS-SBO *
231					REC-XHE-FO-DGEN	+				
232	99	9	7.37E-09	0.90032	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	* NOTQ *
233					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	* QS-SBO *
234					REC-XHE-FO-DGEN	+				
235	100	9	7.37E-09	0.90242	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	* NOTQ *
236					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	* QS-SBO *
237					REC-XHE-FO-DGEN	+				
238	97	9	7.37E-09	0.90452	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	* NOTQ *
239					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	* QS-SBO *
240					REC-XHE-FO-DGEN	+				
241	73	9	6.97E-09	0.90651	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	* NOTQ *
242					NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	* QS-SBO *
243					REC-XHE-FO-DGEN	+				
244	72	9	6.97E-09	0.90850	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	* NOTQ *
245					NRAC-HALFHR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	* QS-SBO *
246					REC-XHE-FO-DGEN	+				
247	71	9	6.97E-09	0.91049	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	* NOTQ *
248					NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	* QS-SBO *
249					REC-XHE-FO-DGEN	+				
250	77	10	6.79E-09	0.91242	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	* IE-T1 *
251					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	* OEP-DGN-FS-DG01 *
252					/QS-SBO	*	REC-XHE-FO-DGEN	+		
253	76	10	6.79E-09	0.91436	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	* IE-T1 *
254					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	* OEP-DGN-FS-DG01 *
255					/QS-SBO	*	REC-XHE-FO-DGEN	+		
256	75	10	6.79E-09	0.91630	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	* IE-T1 *
257					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	* OEP-DGN-FS-DG03 *
258					/QS-SBO	*	REC-XHE-FO-DGEN	+		
259	74	10	6.79E-09	0.91824	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	* IE-T1 *
260					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	* OEP-DGN-FS-DG02 *
261					/QS-SBO	*	REC-XHE-FO-DGEN	+		
262	108	9	6.76E-09	0.92017	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	* NOTQ *
263					NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	* QS-SBO *
264					REC-XHE-FO-DGEN	+				
265	106	9	6.76E-09	0.92210	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	* NOTQ *
266					NRAC-6HR-AVG	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	* QS-SBO *
267					REC-XHE-FO-DGEN	+				
268	107	9	6.76E-09	0.92402	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	* NOTQ *
269					NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	* QS-SBO *
270					REC-XHE-FO-DGEN	+				

SEQUENCE SBO-SLOCA2

TOP EVENT SBO-SLOCA2 CONTAINS 37 EVENTS IN 770 CUT SETS

THE FREQUENCY OF TOP EVENT SBO-SLOCA2 IS 2.59E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT SBO-SLOCA2

N	1000
MEAN	3.34E-06
STD DEV	7.22E-06
LOWER 5%	0.00E+00
LOWER 25%	0.00E+00
MEDIAN	1.09E-06
UPPER 25%	3.44E-06
UPPER 5%	1.44E-05

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE SBO-SLOCA2
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
NOTQ	770	9.73E-01	(1.0)	2.59E-06	(1.5)		
NOTL-SBOU1U2	770	9.68E-01	(2.0)	2.59E-06	(1.5)		
REC-XHE-FO-DGHWS	630	8.00E-01	(3.0)	2.56E-06	(3.0)	0.00E+00	1.27E-05
OEP-DGN-FS	147	2.20E-02	(19.5)	2.21E-06	(4.0)	0.00E+00	9.67E-06
RCP-LOCA-750-90M	110	5.30E-01	(5.0)	2.09E-06	(5.0)	0.00E+00	1.27E-05
BETA-3DG	21	1.80E-02	(22.0)	2.09E-06	(6.0)	0.00E+00	9.32E-06
NRAC-216M	93	1.38E-01	(10.0)	2.02E-06	(7.0)	0.00E+00	1.21E-05
RCP-LOCA-467-150	110	1.27E-01	(11.0)	3.93E-07	(8.0)	0.00E+00	2.60E-06
NRAC-258M	93	1.08E-01	(14.0)	3.78E-07	(9.0)	0.00E+00	2.48E-06
OEP-DGN-FS-DG03	231	2.20E-02	(19.5)	2.07E-07	(11.0)	0.00E+00	1.86E-06
OEP-DGN-FS-DG02	231	2.20E-02	(19.5)	2.07E-07	(11.0)	0.00E+00	1.86E-06
OEP-DGN-FS-DG01	231	2.20E-02	(19.5)	2.07E-07	(11.0)	0.00E+00	1.86E-06
OEP-DGN-FR-6HDG3	217	1.20E-02	(27.0)	1.40E-07	(14.0)	0.00E+00	1.23E-06
OEP-DGN-FR-6HDG2	217	1.20E-02	(27.0)	1.40E-07	(14.0)	0.00E+00	1.23E-06
OEP-DGN-FR-6HDG1	217	1.20E-02	(27.0)	1.40E-07	(14.0)	0.00E+00	1.23E-06
BETA-2DG	126	3.80E-02	(17.0)	1.24E-07	(16.5)	0.00E+00	4.88E-07
NOTDG-CCF	126	5.20E-01	(6.0)	1.24E-07	(16.5)		
NRAC-201M	17	1.50E-01	(9.0)	7.68E-08	(18.0)	0.00E+00	4.04E-07
NRAC-7HR	330	5.00E-02	(15.0)	6.60E-08	(19.0)	0.00E+00	0.00E+00
OEP-DGN-MA-DG03	112	6.00E-03	(30.0)	5.32E-08	(21.0)	0.00E+00	2.76E-07
OEP-DGN-MA-DG02	112	6.00E-03	(30.0)	5.32E-08	(21.0)	0.00E+00	2.76E-07
OEP-DGN-MA-DG01	112	6.00E-03	(30.0)	5.32E-08	(21.0)	0.00E+00	2.76E-07
NRAC-246M	110	1.15E-01	(13.0)	2.68E-08	(23.0)	0.00E+00	6.49E-08
RCP-LOCA-1440-90	110	4.30E-03	(32.0)	2.58E-08	(24.5)	0.00E+00	0.00E+00
NRAC-150M	110	2.10E-01	(8.0)	2.58E-08	(24.5)	0.00E+00	0.00E+00
OEP-CRB-FT-15J3	105	3.00E-03	(35.0)	2.40E-08	(27.0)	0.00E+00	1.45E-07
OEP-CRB-FT-15H3	105	3.00E-03	(35.0)	2.40E-08	(27.0)	0.00E+00	1.45E-07
OEP-CRB-FT-25H3	105	3.00E-03	(35.0)	2.40E-08	(27.0)	0.00E+00	1.45E-07
RCP-LOCA-183-210	110	1.61E-02	(23.5)	2.30E-08	(29.5)	0.00E+00	0.00E+00
RCP-LOCA-183-150	110	1.61E-02	(23.5)	2.30E-08	(29.5)	0.00E+00	0.00E+00
RCP-LOCA-183-90	110	1.40E-02	(25.0)	2.00E-08	(31.0)	0.00E+00	0.00E+00
REC-XHE-FO-DGTMS	84	7.00E-01	(4.0)	1.56E-08	(32.0)	0.00E+00	8.10E-08
RCP-LOCA-561-150	110	4.00E-03	(33.0)	1.32E-08	(33.0)	0.00E+00	0.00E+00
O	518	4.90E-02	(16.0)	1.56E-09	(34.0)	-2.65E-08	2.92E-08
NRAC-234M	17	1.23E-01	(12.0)	4.76E-10	(35.0)	0.00E+00	0.00E+00
QS-SBO	770	2.70E-01	(7.0)	-9.27E-09	(36.0)	-4.28E-08	0.00E+00

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T1	770	7.70E-02	(1.0)	2.59E-06	(1.0)	0.00E+00	1.44E-05

SEQUENCE SBO-SLOCA2
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
BETA-3DG	21	1.80E-02	(22.0)	1.14E-04	(1.0)	0.00E+00	4.25E-04
OEP-DGN-FS	147	2.20E-02	(19.5)	9.82E-05	(2.0)	0.00E+00	4.01E-04
NRAC-216M	93	1.38E-01	(10.0)	1.26E-05	(3.0)	0.00E+00	7.54E-05
OEP-DGN-FR-6HDG1	217	1.20E-02	(27.0)	1.15E-05	(5.0)	0.00E+00	6.41E-05
OEP-DGN-FR-6HDG2	217	1.20E-02	(27.0)	1.15E-05	(5.0)	0.00E+00	6.41E-05
OEP-DGN-FR-6HDG3	217	1.20E-02	(27.0)	1.15E-05	(5.0)	0.00E+00	6.41E-05
OEP-DGN-FS-DG03	231	2.20E-02	(19.5)	9.20E-06	(8.0)	0.00E+00	5.27E-05
OEP-DGN-FS-DG01	231	2.20E-02	(19.5)	9.20E-06	(8.0)	0.00E+00	5.27E-05
OEP-DGN-FS-DG02	231	2.20E-02	(19.5)	9.20E-06	(8.0)	0.00E+00	5.27E-05
OEP-DGN-MA-DG02	112	6.00E-03	(30.0)	8.81E-06	(11.0)	0.00E+00	5.18E-05
OEP-DGN-MA-DG01	112	6.00E-03	(30.0)	8.81E-06	(11.0)	0.00E+00	5.18E-05
OEP-DGN-MA-DG03	112	6.00E-03	(30.0)	8.81E-06	(11.0)	0.00E+00	5.18E-05
OEP-CRB-FT-15J3	105	3.00E-03	(35.0)	7.99E-06	(14.0)	0.00E+00	4.93E-05
OEP-CRB-FT-25H3	105	3.00E-03	(35.0)	7.99E-06	(14.0)	0.00E+00	4.93E-05
OEP-CRB-FT-15H3	105	3.00E-03	(35.0)	7.99E-06	(14.0)	0.00E+00	4.93E-05
RCP-LOCA-1440-90	110	4.30E-03	(32.0)	5.97E-06	(16.0)	2.09E-07	3.03E-05
RCP-LOCA-561-150	110	4.00E-03	(33.0)	3.28E-06	(17.0)	1.69E-07	1.69E-05
BETA-2DG	126	3.80E-02	(17.0)	3.13E-06	(18.0)	0.00E+00	1.34E-05
NRAC-258M	93	1.08E-01	(14.0)	3.13E-06	(19.0)	0.00E+00	2.29E-05
RCP-LOCA-467-150	110	1.27E-01	(11.0)	2.70E-06	(20.0)	0.00E+00	1.51E-05
RCP-LOCA-750-90M	110	5.30E-01	(5.0)	1.86E-06	(21.0)	0.00E+00	1.04E-05
RCP-LOCA-183-90	110	1.40E-02	(25.0)	1.41E-06	(22.0)	5.71E-08	7.78E-06
RCP-LOCA-183-210	110	1.61E-02	(23.5)	1.40E-06	(23.5)	3.99E-08	7.68E-06
RCP-LOCA-183-150	110	1.61E-02	(23.5)	1.40E-06	(23.5)	4.05E-08	7.78E-06
NRAC-7HR	330	5.00E-02	(15.0)	1.25E-06	(25.0)	0.00E+00	0.00E+00
REC-XHE-FO-DGHWS	630	8.00E-01	(3.0)	6.40E-07	(26.0)	0.00E+00	2.86E-06
NRAC-201M	17	1.50E-01	(9.0)	4.35E-07	(27.0)	0.00E+00	2.25E-06
NRAC-248M	110	1.15E-01	(13.0)	2.06E-07	(28.0)	0.00E+00	5.12E-07
NOTDG-CCF	126	5.20E-01	(6.0)	1.14E-07	(29.0)		
NRAC-150M	110	2.10E-01	(8.0)	9.70E-08	(30.0)	0.00E+00	0.00E+00
NOTL-SBOU1U2	770	9.66E-01	(2.0)	8.57E-08	(31.0)		
NOTQ	770	9.73E-01	(1.0)	7.19E-08	(32.0)		
O	518	4.90E-02	(16.0)	3.02E-08	(33.0)	-6.73E-07	5.42E-07
REC-XHE-FO-DGTMS	84	7.00E-01	(4.0)	6.69E-09	(34.0)	0.00E+00	2.42E-08
NRAC-234M	17	1.23E-01	(12.0)	3.39E-09	(35.0)	0.00E+00	0.00E+00
QS-SBO	770	2.70E-01	(7.0)	-2.51E-08	(36.0)	-1.50E-07	0.00E+00

SEQUENCE SBO-SLOCA2
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
RCP-LOCA-750-90M	110	5.30E-01	(5.0)	44.8	(1.0)	NA	0.98
RCP-LOCA-467-150	110	1.27E-01	(11.0)	5.3	(2.0)	NA	1.00
OEP-DGN-FS-DG03	231	2.20E-02	(19.5)	2.4	(4.5)	NA	0.77
OEP-DGN-FS	147	2.20E-02	(19.5)	2.4	(4.5)	NA	0.77
OEP-DGN-FS-DG01	231	2.20E-02	(19.5)	2.4	(4.5)	NA	0.77
OEP-DGN-FS-DG02	231	2.20E-02	(19.5)	2.4	(4.5)	NA	0.77
BETA-3DG	21	1.80E-02	(22.0)	1.7	(7.0)	NA	0.89
NRAC-216M	93	1.38E-01	(10.0)	1.5	(8.0)	NA	0.95
OEP-DGN-FR-6HDG3	217	1.20E-02	(27.0)	1.4	(10.0)	NA	0.84
OEP-DGN-FR-6HDG2	217	1.20E-02	(27.0)	1.4	(10.0)	NA	0.84
OEP-DGN-FR-6HDG1	217	1.20E-02	(27.0)	1.4	(10.0)	NA	0.84
REC-XHE-FO-DGTMS	84	7.00E-01	(4.0)	1.3	(12.0)	NA	1.00
NRAC-150M	110	2.10E-01	(8.0)	1.3	(13.0)	NA	1.00
NRAC-7HR	330	5.00E-02	(15.0)	1.3	(14.0)	NA	1.00
NRAC-258M	93	1.08E-01	(14.0)	1.3	(15.0)	NA	1.02
NRAC-201M	17	1.50E-01	(9.0)	1.3	(16.0)	NA	1.00
NRAC-246M	110	1.15E-01	(13.0)	1.3	(17.0)	NA	1.00
REC-XHE-FO-DGHWS	630	8.00E-01	(3.0)	1.2	(18.0)	NA	0.99
NRAC-234M	17	1.23E-01	(12.0)	1.2	(19.0)	NA	1.00
RCP-LOCA-1440-90	110	4.30E-03	(32.0)	0.8	(20.0)	NA	1.01
O	518	4.90E-02	(16.0)	0.7	(21.0)	NA	1.00
OEP-CRB-FT-15J3	105	3.00E-03	(35.0)	0.5	(23.0)	NA	0.95
OEP-CRB-FT-15H3	105	3.00E-03	(35.0)	0.5	(23.0)	NA	0.95
OEP-CRB-FT-25H3	105	3.00E-03	(35.0)	0.5	(23.0)	NA	0.95
OEP-DGN-MA-DG03	112	6.00E-03	(30.0)	0.4	(26.0)		
OEP-DGN-MA-DG02	112	6.00E-03	(30.0)	0.4	(26.0)		
OEP-DGN-MA-DG01	112	6.00E-03	(30.0)	0.4	(26.0)		
RCP-LOCA-183-210	110	1.61E-02	(23.5)	0.3	(28.0)		
BETA-2DG	126	3.80E-02	(17.0)	0.2	(29.0)		
RCP-LOCA-561-150	110	4.00E-03	(33.0)	0.2	(30.0)		
RCP-LOCA-183-150	110	1.61E-02	(23.5)	0.2	(31.0)		
RCP-LOCA-183-90	110	1.40E-02	(25.0)	0.1	(32.0)		
QS-SBO	770	2.70E-01	(7.0)	0.0	(33.0)		
NOTDG-CCF	126	5.20E-01	(6.0)				
NOTQ	770	9.73E-01	(1.0)				
NOTL-SBOU1U2	770	9.68E-01	(2.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	770	7.70E-02	(2.0)	1.8	(35.0)	NA	0.96

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE

SEQUENCE SBO-SLOCA2

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT SBO-SLOCA2 WITH TOP EVENT FREQUENCY 2.59E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	10	1.17E-06	0.45000	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
3					NRAC-216M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
4					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
5	2	9	4.54E-07	0.62502	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
6					NRAC-216M	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-750-90M	*
7					REC-XHE-FO-DGHWS	+						
8	111	10	2.19E-07	0.70941	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
9					NRAC-258M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
10					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
11	112	9	8.51E-08	0.74223	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
12					NRAC-258M	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-467-150	*
13					REC-XHE-FO-DGHWS	+						
14	3	10	6.53E-08	0.76743	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
15					NRAC-201M	*	O	*	OEP-DGN-FS	*	/QS-SBO	*
16					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
17	4	11	3.14E-08	0.77953	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
18					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*
19					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
20	5	11	1.71E-08	0.78613	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
21					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*
22					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
23	7	11	1.71E-08	0.79273	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
24					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
25					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
26	6	11	1.71E-08	0.79933	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
27					/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
28					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+		
29	8	12	1.54E-08	0.80526	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
30					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*
31					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
32	9	12	1.54E-08	0.81119	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
33					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*
34					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
35	10	12	1.54E-08	0.81711	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
36					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*
37					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
38	441	10	1.44E-08	0.82267	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
39					NRAC-150M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
40					RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	+				
41	331	10	1.28E-08	0.82762	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
42					NRAC-7HR	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
43					RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	+				
44	221	10	1.28E-08	0.83258	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
45					NRAC-7HR	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
46					RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	+				

47	11	10	1.22E-08	0.83728	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
48					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*			
49					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+							
50	113	10	1.20E-08	0.84191	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*			
51					NRAC-246M	*	O	*	OEP-DGN-FS	*	/QS-SBO	*			
52					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+							
53	551	10	1.12E-08	0.84622	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*			
54					NRAC-7HR	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*			
55					RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	+							
56	14	11	9.33E-09	0.84982	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
57					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*			
58					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
59	13	11	9.33E-09	0.85342	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
60					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*			
61					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
62	12	11	9.33E-09	0.85702	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
63					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*			
64					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
65	16	11	8.56E-09	0.86032	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
66					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*			
67					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
68	15	11	8.56E-09	0.86362	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
69					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*			
70					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
71	17	11	8.56E-09	0.86692	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
72					/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*			
73					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
74	20	12	7.68E-09	0.86988	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
75					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS	*			
76					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
77	18	12	7.68E-09	0.87285	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
78					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS	*			
79					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
80	19	12	7.68E-09	0.87581	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
81					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS	*			
82					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
83	661	10	7.34E-09	0.87864	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*			
84					NRAC-246M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*			
85					RCP-LOCA-561-150	*	REC-XHE-FO-DGHWS	+							
86	21	10	6.65E-09	0.88121	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
87					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*			
88					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+							
89	22	10	6.65E-09	0.88377	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
90					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*			
91					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+							
92	23	10	6.65E-09	0.88634	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
93					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*			
94					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+							
95	24	10	6.36E-09	0.88880	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
96					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*			
97					/QS-SBO	*	RCP-LOCA-750-90M	+							
98	27	11	5.98E-09	0.89110	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
99					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*			
100					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
101	25	11	5.98E-09	0.89341	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
102					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*			

103					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
104	26	11	5.98E-09	0.89571	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
105					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	
106					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
107	114	11	5.88E-09	0.89798	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-258M	*	
108					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	
109					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
110	442	9	5.60E-09	0.90014	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	
111					NRAC-150M	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-1440-90	*	
112					REC-XHE-FO-DGHWS	+							
113	332	9	4.99E-09	0.90207	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	
114					NRAC-7HR	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-183-210	*	
115					REC-XHE-FO-DGHWS	+							
116	222	9	4.99E-09	0.90399	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	
117					NRAC-7HR	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-183-150	*	
118					REC-XHE-FO-DGHWS	+							
119	30	11	4.67E-09	0.90579	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
120					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*	
121					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
122	28	11	4.67E-09	0.90759	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
123					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*	
124					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
125	32	11	4.67E-09	0.90939	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
126					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	
127					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
128	31	11	4.67E-09	0.91119	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
129					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	
130					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
131	29	11	4.67E-09	0.91299	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
132					/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	
133					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
134	33	11	4.67E-09	0.91479	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
135					/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	
136					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
137	552	9	4.34E-09	0.91647	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	
138					NRAC-7HR	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-183-90	*	
139					REC-XHE-FO-DGHWS	+							
140	34	11	4.28E-09	0.91812	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
141					/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	
142					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
143	35	11	4.28E-09	0.91977	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
144					/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	
145					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
146	36	11	4.28E-09	0.92142	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
147					/O	*	OEP-CRB-FT-25H3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	
148					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
149	39	10	3.63E-09	0.92282	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
150					OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*	QS-SBO	*	
151					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
152	38	10	3.63E-09	0.92422	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
153					OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
154					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
155	37	10	3.63E-09	0.92562	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	
156					OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*	
157					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
158	41	10	3.33E-09	0.92690	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*	

SEQUENCE V

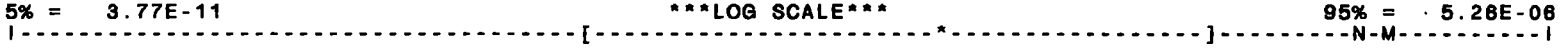
TOP EVENT V CONTAINS 3 EVENTS IN 3 CUT SETS

THE FREQUENCY OF TOP EVENT V IS 1.20E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT V

N	1000
MEAN	1.62E-06
STD DEV	6.02E-06
LOWER 5%	3.77E-11
LOWER 25%	3.31E-09
MEDIAN	4.88E-08
UPPER 25%	3.72E-07
UPPER 5%	5.26E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)



NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE V

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-V-TRAIN-2	1	4.00E-07	(2.0)	4.00E-07	(2.0)	1.26E-11	1.75E-06
IE-V-TRAIN-3	1	4.00E-07	(2.0)	4.00E-07	(2.0)	1.26E-11	1.75E-06
IE-V-TRAIN-1	1	4.00E-07	(2.0)	4.00E-07	(2.0)	1.26E-11	1.75E-06

SEQUENCE V

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
IE-V-TRAIN-2	1	4.00E-07	(2.0)	100.0	(2.0)
IE-V-TRAIN-3	1	4.00E-07	(2.0)	100.0	(2.0)
IE-V-TRAIN-1	1	4.00E-07	(2.0)	100.0	(2.0)

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE V

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT V WITH TOP EVENT FREQUENCY 1.20E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	2	1	4.00E-07	0.33333	IE-V-TRAIN-2	+
3	3	1	4.00E-07	0.66667	IE-V-TRAIN-3	+
4	1	1	4.00E-07	1.00000	IE-V-TRAIN-1	.

SEQUENCE SBO-Q

TOP EVENT SBO-Q CONTAINS 23 EVENTS IN 92 CUT SETS

THE FREQUENCY OF TOP EVENT SBO-Q IS 1.92E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT SBO-Q

N	1000
MEAN	2.21E-06
STD DEV	8.99E-06
LOWER 5%	9.09E-09
LOWER 25%	8.31E-08
MEDIAN	3.35E-07
UPPER 25%	1.21E-06
UPPER 5%	8.68E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE SBO-Q
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
SBO-PORV-DMD	92	4.50E-01	(4.0)	1.92E-06	(2.0)	9.09E-09	8.68E-06
NRAC-1HR	92	4.40E-01	(5.0)	1.92E-06	(2.0)	9.09E-09	8.68E-06
NOTL-SBOU1	92	9.93E-01	(1.0)	1.92E-06	(2.0)		
REC-XHE-FO-DGEN	86	9.00E-01	(2.0)	1.91E-06	(4.0)	8.95E-09	8.64E-06
OEP-DGN-FS-DG01	28	2.20E-02	(12.5)	1.09E-06	(5.0)	4.17E-09	5.03E-06
PPS-SOV-OO-1456	46	3.00E-02	(9.5)	9.61E-07	(6.5)	4.55E-09	4.34E-06
PPS-SOV-OO-1455C	46	3.00E-02	(9.5)	9.61E-07	(6.5)	4.55E-09	4.34E-06
OEP-DGN-FS-DG03	16	2.20E-02	(12.5)	5.73E-07	(8.5)	2.32E-09	2.63E-06
OEP-DGN-FS-DG02	16	2.20E-02	(12.5)	5.73E-07	(8.5)	2.32E-09	2.63E-06
BETA-2DG	4	3.80E-02	(7.0)	3.55E-07	(11.0)	1.67E-09	1.42E-06
OEP-DGN-FS	4	2.20E-02	(12.5)	3.55E-07	(11.0)	1.67E-09	1.42E-06
NOTDG-CCF	4	5.20E-01	(3.0)	3.55E-07	(11.0)		
OEP-DGN-MA-DG01	18	6.00E-03	(16.0)	2.38E-07	(13.0)	2.76E-10	7.10E-07
OEP-CRB-FT-15H3	20	3.00E-03	(18.5)	1.37E-07	(14.0)	1.95E-10	3.85E-07
OEP-DGN-MA-DG02	12	6.00E-03	(16.0)	1.28E-07	(15.0)	1.39E-10	4.04E-07
OEP-DGN-MA-DG03	10	6.00E-03	(16.0)	1.24E-07	(16.0)	1.39E-10	3.71E-07
OEP-DGN-FR-DG01	22	2.00E-03	(21.0)	9.72E-08	(17.0)	1.49E-10	3.39E-07
OEP-CRB-FT-15J3	8	3.00E-03	(18.5)	6.63E-08	(18.0)	9.69E-11	1.87E-07
OEP-DGN-FR-DG02	14	2.00E-03	(21.0)	5.13E-08	(19.0)	8.00E-11	1.78E-07
OEP-DGN-FR-DG03	12	2.00E-03	(21.0)	5.06E-08	(20.0)	8.06E-11	1.76E-07
QS-SBO	92	2.70E-01	(6.0)	-1.23E-08	(21.0)	-9.84E-08	-2.83E-12
DGN-FTO	88	3.39E-02	(8.0)	-5.50E-08	(22.0)	-2.47E-07	-1.36E-10

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T1	92	7.70E-02	(1.0)	1.92E-06	(1.0)	9.09E-09	8.68E-06

SEQUENCE SBO-Q
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
OEP-DGN-FS-DG01	28	2.20E-02	(12.5)	4.87E-05	(1.0)	3.52E-07	1.91E-04
OEP-DGN-FR-DG01	22	2.00E-03	(21.0)	4.85E-05	(2.0)	3.58E-07	1.79E-04
OEP-CRB-FT-15H3	20	3.00E-03	(18.5)	4.57E-05	(3.0)	3.46E-07	1.70E-04
OEP-DGN-MA-DG01	18	6.00E-03	(16.0)	3.94E-05	(4.0)	3.25E-07	1.46E-04
PPS-SOV-OO-1455C	46	3.00E-02	(9.5)	3.11E-05	(5.5)	1.05E-06	1.54E-04
PPS-SOV-OO-1456	46	3.00E-02	(9.5)	3.11E-05	(5.5)	1.05E-06	1.54E-04
OEP-DGN-FR-DG02	14	2.00E-03	(21.0)	2.56E-05	(7.0)	1.82E-07	9.71E-05
OEP-DGN-FS-DG03	16	2.20E-02	(12.5)	2.55E-05	(8.5)	1.79E-07	1.04E-04
OEP-DGN-FS-DG02	16	2.20E-02	(12.5)	2.55E-05	(8.5)	1.79E-07	1.04E-04
OEP-DGN-FR-DG03	12	2.00E-03	(21.0)	2.53E-05	(10.0)	1.83E-07	9.02E-05
OEP-CRB-FT-15J3	8	3.00E-03	(18.5)	2.21E-05	(11.0)	1.71E-07	7.17E-05
OEP-DGN-MA-DG02	12	6.00E-03	(16.0)	2.12E-05	(12.0)	1.67E-07	8.02E-05
OEP-DGN-MA-DG03	10	6.00E-03	(16.0)	2.06E-05	(13.0)	1.66E-07	7.45E-05
OEP-DGN-FS	4	2.20E-02	(12.5)	1.58E-05	(14.0)	1.15E-07	5.41E-05
BETA-2DG	4	3.80E-02	(7.0)	9.00E-06	(15.0)	6.55E-08	3.34E-05
NRAC-1HR	92	4.40E-01	(5.0)	2.45E-06	(16.0)	1.10E-08	9.80E-06
SBO-PORV-DMD	92	4.50E-01	(4.0)	2.35E-06	(17.0)	9.19E-09	1.07E-05
NOTDG-CCF	4	5.20E-01	(3.0)	3.28E-07	(18.0)		
REC-XHE-FO-DGEN	86	9.00E-01	(2.0)	2.12E-07	(19.0)	2.49E-10	9.14E-07
NOTL-SBOU1	92	9.93E-01	(1.0)	1.36E-08	(20.0)		
QS-SBO	92	2.70E-01	(6.0)	-3.33E-08	(21.0)	-8.67E-08	-3.59E-11
DGN-FTO	88	3.39E-02	(8.0)	-1.57E-06	(22.0)	-7.51E-06	-6.85E-09

SEQUENCE SBO-Q
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
PPS-SOV-OO-1456	46	3.00E-02	(9.5)	44.8	(1.5)	7.31	1.12
PPS-SOV-OO-1455C	46	3.00E-02	(9.5)	44.8	(1.5)	7.31	1.12
QS-SBO	92	2.70E-01	(6.0)	43.8	(3.0)	0.99	1.00
OEP-DGN-FS	4	2.20E-02	(12.5)	20.2	(5.5)	1.75	0.97
OEP-DGN-FS-DG01	28	2.20E-02	(12.5)	20.2	(5.5)	1.75	0.97
OEP-DGN-FS-DG03	16	2.20E-02	(12.5)	20.2	(5.5)	1.75	0.97
OEP-DGN-FS-DG02	16	2.20E-02	(12.5)	20.2	(5.5)	1.75	0.97
SBO-PORV-DMD	92	4.50E-01	(4.0)	14.8	(8.0)	1.92	1.10
OEP-DGN-MA-DG01	18	6.00E-03	(16.0)	2.7	(10.0)	1.32	0.93
OEP-DGN-MA-DG03	10	6.00E-03	(16.0)	2.7	(10.0)	1.32	0.93
OEP-DGN-MA-DG02	12	6.00E-03	(16.0)	2.7	(10.0)	1.32	0.93
OEP-DGN-FR-DG03	12	2.00E-03	(21.0)	1.6	(13.0)	1.02	0.98
OEP-DGN-FR-DG02	14	2.00E-03	(21.0)	1.6	(13.0)	1.02	0.98
OEP-DGN-FR-DG01	22	2.00E-03	(21.0)	1.6	(13.0)	1.02	0.98
REC-XHE-FO-DGEN	86	9.00E-01	(2.0)	1.2	(15.0)	1.02	0.97
BETA-2DG	4	3.80E-02	(7.0)	1.0	(16.0)	1.12	1.01
NRAC-1HR	92	4.40E-01	(5.0)	0.6	(17.0)	0.97	0.92
OEP-CRB-FT-15J3	8	3.00E-03	(18.5)	0.4	(18.5)		
OEP-CRB-FT-15H3	20	3.00E-03	(18.5)	0.4	(18.5)		
DGN-FTO	88	3.39E-02	(8.0)	0.0	(20.0)		
NOTDG-CCF	4	5.20E-01	(3.0)				
NOTL-SBOU1	92	9.93E-01	(1.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	92	7.70E-02	(1.0)	16.1	(1.0)	1.85	0.97

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE SBO-Q

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT SBO-Q WITH TOP EVENT FREQUENCY 1.92E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	2	10	1.40E-07	0.07258	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
3					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
4					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
5	3	10	1.40E-07	0.14515	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
6					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
7					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
8	4	10	1.40E-07	0.21773	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
9					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
10					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
11	1	10	1.40E-07	0.29030	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
12					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*
13					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
14	6	10	1.30E-07	0.35778	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
15					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
16					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
17	5	10	1.30E-07	0.42525	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
18					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*	/QS-SBO	*
19					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
20	7	10	5.16E-08	0.45209	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
21					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*
22					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
23	10	10	5.16E-08	0.47894	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
24					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*
25					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
26	9	10	5.16E-08	0.50578	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
27					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*
28					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
29	8	10	5.16E-08	0.53262	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
30					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*
31					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
32	12	10	4.80E-08	0.55758	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
33					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*	QS-SBO	*
34					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
35	11	10	4.80E-08	0.58253	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
36					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	QS-SBO	*
37					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
38	15	10	3.81E-08	0.60233	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
39					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*
40					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
41	14	10	3.81E-08	0.62212	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
42					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
43					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
44	16	10	3.81E-08	0.64191	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
45					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*
46					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				

47	18	10	3.81E-08	0.66171	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
48					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
49					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
50	13	10	3.81E-08	0.68150	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
51					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*
52					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
53	19	10	3.81E-08	0.70129	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
54					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
55					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
56	17	10	3.81E-08	0.72109	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
57					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
58					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
59	20	10	3.81E-08	0.74088	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
60					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
61					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
62	26	10	1.90E-08	0.75078	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
63					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
64					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
65	25	10	1.90E-08	0.76067	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
66					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*
67					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
68	24	10	1.90E-08	0.77057	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
69					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
70					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
71	23	10	1.90E-08	0.78047	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
72					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
73					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
74	21	10	1.90E-08	0.79036	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
75					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
76					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
77	22	10	1.90E-08	0.80026	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
78					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*
79					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
80	30	10	1.41E-08	0.80758	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
81					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*
82					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
83	29	10	1.41E-08	0.81490	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
84					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*
85					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
86	28	10	1.41E-08	0.82222	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
87					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*
88					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
89	31	10	1.41E-08	0.82954	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
90					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*
91					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
92	27	10	1.41E-08	0.83686	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
93					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*
94					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
95	34	10	1.41E-08	0.84419	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
96					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*
97					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
98	33	10	1.41E-08	0.85151	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
99					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*
100					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
101	32	10	1.41E-08	0.85883	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
102					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*

103					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
104	42	10	1.27E-08	0.86542	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
105					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
106					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
107	41	10	1.27E-08	0.87202	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
108					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*
109					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
110	40	10	1.27E-08	0.87862	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
111					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
112					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
113	39	10	1.27E-08	0.88522	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
114					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
115					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
116	38	10	1.27E-08	0.89182	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
117					OEP-DGN-FR-DG03	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
118					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
119	37	10	1.27E-08	0.89841	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
120					OEP-DGN-FR-DG03	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*
121					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
122	36	10	1.27E-08	0.90501	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
123					OEP-DGN-FR-DG02	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*
124					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
125	35	10	1.27E-08	0.91161	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
126					OEP-DGN-FR-DG02	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
127					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
128	48	10	7.04E-09	0.91527	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
129					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*
130					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
131	47	10	7.04E-09	0.91893	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
132					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*
133					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
134	46	10	7.04E-09	0.92259	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
135					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*
136					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
137	45	10	7.04E-09	0.92625	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
138					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*
139					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
140	44	10	7.04E-09	0.92991	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
141					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*
142					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
143	43	10	7.04E-09	0.93357	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
144					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*
145					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
146	54	10	5.19E-09	0.93627	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
147					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
148					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
149	53	10	5.19E-09	0.93897	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
150					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*
151					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
152	52	10	5.19E-09	0.94167	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
153					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
154					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
155	51	10	5.19E-09	0.94437	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
156					OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
157					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
158	50	10	5.19E-09	0.94707	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*

SEQUENCE S1-H1

TOP EVENT S1-H1-CM CONTAINS 20 EVENTS IN 30 CUT SETS

THE FREQUENCY OF TOP EVENT S1-H1-CM IS 1.55E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT S1-H1-CM

N	1000
MEAN	1.74E-06
STD DEV	4.43E-06
LOWER 5%	1.09E-07
LOWER 25%	3.62E-07
MEDIAN	7.67E-07
UPPER 25%	1.63E-06
UPPER 5%	5.58E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE S1-H1
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
BETA-2MOV	3	8.80E-02	(1.0)	9.86E-07	(1.0)	2.62E-08	3.15E-06
LPR-MOV-FT-1862A	7	5.20E-03	(3.5)	5.30E-07	(2.0)	7.86E-09	2.52E-06
LPR-MOV-FT-1860A	6	3.00E-03	(7.5)	3.05E-07	(3.0)	4.56E-09	1.15E-06
RMT-CCF-FA-MSCAL	1	3.00E-04	(17.0)	3.00E-07	(4.0)	7.36E-09	1.25E-06
LPR-MOV-FT-1890A	2	3.00E-03	(7.5)	2.73E-07	(5.0)	4.02E-09	1.00E-06
LPR-MOV-FT-1862B	6	5.20E-03	(3.5)	7.24E-08	(6.0)	5.93E-10	5.40E-07
LPR-CCF-PG-SUMP	1	5.00E-05	(18.0)	5.00E-08	(7.0)	1.14E-09	2.05E-07
LPR-MOV-FT-1860B	5	3.00E-03	(7.5)	4.15E-08	(8.0)	3.88E-10	2.63E-07
LPR-XHE-FO-HOTLG	1	4.00E-05	(19.0)	4.00E-08	(9.0)	9.44E-10	1.40E-07
LPI-MDP-FS-SI1B	3	3.00E-03	(7.5)	2.65E-08	(10.5)	2.40E-10	9.57E-08
LPI-MDP-FS-SI1A	3	3.00E-03	(7.5)	2.65E-08	(10.5)	2.40E-10	9.57E-08
LPI-MDP-MA-SI1B	3	2.00E-03	(11.5)	1.77E-08	(12.5)	1.41E-10	7.80E-08
LPI-MDP-MA-SI1A	3	2.00E-03	(11.5)	1.77E-08	(12.5)	1.41E-10	7.80E-08
LPR-MOV-FT-1890B	1	3.00E-03	(7.5)	9.00E-09	(14.0)	7.37E-12	1.08E-07
LPI-MDP-FR-B21HR	4	6.30E-04	(15.5)	8.32E-09	(15.5)	9.43E-11	2.93E-08
LPI-MDP-FR-A21HR	4	6.30E-04	(15.5)	8.32E-09	(15.5)	9.43E-11	2.93E-08
RMT-ACT-FA-RMTSB	2	1.60E-03	(13.5)	3.09E-09	(17.5)	4.32E-11	2.51E-08
RMT-ACT-FA-RMTSA	2	1.60E-03	(13.5)	3.09E-09	(17.5)	4.32E-11	2.51E-08
RMT-XHE-FO-MANS1	2	6.40E-02	(2.0)	1.06E-09	(19.0)	5.10E-12	3.57E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-S1	30	1.00E-03	(1.0)	1.55E-06	(1.0)	1.09E-07	5.58E-06

SEQUENCE S1-H1
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
LPR-XHE-FO-HOTLG	1	4.00E-05	(19.0)	1.00E-03	(1.5)	2.66E-04	2.40E-03
LPR-CCF-PG-SUMP	1	5.00E-05	(18.0)	1.00E-03	(1.5)	2.66E-04	2.40E-03
RMT-CCF-FA-MSCAL	1	3.00E-04	(17.0)	1.00E-03	(3.0)	2.66E-04	2.40E-03
LPR-MOV-FT-1860A	6	3.00E-03	(7.5)	1.02E-04	(4.0)	1.54E-05	2.91E-04
LPR-MOV-FT-1862A	7	5.20E-03	(3.5)	1.01E-04	(5.0)	1.55E-05	2.92E-04
LPR-MOV-FT-1890A	2	3.00E-03	(7.5)	9.07E-05	(6.0)	1.30E-05	2.73E-04
LPR-MOV-FT-1862B	6	5.20E-03	(3.5)	1.39E-05	(7.0)	1.47E-06	4.35E-05
LPR-MOV-FT-1860B	5	3.00E-03	(7.5)	1.38E-05	(8.0)	1.44E-06	4.28E-05
LPI-MDP-FR-B21HR	4	6.30E-04	(15.5)	1.32E-05	(9.5)	1.30E-06	4.11E-05
LPI-MDP-FR-A21HR	4	6.30E-04	(15.5)	1.32E-05	(9.5)	1.30E-06	4.11E-05
BETA-2MOV	3	8.80E-02	(1.0)	1.02E-05	(11.0)	5.06E-07	3.49E-05
LPI-MDP-MA-SI1B	3	2.00E-03	(11.5)	8.81E-06	(12.5)	5.94E-07	2.82E-05
LPI-MDP-MA-SI1A	3	2.00E-03	(11.5)	8.81E-06	(12.5)	5.94E-07	2.82E-05
LPI-MDP-FS-SI1B	3	3.00E-03	(7.5)	8.80E-06	(14.5)	5.93E-07	2.82E-05
LPI-MDP-FS-SI1A	3	3.00E-03	(7.5)	8.80E-06	(14.5)	5.93E-07	2.82E-05
LPR-MOV-FT-1890B	1	3.00E-03	(7.5)	2.99E-06	(16.0)	6.55E-08	1.10E-05
RMT-ACT-FA-RMTSB	2	1.60E-03	(13.5)	1.93E-06	(17.5)	1.51E-07	6.17E-06
RMT-ACT-FA-RMTSA	2	1.60E-03	(13.5)	1.93E-06	(17.5)	1.51E-07	6.17E-06
RMT-XHE-FO-MANS1	2	6.40E-02	(2.0)	1.56E-08	(19.0)	1.46E-10	6.27E-08

SEQUENCE S1-H1
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
LPR-MOV-FT-1862A	7	5.20E-03	(3.5)	23.4	(1.5)	1.80	0.90
LPR-MOV-FT-1862B	6	5.20E-03	(3.5)	23.4	(1.5)	1.80	0.90
LPR-MOV-FT-1860A	6	3.00E-03	(7.5)	19.8	(4.5)	1.85	0.99
LPR-MOV-FT-1890B	1	3.00E-03	(7.5)	19.8	(4.5)	1.85	0.99
LPR-MOV-FT-1860B	5	3.00E-03	(7.5)	19.8	(4.5)	1.85	0.99
LPR-MOV-FT-1890A	2	3.00E-03	(7.5)	19.8	(4.5)	1.85	0.99
RMT-CCF-FA-MSCAL	1	3.00E-04	(17.0)	10.3	(7.0)	1.67	0.92
BETA-2MOV	3	8.80E-02	(1.0)	8.8	(8.0)	1.17	0.97
LPR-XHE-FO-HOTLG	1	4.00E-05	(19.0)	1.2	(9.0)	1.06	1.01
LPI-MDP-MA-SI1B	3	2.00E-03	(11.5)	1.0	(10.5)	1.02	1.00
LPI-MDP-MA-SI1A	3	2.00E-03	(11.5)	1.0	(10.5)	1.02	1.00
LPI-MDP-FS-SI1B	3	3.00E-03	(7.5)	0.8	(12.5)	1.02	1.01
LPI-MDP-FS-SI1A	3	3.00E-03	(7.5)	0.8	(12.5)	1.02	1.01
LPR-CCF-PG-SUMP	1	5.00E-05	(18.0)	0.7	(14.0)	1.09	1.01
LPI-MDP-FR-B21HR	4	6.30E-04	(15.5)	0.0	(17.0)		
RMT-XHE-FO-MANS1	2	6.40E-02	(2.0)	0.0	(17.0)		
RMT-ACT-FA-RMTSB	2	1.60E-03	(13.5)	0.0	(17.0)		
RMT-ACT-FA-RMTSA	2	1.60E-03	(13.5)	0.0	(17.0)		
LPI-MDP-FR-A21HR	4	6.30E-04	(15.5)	0.0	(17.0)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-S1	30	1.00E-03	(1.0)	32.6	(1.0)	1.98	1.01

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE S1-H1

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT S1-H1-CM WITH TOP EVENT FREQUENCY 1.55E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	3	3	4.58E-07	0.29445	BETA-2MOV	*	IE-S1	*	LPR-MOV-FT-1862A	+			
3	1	2	3.00E-07	0.48749	IE-S1	*	RMT-CCF-FA-MSCAL	+					
4	4	3	2.64E-07	0.65736	BETA-2MOV	*	IE-S1	*	LPR-MOV-FT-1890A	+			
5	2	3	2.64E-07	0.82723	BETA-2MOV	*	IE-S1	*	LPR-MOV-FT-1860A	+			
6	5	2	5.00E-08	0.85941	IE-S1	*	LPR-CCF-PG-SUMP	+					
7	6	2	4.00E-08	0.88514	IE-S1	*	LPR-XHE-FO-HOTLG	+					
8	7	3	2.70E-08	0.90254	IE-S1	*	LPR-MOV-FT-1862A	*	LPR-MOV-FT-1862B	+			
9	10	3	1.56E-08	0.91258	IE-S1	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1862B	+			
10	9	3	1.56E-08	0.92262	IE-S1	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1862A	+			
11	11	3	1.56E-08	0.93266	IE-S1	*	LPR-MOV-FT-1860B	*	LPR-MOV-FT-1862A	+			
12	8	3	1.56E-08	0.94270	IE-S1	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1862B	+			
13	12	3	1.04E-08	0.94939	IE-S1	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1862A	+			
14	13	3	1.04E-08	0.95608	IE-S1	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1862B	+			
15	15	3	9.00E-09	0.96187	IE-S1	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1860B	+			
16	14	3	9.00E-09	0.96766	IE-S1	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1860A	+			
17	17	3	9.00E-09	0.97345	IE-S1	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1860B	+			
18	16	3	9.00E-09	0.97924	IE-S1	*	LPR-MOV-FT-1890A	*	LPR-MOV-FT-1890B	+			
19	19	3	6.00E-09	0.98310	IE-S1	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1860A	+			
20	18	3	6.00E-09	0.98697	IE-S1	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1860B	+			
21	21	3	3.28E-09	0.98907	IE-S1	*	LPI-MDP-FR-B21HR	*	LPR-MOV-FT-1862A	+			
22	20	3	3.28E-09	0.99118	IE-S1	*	LPI-MDP-FR-A21HR	*	LPR-MOV-FT-1862B	+			
23	22	3	2.56E-09	0.99283	IE-S1	*	RMT-ACT-FA-RMTSA	*	RMT-ACT-FA-RMTSB	+			
24	26	3	1.89E-09	0.99404	IE-S1	*	LPI-MDP-FR-B21HR	*	LPR-MOV-FT-1860A	+			
25	25	3	1.89E-09	0.99526	IE-S1	*	LPI-MDP-FR-A21HR	*	LPI-MDP-FS-SI1B	+			
26	24	3	1.89E-09	0.99648	IE-S1	*	LPI-MDP-FR-A21HR	*	LPR-MOV-FT-1860B	+			
27	23	3	1.89E-09	0.99769	IE-S1	*	LPI-MDP-FR-B21HR	*	LPI-MDP-FS-SI1A	+			
28	28	3	1.26E-09	0.99850	IE-S1	*	LPI-MDP-FR-A21HR	*	LPI-MDP-MA-SI1B	+			
29	27	3	1.26E-09	0.99931	IE-S1	*	LPI-MDP-FR-B21HR	*	LPI-MDP-MA-SI1A	+			
30	30	4	5.32E-10	0.99966	IE-S1	*	LPR-MOV-FT-1862A	*	RMT-ACT-FA-RMTSB	*	RMT-XHE-FO-MANS1	+	
31	29	4	5.32E-10	1.00000	IE-S1	*	LPR-MOV-FT-1862B	*	RMT-ACT-FA-RMTSA	*	RMT-XHE-FO-MANS1		

SURRY SEQUENCE T7-OD-QS

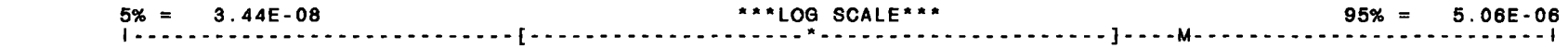
TOP EVENT T7-OD-QS CONTAINS 16 EVENTS IN 8 CUT SETS

THE FREQUENCY OF TOP EVENT T7-OD-QS IS 1.39E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T7-OD-QS

N	1000
MEAN	1.41E-06
STD DEV	4.48E-06
LOWER 5%	3.44E-08
LOWER 25%	1.45E-07
MEDIAN	3.74E-07
UPPER 25%	1.06E-06
UPPER 5%	5.06E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)



NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SURRY SEQUENCE T7-OD-QS

RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IAS-CCF-LF-INAIR	3	2.70E-05	(14.0)	4.59E-04	(1.0)	5.11E-10	1.35E-07
MSS-XHE-FO-ISAFW	1	6.80E-06	(15.0)	2.10E-04	(2.0)	4.39E-11	7.32E-09
REC-XHE-FO-DPRES	3	1.40E-02	(11.5)	3.15E-05	(3.0)	2.06E-08	4.88E-06
PORV-BLK	2	1.50E-01	(7.5)	2.48E-05	(4.0)	8.15E-09	2.14E-06
MSS-XHE-FO-BLOCK	2	6.40E-02	(9.0)	1.82E-05	(5.0)	3.63E-09	9.14E-07
SGTR-SGSRV-ODMD2	2	1.50E-01	(7.5)	1.82E-05	(6.0)	6.31E-09	2.00E-06
PORV-NOT-BLK	4	8.50E-01	(5.0)	3.30E-06	(7.0)	1.48E-08	3.09E-06
MSS-CKV-FT-SGDHR	1	2.00E-03	(13.0)	2.58E-06	(8.0)	1.24E-10	3.09E-08
RCS-XHE-FO-DPRT7	5	2.90E-02	(10.0)	1.36E-06	(9.0)		
MSS-SRV-OO-ODSRV	4	1.00E+00	(2.5)	1.15E-06	(10.0)		
SGTR-SGSRV-ODMD1	2	1.00E+00	(2.5)	6.21E-07	(11.0)		
MSS-XHE-FO-ISDHR	1	1.40E-02	(11.5)	5.30E-07	(12.0)	1.24E-10	3.09E-08
SGTR-SGADV-ODMD	2	1.00E+00	(2.5)	2.36E-07	(13.5)		
MSS-SOV-OO-ODADV	2	1.00E+00	(2.5)	2.36E-07	(13.5)		
REC-XHE-FO-GAGRV	2	3.00E-01	(6.0)	1.23E-08	(15.0)	1.79E-10	7.97E-08

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T7	8	1.00E-02	(1.0)	5.14E-04	(1.0)	3.49E-08	5.06E-06

SURRY SEQUENCE T7-OD-QS
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
RCS-XHE-FO-DPRT7	5	2.90E-02	(10.0)	4.55E-05	(1.0)		
REC-XHE-FO-DPRES	3	1.40E-02	(11.5)	3.71E-06	(2.0)	1.53E-05	2.62E-04
PORV-NOT-BLK	4	8.50E-01	(5.0)	2.42E-06	(3.0)	6.57E-10	5.52E-07
SGTR-SGSRV-ODMD2	2	1.50E-01	(7.5)	1.51E-06	(4.0)	7.58E-08	9.60E-06
PORV-BLK	2	1.50E-01	(7.5)	1.30E-06	(5.0)	9.64E-08	1.16E-05
MSS-XHE-FO-BLOCK	2	6.40E-02	(9.0)	9.09E-07	(6.0)	1.13E-07	1.09E-05
IAS-CCF-LF-INAIR	3	2.70E-05	(14.0)	6.90E-09	(7.0)	1.59E-04	4.35E-03
MSS-CKV-FT-SGDHR	1	2.00E-03	(13.0)	6.51E-09	(8.5)	1.00E-07	1.67E-05
MSS-XHE-FO-ISDHR	1	1.40E-02	(11.5)	6.51E-09	(8.5)	7.83E-08	1.62E-06
REC-XHE-FO-GAGRV	2	3.00E-01	(6.0)	2.93E-09	(10.0)	6.04E-10	2.04E-07
MSS-XHE-FO-ISAFW	1	6.80E-06	(15.0)	1.08E-10	(11.0)	7.74E-05	6.97E-04
SGTR-SGSRV-ODMD1	2	1.00E+00	(2.5)	0.00E+00	(13.5)		
SGTR-SGADV-ODMD	2	1.00E+00	(2.5)	0.00E+00	(13.5)		
MSS-SOV-OO-ODADV	2	1.00E+00	(2.5)	0.00E+00	(13.5)		
MSS-SRV-OO-ODSRV	4	1.00E+00	(2.5)	0.00E+00	(13.5)		

SURRY SEQUENCE T7-OD-QS
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
REC-XHE-FO-DPRES	3	1.40E-02	(11.5)	63.1	(1.0)	6.72	0.77
PORV-BLK	2	1.50E-01	(7.5)	5.2	(2.0)	1.25	1.07
SGTR-SGSRV-ODMD2	2	1.50E-01	(7.5)	4.4	(3.0)	1.13	0.94
IAS-CCF-LF-INAIR	3	2.70E-05	(14.0)	1.2	(4.0)	1.10	1.00
MSS-XHE-FO-BLOCK	2	6.40E-02	(9.0)	1.0	(5.0)	0.97	1.02
PORV-NOT-BLK	4	8.50E-01	(5.0)	0.9	(6.0)	1.00	0.97
MSS-XHE-FO-ISAFW	1	6.80E-06	(15.0)	0.6	(7.0)	1.02	1.00
MSS-XHE-FO-ISDHR	1	1.40E-02	(11.5)	0.4	(8.0)		
REC-XHE-FO-GAGRV	2	3.00E-01	(6.0)	0.0	(9.5)		
MSS-CKV-FT-SGDHR	1	2.00E-03	(13.0)	0.0	(9.5)		
SGTR-SGSRV-ODMD1	2	1.00E+00	(2.5)				
SGTR-SGADV-ODMD	2	1.00E+00	(2.5)				
MSS-SOV-OO-ODADV	2	1.00E+00	(2.5)				
RCS-XHE-FO-DPRT7	5	2.90E-02	(10.0)				
MSS-SRV-OO-ODSRV	4	1.00E+00	(2.5)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T7	8	1.00E-02	(1.0)	20.2	(1.0)	1.74	1.03

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT.

SURRY SEQUENCE T7-OD-QS

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T7-OD-QS WITH TOP EVENT FREQUENCY 1.39E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	6	6.09E-07	0.43663	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	RCS-XHE-FO-DPRT7	*
3					REC-XHE-FO-DPRES	*	SGTR-SGSRV-ODMD1	+				
4	2	6	5.18E-07	0.80777	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	RCS-XHE-FO-DPRT7	*
5					REC-XHE-FO-DPRES	*	SGTR-SGSRV-ODMD2	+				
6	3	7	2.21E-07	0.96612	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	PORV-NOT-BLK	*
7					RCS-XHE-FO-DPRT7	*	REC-XHE-FO-DPRES	*	SGTR-SGADV ODMD	+		
8	7	6	1.47E-08	0.97665	IAS-CCF-LF-INAIR	*	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*
9					PORV-NOT-BLK	*	SGTR-SGADV-ODMD	+				
10	4	6	1.22E-08	0.98536	IAS-CCF-LF-INAIR	*	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*
11					REC-XHE-FO-GAGRV	*	SGTR-SGSRV-ODMD1	+				
12	5	6	1.03E-08	0.99276	IAS-CCF-LF-INAIR	*	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*
13					REC-XHE-FO-GAGRV	*	SGTR-SGSRV-ODMD2	+				
14	6	4	8.12E-09	0.99859	IE-T7	*	MSS-CKV-FT-SGDHR	*	MSS-XHE-FO-ISDHR	*	RCS-XHE-FO-DPRT7	*
15	8	3	1.97E-09	1.00000	IE-T7	*	MSS-XHE-FO-ISAFW	*	RCS-XHE-FO-DPRT7			

SEQUENCE T2-L-D2

TOP EVENT T2-L-D2 CONTAINS 24 EVENTS IN 21 CUT SETS

THE FREQUENCY OF TOP EVENT T2-L-D2 IS 7.16E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T2-L-D2

N	1000
MEAN	9.82E-07
STD DEV	9.62E-06
LOWER 5%	1.44E-08
LOWER 25%	6.99E-08
MEDIAN	1.99E-07
UPPER 25%	5.95E-07
UPPER 5%	2.45E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE T2-L-D2
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
AFW-XHE-FO-UNIT2	21	3.60E-02	(4.0)	7.16E-07	(1.0)	1.44E-08	2.45E-06
HPI-XHE-FO-FDBLD	14	7.10E-02	(2.0)	7.10E-07	(2.0)	1.42E-08	2.45E-06
AFW-PSF-FC-XCONN	6	1.50E-04	(18.0)	3.65E-07	(3.0)	8.74E-09	1.42E-06
AFW-CCF-LK-STMBD	3	1.00E-04	(20.5)	2.42E-07	(4.0)	1.86E-10	6.11E-07
BETA-AFW	3	5.60E-02	(3.0)	4.32E-08	(5.5)	2.72E-10	1.92E-07
AFW-MDP-FS	3	6.30E-03	(9.0)	4.32E-08	(5.5)	2.72E-10	1.92E-07
AFW-TDP-FS-FW2	3	1.10E-02	(6.0)	3.68E-08	(7.0)	1.62E-10	1.60E-07
AFW-TDP-FR-2P6HR	4	3.00E-02	(5.0)	3.01E-08	(8.0)	7.00E-11	1.09E-07
AFW-CKV-OO-CV142	1	1.00E-03	(16.0)	2.64E-08	(9.0)	9.71E-11	1.15E-07
AFW-MDP-FS-FW3B	5	6.30E-03	(9.0)	2.09E-08	(10.5)	2.68E-10	9.26E-08
AFW-MDP-FS-FW3A	5	6.30E-03	(9.0)	2.09E-08	(10.5)	2.68E-10	9.26E-08
AFW-CKV-OO-CV157	1	1.00E-03	(16.0)	1.51E-08	(12.5)	1.98E-10	5.17E-08
AFW-CKV-OO-CV172	1	1.00E-03	(16.0)	1.51E-08	(12.5)	1.98E-10	5.17E-08
AFW-TDP-MA-FW2	2	1.00E-02	(7.0)	9.43E-09	(14.0)	2.19E-11	3.03E-08
BETA-2MOV	4	8.80E-02	(1.0)	4.47E-09	(15.0)	1.88E-11	1.50E-08
AFW-TNK-VF-CST	1	1.00E-06	(23.0)	2.40E-09	(16.0)	5.44E-11	9.69E-09
HPI-MOV-FT-1867C	2	3.00E-03	(11.5)	2.23E-09	(17.5)	9.41E-12	7.51E-09
HPI-MOV-FT-1115B	2	3.00E-03	(11.5)	2.23E-09	(17.5)	9.41E-12	7.51E-09
AFW-MDP-MA-FW3B	1	2.00E-03	(13.5)	9.08E-10	(19.5)	6.82E-13	2.59E-09
AFW-MDP-MA-FW3A	1	2.00E-03	(13.5)	9.08E-10	(19.5)	6.82E-13	2.59E-09
HPI-CKV-FT-CV410	1	1.00E-04	(20.5)	5.08E-10	(22.0)	1.54E-11	1.83E-09
HPI-CKV-FT-CV25	1	1.00E-04	(20.5)	5.08E-10	(22.0)	1.54E-11	1.83E-09
HPI-CKV-FT-CV225	1	1.00E-04	(20.5)	5.08E-10	(22.0)	1.54E-11	1.83E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T2	21	9.40E-01	(1.0)	7.16E-07	(1.0)	1.44E-08	2.45E-06

SEQUENCE T2-L-D2
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
AFW-PSF-FC-XCONN	6	1.50E-04	(18.0)	2.43E-03	(1.0)	8.75E-05	9.05E-03
AFW-CCF-LK-STMBD	3	1.00E-04	(20.5)	2.42E-03	(2.0)	8.63E-05	9.03E-03
AFW-TNK-VF-CST	1	1.00E-06	(23.0)	2.40E-03	(3.0)	8.40E-05	9.02E-03
AFW-CKV-OO-CV142	1	1.00E-03	(16.0)	2.64E-05	(4.0)	1.22E-07	1.08E-04
AFW-XHE-FO-UNIT2	21	3.60E-02	(4.0)	1.92E-05	(5.0)	9.47E-07	6.25E-05
AFW-CKV-OO-CV172	1	1.00E-03	(16.0)	1.51E-05	(6.5)	3.42E-07	5.67E-05
AFW-CKV-OO-CV157	1	1.00E-03	(16.0)	1.51E-05	(6.5)	3.42E-07	5.67E-05
HPI-XHE-FO-FDBLD	14	7.10E-02	(2.0)	9.29E-06	(8.0)	4.25E-07	2.89E-05
AFW-MDP-FS	3	6.30E-03	(9.0)	6.82E-06	(9.0)	6.78E-08	2.90E-05
HPI-CKV-FT-CV410	1	1.00E-04	(20.5)	5.08E-06	(11.0)	2.64E-07	1.70E-05
HPI-CKV-FT-CV225	1	1.00E-04	(20.5)	5.08E-06	(11.0)	2.64E-07	1.70E-05
HPI-CKV-FT-CV25	1	1.00E-04	(20.5)	5.08E-06	(11.0)	2.64E-07	1.70E-05
AFW-TDP-FS-FW2	3	1.10E-02	(6.0)	3.31E-06	(13.0)	7.97E-08	1.20E-05
AFW-MDP-FS-FW3B	5	6.30E-03	(9.0)	3.30E-06	(14.5)	7.01E-08	1.24E-05
AFW-MDP-FS-FW3A	5	6.30E-03	(9.0)	3.30E-06	(14.5)	7.01E-08	1.24E-05
AFW-TDP-FR-2P6HR	4	3.00E-02	(5.0)	9.73E-07	(16.0)	1.53E-08	4.47E-06
AFW-TDP-MA-FW2	2	1.00E-02	(7.0)	9.34E-07	(17.0)	1.47E-08	4.16E-06
HPI-MOV-FT-1867C	2	3.00E-03	(11.5)	7.42E-07	(18.5)	1.60E-08	2.47E-06
HPI-MOV-FT-1115B	2	3.00E-03	(11.5)	7.42E-07	(18.5)	1.60E-08	2.47E-06
BETA-AFW	3	5.60E-02	(3.0)	7.29E-07	(20.0)	6.36E-09	2.91E-06
AFW-MDP-MA-FW3B	1	2.00E-03	(13.5)	4.53E-07	(21.5)	1.60E-09	1.68E-06
AFW-MDP-MA-FW3A	1	2.00E-03	(13.5)	4.53E-07	(21.5)	1.60E-09	1.68E-06
BETA-2MOV	4	8.80E-02	(1.0)	4.63E-08	(23.0)	2.37E-10	1.71E-07

SEQUENCE T2-L-D2
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
HPI-XHE-FO-FDBLD	14	7.10E-02	(2.0)	32.5	(1.0)
AFW-XHE-FO-UNIT2	21	3.60E-02	(4.0)	32.1	(2.0)
AFW-CCF-LK-STMBD	3	1.00E-04	(20.5)	9.8	(3.0)
AFW-PSF-FC-XCONN	6	1.50E-04	(18.0)	7.4	(4.0)
AFW-TDP-FR-2P6HR	4	3.00E-02	(5.0)	1.6	(5.0)
BETA-AFW	3	5.60E-02	(3.0)	1.2	(6.0)
AFW-TDP-FS-FW2	3	1.10E-02	(6.0)	0.9	(7.0)
AFW-MDP-FS-FW3B	5	6.30E-03	(9.0)	0.8	(9.0)
AFW-MDP-FS-FW3A	5	6.30E-03	(9.0)	0.8	(9.0)
AFW-MDP-FS	3	6.30E-03	(9.0)	0.8	(9.0)
AFW-TDP-MA-FW2	2	1.00E-02	(7.0)	0.7	(11.0)
AFW-CKV-OO-CV157	1	1.00E-03	(16.0)	0.4	(13.0)
AFW-CKV-OO-CV172	1	1.00E-03	(16.0)	0.4	(13.0)
AFW-CKV-OO-CV142	1	1.00E-03	(16.0)	0.4	(13.0)
AFW-TNK-VF-CST	1	1.00E-06	(23.0)	0.0	(19.0)
HPI-MOV-FT-1867C	2	3.00E-03	(11.5)	0.0	(19.0)
HPI-MOV-FT-1115B	2	3.00E-03	(11.5)	0.0	(19.0)
HPI-CKV-FT-CV410	1	1.00E-04	(20.5)	0.0	(19.0)
HPI-CKV-FT-CV25	1	1.00E-04	(20.5)	0.0	(19.0)
HPI-CKV-FT-CV225	1	1.00E-04	(20.5)	0.0	(19.0)
AFW-MDP-MA-FW3B	1	2.00E-03	(13.5)	0.0	(19.0)
BETA-2MOV	4	8.80E-02	(1.0)	0.0	(19.0)
AFW-MDP-MA-FW3A	1	2.00E-03	(13.5)	0.0	(19.0)

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
IE-T2	21	9.40E-01	(1.0)	17.9	(1.0)

SEQUENCE T2-L-D2

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T2-L-D2 WITH TOP EVENT FREQUENCY 7.16E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	4	3.60E-07	0.50358	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	IE-T2	+
3	2	4	2.40E-07	0.83930	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	IE-T2	+
4	3	5	2.64E-08	0.87623	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*
5					IE-T2	+						
6	4	6	2.54E-08	0.91177	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
7					HPI-XHE-FO-FDBLD	*	IE-T2	+				
8	6	5	1.51E-08	0.93292	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*
9					IE-T2	+						
10	5	5	1.51E-08	0.95407	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*
11					IE-T2	+						
12	7	6	9.32E-09	0.96710	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
13					HPI-XHE-FO-FDBLD	*	IE-T2	+				
14	8	6	8.48E-09	0.97894	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
15					HPI-XHE-FO-FDBLD	*	IE-T2	+				
16	9	6	2.66E-09	0.98294	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*
17					HPI-XHE-FO-FDBLD	*	IE-T2	+				
18	10	4	2.40E-09	0.98629	AFW-TNK-VF-CST	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	IE-T2	+
19	12	5	1.34E-09	0.98817	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	HPI-MOV-FT-1867C	*
20					IE-T2	+						
21	11	5	1.34E-09	0.99004	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	HPI-MOV-FT-1115B	*
22					IE-T2	+						
23	13	6	1.05E-09	0.99151	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*
24					HPI-XHE-FO-FDBLD	*	IE-T2	+				
25	14	6	9.54E-10	0.99284	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*
26					HPI-XHE-FO-FDBLD	*	IE-T2	+				
27	15	6	9.08E-10	0.99411	AFW-MDP-FS-FW3B	*	AFW-MDP-MA-FW3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*
28					HPI-XHE-FO-FDBLD	*	IE-T2	+				
29	16	6	9.08E-10	0.99538	AFW-MDP-FS-FW3A	*	AFW-MDP-MA-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*
30					HPI-XHE-FO-FDBLD	*	IE-T2	+				
31	18	5	8.93E-10	0.99662	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	HPI-MOV-FT-1867C	*
32					IE-T2	+						
33	17	5	8.93E-10	0.99787	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	HPI-MOV-FT-1115B	*
34					IE-T2	+						
35	21	4	5.08E-10	0.99858	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	HPI-CKV-FT-CV225	*	IE-T2	+
36	20	4	5.08E-10	0.99929	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	HPI-CKV-FT-CV410	*	IE-T2	+
37	19	4	5.08E-10	1.00000	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	HPI-CKV-FT-CV25	*	IE-T2	.

SEQUENCE S1-D1

TOP EVENT S1-D1-CM CONTAINS 21 EVENTS IN 14 CUT SETS

THE FREQUENCY OF TOP EVENT S1-D1-CM IS 8.17E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT S1-D1-CM

N	1000
MEAN	8.59E-07
STD DEV	2.02E-06
LOWER 5%	1.05E-07
LOWER 25%	2.37E-07
MEDIAN	4.55E-07
UPPER 25%	8.89E-07
UPPER 5%	2.38E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE S1-D1
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
HPI-MOV-FT	2	3.00E-03	(7.0)	4.25E-07	(1.5)	5.90E-09	1.33E-06
BETA-2MOV	2	8.80E-02	(3.0)	4.25E-07	(1.5)	5.90E-09	1.33E-06
HPI-XHE-FO-ALT	1	6.10E-01	(1.0)	1.61E-07	(3.0)	1.41E-09	5.50E-07
HPI-CKV-FT-CV410	1	1.00E-04	(15.0)	1.00E-07	(5.0)	1.34E-08	3.03E-07
HPI-CKV-FT-CV25	1	1.00E-04	(15.0)	1.00E-07	(5.0)	1.34E-08	3.03E-07
HPI-CKV-FT-CV225	1	1.00E-04	(15.0)	1.00E-07	(5.0)	1.34E-08	3.03E-07
HPI-XVM-PG-XV24	1	4.00E-05	(19.0)	4.00E-08	(7.0)	5.43E-09	1.17E-07
CPC-STR-PG-3HR	1	9.00E-05	(17.5)	2.37E-08	(8.5)		
BETA-STR	1	2.63E-01	(2.0)	2.37E-08	(8.5)	4.15E-09	7.18E-08
HPI-MOV-FT-1115D	1	3.00E-03	(7.0)	9.00E-09	(11.5)	7.37E-12	1.08E-07
HPI-MOV-FT-1115C	1	3.00E-03	(7.0)	9.00E-09	(11.5)	7.37E-12	1.08E-07
HPI-MOV-FT-1115B	1	3.00E-03	(7.0)	9.00E-09	(11.5)	7.37E-12	1.08E-07
HPI-MOV-FT-1115E	1	3.00E-03	(7.0)	9.00E-09	(11.5)	7.37E-12	1.08E-07
CPC-MDP-FR-SWA3H	2	4.80E-04	(13.0)	4.80E-09	(14.0)	3.38E-10	1.50E-08
CPC-MDP-FS-SW10B	2	8.00E-03	(4.0)	4.56E-09	(15.0)	3.08E-10	1.50E-08
RWT-TNK-LF-RWST	1	2.70E-06	(20.0)	2.70E-09	(16.0)	6.12E-11	1.07E-08
SIS-ACT-FA-SISB	1	1.60E-03	(11.5)	2.56E-09	(17.5)	2.87E-11	2.38E-08
SIS-ACT-FA-SISA	1	1.60E-03	(11.5)	2.56E-09	(17.5)	2.87E-11	2.38E-08
CPC-MDP-MA-SW10B	1	2.00E-03	(10.0)	9.60E-10	(19.0)	1.51E-11	3.61E-09
CPC-STR-PG-2A3HR	1	9.00E-05	(17.5)	7.20E-10	(20.0)	9.84E-12	2.43E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-S1	14	1.00E-03	(1.0)	8.17E-07	(1.0)	1.05E-07	2.38E-06

SEQUENCE S1-D1
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
RWT-TNK-LF-RWST	1	2.70E-06	(20.0)	1.00E-03	(1.0)	2.66E-04	2.40E-03
HPI-XVM-PG-XV24	1	4.00E-05	(19.0)	1.00E-03	(2.0)	2.66E-04	2.40E-03
HPI-CKV-FT-CV25	1	1.00E-04	(15.0)	1.00E-03	(4.0)	2.66E-04	2.40E-03
HPI-CKV-FT-CV410	1	1.00E-04	(15.0)	1.00E-03	(4.0)	2.66E-04	2.40E-03
HPI-CKV-FT-CV225	1	1.00E-04	(15.0)	1.00E-03	(4.0)	2.66E-04	2.40E-03
CPC-STR-PG-3HR	1	9.00E-05	(17.5)	2.63E-04	(6.0)		
HPI-MOV-FT	2	3.00E-03	(7.0)	1.41E-04	(7.0)	1.84E-05	4.29E-04
CPC-MDP-FR-SWA3H	2	4.80E-04	(13.0)	1.00E-05	(8.0)	1.23E-06	3.25E-05
CPC-STR-PG-2A3HR	1	9.00E-05	(17.5)	8.00E-06	(9.0)	9.10E-07	2.73E-05
BETA-2MOV	2	8.80E-02	(3.0)	4.40E-06	(10.0)	9.44E-08	1.69E-05
HPI-MOV-FT-1115D	1	3.00E-03	(7.0)	2.99E-06	(12.5)	6.55E-08	1.10E-05
HPI-MOV-FT-1115C	1	3.00E-03	(7.0)	2.99E-06	(12.5)	6.55E-08	1.10E-05
HPI-MOV-FT-1115B	1	3.00E-03	(7.0)	2.99E-06	(12.5)	6.55E-08	1.10E-05
HPI-MOV-FT-1115E	1	3.00E-03	(7.0)	2.99E-06	(12.5)	6.55E-08	1.10E-05
SIS-ACT-FA-SISB	1	1.60E-03	(11.5)	1.60E-06	(15.5)	1.16E-07	5.25E-06
SIS-ACT-FA-SISA	1	1.60E-03	(11.5)	1.60E-06	(15.5)	1.16E-07	5.25E-06
CPC-MDP-FS-SW10B	2	8.00E-03	(4.0)	5.65E-07	(17.0)	8.64E-08	1.64E-06
CPC-MDP-MA-SW10B	1	2.00E-03	(10.0)	4.79E-07	(18.0)	6.83E-08	1.43E-06
HPI-XHE-FO-ALT	1	6.10E-01	(1.0)	1.03E-07	(19.0)	5.00E-10	3.72E-07
BETA-STR	1	2.63E-01	(2.0)	6.63E-08	(20.0)	1.51E-08	1.59E-07

SEQUENCE S1-D1
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
HPI-MOV-FT-1115C	1	3.00E-03	(15.0)	30.0	(3.5)	1.85	0.80
HPI-MOV-FT-1115D	1	3.00E-03	(15.0)	30.0	(3.5)	1.85	0.80
HPI-MOV-FT-1867D	3	3.00E-03	(15.0)	30.0	(3.5)	1.85	0.80
HPI-MOV-FT-1115B	1	3.00E-03	(15.0)	30.0	(3.5)	1.85	0.80
HPI-MOV-FT	2	3.00E-03	(15.0)	30.0	(3.5)	1.85	0.80
HPI-MOV-FT-1115E	1	3.00E-03	(15.0)	30.0	(3.5)	1.85	0.80
HPI-XHE-FO-UN2S3	13	4.40E-02	(6.0)	19.3	(7.0)	1.52	0.80
BETA-2MOV	2	8.80E-02	(3.0)	4.5	(8.0)	1.05	0.96
HPI-CKV-FT-CV25	1	1.00E-04	(26.0)	3.9	(10.0)	1.18	0.92
HPI-CKV-FT-CV410	1	1.00E-04	(26.0)	3.9	(10.0)	1.18	0.92
HPI-CKV-FT-CV225	1	1.00E-04	(26.0)	3.9	(10.0)	1.18	0.92
HPI-XHE-FO-ALTS3	1	5.50E-02	(5.0)	3.2	(12.0)	1.06	1.00
RWT-TNK-LF-RWST	1	2.70E-06	(32.0)	2.4	(13.0)	1.16	1.02
HPI-MDP-FS	1	4.00E-03	(9.0)	0.9	(14.0)	1.00	1.00
CPC-CKV-OO-CV113	1	1.00E-03	(21.5)	0.6	(15.5)	1.07	1.00
HPI-CKV-OO-CV258	1	1.00E-03	(21.5)	0.6	(15.5)	1.07	1.00
HPI-XHE-FO-ALTIN	1	5.70E-03	(8.0)	0.5	(17.0)		
CPC-XHE-FO-REALN	3	7.00E-02	(4.0)	0.5	(18.0)		
CPC-MDP-FS-CC2B	1	3.00E-03	(15.0)	0.5	(19.0)		
CPC-MDP-MA-CC2B	1	2.00E-03	(19.0)	0.4	(20.0)		
ACP-TFM-NO-1H1	1	4.00E-05	(30.5)	0.4	(21.0)		
HPI-MDP-FR-1A24H	2	1.60E-03	(20.0)	0.1	(22.0)		
HPI-XVM-PG-XV24	1	4.00E-05	(30.5)	0.0	(27.0)		
CPC-MDP-FS-SW10B	1	8.00E-03	(7.0)	0.0	(27.0)		
BETA-STR	1	2.63E-01	(1.0)	0.0	(27.0)		
ACP-BAC-ST-1H1	1	9.00E-05	(28.5)	0.0	(27.0)		
CPC-MDP-FR-SWB24	1	3.80E-03	(10.5)	0.0	(27.0)		
BETA-HPI	1	2.10E-01	(2.0)	0.0	(27.0)		
CPC-MDP-FR-SWA24	3	3.80E-03	(10.5)	0.0	(27.0)		
CPC-MDP-FR-CCA24	2	7.20E-04	(23.5)	0.0	(27.0)		
ACP-BAC-ST-4KV1H	1	9.00E-05	(28.5)	0.0	(27.0)		
CPC-STR-PG-24H	1	7.20E-04	(23.5)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-S3	20	1.30E-02	(1.0)	32.3	(1.0)	1.94	0.89

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE S1-D1

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT S1-D1-CM WITH TOP EVENT FREQUENCY 8.17E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	3	2.64E-07	0.32294	BETA-2MOV	*	HPI-MOV-FT	*	IE-S1	+	
3	2	4	1.61E-07	0.51993	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALT	*	IE-S1
4	3	2	1.00E-07	0.64226	HPI-CKV-FT-CV25	*	IE-S1	+			
5	5	2	1.00E-07	0.76458	HPI-CKV-FT-CV410	*	IE-S1	+			
6	4	2	1.00E-07	0.88691	HPI-CKV-FT-CV225	*	IE-S1	+			
7	6	2	4.00E-08	0.93584	HPI-XVM-PG-XV24	*	IE-S1	+			
8	7	3	2.37E-08	0.96479	BETA-STR	*	CPC-STR-PG-3HR	*	IE-S1	+	
9	9	3	9.00E-09	0.97580	HPI-MOV-FT-1115B	*	HPI-MOV-FT-1115D	*	IE-S1	+	
10	8	3	9.00E-09	0.98681	HPI-MOV-FT-1115C	*	HPI-MOV-FT-1115E	*	IE-S1	+	
11	10	3	3.84E-09	0.99151	CPC-MDP-FR-SWA3H	*	CPC-MDP-FS-SW10B	*	IE-S1	+	
12	11	2	2.70E-09	0.99481	IE-S1	*	RWT-TNK-LF-RWST	+			
13	12	3	2.56E-09	0.99795	IE-S1	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+	
14	13	3	9.60E-10	0.99912	CPC-MDP-FR-SWA3H	*	CPC-MDP-MA-SW10B	*	IE-S1	+	
15	14	3	7.20E-10	1.00000	CPC-MDP-FS-SW10B	*	CPC-STR-PG-2A3HR	*	IE-S1	.	

SEQUENCE T-K-R-Z

TOP EVENT T-K-R-Z CONTAINS 4 EVENTS IN 1 CUT SETS

THE FREQUENCY OF TOP EVENT T-K-R-Z IS 8.43E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T-K-R-Z

N	1000
MEAN	8.23E-07
STD DEV	3.39E-06
LOWER 5%	6.29E-09
LOWER 25%	3.79E-08
MEDIAN	1.52E-07
UPPER 25%	5.00E-07
UPPER 5%	3.16E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE T-K-R-Z
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
K	1	6.00E-05	(3.0)	8.43E-07	(2.0)	6.29E-09	3.16E-06
Z	1	1.40E-02	(2.0)	8.43E-07	(2.0)	6.29E-09	3.16E-06
R	1	1.70E-01	(1.0)	8.43E-07	(2.0)	6.29E-09	3.16E-06

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-TN	1	5.90E+00	(1.0)	8.43E-07	(1.0)	6.29E-09	3.16E-06

SEQUENCE T-K-R-Z
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
K	1	6.00E-05	(3.0)	1.40E-02	(1.0)	2.56E-04	5.21E-02
Z	1	1.40E-02	(2.0)	5.93E-05	(2.0)	1.60E-06	2.16E-04
R	1	1.70E-01	(1.0)	4.11E-06	(3.0)	6.48E-08	1.94E-05

SEQUENCE T-K-R-Z
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
Z	1	1.40E-02	(2.0)	39.5	(1.0)
K	1	6.00E-05	(3.0)	26.8	(2.0)
R	1	1.70E-01	(1.0)	22.5	(3.0)

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
IE-TN	1	5.90E+00	(1.0)	13.3	(1.0)

SEQUENCE T-K-R-Z

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T-K-R-Z WITH TOP EVENT FREQUENCY 8.43E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	4	8.43E-07	1.00000	IE-TN	*	K	*	R	*	Z

SEQUENCE A-H1

TOP EVENT A-H1-CM CONTAINS 19 EVENTS IN 28 CUT SETS

THE FREQUENCY OF TOP EVENT A-H1-CM IS 7.78E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT A-H1-CM

N	1000
MEAN	8.16E-07
STD DEV	1.70E-06
LOWER 5%	6.34E-08
LOWER 25%	1.68E-07
MEDIAN	3.75E-07
UPPER 25%	8.48E-07
UPPER 5%	2.97E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE A-H1
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
BETA-2MOV	3	8.80E-02	(1.0)	4.93E-07	(1.0)	1.56E-08	1.93E-06
LPR-MOV-FT-1862A	6	5.20E-03	(2.5)	2.65E-07	(2.0)	4.69E-09	1.23E-06
LPR-MOV-FT-1860A	6	3.00E-03	(6.5)	1.53E-07	(3.0)	2.29E-09	6.24E-07
RMT-CCF-FA-MSCAL	1	3.00E-04	(16.0)	1.50E-07	(4.0)	3.25E-09	5.76E-07
LPR-MOV-FT-1890A	2	3.00E-03	(6.5)	1.37E-07	(5.0)	1.84E-09	5.65E-07
LPR-MOV-FT-1862B	5	5.20E-03	(2.5)	3.62E-08	(6.0)	2.81E-10	2.79E-07
LPR-CCF-PG-SUMP	1	5.00E-05	(17.0)	2.50E-08	(7.0)	5.31E-10	8.88E-08
LPR-MOV-FT-1860B	5	3.00E-03	(6.5)	2.09E-08	(8.0)	2.20E-10	1.44E-07
LPR-XHE-FO-HOTLG	1	4.00E-05	(18.0)	2.00E-08	(9.0)	4.72E-10	7.72E-08
LPI-MDP-FS-SI1B	3	3.00E-03	(6.5)	1.34E-08	(10.5)	1.20E-10	5.22E-08
LPI-MDP-FS-SI1A	3	3.00E-03	(6.5)	1.34E-08	(10.5)	1.20E-10	5.22E-08
LPI-MDP-MA-SI1B	3	2.00E-03	(10.5)	8.92E-09	(12.5)	7.22E-11	3.07E-08
LPI-MDP-MA-SI1A	3	2.00E-03	(10.5)	8.92E-09	(12.5)	7.22E-11	3.07E-08
LPI-MDP-FR-B24HR	4	7.20E-04	(14.5)	4.75E-09	(14.5)	5.27E-11	1.99E-08
LPI-MDP-FR-A24HR	4	7.20E-04	(14.5)	4.75E-09	(14.5)	5.27E-11	1.99E-08
LPR-MOV-FT-1890B	1	3.00E-03	(6.5)	4.50E-09	(16.0)	4.55E-12	5.85E-08
RMT-ACT-FA-RMTSB	1	1.60E-03	(12.5)	1.28E-09	(17.5)	1.27E-11	1.04E-08
RMT-ACT-FA-RMTSA	1	1.60E-03	(12.5)	1.28E-09	(17.5)	1.27E-11	1.04E-08

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-A	28	5.00E-04	(1.0)	7.78E-07	(1.0)	8.34E-08	2.97E-06

SEQUENCE A-H1
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
LPR-XHE-FO-HOTLG	1	4.00E-05	(18.0)	5.00E-04	(1.5)	1.33E-04	1.20E-03
LPR-CCF-PG-SUMP	1	5.00E-05	(17.0)	5.00E-04	(1.5)	1.33E-04	1.20E-03
RMT-CCF-FA-MSCAL	1	3.00E-04	(16.0)	5.00E-04	(3.0)	1.33E-04	1.20E-03
LPR-MOV-FT-1860A	6	3.00E-03	(6.5)	5.08E-05	(4.0)	7.86E-06	1.51E-04
LPR-MOV-FT-1862A	6	5.20E-03	(2.5)	5.07E-05	(5.0)	7.84E-06	1.50E-04
LPR-MOV-FT-1890A	2	3.00E-03	(6.5)	4.54E-05	(6.0)	6.13E-06	1.34E-04
LPR-MOV-FT-1860B	5	3.00E-03	(6.5)	6.94E-06	(7.0)	7.15E-07	2.19E-05
LPR-MOV-FT-1862B	5	5.20E-03	(2.5)	6.92E-06	(8.0)	7.16E-07	2.19E-05
LPI-MDP-FR-B24HR	4	7.20E-04	(14.5)	6.60E-06	(9.5)	6.52E-07	2.15E-05
LPI-MDP-FR-A24HR	4	7.20E-04	(14.5)	6.60E-06	(9.5)	6.52E-07	2.15E-05
BETA-2MOV	3	8.80E-02	(1.0)	5.11E-06	(11.0)	3.18E-07	1.83E-05
LPI-MDP-MA-SI1B	3	2.00E-03	(10.5)	4.45E-06	(12.5)	3.18E-07	1.55E-05
LPI-MDP-MA-SI1A	3	2.00E-03	(10.5)	4.45E-06	(12.5)	3.18E-07	1.55E-05
LPI-MDP-FS-SI1B	3	3.00E-03	(6.5)	4.45E-06	(14.5)	3.18E-07	1.54E-05
LPI-MDP-FS-SI1A	3	3.00E-03	(6.5)	4.45E-06	(14.5)	3.18E-07	1.54E-05
LPR-MOV-FT-1890B	1	3.00E-03	(6.5)	1.50E-06	(16.0)	3.30E-08	5.83E-06
RMT-ACT-FA-RMTSB	1	1.60E-03	(12.5)	7.99E-07	(17.5)	5.38E-08	2.79E-06
RMT-ACT-FA-RMTSA	1	1.60E-03	(12.5)	7.99E-07	(17.5)	5.38E-08	2.79E-06

SEQUENCE A-H1
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
LPR-MOV-FT-1862B	5	5.20E-03	(2.5)	22.9	(1.5)	1.54	0.87
LPR-MOV-FT-1862A	6	5.20E-03	(2.5)	22.9	(1.5)	1.54	0.87
LPR-MOV-FT-1860A	6	3.00E-03	(6.5)	20.8	(4.5)	1.62	0.84
LPR-MOV-FT-1860B	5	3.00E-03	(6.5)	20.8	(4.5)	1.62	0.84
LPR-MOV-FT-1890A	2	3.00E-03	(6.5)	20.8	(4.5)	1.62	0.84
LPR-MOV-FT-1890B	1	3.00E-03	(6.5)	20.8	(4.5)	1.62	0.84
RMT-CCF-FA-MSCAL	1	3.00E-04	(16.0)	9.5	(7.0)	1.52	0.98
BETA-2MOV	3	8.80E-02	(1.0)	9.1	(8.0)	1.07	0.90
LPR-XHE-FO-HOTLG	1	4.00E-05	(18.0)	1.4	(9.0)	1.04	0.99
LPI-MDP-FS-SI1B	3	3.00E-03	(6.5)	1.2	(10.5)	1.01	1.00
LPI-MDP-FS-SI1A	3	3.00E-03	(6.5)	1.2	(10.5)	1.01	1.00
LPR-CCF-PG-SUMP	1	5.00E-05	(17.0)	0.8	(12.0)	1.03	1.00
LPI-MDP-MA-SI1B	3	2.00E-03	(10.5)	0.4	(13.5)		
LPI-MDP-MA-SI1A	3	2.00E-03	(10.5)	0.4	(13.5)		
LPI-MDP-FR-B24HR	4	7.20E-04	(14.5)	0.2	(15.5)		
LPI-MDP-FR-A24HR	4	7.20E-04	(14.5)	0.2	(15.5)		
RMT-ACT-FA-RMTSB	1	1.60E-03	(12.5)	0.1	(17.5)		
RMT-ACT-FA-RMTSA	1	1.60E-03	(12.5)	0.1	(17.5)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-A	28	5.00E-04	(1.0)	30.4	(1.0)	1.71	0.95

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE A-H1

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT A-H1-CM WITH TOP EVENT FREQUENCY 7.78E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	3	3	2.29E-07	0.29420	BETA-2MOV	*	IE-A	*	LPR-MOV-FT-1862A	+
3	1	2	1.50E-07	0.48707	IE-A	*	RMT-CCF-FA-MSCAL	+		
4	4	3	1.32E-07	0.65681	BETA-2MOV	*	IE-A	*	LPR-MOV-FT-1890A	+
5	2	3	1.32E-07	0.82654	BETA-2MOV	*	IE-A	*	LPR-MOV-FT-1860A	+
6	5	2	2.50E-08	0.85868	IE-A	*	LPR-CCF-PG-SUMP	+		
7	6	2	2.00E-08	0.88440	IE-A	*	LPR-XHE-FO-HOTLG	+		
8	7	3	1.35E-08	0.90178	IE-A	*	LPR-MOV-FT-1862A	*	LPR-MOV-FT-1862B	+
9	10	3	7.80E-09	0.91181	IE-A	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1862B	+
10	9	3	7.80E-09	0.92184	IE-A	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1862A	+
11	11	3	7.80E-09	0.93187	IE-A	*	LPR-MOV-FT-1860B	*	LPR-MOV-FT-1862A	+
12	8	3	7.80E-09	0.94190	IE-A	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1862B	+
13	12	3	5.20E-09	0.94859	IE-A	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1862A	+
14	13	3	5.20E-09	0.95527	IE-A	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1862B	+
15	15	3	4.50E-09	0.96106	IE-A	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1860B	+
16	14	3	4.50E-09	0.96685	IE-A	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1860A	+
17	17	3	4.50E-09	0.97263	IE-A	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1860B	+
18	16	3	4.50E-09	0.97842	IE-A	*	LPR-MOV-FT-1890A	*	LPR-MOV-FT-1890B	+
19	19	3	3.00E-09	0.98228	IE-A	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1860A	+
20	18	3	3.00E-09	0.98613	IE-A	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1860B	+
21	21	3	1.87E-09	0.98854	IE-A	*	LPI-MDP-FR-B24HR	*	LPR-MOV-FT-1862A	+
22	20	3	1.87E-09	0.99095	IE-A	*	LPI-MDP-FR-A24HR	*	LPR-MOV-FT-1862B	+
23	22	3	1.28E-09	0.99259	IE-A	*	RMT-ACT-FA-RMTSA	*	RMT-ACT-FA-RMTSB	+
24	26	3	1.08E-09	0.99398	IE-A	*	LPI-MDP-FR-B24HR	*	LPR-MOV-FT-1860A	+
25	25	3	1.08E-09	0.99537	IE-A	*	LPI-MDP-FR-A24HR	*	LPI-MDP-FS-SI1B	+
26	24	3	1.08E-09	0.99676	IE-A	*	LPI-MDP-FR-A24HR	*	LPR-MOV-FT-1860B	+
27	23	3	1.08E-09	0.99815	IE-A	*	LPI-MDP-FR-B24HR	*	LPI-MDP-FS-SI1A	+
28	28	3	7.20E-10	0.99907	IE-A	*	LPI-MDP-FR-A24HR	*	LPI-MDP-MA-SI1B	+
29	27	3	7.20E-10	1.00000	IE-A	*	LPI-MDP-FR-B24HR	*	LPI-MDP-MA-SI1A	.

SEQUENCE T2-L-P

TOP EVENT T2-L-P CONTAINS 29 EVENTS IN 44 CUT SETS

THE FREQUENCY OF TOP EVENT T2-L-P IS 7.69E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T2-L-P

N	1000
MEAN	7.36E-07
STD DEV	1.72E-06
LOWER 5%	2.27E-08
LOWER 25%	9.78E-08
MEDIAN	2.61E-07
UPPER 25%	6.66E-07
UPPER 5%	2.62E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE T2-L-P
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
AFW-XHE-FO-UNIT2	44	3.60E-02	(10.0)	7.69E-07	(1.0)	2.27E-08	2.62E-06
PPS-XHE-FO-PORVS	4	4.40E-02	(6.0)	4.52E-07	(2.0)	8.80E-09	1.66E-06
AFW-PSF-FC-XCONN	7	1.50E-04	(23.0)	3.66E-07	(3.0)	1.21E-08	1.28E-06
AFW-CCF-LK-STMBD	7	1.00E-04	(24.0)	2.44E-07	(4.0)	2.66E-10	6.33E-07
PPS-MOV-FC-1536	15	3.00E-01	(1.5)	1.46E-07	(5.5)	2.72E-09	5.13E-07
PPS-MOV-FC-1535	15	3.00E-01	(1.5)	1.46E-07	(5.5)	2.72E-09	5.13E-07
PPS-MOV-FT-1536	11	4.00E-02	(8.0)	1.34E-07	(7.5)	2.50E-09	4.71E-07
PPS-MOV-FT-1535	11	4.00E-02	(8.0)	1.34E-07	(7.5)	2.50E-09	4.71E-07
AFW-TDP-FR-2P24H	19	1.20E-01	(3.0)	1.17E-07	(9.0)	1.44E-09	4.83E-07
AFW-MDP-FS	11	6.30E-03	(14.0)	1.09E-07	(10.5)	1.08E-09	4.40E-07
BETA-AFW	11	5.60E-02	(5.0)	1.09E-07	(10.5)	1.08E-09	4.40E-07
AFW-TDP-FS-FW2	5	1.10E-02	(11.0)	2.85E-08	(12.0)	1.31E-10	1.39E-07
AFW-CKV-OO-CV142	3	1.00E-03	(20.0)	2.53E-08	(13.0)	1.20E-10	1.19E-07
PPS-MOV-FT	6	4.00E-02	(8.0)	2.09E-08	(14.5)	2.72E-10	6.93E-08
BETA-2MOV	6	8.80E-02	(4.0)	2.09E-08	(14.5)	2.72E-10	6.93E-08
AFW-MDP-FS-FW3B	8	6.30E-03	(14.0)	1.32E-08	(16.5)	1.87E-10	5.70E-08
AFW-MDP-FS-FW3A	8	6.30E-03	(14.0)	1.32E-08	(16.5)	1.87E-10	5.70E-08
PPS-SOV-FT-1455C	3	1.00E-03	(20.0)	9.89E-09	(18.5)	2.54E-10	3.36E-08
PPS-SOV-FT-1456	3	1.00E-03	(20.0)	9.89E-09	(18.5)	2.54E-10	3.36E-08
AFW-CKV-OO-CV172	2	1.00E-03	(20.0)	5.12E-09	(20.5)	7.77E-11	1.85E-08
AFW-CKV-OO-CV157	2	1.00E-03	(20.0)	5.12E-09	(20.5)	7.77E-11	1.85E-08
DCP-BDC-ST-BUS1B	2	9.00E-05	(26.5)	3.03E-09	(22.5)	2.57E-11	1.11E-08
DCP-BDC-ST-BUS1A	2	9.00E-05	(26.5)	3.03E-09	(22.5)	2.57E-11	1.11E-08
AFW-TDP-MA-FW2	2	1.00E-02	(12.0)	2.87E-09	(24.0)	5.72E-12	9.04E-09
AFW-MDP-MA-FW3B	3	2.00E-03	(16.5)	1.96E-09	(25.5)	5.19E-12	6.83E-09
AFW-MDP-MA-FW3A	3	2.00E-03	(16.5)	1.96E-09	(25.5)	5.19E-12	6.83E-09
ACP-BAC-ST-4KV1J	1	9.00E-05	(26.5)	6.91E-10	(27.5)	4.25E-12	3.00E-09
ACP-BAC-ST-4KV1H	1	9.00E-05	(26.5)	6.91E-10	(27.5)	4.25E-12	3.00E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T2	44	9.40E-01	(1.0)	7.69E-07	(1.0)	2.27E-08	2.62E-06

SEQUENCE T2-L-P
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
AFW-CCF-LK-STMBD	7	1.00E-04	(24.0)	2.44E-03	(1.0)	1.29E-04	8.90E-03
AFW-PSF-FC-XCONN	7	1.50E-04	(23.0)	2.44E-03	(2.0)	1.29E-04	8.90E-03
DCP-BDC-ST-BUS1A	2	9.00E-05	(26.5)	3.37E-05	(3.5)	7.77E-07	1.36E-04
DCP-BDC-ST-BUS1B	2	9.00E-05	(26.5)	3.37E-05	(3.5)	7.77E-07	1.36E-04
AFW-CKV-OO-CV142	3	1.00E-03	(20.0)	2.53E-05	(5.0)	1.70E-07	1.02E-04
AFW-XHE-FO-UNIT2	44	3.60E-02	(10.0)	2.06E-05	(6.0)	1.64E-06	6.58E-05
AFW-MDP-FS	11	6.30E-03	(14.0)	1.72E-05	(7.0)	2.52E-07	6.78E-05
PPS-SOV-FT-1455C	3	1.00E-03	(20.0)	9.88E-06	(8.5)	4.21E-07	3.22E-05
PPS-SOV-FT-1456	3	1.00E-03	(20.0)	9.88E-06	(8.5)	4.21E-07	3.22E-05
PPS-XHE-FO-PORVS	4	4.40E-02	(6.0)	9.81E-06	(10.0)	4.28E-07	3.19E-05
ACP-BAC-ST-4KV1H	1	9.00E-05	(26.5)	7.67E-06	(11.5)	1.22E-07	3.09E-05
ACP-BAC-ST-4KV1J	1	9.00E-05	(26.5)	7.67E-06	(11.5)	1.22E-07	3.09E-05
AFW-CKV-OO-CV172	2	1.00E-03	(20.0)	5.11E-06	(13.5)	1.07E-07	1.94E-05
AFW-CKV-OO-CV157	2	1.00E-03	(20.0)	5.11E-06	(13.5)	1.07E-07	1.94E-05
PPS-MOV-FT-1536	11	4.00E-02	(8.0)	3.23E-06	(15.5)	1.03E-07	1.14E-05
PPS-MOV-FT-1535	11	4.00E-02	(8.0)	3.23E-06	(15.5)	1.03E-07	1.14E-05
AFW-TDP-FS-FW2	5	1.10E-02	(11.0)	2.56E-06	(17.0)	8.64E-08	1.04E-05
AFW-MDP-FS-FW3B	8	6.30E-03	(14.0)	2.08E-06	(18.5)	5.72E-08	7.43E-06
AFW-MDP-FS-FW3A	8	6.30E-03	(14.0)	2.08E-06	(18.5)	5.72E-08	7.43E-06
BETA-AFW	11	5.60E-02	(5.0)	1.84E-06	(20.0)	2.99E-08	7.81E-06
AFW-MDP-MA-FW3B	3	2.00E-03	(16.5)	9.78E-07	(21.5)	1.67E-08	3.75E-06
AFW-MDP-MA-FW3A	3	2.00E-03	(16.5)	9.78E-07	(21.5)	1.67E-08	3.75E-06
AFW-TDP-FR-2P24H	19	1.20E-01	(3.0)	8.59E-07	(23.0)	1.88E-08	3.64E-06
PPS-MOV-FT	6	4.00E-02	(8.0)	5.01E-07	(24.0)	1.04E-08	1.80E-06
PPS-MOV-FC-1536	15	3.00E-01	(1.5)	3.40E-07	(25.5)	8.65E-09	1.31E-06
PPS-MOV-FC-1535	15	3.00E-01	(1.5)	3.40E-07	(25.5)	8.65E-09	1.31E-06
AFW-TDP-MA-FW2	2	1.00E-02	(12.0)	2.84E-07	(27.0)	4.01E-09	1.12E-06
BETA-2MOV	6	8.80E-02	(4.0)	2.17E-07	(28.0)	3.72E-09	7.55E-07

SEQUENCE T2-L-P
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
AFW-XHE-FO-UNIT2	44	3.60E-02	(10.0)	38.0	(1.0)	2.63	0.96
PPS-XHE-FO-PORVS	4	4.40E-02	(6.0)	11.9	(2.0)	1.40	0.92
AFW-CCF-LK-STMBD	7	1.00E-04	(24.0)	8.0	(3.0)	1.50	1.07
AFW-PSF-FC-XCONN	7	1.50E-04	(23.0)	7.9	(4.0)	1.21	1.01
PPS-MOV-FT-1535	11	4.00E-02	(8.0)	3.6	(6.0)	1.05	1.04
PPS-MOV-FT-1536	11	4.00E-02	(8.0)	3.6	(6.0)	1.05	1.04
PPS-MOV-FT	6	4.00E-02	(8.0)	3.6	(6.0)	1.05	1.04
PPS-MOV-FC-1535	15	3.00E-01	(1.5)	3.3	(8.5)	1.11	0.96
PPS-MOV-FC-1536	15	3.00E-01	(1.5)	3.3	(8.5)	1.11	0.96
AFW-TDP-FR-2P24H	19	1.20E-01	(3.0)	2.4	(10.0)	1.09	1.01
AFW-TDP-FS-FW2	5	1.10E-02	(11.0)	2.3	(11.0)	1.08	1.00
BETA-AFW	11	5.60E-02	(5.0)	2.2	(12.0)	1.02	1.02
AFW-TDP-MA-FW2	2	1.00E-02	(12.0)	0.9	(13.0)	0.99	1.00
AFW-MDP-FS	11	6.30E-03	(14.0)	0.9	(15.0)	1.02	1.06
AFW-MDP-FS-FW3B	8	6.30E-03	(14.0)	0.9	(15.0)	1.02	1.06
AFW-MDP-FS-FW3A	8	6.30E-03	(14.0)	0.9	(15.0)	1.02	1.06
AFW-MDP-MA-FW3B	3	2.00E-03	(16.5)	0.6	(17.5)	1.00	1.00
AFW-MDP-MA-FW3A	3	2.00E-03	(16.5)	0.6	(17.5)	1.00	1.00
BETA-2MOV	6	8.80E-02	(4.0)	0.5	(19.0)		
PPS-SOV-FT-1456	3	1.00E-03	(20.0)	0.4	(20.5)		
PPS-SOV-FT-1455C	3	1.00E-03	(20.0)	0.4	(20.5)		
DCP-BDC-ST-BUS1B	2	9.00E-05	(26.5)	0.4	(23.5)		
ACP-BAC-ST-4KV1H	1	9.00E-05	(26.5)	0.4	(23.5)		
DCP-BDC-ST-BUS1A	2	9.00E-05	(26.5)	0.4	(23.5)		
ACP-BAC-ST-4KV1J	1	9.00E-05	(26.5)	0.4	(23.5)		
AFW-CKV-OO-CV172	2	1.00E-03	(20.0)	0.0	(27.0)		
AFW-CKV-OO-CV157	2	1.00E-03	(20.0)	0.0	(27.0)		
AFW-CKV-OO-CV142	3	1.00E-03	(20.0)	0.0	(27.0)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T2	44	9.40E-01	(1.0)	22.3	(1.0)	1.71	1.06

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE T2-L-P

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T2-L-P WITH TOP EVENT FREQUENCY 7.69E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	4	2.23E-07	0.29054	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-XHE-FO-PORVS	+
3	2	4	1.49E-07	0.48424	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-XHE-FO-PORVS	+
4	3	6	6.30E-08	0.56624	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
5					IE-T2	*	PPS-XHE-FO-PORVS	+				
6	4	5	6.09E-08	0.64548	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1535	*
7					PPS-MOV-FT-1535	+						
8	5	5	6.09E-08	0.72472	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1536	*
9					PPS-MOV-FT-1536	+						
10	6	5	4.06E-08	0.77754	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1536	*
11					PPS-MOV-FT-1536	+						
12	7	5	4.06E-08	0.83037	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1535	*
13					PPS-MOV-FT-1535	+						
14	9	7	1.72E-08	0.85273	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
15					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+		
16	8	7	1.72E-08	0.87510	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
17					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+		
18	10	5	1.64E-08	0.89640	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T2	*
19					PPS-XHE-FO-PORVS	+						
20	12	6	5.36E-09	0.90338	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2	*
21					PPS-MOV-FC-1535	*	PPS-MOV-FT	+				
22	11	6	5.36E-09	0.91035	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2	*
23					PPS-MOV-FC-1536	*	PPS-MOV-FT	+				
24	14	4	5.08E-09	0.91695	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1455C	+
25	13	4	5.08E-09	0.92356	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1456	+
26	15	6	4.47E-09	0.92937	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T2	*
27					PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+				
28	16	6	4.47E-09	0.93518	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T2	*
29					PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+				
30	18	6	3.57E-09	0.93983	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2	*
31					PPS-MOV-FC-1535	*	PPS-MOV-FT	+				
32	17	6	3.57E-09	0.94448	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2	*
33					PPS-MOV-FC-1536	*	PPS-MOV-FT	+				
34	20	4	3.38E-09	0.94888	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1456	+
35	19	4	3.38E-09	0.95328	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1455C	+
36	24	6	2.56E-09	0.95661	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T2	*
37					PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+				
38	23	6	2.56E-09	0.95994	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T2	*
39					PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+				
40	22	6	2.56E-09	0.96326	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T2	*
41					PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+				
42	21	6	2.56E-09	0.96659	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T2	*
43					PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+				
44	26	5	2.30E-09	0.96959	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1A	*
45					IE-T2	+						
46	25	5	2.30E-09	0.97258	AFW-MDP-FS-FW3A	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1B	*

47					IE-T2	+							
48	28	7	1.93E-09	0.97510	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	
49					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+			
50	27	7	1.93E-09	0.97762	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	
51					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+			
52	30	7	1.58E-09	0.97967	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*	
53					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+			
54	29	7	1.58E-09	0.98172	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*	
55					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+			
56	31	8	1.51E-09	0.98368	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	
57					BETA-AFW	*	IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT	+	
58	32	8	1.51E-09	0.98565	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	
59					BETA-AFW	*	IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT	+	
60	34	6	1.43E-09	0.98752	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*	
61					IE-T2	*	PPS-SOV-FT-1455C	+					
62	33	6	1.43E-09	0.98938	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*	
63					IE-T2	*	PPS-SOV-FT-1456	+					
64	36	7	1.43E-09	0.99124	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*	
65					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+			
66	35	7	1.43E-09	0.99311	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*	
67					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+			
68	38	5	7.31E-10	0.99406	AFW-MDP-MA-FW3A	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1B	*	
69					IE-T2	+							
70	37	5	7.31E-10	0.99501	AFW-MDP-MA-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1A	*	
71					IE-T2	+							
72	40	6	6.91E-10	0.99591	ACP-BAC-ST-4KV1H	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	
73					IE-T2	*	PPS-MOV-FC-1535	+					
74	39	6	6.91E-10	0.99681	ACP-BAC-ST-4KV1J	*	AFW-MDP-FS-FW3A	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	
75					IE-T2	*	PPS-MOV-FC-1536	+					
76	44	7	6.14E-10	0.99760	AFW-MDP-FS-FW3A	*	AFW-MDP-MA-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	
77					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+			
78	43	7	6.14E-10	0.99840	AFW-MDP-FS-FW3B	*	AFW-MDP-MA-FW3A	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	
79					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+			
80	42	7	6.14E-10	0.99920	AFW-MDP-FS-FW3A	*	AFW-MDP-MA-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	
81					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+			
82	41	7	6.14E-10	1.00000	AFW-MDP-FS-FW3B	*	AFW-MDP-MA-FW3A	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	
83					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536				

SEQUENCE S1-D6

TOP EVENT S1-D6-CM CONTAINS 12 EVENTS IN 11 CUT SETS

THE FREQUENCY OF TOP EVENT S1-D6-CM IS 9.33E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT S1-D6-CM

N	1000
MEAN	6.66E-07
STD DEV	2.65E-06
LOWER 5%	4.20E-08
LOWER 25%	1.06E-07
MEDIAN	2.27E-07
UPPER 25%	5.17E-07
UPPER 5%	2.17E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE S1-D6

RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
BETA-LPI	1	1.50E-01	(1.0)	4.50E-07	(1.5)	6.85E-09	1.66E-06
LPI-MDP-FS	1	3.00E-03	(3.0)	4.50E-07	(1.5)	6.85E-09	1.66E-06
LPI-MOV-PG-1890C	1	4.40E-04	(11.0)	4.40E-07	(3.0)	1.34E-08	2.79E-07
LPI-MDP-FS-SI1B	4	3.00E-03	(3.0)	2.28E-08	(4.5)	2.48E-10	1.49E-07
LPI-MDP-FS-SI1A	4	3.00E-03	(3.0)	2.28E-08	(4.5)	2.48E-10	1.49E-07
LPI-MDP-MA-SI1A	2	2.00E-03	(5.5)	9.20E-09	(6.5)	8.45E-11	3.74E-08
LPI-MDP-MA-SI1B	2	2.00E-03	(5.5)	9.20E-09	(6.5)	8.45E-11	3.74E-08
SIS-ACT-FA-SISB	2	1.60E-03	(7.5)	8.00E-09	(8.5)	1.65E-10	2.86E-08
SIS-ACT-FA-SISA	2	1.60E-03	(7.5)	8.00E-09	(8.5)	1.65E-10	2.86E-08
LPI-CKV-OO-CV58	1	1.00E-03	(9.5)	3.00E-09	(10.5)	4.70E-11	1.19E-08
LPI-CKV-OO-CV50	1	1.00E-03	(9.5)	3.00E-09	(10.5)	4.70E-11	1.19E-08

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-S1	11	1.00E-03	(1.0)	9.33E-07	(1.0)	4.20E-08	2.17E-06

SEQUENCE S1-D8

RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
LPI-MOV-PG-1890C	1	4.40E-04	(11.0)	1.00E-03	(1.0)	2.66E-04	2.40E-03
LPI-MDP-FS	1	3.00E-03	(3.0)	1.50E-04	(2.0)	2.06E-05	4.65E-04
LPI-MDP-FS-SI1B	4	3.00E-03	(3.0)	7.58E-06	(3.5)	9.71E-07	2.48E-05
LPI-MDP-FS-SI1A	4	3.00E-03	(3.0)	7.58E-06	(3.5)	9.71E-07	2.48E-05
SIS-ACT-FA-SISA	2	1.60E-03	(7.5)	4.99E-06	(5.5)	2.72E-07	1.83E-05
SIS-ACT-FA-SISB	2	1.60E-03	(7.5)	4.99E-06	(5.5)	2.72E-07	1.83E-05
LPI-MDP-MA-SI1A	2	2.00E-03	(5.5)	4.59E-06	(7.5)	3.49E-07	1.55E-05
LPI-MDP-MA-SI1B	2	2.00E-03	(5.5)	4.59E-06	(7.5)	3.49E-07	1.55E-05
LPI-CKV-OO-CV58	1	1.00E-03	(9.5)	3.00E-06	(9.5)	7.56E-08	1.20E-05
LPI-CKV-OO-CV50	1	1.00E-03	(9.5)	3.00E-06	(9.5)	7.56E-08	1.20E-05
BETA-LPI	1	1.50E-01	(1.0)	2.55E-06	(11.0)	5.98E-08	1.05E-05

SEQUENCE S1-D6

UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
LPI-MDP-FS-SI1B	4	3.00E-03	(3.0)	52.9	(2.0)
LPI-MDP-FS-SI1A	4	3.00E-03	(3.0)	52.9	(2.0)
LPI-MDP-FS	1	3.00E-03	(3.0)	52.9	(2.0)
BETA-LPI	1	1.50E-01	(1.0)	7.9	(4.0)
LPI-MOV-PG-1890C	1	4.40E-04	(11.0)	5.2	(5.0)
LPI-MDP-MA-SI1A	2	2.00E-03	(5.5)	1.1	(6.5)
LPI-MDP-MA-SI1B	2	2.00E-03	(5.5)	1.1	(6.5)
SIS-ACT-FA-SISB	2	1.60E-03	(7.5)	0.7	(8.5)
SIS-ACT-FA-SISA	2	1.60E-03	(7.5)	0.7	(8.5)
LPI-CKV-OO-CV58	1	1.00E-03	(9.5)	0.6	(10.5)
LPI-CKV-OO-CV50	1	1.00E-03	(9.5)	0.6	(10.5)

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
IE-S1	11	1.00E-03	(1.0)	30.8	(1.0)

SEQUENCE S1-D6

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT S1-D6-CM WITH TOP EVENT FREQUENCY 9.33E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	3	4.50E-07	0.48232	BETA-LPI	*	IE-S1	*	LPI-MDP-FS	+
3	2	2	4.40E-07	0.95391	IE-S1	*	LPI-MOV-PG-1890C	+		
4	3	3	9.00E-09	0.96356	IE-S1	*	LPI-MDP-FS-SI1A	*	LPI-MDP-FS-SI1B	+
5	5	3	6.00E-09	0.96999	IE-S1	*	LPI-MDP-FS-SI1A	*	LPI-MDP-MA-SI1B	+
6	4	3	6.00E-09	0.97642	IE-S1	*	LPI-MDP-FS-SI1B	*	LPI-MDP-MA-SI1A	+
7	7	3	4.80E-09	0.98156	IE-S1	*	LPI-MDP-FS-SI1B	*	SIS-ACT-FA-SISA	+
8	6	3	4.80E-09	0.98671	IE-S1	*	LPI-MDP-FS-SI1A	*	SIS-ACT-FA-SISB	+
9	9	3	3.20E-09	0.99014	IE-S1	*	LPI-MDP-MA-SI1A	*	SIS-ACT-FA-SISB	+
10	8	3	3.20E-09	0.99357	IE-S1	*	LPI-MDP-MA-SI1B	*	SIS-ACT-FA-SISA	+
11	11	3	3.00E-09	0.99678	IE-S1	*	LPI-CKV-OO-CV58	*	LPI-MDP-FS-SI1A	+
12	10	3	3.00E-09	1.00000	IE-S1	*	LPI-CKV-OO-CV50	*	LPI-MDP-FS-SI1B	.

SURRY SEQUENCE SBO-L2

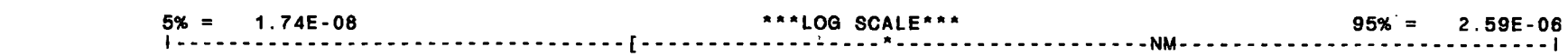
TOP EVENT SBO-L2 CONTAINS 35 EVENTS IN 61 CUT SETS

THE FREQUENCY OF TOP EVENT SBO-L2 IS 6.17E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT SBO-L2

N	1000
MEAN	6.49E-07
STD DEV	1.29E-06
LOWER 5%	1.74E-08
LOWER 25%	9.40E-08
MEDIAN	2.29E-07
UPPER 25%	6.28E-07
UPPER 5%	2.59E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)



NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SURRY SEQUENCE SBO-L2
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
REC-XHE-FO-DGEN	61	9.00E-01	(2.0)	6.17E-07	(1.0)	1.74E-08	2.59E-06
NOTQ	57	9.73E-01	(1.0)	6.15E-07	(2.0)		
OEP-DGN-FS	46	2.20E-02	(19.5)	5.94E-07	(3.0)	1.65E-08	2.41E-06
BETA-3DG	31	1.80E-02	(22.0)	5.77E-07	(4.0)	1.55E-08	2.38E-06
QS-SBO	61	2.70E-01	(8.0)	2.85E-07	(5.0)	4.45E-09	1.17E-06
NRAC-HALFHR	40	6.00E-01	(3.0)	2.66E-07	(6.0)	5.60E-09	1.16E-06
NRAC-1HR	11	4.40E-01	(6.0)	2.33E-07	(7.5)	3.13E-09	1.05E-06
AFW-XHE-FO-CST2	11	6.50E-02	(12.0)	2.33E-07	(7.5)	3.13E-09	1.05E-06
UNIT2-LOW-POWER	20	3.50E-01	(7.0)	1.41E-07	(9.0)		
AFW-TDP-FS-FW2	20	1.10E-02	(26.5)	1.35E-07	(10.0)	1.18E-09	5.78E-07
AFW-TDP-MA-FW2	17	1.00E-02	(28.5)	1.22E-07	(11.0)	7.70E-10	4.90E-07
NRAC-6HR-AVG	10	1.94E-01	(9.0)	1.18E-07	(12.0)	4.61E-10	5.64E-07
AFW-TDP-FR-2P6HR	8	3.00E-02	(15.5)	1.15E-07	(13.0)	4.47E-10	5.34E-07
QS-UNIT2	6	1.60E-01	(10.0)	6.04E-08	(14.0)	7.72E-10	1.95E-07
AFW-XHE-FO-U2SBO	4	7.50E-02	(11.0)	2.78E-08	(15.0)	2.33E-10	1.16E-07
OEP-DGN-FS-DG03	12	2.20E-02	(19.5)	1.86E-08	(17.0)	1.28E-10	1.85E-07
OEP-DGN-FS-DG01	12	2.20E-02	(19.5)	1.86E-08	(17.0)	1.28E-10	1.85E-07
OEP-DGN-FS-DG02	12	2.20E-02	(19.5)	1.86E-08	(17.0)	1.28E-10	1.85E-07
NOTDG-CCF	15	5.20E-01	(4.0)	1.76E-08	(19.5)		
BETA-2DG	15	3.80E-02	(13.0)	1.76E-08	(19.5)	1.13E-10	6.89E-08
AFW-CKV-OO-CV172	4	1.00E-03	(33.0)	1.12E-08	(21.0)	4.16E-10	4.04E-08
OEP-DGN-FR-6HDG3	7	1.20E-02	(24.0)	8.79E-09	(23.0)	4.17E-11	3.93E-08
OEP-DGN-FR-6HDG2	7	1.20E-02	(24.0)	8.79E-09	(23.0)	4.17E-11	3.93E-08
OEP-DGN-FR-6HDG1	7	1.20E-02	(24.0)	8.79E-09	(23.0)	4.17E-11	3.93E-08
AFW-TDP-FR-6HRU2	3	3.00E-02	(15.5)	5.79E-09	(25.0)	6.62E-12	4.50E-08
AFW-TDP-FS-U2FW2	3	1.10E-02	(26.5)	3.95E-09	(26.0)	6.44E-12	2.34E-08
AFW-TDP-MA-U2FW2	3	1.00E-02	(28.5)	3.59E-09	(27.0)	6.68E-12	2.44E-08
SBO-PORV-DMD	4	4.50E-01	(5.0)	2.39E-09	(28.0)	5.52E-12	4.94E-09
OEP-DGN-MA-DG03	1	6.00E-03	(31.0)	1.36E-09	(30.0)	3.13E-12	4.34E-09
OEP-DGN-MA-DG02	1	6.00E-03	(31.0)	1.36E-09	(30.0)	3.13E-12	4.34E-09
OEP-DGN-MA-DG01	1	6.00E-03	(31.0)	1.36E-09	(30.0)	3.13E-12	4.34E-09
PPS-SOV-OO-1456	2	3.00E-02	(15.5)	1.19E-09	(32.5)	2.76E-12	2.47E-09
PPS-SOV-OO-1455C	2	3.00E-02	(15.5)	1.19E-09	(32.5)	2.76E-12	2.47E-09
AFW-PSF-FC-XCONN	1	1.50E-04	(34.0)	6.14E-10	(34.0)	1.90E-11	2.50E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T1	61	7.70E-02	(1.0)	6.17E-07	(1.0)	1.74E-08	2.59E-06

SURRY SEQUENCE SBO-L2
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
BETA-3DG	31	1.80E-02	(22.0)	3.15E-05	(1.0)	1.38E-06	1.13E-04
OEP-DGN-FS	46	2.20E-02	(19.5)	2.64E-05	(2.0)	1.34E-06	1.05E-04
AFW-TDP-FS-FW2	20	1.10E-02	(26.5)	1.22E-05	(3.0)	7.63E-07	4.37E-05
AFW-TDP-MA-FW2	17	1.00E-02	(28.5)	1.20E-05	(4.0)	7.32E-07	4.32E-05
AFW-CKV-OO-CV172	4	1.00E-03	(33.0)	1.12E-05	(5.0)	6.71E-07	3.81E-05
AFW-PSF-FC-XCONN	1	1.50E-04	(34.0)	4.09E-06	(6.0)	1.71E-07	1.54E-05
AFW-TDP-FR-2P6HR	8	3.00E-02	(15.5)	3.73E-06	(7.0)	1.00E-07	1.44E-05
AFW-XHE-FO-CST2	11	6.50E-02	(12.0)	3.35E-06	(8.0)	1.04E-07	1.43E-05
OEP-DGN-FS-DG02	12	2.20E-02	(19.5)	8.27E-07	(10.0)	1.77E-08	4.36E-06
OEP-DGN-FS-DG03	12	2.20E-02	(19.5)	8.27E-07	(10.0)	1.77E-08	4.36E-06
OEP-DGN-FS-DG01	12	2.20E-02	(19.5)	8.27E-07	(10.0)	1.77E-08	4.36E-06
QS-SBO	61	2.70E-01	(8.0)	7.71E-07	(12.0)	1.69E-08	3.12E-06
OEP-DGN-FR-6HDG3	7	1.20E-02	(24.0)	7.24E-07	(14.0)	1.73E-08	3.72E-06
OEP-DGN-FR-6HDG2	7	1.20E-02	(24.0)	7.24E-07	(14.0)	1.73E-08	3.72E-06
OEP-DGN-FR-6HDG1	7	1.20E-02	(24.0)	7.24E-07	(14.0)	1.73E-08	3.72E-06
NRAC-6HR-AVG	10	1.94E-01	(9.0)	4.89E-07	(16.0)	3.68E-09	2.04E-06
BETA-2DG	15	3.80E-02	(13.0)	4.45E-07	(17.0)	3.96E-09	1.66E-06
AFW-TDP-MA-U2FW2	3	1.00E-02	(28.5)	3.55E-07	(18.0)	5.99E-09	1.44E-06
AFW-TDP-FS-U2FW2	3	1.10E-02	(26.5)	3.55E-07	(19.0)	5.98E-09	1.44E-06
AFW-XHE-FO-U2SBO	4	7.50E-02	(11.0)	3.43E-07	(20.0)	6.32E-09	1.40E-06
QS-UNIT2	6	1.60E-01	(10.0)	3.17E-07	(21.0)	5.46E-09	1.41E-06
NRAC-1HR	11	4.40E-01	(6.0)	2.97E-07	(22.0)	4.02E-09	1.36E-06
UNIT2-LOW-POWER	20	3.50E-01	(7.0)	2.61E-07	(23.0)		
OEP-DGN-MA-DG03	1	6.00E-03	(31.0)	2.25E-07	(25.0)	2.91E-09	9.30E-07
OEP-DGN-MA-DG02	1	6.00E-03	(31.0)	2.25E-07	(25.0)	2.91E-09	9.30E-07
OEP-DGN-MA-DG01	1	6.00E-03	(31.0)	2.25E-07	(25.0)	2.91E-09	9.30E-07
AFW-TDP-FR-6HRU2	3	3.00E-02	(15.5)	1.87E-07	(27.0)	1.82E-09	7.72E-07
NRAC-HALFHR	40	6.00E-01	(3.0)	1.78E-07	(28.0)	3.71E-09	7.16E-07
REC-XHE-FO-DGEN	61	9.00E-01	(2.0)	6.86E-08	(29.0)	4.38E-10	2.49E-07
PPS-SOV-OO-1456	2	3.00E-02	(15.5)	3.86E-08	(30.5)	3.05E-10	1.47E-07
PPS-SOV-OO-1455C	2	3.00E-02	(15.5)	3.86E-08	(30.5)	3.05E-10	1.47E-07
NOTQ	57	9.73E-01	(1.0)	1.71E-08	(32.0)		
NOTDG-CCF	15	5.20E-01	(4.0)	1.62E-08	(33.0)		
SBO-PORV-DMD	4	4.50E-01	(5.0)	2.92E-09	(34.0)	5.15E-12	5.41E-09

SURRY SEQUENCE SBO-L2
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
OEP-DGN-FS-DG03	12	2.20E-02	(19.5)	22.6	(2.5)	1.88	0.93
OEP-DGN-FS	46	2.20E-02	(19.5)	22.6	(2.5)	1.88	0.93
OEP-DGN-FS-DG01	12	2.20E-02	(19.5)	22.6	(2.5)	1.88	0.93
OEP-DGN-FS-DG02	12	2.20E-02	(19.5)	22.6	(2.5)	1.88	0.93
BETA-3DG	31	1.80E-02	(22.0)	17.9	(5.0)	1.56	0.91
QS-SBO	61	2.70E-01	(8.0)	7.7	(6.0)	1.29	0.97
QS-UNIT2	6	1.60E-01	(10.0)	7.5	(7.0)	1.08	1.06
PPS-SOV-OO-1455C	2	3.00E-02	(15.5)	7.0	(8.5)	1.00	1.00
PPS-SOV-OO-1456	2	3.00E-02	(15.5)	7.0	(8.5)	1.00	1.00
AFW-XHE-FO-CST2	11	6.50E-02	(12.0)	5.5	(10.0)	1.27	1.00
AFW-TDP-MA-FW2	17	1.00E-02	(28.5)	4.9	(11.5)	1.38	0.98
AFW-TDP-MA-U2FW2	3	1.00E-02	(28.5)	4.9	(11.5)	1.38	0.98
AFW-TDP-FS-U2FW2	3	1.10E-02	(26.5)	4.9	(13.5)	1.29	1.08
AFW-TDP-FS-FW2	20	1.10E-02	(26.5)	4.9	(13.5)	1.29	1.08
AFW-TDP-FR-2P6HR	8	3.00E-02	(15.5)	3.0	(15.5)	1.19	0.93
AFW-TDP-FR-6HRU2	3	3.00E-02	(15.5)	3.0	(15.5)	1.19	0.93
NRAC-6HR-AVG	10	1.94E-01	(9.0)	1.5	(17.0)	1.02	0.98
REC-XHE-FO-DGEN	61	9.00E-01	(2.0)	1.3	(18.0)	1.01	0.94
SBO-PORV-DMD	4	4.50E-01	(5.0)	0.9	(19.0)	1.00	1.00
AFW-PSF-FC-XCONN	1	1.50E-04	(34.0)	0.9	(20.0)	1.00	1.00
AFW-XHE-FO-U2SBO	4	7.50E-02	(11.0)	0.8	(21.0)	0.98	1.02
OEP-DGN-FR-6HDG3	7	1.20E-02	(24.0)	0.7	(23.0)	0.99	1.01
OEP-DGN-FR-6HDG2	7	1.20E-02	(24.0)	0.7	(23.0)	0.99	1.01
OEP-DGN-FR-6HDG1	7	1.20E-02	(24.0)	0.7	(23.0)	0.99	1.01
NRAC-1HR	11	4.40E-01	(6.0)	0.6	(25.0)	0.96	1.01
NRAC-HALFHR	40	6.00E-01	(3.0)	0.5	(26.0)	0.97	1.00
BETA-2DG	15	3.80E-02	(13.0)	0.5	(27.0)	1.00	1.00
AFW-CKV-OO-CV172	4	1.00E-03	(33.0)	0.4	(28.0)		
OEP-DGN-MA-DG03	1	6.00E-03	(31.0)	0.0	(30.0)		
OEP-DGN-MA-DG02	1	6.00E-03	(31.0)	0.0	(30.0)		
OEP-DGN-MA-DG01	1	6.00E-03	(31.0)	0.0	(30.0)		
NOTQ	57	9.73E-01	(1.0)				
NOTDG-CCF	15	5.20E-01	(4.0)				
UNIT2-LOW-POWER	20	3.50E-01	(7.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	61	7.70E-02	(1.0)	28.6	(1.0)	1.79	1.05

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SURRY SEQUENCE SBO-L2

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT SBO-L2 WITH TOP EVENT FREQUENCY 6.17E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	8	2.06E-07	0.33418	AFW-XHE-FO-CST2	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
3					NRAC-1HR	*	OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGEN	+	
4	2	8	4.76E-08	0.41129	AFW-TDP-FS-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
5					NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGEN	+	
6	3	9	4.50E-08	0.48427	AFW-TDP-FS-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
7					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGEN	*	
8					UNIT2-LOW-POWER	+							
9	4	8	4.33E-08	0.55438	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
10					NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGEN	+	
11	6	8	4.20E-08	0.62238	AFW-TDP-FR-2P6HR	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
12					NRAC-6HR-AVG	*	OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGEN	+	
13	5	9	4.09E-08	0.68872	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
14					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGEN	*	
15					UNIT2-LOW-POWER	+							
16	8	9	3.97E-08	0.75307	AFW-TDP-FR-2P6HR	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
17					NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGEN	*	
18					UNIT2-LOW-POWER	+							
19	7	9	2.06E-08	0.78643	AFW-TDP-FS-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
20					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	QS-UNIT2	*	
21					REC-XHE-FO-DGEN	+							
22	9	9	1.87E-08	0.81676	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
23					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	QS-UNIT2	*	
24					REC-XHE-FO-DGEN	+							
25	11	9	1.82E-08	0.84618	AFW-TDP-FR-2P6HR	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
26					NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	QS-UNIT2	*	
27					REC-XHE-FO-DGEN	+							
28	10	9	9.65E-09	0.86182	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U2SBO	*	BETA-3DG	*	IE-T1	*	
29					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	
30					REC-XHE-FO-DGEN	+							
31	12	9	8.77E-09	0.87603	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U2SBO	*	BETA-3DG	*	IE-T1	*	
32					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	
33					REC-XHE-FO-DGEN	+							
34	15	9	8.51E-09	0.88982	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U2SBO	*	BETA-3DG	*	IE-T1	*	
35					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	
36					REC-XHE-FO-DGEN	+							
37	13	9	5.54E-09	0.89881	AFW-XHE-FO-CST2	*	IE-T1	*	NOTQ	*	NRAC-1HR	*	
38					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
39					REC-XHE-FO-DGEN	+							
40	14	8	4.33E-09	0.90582	AFW-CKV-OO-CV172	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
41					NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGEN	+	
42	16	9	4.09E-09	0.91245	AFW-CKV-OO-CV172	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
43					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGEN	*	
44					UNIT2-LOW-POWER	+							
45	27	9	3.40E-09	0.91797	AFW-TDP-FR-2P6HR	*	AFW-TDP-FR-6HRU2	*	BETA-3DG	*	IE-T1	*	
46					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	

47					REC-XHE-FO-DGEN	+							
48	19	9	3.02E-09	0.92287	AFW-XHE-FO-CST2	*	IE-T1	*	NOTQ	*	NRAC-1HR	*	
49					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
50					REC-XHE-FO-DGEN	+							
51	18	9	3.02E-09	0.92777	AFW-XHE-FO-CST2	*	IE-T1	*	NOTQ	*	NRAC-1HR	*	
52					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*	
53					REC-XHE-FO-DGEN	+							
54	17	9	3.02E-09	0.93267	AFW-XHE-FO-CST2	*	IE-T1	*	NOTQ	*	NRAC-1HR	*	
55					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*	
56					REC-XHE-FO-DGEN	+							
57	22	10	2.72E-09	0.93708	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	
58					NOTQ	*	NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	
59					QS-SBO	*	REC-XHE-FO-DGEN	+					
60	21	10	2.72E-09	0.94148	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	
61					NOTQ	*	NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*	
62					QS-SBO	*	REC-XHE-FO-DGEN	+					
63	20	10	2.72E-09	0.94588	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	
64					NOTQ	*	NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*	
65					QS-SBO	*	REC-XHE-FO-DGEN	+					
66	23	9	1.87E-09	0.94891	AFW-CKV-OO-CV172	*	BETA-3DG	*	IE-T1	*	NOTQ	*	
67					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	QS-UNIT2	*	
68					REC-XHE-FO-DGEN	+							
69	28	9	1.42E-09	0.95121	AFW-TDP-FS-FW2	*	AFW-TDP-FS-U2FW2	*	BETA-3DG	*	IE-T1	*	
70					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	
71					REC-XHE-FO-DGEN	+							
72	26	10	1.36E-09	0.95341	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	
73					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG01	*	
74					QS-SBO	*	REC-XHE-FO-DGEN	+					
75	25	10	1.36E-09	0.95561	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	
76					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG02	*	
77					QS-SBO	*	REC-XHE-FO-DGEN	+					
78	24	10	1.36E-09	0.95781	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	
79					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG03	*	
80					QS-SBO	*	REC-XHE-FO-DGEN	+					
81	30	9	1.29E-09	0.95990	AFW-TDP-FS-U2FW2	*	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	
82					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	
83					REC-XHE-FO-DGEN	+							
84	29	9	1.29E-09	0.96198	AFW-TDP-FS-FW2	*	AFW-TDP-MA-U2FW2	*	BETA-3DG	*	IE-T1	*	
85					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	
86					REC-XHE-FO-DGEN	+							
87	44	9	1.25E-09	0.96400	AFW-TDP-FR-2P6HR	*	AFW-TDP-FS-U2FW2	*	BETA-3DG	*	IE-T1	*	
88					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	
89					REC-XHE-FO-DGEN	+							
90	43	9	1.25E-09	0.96603	AFW-TDP-FR-6HRU2	*	AFW-TDP-FS-FW2	*	BETA-3DG	*	IE-T1	*	
91					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	
92					REC-XHE-FO-DGEN	+							
93	31	10	1.21E-09	0.96799	AFW-TDP-FS-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*	
94					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	/QS-SBO	*	
95					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+					
96	32	9	1.17E-09	0.96988	AFW-TDP-MA-FW2	*	AFW-TDP-MA-U2FW2	*	BETA-3DG	*	IE-T1	*	
97					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	
98					REC-XHE-FO-DGEN	+							
99	58	9	1.13E-09	0.97172	AFW-TDP-FR-2P6HR	*	AFW-TDP-MA-U2FW2	*	BETA-3DG	*	IE-T1	*	
100					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	
101					REC-XHE-FO-DGEN	+							
102	57	9	1.13E-09	0.97356	AFW-TDP-FR-6HRU2	*	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	

103					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*		
104					REC-XHE-FO-DGEN	+								
105	59	9	1.13E-09	0.97539	AFW-TDP-FR-2P6HR	*	IE-T1	*	NOTQ	*	NRAC-6HR-AVG	*		
106					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*		
107					REC-XHE-FO-DGEN	+								
108	33	10	1.10E-09	0.97717	AFW-TDP-MA-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*		
109					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	/QS-SBO	*		
110					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
111	34	9	8.77E-10	0.97859	AFW-CKV-OO-CV172	*	AFW-XHE-FO-U2SBO	*	BETA-3DG	*	IE-T1	*		
112					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*		
113					REC-XHE-FO-DGEN	+								
114	37	10	6.60E-10	0.97966	AFW-TDP-FS-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*		
115					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	/QS-SBO	*		
116					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
117	36	10	6.60E-10	0.98073	AFW-TDP-FS-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*		
118					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	/QS-SBO	*		
119					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
120	35	10	6.60E-10	0.98181	AFW-TDP-FS-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*		
121					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	/QS-SBO	*		
122					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
123	42	10	6.27E-10	0.98282	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*		
124					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*		
125					QS-SBO	*	REC-XHE-FO-DGEN	+						
126	41	10	6.27E-10	0.98384	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*		
127					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*		
128					QS-SBO	*	REC-XHE-FO-DGEN	+						
129	40	10	6.27E-10	0.98485	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*		
130					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*		
131					QS-SBO	*	REC-XHE-FO-DGEN	+						
132	39	10	6.25E-10	0.98587	AFW-TDP-FS-FW2	*	BETA-3DG	*	IE-T1	*	NRAC-HALFHR	*		
133					OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	REC-XHE-FO-DGEN	*		
134					SBO-PORV-DMD	*	UNIT2-LOW-POWER	+						
135	38	10	6.25E-10	0.98688	AFW-TDP-FS-FW2	*	BETA-3DG	*	IE-T1	*	NRAC-HALFHR	*		
136					OEP-DGN-FS	*	PPS-SOV-OO-1456	*	/QS-SBO	*	REC-XHE-FO-DGEN	*		
137					SBO-PORV-DMD	*	UNIT2-LOW-POWER	+						
138	45	9	6.14E-10	0.98787	AFW-PSF-FC-XCONN	*	BETA-3DG	*	IE-T1	*	NOTQ	*		
139					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGEN	*		
140					UNIT2-LOW-POWER	+								
141	48	10	6.00E-10	0.98885	AFW-TDP-MA-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*		
142					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	/QS-SBO	*		
143					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
144	47	10	6.00E-10	0.98982	AFW-TDP-MA-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*		
145					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	/QS-SBO	*		
146					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
147	46	10	6.00E-10	0.99079	AFW-TDP-MA-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*		
148					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	/QS-SBO	*		
149					REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+						
150	51	11	5.93E-10	0.99175	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*		
151					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*		
152					/QS-SBO	*	REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+				
153	50	11	5.93E-10	0.99271	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*		
154					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*		
155					/QS-SBO	*	REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+				
156	49	11	5.93E-10	0.99368	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*		
157					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*		
158					/QS-SBO	*	REC-XHE-FO-DGEN	*	UNIT2-LOW-POWER	+				

159	56	10	5.70E-10	0.99460	AFW-TDP-MA-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
160					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*
161					QS-SBO	*	REC-XHE-FO-DGEN	+				
162	55	10	5.70E-10	0.99552	AFW-TDP-MA-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
163					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*
164					QS-SBO	*	REC-XHE-FO-DGEN	+				
165	54	10	5.70E-10	0.99645	AFW-TDP-MA-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
166					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*
167					QS-SBO	*	REC-XHE-FO-DGEN	+				
168	53	10	5.68E-10	0.99737	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	NRAC-HALFHR	*
169					OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
170					SBO-PORV-DMD	*	UNIT2-LOW-POWER	+				
171	52	10	5.68E-10	0.99829	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	NRAC-HALFHR	*
172					OEP-DGN-FS	*	PPS-SOV-OO-1456	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
173					SBO-PORV-DMD	*	UNIT2-LOW-POWER	+				
174	60	10	5.53E-10	0.99918	AFW-TDP-FS-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*
175					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	/QS-SBO	*
176					QS-UNIT2	*	REC-XHE-FO-DGEN	+				
177	61	10	5.03E-10	1.00000	AFW-TDP-MA-FW2	*	IE-T1	*	NOTQ	*	NRAC-HALFHR	*
178					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	/QS-SBO	*
179					QS-UNIT2	*	REC-XHE-FO-DGEN					

SEQUENCE A-D5

TOP EVENT A-D5 CONTAINS 7 EVENTS IN 6 CUT SETS

THE FREQUENCY OF TOP EVENT A-D5 IS 8.50E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT A-D5

N	1000
MEAN	6.37E-07
STD DEV	6.32E-07
LOWER 5%	1.12E-07
LOWER 25%	2.58E-07
MEDIAN	4.56E-07
UPPER 25%	7.90E-07
UPPER 5%	1.77E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE A-D5
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
ACC-MOV-PG-1865B	1	6.50E-04	(1.5)	3.25E-07	(1.5)	3.03E-09	6.51E-07
ACC-MOV-PG-1865C	1	6.50E-04	(1.5)	3.25E-07	(1.5)	3.03E-08	6.51E-07
ACC-CKV-FT-CV145	1	1.00E-04	(4.5)	5.00E-08	(4.5)	6.43E-09	1.63E-07
ACC-CKV-FT-CV147	1	1.00E-04	(4.5)	5.00E-08	(4.5)	6.43E-09	1.63E-07
ACC-CKV-FT-CV130	1	1.00E-04	(4.5)	5.00E-08	(4.5)	6.43E-09	1.63E-07
ACC-CKV-FT-CV128	1	1.00E-04	(4.5)	5.00E-08	(4.5)	6.43E-09	1.63E-07

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-A	6	5.00E-04	(1.0)	8.50E-07	(1.0)	1.12E-07	1.77E-06

SEQUENCE A-D5
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
ACC-CKV-FT-CV128	1	1.00E-04	(4.5)	5.00E-04	(2.5)	1.33E-04	1.20E-03
ACC-CKV-FT-CV145	1	1.00E-04	(4.5)	5.00E-04	(2.5)	1.33E-04	1.20E-03
ACC-CKV-FT-CV147	1	1.00E-04	(4.5)	5.00E-04	(2.5)	1.33E-04	1.20E-03
ACC-CKV-FT-CV130	1	1.00E-04	(4.5)	5.00E-04	(2.5)	1.33E-04	1.20E-03
ACC-MOV-PG-1865C	1	6.50E-04	(1.5)	5.00E-04	(5.5)	1.33E-04	1.20E-03
ACC-MOV-PG-1865B	1	6.50E-04	(1.5)	5.00E-04	(5.5)	1.33E-04	1.20E-03

SEQUENCE A-D5
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
ACC-MOV-PG-1865B	1	6.50E-04	(1.5)	28.0	(1.5)
ACC-MOV-PG-1865C	1	6.50E-04	(1.5)	28.0	(1.5)
ACC-CKV-FT-CV145	1	1.00E-04	(4.5)	9.0	(4.5)
ACC-CKV-FT-CV147	1	1.00E-04	(4.5)	9.0	(4.5)
ACC-CKV-FT-CV130	1	1.00E-04	(4.5)	9.0	(4.5)
ACC-CKV-FT-CV128	1	1.00E-04	(4.5)	9.0	(4.5)

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
IE-A	6	5.00E-04	(1.0)	63.6	(1.0)

SEQUENCE A-D5

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT A-D5 WITH TOP EVENT FREQUENCY 8.50E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	2	3.25E-07	0.38235	ACC-MOV-PG-1865C *	IE-A	+
3	2	2	3.25E-07	0.76471	ACC-MOV-PG-1865B *	IE-A	+
4	3	2	5.00E-08	0.82353	ACC-CKV-FT-CV128 *	IE-A	+
5	5	2	5.00E-08	0.88235	ACC-CKV-FT-CV145 *	IE-A	+
6	6	2	5.00E-08	0.94118	ACC-CKV-FT-CV130 *	IE-A	+
7	4	2	5.00E-08	1.00000	ACC-CKV-FT-CV147 *	IE-A	.

SEQUENCE T-K-R-D4

TOP EVENT T-K-R-D4 CONTAINS 23 EVENTS IN 14 CUT SETS

THE FREQUENCY OF TOP EVENT T-K-R-D4 IS 5.65E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T-K-R-D4

N	1000
MEAN	6.36E-07
STD DEV	1.80E-06
LOWER 5%	9.48E-09
LOWER 25%	4.77E-08
MEDIAN	1.50E-07
UPPER 25%	4.39E-07
UPPER 5%	2.82E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE T-K-R-D4
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
R	14	1.70E-01	(4.0)	5.65E-07	(1.5)	9.48E-09	2.82E-06
K	14	6.00E-05	(18.0)	5.65E-07	(1.5)	9.48E-09	2.82E-06
PPS-MOV-FC-1536	3	3.00E-01	(1.5)	2.64E-07	(3.5)	2.00E-09	1.46E-06
PPS-MOV-FC-1535	3	3.00E-01	(1.5)	2.64E-07	(3.5)	2.00E-09	1.46E-06
PPS-MOV-FT-1535	2	4.00E-02	(8.0)	2.43E-07	(5.0)	1.82E-09	1.29E-06
HPI-MOV-FT-1350	1	3.00E-03	(10.0)	2.02E-07	(6.0)	8.17E-10	7.56E-07
PPS-XHE-FO-EMBOR	1	1.00E-03	(12.5)	6.73E-08	(7.0)	2.58E-10	2.40E-07
BETA-2MOV	1	8.80E-02	(5.0)	2.13E-08	(8.5)	1.11E-10	1.15E-07
PPS-MOV-FT	1	4.00E-02	(8.0)	2.13E-08	(8.5)	1.11E-10	1.15E-07
ACP-BAC-ST-4KV1H	1	9.00E-05	(16.0)	6.06E-09	(11.0)	6.02E-11	2.23E-08
ACP-BAC-ST-1H1-2	1	9.00E-05	(16.0)	6.06E-09	(11.0)	6.02E-11	2.23E-08
ACP-BAC-ST-1H1	1	9.00E-05	(16.0)	6.06E-09	(11.0)	6.02E-11	2.23E-08
BETA-SRV	1	7.00E-02	(6.0)	4.71E-09	(13.5)	5.25E-11	1.74E-08
PPS-SOV-FT	1	1.00E-03	(12.5)	4.71E-09	(13.5)	5.25E-11	1.74E-08
HPI-MOV-PG-1350	1	4.00E-05	(19.5)	2.69E-09	(15.5)	4.77E-11	1.08E-08
ACP-TFM-NO-1H1	1	4.00E-05	(19.5)	2.69E-09	(15.5)	4.79E-11	1.15E-08
CVC-MDP-FR-2A1HR	1	3.00E-05	(21.5)	2.02E-09	(17.0)	8.51E-12	6.51E-09
PPS-SOV-FT-1456	1	1.00E-03	(12.5)	8.08E-10	(19.0)	7.39E-12	3.22E-09
PPS-SOV-FT-1455C	1	1.00E-03	(12.5)	8.08E-10	(19.0)	7.39E-12	3.22E-09
PPS-MOV-FT-1536	1	4.00E-02	(8.0)	8.08E-10	(19.0)	7.39E-12	3.22E-09
BETA-STR	1	2.63E-01	(3.0)	5.31E-10	(21.5)	1.11E-11	1.88E-09
CPC-STR-PG-1HR	1	3.00E-05	(21.5)	5.31E-10	(21.5)		

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T	14	6.60E+00	(1.0)	5.65E-07	(1.0)	9.48E-09	2.82E-06

SEQUENCE T-K-R-D4
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
K	14	6.00E-05	(18.0)	9.42E-03	(1.0)	4.23E-04	4.43E-02
CVC-MDP-FR-2A1HR	1	3.00E-05	(21.5)	6.73E-05	(3.0)	1.80E-06	2.49E-04
HPI-MOV-PG-1350	1	4.00E-05	(19.5)	6.73E-05	(3.0)	1.80E-06	2.49E-04
ACP-TFM-NO-1H1	1	4.00E-05	(19.5)	6.73E-05	(3.0)	1.80E-06	2.49E-04
ACP-BAC-ST-1H1	1	9.00E-05	(16.0)	6.73E-05	(6.0)	1.80E-06	2.49E-04
ACP-BAC-ST-4KV1H	1	9.00E-05	(16.0)	6.73E-05	(6.0)	1.80E-06	2.49E-04
ACP-BAC-ST-1H1-2	1	9.00E-05	(16.0)	6.73E-05	(6.0)	1.80E-06	2.49E-04
PPS-XHE-FO-EMBOR	1	1.00E-03	(12.5)	6.73E-05	(8.0)	1.79E-06	2.48E-04
HPI-MOV-FT-1350	1	3.00E-03	(10.0)	6.71E-05	(9.0)	1.80E-06	2.48E-04
CPC-STR-PG-1HR	1	3.00E-05	(21.5)	1.77E-05	(10.0)		
PPS-MOV-FT-1535	2	4.00E-02	(8.0)	5.84E-06	(11.0)	7.32E-08	3.20E-05
PPS-SOV-FT	1	1.00E-03	(12.5)	4.71E-06	(12.0)	8.54E-08	1.69E-05
R	14	1.70E-01	(4.0)	2.76E-06	(13.0)	8.63E-08	1.21E-05
PPS-SOV-FT-1456	1	1.00E-03	(12.5)	8.07E-07	(14.5)	1.16E-08	3.27E-06
PPS-SOV-FT-1455C	1	1.00E-03	(12.5)	8.07E-07	(14.5)	1.16E-08	3.27E-06
PPS-MOV-FC-1536	3	3.00E-01	(1.5)	6.17E-07	(16.5)	8.65E-09	2.03E-06
PPS-MOV-FC-1535	3	3.00E-01	(1.5)	6.17E-07	(16.5)	8.65E-09	2.03E-06
PPS-MOV-FT	1	4.00E-02	(8.0)	5.12E-07	(18.0)	4.12E-09	2.79E-06
BETA-2MOV	1	8.80E-02	(5.0)	2.21E-07	(19.0)	1.67E-09	1.19E-06
BETA-SRV	1	7.00E-02	(6.0)	6.26E-08	(20.0)	1.12E-09	2.36E-07
PPS-MOV-FT-1536	1	4.00E-02	(8.0)	1.94E-08	(21.0)	2.91E-10	8.88E-08
BETA-STR	1	2.63E-01	(3.0)	1.49E-09	(22.0)	3.74E-11	6.09E-09

SEQUENCE T-K-R-D4
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
K	14	6.00E-05	(18.0)	31.9	(1.0)
R	14	1.70E-01	(4.0)	26.6	(2.0)
PPS-MOV-FC-1535	3	3.00E-01	(1.5)	11.0	(3.5)
PPS-MOV-FC-1536	3	3.00E-01	(1.5)	11.0	(3.5)
HPI-MOV-FT-1350	1	3.00E-03	(10.0)	8.3	(5.0)
PPS-MOV-FT	1	4.00E-02	(8.0)	3.9	(7.0)
PPS-MOV-FT-1536	1	4.00E-02	(8.0)	3.9	(7.0)
PPS-MOV-FT-1535	2	4.00E-02	(8.0)	3.9	(7.0)
PPS-XHE-FO-EMBOR	1	1.00E-03	(12.5)	1.3	(9.0)
BETA-SRV	1	7.00E-02	(6.0)	0.8	(10.0)
CVC-MDP-FR-2A1HR	1	3.00E-05	(21.5)	0.8	(11.0)
ACP-TFM-NO-1H1	1	4.00E-05	(19.5)	0.5	(12.0)
PPS-SOV-FT-1456	1	1.00E-03	(12.5)	0.4	(14.0)
PPS-SOV-FT-1455C	1	1.00E-03	(12.5)	0.4	(14.0)
PPS-SOV-FT	1	1.00E-03	(12.5)	0.4	(14.0)
BETA-STR	1	2.63E-01	(3.0)	0.3	(16.0)
ACP-BAC-ST-4KV1H	1	9.00E-05	(16.0)	0.0	(19.0)
HPI-MOV-PG-1350	1	4.00E-05	(19.5)	0.0	(19.0)
BETA-2MOV	1	8.80E-02	(5.0)	0.0	(19.0)
ACP-BAC-ST-1H1-2	1	9.00E-05	(16.0)	0.0	(19.0)
ACP-BAC-ST-1H1	1	9.00E-05	(16.0)	0.0	(19.0)
CPC-STR-PG-1HR	1	3.00E-05	(21.5)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
IE-T	14	6.60E+00	(1.0)	16.1	(1.0)

SEQUENCE T-K-R-D4

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T-K-R-D4 WITH TOP EVENT FREQUENCY 5.65E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	6	2.42E-07	0.42864	IE-T	*	K	*	PPS-MOV-FC-1535	*	PPS-MOV-FC-1536	*	
3					PPS-MOV-FT-1535	*	R	+					
4	2	4	2.02E-07	0.78584	HPI-MOV-FT-1350	*	IE-T	*	K	*	R		+
5	3	4	6.73E-08	0.90490	IE-T	*	K	*	PPS-XHE-FO-EMBOR	*	R		+
6	4	7	2.13E-08	0.94282	BETA-2MOV	*	IE-T	*	K	*	PPS-MOV-FC-1535	*	
7					PPS-MOV-FC-1536	*	PPS-MOV-FT	*	R	+			
8	6	4	6.06E-09	0.95334	ACP-BAC-ST-4KV1H	*	IE-T	*	K	*	R		+
9	7	4	6.06E-09	0.96406	ACP-BAC-ST-1H1	*	IE-T	*	K	*	R		+
10	5	4	6.06E-09	0.97477	ACP-BAC-ST-1H1-2	*	IE-T	*	K	*	R		+
11	8	5	4.71E-09	0.98311	BETA-SRV	*	IE-T	*	K	*	PPS-SOV-FT		*
12					R	+							
13	10	4	2.69E-09	0.98787	ACP-TFM-NO-1H1	*	IE-T	*	K	*	R		+
14	9	4	2.69E-09	0.99263	HPI-MOV-PG-1350	*	IE-T	*	K	*	R		+
15	11	4	2.02E-09	0.99620	CVC-MDP-FR-2A1HR	*	IE-T	*	K	*	R		+
16	13	6	8.08E-10	0.99763	IE-T	*	K	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536		*
17					PPS-SOV-FT-1456	*	R	+					
18	12	6	8.08E-10	0.99906	IE-T	*	K	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535		*
19					PPS-SOV-FT-1455C	*	R	+					
20	14	5	5.31E-10	1.00000	BETA-STR	*	CPC-STR-PG-1HR	*	IE-T	*	K		*
21					R								

SURRY SEQUENCE S3-D1

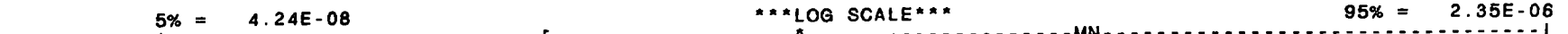
TOP EVENT S3-D1-CM CONTAINS 33 EVENTS IN 20 CUT SETS

THE FREQUENCY OF TOP EVENT S3-D1-CM IS 6.39E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT S3-D1-CM

N	1000
MEAN	6.25E-07
STD DEV	1.34E-06
LOWER 5%	4.24E-08
LOWER 25%	1.30E-07
MEDIAN	2.70E-07
UPPER 25%	6.16E-07
UPPER 5%	2.35E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)



NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SURRY SEQUENCE S3-D1
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
BETA-2MOV	2	8.80E-02	(3.0)	4.05E-07	(1.5)	3.72E-09	1.56E-06
HPI-MOV-FT	2	3.00E-03	(15.0)	4.05E-07	(1.5)	3.72E-09	1.56E-06
HPI-XHE-FO-UN2S3	13	4.40E-02	(6.0)	3.13E-07	(3.0)	1.52E-08	1.29E-06
HPI-XHE-FO-ALTS3	1	7.40E-02	(4.0)	2.54E-07	(4.0)	2.00E-09	9.24E-07
HPI-CKV-FT-CV25	1	1.00E-04	(26.0)	5.72E-08	(5.5)	3.04E-09	2.08E-07
HPI-CKV-FT-CV410	1	1.00E-04	(26.0)	5.72E-08	(5.5)	3.04E-09	2.08E-07
RWT-TNK-LF-RWST	1	2.70E-06	(32.0)	3.51E-08	(7.0)	7.12E-10	1.29E-07
HPI-XVM-PG-XV24	1	4.00E-05	(30.5)	2.29E-08	(8.0)	1.22E-09	8.29E-08
HPI-MDP-FR-1A24H	2	1.60E-03	(20.0)	2.16E-08	(9.0)	1.95E-09	6.93E-08
HPI-CKV-OO-CV258	1	1.00E-03	(21.5)	2.08E-08	(10.0)	1.77E-09	6.71E-08
CPC-XHE-FO-REALN	3	7.00E-02	(5.0)	9.38E-09	(11.0)	2.61E-10	3.62E-08
HPI-MOV-FT-1867D	3	3.00E-03	(15.0)	8.58E-09	(12.0)	1.16E-10	3.33E-08
BETA-STR	1	2.63E-01	(1.0)	7.58E-09	(13.5)	2.00E-10	2.96E-08
CPC-STR-PG-24H	1	7.20E-04	(23.5)	7.58E-09	(13.5)		
HPI-XHE-FO-ALTIN	1	5.70E-03	(8.0)	7.41E-09	(15.5)	9.74E-11	3.25E-08
HPI-CKV-FT-CV225	1	1.00E-04	(26.0)	7.41E-09	(15.5)	9.74E-11	3.25E-08
HPI-MOV-FT-1115E	1	3.00E-03	(15.0)	5.15E-09	(18.5)	2.41E-12	6.23E-08
HPI-MOV-FT-1115D	1	3.00E-03	(15.0)	5.15E-09	(18.5)	2.41E-12	6.23E-08
HPI-MOV-FT-1115C	1	3.00E-03	(15.0)	5.15E-09	(18.5)	2.41E-12	6.23E-08
HPI-MOV-FT-1115B	1	3.00E-03	(15.0)	5.15E-09	(18.5)	2.41E-12	6.23E-08
CPC-MDP-FR-SWA24	3	3.80E-03	(10.5)	3.97E-09	(21.0)	1.35E-10	1.56E-08
ACP-BAC-ST-4KV1H	1	9.00E-05	(28.5)	3.51E-09	(22.5)	3.30E-11	1.33E-08
ACP-BAC-ST-1H1	1	9.00E-05	(28.5)	3.51E-09	(22.5)	3.30E-11	1.33E-08
CPC-CKV-OO-CV113	1	1.00E-03	(21.5)	2.17E-09	(24.0)	7.76E-11	8.77E-09
CPC-MDP-FR-CCA24	2	7.20E-04	(23.5)	2.06E-09	(25.0)	8.97E-12	6.85E-09
ACP-TFM-NO-1H1	1	4.00E-05	(30.5)	1.56E-09	(26.0)	2.60E-11	6.43E-09
CPC-MDP-FS-CC2B	1	3.00E-03	(15.0)	1.24E-09	(27.0)	2.69E-12	4.35E-09
CPC-MDP-FS-SW10B	1	8.00E-03	(7.0)	1.22E-09	(28.0)	1.70E-11	4.86E-09
CPC-MDP-MA-CC2B	1	2.00E-03	(19.0)	8.24E-10	(29.0)	1.35E-12	2.64E-09
BETA-HPI	1	2.10E-01	(2.0)	7.69E-10	(30.5)	1.80E-11	3.14E-09
HPI-MDP-FS	1	4.00E-03	(9.0)	7.69E-10	(30.5)	1.80E-11	3.14E-09
CPC-MDP-FR-SWB24	1	3.80E-03	(10.5)	5.78E-10	(32.0)	5.84E-12	3.57E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-S3	20	1.30E-02	(1.0)	6.39E-07	(1.0)	4.24E-08	2.35E-06

SURRY SEQUENCE S3-D1
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
RWT-TNK-LF-RWST	1	2.70E-06	(32.0)	1.30E-02	(1.0)	3.47E-03	3.12E-02
HPI-XVM-PG-XV24	1	4.00E-05	(30.5)	5.72E-04	(2.0)	4.80E-05	2.01E-03
HPI-CKV-FT-CV410	1	1.00E-04	(26.0)	5.72E-04	(3.5)	4.80E-05	2.01E-03
HPI-CKV-FT-CV25	1	1.00E-04	(26.0)	5.72E-04	(3.5)	4.80E-05	2.01E-03
HPI-MOV-FT	2	3.00E-03	(15.0)	1.35E-04	(5.0)	1.01E-05	4.71E-04
HPI-CKV-FT-CV225	1	1.00E-04	(26.0)	7.41E-05	(6.0)	1.66E-06	3.04E-04
ACP-TFM-NO-1H1	1	4.00E-05	(30.5)	3.90E-05	(7.0)	9.10E-07	1.52E-04
ACP-BAC-ST-1H1	1	9.00E-05	(28.5)	3.90E-05	(8.5)	9.10E-07	1.51E-04
ACP-BAC-ST-4KV1H	1	9.00E-05	(28.5)	3.90E-05	(8.5)	9.10E-07	1.51E-04
HPI-CKV-OO-CV258	1	1.00E-03	(21.5)	2.08E-05	(10.0)	3.16E-06	6.41E-05
HPI-MDP-FR-1A24H	2	1.60E-03	(20.0)	1.35E-05	(11.0)	1.84E-06	3.93E-05
CPC-STR-PG-24H	1	7.20E-04	(23.5)	1.05E-05	(12.0)		
HPI-XHE-FO-UN2S3	13	4.40E-02	(6.0)	6.80E-06	(13.0)	8.38E-07	2.30E-05
BETA-2MOV	2	8.80E-02	(3.0)	4.20E-06	(14.0)	5.65E-08	1.66E-05
HPI-XHE-FO-ALTS3	1	7.40E-02	(4.0)	3.18E-06	(15.0)	4.96E-08	1.22E-05
CPC-MDP-FR-CCA24	2	7.20E-04	(23.5)	2.86E-06	(16.0)	7.55E-08	1.08E-05
HPI-MOV-FT-1867D	3	3.00E-03	(15.0)	2.85E-06	(17.0)	3.31E-07	9.46E-06
CPC-CKV-OO-CV113	1	1.00E-03	(21.5)	2.17E-06	(18.0)	1.18E-07	8.73E-06
HPI-MOV-FT-1115E	1	3.00E-03	(15.0)	1.71E-06	(20.5)	1.76E-08	7.48E-06
HPI-MOV-FT-1115D	1	3.00E-03	(15.0)	1.71E-06	(20.5)	1.76E-08	7.48E-06
HPI-MOV-FT-1115C	1	3.00E-03	(15.0)	1.71E-06	(20.5)	1.76E-08	7.48E-06
HPI-MOV-FT-1115B	1	3.00E-03	(15.0)	1.71E-06	(20.5)	1.76E-08	7.48E-06
HPI-XHE-FO-ALTIN	1	5.70E-03	(8.0)	1.29E-06	(23.0)	1.74E-07	3.90E-06
CPC-MDP-FR-SWA24	3	3.80E-03	(10.5)	1.04E-06	(24.0)	6.32E-08	3.81E-06
CPC-MDP-MA-CC2B	1	2.00E-03	(19.0)	4.11E-07	(25.0)	4.82E-09	1.70E-06
CPC-MDP-FS-CC2B	1	3.00E-03	(15.0)	4.11E-07	(26.0)	4.82E-09	1.70E-06
HPI-MDP-FS	1	4.00E-03	(9.0)	1.91E-07	(27.0)	7.96E-09	7.31E-07
CPC-MDP-FR-SWB24	1	3.80E-03	(10.5)	1.52E-07	(28.0)	3.31E-09	6.45E-07
CPC-MDP-FS-SW10B	1	8.00E-03	(7.0)	1.51E-07	(29.0)	3.29E-09	6.47E-07
CPC-XHE-FO-REALN	3	7.00E-02	(5.0)	1.25E-07	(30.0)	8.10E-09	4.54E-07
BETA-STR	1	2.63E-01	(1.0)	2.12E-08	(31.0)	7.16E-10	8.46E-08
BETA-HPI	1	2.10E-01	(2.0)	2.89E-09	(32.0)	7.81E-11	1.10E-08

SURRY SEQUENCE S3-D1
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
HPI-MOV-FT-1115E	1	3.00E-03	(15.0)	32.1	(3.5)	1.90	0.85
HPI-MOV-FT-1115C	1	3.00E-03	(15.0)	32.1	(3.5)	1.90	0.85
HPI-MOV-FT-1115D	1	3.00E-03	(15.0)	32.1	(3.5)	1.90	0.85
HPI-MOV-FT-1867D	3	3.00E-03	(15.0)	32.1	(3.5)	1.90	0.85
HPI-MOV-FT-1115B	1	3.00E-03	(15.0)	32.1	(3.5)	1.90	0.85
HPI-MOV-FT	2	3.00E-03	(15.0)	32.1	(3.5)	1.90	0.85
HPI-XHE-FO-UN2S3	13	4.40E-02	(6.0)	17.0	(7.0)	1.48	0.84
BETA-2MOV	2	8.80E-02	(3.0)	5.4	(8.0)	1.07	0.99
HPI-XHE-FO-ALTS3	1	7.40E-02	(4.0)	4.4	(9.0)	1.08	0.99
HPI-CKV-FT-CV225	1	1.00E-04	(26.0)	3.5	(11.0)	1.16	0.99
HPI-CKV-FT-CV410	1	1.00E-04	(26.0)	3.5	(11.0)	1.16	0.99
HPI-CKV-FT-CV25	1	1.00E-04	(26.0)	3.5	(11.0)	1.16	0.99
RWT-TNK-LF-RWST	1	2.70E-06	(32.0)	2.3	(13.0)	1.16	1.00
HPI-MDP-FS	1	4.00E-03	(9.0)	0.9	(14.0)	1.00	1.00
ACP-TFM-NO-1H1	1	4.00E-05	(30.5)	0.6	(15.0)	1.00	1.00
CPC-CKV-OO-CV113	1	1.00E-03	(21.5)	0.5	(16.5)	1.06	0.98
HPI-CKV-OO-CV258	1	1.00E-03	(21.5)	0.5	(16.5)	1.06	0.98
HPI-XHE-FO-ALTIN	1	5.70E-03	(8.0)	0.5	(18.0)	1.00	1.00
CPC-XHE-FO-REALN	3	7.00E-02	(5.0)	0.5	(19.0)		
CPC-MDP-FS-CC2B	1	3.00E-03	(15.0)	0.4	(20.0)		
CPC-MDP-MA-CC2B	1	2.00E-03	(19.0)	0.4	(21.0)		
HPI-XVM-PG-XV24	1	4.00E-05	(30.5)	0.0	(26.5)		
CPC-MDP-FS-SW10B	1	8.00E-03	(7.0)	0.0	(26.5)		
BETA-STR	1	2.63E-01	(1.0)	0.0	(26.5)		
ACP-BAC-ST-1H1	1	9.00E-05	(28.5)	0.0	(26.5)		
HPI-MDP-FR-1A24H	2	1.60E-03	(20.0)	0.0	(26.5)		
CPC-MDP-FR-SWB24	1	3.80E-03	(10.5)	0.0	(26.5)		
BETA-HPI	1	2.10E-01	(2.0)	0.0	(26.5)		
CPC-MDP-FR-SWA24	3	3.80E-03	(10.5)	0.0	(26.5)		
CPC-MDP-FR-CCA24	2	7.20E-04	(23.5)	0.0	(26.5)		
ACP-BAC-ST-4KV1H	1	9.00E-05	(28.5)	0.0	(26.5)		
CPC-STR-PG-24H	1	7.20E-04	(23.5)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-S3	20	1.30E-02	(1.0)	31.4	(1.0)	1.93	0.93

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SURRY SEQUENCE S3-D1

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT S3-D1-CM WITH TOP EVENT FREQUENCY 6.39E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	4	2.54E-07	0.39756	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALTS3	*	IE-S3		+
3	2	4	1.51E-07	0.63394	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-UN2S3	*	IE-S3		+
4	3	3	5.72E-08	0.72348	HPI-CKV-FT-CV410	*	HPI-XHE-FO-UN2S3	*	IE-S3	+			
5	4	3	5.72E-08	0.81302	HPI-CKV-FT-CV25	*	HPI-XHE-FO-UN2S3	*	IE-S3	+			
6	5	2	3.51E-08	0.86797	IE-S3	*	RWT-TNK-LF-RWST	+					
7	6	3	2.29E-08	0.90378	HPI-XHE-FO-UN2S3	*	HPI-XVM-PG-XV24	*	IE-S3	+			
8	7	3	2.08E-08	0.93634	HPI-CKV-OO-CV258	*	HPI-MDP-FR-1A24H	*	IE-S3	+			
9	8	5	7.58E-09	0.94821	BETA-STR	*	CPC-STR-PG-24H	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S3	*	
10					IE-S3	+							
11	9	3	7.41E-09	0.95981	HPI-CKV-FT-CV225	*	HPI-XHE-FO-ALTIN	*	IE-S3	+			
12	11	4	5.15E-09	0.96787	HPI-MOV-FT-1115B	*	HPI-MOV-FT-1115D	*	HPI-XHE-FO-UN2S3	*	IE-S3		+
13	10	4	5.15E-09	0.97593	HPI-MOV-FT-1115C	*	HPI-MOV-FT-1115E	*	HPI-XHE-FO-UN2S3	*	IE-S3		+
14	13	3	3.51E-09	0.98142	ACP-BAC-ST-1H1	*	HPI-MOV-FT-1867D	*	IE-S3	+			
15	12	3	3.51E-09	0.98692	ACP-BAC-ST-4KV1H	*	HPI-MOV-FT-1867D	*	IE-S3	+			
16	14	4	2.17E-09	0.99032	CPC-CKV-OO-CV113	*	CPC-MDP-FR-SWA24	*	HPI-XHE-FO-UN2S3	*	IE-S3		+
17	15	3	1.56E-09	0.99276	ACP-TFM-NO-1H1	*	HPI-MOV-FT-1867D	*	IE-S3	+			
18	16	4	1.24E-09	0.99470	CPC-MDP-FR-CCA24	*	CPC-MDP-FS-CC2B	*	HPI-XHE-FO-UN2S3	*	IE-S3		+
19	17	5	1.22E-09	0.99660	CPC-MDP-FR-SWA24	*	CPC-MDP-FS-SW10B	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S3	*	
20					IE-S3	+							
21	18	4	8.24E-10	0.99789	CPC-MDP-FR-CCA24	*	CPC-MDP-MA-CC2B	*	HPI-XHE-FO-UN2S3	*	IE-S3		+
22	19	5	7.69E-10	0.99909	BETA-HPI	*	HPI-MDP-FR-1A24H	*	HPI-MDP-FS	*	HPI-XHE-FO-UN2S3	*	
23					IE-S3	+							
24	20	5	5.78E-10	1.00000	CPC-MDP-FR-SWA24	*	CPC-MDP-FR-SWB24	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S3	*	
25					IE-S3	.							

SEQUENCE S2-D1

TOP EVENT S2-D1-CM CONTAINS 19 EVENTS IN 11 CUT SETS

THE FREQUENCY OF TOP EVENT S2-D1-CM IS 4.29E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT S2-D1-CM

N	1000
MEAN	4.37E-07
STD DEV	8.61E-07
LOWER 5%	4.18E-08
LOWER 25%	1.08E-07
MEDIAN	2.27E-07
UPPER 25%	4.46E-07
UPPER 5%	1.38E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE S2-D1
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
BETA-2MOV	2	8.80E-02	(4.0)	2.43E-07	(1.5)	2.96E-09	8.86E-07
HPI-MOV-FT	2	3.00E-03	(8.0)	2.43E-07	(1.5)	2.96E-09	8.86E-07
HPI-XHE-FO-UN2S2	7	3.10E-01	(2.0)	1.63E-07	(3.0)	7.61E-09	6.53E-07
HPI-XHE-FO-ALT	1	6.10E-01	(1.0)	1.61E-07	(4.0)	1.80E-09	5.41E-07
HPI-CKV-FT-CV225	1	1.00E-04	(15.0)	1.00E-07	(5.0)	1.32E-08	3.01E-07
HPI-CKV-FT-CV25	1	1.00E-04	(15.0)	3.10E-08	(6.5)	1.55E-09	1.11E-07
HPI-CKV-FT-CV410	1	1.00E-04	(15.0)	3.10E-08	(6.5)	1.55E-09	1.11E-07
HPI-XVM-PG-XV24	1	4.00E-05	(17.0)	1.24E-08	(8.0)	6.18E-10	4.11E-08
HPI-MOV-FT-1115E	1	3.00E-03	(8.0)	2.79E-09	(10.5)	1.52E-12	3.07E-08
HPI-MOV-FT-1115D	1	3.00E-03	(8.0)	2.79E-09	(10.5)	1.52E-12	3.07E-08
HPI-MOV-FT-1115C	1	3.00E-03	(8.0)	2.79E-09	(10.5)	1.52E-12	3.07E-08
HPI-MOV-FT-1115B	1	3.00E-03	(8.0)	2.79E-09	(10.5)	1.52E-12	3.07E-08
RWT-TNK-LF-RWST	1	2.70E-06	(18.0)	2.70E-09	(13.0)	6.15E-11	1.06E-08
SIS-ACT-FA-SISB	1	1.60E-03	(11.5)	2.56E-09	(14.5)	2.70E-11	2.53E-08
SIS-ACT-FA-SISA	1	1.60E-03	(11.5)	2.56E-09	(14.5)	2.70E-11	2.53E-08
CPC-STR-PG-6HR	1	1.80E-04	(13.0)	1.03E-09	(17.0)		
CPC-XHE-FO-REALN	1	7.00E-02	(5.0)	1.03E-09	(17.0)	2.87E-11	4.34E-09
BETA-STR	1	2.63E-01	(3.0)	1.03E-09	(17.0)	2.87E-11	4.34E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-S2	11	1.00E-03	(1.0)	4.29E-07	(1.0)	4.18E-08	1.38E-06

SEQUENCE S2-D1
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
RWT-TNK-LF-RWST	1	2.70E-06	(18.0)	1.00E-03	(1.0)	2.66E-04	2.40E-03
HPI-CKV-FT-CV225	1	1.00E-04	(15.0)	1.00E-03	(2.0)	2.66E-04	2.40E-03
HPI-XVM-PG-XV24	1	4.00E-05	(17.0)	3.10E-04	(3.0)	2.53E-05	9.25E-04
HPI-CKV-FT-CV410	1	1.00E-04	(15.0)	3.10E-04	(4.5)	2.53E-05	9.25E-04
HPI-CKV-FT-CV25	1	1.00E-04	(15.0)	3.10E-04	(4.5)	2.53E-05	9.25E-04
HPI-MOV-FT	2	3.00E-03	(8.0)	8.07E-05	(6.0)	8.22E-06	2.50E-04
CPC-STR-PG-6HR	1	1.80E-04	(13.0)	5.71E-06	(7.0)		
BETA-2MOV	2	8.80E-02	(4.0)	2.52E-06	(8.0)	4.31E-08	1.00E-05
SIS-ACT-FA-SISB	1	1.60E-03	(11.5)	1.60E-06	(9.5)	1.14E-07	5.59E-06
SIS-ACT-FA-SISA	1	1.60E-03	(11.5)	1.60E-06	(9.5)	1.14E-07	5.59E-06
HPI-MOV-FT-1115E	1	3.00E-03	(8.0)	9.27E-07	(12.5)	1.16E-08	3.62E-06
HPI-MOV-FT-1115D	1	3.00E-03	(8.0)	9.27E-07	(12.5)	1.16E-08	3.62E-06
HPI-MOV-FT-1115C	1	3.00E-03	(8.0)	9.27E-07	(12.5)	1.16E-08	3.62E-06
HPI-MOV-FT-1115B	1	3.00E-03	(8.0)	9.27E-07	(12.5)	1.16E-08	3.62E-06
HPI-XHE-FO-UN2S2	7	3.10E-01	(2.0)	3.62E-07	(15.0)	2.74E-08	1.25E-06
HPI-XHE-FO-ALT	1	6.10E-01	(1.0)	1.03E-07	(16.0)	4.60E-10	3.88E-07
CPC-XHE-FO-REALN	1	7.00E-02	(5.0)	1.36E-08	(17.0)	8.42E-10	4.66E-08
BETA-STR	1	2.63E-01	(3.0)	2.88E-09	(18.0)	9.75E-11	1.21E-08

SEQUENCE S2-D1
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
HPI-MOV-FT	2	3.00E-03	(8.0)	31.8	(3.0)	1.60	0.87
HPI-MOV-FT-1115E	1	3.00E-03	(8.0)	31.8	(3.0)	1.60	0.87
HPI-MOV-FT-1115C	1	3.00E-03	(8.0)	31.8	(3.0)	1.60	0.87
HPI-MOV-FT-1115B	1	3.00E-03	(8.0)	31.8	(3.0)	1.60	0.87
HPI-MOV-FT-1115D	1	3.00E-03	(8.0)	31.8	(3.0)	1.60	0.87
HPI-CKV-FT-CV25	1	1.00E-04	(15.0)	11.7	(7.0)	1.37	0.91
HPI-CKV-FT-CV225	1	1.00E-04	(15.0)	11.7	(7.0)	1.37	0.91
HPI-CKV-FT-CV410	1	1.00E-04	(15.0)	11.7	(7.0)	1.37	0.91
HPI-XHE-FO-UN2S2	7	3.10E-01	(2.0)	7.2	(9.0)	1.09	1.00
BETA-2MOV	2	8.80E-02	(4.0)	5.0	(10.0)	1.07	1.12
HPI-XHE-FO-ALT	1	6.10E-01	(1.0)	2.1	(11.0)	1.03	1.01
RWT-TNK-LF-RWST	1	2.70E-06	(18.0)	0.6	(12.0)	0.98	1.01
CPC-XHE-FO-REALN	1	7.00E-02	(5.0)	0.3	(13.0)		
SIS-ACT-FA-SISB	1	1.60E-03	(11.5)	0.3	(14.5)		
SIS-ACT-FA-SISA	1	1.60E-03	(11.5)	0.3	(14.5)		
HPI-XVM-PG-XV24	1	4.00E-05	(17.0)	0.0	(16.5)		
BETA-STR	1	2.63E-01	(3.0)	0.0	(16.5)		
CPC-STR-PG-6HR	1	1.80E-04	(13.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-S2	11	1.00E-03	(1.0)	39.1	(1.0)	1.98	0.90

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE S2-D1

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT S2-D1-CM WITH TOP EVENT FREQUENCY 4.29E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	4	1.61E-07	0.37526	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALT	*	IE-S2		+
3	2	2	1.00E-07	0.60828	HPI-CKV-FT-CV225	*	IE-S2	+					
4	3	4	8.18E-08	0.79898	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-UN2S2	*	IE-S2		+
5	5	3	3.10E-08	0.87122	HPI-CKV-FT-CV25	*	HPI-XHE-FO-UN2S2	*	IE-S2	+			
6	4	3	3.10E-08	0.94345	HPI-CKV-FT-CV410	*	HPI-XHE-FO-UN2S2	*	IE-S2	+			
7	6	3	1.24E-08	0.97235	HPI-XHE-FO-UN2S2	*	HPI-XVM-PG-XV24	*	IE-S2	+			
8	7	4	2.79E-09	0.97885	HPI-MOV-FT-1115C	*	HPI-MOV-FT-1115E	*	HPI-XHE-FO-UN2S2	*	IE-S2		+
9	8	4	2.79E-09	0.98535	HPI-MOV-FT-1115B	*	HPI-MOV-FT-1115D	*	HPI-XHE-FO-UN2S2	*	IE-S2		+
10	9	2	2.70E-09	0.99164	IE-S2	*	RWT-TNK-LF-RWST	+					
11	10	3	2.56E-09	0.99761	IE-S2	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+			
12	11	5	1.03E-09	1.00000	BETA-STR	*	CPC-STR-PG-6HR	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S2	*	
13					IE-S2								

SEQUENCE SBO-BATT2

TOP EVENT SBO-BATT2 CONTAINS 24 EVENTS IN 40 CUT SETS

THE FREQUENCY OF TOP EVENT SBO-BATT2 IS 2.97E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT SBO-BATT2

N	1000
MEAN	4.33E-07
STD DEV	1.98E-06
LOWER 5%	0.00E+00
LOWER 25%	0.00E+00
MEDIAN	0.00E+00
UPPER 25%	1.03E-07
UPPER 5%	1.70E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE SBO-BATT2
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
NRAC-7HR	40	5.00E-02	(7.0)	2.97E-07	(2.5)	0.00E+00	1.70E-06
NOTL-SBOU1U2	40	9.68E-01	(2.0)	2.97E-07	(2.5)		
NOTQ	40	9.73E-01	(1.0)	2.97E-07	(2.5)		
NSLOCA	40	2.70E-01	(5.5)	2.97E-07	(2.5)	0.00E+00	1.70E-06
REC-XHE-FO-DGHWB	39	6.00E-01	(3.0)	2.96E-07	(5.0)	0.00E+00	1.63E-06
OEP-DGN-FS	12	2.20E-02	(11.5)	2.45E-07	(6.0)	0.00E+00	1.19E-06
BETA-3DG	3	1.80E-02	(14.0)	2.33E-07	(7.0)	0.00E+00	1.14E-06
OEP-DGN-FS-DG03	15	2.20E-02	(11.5)	4.02E-08	(8.0)	0.00E+00	2.68E-07
OEP-DGN-MA-DG01	5	6.00E-03	(19.0)	2.45E-08	(9.0)	0.00E+00	8.83E-08
OEP-DGN-FS-DG02	14	2.20E-02	(11.5)	1.93E-08	(10.5)	0.00E+00	1.48E-07
OEP-DGN-FS-DG01	14	2.20E-02	(11.5)	1.93E-08	(10.5)	0.00E+00	1.48E-07
QS-SBO	40	2.70E-01	(5.5)	1.63E-08	(12.0)	0.00E+00	5.48E-08
OEP-DGN-FR-6HDG3	11	1.20E-02	(16.0)	1.23E-08	(14.0)	0.00E+00	5.79E-08
OEP-DGN-FR-6HDG2	11	1.20E-02	(16.0)	1.23E-08	(14.0)	0.00E+00	5.79E-08
OEP-DGN-FR-6HDG1	11	1.20E-02	(16.0)	1.23E-08	(14.0)	0.00E+00	5.79E-08
NOTDG-CCF	9	5.20E-01	(4.0)	1.21E-08	(16.5)		
BETA-2DG	9	3.80E-02	(9.0)	1.21E-08	(16.5)	0.00E+00	4.23E-08
OEP-DGN-MA-DG03	4	6.00E-03	(19.0)	3.54E-09	(18.5)	0.00E+00	1.20E-08
OEP-DGN-MA-DG02	4	6.00E-03	(19.0)	3.54E-09	(18.5)	0.00E+00	1.20E-08
OEP-CRB-FT-25H3	1	3.00E-03	(22.0)	5.92E-10	(21.0)	0.00E+00	2.22E-09
OEP-CRB-FT-15J3	1	3.00E-03	(22.0)	5.92E-10	(21.0)	0.00E+00	2.22E-09
OEP-CRB-FT-15H3	1	3.00E-03	(22.0)	5.92E-10	(21.0)	0.00E+00	2.22E-09
O	28	4.90E-02	(8.0)	-1.82E-09	(23.0)	-1.16E-08	0.00E+00

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T1	40	7.70E-02	(1.0)	2.97E-07	(1.0)	0.00E+00	1.70E-06

SEQUENCE SBO-BATT2
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
BETA-3DG	3	1.80E-02	(14.0)	1.27E-05	(1.0)	0.00E+00	7.34E-05
OEP-DGN-FS	12	2.20E-02	(11.5)	1.09E-05	(2.0)	0.00E+00	6.18E-05
NRAC-7HR	40	5.00E-02	(7.0)	5.65E-06	(3.0)	0.00E+00	3.86E-05
OEP-DGN-MA-DG01	5	6.00E-03	(19.0)	4.05E-06	(4.0)	0.00E+00	2.21E-05
OEP-DGN-FS-DG03	15	2.20E-02	(11.5)	1.79E-06	(5.0)	0.00E+00	9.83E-06
OEP-DGN-FR-6HDG2	11	1.20E-02	(16.0)	1.01E-06	(7.0)	0.00E+00	6.36E-06
OEP-DGN-FR-6HDG1	11	1.20E-02	(16.0)	1.01E-06	(7.0)	0.00E+00	6.36E-06
OEP-DGN-FR-6HDG3	11	1.20E-02	(16.0)	1.01E-06	(7.0)	0.00E+00	6.36E-06
OEP-DGN-FS-DG02	14	2.20E-02	(11.5)	8.56E-07	(9.5)	0.00E+00	5.14E-06
OEP-DGN-FS-DG01	14	2.20E-02	(11.5)	8.56E-07	(9.5)	0.00E+00	5.14E-06
NSLOCA	40	2.70E-01	(5.5)	8.04E-07	(11.0)	0.00E+00	4.05E-06
OEP-DGN-MA-DG03	4	6.00E-03	(19.0)	5.86E-07	(12.5)	0.00E+00	3.19E-06
OEP-DGN-MA-DG02	4	6.00E-03	(19.0)	5.86E-07	(12.5)	0.00E+00	3.19E-06
BETA-2DG	9	3.80E-02	(9.0)	3.05E-07	(14.0)	0.00E+00	1.30E-06
REC-XHE-FO-DGHWB	39	6.00E-01	(3.0)	1.97E-07	(15.0)	0.00E+00	1.02E-06
OEP-CRB-FT-25H3	1	3.00E-03	(22.0)	1.97E-07	(17.0)	0.00E+00	1.17E-06
OEP-CRB-FT-15J3	1	3.00E-03	(22.0)	1.97E-07	(17.0)	0.00E+00	1.17E-06
OEP-CRB-FT-15H3	1	3.00E-03	(22.0)	1.97E-07	(17.0)	0.00E+00	1.17E-06
QS-SBO	40	2.70E-01	(5.5)	4.42E-08	(19.0)	0.00E+00	1.48E-07
NOTDG-CCF	9	5.20E-01	(4.0)	1.11E-08	(20.0)		
NOTL-SBOU1U2	40	9.68E-01	(2.0)	9.83E-09	(21.0)		
NOTQ	40	9.73E-01	(1.0)	8.25E-09	(22.0)		
O	28	4.90E-02	(8.0)	-3.53E-08	(23.0)	-2.59E-07	0.00E+00

SEQUENCE SBO-BATT2
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
NSLOCA	40	2.70E-01	(5.5)	95.5	(1.0)	NA	0.91
OEP-DGN-FS-DG02	14	2.20E-02	(11.5)	1.3	(3.5)	NA	1.05
OEP-DGN-FS-DG01	14	2.20E-02	(11.5)	1.3	(3.5)	NA	1.05
OEP-DGN-FS	12	2.20E-02	(11.5)	1.3	(3.5)	NA	1.05
OEP-DGN-FS-DG03	15	2.20E-02	(11.5)	1.3	(3.5)	NA	1.05
BETA-3DG	3	1.80E-02	(14.0)	1.2	(6.0)	NA	1.12
OEP-DGN-FR-6HDG3	11	1.20E-02	(16.0)	1.1	(8.0)	NA	0.93
OEP-DGN-FR-6HDG2	11	1.20E-02	(16.0)	1.1	(8.0)	NA	0.93
OEP-DGN-FR-6HDG1	11	1.20E-02	(16.0)	1.1	(8.0)	NA	0.93
OEP-DGN-MA-DG02	4	6.00E-03	(19.0)	0.6	(11.0)	NA	0.98
OEP-DGN-MA-DG01	5	6.00E-03	(19.0)	0.6	(11.0)	NA	0.98
OEP-DGN-MA-DG03	4	6.00E-03	(19.0)	0.6	(11.0)	NA	0.98
NRAC-7HR	40	5.00E-02	(7.0)	0.5	(13.0)	NA	1.16
OEP-CRB-FT-25H3	1	3.00E-03	(22.0)	0.4	(15.0)		
OEP-CRB-FT-15J3	1	3.00E-03	(22.0)	0.4	(15.0)		
OEP-CRB-FT-15H3	1	3.00E-03	(22.0)	0.4	(15.0)		
QS-SBO	40	2.70E-01	(5.5)	0.0	(18.5)		
BETA-2DG	9	3.80E-02	(9.0)	0.0	(18.5)		
O	28	4.90E-02	(8.0)	0.0	(18.5)		
REC-XHE-FO-DGHWB	39	6.00E-01	(3.0)	0.0	(18.5)		
NOTDG-CCF	9	5.20E-01	(4.0)				
NOTQ	40	9.73E-01	(1.0)				
NOTL-SBOU1U2	40	9.68E-01	(2.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	40	7.70E-02	(1.0)	0.3	(1.0)		

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE SBO-BATT2

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT SBO-BATT2 WITH TOP EVENT FREQUENCY 2.97E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	10	1.61E-07	0.54324	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
3					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS	*
4					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
5	2	9	6.28E-08	0.75452	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
6					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS	*	QS-SBO	*
7					REC-XHE-FO-DGHWB	+						
8	3	9	2.09E-08	0.82495	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
9					NSLOCA	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*
10					REC-XHE-FO-DGHWB	+						
11	4	10	8.32E-09	0.85294	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
12					NRAC-7HR	*	NSLOCA	*	O	*	OEP-DGN-FS	*
13					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
14	5	11	4.34E-09	0.86754	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
15					NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
16					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
17	7	11	2.37E-09	0.87551	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
18					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
19					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
20	6	11	2.37E-09	0.88348	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
21					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
22					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
23	8	11	2.37E-09	0.89145	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
24					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
25					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
26	11	12	2.13E-09	0.89860	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
27					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
28					OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
29	10	12	2.13E-09	0.90576	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
30					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
31					OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
32	9	12	2.13E-09	0.91291	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
33					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
34					OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
35	12	10	1.69E-09	0.91860	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
36					NSLOCA	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*
37					QS-SBO	*	REC-XHE-FO-DGHWB	+				
38	15	11	1.29E-09	0.92294	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
39					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
40					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
41	14	11	1.29E-09	0.92729	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
42					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
43					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		
44	13	11	1.29E-09	0.93163	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
45					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*
46					OEP-DGN-FS-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+		

47	18	11	1.18E-09	0.93562	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
48					NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	
49					OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
50	17	11	1.18E-09	0.93960	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
51					NSLOCA	*	/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	
52					OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
53	16	11	1.18E-09	0.94358	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
54					NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	
55					OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
56	19	10	1.17E-09	0.94754	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
57					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	
58					OEP-DGN-FR-6HDG3	*	/QS-SBO	+					
59	22	12	1.06E-09	0.95111	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
60					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*	
61					OEP-DGN-FS	*	OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+	
62	21	12	1.06E-09	0.95469	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
63					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*	
64					OEP-DGN-FS	*	OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+	
65	20	12	1.06E-09	0.95827	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
66					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*	
67					OEP-DGN-FS	*	OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+	
68	25	10	9.21E-10	0.96137	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
69					NSLOCA	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	
70					QS-SBO	*	REC-XHE-FO-DGHWB	+					
71	24	10	9.21E-10	0.96447	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
72					NSLOCA	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	
73					QS-SBO	*	REC-XHE-FO-DGHWB	+					
74	23	10	9.21E-10	0.96757	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
75					NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	
76					QS-SBO	*	REC-XHE-FO-DGHWB	+					
77	28	11	8.27E-10	0.97035	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
78					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG3	*	
79					OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGHWB	+			
80	27	11	8.27E-10	0.97313	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
81					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG1	*	
82					OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGHWB	+			
83	26	11	8.27E-10	0.97592	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*	
84					NOTQ	*	NRAC-7HR	*	NSLOCA	*	OEP-DGN-FR-6HDG2	*	
85					OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGHWB	+			
86	31	11	6.46E-10	0.97809	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
87					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*	
88					OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
89	30	11	6.46E-10	0.98026	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
90					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
91					OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
92	29	11	6.46E-10	0.98243	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
93					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	
94					OEP-DGN-MA-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
95	34	11	6.46E-10	0.98461	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
96					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
97					OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
98	33	11	6.46E-10	0.98678	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
99					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
100					OEP-DGN-MA-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
101	32	11	6.46E-10	0.98895	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
102					NSLOCA	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*	

103					OEP-DGN-MA-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
104	37	11	5.92E-10	0.99095	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
105					NSLOCA	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	
106					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
107	36	11	5.92E-10	0.99294	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
108					NSLOCA	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	
109					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
110	35	11	5.92E-10	0.99493	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
111					NSLOCA	*	/O	*	OEP-CRB-FT-25H3	*	OEP-DGN-FS-DG01	*	
112					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
113	40	10	5.02E-10	0.99662	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
114					NSLOCA	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
115					QS-SBO	*	REC-XHE-FO-DGHWB	+					
116	39	10	5.02E-10	0.99831	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
117					NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*	
118					QS-SBO	*	REC-XHE-FO-DGHWB	+					
119	38	10	5.02E-10	1.00000	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*	
120					NSLOCA	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*	
121					QS-SBO	*	REC-XHE-FO-DGHWB	.					

SEQUENCE SBO-Q2

TOP EVENT SBO-Q2 CONTAINS 21 EVENTS IN 32 CUT SETS

THE FREQUENCY OF TOP EVENT SBO-Q2 IS 3.46E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT SBO-Q2

N	1000
MEAN	3.23E-07
STD DEV	1.10E-06
LOWER 5%	1.83E-09
LOWER 25%	1.44E-08
MEDIAN	5.91E-08
UPPER 25%	2.21E-07
UPPER 5%	1.25E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE SBO-Q2
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
NOTL-SBOU1U2	32	9.68E-01	(1.0)	3.46E-07	(2.5)		
NRAC-1HR	32	4.40E-01	(5.0)	3.46E-07	(2.5)	1.83E-09	1.25E-06
SBO-PORV-DMD	32	4.50E-01	(4.0)	3.46E-07	(2.5)	1.83E-09	1.25E-06
REC-XHE-FO-DGEN	32	9.00E-01	(2.0)	3.46E-07	(2.5)	1.83E-09	1.25E-06
OEP-DGN-FS	22	2.20E-02	(11.5)	3.33E-07	(5.0)	1.70E-09	1.20E-06
BETA-3DG	4	1.80E-02	(14.0)	3.16E-07	(6.0)	1.61E-09	1.15E-06
PPS-SOV-OO-1456	16	3.00E-02	(8.5)	1.73E-07	(7.5)	9.13E-10	6.26E-07
PPS-SOV-OO-1455C	16	3.00E-02	(8.5)	1.73E-07	(7.5)	9.13E-10	6.26E-07
NOTDG-CCF	18	5.20E-01	(3.0)	1.70E-08	(9.5)		
BETA-2DG	18	3.80E-02	(7.0)	1.70E-08	(9.5)	3.47E-11	4.38E-08
OEP-DGN-FS-DG03	8	2.20E-02	(11.5)	1.19E-08	(12.0)	1.87E-11	1.01E-07
OEP-DGN-FS-DG02	8	2.20E-02	(11.5)	1.19E-08	(12.0)	1.87E-11	1.01E-07
OEP-DGN-FS-DG01	8	2.20E-02	(11.5)	1.19E-08	(12.0)	1.87E-11	1.01E-07
OEP-DGN-FR-6HDG2	4	1.20E-02	(16.0)	4.16E-09	(15.0)	4.32E-12	1.17E-08
OEP-DGN-FR-6HDG1	4	1.20E-02	(16.0)	4.16E-09	(15.0)	4.32E-12	1.17E-08
OEP-DGN-FR-6HDG3	4	1.20E-02	(16.0)	4.16E-09	(15.0)	4.32E-12	1.17E-08
OEP-DGN-MA-DG03	4	6.00E-03	(19.0)	3.21E-09	(18.0)	3.13E-12	9.44E-09
OEP-DGN-MA-DG02	4	6.00E-03	(19.0)	3.21E-09	(18.0)	3.13E-12	9.44E-09
OEP-DGN-MA-DG01	4	6.00E-03	(19.0)	3.21E-09	(18.0)	3.13E-12	9.44E-09
QS-SBO	32	2.70E-01	(6.0)	-3.56E-09	(20.0)	-2.37E-08	-6.73E-13

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T1	32	7.70E-02	(1.0)	3.46E-07	(1.0)	1.83E-09	1.25E-06

SEQUENCE SBO-Q2
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
BETA-3DG	4	1.80E-02	(14.0)	1.72E-05	(1.0)	1.25E-07	6.31E-05
OEP-DGN-FS	22	2.20E-02	(11.5)	1.48E-05	(2.0)	1.14E-07	5.38E-05
PPS-SOV-OO-1455C	16	3.00E-02	(8.5)	5.60E-06	(3.5)	1.82E-07	2.51E-05
PPS-SOV-OO-1456	16	3.00E-02	(8.5)	5.60E-06	(3.5)	1.82E-07	2.51E-05
OEP-DGN-MA-DG03	4	6.00E-03	(19.0)	5.31E-07	(6.0)	2.90E-09	1.42E-06
OEP-DGN-MA-DG02	4	6.00E-03	(19.0)	5.31E-07	(6.0)	2.90E-09	1.42E-06
OEP-DGN-MA-DG01	4	6.00E-03	(19.0)	5.31E-07	(6.0)	2.90E-09	1.42E-06
OEP-DGN-FS-DG03	8	2.20E-02	(11.5)	5.27E-07	(9.0)	1.85E-09	2.03E-06
OEP-DGN-FS-DG02	8	2.20E-02	(11.5)	5.27E-07	(9.0)	1.85E-09	2.03E-06
OEP-DGN-FS-DG01	8	2.20E-02	(11.5)	5.27E-07	(9.0)	1.85E-09	2.03E-06
NRAC-1HR	32	4.40E-01	(5.0)	4.41E-07	(11.0)	2.58E-09	1.64E-06
BETA-2DG	18	3.80E-02	(7.0)	4.31E-07	(12.0)	1.23E-09	1.32E-06
SBO-PORV-DMD	32	4.50E-01	(4.0)	4.23E-07	(13.0)	2.03E-09	1.81E-06
OEP-DGN-FR-6HDG2	4	1.20E-02	(16.0)	3.42E-07	(15.0)	1.61E-09	1.38E-06
OEP-DGN-FR-6HDG1	4	1.20E-02	(16.0)	3.42E-07	(15.0)	1.61E-09	1.38E-06
OEP-DGN-FR-6HDG3	4	1.20E-02	(16.0)	3.42E-07	(15.0)	1.61E-09	1.38E-06
REC-XHE-FO-DGEN	32	9.00E-01	(2.0)	3.85E-08	(17.0)	4.56E-11	1.32E-07
NOTDG-CCF	18	5.20E-01	(3.0)	1.57E-08	(18.0)		
NOTL-SBOU1U2	32	9.68E-01	(1.0)	1.14E-08	(19.0)		
QS-SBO	32	2.70E-01	(6.0)	-9.62E-09	(20.0)	-2.83E-08	-9.38E-12

SEQUENCE SBO-Q2
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
PPS-SOV-OO-1456	16	3.00E-02	(8.5)	46.1	(1.5)	6.23	1.21
PPS-SOV-OO-1455C	16	3.00E-02	(8.5)	46.1	(1.5)	6.23	1.21
QS-SBO	32	2.70E-01	(6.0)	45.2	(3.0)	1.00	1.02
SBO-PORV-DMD	32	4.50E-01	(4.0)	15.3	(4.0)	1.69	1.14
OEP-DGN-FS-DG03	8	2.20E-02	(11.5)	13.9	(6.5)	1.51	0.99
OEP-DGN-FS	22	2.20E-02	(11.5)	13.9	(6.5)	1.51	0.99
OEP-DGN-FS-DG01	8	2.20E-02	(11.5)	13.9	(6.5)	1.51	0.99
OEP-DGN-FS-DG02	8	2.20E-02	(11.5)	13.9	(6.5)	1.51	0.99
BETA-3DG	4	1.80E-02	(14.0)	9.3	(9.0)	1.39	1.04
REC-XHE-FO-DGEN	32	9.00E-01	(2.0)	1.1	(10.0)	1.01	1.03
NRAC-1HR	32	4.40E-01	(5.0)	0.7	(11.0)	1.12	1.02
BETA-2DG	18	3.80E-02	(7.0)	0.6	(12.0)	0.97	1.00
OEP-DGN-FR-6HDG2	4	1.20E-02	(16.0)	0.5	(14.0)		
OEP-DGN-FR-6HDG1	4	1.20E-02	(16.0)	0.5	(14.0)		
OEP-DGN-FR-6HDG3	4	1.20E-02	(16.0)	0.5	(14.0)		
OEP-DGN-MA-DG03	4	6.00E-03	(19.0)	0.0	(17.0)		
OEP-DGN-MA-DG02	4	6.00E-03	(19.0)	0.0	(17.0)		
OEP-DGN-MA-DG01	4	6.00E-03	(19.0)	0.0	(17.0)		
NOTDG-CCF	18	5.20E-01	(3.0)				
NOTL-SBOU1U2	32	9.68E-01	(1.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	32	7.70E-02	(1.0)	17.0	(1.0)	1.52	1.10

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE SBO-Q2

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT SBO-Q2 WITH TOP EVENT FREQUENCY 3.46E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	2	9	1.15E-07	0.33276	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*
3					OEP-DGN-FS	*	PPS-SOV-OO-1456	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
4					SBO-PORV-DMD	+						
5	1	9	1.15E-07	0.66552	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*
6					OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
7					SBO-PORV-DMD	+						
8	3	9	4.26E-08	0.78859	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*
9					OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	QS-SBO	*	REC-XHE-FO-DGEN	*
10					SBO-PORV-DMD	+						
11	4	9	4.26E-08	0.91167	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*
12					OEP-DGN-FS	*	PPS-SOV-OO-1456	*	QS-SBO	*	REC-XHE-FO-DGEN	*
13					SBO-PORV-DMD	+						
14	5	10	3.10E-09	0.92061	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*
15					OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
16					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
17	6	10	3.10E-09	0.92956	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*
18					OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
19					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
20	11	11	1.52E-09	0.93394	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
21					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*
22					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+		
23	12	11	1.52E-09	0.93833	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
24					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*
25					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+		
26	10	11	1.52E-09	0.94271	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
27					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*
28					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+		
29	9	11	1.52E-09	0.94709	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
30					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*
31					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+		
32	8	11	1.52E-09	0.95148	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
33					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*
34					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+		
35	7	11	1.52E-09	0.95586	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*
36					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*
37					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+		
38	14	10	1.15E-09	0.95917	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*
39					OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*
40					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
41	13	10	1.15E-09	0.96248	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*
42					OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*
43					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
44	15	10	8.45E-10	0.96492	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*
45					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
46					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				

47	20	10	8.45E-10	0.96736	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*		
48					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
49					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
50	19	10	8.45E-10	0.96980	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG02	*		
51					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
52					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
53	18	10	8.45E-10	0.97224	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG02	*		
54					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
55					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
56	17	10	8.45E-10	0.97468	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*		
57					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*		
58					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
59	16	10	8.45E-10	0.97712	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	OEP-DGN-FS-DG01	*		
60					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*		
61					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+						
62	26	11	7.59E-10	0.97931	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
63					NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*		
64					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
65	25	11	7.59E-10	0.98150	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
66					NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*		
67					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
68	24	11	7.59E-10	0.98370	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
69					NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*		
70					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
71	23	11	7.59E-10	0.98589	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
72					NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*		
73					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
74	22	11	7.59E-10	0.98808	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
75					NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*		
76					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
77	21	11	7.59E-10	0.99027	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
78					NRAC-1HR	*	OEP-DGN-FS	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*		
79					/QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
80	30	11	5.61E-10	0.99189	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
81					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*		
82					QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
83	29	11	5.61E-10	0.99351	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
84					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*		
85					QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
86	28	11	5.61E-10	0.99514	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
87					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*		
88					QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
89	31	11	5.61E-10	0.99676	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
90					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*		
91					QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
92	27	11	5.61E-10	0.99838	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
93					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*		
94					QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
95	32	11	5.61E-10	1.00000	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*		
96					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*		
97					QS-SBO	*	REC-XHE-FO-DGEN	*	SBO-PORV-DMD	.				

SEQUENCE A-D6

TOP EVENT A-D6-CM CONTAINS 13 EVENTS IN 13 CUT SETS

THE FREQUENCY OF TOP EVENT A-D6-CM IS 4.69E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT A-D6-CM

N	1000
MEAN	3.10E-07
STD DEV	7.26E-07
LOWER 5%	2.10E-08
LOWER 25%	5.79E-08
MEDIAN	1.20E-07
UPPER 25%	2.63E-07
UPPER 5%	1.13E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

   RISK REDUCTION = PD x EV(J)
   = TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

   RISK INCREASE = PD - RISK REDUCTION
   = PD x (1 - EV(J))
   = TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE A-D6
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
BETA-LPI	1	1.50E-01	(1.0)	2.25E-07	(1.5)	3.50E-09	8.63E-07
LPI-MDP-FS	1	3.00E-03	(3.0)	2.25E-07	(1.5)	3.50E-09	8.63E-07
LPI-MOV-PG-1890C	1	4.40E-04	(11.0)	2.20E-07	(3.0)	6.87E-09	1.48E-07
LPI-MDP-FS-SI1A	4	3.00E-03	(3.0)	1.14E-08	(4.5)	1.10E-10	8.82E-08
LPI-MDP-FS-SI1B	4	3.00E-03	(3.0)	1.14E-08	(4.5)	1.10E-10	8.82E-08
SIS-ACT-FA-SISB	3	1.60E-03	(7.5)	5.28E-09	(6.5)	1.20E-10	2.78E-08
SIS-ACT-FA-SISA	3	1.60E-03	(7.5)	5.28E-09	(6.5)	1.20E-10	2.78E-08
LPI-MDP-MA-SI1A	2	2.00E-03	(5.5)	4.60E-09	(8.5)	4.45E-11	1.69E-08
LPI-MDP-MA-SI1B	2	2.00E-03	(5.5)	4.60E-09	(8.5)	4.45E-11	1.69E-08
LPI-CKV-OO-CV58	1	1.00E-03	(9.5)	1.50E-09	(10.5)	2.51E-11	6.31E-09
LPI-CKV-OO-CV50	1	1.00E-03	(9.5)	1.50E-09	(10.5)	2.51E-11	6.31E-09
RWT-TNK-LF-RWST	1	2.70E-06	(12.0)	1.35E-09	(12.0)	2.77E-11	5.10E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-A	13	5.00E-04	(1.0)	4.69E-07	(1.0)	2.10E-08	1.13E-06

SEQUENCE A-D6
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
RWT-TNK-LF-RWST	1	2.70E-06	(12.0)	5.00E-04	(1.0)	1.33E-04	1.20E-03
LPI-MOV-PG-1890C	1	4.40E-04	(11.0)	5.00E-04	(2.0)	1.33E-04	1.20E-03
LPI-MDP-FS	1	3.00E-03	(3.0)	7.48E-05	(3.0)	9.95E-06	2.12E-04
LPI-MDP-FS-SI1A	4	3.00E-03	(3.0)	3.79E-06	(4.5)	5.09E-07	1.17E-05
LPI-MDP-FS-SI1B	4	3.00E-03	(3.0)	3.79E-06	(4.5)	5.09E-07	1.17E-05
SIS-ACT-FA-SISB	3	1.60E-03	(7.5)	3.29E-06	(6.5)	3.25E-07	1.12E-05
SIS-ACT-FA-SISA	3	1.60E-03	(7.5)	3.29E-06	(6.5)	3.25E-07	1.12E-05
LPI-MDP-MA-SI1A	2	2.00E-03	(5.5)	2.30E-06	(8.5)	1.65E-07	7.64E-06
LPI-MDP-MA-SI1B	2	2.00E-03	(5.5)	2.30E-06	(8.5)	1.65E-07	7.64E-06
LPI-CKV-OO-CV58	1	1.00E-03	(9.5)	1.50E-06	(10.5)	3.32E-08	5.90E-06
LPI-CKV-OO-CV50	1	1.00E-03	(9.5)	1.50E-06	(10.5)	3.32E-08	5.90E-06
BETA-LPI	1	1.50E-01	(1.0)	1.28E-06	(12.0)	2.85E-08	4.90E-06

SEQUENCE A-D6
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
LPI-MDP-FS-SI1B	4	3.00E-03	(3.0)	52.9	(2.0)	2.47	0.73
LPI-MDP-FS-SI1A	4	3.00E-03	(3.0)	52.9	(2.0)	2.47	0.73
LPI-MDP-FS	1	3.00E-03	(3.0)	52.9	(2.0)	2.47	0.73
BETA-LPI	1	1.50E-01	(1.0)	8.0	(4.0)	1.11	1.03
LPI-MOV-PG-1890C	1	4.40E-04	(11.0)	4.9	(5.0)	3.75	1.25
LPI-MDP-MA-SI1A	2	2.00E-03	(5.5)	1.2	(6.5)	1.02	1.02
LPI-MDP-MA-SI1B	2	2.00E-03	(5.5)	1.2	(6.5)	1.02	1.02
SIS-ACT-FA-SISB	3	1.60E-03	(7.5)	0.6	(8.5)	0.97	1.02
SIS-ACT-FA-SISA	3	1.60E-03	(7.5)	0.6	(8.5)	0.97	1.02
LPI-CKV-OO-CV58	1	1.00E-03	(9.5)	0.4	(10.5)		
LPI-CKV-OO-CV50	1	1.00E-03	(9.5)	0.4	(10.5)		
RWT-TNK-LF-RWST	1	2.70E-06	(12.0)	0.0	(12.0)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-A	13	5.00E-04	(1.0)	30.7	(1.0)	1.98	0.91

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SEQUENCE A-D6

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT A-D6-CM WITH TOP EVENT FREQUENCY 4.69E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	3	2.25E-07	0.47961	BETA-LPI	*	IE-A	*	LPI-MDP-FS	+
3	2	2	2.20E-07	0.94856	IE-A	*	LPI-MOV-PG-1890C	+		
4	3	3	4.50E-09	0.95816	IE-A	*	LPI-MDP-FS-SI1A	*	LPI-MDP-FS-SI1B	+
5	5	3	3.00E-09	0.96455	IE-A	*	LPI-MDP-FS-SI1A	*	LPI-MDP-MA-SI1B	+
6	4	3	3.00E-09	0.97095	IE-A	*	LPI-MDP-FS-SI1B	*	LPI-MDP-MA-SI1A	+
7	7	3	2.40E-09	0.97606	IE-A	*	LPI-MDP-FS-SI1B	*	SIS-ACT-FA-SISA	+
8	6	3	2.40E-09	0.98116	IE-A	*	LPI-MDP-FS-SI1A	*	SIS-ACT-FA-SISB	+
9	9	3	1.60E-09	0.98459	IE-A	*	LPI-MDP-MA-SI1A	*	SIS-ACT-FA-SISB	+
10	8	3	1.60E-09	0.98800	IE-A	*	LPI-MDP-MA-SI1B	*	SIS-ACT-FA-SISA	+
11	11	3	1.50E-09	0.99120	IE-A	*	LPI-CKV-OO-CV58	*	LPI-MDP-FS-SI1A	+
12	10	3	1.50E-09	0.99439	IE-A	*	LPI-CKV-OO-CV50	*	LPI-MDP-FS-SI1B	+
13	12	2	1.35E-09	0.99727	IE-A	*	RWT-TNK-LF-RWST	+		
14	13	3	1.28E-09	1.00000	IE-A	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	

SURRY STEAM GENERATOR TUBE RUPTURE SEQUENCE T7-D1-OD

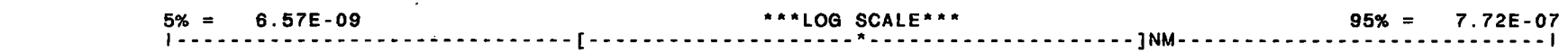
TOP EVENT T7-D1-OD CONTAINS 22 EVENTS IN 12 CUT SETS

THE FREQUENCY OF TOP EVENT T7-D1-OD IS 1.95E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T7-D1-OD

N	1000
MEAN	2.13E-07
STD DEV	8.64E-07
LOWER 5%	6.57E-09
LOWER 25%	2.76E-08
MEDIAN	7.03E-08
UPPER 25%	1.91E-07
UPPER 5%	7.72E-07

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)



NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SURRY STEAM GENERATOR TUBE RUPTURE SEQUENCE T7-D1-OD
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
RCS-XHE-FO-DPT7D	12	4.00E-01	(1.0)	1.95E-07	(1.0)	6.57E-09	7.72E-07
BETA-2MOV	2	8.80E-02	(3.0)	1.25E-07	(2.5)	5.68E-10	4.34E-07
HPI-MOV-FT	2	3.00E-03	(8.5)	1.25E-07	(2.5)	5.68E-10	4.34E-07
HPI-XHE-FO-UN2S3	5	4.40E-02	(6.0)	8.93E-08	(4.0)	2.29E-09	3.46E-07
HPI-XHE-FO-ALTS3	1	7.40E-02	(4.0)	7.81E-08	(5.0)	3.04E-10	2.88E-07
HPI-CKV-FT-CV410	1	1.00E-04	(16.0)	1.76E-08	(6.5)	4.92E-10	7.05E-08
HPI-CKV-FT-CV25	1	1.00E-04	(16.0)	1.76E-08	(6.5)	4.92E-10	7.05E-08
RWT-TNK-LF-RWST	1	2.70E-06	(21.0)	1.08E-08	(8.0)	1.23E-10	3.98E-08
SIS-ACT-FA-SISA	1	1.60E-03	(10.5)	1.02E-08	(9.5)	5.74E-11	1.06E-07
SIS-ACT-FA-SISB	1	1.60E-03	(10.5)	1.02E-08	(9.5)	5.74E-11	1.06E-07
HPI-XVM-PG-XV24	1	4.00E-05	(20.0)	7.04E-09	(11.0)	1.70E-10	2.77E-08
HPI-XHE-FO-ALTIN	1	5.70E-03	(7.0)	2.28E-09	(12.5)	1.94E-11	8.89E-09
HPI-CKV-FT-CV225	1	1.00E-04	(16.0)	2.28E-09	(12.5)	1.94E-11	8.89E-09
HPI-MOV-FT-1867D	2	3.00E-03	(8.5)	2.16E-09	(14.0)	9.64E-12	7.91E-09
HPI-MDP-FR-1A6HR	1	4.00E-04	(13.0)	1.60E-09	(15.5)	5.94E-11	5.71E-09
HPI-CKV-OO-CV258	1	1.00E-03	(12.0)	1.60E-09	(15.5)	5.94E-11	5.71E-09
ACP-BAC-ST-1H1	1	9.00E-05	(18.5)	1.08E-09	(17.5)	4.82E-12	3.96E-09
ACP-BAC-ST-4KV1H	1	9.00E-05	(18.5)	1.08E-09	(17.5)	4.82E-12	3.96E-09
CPC-XHE-FO-REALN	1	7.00E-02	(5.0)	5.83E-10	(20.0)	6.47E-12	2.27E-09
CPC-STR-PG-6HR	1	1.80E-04	(14.0)	5.83E-10	(20.0)		
BETA-STR	1	2.63E-01	(2.0)	5.83E-10	(20.0)	6.47E-12	2.27E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T7	12	1.00E-02	(1.0)	1.95E-07	(1.0)	6.57E-09	7.72E-07

SURRY STEAM GENERATOR TUBE RUPTURE SEQUENCE T7-D1-OD
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
RWT-TNK-LF-RWST	1	2.70E-06	(21.0)	4.00E-03	(1.0)	3.87E-04	1.20E-02
HPI-XVM-PG-XV24	1	4.00E-05	(20.0)	1.76E-04	(2.0)	7.23E-06	6.23E-04
HPI-CKV-FT-CV410	1	1.00E-04	(16.0)	1.76E-04	(3.5)	7.23E-06	6.23E-04
HPI-CKV-FT-CV25	1	1.00E-04	(16.0)	1.76E-04	(3.5)	7.23E-06	6.23E-04
HPI-MOV-FT	2	3.00E-03	(8.5)	4.14E-05	(5.0)	1.28E-06	1.62E-04
HPI-CKV-FT-CV225	1	1.00E-04	(16.0)	2.28E-05	(6.0)	3.25E-07	9.25E-05
ACP-BAC-ST-4KV1H	1	9.00E-05	(18.5)	1.20E-05	(7.5)	1.38E-07	4.21E-05
ACP-BAC-ST-1H1	1	9.00E-05	(18.5)	1.20E-05	(7.5)	1.38E-07	4.21E-05
SIS-ACT-FA-SISB	1	1.60E-03	(10.5)	6.39E-06	(9.5)	2.14E-07	2.60E-05
SIS-ACT-FA-SISA	1	1.60E-03	(10.5)	6.39E-06	(9.5)	2.14E-07	2.60E-05
HPI-MDP-FR-1A6HR	1	4.00E-04	(13.0)	4.00E-06	(11.0)	2.30E-07	1.29E-05
CPC-STR-PG-6HR	1	1.80E-04	(14.0)	3.24E-06	(12.0)		
HPI-XHE-FO-UN2S3	5	4.40E-02	(6.0)	1.94E-06	(13.0)	1.05E-07	6.54E-06
HPI-CKV-CO-CV258	1	1.00E-03	(12.0)	1.60E-06	(14.0)	9.92E-08	5.32E-06
BETA-2MOV	2	8.80E-02	(3.0)	1.29E-06	(15.0)	1.12E-08	4.95E-06
HPI-XHE-FO-ALTS3	1	7.40E-02	(4.0)	9.78E-07	(16.0)	8.92E-09	3.75E-06
HPI-MOV-FT-1867D	2	3.00E-03	(8.5)	7.18E-07	(17.0)	2.51E-08	2.63E-06
HPI-XHE-FO-ALTIN	1	5.70E-03	(7.0)	3.98E-07	(18.0)	2.31E-08	1.41E-06
RCS-XHE-FO-DPT7D	12	4.00E-01	(1.0)	2.92E-07	(19.0)	1.07E-08	1.08E-06
CPC-XHE-FO-REALN	1	7.00E-02	(5.0)	7.75E-09	(20.0)	2.31E-10	2.70E-08
BETA-STR	1	2.63E-01	(2.0)	1.63E-09	(21.0)	2.37E-11	6.76E-09

SURRY STEAM GENERATOR TUBE RUPTURE SEQUENCE T7-D1-OD
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
RCS-XHE-FO-DPT7D	12	4.00E-01	(1.0)	32.9	(1.0)	2.01	0.82
HPI-MOV-FT-1867D	2	3.00E-03	(8.5)	19.2	(2.5)	1.61	1.00
HPI-MOV-FT	2	3.00E-03	(8.5)	19.2	(2.5)	1.61	1.00
HPI-XHE-FO-UN2S3	5	4.40E-02	(6.0)	8.7	(4.0)	1.31	0.97
SIS-ACT-FA-SISA	1	1.60E-03	(10.5)	6.3	(5.5)	1.11	0.90
SIS-ACT-FA-SISB	1	1.60E-03	(10.5)	6.3	(5.5)	1.11	0.90
BETA-2MOV	2	8.80E-02	(3.0)	4.8	(7.0)	1.03	0.95
HPI-XHE-FO-ALTS3	1	7.40E-02	(4.0)	3.1	(8.0)	1.09	1.02
HPI-CKV-FT-CV225	1	1.00E-04	(16.0)	2.2	(10.0)	1.12	0.97
HPI-CKV-FT-CV410	1	1.00E-04	(16.0)	2.2	(10.0)	1.12	0.97
HPI-CKV-FT-CV25	1	1.00E-04	(16.0)	2.2	(10.0)	1.12	0.97
RWT-TNK-LF-RWST	1	2.70E-06	(21.0)	1.7	(12.0)	1.05	1.01
ACP-BAC-ST-4KV1H	1	9.00E-05	(18.5)	0.8	(13.5)	1.00	1.00
ACP-BAC-ST-1H1	1	9.00E-05	(18.5)	0.8	(13.5)	1.00	1.00
HPI-CKV-OO-CV258	1	1.00E-03	(12.0)	0.6	(15.0)	1.01	1.00
HPI-XHE-FO-ALTIN	1	5.70E-03	(7.0)	0.6	(16.0)	1.00	1.01
HPI-MDP-FR-1A6HR	1	4.00E-04	(13.0)	0.5	(17.0)		
CPC-XHE-FO-REALN	1	7.00E-02	(5.0)	0.0	(19.0)		
HPI-XVM-PG-XV24	1	4.00E-05	(20.0)	0.0	(19.0)		
BETA-STR	1	2.63E-01	(2.0)	0.0	(19.0)		
CPC-STR-PG-6HR	1	1.80E-04	(14.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T7	12	1.00E-02	(1.0)	23.4	(1.0)	1.73	0.87

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SURRY STEAM GENERATOR TUBE RUPTURE SEQUENCE T7-D1-OD

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T7-D1-OD WITH TOP EVENT FREQUENCY 1.95E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	5	7.81E-08	0.40175	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALTS3	*	IE-T7		*
3					RCS-XHE-FO-DPT7D	+							
4	2	5	4.65E-08	0.64062	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-UN2S3	*	IE-T7		*
5					RCS-XHE-FO-DPT7D	+							
6	3	4	1.76E-08	0.73110	HPI-CKV-FT-CV410	*	HPI-XHE-FO-UN2S3	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
7	4	4	1.76E-08	0.82159	HPI-CKV-FT-CV25	*	HPI-XHE-FO-UN2S3	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
8	5	3	1.08E-08	0.87711	IE-T7	*	RCS-XHE-FO-DPT7D	*	RWT-TNK-LF-RWST	+			
9	6	4	1.02E-08	0.92976	IE-T7	*	RCS-XHE-FO-DPT7D	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+	
10	7	4	7.04E-09	0.96595	HPI-XHE-FO-UN2S3	*	HPI-XVM-PG-XV24	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
11	8	4	2.28E-09	0.97767	HPI-CKV-FT-CV225	*	HPI-XHE-FO-ALTIN	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
12	9	4	1.60E-09	0.98590	HPI-CKV-OO-CV258	*	HPI-MDP-FR-1A6HR	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
13	11	4	1.08E-09	0.99145	ACP-BAC-ST-4KV1H	*	HPI-MOV-FT-1867D	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
14	10	4	1.08E-09	0.99700	ACP-BAC-ST-1H1	*	HPI-MOV-FT-1867D	*	IE-T7	*	RCS-XHE-FO-DPT7D	+	
15	12	6	5.83E-10	1.00000	BETA-STR	*	CPC-STR-PG-6HR	*	CPC-XHE-FC-REALN	*	HPI-XHE-FO-UN2S3	*	
16					IE-T7	*	RCS-XHE-FO-DPT7D	.					

SEQUENCE T5A-L-P

TOP EVENT T5A-L-P CONTAINS 22 EVENTS IN 25 CUT SETS

THE FREQUENCY OF TOP EVENT T5A-L-P IS 1.38E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T5A-L-P

N	1000
MEAN	1.31E-07
STD DEV	5.85E-07
LOWER 5%	1.12E-09
LOWER 25%	7.40E-09
MEDIAN	2.62E-08
UPPER 25%	8.85E-08
UPPER 5%	4.52E-07

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE T5A-L-P
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
AFW-CCF-LK-STMBD	1	1.00E-04	(16.5)	5.14E-05	(2.0)	8.01E-12	3.45E-08
AFW-PSF-FC-XCONN	1	1.50E-04	(15.0)	5.14E-05	(2.0)	2.85E-10	9.44E-08
AFW-TNK-VF-CST	1	1.00E-06	(21.0)	5.14E-05	(2.0)	1.60E-12	6.54E-10
AFW-MDP-FS-FW3B	4	6.30E-03	(7.0)	3.42E-06	(4.0)	2.43E-10	1.78E-07
AFW-MDP-MA-FW3B	3	2.00E-03	(9.0)	3.36E-06	(6.0)	2.60E-11	5.29E-08
AFW-MDP-FR-3B6HR	3	1.80E-04	(14.0)	3.36E-06	(6.0)	1.83E-12	4.44E-09
AFW-ACT-FA-PMP3B	3	6.00E-04	(13.0)	3.36E-06	(6.0)	1.69E-11	1.60E-08
AFW-XHE-FO-UNIT2	25	3.60E-02	(2.0)	2.34E-06	(8.0)	1.20E-09	4.52E-07
AFW-CKV-OO-CV142	1	1.00E-03	(11.0)	1.65E-06	(9.0)	3.34E-12	6.10E-09
AFW-TDP-FS-FW2	6	1.10E-02	(4.0)	8.91E-07	(10.0)	4.50E-11	6.70E-08
DCP-BDC-ST-BUS1B	1	9.00E-05	(18.5)	8.88E-07	(12.5)	5.67E-13	1.45E-09
ACP-BAC-ST-4KV1J	1	9.00E-05	(18.5)	8.88E-07	(12.5)	5.67E-13	1.45E-09
AFW-XVM-PG-XV183	1	4.00E-05	(20.0)	8.88E-07	(12.5)	4.05E-13	6.29E-10
AFW-CKV-FT-CV172	1	1.00E-04	(16.5)	8.88E-07	(12.5)	1.01E-12	1.80E-09
AFW-TDP-FR-2P6HR	9	3.00E-02	(3.0)	8.40E-07	(15.0)	9.46E-11	1.59E-07
AFW-TDP-MA-FW2	5	1.00E-02	(5.0)	8.27E-07	(16.0)	3.59E-11	5.68E-08
AFW-CKV-OO-CV172	1	1.00E-03	(11.0)	7.55E-07	(17.5)	6.59E-12	4.29E-09
AFW-CKV-OO-CV157	1	1.00E-03	(11.0)	7.55E-07	(17.5)	6.59E-12	4.29E-09
AFW-MDP-FS	3	6.30E-03	(7.0)	1.42E-07	(19.0)	8.28E-12	1.02E-08
AFW-MDP-FS-FW3A	1	6.30E-03	(7.0)	6.40E-08	(20.0)	6.59E-12	4.29E-09
BETA-AFW	3	5.60E-02	(1.0)	4.93E-08	(21.0)	8.28E-12	1.02E-08

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T5A	25	5.00E-03	(1.0)	4.08E-05	(1.0)	1.20E-09	4.52E-07

SEQUENCE T5A-L-P
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
AFW-XHE-FO-UNIT2	25	3.60E-02	(2.0)	7.01E-08	(1.0)	6.18E-08	1.17E-05
AFW-MDP-FS-FW3B	4	6.30E-03	(7.0)	5.02E-08	(2.0)	6.88E-08	2.96E-05
AFW-TDP-FS-FW2	6	1.10E-02	(4.0)	2.86E-08	(3.0)	2.42E-08	6.48E-06
AFW-TDP-FR-2P6HR	9	3.00E-02	(3.0)	1.45E-08	(4.0)	2.03E-08	5.78E-06
AFW-TDP-MA-FW2	5	1.00E-02	(5.0)	1.32E-08	(5.0)	1.88E-08	5.94E-06
AFW-PSF-FC-XCONN	1	1.50E-04	(15.0)	1.08E-08	(6.0)	2.78E-06	6.24E-04
BETA-AFW	3	5.60E-02	(1.0)	2.09E-09	(7.5)	2.10E-10	1.60E-07
AFW-MDP-FS	3	6.30E-03	(7.0)	2.09E-09	(7.5)	2.44E-09	1.51E-06
AFW-MDP-MA-FW3B	3	2.00E-03	(9.0)	2.06E-09	(9.0)	6.31E-08	2.95E-05
AFW-CKV-OO-CV142	1	1.00E-03	(11.0)	2.06E-09	(10.0)	4.97E-09	6.31E-06
AFW-CCF-LK-STMBD	1	1.00E-04	(16.5)	1.07E-09	(11.0)	2.78E-06	6.24E-04
AFW-CKV-OO-CV172	1	1.00E-03	(11.0)	9.40E-10	(13.0)	1.14E-08	4.10E-06
AFW-CKV-OO-CV157	1	1.00E-03	(11.0)	9.40E-10	(13.0)	1.14E-08	4.10E-06
AFW-MDP-FS-FW3A	1	6.30E-03	(7.0)	9.40E-10	(13.0)	1.63E-09	6.71E-07
AFW-MDP-FR-3B6HR	3	1.80E-04	(14.0)	4.30E-10	(15.0)	6.33E-08	2.95E-05
AFW-ACT-FA-PMP3B	3	6.00E-04	(13.0)	1.75E-10	(16.0)	6.33E-08	2.95E-05
AFW-CKV-FT-CV172	1	1.00E-04	(16.5)	1.69E-10	(17.0)	1.45E-08	1.81E-05
AFW-XVM-PG-XV183	1	4.00E-05	(20.0)	3.84E-11	(18.0)	1.45E-08	1.81E-05
AFW-TNK-VF-CST	1	1.00E-06	(21.0)	1.86E-11	(19.0)	2.78E-06	6.24E-04
DCP-BDC-ST-BUS1B	1	9.00E-05	(18.5)	2.96E-12	(20.5)	1.45E-08	1.81E-05
ACP-BAC-ST-4KV1J	1	9.00E-05	(18.5)	2.96E-12	(20.5)	1.45E-08	1.81E-05

SEQUENCE T5A-L-P
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
AFW-XHE-FO-UNIT2	25	3.60E-02	(2.0)	25.3	(1.0)	2.02	0.95
AFW-TDP-FR-2P6HR	9	3.00E-02	(3.0)	7.3	(2.0)	1.35	1.04
AFW-MDP-FS-FW3B	4	6.30E-03	(7.0)	2.5	(4.0)	1.20	1.10
AFW-MDP-FS	3	6.30E-03	(7.0)	2.5	(4.0)	1.20	1.10
AFW-MDP-FS-FW3A	1	6.30E-03	(7.0)	2.5	(4.0)	1.20	1.10
AFW-TDP-FS-FW2	6	1.10E-02	(4.0)	2.5	(6.0)	1.06	0.98
AFW-PSF-FC-XCONN	1	1.50E-04	(15.0)	2.4	(7.0)	1.13	0.93
AFW-CCF-LK-STMBD	1	1.00E-04	(18.5)	1.8	(8.0)	1.28	1.00
AFW-TDP-MA-FW2	5	1.00E-02	(5.0)	1.5	(9.0)	1.13	0.99
AFW-MDP-MA-FW3B	3	2.00E-03	(9.0)	1.0	(10.0)	1.04	1.06
AFW-CKV-FT-CV172	1	1.00E-04	(16.5)	0.9	(11.0)	1.07	1.00
AFW-MDP-FR-3B6HR	3	1.80E-04	(14.0)	0.4	(12.0)		
AFW-CKV-OO-CV172	1	1.00E-03	(11.0)	0.4	(14.0)		
AFW-CKV-OO-CV157	1	1.00E-03	(11.0)	0.4	(14.0)		
AFW-CKV-OO-CV142	1	1.00E-03	(11.0)	0.4	(14.0)		
AFW-ACT-FA-PMP3B	3	6.00E-04	(13.0)	0.2	(16.0)		
DCP-BDC-ST-BUS1B	1	9.00E-05	(18.5)	0.0	(19.0)		
BETA-AFW	3	5.60E-02	(1.0)	0.0	(19.0)		
AFW-XVM-PG-XV183	1	4.00E-05	(20.0)	0.0	(19.0)		
AFW-TNK-VF-CST	1	1.00E-06	(21.0)	0.0	(19.0)		
ACP-BAC-ST-4KV1J	1	9.00E-05	(18.5)	0.0	(19.0)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T5A	25	5.00E-03	(1.0)	57.0	(1.0)	7.86	0.96

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SURRY SEQUENCE T5A-L-P

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T5A-L-P WITH TOP EVENT FREQUENCY 1.38E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	4	3.40E-08	0.24697	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
3	2	3	2.70E-08	0.44298	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
4	3	3	1.80E-08	0.57365	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
5	4	4	1.25E-08	0.66421	AFW-MDP-FS-FW3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
6	5	4	1.13E-08	0.74653	AFW-MDP-FS-FW3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
7	6	4	1.08E-08	0.82493	AFW-MDP-MA-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
8	7	4	3.96E-09	0.85368	AFW-MDP-MA-FW3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
9	8	4	3.60E-09	0.87982	AFW-MDP-MA-FW3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
10	9	4	3.24E-09	0.90334	AFW-ACT-FA-PMP3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
11	10	4	1.98E-09	0.91771	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
12	11	5	1.91E-09	0.93154	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
13					IE-T5A	+						
14	12	4	1.19E-09	0.94017	AFW-ACT-FA-PMP3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
15	14	4	1.13E-09	0.94840	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
16	13	4	1.13E-09	0.95663	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
17	15	4	1.08E-09	0.96447	AFW-ACT-FA-PMP3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
18	16	4	9.72E-10	0.97153	AFW-MDP-FR-3B6HR	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
19	17	5	6.99E-10	0.97660	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
20					IE-T5A	+						
21	18	5	6.35E-10	0.98121	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
22					IE-T5A	+						
23	19	4	5.40E-10	0.98513	AFW-CKV-FT-CV172	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
24	20	4	4.86E-10	0.98866	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1B	*	IE-T5A	+
25	21	4	4.86E-10	0.99219	ACP-BAC-ST-4KV1J	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
26	22	4	3.56E-10	0.99477	AFW-MDP-FR-3B6HR	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
27	23	4	3.24E-10	0.99713	AFW-MDP-FR-3B6HR	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
28	24	4	2.16E-10	0.99869	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	AFW-XVM-PG-XV183	*	IE-T5A	+
29	25	3	1.80E-10	1.00000	AFW-TNK-VF-CST	*	AFW-XHE-FO-UNIT2	*	IE-T5A			

SEQUENCE T5B-L-P

TOP EVENT T5B-L-P CONTAINS 22 EVENTS IN 25 CUT SETS

THE FREQUENCY OF TOP EVENT T5B-L-P IS 1.38E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T5B-L-P

N	1000
MEAN	1.31E-07
STD DEV	5.85E-07
LOWER 5%	1.12E-09
LOWER 25%	7.40E-09
MEDIAN	2.62E-08
UPPER 25%	8.85E-08
UPPER 5%	4.52E-07

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE T5B-L-P
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
AFW-CCF-LK-STMBD	1	1.00E-04	(16.5)	5.14E-05	(2.0)	8.01E-12	3.45E-08
AFW-TNK-VF-CST	1	1.00E-06	(21.0)	5.14E-05	(2.0)	1.60E-12	6.54E-10
AFW-PSF-FC-XCONN	1	1.50E-04	(15.0)	5.14E-05	(2.0)	2.85E-10	9.44E-08
AFW-MDP-FS-FW3A	4	6.30E-03	(7.0)	3.42E-06	(4.0)	2.43E-10	1.78E-07
AFW-MDP-MA-FW3A	3	2.00E-03	(9.0)	3.36E-06	(6.0)	2.60E-11	5.29E-08
AFW-ACT-FA-PMP3A	3	6.00E-04	(13.0)	3.36E-06	(6.0)	1.69E-11	1.60E-08
AFW-MDP-FR-3A6HR	3	1.80E-04	(14.0)	3.36E-06	(6.0)	1.83E-12	4.44E-09
AFW-XHE-FO-UNIT2	25	3.60E-02	(2.0)	2.34E-06	(8.0)	1.20E-09	4.52E-07
AFW-CKV-OO-CV142	1	1.00E-03	(11.0)	1.65E-06	(9.0)	3.34E-12	6.10E-09
AFW-TDP-FS-FW2	6	1.10E-02	(4.0)	8.91E-07	(10.0)	4.50E-11	6.70E-08
DCP-BDC-ST-BUS1A	1	9.00E-05	(18.5)	8.88E-07	(12.5)	5.67E-13	1.45E-09
ACP-BAC-ST-4KV1H	1	9.00E-05	(18.5)	8.88E-07	(12.5)	5.67E-13	1.45E-09
AFW-XVM-PG-XV168	1	4.00E-05	(20.0)	8.88E-07	(12.5)	4.05E-13	6.29E-10
AFW-CKV-FT-CV157	1	1.00E-04	(16.5)	8.88E-07	(12.5)	1.01E-12	1.80E-09
AFW-TDP-FR-2P6HR	9	3.00E-02	(3.0)	8.40E-07	(15.0)	9.46E-11	1.59E-07
AFW-TDP-MA-FW2	5	1.00E-02	(5.0)	8.27E-07	(16.0)	3.59E-11	5.68E-08
AFW-CKV-OO-CV172	1	1.00E-03	(11.0)	7.55E-07	(17.5)	6.59E-12	4.29E-09
AFW-CKV-OO-CV157	1	1.00E-03	(11.0)	7.55E-07	(17.5)	6.59E-12	4.29E-09
AFW-MDP-FS	3	6.30E-03	(7.0)	1.42E-07	(19.0)	8.28E-12	1.02E-08
AFW-MDP-FS-FW3B	1	6.30E-03	(7.0)	6.40E-08	(20.0)	6.59E-12	4.29E-09
BETA-AFW	3	5.80E-02	(1.0)	4.93E-08	(21.0)	8.28E-12	1.02E-08

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T5B	25	5.00E-03	(1.0)	4.08E-05	(1.0)	1.20E-09	4.52E-07

SEQUENCE T5B-L-P
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
AFW-XHE-FO-UNIT2	25	3.60E-02	(2.0)	7.01E-08	(1.0)	6.18E-08	1.17E-05
AFW-MDP-FS-FW3A	4	6.30E-03	(7.0)	5.02E-08	(2.0)	6.88E-08	2.96E-05
AFW-TDP-FS-FW2	6	1.10E-02	(4.0)	2.86E-08	(3.0)	2.42E-08	6.48E-06
AFW-TDP-FR-2P6HR	9	3.00E-02	(3.0)	1.45E-08	(4.0)	2.03E-08	5.78E-06
AFW-TDP-MA-FW2	5	1.00E-02	(5.0)	1.32E-08	(5.0)	1.88E-08	5.94E-06
AFW-PSF-FC-XCONN	1	1.50E-04	(15.0)	1.08E-08	(6.0)	2.78E-06	6.24E-04
BETA-AFW	3	5.60E-02	(1.0)	2.09E-09	(7.5)	2.10E-10	1.60E-07
AFW-MDP-FS	3	6.30E-03	(7.0)	2.09E-09	(7.5)	2.44E-09	1.51E-06
AFW-MDP-MA-FW3A	3	2.00E-03	(9.0)	2.06E-09	(9.0)	6.31E-08	2.95E-05
AFW-CKV-OO-CV142	1	1.00E-03	(11.0)	2.06E-09	(10.0)	4.97E-09	6.31E-06
AFW-CCF-LK-STMBD	1	1.00E-04	(16.5)	1.07E-09	(11.0)	2.78E-06	6.24E-04
AFW-CKV-OO-CV172	1	1.00E-03	(11.0)	9.40E-10	(13.0)	1.14E-08	4.10E-06
AFW-CKV-OO-CV157	1	1.00E-03	(11.0)	9.40E-10	(13.0)	1.14E-08	4.10E-06
AFW-MDP-FS-FW3B	1	6.30E-03	(7.0)	9.40E-10	(13.0)	1.63E-09	6.71E-07
AFW-MDP-FR-3A6HR	3	1.80E-04	(14.0)	4.30E-10	(15.0)	6.33E-08	2.95E-05
AFW-ACT-FA-PMP3A	3	6.00E-04	(13.0)	1.75E-10	(16.0)	6.33E-08	2.95E-05
AFW-CKV-FT-CV157	1	1.00E-04	(16.5)	1.69E-10	(17.0)	1.45E-08	1.81E-05
AFW-XVM-PG-XV168	1	4.00E-05	(20.0)	3.84E-11	(18.0)	1.45E-08	1.81E-05
AFW-TNK-VF-CST	1	1.00E-06	(21.0)	1.86E-11	(19.0)	2.78E-06	6.24E-04
DCP-BDC-ST-BUS1A	1	9.00E-05	(18.5)	2.96E-12	(20.5)	1.45E-08	1.81E-05
ACP-BAC-ST-4KV1H	1	9.00E-05	(18.5)	2.96E-12	(20.5)	1.45E-08	1.81E-05

SEQUENCE T5B-L-P
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
AFW-XHE-FO-UNIT2	25	3.60E-02	(2.0)	25.3	(1.0)	2.02	0.95
AFW-TDP-FR-2P6HR	9	3.00E-02	(3.0)	7.3	(2.0)	1.35	1.04
AFW-MDP-FS-FW3B	1	6.30E-03	(7.0)	2.5	(4.0)	1.20	1.10
AFW-MDP-FS	3	6.30E-03	(7.0)	2.5	(4.0)	1.20	1.10
AFW-MDP-FS-FW3A	4	6.30E-03	(7.0)	2.5	(4.0)	1.20	1.10
AFW-TDP-FS-FW2	6	1.10E-02	(4.0)	2.5	(6.0)	1.06	0.98
AFW-PSF-FC-XCONN	1	1.50E-04	(15.0)	2.4	(7.0)	1.13	0.93
AFW-CCF-LK-STMBD	1	1.00E-04	(16.5)	1.8	(8.0)	1.28	1.00
AFW-TDP-MA-FW2	5	1.00E-02	(5.0)	1.5	(9.0)	1.13	0.99
AFW-MDP-MA-FW3A	3	2.00E-03	(9.0)	1.0	(10.0)	1.04	1.06
AFW-CKV-FT-CV157	1	1.00E-04	(16.5)	0.9	(11.0)	1.07	1.00
AFW-MDP-FR-3A6HR	3	1.80E-04	(14.0)	0.4	(12.0)		
AFW-CKV-OO-CV172	1	1.00E-03	(11.0)	0.4	(14.0)		
AFW-CKV-OO-CV157	1	1.00E-03	(11.0)	0.4	(14.0)		
AFW-CKV-OO-CV142	1	1.00E-03	(11.0)	0.4	(14.0)		
AFW-ACT-FA-PMP3A	3	6.00E-04	(13.0)	0.2	(16.0)		
DCP-BDC-ST-BUS1A	1	9.00E-05	(18.5)	0.0	(19.0)		
BETA-AFW	3	5.60E-02	(1.0)	0.0	(19.0)		
AFW-XVM-PG-XV168	1	4.00E-05	(20.0)	0.0	(19.0)		
AFW-TNK-VF-CST	1	1.00E-06	(21.0)	0.0	(19.0)		
ACP-BAC-ST-4KV1H	1	9.00E-05	(18.5)	0.0	(19.0)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T5B	25	5.00E-03	(1.0)	57.0	(1.0)	7.86	0.96

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SURRY SEQUENCE T5B-L-P

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T5B-L-P WITH TOP EVENT FREQUENCY 1.38E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	4	3.40E-08	0.24697	AFW-MDP-FS-FW3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
3	2	3	2.70E-08	0.44298	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
4	3	3	1.80E-08	0.57365	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
5	4	4	1.25E-08	0.66421	AFW-MDP-FS-FW3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
6	5	4	1.13E-08	0.74653	AFW-MDP-FS-FW3A	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
7	6	4	1.08E-08	0.82493	AFW-MDP-MA-FW3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
8	7	4	3.96E-09	0.85368	AFW-MDP-MA-FW3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
9	8	4	3.60E-09	0.87982	AFW-MDP-MA-FW3A	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
10	9	4	3.24E-09	0.90334	AFW-ACT-FA-PMP3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
11	10	4	1.98E-09	0.91771	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
12	11	5	1.91E-09	0.93154	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
13					IE-T5B	+						
14	12	4	1.19E-09	0.94017	AFW-ACT-FA-PMP3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
15	14	4	1.13E-09	0.94840	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
16	13	4	1.13E-09	0.95663	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
17	15	4	1.08E-09	0.96447	AFW-ACT-FA-PMP3A	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
18	16	4	9.72E-10	0.97153	AFW-MDP-FR-3A6HR	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
19	17	5	6.99E-10	0.97660	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
20					IE-T5B	+						
21	18	5	6.35E-10	0.98121	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
22					IE-T5B	+						
23	19	4	5.40E-10	0.98513	AFW-CKV-FT-CV157	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
24	20	4	4.86E-10	0.98868	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1A	*	IE-T5B	+
25	21	4	4.86E-10	0.99219	ACP-BAC-ST-4KV1H	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
26	22	4	3.56E-10	0.99477	AFW-MDP-FR-3A6HR	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
27	23	4	3.24E-10	0.99713	AFW-MDP-FR-3A6HR	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
28	24	4	2.16E-10	0.99869	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	AFW-XVM-PG-XV168	*	IE-T5B	+
29	25	3	1.80E-10	1.00000	AFW-TNK-VF-CST	*	AFW-XHE-FO-UNIT2	*	IE-T5B	.		

SEQUENCE T7-L3

TOP EVENT T7-L3 CONTAINS 14 EVENTS IN 8 CUT SETS

THE FREQUENCY OF TOP EVENT T7-L3 IS 1.05E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T7-L3

N	1000
MEAN	1.06E-07
STD DEV	2.83E-07
LOWER 5%	4.81E-09
LOWER 25%	1.74E-08
MEDIAN	4.06E-08
UPPER 25%	1.01E-07
UPPER 5%	3.42E-07

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

   RISK REDUCTION = PD x EV(J)
   = TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

   RISK INCREASE = PD - RISK REDUCTION
   = PD x (1 - EV(J))
   = TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE T7-L3
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
AFW-XHE-FO-UNIT2	8	3.60E-02	(2.0)	1.05E-07	(1.0)	4.81E-09	3.42E-07
AFW-PSF-FC-XCONN	1	1.50E-04	(12.0)	5.40E-08	(2.0)	2.87E-09	2.07E-07
AFW-CCF-LK-STMBD	1	1.00E-04	(13.0)	3.60E-08	(3.0)	4.42E-11	9.33E-08
AFW-MDP-FS	3	6.30E-03	(7.0)	6.48E-09	(4.5)	8.09E-11	2.37E-08
BETA-AFW	3	5.60E-02	(1.0)	6.48E-09	(4.5)	8.09E-11	2.37E-08
AFW-TDP-FS-FW2	2	1.10E-02	(4.0)	5.36E-09	(6.0)	4.32E-11	2.05E-08
AFW-CKV-OO-CV142	1	1.00E-03	(10.0)	3.96E-09	(7.0)	3.02E-11	1.54E-08
AFW-TDP-FR-2P6HR	1	3.00E-02	(3.0)	3.81E-09	(8.0)	1.87E-11	1.30E-08
AFW-MDP-FS-FW3B	1	6.30E-03	(7.0)	2.27E-09	(10.5)	7.15E-11	8.22E-09
AFW-MDP-FS-FW3A	1	6.30E-03	(7.0)	2.27E-09	(10.5)	7.15E-11	8.22E-09
AFW-CKV-OO-CV157	1	1.00E-03	(10.0)	2.27E-09	(10.5)	7.15E-11	8.22E-09
AFW-CKV-OO-CV172	1	1.00E-03	(10.0)	2.27E-09	(10.5)	7.15E-11	8.22E-09
AFW-TDP-MA-FW2	1	1.00E-02	(5.0)	1.27E-09	(13.0)	5.11E-12	4.90E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T7	8	1.00E-02	(1.0)	1.05E-07	(1.0)	4.81E-09	3.42E-07

SEQUENCE T7-L3
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
AFW-CCF-LK-STMBD	1	1.00E-04	(13.0)	3.60E-04	(1.0)	2.98E-05	1.16E-03
AFW-PSF-FC-XCONN	1	1.50E-04	(12.0)	3.60E-04	(2.0)	2.98E-05	1.16E-03
AFW-CKV-OO-CV142	1	1.00E-03	(10.0)	3.96E-06	(3.0)	4.48E-08	1.58E-05
AFW-XHE-FO-UNIT2	8	3.60E-02	(2.0)	2.81E-06	(4.0)	3.32E-07	7.86E-06
AFW-CKV-OO-CV157	1	1.00E-03	(10.0)	2.27E-06	(5.5)	1.13E-07	7.66E-06
AFW-CKV-OO-CV172	1	1.00E-03	(10.0)	2.27E-06	(5.5)	1.13E-07	7.66E-06
AFW-MDP-FS	3	6.30E-03	(7.0)	1.02E-06	(7.0)	1.70E-08	3.80E-06
AFW-TDP-FS-FW2	2	1.10E-02	(4.0)	4.82E-07	(8.0)	2.68E-08	1.61E-06
AFW-MDP-FS-FW3B	1	6.30E-03	(7.0)	3.58E-07	(9.5)	1.71E-08	1.34E-06
AFW-MDP-FS-FW3A	1	6.30E-03	(7.0)	3.58E-07	(9.5)	1.71E-08	1.34E-06
AFW-TDP-MA-FW2	1	1.00E-02	(5.0)	1.26E-07	(11.0)	3.94E-09	4.85E-07
AFW-TDP-FR-2P6HR	1	3.00E-02	(3.0)	1.23E-07	(12.0)	3.91E-09	4.71E-07
BETA-AFW	3	5.60E-02	(1.0)	1.09E-07	(13.0)	2.09E-09	4.25E-07

SEQUENCE T7-L3
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
AFW-XHE-FO-UNIT2	8	3.60E-02	(2.0)	46.9	(1.0)
AFW-PSF-FC-XCONN	1	1.50E-04	(12.0)	12.1	(2.0)
AFW-CCF-LK-STMBD	1	1.00E-04	(13.0)	11.1	(3.0)
AFW-TDP-FS-FW2	2	1.10E-02	(4.0)	1.7	(4.0)
AFW-TDP-FR-2P6HR	1	3.00E-02	(3.0)	1.5	(5.0)
BETA-AFW	3	5.60E-02	(1.0)	1.1	(6.0)
AFW-MDP-FS-FW3B	1	6.30E-03	(7.0)	0.9	(8.0)
AFW-MDP-FS-FW3A	1	6.30E-03	(7.0)	0.9	(8.0)
AFW-MDP-FS	3	6.30E-03	(7.0)	0.9	(8.0)
AFW-TDP-MA-FW2	1	1.00E-02	(5.0)	0.4	(10.0)
AFW-CKV-OO-CV157	1	1.00E-03	(10.0)	0.3	(12.0)
AFW-CKV-OO-CV172	1	1.00E-03	(10.0)	0.3	(12.0)
AFW-CKV-OO-CV142	1	1.00E-03	(10.0)	0.3	(12.0)

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
IE-T7	8	1.00E-02	(1.0)	25.5	(1.0)

SEQUENCE T7-L3

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T7-L WITH TOP EVENT FREQUENCY 1.05E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	3	5.40E-08	0.51442	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T7	+		
3	2	3	3.60E-08	0.85736	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T7	+		
4	3	4	3.96E-09	0.89508	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T7	+
5	4	5	3.81E-09	0.93138	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
6					IE-T7	+						
7	6	4	2.27E-09	0.95299	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T7	+
8	5	4	2.27E-09	0.97459	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T7	+
9	7	5	1.40E-09	0.98790	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
10					IE-T7	+						
11	8	5	1.27E-09	1.00000	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
12					IE-T7	.						

SURRY SEQUENCE T7-OD-Q-QS

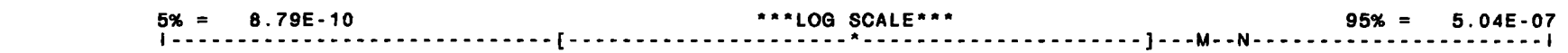
TOP EVENT T7-OD-Q-QS CONTAINS 16 EVENTS IN 10 CUT SETS

THE FREQUENCY OF TOP EVENT T7-OD-Q-QS IS 1.22E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T7-OD-Q-QS

N	1000
MEAN	1.07E-07
STD DEV	2.76E-07
LOWER 5%	8.79E-10
LOWER 25%	5.66E-09
MEDIAN	2.05E-08
UPPER 25%	8.02E-08
UPPER 5%	5.04E-07

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)



NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SURRY SEQUENCE T7-OD-Q-QS
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
PPS-SOV-OO-1455C	5	3.00E-02	(12.5)	2.14E-07	(1.5)	4.39E-10	2.52E-07
PPS-SOV-OO-1456	5	3.00E-02	(12.5)	2.14E-07	(1.5)	4.39E-10	2.52E-07
RCS-XHE-FO-DPRT7	10	2.90E-02	(14.0)	1.22E-07	(3.0)		
MSS-SRV-OO-ODSRV	8	1.00E+00	(2.5)	1.03E-07	(4.0)		
SGTR-SGSRV-ODMD1	4	1.00E+00	(2.5)	5.57E-08	(5.0)		
PPS-MOV-FC-OPER	4	2.70E-03	(15.0)	5.19E-08	(6.0)	1.33E-11	2.76E-08
PPS-MOV-OO-1536	3	4.00E-02	(10.5)	3.43E-08	(7.5)	4.23E-10	2.43E-07
PPS-MOV-OO-1535	3	4.00E-02	(10.5)	3.43E-08	(7.5)	4.23E-10	2.43E-07
SGTR-SGADV-ODMD	2	1.00E+00	(2.5)	1.89E-08	(9.5)		
MSS-SOV-OO-ODADV	2	1.00E+00	(2.5)	1.89E-08	(9.5)		
PORV-BLK	4	1.50E-01	(7.5)	1.33E-08	(11.0)	2.72E-10	2.41E-07
SGTR-SGSRV-ODMD2	4	1.50E-01	(7.5)	9.71E-09	(12.0)	1.90E-10	1.70E-07
MSS-XHE-FO-BLOCK	2	6.40E-02	(9.0)	8.82E-09	(13.0)	8.60E-11	7.18E-08
RCS-PORV-ODMD	10	5.00E-01	(6.0)	8.08E-09	(14.0)	8.79E-10	5.04E-07
PORV-NOT-BLK	6	8.50E-01	(5.0)	1.70E-09	(15.0)	3.70E-10	2.57E-07

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T7	10	1.00E-02	(1.0)	2.68E-07	(1.0)	8.79E-10	5.04E-07

SURRY SEQUENCE T7-OD-Q-QS
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
RCS-XHE-FO-DPRT7	10	2.90E-02	(14.0)	4.09E-06	(1.0)		
RCS-PORV-ODMD	10	5.00E-01	(6.0)	1.94E-09	(2.0)	7.02E-10	4.79E-07
PORV-NOT-BLK	6	8.50E-01	(5.0)	1.24E-09	(3.0)	2.04E-11	4.22E-08
PPS-SOV-OO-1456	5	3.00E-02	(12.5)	9.71E-10	(4.5)	8.85E-08	7.16E-06
PPS-SOV-OO-1455C	5	3.00E-02	(12.5)	9.71E-10	(4.5)	8.85E-08	7.16E-06
PPS-MOV-OO-1535	3	4.00E-02	(10.5)	9.01E-10	(6.5)	1.51E-08	5.96E-06
PPS-MOV-OO-1536	3	4.00E-02	(10.5)	9.01E-10	(6.5)	1.51E-08	5.96E-06
SGTR-SGSRV-ODMD2	4	1.50E-01	(7.5)	8.05E-10	(8.0)	2.56E-09	1.10E-06
PORV-BLK	4	1.50E-01	(7.5)	6.96E-10	(9.0)	2.79E-09	1.23E-06
MSS-XHE-FO-BLOCK	2	6.40E-02	(9.0)	4.40E-10	(10.0)	2.45E-09	1.10E-06
PPS-MOV-FC-OPER	4	2.70E-03	(15.0)	1.38E-10	(11.0)	2.51E-08	1.03E-05
SGTR-SGSRV-ODMD1	4	1.00E+00	(2.5)	0.00E+00	(13.5)		
SGTR-SGADV-ODMD	2	1.00E+00	(2.5)	0.00E+00	(13.5)		
MSS-SRV-OO-ODSRV	8	1.00E+00	(2.5)	0.00E+00	(13.5)		
MSS-SOV-OO-ODADV	2	1.00E+00	(2.5)	0.00E+00	(13.5)		

SURRY SEQUENCE T7-OD-Q-QS
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
PPS-SOV-OO-1456	5	3.00E-02	(12.5)	53.0	(1.5)	6.34	0.85
PPS-SOV-OO-1455C	5	3.00E-02	(12.5)	53.0	(1.5)	6.34	0.85
RCS-PORV-ODMD	10	5.00E-01	(6.0)	14.0	(3.0)	1.81	0.94
PPS-MOV-OO-1535	3	4.00E-02	(10.5)	11.3	(4.5)	1.46	1.01
PPS-MOV-OO-1536	3	4.00E-02	(10.5)	11.3	(4.5)	1.46	1.01
PORV-BLK	4	1.50E-01	(7.5)	4.5	(6.0)	1.13	0.94
SGTR-SGSRV-ODMD2	4	1.50E-01	(7.5)	4.0	(7.0)	1.16	1.00
PORV-NOT-BLK	6	8.50E-01	(5.0)	1.0	(8.0)	1.07	0.99
MSS-XHE-FO-BLOCK	2	6.40E-02	(9.0)	1.0	(9.0)	1.04	1.01
PPS-MOV-FC-OPER	4	2.70E-03	(15.0)	0.6	(10.0)	1.05	1.01
SGTR-SGSRV-ODMD1	4	1.00E+00	(2.5)				
SGTR-SGADV-ODMD	2	1.00E+00	(2.5)				
RCS-XHE-FO-DPRT7	10	2.90E-02	(14.0)				
MSS-SRV-OO-ODSRV	8	1.00E+00	(2.5)				
MSS-SOV-OO-ODADV	2	1.00E+00	(2.5)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T7	10	1.00E-02	(1.0)	13.0	(1.0)	1.62	0.99

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SURRY SEQUENCE T7-OD-Q-QS

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T7-OD-Q-QS WITH TOP EVENT FREQUENCY 1.22E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	8	2.61E-08	0.21390	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-OO-1535	*
3					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
4	2	8	2.61E-08	0.42780	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-OO-1536	*
5					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
6	4	8	2.22E-08	0.60961	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-OO-1536	*
7					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+
8	3	8	2.22E-08	0.79143	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-OO-1535	*
9					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+
10	6	9	9.47E-09	0.86900	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	PORV-NOT-BLK	*
11					PPS-MOV-OO-1536	*	PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*
12					SGTR-SGADV-ODMD	+						
13	5	9	9.47E-09	0.94658	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	PORV-NOT-BLK	*
14					PPS-MOV-OO-1535	*	PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*
15					SGTR-SGADV-ODMD	+						
16	7	8	1.76E-09	0.96102	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-FC-OPER	*
17					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
18	8	8	1.76E-09	0.97546	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-FC-OPER	*
19					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
20	10	8	1.50E-09	0.98773	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-FC-OPER	*
21					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+
22	9	8	1.50E-09	1.00000	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-FC-OPER	*
23					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	.

SEQUENCE T7-K-R

TOP EVENT T7-K-R CONTAINS 3 EVENTS IN 1 CUT SETS

THE FREQUENCY OF TOP EVENT T7-K-R IS 1.02E-07

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT T7-K-R

N	1000
MEAN	1.04E-07
STD DEV	2.50E-07
LOWER 5%	3.24E-09
LOWER 25%	1.29E-08
MEDIAN	3.41E-08
UPPER 25%	9.12E-08
UPPER 5%	4.04E-07

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SEQUENCE T7-K-R
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
K	1	6.00E-05	(2.0)	1.02E-07	(1.5)	3.24E-09	4.04E-07
R	1	1.70E-01	(1.0)	1.02E-07	(1.5)	3.24E-09	4.04E-07

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-T7	1	1.00E-02	(1.0)	1.02E-07	(1.0)	3.24E-09	4.04E-07

SEQUENCE T7-K-R
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
K	1	6.00E-05	(2.0)	1.70E-03	(1.0)	1.41E-04	5.63E-03
R	1	1.70E-01	(1.0)	4.98E-07	(2.0)	3.53E-08	1.85E-06

SEQUENCE T7-K-R
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
K	1	6.00E-05	(2.0)	43.6	(1.0)
R	1	1.70E-01	(1.0)	36.0	(2.0)

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
IE-T7	1	1.00E-02	(1.0)	21.4	(1.0)

SEQUENCE T7-K-R

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT T7-K-R WITH TOP EVENT FREQUENCY 1.02E-07

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	3	1.02E-07	1.00000	IE-T7	*	K	*	R

PLANT DAMAGE STATE GROUP PDS1

TOP EVENT PDS1 CONTAINS 53 EVENTS IN 2146 CUT SETS

THE FREQUENCY OF TOP EVENT PDS1 IS 1.66E-05

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT PDS1

N	1000
MEAN	2.21E-05
STD DEV	4.54E-05
LOWER 5%	6.10E-07
LOWER 25%	3.20E-06
MEDIAN	8.21E-06
UPPER 25%	2.04E-05
UPPER 5%	9.47E-05

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

PLANT DAMAGE STATE GROUP PDS1
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
NOTQ	2021	9.73E-01	(2.0)	1.43E-05	(1.0)		
NOTL-SBOU1	1304	9.93E-01	(1.0)	1.33E-05	(2.0)		
NRAC-7HR	974	5.00E-02	(25.0)	8.02E-06	(3.0)	2.64E-07	4.22E-05
NOTW2	54	8.15E-01	(5.0)	7.15E-06	(4.0)		
REC-XHE-FO-DGHWB	148	6.00E-01	(8.0)	6.88E-06	(5.0)	2.16E-07	3.66E-05
OEP-DGN-FS-DG01	617	2.20E-02	(32.5)	6.49E-06	(6.0)	1.62E-07	3.70E-05
REC-XHE-FO-DGHWS	1407	8.00E-01	(6.0)	5.98E-06	(7.0)	0.00E+00	2.97E-05
RCP-LOCA-750-90M	262	5.30E-01	(9.0)	5.20E-06	(8.0)	0.00E+00	3.16E-05
NRAC-216M	200	1.38E-01	(18.0)	5.00E-06	(9.0)	0.00E+00	2.99E-05
OEP-DGN-FS	232	2.20E-02	(32.5)	4.41E-06	(10.0)	1.55E-07	1.64E-05
OEP-DGN-FS-DG03	462	2.20E-02	(32.5)	3.51E-06	(11.0)	8.59E-08	1.94E-05
OEP-DGN-FS-DG02	461	2.20E-02	(32.5)	3.49E-06	(12.0)	8.54E-08	1.94E-05
NOTL-SBOU1U2	841	9.68E-01	(3.0)	3.23E-06	(13.0)		
OEP-DGN-FR-6HDG1	568	1.20E-02	(40.0)	3.21E-06	(14.0)	1.92E-08	2.37E-05
REC-XHE-FO-SCOOL	589	1.25E-01	(20.0)	2.88E-06	(15.0)	3.67E-08	1.61E-05
BETA-3DG	27	1.80E-02	(35.0)	2.63E-06	(16.0)	6.96E-08	1.07E-05
NRAC-1HR	124	4.40E-01	(13.0)	2.27E-06	(17.5)	1.17E-08	9.56E-06
SBO-PORV-DMD	124	4.50E-01	(12.0)	2.27E-06	(17.5)	1.17E-08	9.56E-06
REC-XHE-FO-DGEN	118	9.00E-01	(4.0)	2.26E-06	(19.0)	1.17E-08	9.39E-06
OEP-DGN-FR-6HDG3	424	1.20E-02	(40.0)	1.85E-06	(20.0)	1.10E-08	1.40E-05
BETA-2DG	205	3.80E-02	(27.0)	1.78E-06	(21.5)	6.15E-08	6.88E-06
NOTDG-CCF	205	5.20E-01	(10.0)	1.78E-06	(21.5)		
OEP-DGN-FR-6HDG2	416	1.20E-02	(40.0)	1.61E-06	(23.0)	9.44E-09	1.14E-05
OEP-DGN-MA-DG01	362	6.00E-03	(43.0)	1.48E-06	(24.0)	1.08E-08	6.09E-06
MCW-CCF-VF-SBO	570	6.00E-02	(24.0)	1.38E-06	(25.0)	1.51E-08	7.92E-06
PPS-SOV-OO-1456	62	3.00E-02	(29.5)	1.13E-06	(26.5)	5.86E-09	4.78E-06
PPS-SOV-OO-1455C	62	3.00E-02	(29.5)	1.13E-06	(26.5)	5.86E-09	4.78E-06
RCP-LOCA-467-150	262	1.27E-01	(19.0)	9.74E-07	(28.0)	0.00E+00	6.42E-06
NRAC-258M	200	1.08E-01	(23.0)	9.38E-07	(29.0)	0.00E+00	6.16E-06
OEP-CRB-FT-15H3	396	3.00E-03	(48.0)	9.19E-07	(30.0)	6.84E-09	3.42E-06
OEP-DGN-MA-DG02	259	6.00E-03	(43.0)	8.14E-07	(31.0)	5.86E-09	3.30E-06
OEP-DGN-MA-DG03	257	6.00E-03	(43.0)	7.72E-07	(32.0)	5.62E-09	3.12E-06
NSLOCA	134	2.70E-01	(14.5)	7.08E-07	(33.0)	0.00E+00	3.86E-06
OEP-CRB-FT-15J3	265	3.00E-03	(48.0)	5.11E-07	(34.0)	3.64E-09	2.12E-06
REC-XHE-FO-DGTMB	18	5.00E-01	(11.0)	2.78E-07	(35.0)	6.63E-10	9.35E-07
NRAC-201M	62	1.50E-01	(17.0)	1.95E-07	(36.0)	0.00E+00	1.00E-06
REC-XHE-FO-DGTMS	217	7.00E-01	(7.0)	1.66E-07	(37.0)	0.00E+00	6.86E-07
OEP-DGN-FR-DG01	22	2.00E-03	(51.0)	9.72E-08	(38.0)	1.49E-10	3.39E-07
NRAC-246M	262	1.15E-01	(22.0)	8.74E-08	(39.0)	0.00E+00	1.60E-07
RCP-LOCA-1440-90	262	4.30E-03	(45.0)	6.40E-08	(40.5)	0.00E+00	0.00E+00
NRAC-150M	262	2.10E-01	(16.0)	6.40E-08	(40.5)	0.00E+00	0.00E+00
RCP-LOCA-183-210	262	1.61E-02	(36.5)	5.70E-08	(42.5)	0.00E+00	0.00E+00
RCP-LOCA-183-150	262	1.61E-02	(36.5)	5.70E-08	(42.5)	0.00E+00	0.00E+00
OEP-DGN-FR-DG02	14	2.00E-03	(51.0)	5.13E-08	(44.0)	8.00E-11	1.78E-07
OEP-DGN-FR-DG03	12	2.00E-03	(51.0)	5.06E-08	(45.0)	8.06E-11	1.76E-07
RCP-LOCA-183-90	262	1.40E-02	(38.0)	4.97E-08	(46.0)	0.00E+00	0.00E+00
RCP-LOCA-561-150	262	4.00E-03	(46.0)	3.27E-08	(47.0)	0.00E+00	0.00E+00

OEP-CRB-FT-25H3	106	3.00E-03 (48.0)	2.46E-08 (48.0)	2.20E-11	1.45E-07
NRAC-234M	62	1.23E-01 (21.0)	1.21E-09 (49.0)	0.00E+00	0.00E+00
QS-SBO	2145	2.70E-01 (14.5)	-5.62E-09 (50.0)	-2.33E-07	7.23E-08
O	1288	4.90E-02 (26.0)	-1.55E-08 (51.0)	-2.20E-07	8.02E-08
DGN-FTO	1252	3.39E-02 (28.0)	-4.11E-07 (52.0)	-2.29E-06	-5.65E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ (RANK)	RISK REDUCTION (RANK)	LOWER 5%	UPPER 5%
IE-T1	2146	7.70E-02 (1.0)	1.66E-05 (1.0)	6.10E-07	9.47E-05

PLANT DAMAGE STATE GROUP PDS1
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
OEP-CRB-FT-15H3	398	3.00E-03	(48.0)	3.05E-04	(1.0)	1.66E-05	1.00E-03
OEP-DGN-FS-DG01	617	2.20E-02	(32.5)	2.89E-04	(2.0)	1.48E-05	9.30E-04
OEP-DGN-FR-6HDG1	568	1.20E-02	(40.0)	2.64E-04	(3.0)	1.43E-05	8.47E-04
OEP-DGN-MA-DG01	382	6.00E-03	(43.0)	2.46E-04	(4.0)	1.25E-05	8.55E-04
OEP-DGN-FS	232	2.20E-02	(32.5)	1.96E-04	(5.0)	1.23E-05	5.96E-04
OEP-CRB-FT-15J3	265	3.00E-03	(48.0)	1.70E-04	(6.0)	1.13E-05	5.71E-04
OEP-DGN-FS-DG03	462	2.20E-02	(32.5)	1.56E-04	(7.0)	7.85E-06	5.15E-04
OEP-DGN-FS-DG02	461	2.20E-02	(32.5)	1.55E-04	(8.0)	7.84E-06	5.15E-04
OEP-DGN-FR-6HDG3	424	1.20E-02	(40.0)	1.52E-04	(9.0)	9.13E-06	4.95E-04
NRAC-7HR	974	5.00E-02	(25.0)	1.52E-04	(10.0)	6.19E-06	8.40E-04
BETA-3DG	27	1.80E-02	(35.0)	1.43E-04	(11.0)	5.93E-06	4.91E-04
OEP-DGN-MA-DG02	259	6.00E-03	(43.0)	1.35E-04	(12.0)	7.02E-06	4.90E-04
OEP-DGN-FR-6HDG2	418	1.20E-02	(40.0)	1.33E-04	(13.0)	6.68E-06	4.28E-04
OEP-DGN-MA-DG03	257	6.00E-03	(43.0)	1.28E-04	(14.0)	6.55E-06	4.63E-04
OEP-DGN-FR-DG01	22	2.00E-03	(51.0)	4.85E-05	(15.0)	3.58E-07	1.79E-04
BETA-2DG	205	3.80E-02	(27.0)	4.51E-05	(16.0)	2.17E-06	1.53E-04
PPS-SOV-OO-1455C	62	3.00E-02	(29.5)	3.67E-05	(17.5)	1.37E-06	1.77E-04
PPS-SOV-OO-1456	62	3.00E-02	(29.5)	3.67E-05	(17.5)	1.37E-06	1.77E-04
NRAC-216M	200	1.38E-01	(18.0)	3.13E-05	(19.0)	0.00E+00	1.96E-04
OEP-DGN-FR-DG02	14	2.00E-03	(51.0)	2.56E-05	(20.0)	1.82E-07	9.71E-05
OEP-DGN-FR-DG03	12	2.00E-03	(51.0)	2.53E-05	(21.0)	1.83E-07	9.02E-05
MCW-CCF-VF-SBO	570	6.00E-02	(24.0)	2.16E-05	(22.0)	4.43E-07	1.26E-04
REC-XHE-FO-SCOOL	589	1.25E-01	(20.0)	2.02E-05	(23.0)	3.86E-07	1.10E-04
RCP-LOCA-1440-90	262	4.30E-03	(45.0)	1.48E-05	(24.0)	5.15E-07	7.58E-05
OEP-CRB-FT-25H3	106	3.00E-03	(48.0)	8.19E-06	(25.0)	3.00E-08	4.93E-05
RCP-LOCA-561-150	262	4.00E-03	(46.0)	8.14E-06	(26.0)	3.59E-07	4.29E-05
NRAC-258M	200	1.08E-01	(23.0)	7.75E-06	(27.0)	0.00E+00	5.03E-05
RCP-LOCA-467-150	262	1.27E-01	(19.0)	6.70E-06	(28.0)	0.00E+00	3.68E-05
RCP-LOCA-750-90M	262	5.30E-01	(9.0)	4.61E-06	(29.0)	0.00E+00	2.89E-05
REC-XHE-FO-DGHWB	148	6.00E-01	(8.0)	4.59E-06	(30.0)	6.18E-08	2.27E-05
RCP-LOCA-183-90	262	1.40E-02	(38.0)	3.50E-06	(31.0)	1.28E-07	2.03E-05
RCP-LOCA-183-210	262	1.61E-02	(36.5)	3.49E-06	(32.5)	8.75E-08	1.99E-05
RCP-LOCA-183-150	262	1.61E-02	(36.5)	3.49E-06	(32.5)	9.22E-08	2.03E-05
NRAC-1HR	124	4.40E-01	(13.0)	2.89E-06	(34.0)	1.46E-08	1.12E-05
SBO-PORV-DMD	124	4.50E-01	(12.0)	2.77E-06	(35.0)	1.31E-08	1.29E-05
NSLOCA	134	2.70E-01	(14.5)	1.91E-06	(36.0)	0.00E+00	1.03E-05
NOTDG-CCF	205	5.20E-01	(10.0)	1.64E-06	(37.0)		
NOTW2	54	8.15E-01	(5.0)	1.62E-06	(38.0)		
REC-XHE-FO-DGHWS	1407	8.00E-01	(6.0)	1.49E-06	(39.0)	0.00E+00	7.99E-06
NRAC-201M	62	1.50E-01	(17.0)	1.11E-06	(40.0)	0.00E+00	6.36E-06
NRAC-246M	262	1.15E-01	(22.0)	5.18E-07	(41.0)	0.00E+00	1.30E-06
NOTQ	2021	9.73E-01	(2.0)	3.96E-07	(42.0)		
REC-XHE-FO-DGTMB	18	5.00E-01	(11.0)	2.78E-07	(43.0)	5.61E-10	1.14E-06
REC-XHE-FO-DGEN	118	9.00E-01	(4.0)	2.51E-07	(44.0)	3.10E-10	1.01E-06
NRAC-150M	262	2.10E-01	(16.0)	2.41E-07	(45.0)	0.00E+00	0.00E+00
NOTL-SBOU1U2	841	9.68E-01	(3.0)	1.07E-07	(46.0)		
NOTL-SBOU1	1304	9.93E-01	(1.0)	9.40E-08	(47.0)		

REC-XHE-FO-DGTMS	217	7.00E-01	(7.0)	7.11E-08	(48.0)	0.00E+00	2.45E-07
NRAC-234M	62	1.23E-01	(21.0)	8.62E-09	(49.0)	0.00E+00	0.00E+00
QS-SBO	2145	2.70E-01	(14.5)	-1.52E-08	(50.0)	-3.73E-07	2.44E-07
O	1288	4.90E-02	(26.0)	-3.01E-07	(51.0)	-4.11E-06	1.42E-06
DGN-FTO	1252	3.39E-02	(28.0)	-1.17E-05	(52.0)	-7.11E-05	-3.16E-07

PLANT DAMAGE STATE GROUP PDS1
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
OEP-DGN-FS-DG01	617	2.20E-02	(32.5)	24.2	(2.5)	1.79	0.64
OEP-DGN-FS-DG02	461	2.20E-02	(32.5)	24.2	(2.5)	1.79	0.64
OEP-DGN-FS-DG03	462	2.20E-02	(32.5)	24.2	(2.5)	1.79	0.64
OEP-DGN-FS	232	2.20E-02	(32.5)	24.2	(2.5)	1.79	0.64
OEP-DGN-FR-6HDG3	424	1.20E-02	(40.0)	17.1	(6.0)	1.55	0.72
OEP-DGN-FR-6HDG1	568	1.20E-02	(40.0)	17.1	(6.0)	1.55	0.72
OEP-DGN-FR-6HDG2	416	1.20E-02	(40.0)	17.1	(6.0)	1.55	0.72
OEP-DGN-FR-DG02	14	2.00E-03	(51.0)	16.7	(9.0)	1.03	1.00
OEP-DGN-FR-DG03	12	2.00E-03	(51.0)	16.7	(9.0)	1.03	1.00
OEP-DGN-FR-DG01	22	2.00E-03	(51.0)	16.7	(9.0)	1.03	1.00
REC-XHE-FO-DGTMB	18	5.00E-01	(11.0)	8.8	(11.0)	0.99	1.00
REC-XHE-FO-DGHWS	1407	8.00E-01	(6.0)	8.8	(12.0)	1.11	0.98
REC-XHE-FO-DGEN	118	9.00E-01	(4.0)	8.6	(13.0)	0.99	1.00
REC-XHE-FO-DGHWB	148	6.00E-01	(8.0)	8.6	(14.0)	1.20	0.99
NRAC-7HR	974	5.00E-02	(25.0)	8.4	(15.0)	1.26	1.00
REC-XHE-FO-DGTMS	217	7.00E-01	(7.0)	8.4	(16.0)	1.00	1.00
NRAC-258M	200	1.08E-01	(23.0)	8.2	(17.0)	1.06	1.00
NRAC-201M	62	1.50E-01	(17.0)	8.2	(18.0)	1.00	1.01
NRAC-234M	62	1.23E-01	(21.0)	8.1	(19.0)	1.00	1.00
NRAC-1HR	124	4.40E-01	(13.0)	8.1	(20.0)	1.02	1.00
NRAC-216M	200	1.38E-01	(18.0)	8.0	(21.0)	1.03	0.98
NRAC-150M	262	2.10E-01	(16.0)	8.0	(22.0)	1.00	1.00
NRAC-246M	262	1.15E-01	(22.0)	7.9	(23.0)	1.01	1.00
NSLOCA	134	2.70E-01	(14.5)	3.6	(24.0)	0.96	1.03
OEP-DGN-MA-DG03	257	6.00E-03	(43.0)	3.3	(26.0)	1.12	0.89
OEP-DGN-MA-DG02	259	6.00E-03	(43.0)	3.3	(26.0)	1.12	0.89
OEP-DGN-MA-DG01	362	6.00E-03	(43.0)	3.3	(26.0)	1.12	0.89
RCP-LOCA-750-90M	262	5.30E-01	(9.0)	2.2	(28.0)	1.15	0.93
PPS-SOV-OO-1456	62	3.00E-02	(29.5)	2.0	(29.5)	1.24	0.89
PPS-SOV-OO-1455C	62	3.00E-02	(29.5)	2.0	(29.5)	1.24	0.89
QS-SBO	2145	2.70E-01	(14.5)	1.9	(31.0)	1.00	1.00
OEP-CRB-FT-25H3	106	3.00E-03	(48.0)	1.5	(33.0)	1.02	0.96
OEP-CRB-FT-15J3	265	3.00E-03	(48.0)	1.5	(33.0)	1.02	0.96
OEP-CRB-FT-15H3	396	3.00E-03	(48.0)	1.5	(33.0)	1.02	0.96
REC-XHE-FO-SCOOL	589	1.25E-01	(20.0)	1.2	(35.0)	1.06	0.97
BETA-3DG	27	1.80E-02	(35.0)	1.2	(36.0)	1.06	0.98
BETA-2DG	205	3.80E-02	(27.0)	1.1	(37.0)	1.01	1.01
O	1288	4.90E-02	(26.0)	1.0	(38.0)	1.00	1.00
SBO-PORV-DMD	124	4.50E-01	(12.0)	0.9	(39.0)	0.98	0.92
RCP-LOCA-183-150	262	1.61E-02	(36.5)	0.3	(40.0)		
RCP-LOCA-467-150	262	1.27E-01	(19.0)	0.2	(41.0)		
RCP-LOCA-1440-90	262	4.30E-03	(45.0)	0.2	(42.0)		
RCP-LOCA-561-150	262	4.00E-03	(46.0)	0.1	(43.0)		
RCP-LOCA-183-90	262	1.40E-02	(38.0)	0.0	(44.0)		
RCP-LOCA-183-210	262	1.61E-02	(36.5)	0.0	(45.0)		
DGN-FTO	1252	3.39E-02	(28.0)	0.0	(46.5)		
MCW-CCF-VF-SBO	570	6.00E-02	(24.0)	0.0	(46.5)		

NOTL-SBOU1U2	841	9.68E-01	(3.0)
NOTL-SBOU1	1304	9.93E-01	(1.0)
NOTDG-CCF	205	5.20E-01	(10.0)
NOTW2	54	8.15E-01	(5.0)
NOTQ	2021	9.73E-01	(2.0)

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T1	2146	7.70E-02	(1.0)	30.0	(1.0)	2.03	0.88

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

PLANT DAMAGE STATE GROUP PDS1

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT PDS1 WITH TOP EVENT FREQUENCY 1.66E-05

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	55	10	1.17E-06	0.07046	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
3					NRAC-216M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
4					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
5	2	10	6.21E-07	0.10796	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
6					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
7					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
8	1	10	6.21E-07	0.14546	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
9					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
10					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
11	3	10	5.77E-07	0.18033	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
12					NOTQ	*	NOTW2	*	NRAC-7HR	*	OEP-DGN-FS	*
13					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
14	56	9	4.54E-07	0.20773	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
15					NRAC-216M	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-750-90M	*
16					REC-XHE-FO-DGHWS	+						
17	7	10	3.39E-07	0.22818	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
18					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
19					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
20	5	10	3.39E-07	0.24864	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
21					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
22					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
23	4	10	3.39E-07	0.26909	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
24					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
25					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
26	6	10	3.39E-07	0.28955	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
27					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
28					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
29	8	9	3.08E-07	0.30814	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
30					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
31					/QS-SBO	+						
32	9	10	2.30E-07	0.32201	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
33					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*
34					QS-SBO	*	REC-XHE-FO-DGHWB	+				
35	10	10	2.30E-07	0.33589	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
36					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*
37					QS-SBO	*	REC-XHE-FO-DGHWB	+				
38	255	10	2.19E-07	0.34910	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
39					NRAC-258M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
40					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
41	11	10	2.14E-07	0.36199	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
42					NOTQ	*	NOTW2	*	NRAC-7HR	*	OEP-DGN-FS	*
43					QS-SBO	*	REC-XHE-FO-DGHWB	+				
44	12	10	1.85E-07	0.37315	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
45					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
46					/QS-SBO	*	REC-XHE-FO-DGHWB	+				

47	57	12	1.77E-07	0.38382	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
48					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	
49					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
50	58	12	1.77E-07	0.39449	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
51					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	
52					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
53	13	10	1.69E-07	0.40472	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
54					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	
55					/QS-SBO	*	REC-XHE-FO-DGHWB	+					
56	15	10	1.69E-07	0.41494	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
57					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	
58					/QS-SBO	*	REC-XHE-FO-DGHWB	+					
59	16	10	1.69E-07	0.42517	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
60					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	
61					/QS-SBO	*	REC-XHE-FO-DGHWB	+					
62	14	10	1.69E-07	0.43540	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
63					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	
64					/QS-SBO	*	REC-XHE-FO-DGHWB	+					
65	59	12	1.64E-07	0.44532	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
66					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS	*	
67					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
68	1579	10	1.61E-07	0.45507	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	
69					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS	*	
70					/QS-SBO	*	REC-XHE-FO-DGHWB	+					
71	1458	10	1.40E-07	0.46350	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
72					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
73					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
74	1457	10	1.40E-07	0.47192	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
75					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
76					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
77	1456	10	1.40E-07	0.48035	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
78					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
79					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
80	1455	10	1.40E-07	0.48878	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
81					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
82					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
83	1460	10	1.30E-07	0.49661	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
84					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
85					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
86	1459	10	1.30E-07	0.50445	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
87					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
88					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
89	20	10	1.25E-07	0.51201	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
90					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	
91					QS-SBO	*	REC-XHE-FO-DGHWB	+					
92	18	10	1.25E-07	0.51958	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
93					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	
94					QS-SBO	*	REC-XHE-FO-DGHWB	+					
95	17	10	1.25E-07	0.52714	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
96					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	
97					QS-SBO	*	REC-XHE-FO-DGHWB	+					
98	19	10	1.25E-07	0.53471	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
99					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	
100					QS-SBO	*	REC-XHE-FO-DGHWB	+					
101	1462	9	1.15E-07	0.54167	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	
102					OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	REC-XHE-FO-DGEN	*	

103					SBO-PORV-DMD	+						
104	1461	9	1.15E-07	0.54862	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*
105					OEP-DGN-FS	*	PPS-SOV-OO-1456	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
106					SBO-PORV-DMD	+						
107	21	9	1.14E-07	0.55550	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
108					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
109					QS-SBO	+						
110	61	12	9.63E-08	0.56132	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
111					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
112					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
113	60	12	9.63E-08	0.56714	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
114					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
115					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
116	62	12	9.63E-08	0.57296	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
117					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
118					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
119	63	12	9.63E-08	0.57878	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
120					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
121					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
122	22	10	9.24E-08	0.58436	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
123					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
124					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
125	23	10	9.24E-08	0.58994	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
126					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
127					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
128	256	9	8.51E-08	0.59507	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
129					NRAC-258M	*	OEP-DGN-FS	*	QS-SBO	*	RCP-LOCA-467-150	*
130					REC-XHE-FO-DGHWS	+						
131	65	12	8.48E-08	0.60020	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
132					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*
133					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
134	64	12	8.48E-08	0.60532	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
135					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*
136					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
137	25	10	8.47E-08	0.61043	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
138					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
139					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
140	26	10	8.47E-08	0.61554	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
141					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
142					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
143	24	10	8.47E-08	0.62066	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
144					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
145					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
146	66	12	7.88E-08	0.62542	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*
147					NOTL-SBOU1	*	NOTQ	*	NRAC-216M	*	/O	*
148					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
149	27	10	7.70E-08	0.63007	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
150					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*
151					/QS-SBO	*	REC-XHE-FO-DGTMB	+				
152	28	10	7.70E-08	0.63472	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
153					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*
154					/QS-SBO	*	REC-XHE-FO-DGTMB	+				
155	29	9	7.70E-08	0.63936	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
156					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*
157					/QS-SBO	+						
158	30	9	7.70E-08	0.64401	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*

159					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3.	*	OEP-DGN-FR-6HDG1	*
160					/QS-SBO	+						
161	68	11	6.87E-08	0.64816	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
162					NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
163					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
164	67	11	6.87E-08	0.65231	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
165					NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
166					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
167	31	10	6.83E-08	0.65644	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
168					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
169					QS-SBO	*	REC-XHE-FO-DGHWB	+				
170	69	11	6.57E-08	0.66041	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
171					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
172					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+		
173	1713	10	6.53E-08	0.66435	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
174					NRAC-201M	*	O	*	OEP-DGN-FS	*	/QS-SBO	*
175					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
176	70	11	6.39E-08	0.66821	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
177					NOTQ	*	NRAC-216M	*	OEP-DGN-FS	*	QS-SBO	*
178					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
179	1580	9	6.28E-08	0.67200	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
180					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS	*	QS-SBO	*
181					REC-XHE-FO-DGHWB	+						
182	32	10	6.26E-08	0.67579	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
183					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*
184					QS-SBO	*	REC-XHE-FO-DGHWB	+				
185	33	10	6.26E-08	0.67957	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
186					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
187					QS-SBO	*	REC-XHE-FO-DGHWB	+				
188	34	10	6.26E-08	0.68335	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
189					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*
190					QS-SBO	*	REC-XHE-FO-DGHWB	+				
191	35	10	6.26E-08	0.68713	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
192					NOTW2	*	NRAC-7HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
193					QS-SBO	*	REC-XHE-FO-DGHWB	+				
194	71	12	5.26E-08	0.69031	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
195					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*
196					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
197	1529	10	5.16E-08	0.69343	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
198					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*
199					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
200	1530	10	5.16E-08	0.69654	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
201					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*
202					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
203	1532	10	5.16E-08	0.69966	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
204					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*
205					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
206	1531	10	5.16E-08	0.70278	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
207					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*
208					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
209	75	12	4.82E-08	0.70569	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
210					NRAC-216M	*	/O	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*
211					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
212	72	12	4.82E-08	0.70859	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
213					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*
214					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+

215	73	12	4.82E-08	0.71150	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
216					NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	
217					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
218	74	12	4.82E-08	0.71441	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
219					NRAC-216M	*	/O	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	
220					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
221	1534	10	4.80E-08	0.71731	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
222					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1456	*	QS-SBO	*	
223					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
224	1533	10	4.80E-08	0.72021	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*	
225					NRAC-1HR	*	OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	QS-SBO	*	
226					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
227	76	12	4.62E-08	0.72300	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
228					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*	
229					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
230	78	12	4.62E-08	0.72580	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
231					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	
232					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
233	77	12	4.62E-08	0.72859	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
234					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	
235					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
236	79	12	4.62E-08	0.73138	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*	
237					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	
238					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+	
239	36	10	4.62E-08	0.73417	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*	
240					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	
241					/QS-SBO	*	REC-XHE-FO-DGHWB	+					
242	1535	9	4.26E-08	0.73674	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	
243					OEP-DGN-FS	*	PPS-SOV-OO-1455C	*	QS-SBO	*	REC-XHE-FO-DGEN	*	
244					SBO-PORV-DMD	+							
245	1536	9	4.26E-08	0.73932	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NRAC-1HR	*	
246					OEP-DGN-FS	*	PPS-SOV-OO-1456	*	QS-SBO	*	REC-XHE-FO-DGEN	*	
247					SBO-PORV-DMD	+							
248	1465	10	3.81E-08	0.74162	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
249					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
250					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
251	1467	10	3.81E-08	0.74391	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
252					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
253					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
254	1470	10	3.81E-08	0.74621	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
255					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
256					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
257	1468	10	3.81E-08	0.74851	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
258					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
259					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
260	1463	10	3.81E-08	0.75081	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
261					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	
262					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
263	1466	10	3.81E-08	0.75311	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
264					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
265					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
266	1469	10	3.81E-08	0.75541	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
267					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*	
268					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
269	1464	10	3.81E-08	0.75770	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*	
270					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*	

271					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+					
272	81	11	3.75E-08	0.75997	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
273					NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO		*
274					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
275	80	11	3.75E-08	0.76223	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
276					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO		*
277					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
278	82	11	3.75E-08	0.76449	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
279					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO		*
280					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
281	83	11	3.75E-08	0.76676	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
282					NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO		*
283					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
284	37	10	3.42E-08	0.76882	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
285					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02		*
286					QS-SBO	*	REC-XHE-FO-DGHWB	+					
287	38	10	3.42E-08	0.77086	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
288					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01		*
289					QS-SBO	*	REC-XHE-FO-DGHWB	+					
290	257	12	3.31E-08	0.77288	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
291					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02		*
292					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
293	258	12	3.31E-08	0.77489	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
294					NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03		*
295					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
296	84	11	3.30E-08	0.77688	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1		*
297					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02		*
298					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
299	85	11	3.30E-08	0.77887	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1		*
300					NOTQ	*	NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03		*
301					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
302	86	11	3.15E-08	0.78077	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1		*
303					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1		*
304					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	RCP-LOCA-750-90M	+			
305	87	11	3.14E-08	0.78267	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M		*
306					/O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03		*
307					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
308	41	10	3.13E-08	0.78456	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
309					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02		*
310					QS-SBO	*	REC-XHE-FO-DGHWB	+					
311	40	10	3.13E-08	0.78645	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
312					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01		*
313					QS-SBO	*	REC-XHE-FO-DGHWB	+					
314	39	10	3.13E-08	0.78834	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
315					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03		*
316					QS-SBO	*	REC-XHE-FO-DGHWB	+					
317	259	12	3.08E-08	0.79020	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1		*
318					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS		*
319					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+	
320	88	11	3.07E-08	0.79205	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF		*
321					NOTL-SBOU1	*	NOTQ	*	NRAC-216M	*	OEP-DGN-FS		*
322					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
323	42	10	2.85E-08	0.79377	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*
324					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03		*
325					QS-SBO	*	REC-XHE-FO-DGTMB	+					
326	45	9	2.85E-08	0.79549	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ		*

327					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*
328					QS-SBO	+							
329	43	10	2.85E-08	0.79721	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
330					NOTW2	*	NRAC-7HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*
331					QS-SBO	*	REC-XHE-FO-DGTMB	+				
332	44	9	2.85E-08	0.79893	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
333					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*
334					QS-SBO	+						
335	90	12	2.63E-08	0.80052	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
336					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*
337					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
338	89	12	2.63E-08	0.80210	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
339					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*
340					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
341	91	10	2.55E-08	0.80365	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
342					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	*
343					RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+				
344	92	12	2.52E-08	0.80517	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
345					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*
346					OEP-DGN-FR-6HDG2	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
347	1581	12	2.45E-08	0.80665	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
348					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*
349					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
350	1582	12	2.45E-08	0.80813	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
351					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FS-DG01	*
352					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
353	95	12	2.41E-08	0.80958	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
354					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*
355					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
356	94	12	2.41E-08	0.81103	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
357					NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*
358					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
359	93	12	2.41E-08	0.81249	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
360					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*
361					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
362	99	12	2.31E-08	0.81389	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
363					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG02	*
364					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
365	96	12	2.31E-08	0.81528	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
366					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*
367					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
368	98	12	2.31E-08	0.81668	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
369					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG03	*
370					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
371	97	12	2.31E-08	0.81808	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
372					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FS-DG01	*
373					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
374	46	10	2.31E-08	0.81947	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
375					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*
376					/QS-SBO	*	REC-XHE-FO-DGHWB	+				
377	101	12	2.30E-08	0.82086	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
378					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*
379					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+
380	100	12	2.30E-08	0.82225	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
381					NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*
382					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	*	REC-XHE-FO-SCOOL	+

383	1583	12	2.27E-08	0.82362	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
384					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
385					OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
386	1584	9	2.09E-08	0.82489	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-7HR	*
387					NSLOCA	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*
388					REC-XHE-FO-DGHWB	+						
389	102	11	2.04E-08	0.82612	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
390					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
391					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
392	49	9	1.92E-08	0.82728	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
393					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-CRB-FT-15J3	*
394					/QS-SBO	+						
395	48	10	1.92E-08	0.82844	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
396					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG03	*
397					/QS-SBO	*	REC-XHE-FO-DGTMB	+				
398	47	10	1.92E-08	0.82961	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
399					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-MA-DG01	*
400					/QS-SBO	*	REC-XHE-FO-DGTMB	+				
401	1473	10	1.90E-08	0.83076	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
402					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
403					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
404	1476	10	1.90E-08	0.83190	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
405					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
406					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
407	1471	10	1.90E-08	0.83305	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
408					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*
409					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
410	1475	10	1.90E-08	0.83420	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
411					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
412					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
413	1474	10	1.90E-08	0.83535	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
414					OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*
415					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
416	1472	10	1.90E-08	0.83650	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
417					OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
418					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
419	104	11	1.87E-08	0.83763	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
420					NRAC-216M	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*
421					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
422	105	11	1.87E-08	0.83876	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
423					NRAC-216M	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*
424					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
425	103	11	1.87E-08	0.83990	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
426					NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*
427					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
428	106	11	1.87E-08	0.84103	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
429					NRAC-216M	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*
430					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
431	260	12	1.81E-08	0.84212	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
432					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
433					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
434	262	12	1.81E-08	0.84321	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
435					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
436					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
437	263	12	1.81E-08	0.84430	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
438					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*

439					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
440	261	12	1.81E-08	0.84539	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
441					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*			
442					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
443	109	11	1.80E-08	0.84648	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
444					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*			
445					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
446	108	11	1.80E-08	0.84757	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
447					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*			
448					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
449	107	11	1.80E-08	0.84865	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
450					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*			
451					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
452	110	11	1.80E-08	0.84974	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
453					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*			
454					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
455	113	11	1.71E-08	0.85077	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
456					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*			
457					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
458	111	11	1.71E-08	0.85180	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
459					/O	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*			
460					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
461	112	11	1.71E-08	0.85284	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
462					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*			
463					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
464	50	10	1.71E-08	0.85387	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
465					NOTW2	*	NRAC-7HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*			
466					QS-SBO	*	REC-XHE-FO-DGHWB	+							
467	114	11	1.64E-08	0.85486	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
468					NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*	OEP-DGN-FR-6HDG1	*			
469					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+					
470	115	11	1.64E-08	0.85585	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
471					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG3	*			
472					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-SCOOL	+					
473	264	12	1.59E-08	0.85681	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
474					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*			
475					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
476	265	12	1.59E-08	0.85777	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
477					NOTQ	*	NRAC-258M	*	/O	*	OEP-DGN-FS-DG01	*			
478					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
479	117	12	1.54E-08	0.85870	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
480					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*			
481					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
482	116	12	1.54E-08	0.85963	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
483					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*			
484					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
485	118	12	1.54E-08	0.86056	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1U2	*			
486					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*			
487					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
488	266	12	1.48E-08	0.86145	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*			
489					NOTL-SBOU1	*	NOTQ	*	NRAC-258M	*	/O	*			
490					OEP-DGN-FS	*	/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+			
491	855	10	1.44E-08	0.86232	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*			
492					NRAC-150M	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*			
493					RCP-LOCA-1440-90	*	REC-XHE-FO-DGHWS	+							
494	1542	10	1.41E-08	0.86317	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*			

495					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1455C	*	QS-SBO	*
496					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
497	1544	10	1.41E-08	0.86402	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
498					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1456	*	QS-SBO	*
499					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
500	1539	10	1.41E-08	0.86487	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
501					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*
502					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
503	1543	10	1.41E-08	0.86572	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
504					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	PPS-SOV-OO-1455C	*	QS-SBO	*
505					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
506	1538	10	1.41E-08	0.86657	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
507					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*
508					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
509	1537	10	1.41E-08	0.86742	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
510					OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1455C	*	QS-SBO	*
511					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
512	1541	10	1.41E-08	0.86827	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
513					OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	PPS-SOV-OO-1456	*	QS-SBO	*
514					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
515	1540	10	1.41E-08	0.86912	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
516					OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	PPS-SOV-OO-1456	*	QS-SBO	*
517					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
518	1587	12	1.33E-08	0.86993	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
519					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG3	*
520					OEP-DGN-FS-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
521	1588	12	1.33E-08	0.87073	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
522					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*
523					OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
524	1586	12	1.33E-08	0.87154	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
525					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG2	*
526					OEP-DGN-FS-DG01	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
527	1585	12	1.33E-08	0.87234	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
528					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*
529					OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+
530	119	12	1.31E-08	0.87314	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
531					NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*
532					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+
533	267	11	1.29E-08	0.87392	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
534					NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
535					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
536	268	11	1.29E-08	0.87469	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
537					NRAC-258M	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
538					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
539	655	10	1.28E-08	0.87547	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
540					NRAC-7HR	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
541					RCP-LOCA-183-210	*	REC-XHE-FO-DGHWS	+				
542	455	10	1.28E-08	0.87625	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
543					NRAC-7HR	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*
544					RCP-LOCA-183-150	*	REC-XHE-FO-DGHWS	+				
545	1477	10	1.27E-08	0.87701	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
546					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
547					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
548	1479	10	1.27E-08	0.87778	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
549					OEP-DGN-FR-DG02	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*
550					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				

551	1481	10	1.27E-08	0.87854	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
552					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1456	*	/QS-SBO	*
553					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
554	1484	10	1.27E-08	0.87931	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
555					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG02	*	PPS-SOV-OO-1456	*	/QS-SBO	*
556					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
557	1480	10	1.27E-08	0.88008	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
558					OEP-DGN-FR-DG03	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
559					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
560	1482	10	1.27E-08	0.88084	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
561					OEP-DGN-FR-DG03	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1456	*	/QS-SBO	*
562					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
563	1483	10	1.27E-08	0.88161	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
564					OEP-DGN-FR-DG02	*	OEP-DGN-FS-DG01	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
565					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
566	1478	10	1.27E-08	0.88237	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NRAC-1HR	*
567					OEP-DGN-FR-DG01	*	OEP-DGN-FS-DG03	*	PPS-SOV-OO-1455C	*	/QS-SBO	*
568					REC-XHE-FO-DGEN	*	SBO-PORV-DMD	+				
569	121	12	1.26E-08	0.88314	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
570					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*
571					OEP-DGN-MA-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
572	120	12	1.26E-08	0.88390	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
573					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG2	*
574					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
575	269	11	1.23E-08	0.88464	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
576					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
577					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-SCOOL	+		
578	122	10	1.23E-08	0.88538	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
579					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*
580					QS-SBO	*	RCP-LOCA-750-90M	+				
581	123	10	1.22E-08	0.88612	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*
582					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	OEP-DGN-FS-DG03	*	QS-SBO	*
583					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+				
584	1589	11	1.21E-08	0.88685	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*
585					NRAC-7HR	*	NSLOCA	*	/O	*	OEP-DGN-FR-6HDG1	*
586					OEP-DGN-FR-6HDG3	*	/QS-SBO	*	REC-XHE-FO-SCOOL	+		
587	1775	10	1.20E-08	0.88758	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*
588					NRAC-246M	*	O	*	OEP-DGN-FS	*	/QS-SBO	*
589					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	+				
590	270	11	1.20E-08	0.88830	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*
591					NOTQ	*	NRAC-258M	*	OEP-DGN-FS	*	QS-SBO	*
592					RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+		
593	1591	12	1.17E-08	0.88901	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
594					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
595					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
596	1590	12	1.17E-08	0.88972	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
597					NOTQ	*	NRAC-7HR	*	NSLOCA	*	/O	*
598					OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+
599	125	12	1.16E-08	0.89042	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
600					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*
601					OEP-DGN-FS-DG02	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
602	126	12	1.16E-08	0.89111	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
603					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15H3	*
604					OEP-DGN-FS-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+
605	124	12	1.16E-08	0.89181	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*
606					NOTQ	*	NRAC-216M	*	/O	*	OEP-CRB-FT-15J3	*

607					OEP-DGN-FS-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+			
608	1055	10	1.12E-08	0.89249	BETA-3DG	*	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*			
609					NRAC-7HR	*	/O	*	OEP-DGN-FS	*	/QS-SBO	*			
610					RCP-LOCA-183-90	*	REC-XHE-FO-DGHWS	+							
611	128	12	1.10E-08	0.89315	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
612					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG3	*			
613					OEP-DGN-MA-DG01	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+			
614	127	12	1.10E-08	0.89382	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
615					NOTQ	*	NRAC-216M	*	/O	*	OEP-DGN-FR-6HDG1	*			
616					OEP-DGN-MA-DG03	*	/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGTMS	+			
617	1592	12	1.09E-08	0.89448	BETA-2DG	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTDG-CCF	*			
618					NOTL-SBOU1	*	NOTQ	*	NRAC-7HR	*	NSLOCA	*			
619					/O	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGHWB	+			
620	129	11	1.02E-08	0.89510	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
621					NRAC-216M	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*			
622					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+					
623	130	11	1.02E-08	0.89571	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
624					NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*			
625					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+					
626	1715	12	9.89E-09	0.89631	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
627					NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*			
628					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
629	1714	12	9.89E-09	0.89691	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
630					NRAC-201M	*	O	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*			
631					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
632	271	12	9.86E-09	0.89750	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
633					NRAC-258M	*	/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*			
634					/QS-SBO	*	RCP-LOCA-467-150	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+			
635	131	11	9.81E-09	0.89810	/DGN-FTO	*	IE-T1	*	MCW-CCF-VF-SBO	*	NOTL-SBOU1	*			
636					NOTQ	*	NRAC-216M	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*			
637					QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
638	1594	11	9.51E-09	0.89867	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
639					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*			
640					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+					
641	1593	11	9.51E-09	0.89924	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
642					NRAC-7HR	*	NSLOCA	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*			
643					QS-SBO	*	REC-XHE-FO-DGHWB	*	REC-XHE-FO-SCOOL	+					
644	134	11	9.37E-09	0.89981	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
645					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*			
646					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+					
647	132	11	9.37E-09	0.90038	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
648					NRAC-216M	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*			
649					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+					
650	133	11	9.37E-09	0.90094	/DGN-FTO	*	IE-T1	*	NOTL-SBOU1	*	NOTQ	*			
651					NRAC-216M	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*			
652					RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	*	REC-XHE-FO-SCOOL	+					
653	136	11	9.33E-09	0.90151	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
654					/O	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*			
655					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
656	137	11	9.33E-09	0.90207	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
657					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG03	*			
658					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
659	135	11	9.33E-09	0.90263	IE-T1	*	NOTL-SBOU1U2	*	NOTQ	*	NRAC-216M	*			
660					/O	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG02	*			
661					/QS-SBO	*	RCP-LOCA-750-90M	*	REC-XHE-FO-DGHWS	+					
662	1716	12	9.20E-09	0.90319	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*	NOTL-SBOU1	*			

PLANT DAMAGE STATE GROUP PDS2

TOP EVENT PDS2 CONTAINS 74 EVENTS IN 127 CUT SETS

THE FREQUENCY OF TOP EVENT PDS2 IS 6.35E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT PDS2

N	1000
MEAN	5.97E-06
STD DEV	8.89E-06
LOWER 5%	1.21E-06
LOWER 25%	2.28E-06
MEDIAN	3.79E-06
UPPER 25%	6.48E-06
UPPER 5%	1.63E-05

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

PLANT DAMAGE STATE GROUP PDS2
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
BETA-2MOV	12	8.80E-02	(6.0)	2.55E-06	(1.0)	9.60E-08	8.47E-06
HPI-MOV-FT	6	3.00E-03	(24.5)	1.07E-06	(2.0)	1.76E-08	3.62E-06
LPR-MOV-FT-1862A	13	5.20E-03	(13.5)	7.95E-07	(3.0)	1.60E-08	3.59E-06
LPI-MDP-FS	2	3.00E-03	(24.5)	6.75E-07	(4.5)	1.26E-08	2.53E-06
BETA-LPI	2	1.50E-01	(5.0)	6.75E-07	(4.5)	1.26E-08	2.53E-06
LPI-MOV-PG-1890C	2	4.40E-04	(54.0)	6.60E-07	(6.0)	2.56E-08	3.97E-07
LPR-MOV-FT-1860A	12	3.00E-03	(24.5)	4.58E-07	(7.0)	8.90E-09	1.63E-06
RMT-CCF-FA-MSCAL	2	3.00E-04	(55.0)	4.50E-07	(8.0)	1.41E-08	1.86E-06
LPR-MOV-FT-1890A	4	3.00E-03	(24.5)	4.10E-07	(9.0)	7.30E-09	1.52E-06
ACC-MOV-PG-1865C	1	6.50E-04	(49.5)	3.25E-07	(10.5)	3.03E-08	6.51E-07
ACC-MOV-PG-1865B	1	6.50E-04	(49.5)	3.25E-07	(10.5)	3.03E-08	6.51E-07
HPI-XHE-FO-ALT	2	6.10E-01	(1.0)	3.22E-07	(12.0)	3.64E-09	1.07E-06
HPI-XHE-FO-UN2S3	13	4.40E-02	(10.0)	3.13E-07	(13.0)	1.52E-08	1.29E-06
HPI-XHE-FO-ALTS3	1	7.40E-02	(7.0)	2.54E-07	(14.0)	2.00E-09	9.24E-07
HPI-CKV-FT-CV225	3	1.00E-04	(60.0)	2.07E-07	(15.0)	3.71E-08	5.80E-07
HPI-CKV-FT-CV410	3	1.00E-04	(60.0)	1.88E-07	(16.5)	3.23E-08	5.52E-07
HPI-CKV-FT-CV25	3	1.00E-04	(60.0)	1.88E-07	(16.5)	3.23E-08	5.52E-07
HPI-XHE-FO-UN2S2	7	3.10E-01	(2.0)	1.63E-07	(18.0)	7.61E-09	6.53E-07
LPR-MOV-FT-1862B	11	5.20E-03	(13.5)	1.09E-07	(19.0)	1.02E-09	8.24E-07
HPI-XVM-PG-XV24	3	4.00E-05	(69.0)	7.53E-08	(20.0)	1.27E-08	2.12E-07
LPI-MDP-FS-SI1B	14	3.00E-03	(24.5)	7.41E-08	(21.5)	1.12E-09	3.67E-07
LPI-MDP-FS-SI1A	14	3.00E-03	(24.5)	7.41E-08	(21.5)	1.12E-09	3.67E-07
LPR-MOV-FT-1860B	10	3.00E-03	(24.5)	6.24E-08	(23.0)	6.67E-10	4.25E-07
LPR-XHE-FO-HOTLG	2	4.00E-05	(69.0)	6.00E-08	(24.0)	1.78E-09	2.16E-07
ACC-CKV-FT-CV145	1	1.00E-04	(60.0)	5.00E-08	(26.5)	6.43E-09	1.63E-07
ACC-CKV-FT-CV130	1	1.00E-04	(60.0)	5.00E-08	(26.5)	6.43E-09	1.63E-07
ACC-CKV-FT-CV147	1	1.00E-04	(60.0)	5.00E-08	(26.5)	6.43E-09	1.63E-07
ACC-CKV-FT-CV128	1	1.00E-04	(60.0)	5.00E-08	(26.5)	6.43E-09	1.63E-07
LPI-MDP-MA-SI1B	10	2.00E-03	(33.5)	4.04E-08	(29.5)	6.04E-10	1.58E-07
LPI-MDP-MA-SI1A	10	2.00E-03	(33.5)	4.04E-08	(29.5)	6.04E-10	1.58E-07
BETA-STR	3	2.63E-01	(3.0)	3.23E-08	(31.0)	6.08E-09	9.70E-08
CPC-STR-PG-3HR	1	9.00E-05	(65.5)	2.37E-08	(32.0)		
HPI-MDP-FR-1A24H	2	1.60E-03	(38.0)	2.16E-08	(33.0)	1.95E-09	6.93E-08
HPI-CKV-OO-CV258	1	1.00E-03	(42.5)	2.08E-08	(34.0)	1.77E-09	6.71E-08
SIS-ACT-FA-SISB	7	1.60E-03	(38.0)	1.84E-08	(35.5)	5.68E-10	1.02E-07
SIS-ACT-FA-SISA	7	1.60E-03	(38.0)	1.84E-08	(35.5)	5.68E-10	1.02E-07
HPI-MOV-FT-1115E	3	3.00E-03	(24.5)	1.69E-08	(38.5)	1.47E-11	2.20E-07
HPI-MOV-FT-1115D	3	3.00E-03	(24.5)	1.69E-08	(38.5)	1.47E-11	2.20E-07
HPI-MOV-FT-1115C	3	3.00E-03	(24.5)	1.69E-08	(38.5)	1.47E-11	2.20E-07
HPI-MOV-FT-1115B	3	3.00E-03	(24.5)	1.69E-08	(38.5)	1.47E-11	2.20E-07
LPR-MOV-FT-1890B	2	3.00E-03	(24.5)	1.35E-08	(41.0)	1.23E-11	1.59E-07
CPC-XHE-FO-REALN	4	7.00E-02	(8.0)	1.04E-08	(42.0)	4.61E-10	4.17E-08
HPI-MOV-FT-1867D	3	3.00E-03	(24.5)	8.58E-09	(43.0)	1.16E-10	3.33E-08
LPI-MDP-FR-B21HR	4	6.30E-04	(51.5)	8.32E-09	(44.5)	9.43E-11	2.93E-08
LPI-MDP-FR-A21HR	4	6.30E-04	(51.5)	8.32E-09	(44.5)	9.43E-11	2.93E-08
CPC-STR-PG-24H	1	7.20E-04	(46.5)	7.58E-09	(46.0)		
HPI-XHE-FO-ALTIN	1	5.70E-03	(12.0)	7.41E-09	(47.0)	9.74E-11	3.25E-08

CPC-MDP-FS-SW10B	3	8.00E-03 (11.0)	5.78E-09 (48.0)	4.30E-10	1.96E-08
CPC-MDP-FR-SWA3H	2	4.80E-04 (53.0)	4.80E-09 (49.0)	3.38E-10	1.50E-08
LPI-MDP-FR-B24HR	4	7.20E-04 (46.5)	4.75E-09 (50.5)	5.27E-11	1.99E-08
LPI-MDP-FR-A24HR	4	7.20E-04 (46.5)	4.75E-09 (50.5)	5.27E-11	1.99E-08
LPI-CKV-OO-CV58	2	1.00E-03 (42.5)	4.50E-09 (52.5)	8.17E-11	1.91E-08
LPI-CKV-OO-CV50	2	1.00E-03 (42.5)	4.50E-09 (52.5)	8.17E-11	1.91E-08
RMT-ACT-FA-RMTSB	3	1.60E-03 (38.0)	4.37E-09 (54.5)	7.13E-11	3.79E-08
RMT-ACT-FA-RMTSA	3	1.60E-03 (38.0)	4.37E-09 (54.5)	7.13E-11	3.79E-08
CPC-MDP-FR-SWA24	3	3.80E-03 (16.5)	3.97E-09 (56.0)	1.35E-10	1.56E-08
ACP-BAC-ST-1H1	1	9.00E-05 (65.5)	3.51E-09 (57.5)	3.30E-11	1.33E-08
ACP-BAC-ST-4KV1H	1	9.00E-05 (65.5)	3.51E-09 (57.5)	3.30E-11	1.33E-08
CPC-CKV-OO-CV113	1	1.00E-03 (42.5)	2.17E-09 (59.0)	7.76E-11	8.77E-09
CPC-MDP-FR-CCA24	2	7.20E-04 (46.5)	2.06E-09 (60.0)	8.97E-12	6.85E-09
ACP-TFM-NO-1H1	1	4.00E-05 (69.0)	1.56E-09 (61.0)	2.60E-11	6.43E-09
CPC-MDP-FS-CC2B	1	3.00E-03 (24.5)	1.24E-09 (62.0)	2.69E-12	4.35E-09
RMT-XHE-FO-MANS1	2	6.40E-02 (9.0)	1.06E-09 (63.0)	5.10E-12	3.57E-09
CPC-STR-PG-6HR	1	1.80E-04 (56.0)	1.03E-09 (64.0)		
CPC-MDP-MA-SW10B	1	2.00E-03 (33.5)	9.60E-10 (65.0)	1.51E-11	3.61E-09
CPC-MDP-MA-CC2B	1	2.00E-03 (33.5)	8.24E-10 (66.0)	1.35E-12	2.64E-09
BETA-HPI	1	2.10E-01 (4.0)	7.69E-10 (67.5)	1.80E-11	3.14E-09
HPI-MDP-FS	1	4.00E-03 (15.0)	7.69E-10 (67.5)	1.80E-11	3.14E-09
CPC-STR-PG-2A3HR	1	9.00E-05 (65.5)	7.20E-10 (69.0)	9.84E-12	2.43E-09
CPC-MDP-FR-SWB24	1	3.80E-03 (16.5)	5.78E-10 (70.0)	5.84E-12	3.57E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ (RANK)	RISK REDUCTION (RANK)	LOWER 5%	UPPER 5%
IE-S1	53	1.00E-03 (2.5)	3.25E-06 (1.0)	3.47E-07	9.66E-06
IE-A	45	5.00E-04 (4.0)	2.07E-06 (2.0)	2.74E-07	5.44E-06
IE-S3	19	1.30E-02 (1.0)	6.04E-07 (3.0)	3.41E-08	2.29E-06
IE-S2	10	1.00E-03 (2.5)	4.26E-07 (4.0)	3.98E-08	1.38E-06

PLANT DAMAGE STATE GROUP PDS2
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
HPI-CKV-FT-CV225	3	1.00E-04	(60.0)	2.07E-03	(1.0)	8.52E-04	4.07E-03
HPI-XVM-PG-XV24	3	4.00E-05	(69.0)	1.88E-03	(2.0)	6.57E-04	3.94E-03
HPI-CKV-FT-CV410	3	1.00E-04	(60.0)	1.88E-03	(3.5)	6.57E-04	3.94E-03
HPI-CKV-FT-CV25	3	1.00E-04	(60.0)	1.88E-03	(3.5)	6.57E-04	3.94E-03
LPR-XHE-FO-HOTLG	2	4.00E-05	(69.0)	1.50E-03	(5.0)	5.89E-04	2.98E-03
RMT-CCF-FA-MSCAL	2	3.00E-04	(55.0)	1.50E-03	(6.0)	5.89E-04	2.98E-03
LPI-MOV-PG-1890C	2	4.40E-04	(54.0)	1.50E-03	(7.0)	5.89E-04	2.98E-03
ACC-CKV-FT-CV130	1	1.00E-04	(60.0)	5.00E-04	(9.5)	1.33E-04	1.20E-03
ACC-CKV-FT-CV145	1	1.00E-04	(60.0)	5.00E-04	(9.5)	1.33E-04	1.20E-03
ACC-CKV-FT-CV147	1	1.00E-04	(60.0)	5.00E-04	(9.5)	1.33E-04	1.20E-03
ACC-CKV-FT-CV128	1	1.00E-04	(60.0)	5.00E-04	(9.5)	1.33E-04	1.20E-03
ACC-MOV-PG-1865B	1	6.50E-04	(49.5)	5.00E-04	(12.5)	1.33E-04	1.20E-03
ACC-MOV-PG-1865C	1	6.50E-04	(49.5)	5.00E-04	(12.5)	1.33E-04	1.20E-03
HPI-MOV-FT	6	3.00E-03	(24.5)	3.57E-04	(14.0)	6.44E-05	9.84E-04
CPC-STR-PG-3HR	1	9.00E-05	(65.5)	2.63E-04	(15.0)		
LPI-MDP-FS	2	3.00E-03	(24.5)	2.24E-04	(16.0)	3.90E-05	6.03E-04
LPR-MOV-FT-1860A	12	3.00E-03	(24.5)	1.52E-04	(17.0)	3.23E-05	3.92E-04
LPR-MOV-FT-1862A	13	5.20E-03	(13.5)	1.52E-04	(18.0)	3.22E-05	3.92E-04
LPR-MOV-FT-1890A	4	3.00E-03	(24.5)	1.36E-04	(19.0)	2.41E-05	3.66E-04
ACP-TFM-NO-1H1	1	4.00E-05	(69.0)	3.90E-05	(20.0)	9.10E-07	1.52E-04
ACP-BAC-ST-1H1	1	9.00E-05	(65.5)	3.90E-05	(21.5)	9.10E-07	1.51E-04
ACP-BAC-ST-4KV1H	1	9.00E-05	(65.5)	3.90E-05	(21.5)	9.10E-07	1.51E-04
BETA-2MOV	12	8.80E-02	(6.0)	2.64E-05	(23.0)	1.80E-06	9.43E-05
LPI-MDP-FS-SI1A	14	3.00E-03	(24.5)	2.46E-05	(24.5)	4.22E-06	6.98E-05
LPI-MDP-FS-SI1B	14	3.00E-03	(24.5)	2.46E-05	(24.5)	4.22E-06	6.98E-05
LPR-MOV-FT-1862B	11	5.20E-03	(13.5)	2.08E-05	(26.0)	2.79E-06	6.36E-05
HPI-CKV-OO-CV258	1	1.00E-03	(42.5)	2.08E-05	(27.0)	3.16E-06	6.41E-05
LPR-MOV-FT-1860B	10	3.00E-03	(24.5)	2.07E-05	(28.0)	2.74E-06	6.46E-05
LPI-MDP-MA-SI1B	10	2.00E-03	(33.5)	2.01E-05	(29.5)	2.81E-06	5.71E-05
LPI-MDP-MA-SI1A	10	2.00E-03	(33.5)	2.01E-05	(29.5)	2.81E-06	5.71E-05
HPI-MDP-FR-1A24H	2	1.60E-03	(38.0)	1.35E-05	(31.0)	1.84E-06	3.93E-05
LPI-MDP-FR-B21HR	4	6.30E-04	(51.5)	1.32E-05	(32.5)	1.30E-06	4.11E-05
LPI-MDP-FR-A21HR	4	6.30E-04	(51.5)	1.32E-05	(32.5)	1.30E-06	4.11E-05
SIS-ACT-FA-SISA	7	1.60E-03	(38.0)	1.15E-05	(34.5)	1.80E-06	3.46E-05
SIS-ACT-FA-SISB	7	1.60E-03	(38.0)	1.15E-05	(34.5)	1.80E-06	3.46E-05
CPC-STR-PG-24H	1	7.20E-04	(46.5)	1.05E-05	(36.0)		
CPC-MDP-FR-SWA3H	2	4.80E-04	(53.0)	1.00E-05	(37.0)	1.23E-06	3.25E-05
CPC-STR-PG-2A3HR	1	9.00E-05	(65.5)	8.00E-06	(38.0)	9.10E-07	2.73E-05
HPI-XHE-FO-UN2S3	13	4.40E-02	(10.0)	6.80E-06	(39.0)	8.38E-07	2.30E-05
LPI-MDP-FR-B24HR	4	7.20E-04	(46.5)	6.60E-06	(40.5)	6.52E-07	2.15E-05
LPI-MDP-FR-A24HR	4	7.20E-04	(46.5)	6.60E-06	(40.5)	6.52E-07	2.15E-05
CPC-STR-PG-6HR	1	1.80E-04	(56.0)	5.71E-06	(42.0)		
HPI-MOV-FT-1115E	3	3.00E-03	(24.5)	5.63E-06	(44.5)	1.25E-07	2.09E-05
HPI-MOV-FT-1115D	3	3.00E-03	(24.5)	5.63E-06	(44.5)	1.25E-07	2.09E-05
HPI-MOV-FT-1115C	3	3.00E-03	(24.5)	5.63E-06	(44.5)	1.25E-07	2.09E-05
HPI-MOV-FT-1115B	3	3.00E-03	(24.5)	5.63E-06	(44.5)	1.25E-07	2.09E-05
LP[illegible]KV-OO-CV58	2	1.00E-03	(42.5)	4.50E-06	(47.5)	1.45E-07	1.69E-05

LPI-CKV-OO-CV50	2	1.00E-03 (42.5)	4.50E-06 (47.5)	1.45E-07	1.69E-05
LPR-MOV-FT-1890B	2	3.00E-03 (24.5)	4.49E-06 (49.0)	1.12E-07	1.72E-05
BETA-LPI	2	1.50E-01 (5.0)	3.83E-06 (50.0)	1.11E-07	1.49E-05
HPI-XHE-FO-ALTS3	1	7.40E-02 (7.0)	3.18E-06 (51.0)	4.96E-08	1.22E-05
CPC-MDP-FR-CCA24	2	7.20E-04 (46.5)	2.86E-06 (52.0)	7.55E-08	1.08E-05
HPI-MOV-FT-1867D	3	3.00E-03 (24.5)	2.85E-06 (53.0)	3.31E-07	9.46E-06
RMT-ACT-FA-RMTSB	3	1.60E-03 (38.0)	2.73E-06 (54.5)	2.79E-07	8.82E-06
RMT-ACT-FA-RMTSA	3	1.60E-03 (38.0)	2.73E-06 (54.5)	2.79E-07	8.82E-06
CPC-CKV-OO-CV113	1	1.00E-03 (42.5)	2.17E-06 (56.0)	1.18E-07	8.73E-06
HPI-XHE-FO-ALTIN	1	5.70E-03 (12.0)	1.29E-06 (57.0)	1.74E-07	3.90E-06
CPC-MDP-FR-SWA24	3	3.80E-03 (16.5)	1.04E-06 (58.0)	6.32E-08	3.81E-06
CPC-MDP-FS-SW10B	3	8.00E-03 (11.0)	7.16E-07 (59.0)	1.11E-07	2.09E-06
CPC-MDP-MA-SW10B	1	2.00E-03 (33.5)	4.79E-07 (60.0)	6.83E-08	1.43E-06
CPC-MDP-MA-CC2B	1	2.00E-03 (33.5)	4.11E-07 (61.0)	4.82E-09	1.70E-06
CPC-MDP-FS-CC2B	1	3.00E-03 (24.5)	4.11E-07 (62.0)	4.82E-09	1.70E-06
HPI-XHE-FO-UN2S2	7	3.10E-01 (2.0)	3.62E-07 (63.0)	2.74E-08	1.25E-06
HPI-XHE-FO-ALT	2	6.10E-01 (1.0)	2.06E-07 (64.0)	1.18E-09	7.78E-07
HPI-MDP-FS	1	4.00E-03 (15.0)	1.91E-07 (65.0)	7.96E-09	7.31E-07
CPC-MDP-FR-SWB24	1	3.80E-03 (16.5)	1.52E-07 (66.0)	3.31E-09	6.45E-07
CPC-XHE-FO-REALN	4	7.00E-02 (8.0)	1.38E-07 (67.0)	1.43E-08	4.95E-07
BETA-STR	3	2.63E-01 (3.0)	9.05E-08 (68.0)	2.41E-08	2.16E-07
RMT-XHE-FO-MANS1	2	6.40E-02 (9.0)	1.56E-08 (69.0)	1.46E-10	6.27E-08
BETA-HPI	1	2.10E-01 (4.0)	2.89E-09 (70.0)	7.81E-11	1.10E-08

PLANT DAMAGE STATE GROUP PDS2
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
HPI-MOV-FT-1115C	3	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
LPR-MOV-FT-1860B	10	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
HPI-MOV-FT-1115E	3	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
LPR-MOV-FT-1890B	2	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
LPR-MOV-FT-1860A	12	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
HPI-MOV-FT-1867D	3	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
HPI-MOV-FT-1115D	3	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
LPR-MOV-FT-1890A	4	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
HPI-MOV-FT-1115B	3	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
HPI-MOV-FT	6	3.00E-03	(24.5)	28.0	(5.5)	1.35	0.90
LPR-MOV-FT-1862A	13	5.20E-03	(13.5)	13.2	(11.5)	1.09	0.91
LPR-MOV-FT-1862B	11	5.20E-03	(13.5)	13.2	(11.5)	1.09	0.91
LPI-MDP-FS-SI1A	14	3.00E-03	(24.5)	9.5	(14.5)	1.09	0.91
LPI-MDP-FS	2	3.00E-03	(24.5)	9.5	(14.5)	1.09	0.91
CPC-MDP-FS-CC2B	1	3.00E-03	(24.5)	9.5	(14.5)	1.09	0.91
LPI-MDP-FS-SI1B	14	3.00E-03	(24.5)	9.5	(14.5)	1.09	0.91
BETA-2MOV	12	8.80E-02	(6.0)	7.6	(17.0)	1.06	1.00
RMT-CCF-FA-MSCAL	2	3.00E-04	(55.0)	4.5	(18.0)	1.09	1.00
HPI-CKV-FT-CV410	3	1.00E-04	(60.0)	3.2	(22.0)	1.10	1.01
HPI-CKV-FT-CV25	3	1.00E-04	(60.0)	3.2	(22.0)	1.10	1.01
HPI-CKV-FT-CV225	3	1.00E-04	(60.0)	3.2	(22.0)	1.10	1.01
ACC-CKV-FT-CV145	1	1.00E-04	(60.0)	3.2	(22.0)	1.10	1.01
ACC-CKV-FT-CV130	1	1.00E-04	(60.0)	3.2	(22.0)	1.10	1.01
ACC-CKV-FT-CV128	1	1.00E-04	(60.0)	3.2	(22.0)	1.10	1.01
ACC-CKV-FT-CV147	1	1.00E-04	(60.0)	3.2	(22.0)	1.10	1.01
HPI-XVM-PG-XV24	3	4.00E-05	(69.0)	2.7	(26.0)	1.01	1.00
LPI-MOV-PG-1890C	2	4.40E-04	(54.0)	2.6	(27.0)	1.26	1.03
ACC-MOV-PG-1865C	1	6.50E-04	(49.5)	2.5	(28.5)	1.17	1.01
ACC-MOV-PG-1865B	1	6.50E-04	(49.5)	2.5	(28.5)	1.17	1.01
BETA-LPI	2	1.50E-01	(5.0)	1.0	(30.0)	1.04	0.97
HPI-XHE-FO-UN2S3	13	4.40E-02	(10.0)	0.9	(31.0)	1.03	1.01
CPC-STR-PG-2A3HR	1	9.00E-05	(65.5)	0.9	(32.0)	1.00	1.00
LPR-XHE-FO-HOTLG	2	4.00E-05	(69.0)	0.7	(33.0)	0.99	1.00
HPI-XHE-FO-ALTIN	1	5.70E-03	(12.0)	0.7	(34.0)	1.00	1.00
HPI-MDP-FS	1	4.00E-03	(15.0)	0.7	(35.0)	1.00	1.00
LPI-MDP-MA-SI1B	10	2.00E-03	(33.5)	0.6	(37.5)	1.01	1.00
LPI-MDP-MA-SI1A	10	2.00E-03	(33.5)	0.6	(37.5)	1.01	1.00
CPC-MDP-MA-SW10B	1	2.00E-03	(33.5)	0.6	(37.5)	1.01	1.00
CPC-MDP-MA-CC2B	1	2.00E-03	(33.5)	0.6	(37.5)	1.01	1.00
HPI-CKV-OO-CV258	1	1.00E-03	(42.5)	0.5	(41.5)	1.00	1.00
CPC-CKV-OO-CV113	1	1.00E-03	(42.5)	0.5	(41.5)	1.00	1.00
LPI-CKV-OO-CV58	2	1.00E-03	(42.5)	0.5	(41.5)	1.00	1.00
LPI-CKV-OO-CV50	2	1.00E-03	(42.5)	0.5	(41.5)	1.00	1.00
BETA-STR	3	2.63E-01	(3.0)	0.5	(44.0)		
CPC-MDP-FR-CCA24	2	7.20E-04	(46.5)	0.4	(46.0)		
LPI-MDP-FR-B24HR	4	7.20E-04	(46.5)	0.4	(46.0)		
LPI-MDP-FR-A24HR	4	7.20E-04	(46.5)	0.4	(46.0)		

BETA-HPI	1	2.10E-01	(4.0)	0.4	(48.0)
HPI-XHE-FO-UN2S2	7	3.10E-01	(2.0)	0.4	(49.0)
ACP-TFM-NO-1H1	1	4.00E-05	(69.0)	0.4	(50.0)
ACP-BAC-ST-1H1	1	9.00E-05	(65.5)	0.0	(59.0)
CPC-XHE-FO-REALN	4	7.00E-02	(8.0)	0.0	(59.0)
LPI-MDP-FR-B21HR	4	6.30E-04	(51.5)	0.0	(59.0)
LPI-MDP-FR-A21HR	4	6.30E-04	(51.5)	0.0	(59.0)
SIS-ACT-FA-SISA	7	1.60E-03	(38.0)	0.0	(59.0)
HPI-XHE-FO-ALTS3	1	7.40E-02	(7.0)	0.0	(59.0)
HPI-XHE-FO-ALT	2	6.10E-01	(1.0)	0.0	(59.0)
CPC-MDP-FS-SW10B	3	8.00E-03	(11.0)	0.0	(59.0)
CPC-MDP-FR-SWB24	1	3.80E-03	(16.5)	0.0	(59.0)
SIS-ACT-FA-SISB	7	1.60E-03	(38.0)	0.0	(59.0)
RMT-XHE-FO-MANS1	2	6.40E-02	(9.0)	0.0	(59.0)
CPC-MDP-FR-SWA3H	2	4.80E-04	(53.0)	0.0	(59.0)
RMT-ACT-FA-RMTSB	3	1.60E-03	(38.0)	0.0	(59.0)
RMT-ACT-FA-RMTSA	3	1.60E-03	(38.0)	0.0	(59.0)
HPI-MDP-FR-1A24H	2	1.60E-03	(38.0)	0.0	(59.0)
CPC-MDP-FR-SWA24	3	3.80E-03	(16.5)	0.0	(59.0)
ACP-BAC-ST-4KV1H	1	9.00E-05	(65.5)	0.0	(59.0)
CPC-STR-PG-6HR	1	1.80E-04	(56.0)		
CPC-STR-PG-3HR	1	9.00E-05	(65.5)		
CPC-STR-PG-24H	1	7.20E-04	(46.5)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-S1	53	1.00E-03	(2.5)	17.3	(1.0)	1.24	0.99
IE-A	45	5.00E-04	(4.0)	7.1	(2.0)	1.14	0.96
IE-S3	19	1.30E-02	(1.0)	1.4	(3.0)	1.01	1.01
IE-S2	10	1.00E-03	(2.5)	0.6	(4.0)	1.00	1.01

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

PLANT DAMAGE STATE GROUP PDS2

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT PDS2 WITH TOP EVENT FREQUENCY 6.35E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	3	3	4.58E-07	0.07203	BETA-2MOV	*	IE-S1	*	LPR-MOV-FT-1862A	+				
3	43	3	4.50E-07	0.14287	BETA-LPI	*	IE-S1	*	LPI-MDP-FS	+				
4	44	2	4.40E-07	0.21214	IE-S1	*	LPI-MOV-PG-1890C	+						
5	81	2	3.25E-07	0.26330	ACC-MOV-PG-1865C	*	IE-A	+						
6	82	2	3.25E-07	0.31446	ACC-MOV-PG-1865B	*	IE-A	+						
7	1	2	3.00E-07	0.36168	IE-S1	*	RMT-CCF-FA-MSCAL	+						
8	30	3	2.64E-07	0.40324	BETA-2MOV	*	HPI-MOV-FT	*	IE-S1	+				
9	4	3	2.64E-07	0.44480	BETA-2MOV	*	IE-S1	*	LPR-MOV-FT-1890A	+				
10	2	3	2.64E-07	0.48636	BETA-2MOV	*	IE-S1	*	LPR-MOV-FT-1860A	+				
11	87	4	2.54E-07	0.52634	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALTS3	*	IE-S3	+		
12	56	3	2.29E-07	0.56235	BETA-2MOV	*	IE-A	*	LPR-MOV-FT-1862A	+				
13	116	3	2.25E-07	0.59777	BETA-LPI	*	IE-A	*	LPI-MDP-FS	+				
14	117	2	2.20E-07	0.63240	IE-A	*	LPI-MOV-PG-1890C	+						
15	106	4	1.61E-07	0.65775	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALT	*	IE-S2	+		
16	31	4	1.61E-07	0.68310	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALT	*	IE-S1	+		
17	88	4	1.51E-07	0.70688	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-UN2S3	*	IE-S3	+		
18	54	2	1.50E-07	0.73049	IE-A	*	RMT-CCF-FA-MSCAL	+						
19	55	3	1.32E-07	0.75127	BETA-2MOV	*	IE-A	*	LPR-MOV-FT-1860A	+				
20	57	3	1.32E-07	0.77205	BETA-2MOV	*	IE-A	*	LPR-MOV-FT-1890A	+				
21	107	2	1.00E-07	0.78779	HPI-CKV-FT-CV225	*	IE-S2	+						
22	34	2	1.00E-07	0.80353	HPI-CKV-FT-CV410	*	IE-S1	+						
23	33	2	1.00E-07	0.81927	HPI-CKV-FT-CV225	*	IE-S1	+						
24	32	2	1.00E-07	0.83501	HPI-CKV-FT-CV25	*	IE-S1	+						
25	108	4	8.18E-08	0.84790	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-UN2S2	*	IE-S2	+		
26	90	3	5.72E-08	0.85690	HPI-CKV-FT-CV25	*	HPI-XHE-FO-UN2S3	*	IE-S3	+				
27	89	3	5.72E-08	0.86590	HPI-CKV-FT-CV410	*	HPI-XHE-FO-UN2S3	*	IE-S3	+				
28	85	2	5.00E-08	0.87378	ACC-CKV-FT-CV145	*	IE-A	+						
29	83	2	5.00E-08	0.88165	ACC-CKV-FT-CV128	*	IE-A	+						
30	84	2	5.00E-08	0.88952	ACC-CKV-FT-CV147	*	IE-A	+						
31	86	2	5.00E-08	0.89739	ACC-CKV-FT-CV130	*	IE-A	+						
32	35	2	4.00E-08	0.90368	HPI-XVM-PG-XV24	*	IE-S1	+						
33	5	2	4.00E-08	0.90998	IE-S1	*	LPR-XHE-FO-HOTLG	+						
34	110	3	3.10E-08	0.91486	HPI-CKV-FT-CV25	*	HPI-XHE-FO-UN2S2	*	IE-S2	+				
35	109	3	3.10E-08	0.91974	HPI-CKV-FT-CV410	*	HPI-XHE-FO-UN2S2	*	IE-S2	+				
36	6	3	2.70E-08	0.92400	IE-S1	*	LPR-MOV-FT-1862A	*	LPR-MOV-FT-1862B	+				
37	36	3	2.37E-08	0.92772	BETA-STR	*	CPC-STR-PG-3HR	*	IE-S1	+				
38	91	3	2.29E-08	0.93133	HPI-XHE-FO-UN2S3	*	HPI-XVM-PG-XV24	*	IE-S3	+				
39	92	3	2.08E-08	0.93460	HPI-CKV-OO-CV258	*	HPI-MDP-FR-1A24H	*	IE-S3	+				
40	58	2	2.00E-08	0.93775	IE-A	*	LPR-XHE-FO-HOTLG	+						
41	7	3	1.56E-08	0.94020	IE-S1	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1862B	+				
42	10	3	1.56E-08	0.94266	IE-S1	*	LPR-MOV-FT-1860B	*	LPR-MOV-FT-1862A	+				
43	9	3	1.56E-08	0.94512	IE-S1	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1862B	+				
44	8	3	1.56E-08	0.94757	IE-S1	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1862A	+				
45	59	3	1.35E-08	0.94970	IE-A	*	LPR-MOV-FT-1862A	*	LPR-MOV-FT-1862B	+				
46	111	3	1.24E-08	0.95165	HPI-XHE-FO-UN2S2	*	HPI-XVM-PG-XV24	*	IE-S2	+				

47	11	3	1.04E-08	0.95329	IE-S1	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1862A	+				
48	12	3	1.04E-08	0.95493	IE-S1	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1862B	+				
49	13	3	9.00E-09	0.95634	IE-S1	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1860A	+				
50	14	3	9.00E-09	0.95776	IE-S1	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1860B	+				
51	45	3	9.00E-09	0.95918	IE-S1	*	LPI-MDP-FS-SI1A	*	LPI-MDP-FS-SI1B	+				
52	15	3	9.00E-09	0.96059	IE-S1	*	LPR-MOV-FT-1890A	*	LPR-MOV-FT-1890B	+				
53	38	3	9.00E-09	0.96201	HPI-MOV-FT-1115B	*	HPI-MOV-FT-1115D	*	IE-S1	+				
54	37	3	9.00E-09	0.96343	HPI-MOV-FT-1115C	*	HPI-MOV-FT-1115E	*	IE-S1	+				
55	16	3	9.00E-09	0.96484	IE-S1	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1860B	+				
56	60	3	7.80E-09	0.96607	IE-A	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1862B	+				
57	61	3	7.80E-09	0.96730	IE-A	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1862A	+				
58	63	3	7.80E-09	0.96853	IE-A	*	LPR-MOV-FT-1860B	*	LPR-MOV-FT-1862A	+				
59	62	3	7.80E-09	0.96975	IE-A	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1862B	+				
60	93	5	7.58E-09	0.97095	BETA-STR	*	CPC-STR-PG-24H	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S3	*		
61					IE-S3	+								
62	94	3	7.41E-09	0.97211	HPI-CKV-FT-CV225	*	HPI-XHE-FO-ALTIN	*	IE-S3	+				
63	18	3	6.00E-09	0.97306	IE-S1	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1860A	+				
64	17	3	6.00E-09	0.97400	IE-S1	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1860B	+				
65	47	3	6.00E-09	0.97495	IE-S1	*	LPI-MDP-FS-SI1A	*	LPI-MDP-MA-SI1B	+				
66	46	3	6.00E-09	0.97589	IE-S1	*	LPI-MDP-FS-SI1B	*	LPI-MDP-MA-SI1A	+				
67	65	3	5.20E-09	0.97671	IE-A	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1862B	+				
68	64	3	5.20E-09	0.97753	IE-A	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1862A	+				
69	96	4	5.15E-09	0.97834	HPI-MOV-FT-1115B	*	HPI-MOV-FT-1115D	*	HPI-XHE-FO-UN2S3	*	IE-S3	+		
70	95	4	5.15E-09	0.97915	HPI-MOV-FT-1115C	*	HPI-MOV-FT-1115E	*	HPI-XHE-FO-UN2S3	*	IE-S3	+		
71	49	3	4.80E-09	0.97991	IE-S1	*	LPI-MDP-FS-SI1B	*	SIS-ACT-FA-SISA	+				
72	48	3	4.80E-09	0.98066	IE-S1	*	LPI-MDP-FS-SI1A	*	SIS-ACT-FA-SISB	+				
73	118	3	4.50E-09	0.98137	IE-A	*	LPI-MDP-FS-SI1A	*	LPI-MDP-FS-SI1B	+				
74	69	3	4.50E-09	0.98208	IE-A	*	LPR-MOV-FT-1860A	*	LPR-MOV-FT-1860B	+				
75	68	3	4.50E-09	0.98279	IE-A	*	LPR-MOV-FT-1890A	*	LPR-MOV-FT-1890B	+				
76	67	3	4.50E-09	0.98350	IE-A	*	LPI-MDP-FS-SI1A	*	LPR-MOV-FT-1860B	+				
77	66	3	4.50E-09	0.98420	IE-A	*	LPI-MDP-FS-SI1B	*	LPR-MOV-FT-1860A	+				
78	39	3	3.84E-09	0.98481	CPC-MDP-FR-SWA3H	*	CPC-MDP-FS-SW10B	*	IE-S1	+				
79	98	3	3.51E-09	0.98536	ACP-BAC-ST-1H1	*	HPI-MOV-FT-1867D	*	IE-S3	+				
80	97	3	3.51E-09	0.98591	ACP-BAC-ST-4KV1H	*	HPI-MOV-FT-1867D	*	IE-S3	+				
81	20	3	3.28E-09	0.98643	IE-S1	*	LPI-MDP-FR-B21HR	*	LPR-MOV-FT-1862A	+				
82	19	3	3.28E-09	0.98694	IE-S1	*	LPI-MDP-FR-A21HR	*	LPR-MOV-FT-1862B	+				
83	51	3	3.20E-09	0.98745	IE-S1	*	LPI-MDP-MA-SI1A	*	SIS-ACT-FA-SISB	+				
84	50	3	3.20E-09	0.98795	IE-S1	*	LPI-MDP-MA-SI1B	*	SIS-ACT-FA-SISA	+				
85	53	3	3.00E-09	0.98842	IE-S1	*	LPI-CKV-OO-CV58	*	LPI-MDP-FS-SI1A	+				
86	52	3	3.00E-09	0.98890	IE-S1	*	LPI-CKV-OO-CV50	*	LPI-MDP-FS-SI1B	+				
87	71	3	3.00E-09	0.98937	IE-A	*	LPI-MDP-MA-SI1B	*	LPR-MOV-FT-1860A	+				
88	70	3	3.00E-09	0.98984	IE-A	*	LPI-MDP-MA-SI1A	*	LPR-MOV-FT-1860B	+				
89	119	3	3.00E-09	0.99031	IE-A	*	LPI-MDP-FS-SI1B	*	LPI-MDP-MA-SI1A	+				
90	120	3	3.00E-09	0.99079	IE-A	*	LPI-MDP-FS-SI1A	*	LPI-MDP-MA-SI1B	+				
91	113	4	2.79E-09	0.99122	HPI-MOV-FT-1115B	*	HPI-MOV-FT-1115D	*	HPI-XHE-FO-UN2S2	*	IE-S2	+		
92	112	4	2.79E-09	0.99166	HPI-MOV-FT-1115C	*	HPI-MOV-FT-1115E	*	HPI-XHE-FO-UN2S2	*	IE-S2	+		
93	114	3	2.56E-09	0.99207	IE-S2	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+				
94	21	3	2.56E-09	0.99247	IE-S1	*	RMT-ACT-FA-RMTSA	*	RMT-ACT-FA-RMTSB	+				
95	40	3	2.56E-09	0.99287	IE-S1	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+				
96	122	3	2.40E-09	0.99325	IE-A	*	LPI-MDP-FS-SI1B	*	SIS-ACT-FA-SISA	+				
97	121	3	2.40E-09	0.99363	IE-A	*	LPI-MDP-FS-SI1A	*	SIS-ACT-FA-SISB	+				
98	99	4	2.17E-09	0.99397	CPC-CKV-OO-CV113	*	CPC-MDP-FR-SWA24	*	HPI-XHE-FO-UN2S3	*	IE-S3	+		
99	25	3	1.89E-09	0.99427	IE-S1	*	LPI-MDP-FR-A21HR	*	LPI-MDP-FS-SI1B	+				
100	24	3	1.89E-09	0.99457	IE-S1	*	LPI-MDP-FR-B21HR	*	LPR-MOV-FT-1860A	+				
101	23	3	1.89E-09	0.99486	IE-S1	*	LPI-MDP-FR-A21HR	*	LPR-MOV-FT-1860B	+				
102	22	3	1.89E-09	0.99516	IE-S1	*	LPI-MDP-FR-B21HR	*	LPI-MDP-FS-SI1A	+				

103	73	3	1.87E-09	0.99546	IE-A	*	LPI-MDP-FR-B24HR	*	LPR-MOV-FT-1862A	+			
104	72	3	1.87E-09	0.99575	IE-A	*	LPI-MDP-FR-A24HR	*	LPR-MOV-FT-1862B	+			
105	124	3	1.60E-09	0.99600	IE-A	*	LPI-MDP-MA-SI1A	*	SIS-ACT-FA-SISB	+			
106	123	3	1.60E-09	0.99625	IE-A	*	LPI-MDP-MA-SI1B	*	SIS-ACT-FA-SISA	+			
107	100	3	1.56E-09	0.99650	ACP-TFM-NO-1H1	*	HPI-MOV-FT-1867D	*	IE-S3	+			
108	126	3	1.50E-09	0.99674	IE-A	*	LPI-CKV-OO-CV58	*	LPI-MDP-FS-SI1A	+			
109	125	3	1.50E-09	0.99697	IE-A	*	LPI-CKV-OO-CV50	*	LPI-MDP-FS-SI1B	+			
110	127	3	1.28E-09	0.99717	IE-A	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+			
111	74	3	1.28E-09	0.99737	IE-A	*	RMT-ACT-FA-RMTSA	*	RMT-ACT-FA-RMTSB	+			
112	27	3	1.26E-09	0.99757	IE-S1	*	LPI-MDP-FR-A21HR	*	LPI-MDP-MA-SI1B	+			
113	26	3	1.26E-09	0.99777	IE-S1	*	LPI-MDP-FR-B21HR	*	LPI-MDP-MA-SI1A	+			
114	101	4	1.24E-09	0.99797	CPC-MDP-FR-CCA24	*	CPC-MDP-FS-CC2B	*	HPI-XHE-FO-UN2S3	*	IE-S3	+	
115	102	5	1.22E-09	0.99816	CPC-MDP-FR-SWA24	*	CPC-MDP-FS-SW10B	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S3	*	
116					IE-S3	+							
117	78	3	1.08E-09	0.99833	IE-A	*	LPI-MDP-FR-A24HR	*	LPI-MDP-FS-SI1B	+			
118	77	3	1.08E-09	0.99850	IE-A	*	LPI-MDP-FR-B24HR	*	LPR-MOV-FT-1860A	+			
119	76	3	1.08E-09	0.99867	IE-A	*	LPI-MDP-FR-A24HR	*	LPR-MOV-FT-1860B	+			
120	75	3	1.08E-09	0.99884	IE-A	*	LPI-MDP-FR-B24HR	*	LPI-MDP-FS-SI1A	+			
121	115	5	1.03E-09	0.99900	BETA-STR	*	CPC-STR-PG-6HR	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S2	*	
122					IE-S2	+							
123	41	3	9.60E-10	0.99915	CPC-MDP-FR-SWA3H	*	CPC-MDP-MA-SW10B	*	IE-S1	+			
124	103	4	8.24E-10	0.99928	CPC-MDP-FR-CCA24	*	CPC-MDP-MA-CC2B	*	HPI-XHE-FO-UN2S3	*	IE-S3	+	
125	104	5	7.69E-10	0.99940	BETA-HPI	*	HPI-MDP-FR-1A24H	*	HPI-MDP-FS	*	HPI-XHE-FO-UN2S3	*	
126					IE-S3	+							
127	42	3	7.20E-10	0.99951	CPC-MDP-FS-SW10B	*	CPC-STR-PG-2A3HR	*	IE-S1	+			
128	80	3	7.20E-10	0.99963	IE-A	*	LPI-MDP-FR-A24HR	*	LPI-MDP-MA-SI1B	+			
129	79	3	7.20E-10	0.99974	IE-A	*	LPI-MDP-FR-B24HR	*	LPI-MDP-MA-SI1A	+			
130	105	5	5.78E-10	0.99983	CPC-MDP-FR-SWA24	*	CPC-MDP-FR-SWB24	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S3	*	
131					IE-S3	+							
132	29	4	5.32E-10	0.99992	IE-S1	*	LPR-MOV-FT-1862A	*	RMT-ACT-FA-RMTSB	*	RMT-XHE-FO-MANS1	+	
133	28	4	5.32E-10	1.00000	IE-S1	*	LPR-MOV-FT-1862B	*	RMT-ACT-FA-RMTSA	*	RMT-XHE-FO-MANS1	.	

SURRY PLANT DAMAGE STATE PDS3

TOP EVENT TRRR-RSYR CONTAINS 40 EVENTS IN 281 CUT SETS

THE FREQUENCY OF TOP EVENT TRRR-RSYR IS 4.12E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT TRRR-RSYR

N	1000
MEAN	5.37E-06
STD DEV	1.40E-05
LOWER 5%	1.10E-07
LOWER 25%	5.20E-07
MEDIAN	1.66E-06
UPPER 25%	4.39E-06
UPPER 5%	2.28E-05

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

5% = 1.10E-07 ***LOG SCALE*** 95% = 2.28E-05

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SURRY PLANT DAMAGE STATE PDS3
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
NOTQ	277	9.73E-01	(1.0)	4.12E-06	(1.0)		
REC-XHE-FO-DGEN	268	9.00E-01	(2.0)	3.98E-06	(2.0)	1.00E-07	2.12E-05
QS-SBO	281	2.70E-01	(8.0)	3.30E-06	(3.0)	6.60E-08	1.85E-05
NRAC-1HR	33	4.40E-01	(6.0)	2.17E-06	(4.5)	2.82E-08	1.23E-05
AFW-XHE-FO-CST2	33	6.50E-02	(13.0)	2.17E-06	(4.5)	2.82E-08	1.23E-05
OEP-DGN-FS-DG01	99	2.20E-02	(21.5)	1.72E-06	(6.0)	3.12E-08	9.11E-06
NRAC-HALFHR	170	6.00E-01	(3.0)	1.31E-06	(7.0)	2.42E-08	6.51E-06
OEP-DGN-FS	67	2.20E-02	(21.5)	1.02E-06	(8.0)	3.34E-08	3.89E-06
OEP-DGN-FS-DG02	58	2.20E-02	(21.5)	8.92E-07	(9.0)	1.67E-08	4.83E-06
OEP-DGN-FR-6HDG1	67	1.20E-02	(26.0)	8.74E-07	(10.0)	4.48E-09	5.59E-06
OEP-DGN-FS-DG03	58	2.20E-02	(21.5)	8.66E-07	(11.0)	1.62E-08	4.69E-06
AFW-TDP-FS-FW2	78	1.10E-02	(28.5)	6.49E-07	(12.0)	4.34E-09	3.32E-06
NRAC-6HR-AVG	78	1.94E-01	(9.0)	6.42E-07	(13.0)	2.33E-09	3.28E-06
AFW-TDP-MA-FW2	83	1.00E-02	(30.5)	6.40E-07	(14.0)	3.45E-09	3.23E-06
AFW-TDP-FR-2P6HR	70	3.00E-02	(17.5)	6.32E-07	(15.0)	2.17E-09	3.27E-06
BETA-3DG	31	1.80E-02	(24.0)	5.77E-07	(16.0)	1.55E-08	2.38E-06
OEP-DGN-FR-6HDG2	42	1.20E-02	(26.0)	4.78E-07	(17.0)	2.53E-09	2.99E-06
OEP-DGN-FR-6HDG3	40	1.20E-02	(26.0)	4.66E-07	(18.0)	2.39E-09	3.06E-06
BETA-2DG	36	3.80E-02	(14.0)	4.44E-07	(19.5)	9.61E-09	1.72E-06
NOTDG-CCF	36	5.20E-01	(4.0)	4.44E-07	(19.5)		
OEP-DGN-MA-DG01	31	6.00E-03	(33.0)	3.70E-07	(21.0)	1.89E-09	1.43E-06
AFW-XHE-FO-U1SBO	73	8.20E-02	(11.0)	2.84E-07	(22.0)	2.62E-09	1.58E-06
OEP-DGN-MA-DG02	20	6.00E-03	(33.0)	2.00E-07	(23.0)	1.09E-09	7.90E-07
OEP-DGN-MA-DG03	16	6.00E-03	(33.0)	1.86E-07	(24.0)	9.52E-10	7.19E-07
OEP-CRB-FT-15H3	22	3.00E-03	(35.5)	1.45E-07	(25.0)	7.36E-10	5.51E-07
UNIT2-LOW-POWER	24	3.50E-01	(7.0)	1.43E-07	(26.0)		
QS-UNIT2	6	1.60E-01	(10.0)	6.04E-08	(27.0)	7.72E-10	1.95E-07
OEP-CRB-FT-15J3	8	3.00E-03	(35.5)	5.36E-08	(28.0)	3.09E-10	2.11E-07
AFW-TDP-FR-6HRU2	22	3.00E-02	(17.5)	4.13E-08	(29.0)	3.85E-11	3.69E-07
AFW-CKV-OO-CV172	16	1.00E-03	(38.0)	3.61E-08	(30.0)	1.37E-09	1.46E-07
AFW-XHE-FO-U2SBO	4	7.50E-02	(12.0)	2.78E-08	(31.0)	2.33E-10	1.16E-07
AFW-TDP-FS-U2FW2	22	1.10E-02	(28.5)	2.56E-08	(32.0)	4.49E-11	2.13E-07
AFW-TDP-MA-U2FW2	20	1.00E-02	(30.5)	2.23E-08	(33.0)	4.09E-11	1.49E-07
OEP-DGN-FR-DG01	1	2.00E-03	(37.0)	5.11E-09	(34.0)	6.69E-12	1.41E-08
SBO-PORV-DMD	4	4.50E-01	(5.0)	2.39E-09	(35.0)	5.52E-12	4.94E-09
PPS-SOV-OO-1456	2	3.00E-02	(17.5)	1.19E-09	(36.5)	2.76E-12	2.47E-09
PPS-SOV-OO-1455C	2	3.00E-02	(17.5)	1.19E-09	(36.5)	2.76E-12	2.47E-09
AFW-PSF-FC-XCONN	1	1.50E-04	(39.0)	6.14E-10	(38.0)	1.90E-11	2.50E-09
DGN-FTO	198	3.39E-02	(15.0)	-1.08E-07	(39.0)	-6.13E-07	-8.91E-10

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%

IE-T1	281	7.70E-02 (1.0)	4.12E-06 (1.0)	1.10E-07	2.28E-05

SURRY PLANT DAMAGE STATE PDS3
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
OEP-DGN-FS-DG01	99	2.20E-02	(21.5)	7.63E-05	(1.0)	2.86E-06	2.89E-04
OEP-DGN-FR-6HDG1	67	1.20E-02	(26.0)	7.19E-05	(2.0)	2.68E-06	2.64E-04
AFW-TDP-MA-FW2	83	1.00E-02	(30.5)	6.33E-05	(3.0)	3.60E-06	2.84E-04
OEP-DGN-MA-DG01	31	6.00E-03	(33.0)	6.13E-05	(4.0)	2.06E-06	2.30E-04
AFW-TDP-FS-FW2	78	1.10E-02	(28.5)	5.83E-05	(5.0)	3.34E-06	2.61E-04
OEP-CRB-FT-15H3	22	3.00E-03	(35.5)	4.83E-05	(6.0)	1.71E-06	1.69E-04
OEP-DGN-FS	67	2.20E-02	(21.5)	4.54E-05	(7.0)	2.40E-06	1.70E-04
OEP-DGN-FS-DG02	58	2.20E-02	(21.5)	3.96E-05	(8.0)	1.51E-06	1.48E-04
OEP-DGN-FR-6HDG2	42	1.20E-02	(26.0)	3.94E-05	(9.0)	1.51E-06	1.45E-04
OEP-DGN-FS-DG03	58	2.20E-02	(21.5)	3.85E-05	(10.0)	1.44E-06	1.44E-04
OEP-DGN-FR-6HDG3	40	1.20E-02	(26.0)	3.83E-05	(11.0)	1.49E-06	1.39E-04
AFW-CKV-OO-CV172	16	1.00E-03	(38.0)	3.61E-05	(12.0)	2.01E-06	1.58E-04
OEP-DGN-MA-DG02	20	6.00E-03	(33.0)	3.31E-05	(13.0)	1.17E-06	1.24E-04
BETA-3DG	31	1.80E-02	(24.0)	3.15E-05	(14.0)	1.38E-06	1.13E-04
AFW-XHE-FO-CST2	33	6.50E-02	(13.0)	3.12E-05	(15.0)	9.92E-07	1.49E-04
OEP-DGN-MA-DG03	16	6.00E-03	(33.0)	3.08E-05	(16.0)	1.03E-06	1.15E-04
AFW-TDP-FR-2P6HR	70	3.00E-02	(17.5)	2.04E-05	(17.0)	4.69E-07	1.02E-04
OEP-CRB-FT-15J3	8	3.00E-03	(35.5)	1.78E-05	(18.0)	5.95E-07	6.65E-05
BETA-2DG	36	3.80E-02	(14.0)	1.12E-05	(19.0)	3.60E-07	4.46E-05
QS-SBO	281	2.70E-01	(8.0)	8.91E-06	(20.0)	2.62E-07	4.26E-05
AFW-PSF-FC-XCONN	1	1.50E-04	(39.0)	4.09E-06	(21.0)	1.71E-07	1.54E-05
AFW-XHE-FO-U1SBO	73	8.20E-02	(11.0)	3.18E-06	(22.0)	5.48E-08	1.67E-05
NRAC-1HR	33	4.40E-01	(6.0)	2.76E-06	(23.0)	3.60E-08	1.54E-05
NRAC-6HR-AVG	78	1.94E-01	(9.0)	2.67E-06	(24.0)	1.77E-08	1.15E-05
OEP-DGN-FR-DG01	1	2.00E-03	(37.0)	2.55E-06	(25.0)	1.74E-08	9.69E-06
AFW-TDP-FS-U2FW2	22	1.10E-02	(28.5)	2.30E-06	(26.0)	4.31E-08	1.14E-05
AFW-TDP-MA-U2FW2	20	1.00E-02	(30.5)	2.21E-06	(27.0)	3.71E-08	1.03E-05
AFW-TDP-FR-6HRU2	22	3.00E-02	(17.5)	1.34E-06	(28.0)	1.17E-08	7.19E-06
NRAC-HALFHR	170	6.00E-01	(3.0)	8.76E-07	(29.0)	1.62E-08	4.26E-06
REC-XHE-FO-DGEN	268	9.00E-01	(2.0)	4.42E-07	(30.0)	2.50E-09	1.82E-06
NOTDG-CCF	36	5.20E-01	(4.0)	4.10E-07	(31.0)		
AFW-XHE-FO-U2SBO	4	7.50E-02	(12.0)	3.43E-07	(32.0)	6.32E-09	1.40E-06
QS-UNIT2	6	1.60E-01	(10.0)	3.17E-07	(33.0)	5.46E-09	1.41E-06
UNIT2-LOW-POWER	24	3.50E-01	(7.0)	2.66E-07	(34.0)		
NOTQ	277	9.73E-01	(1.0)	1.14E-07	(35.0)		
PPS-SOV-OO-1456	2	3.00E-02	(17.5)	3.86E-08	(36.5)	3.05E-10	1.47E-07
PPS-SOV-OO-1455C	2	3.00E-02	(17.5)	3.86E-08	(36.5)	3.05E-10	1.47E-07
SBO-PORV-DMD	4	4.50E-01	(5.0)	2.92E-09	(38.0)	5.15E-12	5.41E-09
DGN-FTO	198	3.39E-02	(15.0)	-3.08E-06	(39.0)	-1.90E-05	-5.73E-08

SURRY PLANT DAMAGE STATE PDS3
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
OEP-DGN-FS-DG02	58	2.20E-02	(21.5)	20.9	(2.5)	1.74	0.75
OEP-DGN-FS-DG03	58	2.20E-02	(21.5)	20.9	(2.5)	1.74	0.75
OEP-DGN-FS-DG01	99	2.20E-02	(21.5)	20.9	(2.5)	1.74	0.75
OEP-DGN-FS	67	2.20E-02	(21.5)	20.9	(2.5)	1.74	0.75
OEP-DGN-FR-6HDG1	67	1.20E-02	(26.0)	14.7	(6.0)	1.25	0.79
OEP-DGN-FR-6HDG2	42	1.20E-02	(26.0)	14.7	(6.0)	1.25	0.79
OEP-DGN-FR-6HDG3	40	1.20E-02	(26.0)	14.7	(6.0)	1.25	0.79
OEP-DGN-FR-DG01	1	2.00E-03	(37.0)	14.2	(8.0)	1.00	1.00
QS-SBO	281	2.70E-01	(8.0)	13.8	(9.0)	1.61	0.95
QS-UNIT2	6	1.60E-01	(10.0)	13.5	(10.0)	1.02	1.00
PPS-SOV-OO-1455C	2	3.00E-02	(17.5)	13.3	(11.5)	1.00	1.00
PPS-SOV-OO-1456	2	3.00E-02	(17.5)	13.3	(11.5)	1.00	1.00
AFW-XHE-FO-CST2	33	6.50E-02	(13.0)	7.7	(13.0)	1.34	0.88
AFW-TDP-MA-FW2	83	1.00E-02	(30.5)	3.1	(14.5)	1.30	1.07
AFW-TDP-MA-U2FW2	20	1.00E-02	(30.5)	3.1	(14.5)	1.30	1.07
AFW-TDP-FS-U2FW2	22	1.10E-02	(28.5)	2.6	(16.5)	1.20	0.95
AFW-TDP-FS-FW2	78	1.10E-02	(28.5)	2.6	(16.5)	1.20	0.95
OEP-DGN-MA-DG01	31	6.00E-03	(33.0)	2.4	(19.0)	1.16	0.96
OEP-DGN-MA-DG02	20	6.00E-03	(33.0)	2.4	(19.0)	1.16	0.96
OEP-DGN-MA-DG03	16	6.00E-03	(33.0)	2.4	(19.0)	1.16	0.96
AFW-TDP-FR-2P6HR	70	3.00E-02	(17.5)	1.9	(21.5)	1.12	1.00
AFW-TDP-FR-6HRU2	22	3.00E-02	(17.5)	1.9	(21.5)	1.12	1.00
NRAC-6HR-AVG	78	1.94E-01	(9.0)	1.7	(23.0)	1.01	0.97
REC-XHE-FO-DGEN	268	9.00E-01	(2.0)	1.4	(24.0)	1.07	0.97
BETA-3DG	31	1.80E-02	(24.0)	1.2	(25.0)	1.07	0.99
SBO-PORV-DMD	4	4.50E-01	(5.0)	0.9	(26.0)	1.00	1.00
AFW-CKV-OO-CV172	16	1.00E-03	(38.0)	0.7	(27.0)	1.00	0.99
AFW-PSF-FC-XCONN	1	1.50E-04	(39.0)	0.7	(28.0)	1.00	1.00
BETA-2DG	36	3.80E-02	(14.0)	0.6	(29.0)	1.02	1.01
OEP-CRB-FT-15J3	8	3.00E-03	(35.5)	0.5	(30.5)		
OEP-CRB-FT-15H3	22	3.00E-03	(35.5)	0.5	(30.5)		
NRAC-1HR	33	4.40E-01	(6.0)	0.4	(32.0)		
AFW-XHE-FO-U2SBO	4	7.50E-02	(12.0)	0.4	(33.0)		
NRAC-HALFHR	170	6.00E-01	(3.0)	0.4	(34.0)		
DGN-FTO	198	3.39E-02	(15.0)	0.4	(35.0)		
AFW-XHE-FO-U1SBO	73	8.20E-02	(11.0)	0.0	(36.0)		
NOTDG-CCF	36	5.20E-01	(4.0)				
UNIT2-LOW-POWER	24	3.50E-01	(7.0)				
NOTQ	277	9.73E-01	(1.0)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*

IE-T1	281	7.70E-02	(1.0)	25.4	(1.0)	1.72	0.93

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SURRY PLANT DAMAGE STATE PDS3

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT TRRR-RSYR WITH TOP EVENT FREQUENCY 4.12E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	9	2.43E-07	0.05903	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
3					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
4					REC-XHE-FO-DGEN	+						
5	2	9	2.43E-07	0.11806	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
6					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
7					REC-XHE-FO-DGEN	+						
8	3	9	2.26E-07	0.17294	AFW-XHE-FO-CST2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
9					NOTQ	*	NRAC-1HR	*	OEP-DGN-FS	*	QS-SBO	*
10					REC-XHE-FO-DGEN	+						
11	4	8	2.06E-07	0.22293	AFW-XHE-FO-CST2	*	BETA-3DG	*	IE-T1	*	NOTQ	*
12					NRAC-1HR	*	OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGEN	+
13	8	9	1.33E-07	0.25513	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
14					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
15					REC-XHE-FO-DGEN	+						
16	6	9	1.33E-07	0.28732	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
17					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*
18					REC-XHE-FO-DGEN	+						
19	5	9	1.33E-07	0.31952	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
20					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
21					REC-XHE-FO-DGEN	+						
22	7	9	1.33E-07	0.35172	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
23					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
24					REC-XHE-FO-DGEN	+						
25	9	8	8.05E-08	0.37123	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
26					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+
27	10	9	7.24E-08	0.38879	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
28					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
29					REC-XHE-FO-DGEN	+						
30	11	9	6.64E-08	0.40489	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
31					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*
32					REC-XHE-FO-DGEN	+						
33	14	9	6.64E-08	0.42099	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
34					NRAC-1HR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*
35					REC-XHE-FO-DGEN	+						
36	12	9	6.64E-08	0.43709	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
37					NRAC-1HR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*
38					REC-XHE-FO-DGEN	+						
39	13	9	6.64E-08	0.45319	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
40					NRAC-1HR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*
41					REC-XHE-FO-DGEN	+						
42	16	9	5.62E-08	0.46681	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
43					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
44					REC-XHE-FO-DGEN	+						
45	15	9	5.62E-08	0.48043	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
46					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*

47					REC-XHE-FO-DGEN	+						
48	17	9	5.22E-08	0.49310	AFW-TDP-FS-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
49					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*
50					REC-XHE-FO-DGEN	+						
51	19	9	5.11E-08	0.50548	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
52					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
53					REC-XHE-FO-DGEN	+						
54	18	9	5.11E-08	0.51786	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
55					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
56					REC-XHE-FO-DGEN	+						
57	40	9	4.95E-08	0.52988	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
58					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	QS-SBO	*
59					REC-XHE-FO-DGEN	+						
60	41	9	4.95E-08	0.54189	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
61					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	QS-SBO	*
62					REC-XHE-FO-DGEN	+						
63	24	8	4.76E-08	0.55343	AFW-TDP-FS-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*
64					NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGEN	+
65	25	9	4.75E-08	0.56494	AFW-TDP-MA-FW2	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
66					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*
67					REC-XHE-FO-DGEN	+						
68	42	9	4.61E-08	0.57611	AFW-TDP-FR-2P6HR	*	BETA-2DG	*	IE-T1	*	NOTDG-CCF	*
69					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	QS-SBO	*
70					REC-XHE-FO-DGEN	+						
71	26	9	4.50E-08	0.58702	AFW-TDP-FS-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*
72					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
73					UNIT2-LOW-POWER	+						
74	30	8	4.33E-08	0.59751	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*
75					NRAC-HALFHR	*	OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGEN	+
76	43	8	4.20E-08	0.60768	AFW-TDP-FR-2P6HR	*	BETA-3DG	*	IE-T1	*	NOTQ	*
77					NRAC-6HR-AVG	*	OEP-DGN-FS	*	QS-SBO	*	REC-XHE-FO-DGEN	+
78	31	9	4.09E-08	0.61761	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*
79					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
80					UNIT2-LOW-POWER	+						
81	45	9	3.97E-08	0.62723	AFW-TDP-FR-2P6HR	*	BETA-3DG	*	IE-T1	*	NOTQ	*
82					NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	REC-XHE-FO-DGEN	*
83					UNIT2-LOW-POWER	+						
84	20	9	3.62E-08	0.63602	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
85					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*
86					REC-XHE-FO-DGEN	+						
87	23	9	3.62E-08	0.64480	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
88					NRAC-1HR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*
89					REC-XHE-FO-DGEN	+						
90	22	9	3.62E-08	0.65358	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
91					NRAC-1HR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*
92					REC-XHE-FO-DGEN	+						
93	21	9	3.62E-08	0.66236	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
94					NRAC-1HR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*
95					REC-XHE-FO-DGEN	+						
96	28	9	3.32E-08	0.67041	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
97					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*
98					REC-XHE-FO-DGEN	+						
99	27	9	3.32E-08	0.67846	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
100					NRAC-1HR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
101					REC-XHE-FO-DGEN	+						
102	29	9	3.32E-08	0.68651	AFW-XHE-FO-C	*	/DGN-FTO	*	IE-T1	*	NOTQ	*

103					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*
104					REC-XHE-FO-DGEN	+						
105	34	9	3.06E-08	0.69394	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
106					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
107					REC-XHE-FO-DGEN	+						
108	33	9	3.06E-08	0.70137	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
109					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
110					REC-XHE-FO-DGEN	+						
111	32	9	3.06E-08	0.70880	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
112					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
113					REC-XHE-FO-DGEN	+						
114	35	9	2.79E-08	0.71555	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
115					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
116					REC-XHE-FO-DGEN	+						
117	36	9	2.79E-08	0.72231	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
118					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
119					REC-XHE-FO-DGEN	+						
120	38	9	2.79E-08	0.72906	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
121					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
122					REC-XHE-FO-DGEN	+						
123	37	9	2.79E-08	0.73582	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
124					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*
125					REC-XHE-FO-DGEN	+						
126	62	9	2.70E-08	0.74237	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
127					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
128					REC-XHE-FO-DGEN	+						
129	59	9	2.70E-08	0.74892	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
130					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*	QS-SBO	*
131					REC-XHE-FO-DGEN	+						
132	60	9	2.70E-08	0.75547	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
133					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*	QS-SBO	*
134					REC-XHE-FO-DGEN	+						
135	61	9	2.70E-08	0.76203	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
136					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*	QS-SBO	*
137					REC-XHE-FO-DGEN	+						
138	44	9	2.06E-08	0.76702	AFW-TDP-FS-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*
139					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	QS-UNIT2	*
140					REC-XHE-FO-DGEN	+						
141	46	9	1.87E-08	0.77155	AFW-TDP-MA-FW2	*	BETA-3DG	*	IE-T1	*	NOTQ	*
142					NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	QS-UNIT2	*
143					REC-XHE-FO-DGEN	+						
144	47	8	1.86E-08	0.77606	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
145					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+
146	71	9	1.82E-08	0.78046	AFW-TDP-FR-2P6HR	*	BETA-3DG	*	IE-T1	*	NOTQ	*
147					NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	QS-UNIT2	*
148					REC-XHE-FO-DGEN	+						
149	39	9	1.81E-08	0.78485	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
150					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
151					REC-XHE-FO-DGEN	+						
152	48	8	1.69E-08	0.78894	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
153					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+
154	49	9	1.67E-08	0.79299	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
155					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*
156					REC-XHE-FO-DGEN	+						
157	77	8	1.64E-08	0.79696	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
158					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG3	*	QS-SBO	+

159	53	9	1.53E-08	0.80068	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
160					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*		
161					REC-XHE-FO-DGEN	+								
162	52	9	1.53E-08	0.80439	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
163					NRAC-HALFHR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
164					REC-XHE-FO-DGEN	+								
165	50	9	1.53E-08	0.80811	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
166					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*		
167					REC-XHE-FO-DGEN	+								
168	51	9	1.53E-08	0.81183	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
169					NRAC-HALFHR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
170					REC-XHE-FO-DGEN	+								
171	54	9	1.52E-08	0.81551	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
172					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*		
173					REC-XHE-FO-DGEN	+								
174	83	9	1.47E-08	0.81908	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
175					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FR-6HDG2	*	QS-SBO	*		
176					REC-XHE-FO-DGEN	+								
177	58	9	1.39E-08	0.82246	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
178					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*		
179					REC-XHE-FO-DGEN	+								
180	55	9	1.39E-08	0.82584	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
181					NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*		
182					REC-XHE-FO-DGEN	+								
183	57	9	1.39E-08	0.82922	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
184					NRAC-HALFHR	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
185					REC-XHE-FO-DGEN	+								
186	56	9	1.39E-08	0.83259	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
187					NRAC-HALFHR	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
188					REC-XHE-FO-DGEN	+								
189	94	9	1.35E-08	0.83587	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
190					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG03	*	QS-SBO	*		
191					REC-XHE-FO-DGEN	+								
192	93	9	1.35E-08	0.83915	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
193					NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-MA-DG02	*	QS-SBO	*		
194					REC-XHE-FO-DGEN	+								
195	92	9	1.35E-08	0.84242	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
196					NRAC-6HR-AVG	*	OEP-DGN-FS-DG03	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
197					REC-XHE-FO-DGEN	+								
198	91	9	1.35E-08	0.84570	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*		
199					NRAC-6HR-AVG	*	OEP-DGN-FS-DG02	*	OEP-DGN-MA-DG01	*	QS-SBO	*		
200					REC-XHE-FO-DGEN	+								
201	63	10	1.25E-08	0.84872	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
202					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		
203					/QS-SBO	*	REC-XHE-FO-DGEN	+						
204	64	10	1.25E-08	0.85174	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
205					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
206					/QS-SBO	*	REC-XHE-FO-DGEN	+						
207	66	10	1.16E-08	0.85454	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*		
208					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*		
209					/QS-SBO	*	REC-XHE-FO-DGEN	+						
210	68	10	1.13E-08	0.85729	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
211					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*		
212					/QS-SBO	*	REC-XHE-FO-DGEN	+						
213	67	10	1.13E-08	0.86004	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*		
214					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*		

215					/QS-SBO	*	REC-XHE-FO-DGEN	+					
216	100	10	1.10E-08	0.86270	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
217					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG02	*	
218					/QS-SBO	*	REC-XHE-FO-DGEN	+					
219	99	10	1.10E-08	0.86536	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*	
220					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS-DG01	*	OEP-DGN-FS-DG03	*	
221					/QS-SBO	*	REC-XHE-FO-DGEN	+					
222	69	10	1.05E-08	0.86791	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*	
223					NOTDG-CCF	*	NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	
224					/QS-SBO	*	REC-XHE-FO-DGEN	+					
225	104	10	1.02E-08	0.87039	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	BETA-2DG	*	IE-T1	*	
226					NOTDG-CCF	*	NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	
227					/QS-SBO	*	REC-XHE-FO-DGEN	+					
228	70	9	9.65E-09	0.87273	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U2SBO	*	BETA-3DG	*	IE-T1	*	
229					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	
230					REC-XHE-FO-DGEN	+							
231	65	9	9.05E-09	0.87493	AFW-XHE-FO-CST2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
232					NRAC-1HR	*	OEP-CRB-FT-15H3	*	OEP-DGN-MA-DG02	*	QS-SBO	*	
233					REC-XHE-FO-DGEN	+							
234	72	9	8.77E-09	0.87705	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U2SBO	*	BETA-3DG	*	IE-T1	*	
235					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FS	*	/QS-SBO	*	
236					REC-XHE-FO-DGEN	+							
237	107	9	8.51E-09	0.87911	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U2SBO	*	BETA-3DG	*	IE-T1	*	
238					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FS	*	/QS-SBO	*	
239					REC-XHE-FO-DGEN	+							
240	76	9	8.36E-09	0.88114	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
241					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*	
242					REC-XHE-FO-DGEN	+							
243	75	9	8.36E-09	0.88317	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
244					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
245					REC-XHE-FO-DGEN	+							
246	74	9	8.36E-09	0.88519	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
247					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*	
248					REC-XHE-FO-DGEN	+							
249	73	9	8.36E-09	0.88722	AFW-TDP-FS-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
250					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
251					REC-XHE-FO-DGEN	+							
252	81	9	7.60E-09	0.88906	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
253					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*	
254					REC-XHE-FO-DGEN	+							
255	80	9	7.60E-09	0.89090	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
256					NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
257					REC-XHE-FO-DGEN	+							
258	79	9	7.60E-09	0.89275	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
259					NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
260					REC-XHE-FO-DGEN	+							
261	78	9	7.60E-09	0.89459	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
262					NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*	
263					REC-XHE-FO-DGEN	+							
264	122	9	7.37E-09	0.89638	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
265					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG02	*	QS-SBO	*	
266					REC-XHE-FO-DGEN	+							
267	121	9	7.37E-09	0.89816	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	
268					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-MA-DG01	*	QS-SBO	*	
269					REC-XHE-FO-DGEN	+							
270	120	9	7.37E-09	0.89995	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*	

271					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-MA-DG01	*	QS-SBO	*
272					REC-XHE-FO-DGEN	+						
273	119	9	7.37E-09	0.90174	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
274					NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-MA-DG03	*	QS-SBO	*
275					REC-XHE-FO-DGEN	+						
276	86	9	6.97E-09	0.90343	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
277					NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*
278					REC-XHE-FO-DGEN	+						
279	85	9	6.97E-09	0.90511	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
280					NRAC-HALFHR	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*
281					REC-XHE-FO-DGEN	+						
282	84	9	6.97E-09	0.90680	AFW-TDP-MA-FW2	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
283					NRAC-HALFHR	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
284					REC-XHE-FO-DGEN	+						
285	87	10	6.79E-09	0.90845	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
286					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
287					/QS-SBO	*	REC-XHE-FO-DGEN	+				
288	90	10	6.79E-09	0.91010	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
289					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
290					/QS-SBO	*	REC-XHE-FO-DGEN	+				
291	89	10	6.79E-09	0.91174	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
292					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
293					/QS-SBO	*	REC-XHE-FO-DGEN	+				
294	88	10	6.79E-09	0.91339	AFW-TDP-FS-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
295					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
296					/QS-SBO	*	REC-XHE-FO-DGEN	+				
297	130	9	6.76E-09	0.91503	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
298					NRAC-6HR-AVG	*	OEP-CRB-FT-15J3	*	OEP-DGN-FS-DG01	*	QS-SBO	*
299					REC-XHE-FO-DGEN	+						
300	129	9	6.76E-09	0.91667	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
301					NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG03	*	QS-SBO	*
302					REC-XHE-FO-DGEN	+						
303	128	9	6.76E-09	0.91831	AFW-TDP-FR-2P6HR	*	/DGN-FTO	*	IE-T1	*	NOTQ	*
304					NRAC-6HR-AVG	*	OEP-CRB-FT-15H3	*	OEP-DGN-FS-DG02	*	QS-SBO	*
305					REC-XHE-FO-DGEN	+						
306	98	10	6.18E-09	0.91980	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
307					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG03	*
308					/QS-SBO	*	REC-XHE-FO-DGEN	+				
309	95	10	6.18E-09	0.92130	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
310					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
311					/QS-SBO	*	REC-XHE-FO-DGEN	+				
312	97	10	6.18E-09	0.92280	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
313					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
314					/QS-SBO	*	REC-XHE-FO-DGEN	+				
315	96	10	6.18E-09	0.92430	AFW-TDP-MA-FW2	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
316					NOTQ	*	NRAC-HALFHR	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
317					/QS-SBO	*	REC-XHE-FO-DGEN	+				
318	138	10	5.99E-09	0.92575	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
319					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG1	*	OEP-DGN-FS-DG02	*
320					/QS-SBO	*	REC-XHE-FO-DGEN	+				
321	136	10	5.99E-09	0.92720	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
322					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG2	*	OEP-DGN-FS-DG01	*
323					/QS-SBO	*	REC-XHE-FO-DGEN	+				
324	135	10	5.99E-09	0.92865	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-U1SBO	*	/DGN-FTO	*	IE-T1	*
325					NOTQ	*	NRAC-6HR-AVG	*	OEP-DGN-FR-6HDG3	*	OEP-DGN-FS-DG01	*
326					/QS-SBO	*	REC-XHE-FO-DGEN	+				

PLANT DAMAGE STATE PDS4

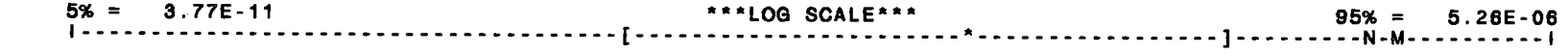
TOP EVENT PDSD4 CONTAINS 3 EVENTS IN 3 CUT SETS

THE FREQUENCY OF TOP EVENT PDSD4 IS 1.20E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT PDSD4

N	1000
MEAN	1.62E-06
STD DEV	6.02E-06
LOWER 5%	3.77E-11
LOWER 25%	3.31E-09
MEDIAN	4.88E-08
UPPER 25%	3.72E-07
UPPER 5%	5.26E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)



NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

PLANT DAMAGE STATE PDS4

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-V-TRAIN-2	1	4.00E-07	(2.0)	4.00E-07	(2.0)	1.26E-11	1.75E-06
IE-V-TRAIN-3	1	4.00E-07	(2.0)	4.00E-07	(2.0)	1.26E-11	1.75E-06
IE-V-TRAIN-1	1	4.00E-07	(2.0)	4.00E-07	(2.0)	1.26E-11	1.75E-06

PLANT DAMAGE STATE PDS4

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)
IE-V-TRAIN-2	1	4.00E-07	(2.0)	100.0	(2.0)
IE-V-TRAIN-3	1	4.00E-07	(2.0)	100.0	(2.0)
IE-V-TRAIN-1	1	4.00E-07	(2.0)	100.0	(2.0)

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

PLANT DAMAGE STATE PDS4

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT PDSD4 WITH TOP EVENT FREQUENCY 1.20E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	2	1	4.00E-07	0.33333	IE-V-TRAIN-2	+
3	3	1	4.00E-07	0.66667	IE-V-TRAIN-3	+
4	1	1	4.00E-07	1.00000	IE-V-TRAIN-1	.

PLANT DAMAGE STATE GROUP PDS5

TOP EVENT TLYY-YNY CONTAINS 54 EVENTS IN 143 CUT SETS

THE FREQUENCY OF TOP EVENT TLYY-YNY IS 1.84E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT TLYY-YNY

N	1000
MEAN	2.05E-06
STD DEV	1.05E-05
LOWER 5%	7.15E-08
LOWER 25%	2.72E-07
MEDIAN	6.91E-07
UPPER 25%	1.75E-06
UPPER 5%	6.00E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

PLANT DAMAGE STATE GROUP PDS5
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
AFW-XHE-FO-UNIT2	143	3.60E-02	(12.0)	1.84E-06	(1.0)	7.15E-08	6.00E-06
AFW-PSF-FC-XCONN	23	1.50E-04	(37.0)	8.21E-07	(2.0)	3.32E-08	2.98E-06
HPI-XHE-FO-FDBLD	14	7.10E-02	(6.0)	7.10E-07	(3.0)	1.42E-08	2.45E-06
AFW-CCF-LK-STMBD	20	1.00E-04	(40.5)	5.46E-07	(4.0)	6.60E-10	1.40E-06
PPS-XHE-FO-PORVS	11	4.40E-02	(8.0)	4.91E-07	(5.0)	1.09E-08	1.84E-06
BETA-AFW	23	5.60E-02	(7.0)	1.67E-07	(6.5)	2.38E-09	6.88E-07
AFW-MDP-FS	23	6.30E-03	(22.0)	1.67E-07	(6.5)	2.38E-09	6.88E-07
PPS-MOV-FC-1536	27	3.00E-01	(2.5)	1.66E-07	(8.0)	3.91E-09	5.80E-07
PPS-MOV-FC-1535	24	3.00E-01	(2.5)	1.61E-07	(9.0)	3.54E-09	5.72E-07
PPS-MOV-FT-1536	14	4.00E-02	(10.0)	1.44E-07	(10.5)	2.99E-09	5.02E-07
PPS-MOV-FT-1535	14	4.00E-02	(10.0)	1.44E-07	(10.5)	2.99E-09	5.02E-07
AFW-TDP-FR-2P6HR	22	3.00E-02	(14.0)	1.35E-07	(12.0)	5.14E-10	4.89E-07
AFW-TDP-FR-2P24H	23	1.20E-01	(4.0)	1.26E-07	(13.0)	1.57E-09	5.07E-07
AFW-TDP-FS-FW2	24	1.10E-02	(19.0)	1.11E-07	(14.0)	8.63E-10	4.50E-07
AFW-MDP-FS-FW3A	23	6.30E-03	(22.0)	9.82E-08	(15.0)	2.13E-09	3.29E-07
AFW-MDP-FS-FW3B	22	6.30E-03	(22.0)	9.70E-08	(16.0)	2.04E-09	3.28E-07
AFW-CKV-OO-CV142	7	1.00E-03	(30.0)	5.70E-08	(17.0)	3.77E-10	2.40E-07
AFW-TDP-MA-FW2	16	1.00E-02	(20.0)	4.76E-08	(18.0)	2.00E-10	1.58E-07
BETA-2MOV	10	8.80E-02	(5.0)	2.54E-08	(19.0)	3.62E-10	8.46E-08
AFW-CKV-OO-CV172	6	1.00E-03	(30.0)	2.33E-08	(20.5)	5.44E-10	7.64E-08
AFW-CKV-OO-CV157	6	1.00E-03	(30.0)	2.33E-08	(20.5)	5.44E-10	7.64E-08
AFW-MDP-MA-FW3B	7	2.00E-03	(26.5)	2.12E-08	(22.5)	4.79E-11	6.59E-08
AFW-MDP-MA-FW3A	7	2.00E-03	(26.5)	2.12E-08	(22.5)	4.79E-11	6.59E-08
PPS-MOV-FT	6	4.00E-02	(10.0)	2.09E-08	(24.0)	2.72E-10	6.93E-08
NRAC-HALFHR	15	6.00E-01	(1.0)	1.68E-08	(25.0)	3.94E-10	6.30E-08
PPS-SOV-FT-1455C	3	1.00E-03	(30.0)	9.89E-09	(26.5)	2.54E-10	3.36E-08
PPS-SOV-FT-1456	3	1.00E-03	(30.0)	9.89E-09	(26.5)	2.54E-10	3.36E-08
AFW-ACT-FA-PMP3A	3	6.00E-04	(33.5)	5.51E-09	(28.5)	1.69E-11	1.60E-08
AFW-ACT-FA-PMP3B	3	6.00E-04	(33.5)	5.51E-09	(28.5)	1.69E-11	1.60E-08
OEP-DGN-FC-DG3U2	3	3.40E-02	(13.0)	5.42E-09	(30.0)	8.97E-11	1.95E-08
OEP-DGN-FS-DG03	4	2.20E-02	(15.5)	4.20E-09	(31.5)	6.28E-11	1.50E-08
OEP-DGN-FS-DG01	4	2.20E-02	(15.5)	4.20E-09	(31.5)	6.28E-11	1.50E-08
DCP-BDC-ST-BUS1B	3	9.00E-05	(45.5)	3.52E-09	(33.5)	3.33E-11	1.35E-08
DCP-BDC-ST-BUS1A	3	9.00E-05	(45.5)	3.52E-09	(33.5)	3.33E-11	1.35E-08
AFW-TNK-VF-CST	3	1.00E-06	(50.0)	2.76E-09	(35.0)	8.44E-11	1.05E-08
HPI-MOV-FT-1867C	2	3.00E-03	(24.5)	2.23E-09	(36.5)	9.41E-12	7.51E-09
HPI-MOV-FT-1115B	2	3.00E-03	(24.5)	2.23E-09	(36.5)	9.41E-12	7.51E-09
AFW-MDP-FR-3B6HR	3	1.80E-04	(35.5)	1.65E-09	(38.5)	1.83E-12	4.44E-09
AFW-MDP-FR-3A6HR	3	1.80E-04	(35.5)	1.65E-09	(38.5)	1.83E-12	4.44E-09
OEP-DGN-FR-6HDG3	2	1.20E-02	(17.5)	1.50E-09	(40.5)	7.36E-12	5.51E-09
OEP-DGN-FR-6HDG1	2	1.20E-02	(17.5)	1.50E-09	(40.5)	7.36E-12	5.51E-09
ACP-BAC-ST-4KV1H	2	9.00E-05	(45.5)	1.18E-09	(42.5)	9.07E-12	3.83E-09
ACP-BAC-ST-4KV1J	2	9.00E-05	(45.5)	1.18E-09	(42.5)	9.07E-12	3.83E-09
AFW-CKV-FT-CV172	1	1.00E-04	(40.5)	5.40E-10	(44.5)	1.01E-12	1.80E-09
AFW-CKV-FT-CV157	1	1.00E-04	(40.5)	5.40E-10	(44.5)	1.01E-12	1.80E-09
HPI-CKV-FT-CV225	1	1.00E-04	(40.5)	5.08E-10	(47.0)	1.54E-11	1.83E-09
HPI-CKV-FT-CV410	1	1.00E-04	(40.5)	5.08E-10	(47.0)	1.54E-11	1.83E-09

HPI-CKV-FT-CV25	1	1.00E-04 (40.5)	5.08E-10 (47.0)	1.54E-11	1.83E-09
AFW-XVM-PG-XV183	1	4.00E-05 (48.5)	2.16E-10 (49.5)	4.05E-13	6.29E-10
AFW-XVM-PG-XV188	1	4.00E-05 (48.5)	2.16E-10 (49.5)	4.05E-13	6.29E-10

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ (RANK)	RISK REDUCTION (RANK)	LOWER 5%	UPPER 5%
IE-T2	65	9.40E-01 (1.0)	1.48E-06 (1.0)	4.82E-08	4.88E-06
IE-T5A	25	5.00E-03 (3.5)	1.38E-07 (2.5)	1.20E-09	4.52E-07
IE-T5B	25	5.00E-03 (3.5)	1.38E-07 (2.5)	1.20E-09	4.52E-07
IE-T1	28	7.70E-02 (2.0)	7.54E-08 (4.0)	2.06E-09	2.85E-07

PLANT DAMAGE STATE GROUP PDS5
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
AFW-PSF-FC-XCONN	23	1.50E-04	(37.0)	5.47E-03	(1.0)	3.81E-04	1.78E-02
AFW-CCF-LK-STMBD	20	1.00E-04	(40.5)	5.46E-03	(2.0)	3.81E-04	1.77E-02
AFW-TNK-VF-CST	3	1.00E-06	(50.0)	2.76E-03	(3.0)	1.45E-04	1.00E-02
AFW-CKV-OO-CV142	7	1.00E-03	(30.0)	5.70E-05	(4.0)	5.37E-07	2.31E-04
AFW-XHE-FO-UNIT2	143	3.60E-02	(12.0)	4.91E-05	(5.0)	5.40E-06	1.55E-04
DCP-BDC-ST-BUS1B	3	9.00E-05	(45.5)	3.91E-05	(6.5)	1.05E-06	1.49E-04
DCP-BDC-ST-BUS1A	3	9.00E-05	(45.5)	3.91E-05	(6.5)	1.05E-06	1.49E-04
AFW-MDP-FS	23	6.30E-03	(22.0)	2.63E-05	(8.0)	5.53E-07	1.04E-04
AFW-CKV-OO-CV172	6	1.00E-03	(30.0)	2.33E-05	(9.5)	9.45E-07	8.49E-05
AFW-CKV-OO-CV157	6	1.00E-03	(30.0)	2.33E-05	(9.5)	9.45E-07	8.49E-05
AFW-MDP-FS-FW3A	23	6.30E-03	(22.0)	1.55E-05	(11.0)	6.47E-07	4.95E-05
AFW-MDP-FS-FW3B	22	6.30E-03	(22.0)	1.53E-05	(12.0)	5.94E-07	4.91E-05
ACP-BAC-ST-4KV1J	2	9.00E-05	(45.5)	1.31E-05	(13.5)	3.06E-07	4.46E-05
ACP-BAC-ST-4KV1H	2	9.00E-05	(45.5)	1.31E-05	(13.5)	3.06E-07	4.46E-05
PPS-XHE-FO-PORVS	11	4.40E-02	(8.0)	1.07E-05	(15.0)	5.15E-07	3.47E-05
AFW-MDP-MA-FW3B	7	2.00E-03	(26.5)	1.06E-05	(16.5)	1.63E-07	3.36E-05
AFW-MDP-MA-FW3A	7	2.00E-03	(26.5)	1.06E-05	(16.5)	1.63E-07	3.36E-05
AFW-TDP-FS-FW2	24	1.10E-02	(19.0)	9.95E-06	(18.0)	4.98E-07	3.11E-05
PPS-SOV-FT-1455C	3	1.00E-03	(30.0)	9.88E-06	(19.5)	4.21E-07	3.22E-05
PPS-SOV-FT-1456	3	1.00E-03	(30.0)	9.88E-06	(19.5)	4.21E-07	3.22E-05
HPI-XHE-FO-FDBLD	14	7.10E-02	(6.0)	9.29E-06	(21.0)	4.25E-07	2.89E-05
AFW-MDP-FR-3A6HR	3	1.80E-04	(35.5)	9.18E-06	(22.5)	6.33E-08	2.95E-05
AFW-MDP-FR-3B6HR	3	1.80E-04	(35.5)	9.18E-06	(22.5)	6.33E-08	2.95E-05
AFW-ACT-FA-PMP3A	3	6.00E-04	(33.5)	9.17E-06	(24.5)	6.33E-08	2.95E-05
AFW-ACT-FA-PMP3B	3	6.00E-04	(33.5)	9.17E-06	(24.5)	6.33E-08	2.95E-05
AFW-XVM-PG-XV183	1	4.00E-05	(48.5)	5.40E-06	(26.5)	1.45E-08	1.81E-05
AFW-XVM-PG-XV168	1	4.00E-05	(48.5)	5.40E-06	(26.5)	1.45E-08	1.81E-05
AFW-CKV-FT-CV172	1	1.00E-04	(40.5)	5.40E-06	(28.5)	1.45E-08	1.81E-05
AFW-CKV-FT-CV157	1	1.00E-04	(40.5)	5.40E-06	(28.5)	1.45E-08	1.81E-05
HPI-CKV-FT-CV225	1	1.00E-04	(40.5)	5.08E-06	(31.0)	2.64E-07	1.70E-05
HPI-CKV-FT-CV410	1	1.00E-04	(40.5)	5.08E-06	(31.0)	2.64E-07	1.70E-05
HPI-CKV-FT-CV25	1	1.00E-04	(40.5)	5.08E-06	(31.0)	2.64E-07	1.70E-05
AFW-TDP-MA-FW2	16	1.00E-02	(20.0)	4.72E-06	(33.0)	1.27E-07	1.60E-05
AFW-TDP-FR-2P6HR	22	3.00E-02	(14.0)	4.38E-06	(34.0)	9.67E-08	1.48E-05
PPS-MOV-FT-1535	14	4.00E-02	(10.0)	3.46E-06	(35.5)	1.17E-07	1.17E-05
PPS-MOV-FT-1536	14	4.00E-02	(10.0)	3.46E-06	(35.5)	1.17E-07	1.17E-05
BETA-AFW	23	5.60E-02	(7.0)	2.82E-06	(37.0)	6.55E-08	1.17E-05
AFW-TDP-FR-2P24H	23	1.20E-01	(4.0)	9.21E-07	(38.0)	2.09E-08	3.91E-06
HPI-MOV-FT-1867C	2	3.00E-03	(24.5)	7.42E-07	(39.5)	1.60E-08	2.47E-06
HPI-MOV-FT-1115B	2	3.00E-03	(24.5)	7.42E-07	(39.5)	1.60E-08	2.47E-06
PPS-MOV-FT	6	4.00E-02	(10.0)	5.01E-07	(41.0)	1.04E-08	1.80E-06
PPS-MOV-FC-1536	27	3.00E-01	(2.5)	3.88E-07	(42.0)	1.37E-08	1.48E-06
PPS-MOV-FC-1535	24	3.00E-01	(2.5)	3.76E-07	(43.0)	1.23E-08	1.45E-06
BETA-2MOV	10	8.80E-02	(5.0)	2.63E-07	(44.0)	4.98E-09	8.98E-07
OEP-DGN-FS-DG03	4	2.20E-02	(15.5)	1.87E-07	(45.5)	5.07E-09	6.33E-07
OEP-DGN-FS-DG01	4	2.20E-02	(15.5)	1.87E-07	(45.5)	5.07E-09	6.33E-07
OEP-DGN-FC-DG3U2	3	3.40E-02	(13.0)	1.54E-07	(47.0)	4.12E-09	5.61E-07

OEP-DGN-FR-6HDG3	2	1.20E-02 (17.5)	1.23E-07 (48.5)	2.99E-09	4.18E-07
OEP-DGN-FR-6HDG1	2	1.20E-02 (17.5)	1.23E-07 (48.5)	2.99E-09	4.18E-07
NRAC-HALFHR	15	6.00E-01 (1.0)	1.12E-08 (50.0)	2.30E-10	4.20E-08

PLANT DAMAGE STATE GROUP PDS5
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
AFW-XHE-FO-UNIT2	143	3.60E-02	(12.0)	43.5	(1.0)	2.83	0.94
AFW-CCF-LK-STMBD	20	1.00E-04	(40.5)	10.2	(2.0)	1.61	1.01
AFW-PSF-FC-XCONN	23	1.50E-04	(37.0)	7.9	(3.0)	1.38	0.88
HPI-XHE-FO-FDBLD	14	7.10E-02	(6.0)	7.2	(4.0)	1.23	0.96
PPS-XHE-FO-PORVS	11	4.40E-02	(8.0)	3.8	(5.0)	1.13	0.92
AFW-TDP-FR-2P6HR	22	3.00E-02	(14.0)	3.3	(6.0)	1.07	0.99
AFW-TDP-FR-2P24H	23	1.20E-01	(4.0)	1.9	(7.0)	1.05	0.94
AFW-TDP-FS-FW2	24	1.10E-02	(19.0)	1.9	(8.0)	1.08	1.00
BETA-AFW	23	5.60E-02	(7.0)	1.7	(9.0)	1.02	0.95
AFW-MDP-FS-FW3A	23	6.30E-03	(22.0)	1.4	(11.0)	1.05	0.98
AFW-MDP-FS	23	6.30E-03	(22.0)	1.4	(11.0)	1.05	0.98
AFW-MDP-FS-FW3B	22	6.30E-03	(22.0)	1.4	(11.0)	1.05	0.98
PPS-MOV-FT-1536	14	4.00E-02	(10.0)	1.3	(14.0)	1.05	1.01
PPS-MOV-FT-1535	14	4.00E-02	(10.0)	1.3	(14.0)	1.05	1.01
PPS-MOV-FT	6	4.00E-02	(10.0)	1.3	(14.0)	1.05	1.01
PPS-MOV-FC-1535	24	3.00E-01	(2.5)	1.1	(16.5)	1.03	0.99
PPS-MOV-FC-1536	27	3.00E-01	(2.5)	1.1	(16.5)	1.03	0.99
AFW-TDP-MA-FW2	16	1.00E-02	(20.0)	1.0	(18.0)	1.04	1.01
HPI-MOV-FT-1867C	2	3.00E-03	(24.5)	0.5	(19.5)		
HPI-MOV-FT-1115B	2	3.00E-03	(24.5)	0.5	(19.5)		
AFW-MDP-FR-3B6HR	3	1.80E-04	(35.5)	0.5	(21.5)		
AFW-MDP-FR-3A6HR	3	1.80E-04	(35.5)	0.5	(21.5)		
BETA-2MOV	10	8.80E-02	(5.0)	0.5	(23.0)		
PPS-SOV-FT-1455C	3	1.00E-03	(30.0)	0.4	(24.5)		
PPS-SOV-FT-1456	3	1.00E-03	(30.0)	0.4	(24.5)		
DCP-BDC-ST-BUS1B	3	9.00E-05	(45.5)	0.4	(27.5)		
DCP-BDC-ST-BUS1A	3	9.00E-05	(45.5)	0.4	(27.5)		
ACP-BAC-ST-4KV1J	2	9.00E-05	(45.5)	0.4	(27.5)		
ACP-BAC-ST-4KV1H	2	9.00E-05	(45.5)	0.4	(27.5)		
OEP-DGN-FS-DG03	4	2.20E-02	(15.5)	0.3	(30.5)		
OEP-DGN-FS-DG01	4	2.20E-02	(15.5)	0.3	(30.5)		
AFW-MDP-MA-FW3B	7	2.00E-03	(26.5)	0.2	(32.5)		
AFW-MDP-MA-FW3A	7	2.00E-03	(26.5)	0.2	(32.5)		
HPI-CKV-FT-CV225	1	1.00E-04	(40.5)	0.0	(42.0)		
AFW-CKV-FT-CV172	1	1.00E-04	(40.5)	0.0	(42.0)		
AFW-XVM-PG-XV183	1	4.00E-05	(48.5)	0.0	(42.0)		
AFW-XVM-PG-XV168	1	4.00E-05	(48.5)	0.0	(42.0)		
AFW-CKV-FT-CV157	1	1.00E-04	(40.5)	0.0	(42.0)		
AFW-ACT-FA-PMP3A	3	6.00E-04	(33.5)	0.0	(42.0)		
AFW-TNK-VF-CST	3	1.00E-06	(50.0)	0.0	(42.0)		
OEP-DGN-FR-6HDG3	2	1.20E-02	(17.5)	0.0	(42.0)		
AFW-CKV-OO-CV172	6	1.00E-03	(30.0)	0.0	(42.0)		
OEP-DGN-FR-6HDG1	2	1.20E-02	(17.5)	0.0	(42.0)		
OEP-DGN-FC-DG3U2	3	3.40E-02	(13.0)	0.0	(42.0)		
NRAC-HALFHR	15	6.00E-01	(1.0)	0.0	(42.0)		
AF[redacted]CKV-OO-CV157	6	1.00E-03	(30.0)	0.0	(42.0)		
H[redacted]V-FT-CV410	1	1.00E-04	(40.5)	0.0	(42.0)		

HPI-CKV-FT-CV25	1	1.00E-04	(40.5)	0.0	(42.0)
AFW-CKV-OO-CV142	7	1.00E-03	(30.0)	0.0	(42.0)
AFW-ACT-FA-PMP3B	3	6.00E-04	(33.5)	0.0	(42.0)

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T2	65	9.40E-01	(1.0)	15.4	(1.0)	1.48	0.95
IE-T5A	25	5.00E-03	(3.5)	3.4	(2.5)	1.14	0.95
IE-T5B	25	5.00E-03	(3.5)	3.4	(2.5)	1.14	0.95
IE-T1	28	7.70E-02	(2.0)	0.3	(4.0)		

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

PLANT DAMAGE STATE GROUP PDS5

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT TLYY-YNY WITH TOP EVENT FREQUENCY 1.84E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	4	3.60E-07	0.19637	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	IE-T2		+
3	2	4	2.40E-07	0.32729	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	IE-T2		+
4	50	4	2.23E-07	0.44899	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-XHE-FO-PORVS		+
5	51	4	1.49E-07	0.53012	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-XHE-FO-PORVS		+
6	52	6	6.30E-08	0.56447	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW		*
7					IE-T2	*	PPS-XHE-FO-PORVS	+					
8	53	5	6.09E-08	0.59766	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1535		*
9					PPS-MOV-FT-1535	+							
10	54	5	6.09E-08	0.63085	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1536		*
11					PPS-MOV-FT-1536	+							
12	56	5	4.06E-08	0.65297	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1535		*
13					PPS-MOV-FT-1535	+							
14	55	5	4.06E-08	0.67510	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-MOV-FC-1536		*
15					PPS-MOV-FT-1536	+							
16	94	4	3.40E-08	0.69364	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A		+
17	119	4	3.40E-08	0.71218	AFW-MDP-FS-FW3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B		+
18	95	3	2.70E-08	0.72689	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+			
19	120	3	2.70E-08	0.74160	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+			
20	3	5	2.64E-08	0.75600	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD		*
21					IE-T2	+							
22	4	6	2.54E-08	0.76986	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW		*
23					HPI-XHE-FO-FDBLD	*	IE-T2	+					
24	22	4	1.83E-08	0.77983	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-XHE-FO-PORVS		+
25	96	3	1.80E-08	0.78963	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+			
26	121	3	1.80E-08	0.79944	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+			
27	58	7	1.72E-08	0.80881	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW		*
28					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+			
29	57	7	1.72E-08	0.81818	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW		*
30					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+			
31	59	5	1.64E-08	0.82710	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T2		*
32					PPS-XHE-FO-PORVS	+							
33	6	5	1.51E-08	0.83535	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD		*
34					IE-T2	+							
35	5	5	1.51E-08	0.84360	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD		*
36					IE-T2	+							
37	97	4	1.25E-08	0.85039	AFW-MDP-FS-FW3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A		+
38	122	4	1.25E-08	0.85719	AFW-MDP-FS-FW3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B		+
39	23	4	1.22E-08	0.86384	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-XHE-FO-PORVS		+
40	98	4	1.13E-08	0.87002	AFW-MDP-FS-FW3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A		+
41	123	4	1.13E-08	0.87619	AFW-MDP-FS-FW3A	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B		+
42	124	4	1.08E-08	0.88208	AFW-MDP-MA-FW3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B		+
43	99	4	1.08E-08	0.88796	AFW-MDP-MA-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A		+
44	7	6	9.32E-09	0.89304	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW		*
45					HPI-XHE-FO-FDBLD	*	IE-T2	+					
46	8	6	8.48E-09	0.89766	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BET		*

47					HPI-XHE-FO-FDBLD	*	IE-T2	+						
48	60	6	5.36E-09	0.90058	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2			
49					PPS-MOV-FC-1536	*	PPS-MOV-FT	+						
50	61	6	5.36E-09	0.90350	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2			
51					PPS-MOV-FC-1535	*	PPS-MOV-FT	+						
52	24	6	5.16E-09	0.90632	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW			
53					IE-T1	*	PPS-XHE-FO-PORVS	+						
54	63	4	5.08E-09	0.90908	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1455C	+		
55	62	4	5.08E-09	0.91185	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1456	+		
56	26	5	4.99E-09	0.91457	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-MOV-FC-1535	*		
57					PPS-MOV-FT-1535	+								
58	25	5	4.99E-09	0.91729	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-MOV-FC-1536	*		
59					PPS-MOV-FT-1536	+								
60	65	6	4.47E-09	0.91972	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T2			
61					PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+						
62	64	6	4.47E-09	0.92216	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T2			
63					PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+						
64	100	4	3.96E-09	0.92431	AFW-MDP-MA-FW3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
65	125	4	3.96E-09	0.92647	AFW-MDP-MA-FW3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
66	101	4	3.60E-09	0.92843	AFW-MDP-MA-FW3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
67	126	4	3.60E-09	0.93039	AFW-MDP-MA-FW3A	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
68	66	6	3.57E-09	0.93234	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2			
69					PPS-MOV-FC-1536	*	PPS-MOV-FT	+						
70	67	6	3.57E-09	0.93429	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	IE-T2			
71					PPS-MOV-FC-1535	*	PPS-MOV-FT	+						
72	69	4	3.38E-09	0.93613	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1456	+		
73	68	4	3.38E-09	0.93798	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T2	*	PPS-SOV-FT-1455C	+		
74	28	5	3.33E-09	0.93979	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-MOV-FC-1536	*		
75					PPS-MOV-FT-1536	+								
76	27	5	3.33E-09	0.94160	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	PPS-MOV-FC-1535	*		
77					PPS-MOV-FT-1535	+								
78	127	4	3.24E-09	0.94337	AFW-ACT-FA-PMP3A	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
79	102	4	3.24E-09	0.94513	AFW-ACT-FA-PMP3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
80	9	6	2.86E-09	0.94669	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*		
81					HPI-XHE-FO-FDBLD	*	IE-T2	+						
82	71	6	2.56E-09	0.94808	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T2			
83					PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+						
84	72	6	2.56E-09	0.94948	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T2			
85					PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+						
86	70	6	2.56E-09	0.95087	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T2			
87					PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+						
88	73	6	2.56E-09	0.95227	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T2			
89					PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+						
90	29	6	2.54E-09	0.95365	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR			
91					OEP-DGN-FC-DG3U2	*	PPS-MOV-FC-1536	+						
92	10	4	2.40E-09	0.95496	AFW-TNK-VF-CST	*	AFW-XHE-FO-UNIT2	*	HPI-XHE-FO-FDBLD	*	IE-T2	+		
93	75	5	2.30E-09	0.95622	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1A	*		
94					IE-T2	+								
95	74	5	2.30E-09	0.95747	AFW-MDP-FS-FW3A	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1B	*		
96					IE-T2	+								
97	103	4	1.98E-09	0.95855	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+		
98	128	4	1.98E-09	0.95963	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+		
99	77	7	1.93E-09	0.96068	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*		
100					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+				
101	76	7	1.93E-09	0.96174	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*		
102					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+				

103	104	5	1.91E-09	0.96278	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
104					IE-T5A	+						
105	129	5	1.91E-09	0.96381	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
106					IE-T5B	+						
107	30	6	1.70E-09	0.96474	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*
108					OEP-DGN-FC-DG3U2	*	PPS-MOV-FC-1536	+				
109	31	6	1.65E-09	0.96563	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*
110					OEP-DGN-FS-DG03	*	PPS-MOV-FC-1536	+				
111	32	6	1.65E-09	0.96653	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*
112					OEP-DGN-FS-DG01	*	PPS-MOV-FC-1535	+				
113	79	7	1.58E-09	0.96739	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
114					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+		
115	78	7	1.58E-09	0.96825	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
116					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+		
117	81	8	1.51E-09	0.96907	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*
118					BETA-AFW	*	IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT	+
119	80	8	1.51E-09	0.96990	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*
120					BETA-AFW	*	IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT	+
121	83	6	1.43E-09	0.97068	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
122					IE-T2	*	PPS-SOV-FT-1455C	+				
123	82	6	1.43E-09	0.97146	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
124					IE-T2	*	PPS-SOV-FT-1456	+				
125	85	7	1.43E-09	0.97224	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
126					IE-T2	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+		
127	84	7	1.43E-09	0.97302	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
128					IE-T2	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+		
129	33	7	1.41E-09	0.97379	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
130					IE-T1	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	+		
131	34	7	1.41E-09	0.97456	AFW-MDP-FS	*	AFW-TDP-FR-2P24H	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
132					IE-T1	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	+		
133	35	5	1.34E-09	0.97529	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T1	*
134					PPS-XHE-FO-PORVS	+						
135	12	5	1.34E-09	0.97602	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	HPI-MOV-FT-1867C	*
136					IE-T2	+						
137	11	5	1.34E-09	0.97675	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	BETA-2MOV	*	HPI-MOV-FT-1115B	*
138					IE-T2	+						
139	105	4	1.19E-09	0.97739	AFW-ACT-FA-PMP3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
140	130	4	1.19E-09	0.97804	AFW-ACT-FA-PMP3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
141	36	7	1.18E-09	0.97868	AFW-MDP-FS-FW3A	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T1	*
142					NRAC-HALFHR	*	OEP-DGN-FC-DG3U2	*	PPS-MOV-FC-1536	+		
143	107	4	1.13E-09	0.97930	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
144	106	4	1.13E-09	0.97992	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
145	132	4	1.13E-09	0.98054	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
146	131	4	1.13E-09	0.98115	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
147	38	6	1.10E-09	0.98175	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*
148					OEP-DGN-FS-DG03	*	PPS-MOV-FC-1536	+				
149	37	6	1.10E-09	0.98235	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T1	*	NRAC-HALFHR	*
150					OEP-DGN-FS-DG01	*	PPS-MOV-FC-1535	+				
151	108	4	1.08E-09	0.98294	AFW-ACT-FA-PMP3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
152	133	4	1.08E-09	0.98353	AFW-ACT-FA-PMP3A	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
153	13	6	1.05E-09	0.98410	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*
154					HPI-XHE-FO-FDBLD	*	IE-T2	+				
155	109	4	9.72E-10	0.98463	AFW-MDP-FR-3B6HR	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+
156	134	4	9.72E-10	0.98516	AFW-MDP-FR-3A6HR	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B	+
157	14	6	9.54E-10	0.98568	AFW-MDP-FS-FW3A	*	AFW-MDP-FS-FW3B	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*
158					HPI-XHE-FO-FDBLD	*	IE-T2	+				

159	15	6	9.08E-10	0.98617	AFW-MDP-FS-FW3B *	AFW-MDP-MA-FW3A *	AFW-TDP-FR-2P6HR *	AFW-XHE-FO-UNIT2 *
160					HPI-XHE-FO-FDBLD *	IE-T2 +		
161	16	6	9.08E-10	0.98667	AFW-MDP-FS-FW3A *	AFW-MDP-MA-FW3B *	AFW-TDP-FR-2P6HR *	AFW-XHE-FO-UNIT2 *
162					HPI-XHE-FO-FDBLD *	IE-T2 +		
163	40	6	8.98E-10	0.98716	AFW-PSF-FC-XCONN *	AFW-XHE-FO-UNIT2 *	IE-T1 *	NRAC-HALFHR *
164					OEP-DGN-FR-6HDG1 *	PPS-MOV-FC-1535 +		
165	39	6	8.98E-10	0.98765	AFW-PSF-FC-XCONN *	AFW-XHE-FO-UNIT2 *	IE-T1 *	NRAC-HALFHR *
166					OEP-DGN-FR-6HDG3 *	PPS-MOV-FC-1536 +		
167	18	5	8.93E-10	0.98813	AFW-CCF-LK-STMBD *	AFW-XHE-FO-UNIT2 *	BETA-2MOV *	HPI-MOV-FT-1867C *
168					IE-T2 +			
169	17	5	8.93E-10	0.98862	AFW-CCF-LK-STMBD *	AFW-XHE-FO-UNIT2 *	BETA-2MOV *	HPI-MOV-FT-1115B *
170					IE-T2 +			
171	42	5	7.68E-10	0.98904	AFW-CKV-OO-CV157 *	AFW-MDP-FS-FW3A *	AFW-XHE-FO-UNIT2 *	IE-T1 *
172					PPS-XHE-FO-PORVS +			
173	41	5	7.68E-10	0.98946	AFW-CKV-OO-CV172 *	AFW-MDP-FS-FW3B *	AFW-XHE-FO-UNIT2 *	IE-T1 *
174					PPS-XHE-FO-PORVS +			
175	44	7	7.61E-10	0.98987	AFW-MDP-FS-FW3B *	AFW-TDP-FS-FW2 *	AFW-XHE-FO-UNIT2 *	IE-T1 *
176					NRAC-HALFHR *	OEP-DGN-FS-DG01 *	PPS-MOV-FC-1535 +	
177	43	7	7.61E-10	0.99029	AFW-MDP-FS-FW3A *	AFW-TDP-FS-FW2 *	AFW-XHE-FO-UNIT2 *	IE-T1 *
178					NRAC-HALFHR *	OEP-DGN-FS-DG03 *	PPS-MOV-FC-1536 +	
179	87	5	7.31E-10	0.99068	AFW-MDP-MA-FW3A *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *	DCP-BDC-ST-BUS1B *
180					IE-T2 +			
181	86	5	7.31E-10	0.99108	AFW-MDP-MA-FW3B *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *	DCP-BDC-ST-BUS1A *
182					IE-T2 +			
183	110	5	6.99E-10	0.99146	AFW-MDP-FS *	AFW-TDP-FS-FW2 *	AFW-XHE-FO-UNIT2 *	BETA-AFW *
184					IE-T5A +			
185	135	5	6.99E-10	0.99184	AFW-MDP-FS *	AFW-TDP-FS-FW2 *	AFW-XHE-FO-UNIT2 *	BETA-AFW *
186					IE-T5B +			
187	46	7	6.92E-10	0.99222	AFW-MDP-FS-FW3B *	AFW-TDP-MA-FW2 *	AFW-XHE-FO-UNIT2 *	IE-T1 *
188					NRAC-HALFHR *	OEP-DGN-FS-DG01 *	PPS-MOV-FC-1535 +	
189	45	7	6.92E-10	0.99260	AFW-MDP-FS-FW3A *	AFW-TDP-MA-FW2 *	AFW-XHE-FO-UNIT2 *	IE-T1 *
190					NRAC-HALFHR *	OEP-DGN-FS-DG03 *	PPS-MOV-FC-1536 +	
191	89	6	6.91E-10	0.99297	ACP-BAC-ST-4KV1H *	AFW-MDP-FS-FW3B *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *
192					IE-T2 *	PPS-MOV-FC-1535 +		
193	88	6	6.91E-10	0.99335	ACP-BAC-ST-4KV1J *	AFW-MDP-FS-FW3A *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *
194					IE-T2 *	PPS-MOV-FC-1536 +		
195	111	5	6.35E-10	0.99370	AFW-MDP-FS *	AFW-TDP-MA-FW2 *	AFW-XHE-FO-UNIT2 *	BETA-AFW *
196					IE-T5A +			
197	136	5	6.35E-10	0.99404	AFW-MDP-FS *	AFW-TDP-MA-FW2 *	AFW-XHE-FO-UNIT2 *	BETA-AFW *
198					IE-T5B +			
199	93	7	6.14E-10	0.99438	AFW-MDP-FS-FW3A *	AFW-MDP-MA-FW3B *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *
200					IE-T2 *	PPS-MOV-FC-1535 *	PPS-MOV-FT-1535 +	
201	92	7	6.14E-10	0.99471	AFW-MDP-FS-FW3B *	AFW-MDP-MA-FW3A *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *
202					IE-T2 *	PPS-MOV-FC-1535 *	PPS-MOV-FT-1535 +	
203	91	7	6.14E-10	0.99505	AFW-MDP-FS-FW3A *	AFW-MDP-MA-FW3B *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *
204					IE-T2 *	PPS-MOV-FC-1536 *	PPS-MOV-FT-1536 +	
205	90	7	6.14E-10	0.99538	AFW-MDP-FS-FW3B *	AFW-MDP-MA-FW3A *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *
206					IE-T2 *	PPS-MOV-FC-1536 *	PPS-MOV-FT-1536 +	
207	48	6	5.99E-10	0.99571	AFW-CCF-LK-STMBD *	AFW-XHE-FO-UNIT2 *	IE-T1 *	NRAC-HALFHR *
208					OEP-DGN-FR-6HDG1 *	PPS-MOV-FC-1535 +		
209	47	6	5.99E-10	0.99603	AFW-CCF-LK-STMBD *	AFW-XHE-FO-UNIT2 *	IE-T1 *	NRAC-HALFHR *
210					OEP-DGN-FR-6HDG3 *	PPS-MOV-FC-1536 +		
211	49	6	5.81E-10	0.99635	AFW-MDP-FS-FW3A *	AFW-MDP-FS-FW3B *	AFW-TDP-FR-2P24H *	AFW-XHE-FO-UNIT2 *
212					IE-T1 *	PPS-XHE-FO-PORVS +		
213	112	4	5.40E-10	0.99664	AFW-CKV-FT-CV172 *	AFW-TDP-FR-2P6HR *	AFW-XHE-FO-UNIT2 *	IE-T5A +
214	137	4	5.40E-10	0.99694	AFW-CKV-FT-CV157 *	AFW-TDP-FR-2P6HR *	AFW-XHE-FO-UNIT2 *	IE-T5B +

215	21	4	5.08E-10	0.99721	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	HPI-CKV-FT-CV225	*	IE-T2		+
216	20	4	5.08E-10	0.99749	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	HPI-CKV-FT-CV410	*	IE-T2		+
217	19	4	5.08E-10	0.99777	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	HPI-CKV-FT-CV25	*	IE-T2		+
218	113	4	4.86E-10	0.99803	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1B	*	IE-T5A		+
219	138	4	4.86E-10	0.99830	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	DCP-BDC-ST-BUS1A	*	IE-T5B		+
220	114	4	4.86E-10	0.99856	ACP-BAC-ST-4KV1J	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5A		+
221	139	4	4.86E-10	0.99883	ACP-BAC-ST-4KV1H	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	IE-T5B		+
222	115	4	3.56E-10	0.99902	AFW-MDP-FR-3B6HR	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A		+
223	140	4	3.56E-10	0.99921	AFW-MDP-FR-3A6HR	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B		+
224	116	4	3.24E-10	0.99939	AFW-MDP-FR-3B6HR	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5A		+
225	141	4	3.24E-10	0.99957	AFW-MDP-FR-3A6HR	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T5B		+
226	117	4	2.16E-10	0.99969	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	AFW-XVM-PG-XV183	*	IE-T5A		+
227	142	4	2.16E-10	0.99980	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	AFW-XVM-PG-XV188	*	IE-T5B		+
228	118	3	1.80E-10	0.99990	AFW-TNK-VF-CST	*	AFW-XHE-FO-UNIT2	*	IE-T5A	+			
229	143	3	1.80E-10	1.00000	AFW-TNK-VF-CST	*	AFW-XHE-FO-UNIT2	*	IE-T5B	.			

PLANT DAMAGE STATE GROUP PDS6

TOP EVENT PDS6 CONTAINS 26 EVENTS IN 16 CUT SETS

THE FREQUENCY OF TOP EVENT PDS6 IS 1.51E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT PDS6

N	1000
MEAN	1.56E-06
STD DEV	4.49E-06
LOWER 5%	3.23E-08
LOWER 25%	1.36E-07
MEDIAN	4.24E-07
UPPER 25%	1.31E-06
UPPER 5%	5.87E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)

NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

   RISK REDUCTION = PD x EV(J)
   = TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

   RISK INCREASE = PD - RISK REDUCTION
   = PD x (1 - EV(J))
   = TEF(EVALUATED WITH EV(J) = 1) - TEF

PLANT DAMAGE STATE GROUP PDS6
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
K	16	6.00E-05	(19.0)	1.51E-06	(1.5)	3.23E-08	5.87E-06
R	16	1.70E-01	(4.0)	1.51E-06	(1.5)	3.23E-08	5.87E-06
Z	1	1.40E-02	(10.0)	8.43E-07	(3.0)	6.29E-09	3.16E-06
PPS-MOV-FC-1535	3	3.00E-01	(1.5)	2.64E-07	(4.5)	2.00E-09	1.46E-06
PPS-MOV-FC-1536	3	3.00E-01	(1.5)	2.64E-07	(4.5)	2.00E-09	1.46E-06
PPS-MOV-FT-1535	2	4.00E-02	(8.0)	2.43E-07	(6.0)	1.82E-09	1.29E-06
HPI-MOV-FT-1350	1	3.00E-03	(11.0)	2.02E-07	(7.0)	8.17E-10	7.56E-07
PPS-XHE-FO-EMBOR	1	1.00E-03	(13.5)	6.73E-08	(8.0)	2.58E-10	2.40E-07
PPS-MOV-FT	1	4.00E-02	(8.0)	2.13E-08	(9.5)	1.11E-10	1.15E-07
BETA-2MOV	1	8.80E-02	(5.0)	2.13E-08	(9.5)	1.11E-10	1.15E-07
ACP-BAC-ST-4KV1H	1	9.00E-05	(17.0)	6.06E-09	(12.0)	6.02E-11	2.23E-08
ACP-BAC-ST-1H1	1	9.00E-05	(17.0)	6.06E-09	(12.0)	6.02E-11	2.23E-08
ACP-BAC-ST-1H1-2	1	9.00E-05	(17.0)	6.06E-09	(12.0)	6.02E-11	2.23E-08
BETA-SRV	1	7.00E-02	(6.0)	4.71E-09	(14.5)	5.25E-11	1.74E-08
PPS-SOV-FT	1	1.00E-03	(13.5)	4.71E-09	(14.5)	5.25E-11	1.74E-08
HPI-MOV-PG-1350	1	4.00E-05	(20.5)	2.69E-09	(16.5)	4.77E-11	1.08E-08
ACP-TFM-NO-1H1	1	4.00E-05	(20.5)	2.69E-09	(16.5)	4.79E-11	1.15E-08
CVC-MDP-FR-2A1HR	1	3.00E-05	(22.5)	2.02E-09	(18.0)	8.51E-12	6.51E-09
PPS-SOV-FT-1456	1	1.00E-03	(13.5)	8.08E-10	(20.0)	7.39E-12	3.22E-09
PPS-SOV-FT-1455C	1	1.00E-03	(13.5)	8.08E-10	(20.0)	7.39E-12	3.22E-09
PPS-MOV-FT-1536	1	4.00E-02	(8.0)	8.08E-10	(20.0)	7.39E-12	3.22E-09
BETA-STR	1	2.63E-01	(3.0)	5.31E-10	(22.5)	1.11E-11	1.88E-09
CPC-STR-PG-1HR	1	3.00E-05	(22.5)	5.31E-10	(22.5)		

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
IE-TN	1	5.90E+00	(2.0)	8.43E-07	(1.0)	6.29E-09	3.16E-06
IE-T	14	6.60E+00	(1.0)	5.65E-07	(2.0)	9.48E-09	2.82E-06
IE-T7	1	1.00E-02	(3.0)	1.02E-07	(3.0)	3.24E-09	4.04E-07

PLANT DAMAGE STATE GROUP PDS6
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
K	16	6.00E-05	(19.0)	2.52E-02	(1.0)	1.45E-03	9.56E-02
CVC-MDP-FR-2A1HR	1	3.00E-05	(22.5)	6.73E-05	(3.0)	1.80E-06	2.49E-04
HPI-MOV-PG-1350	1	4.00E-05	(20.5)	6.73E-05	(3.0)	1.80E-06	2.49E-04
ACP-TFM-NO-1H1	1	4.00E-05	(20.5)	6.73E-05	(3.0)	1.80E-06	2.49E-04
ACP-BAC-ST-1H1-2	1	9.00E-05	(17.0)	6.73E-05	(6.0)	1.80E-06	2.49E-04
ACP-BAC-ST-4KV1H	1	9.00E-05	(17.0)	6.73E-05	(6.0)	1.80E-06	2.49E-04
ACP-BAC-ST-1H1	1	9.00E-05	(17.0)	6.73E-05	(6.0)	1.80E-06	2.49E-04
PPS-XHE-FO-EMBOR	1	1.00E-03	(13.5)	6.73E-05	(8.0)	1.79E-06	2.48E-04
HPI-MOV-FT-1350	1	3.00E-03	(11.0)	6.71E-05	(9.0)	1.80E-06	2.48E-04
Z	1	1.40E-02	(10.0)	5.93E-05	(10.0)	1.60E-06	2.16E-04
CPC-STR-PG-1HR	1	3.00E-05	(22.5)	1.77E-05	(11.0)		
R	16	1.70E-01	(4.0)	7.37E-06	(12.0)	3.46E-07	3.12E-05
PPS-MOV-FT-1535	2	4.00E-02	(8.0)	5.84E-06	(13.0)	7.32E-08	3.20E-05
PPS-SOV-FT	1	1.00E-03	(13.5)	4.71E-06	(14.0)	8.54E-08	1.69E-05
PPS-SOV-FT-1456	1	1.00E-03	(13.5)	8.07E-07	(15.5)	1.16E-08	3.27E-06
PPS-SOV-FT-1455C	1	1.00E-03	(13.5)	8.07E-07	(15.5)	1.16E-08	3.27E-06
PPS-MOV-FC-1536	3	3.00E-01	(1.5)	6.17E-07	(17.5)	8.65E-09	2.03E-06
PPS-MOV-FC-1535	3	3.00E-01	(1.5)	6.17E-07	(17.5)	8.65E-09	2.03E-06
PPS-MOV-FT	1	4.00E-02	(8.0)	5.12E-07	(19.0)	4.12E-09	2.79E-06
BETA-2MOV	1	8.80E-02	(5.0)	2.21E-07	(20.0)	1.67E-09	1.19E-06
BETA-SRV	1	7.00E-02	(6.0)	6.26E-08	(21.0)	1.12E-09	2.36E-07
PPS-MOV-FT-1536	1	4.00E-02	(8.0)	1.94E-08	(22.0)	2.91E-10	8.68E-08
BETA-STR	1	2.63E-01	(3.0)	1.49E-09	(23.0)	3.74E-11	6.09E-09

PLANT DAMAGE STATE GROUP PDS6
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
K	16	6.00E-05	(19.0)	36.6	(1.0)	2.70	0.98
R	16	1.70E-01	(4.0)	30.7	(2.0)	2.24	1.12
Z	1	1.40E-02	(10.0)	13.5	(3.0)	1.33	1.11
PPS-MOV-FC-1536	3	3.00E-01	(1.5)	3.3	(4.5)	0.92	0.92
PPS-MOV-FC-1535	3	3.00E-01	(1.5)	3.3	(4.5)	0.92	0.92
HPI-MOV-FT-1350	1	3.00E-03	(11.0)	2.5	(6.0)	1.10	0.98
PPS-MOV-FT	1	4.00E-02	(8.0)	1.2	(8.0)	0.98	1.03
PPS-MOV-FT-1536	1	4.00E-02	(8.0)	1.2	(8.0)	0.98	1.03
PPS-MOV-FT-1535	2	4.00E-02	(8.0)	1.2	(8.0)	0.98	1.03
ACP-TFM-NO-1H1	1	4.00E-05	(20.5)	0.8	(10.0)	1.00	1.00
CVC-MDP-FR-2A1HR	1	3.00E-05	(22.5)	0.7	(11.0)	1.00	1.00
PPS-SOV-FT-1456	1	1.00E-03	(13.5)	0.6	(13.0)	1.00	1.00
PPS-SOV-FT-1455C	1	1.00E-03	(13.5)	0.6	(13.0)	1.00	1.00
PPS-SOV-FT	1	1.00E-03	(13.5)	0.6	(13.0)	1.00	1.00
BETA-SRV	1	7.00E-02	(6.0)	0.5	(15.0)	1.00	1.00
BETA-STR	1	2.63E-01	(3.0)	0.0	(19.0)		
ACP-BAC-ST-4KV1H	1	9.00E-05	(17.0)	0.0	(19.0)		
HPI-MOV-PG-1350	1	4.00E-05	(20.5)	0.0	(19.0)		
PPS-XHE-FO-EMBOR	1	1.00E-03	(13.5)	0.0	(19.0)		
BETA-2MOV	1	8.80E-02	(5.0)	0.0	(19.0)		
ACP-BAC-ST-1H1-2	1	9.00E-05	(17.0)	0.0	(19.0)		
ACP-BAC-ST-1H1	1	9.00E-05	(17.0)	0.0	(19.0)		
CPC-STR-PG-1HR	1	3.00E-05	(22.5)				

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T	14	6.60E+00	(1.0)	13.9	(1.0)	1.15	1.07
IE-TN	1	5.90E+00	(2.0)	13.9	(2.0)	1.26	1.08
IE-T7	1	1.00E-02	(3.0)	1.5	(3.0)	0.94	1.01

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

PLANT DAMAGE STATE GROUP PDS6

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT PDS6 WITH TOP EVENT FREQUENCY 1.51E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	4	8.43E-07	0.55799	IE-TN	*	K	*	R	*	Z	+
3	2	6	2.42E-07	0.71850	IE-T	*	K	*	PPS-MOV-FC-1535	*	PPS-MOV-FC-1536	*
4					PPS-MOV-FT-1535	*	R	+				
5	3	4	2.02E-07	0.85225	HPI-MOV-FT-1350	*	IE-T	*	K	*	R	+
6	16	3	1.02E-07	0.91981	IE-T7	*	K	*	R	+		
7	4	4	6.73E-08	0.96439	IE-T	*	K	*	PPS-XHE-FO-EMBOR	*	R	+
8	5	7	2.13E-08	0.97851	BETA-2MOV	*	IE-T	*	K	*	PPS-MOV-FC-1535	*
9					PPS-MOV-FC-1536	*	PPS-MOV-FT	*	R	+		
10	7	4	6.06E-09	0.98253	ACP-BAC-ST-4KV1H	*	IE-T	*	K	*	R	+
11	6	4	6.06E-09	0.98654	ACP-BAC-ST-1H1-2	*	IE-T	*	K	*	R	+
12	8	4	6.06E-09	0.99055	ACP-BAC-ST-1H1	*	IE-T	*	K	*	R	+
13	9	5	4.71E-09	0.99367	BETA-SRV	*	IE-T	*	K	*	PPS-SOV-FT	*
14					R	+						
15	11	4	2.69E-09	0.99546	ACP-TFM-NO-1H1	*	IE-T	*	K	*	R	+
16	10	4	2.69E-09	0.99724	HPI-MOV-PG-1350	*	IE-T	*	K	*	R	+
17	12	4	2.02E-09	0.99858	CVC-MDP-FR-2A1HR	*	IE-T	*	K	*	R	+
18	14	6	8.08E-10	0.99911	IE-T	*	K	*	PPS-MOV-FC-1536	*	PPS-MOV-FT-1536	*
19					PPS-SOV-FT-1456	*	R	+				
20	13	6	8.08E-10	0.99965	IE-T	*	K	*	PPS-MOV-FC-1535	*	PPS-MOV-FT-1535	*
21					PPS-SOV-FT-1455C	*	R	+				
22	15	5	5.31E-10	1.00000	BETA-STR	*	CPC-STR-PG-1HR	*	IE-T	*	K	*
23					R	.						

SURRY PLANT DAMAGE STATE PDS7

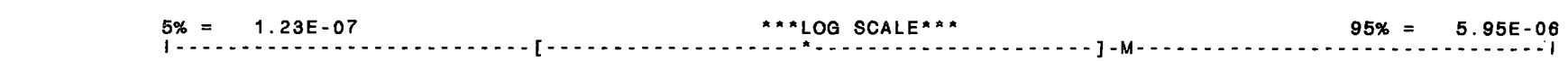
TOP EVENT PDS7 CONTAINS 56 EVENTS IN 38 CUT SETS

THE FREQUENCY OF TOP EVENT PDS7 IS 1.82E-06

DESCRIPTIVE STATISTICS FOR THE FREQUENCY OF TOP EVENT PDS7

N	1000
MEAN	1.84E-06
STD DEV	4.67E-06
LOWER 5%	1.23E-07
LOWER 25%	3.60E-07
MEDIAN	7.36E-07
UPPER 25%	1.68E-06
UPPER 5%	5.95E-06

90% UNCERTAINTY INTERVAL FOR TOP EVENT FREQUENCY (INNERMOST BRACKETS DENOTE INTERQUARTILE RANGE, ASTERISK DENOTES MEDIAN, N DENOTES NOMINAL VALUE AND M DENOTES MEAN)



NOMENCLATURE:

PD = PARTIAL DERIVATIVE

TEF = FREQUENCY OF THE TOP EVENT

EV(J) = PROBABILITY OF EVENT J FOR BASE EVENTS
= FREQUENCY OF EVENT J FOR INITIATING EVENTS

MEASURES:

1. FOR BASE EVENTS AND INITIATING EVENTS:

RISK REDUCTION = PD x EV(J)
= TEF - TEF(EVALUATED WITH EV(J) = 0)

2. FOR BASE EVENTS ONLY:

RISK INCREASE = PD - RISK REDUCTION
= PD x (1 - EV(J))
= TEF(EVALUATED WITH EV(J) = 1) - TEF

SURRY PLANT DAMAGE STATE PDS7
RISK REDUCTION BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK REDUCTION	(RANK)	LOWER 5%	UPPER 5%
RCS-XHE-FO-DPRT7	15	2.90E-02	(24.0)	1.48E-06	(1.0)		
REC-XHE-FO-DPRES	3	1.40E-02	(25.5)	1.35E-06	(2.0)	2.06E-08	4.88E-06
MSS-SRV-OO-ODSRV	12	1.00E+00	(2.5)	1.25E-06	(3.0)		
PORV-NOT-BLK	10	8.50E-01	(5.0)	8.30E-07	(4.0)	2.21E-08	3.30E-06
PORV-BLK	6	1.50E-01	(10.5)	6.77E-07	(5.5)	1.15E-08	2.35E-06
SGTR-SGSRV-ODMD1	6	1.00E+00	(2.5)	6.77E-07	(5.5)		
SGTR-SGSRV-ODMD2	6	1.50E-01	(10.5)	5.75E-07	(7.0)	9.88E-09	2.10E-06
MSS-XHE-FO-BLOCK	4	6.40E-02	(15.0)	2.54E-07	(9.0)	5.03E-09	9.31E-07
SGTR-SGADV-ODMD	4	1.00E+00	(2.5)	2.54E-07	(9.0)		
MSS-SOV-OO-ODADV	4	1.00E+00	(2.5)	2.54E-07	(9.0)		
RCS-XHE-FO-DPT7D	12	4.00E-01	(7.0)	1.95E-07	(11.0)	6.57E-09	7.72E-07
BETA-2MOV	2	8.80E-02	(12.0)	1.25E-07	(12.5)	5.68E-10	4.34E-07
HPI-MOV-FT	2	3.00E-03	(33.5)	1.25E-07	(12.5)	5.68E-10	4.34E-07
RCS-PORV-ODMD	10	5.00E-01	(6.0)	1.22E-07	(14.0)	8.79E-10	5.04E-07
AFW-XHE-FO-UNIT2	8	3.60E-02	(20.0)	1.05E-07	(15.0)	4.81E-09	3.42E-07
HPI-XHE-FO-UN2S3	5	4.40E-02	(17.0)	8.93E-08	(16.0)	2.29E-09	3.46E-07
HPI-XHE-FO-ALTS3	1	7.40E-02	(13.0)	7.81E-08	(17.0)	3.04E-10	2.88E-07
PPS-SOV-OO-1455C	5	3.00E-02	(22.0)	6.10E-08	(18.5)	4.39E-10	2.52E-07
PPS-SOV-OO-1456	5	3.00E-02	(22.0)	6.10E-08	(18.5)	4.39E-10	2.52E-07
PPS-MOV-OO-1535	3	4.00E-02	(18.5)	5.78E-08	(20.5)	4.23E-10	2.43E-07
PPS-MOV-OO-1536	3	4.00E-02	(18.5)	5.78E-08	(20.5)	4.23E-10	2.43E-07
AFW-PSF-FC-XCONN	1	1.50E-04	(45.0)	5.40E-08	(22.0)	2.87E-09	2.07E-07
IAS-CCF-LF-INAIR	3	2.70E-05	(53.0)	3.72E-08	(23.0)	5.11E-10	1.35E-07
AFW-CCF-LK-STMBD	1	1.00E-04	(47.5)	3.60E-08	(24.0)	4.42E-11	9.33E-08
REC-XHE-FO-GAGRV	2	3.00E-01	(8.0)	2.25E-08	(25.0)	1.79E-10	7.97E-08
HPI-CKV-FT-CV410	1	1.00E-04	(47.5)	1.76E-08	(26.5)	4.92E-10	7.05E-08
HPI-CKV-FT-CV25	1	1.00E-04	(47.5)	1.76E-08	(26.5)	4.92E-10	7.05E-08
RWT-TNK-LF-RWST	1	2.70E-06	(55.0)	1.08E-08	(28.0)	1.23E-10	3.98E-08
SIS-ACT-FA-SISB	1	1.60E-03	(37.5)	1.02E-08	(29.5)	5.74E-11	1.06E-07
SIS-ACT-FA-SISA	1	1.60E-03	(37.5)	1.02E-08	(29.5)	5.74E-11	1.06E-07
MSS-XHE-FO-ISDHR	1	1.40E-02	(25.5)	8.12E-09	(31.5)	1.24E-10	3.09E-08
MSS-CKV-FT-SGDHR	1	2.00E-03	(36.0)	8.12E-09	(31.5)	1.24E-10	3.09E-08
HPI-XVM-PG-XV24	1	4.00E-05	(52.0)	7.04E-09	(33.0)	1.70E-10	2.77E-08
PPS-MOV-FC-OPER	4	2.70E-03	(35.0)	6.52E-09	(34.0)	1.33E-11	2.76E-08
AFW-MDP-FS	3	6.30E-03	(30.0)	6.48E-09	(35.5)	8.09E-11	2.37E-08
BETA-AFW	3	5.60E-02	(16.0)	6.48E-09	(35.5)	8.09E-11	2.37E-08
AFW-TDP-FS-FW2	2	1.10E-02	(27.0)	5.36E-09	(37.0)	4.32E-11	2.05E-08
AFW-CKV-OO-CV142	1	1.00E-03	(40.5)	3.96E-09	(38.0)	3.02E-11	1.54E-08
AFW-TDP-FR-2P6HR	1	3.00E-02	(22.0)	3.81E-09	(39.0)	1.87E-11	1.30E-08
HPI-XHE-FO-ALTIN	1	5.70E-03	(32.0)	2.28E-09	(40.5)	1.94E-11	8.89E-09
HPI-CKV-FT-CV225	1	1.00E-04	(47.5)	2.28E-09	(40.5)	1.94E-11	8.89E-09
AFW-CKV-OO-CV172	1	1.00E-03	(40.5)	2.27E-09	(43.5)	7.15E-11	8.22E-09
AFW-CKV-OO-CV157	1	1.00E-03	(40.5)	2.27E-09	(43.5)	7.15E-11	8.22E-09
AFW-MDP-FS-FW3B	1	6.30E-03	(30.0)	2.27E-09	(43.5)	7.15E-11	8.22E-09
AFW-MDP-FS-FW3A	1	6.30E-03	(30.0)	2.27E-09	(43.5)	7.15E-11	8.22E-09
HPI-MOV-FT-1867D	2	3.00E-03	(33.5)	2.16E-09	(46.0)	9.64E-12	7.91E-09
MSS-XHE-FO-ISAFW	1	6.80E-06	(54.0)	1.97E-09	(47.0)	4.39E-11	7.32E-09

HPI-MDP-FR-1A6HR	1	4.00E-04 (43.0)	1.60E-09 (48.5)	5.94E-11	5.71E-09
HPI-CKV-OO-CV258	1	1.00E-03 (40.5)	1.60E-09 (48.5)	5.94E-11	5.71E-09
AFW-TDP-MA-FW2	1	1.00E-02 (28.0)	1.27E-09 (50.0)	5.11E-12	4.90E-09
ACP-BAC-ST-4KV1H	1	9.00E-05 (50.5)	1.08E-09 (51.5)	4.82E-12	3.96E-09
ACP-BAC-ST-1H1	1	9.00E-05 (50.5)	1.08E-09 (51.5)	4.82E-12	3.96E-09
CPC-XHE-FO-REALN	1	7.00E-02 (14.0)	5.83E-10 (54.0)	6.47E-12	2.27E-09
CPC-STR-PG-6HR	1	1.80E-04 (44.0)	5.83E-10 (54.0)		
BETA-STR	1	2.63E-01 (9.0)	5.83E-10 (54.0)	6.47E-12	2.27E-09

RISK REDUCTION BY INITIATING EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

INIT EVENT	OCCUR	FREQ (RANK)	RISK REDUCTION (RANK)	LOWER 5%	UPPER 5%
IE-T7	38	1.00E-02 (1.0)	1.82E-06 (1.0)	1.23E-07	5.95E-06

SURRY PLANT DAMAGE STATE PDS7
RISK INCREASE BY BASE EVENT (WITH ASSOCIATED UNCERTAINTY INTERVALS)

BASE EVENT	OCCUR	PROB	(RANK)	RISK INCREASE	(RANK)	LOWER 5%	UPPER 5%
RWT-TNK-LF-RWST	1	2.70E-06	(55.0)	4.00E-03	(1.0)	3.87E-04	1.20E-02
IAS-CCF-LF-INAIR	3	2.70E-05	(53.0)	1.38E-03	(2.0)	1.59E-04	4.35E-03
AFW-CCF-LK-STMBD	1	1.00E-04	(47.5)	3.60E-04	(3.0)	2.98E-05	1.16E-03
AFW-PSF-FC-XCONN	1	1.50E-04	(45.0)	3.60E-04	(4.0)	2.98E-05	1.16E-03
MSS-XHE-FO-ISAFW	1	6.80E-06	(54.0)	2.90E-04	(5.0)	7.74E-05	6.97E-04
HPI-XVM-PG-XV24	1	4.00E-05	(52.0)	1.76E-04	(6.0)	7.23E-06	6.23E-04
HPI-CKV-FT-CV410	1	1.00E-04	(47.5)	1.76E-04	(7.5)	7.23E-06	6.23E-04
HPI-CKV-FT-CV25	1	1.00E-04	(47.5)	1.76E-04	(7.5)	7.23E-06	6.23E-04
REC-XHE-FO-DPRES	3	1.40E-02	(25.5)	9.49E-05	(9.0)	1.53E-05	2.62E-04
RCS-XHE-FO-DPRT7	15	2.90E-02	(24.0)	4.95E-05	(10.0)		
HPI-MOV-FT	2	3.00E-03	(33.5)	4.14E-05	(11.0)	1.28E-06	1.62E-04
HPI-CKV-FT-CV225	1	1.00E-04	(47.5)	2.28E-05	(12.0)	3.25E-07	9.25E-05
ACP-BAC-ST-4KV1H	1	9.00E-05	(50.5)	1.20E-05	(13.5)	1.38E-07	4.21E-05
ACP-BAC-ST-1H1	1	9.00E-05	(50.5)	1.20E-05	(13.5)	1.38E-07	4.21E-05
SIS-ACT-FA-SISA	1	1.60E-03	(37.5)	6.39E-06	(15.5)	2.14E-07	2.60E-05
SIS-ACT-FA-SISB	1	1.60E-03	(37.5)	6.39E-06	(15.5)	2.14E-07	2.60E-05
MSS-CKV-FT-SGDHR	1	2.00E-03	(36.0)	4.05E-06	(17.0)	1.00E-07	1.67E-05
HPI-MDP-FR-1A6HR	1	4.00E-04	(43.0)	4.00E-06	(18.0)	2.30E-07	1.29E-05
AFW-CKV-OO-CV142	1	1.00E-03	(40.5)	3.96E-06	(19.0)	4.48E-08	1.58E-05
PORV-BLK	6	1.50E-01	(10.5)	3.84E-06	(20.0)	1.41E-07	1.25E-05
MSS-XHE-FO-BLOCK	4	6.40E-02	(15.0)	3.72E-06	(21.0)	1.52E-07	1.18E-05
SGTR-SGSRV-ODMD2	6	1.50E-01	(10.5)	3.26E-06	(22.0)	1.18E-07	1.01E-05
CPC-STR-PG-6HR	1	1.80E-04	(44.0)	3.24E-06	(23.0)		
AFW-XHE-FO-UNIT2	8	3.60E-02	(20.0)	2.81E-06	(24.0)	3.32E-07	7.86E-06
PPS-MOV-FC-OPER	4	2.70E-03	(35.0)	2.41E-06	(25.0)	2.51E-08	1.03E-05
AFW-CKV-OO-CV172	1	1.00E-03	(40.5)	2.27E-06	(26.5)	1.13E-07	7.66E-06
AFW-CKV-OO-CV157	1	1.00E-03	(40.5)	2.27E-06	(26.5)	1.13E-07	7.66E-06
PPS-SOV-OO-1456	5	3.00E-02	(22.0)	1.97E-06	(28.5)	8.85E-08	7.16E-06
PPS-SOV-OO-1455C	5	3.00E-02	(22.0)	1.97E-06	(28.5)	8.85E-08	7.16E-06
HPI-XHE-FO-UN2S3	5	4.40E-02	(17.0)	1.94E-06	(30.0)	1.05E-07	6.54E-06
HPI-CKV-OO-CV258	1	1.00E-03	(40.5)	1.60E-06	(31.0)	9.92E-08	5.32E-06
PPS-MOV-OO-1536	3	4.00E-02	(18.5)	1.39E-06	(32.5)	1.51E-08	5.96E-06
PPS-MOV-OO-1535	3	4.00E-02	(18.5)	1.39E-06	(32.5)	1.51E-08	5.96E-06
BETA-2MOV	2	8.80E-02	(12.0)	1.29E-06	(34.0)	1.12E-08	4.95E-06
AFW-MDP-FS	3	6.30E-03	(30.0)	1.02E-06	(35.0)	1.70E-08	3.80E-06
HPI-XHE-FO-ALTS3	1	7.40E-02	(13.0)	9.78E-07	(36.0)	8.92E-09	3.75E-06
HPI-MOV-FT-1867D	2	3.00E-03	(33.5)	7.18E-07	(37.0)	2.51E-08	2.63E-06
MSS-XHE-FO-ISDHR	1	1.40E-02	(25.5)	5.72E-07	(38.0)	7.83E-08	1.62E-06
AFW-TDP-FS-FW2	2	1.10E-02	(27.0)	4.82E-07	(39.0)	2.68E-08	1.61E-06
HPI-XHE-FO-ALTIN	1	5.70E-03	(32.0)	3.98E-07	(40.0)	2.31E-08	1.41E-06
AFW-MDP-FS-FW3B	1	6.30E-03	(30.0)	3.58E-07	(41.5)	1.71E-08	1.34E-06
AFW-MDP-FS-FW3A	1	6.30E-03	(30.0)	3.58E-07	(41.5)	1.71E-08	1.34E-06
RCS-XHE-FO-DPT7D	12	4.00E-01	(7.0)	2.92E-07	(43.0)	1.07E-08	1.08E-06
PORV-NOT-BLK	10	8.50E-01	(5.0)	1.46E-07	(44.0)	8.89E-10	5.93E-07
AFW-TDP-MA-FW2	1	1.00E-02	(28.0)	1.26E-07	(45.0)	3.94E-09	4.85E-07
AFW-TDP-FR-2P6HR	1	3.00E-02	(22.0)	1.23E-07	(46.0)	3.91E-09	4.71E-07
RCS-PORV-ODMD	10	5.00E-01	(6.0)	1.22E-07	(47.0)	7.02E-10	4.79E-07

SURRY PLANT DAMAGE STATE PDS7
UNCERTAINTY IMPORTANCE BY BASE EVENT

BASE EVENT	OCCUR	PROB	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
REC-XHE-FO-DPRES	3	1.40E-02	(25.5)	46.2	(1.0)	2.59	0.88
PORV-BLK	6	1.50E-01	(10.5)	4.0	(2.0)	1.05	1.02
SGTR-SGSRV-ODMD2	6	1.50E-01	(10.5)	3.8	(3.0)	1.03	0.95
HPI-MOV-FT	2	3.00E-03	(33.5)	2.2	(4.5)	1.11	0.98
HPI-MOV-FT-1867D	2	3.00E-03	(33.5)	2.2	(4.5)	1.11	0.98
PPS-SOV-OO-1456	5	3.00E-02	(22.0)	2.1	(6.5)	1.15	1.02
PPS-SOV-OO-1455C	5	3.00E-02	(22.0)	2.1	(6.5)	1.15	1.02
RCS-XHE-FO-DPT7D	12	4.00E-01	(7.0)	1.3	(8.0)	1.07	1.02
AFW-XHE-FO-UNIT2	8	3.60E-02	(20.0)	1.3	(9.0)	1.02	0.98
MSS-XHE-FO-BLOCK	4	6.40E-02	(15.0)	1.0	(10.0)	1.03	1.02
HPI-XHE-FO-UN2S3	5	4.40E-02	(17.0)	0.9	(11.0)	1.00	1.00
MSS-XHE-FO-ISAFW	1	6.80E-06	(54.0)	0.8	(12.0)	1.01	1.00
BETA-STR	1	2.63E-01	(9.0)	0.8	(13.0)	1.00	1.00
IAS-CCF-LF-INAIR	3	2.70E-05	(53.0)	0.8	(14.0)	1.04	0.99
HPI-XHE-FO-ALTIN	1	5.70E-03	(32.0)	0.8	(15.0)	1.00	1.00
HPI-XHE-FO-ALTS3	1	7.40E-02	(13.0)	0.7	(16.0)	1.01	1.06
AFW-TDP-FS-FW2	2	1.10E-02	(27.0)	0.7	(17.0)	1.01	1.00
BETA-2MOV	2	8.80E-02	(12.0)	0.7	(18.0)	1.06	1.00
RWT-TNK-LF-RWST	1	2.70E-06	(55.0)	0.7	(19.0)	1.00	1.00
PORV-NOT-BLK	10	8.50E-01	(5.0)	0.6	(20.0)	1.03	0.99
PPS-MOV-OO-1536	3	4.00E-02	(18.5)	0.6	(21.5)	1.02	1.05
PPS-MOV-OO-1535	3	4.00E-02	(18.5)	0.6	(21.5)	1.02	1.05
RCS-PORV-ODMD	10	5.00E-01	(6.0)	0.5	(23.0)	1.02	1.03
MSS-XHE-FO-ISDHR	1	1.40E-02	(25.5)	0.5	(24.0)		
AFW-CCF-LK-STMBD	1	1.00E-04	(47.5)	0.5	(25.0)		
HPI-XVM-PG-XV24	1	4.00E-05	(52.0)	0.4	(26.0)		
AFW-TDP-MA-FW2	1	1.00E-02	(28.0)	0.4	(27.0)		
SIS-ACT-FA-SISB	1	1.60E-03	(37.5)	0.3	(28.5)		
SIS-ACT-FA-SISA	1	1.60E-03	(37.5)	0.3	(28.5)		
CPC-XHE-FO-REALN	1	7.00E-02	(14.0)	0.3	(30.0)		
HPI-CKV-FT-CV410	1	1.00E-04	(47.5)	0.2	(32.0)		
HPI-CKV-FT-CV25	1	1.00E-04	(47.5)	0.2	(32.0)		
HPI-CKV-FT-CV225	1	1.00E-04	(47.5)	0.2	(32.0)		
AFW-MDP-FS	3	6.30E-03	(30.0)	0.1	(35.0)		
AFW-MDP-FS-FW3B	1	6.30E-03	(30.0)	0.1	(35.0)		
AFW-MDP-FS-FW3A	1	6.30E-03	(30.0)	0.1	(35.0)		
REC-XHE-FO-GAGRV	2	3.00E-01	(8.0)	0.0	(43.0)		
HPI-MDP-FR-1A6HR	1	4.00E-04	(43.0)	0.0	(43.0)		
AFW-CKV-OO-CV172	1	1.00E-03	(40.5)	0.0	(43.0)		
AFW-TDP-FR-2P6HR	1	3.00E-02	(22.0)	0.0	(43.0)		
AFW-CKV-OO-CV157	1	1.00E-03	(40.5)	0.0	(43.0)		
PPS-MOV-FC-OPER	4	2.70E-03	(35.0)	0.0	(43.0)		
AFW-PSF-FC-XCONN	1	1.50E-04	(45.0)	0.0	(43.0)		
ACP-BAC-ST-1H1	1	9.00E-05	(50.5)	0.0	(43.0)		
HPI-CKV-OO-CV258	1	1.00E-03	(40.5)	0.0	(43.0)		
AFW-CKV-OO-CV142	1	1.00E-03	(40.5)	0.0	(43.0)		
BETA-AFW	3	5.60E-02	(16.0)	0.0	(43.0)		

MSS-CKV-FT-SGDHR	1	2.00E-03	(36.0)	0.0	(43.0)
ACP-BAC-ST-4KV1H	1	9.00E-05	(50.5)	0.0	(43.0)
SGTR-SGSRV-ODMD1	6	1.00E+00	(2.5)		
SGTR-SGADV-ODMD	4	1.00E+00	(2.5)		
RCS-XHE-FO-DPRT7	15	2.90E-02	(24.0)		
CPC-STR-PG-6HR	1	1.80E-04	(44.0)		
MSS-SRV-OO-ODSRV	12	1.00E+00	(2.5)		
MSS-SOV-OO-ODADV	4	1.00E+00	(2.5)		

UNCERTAINTY IMPORTANCE BY INITIATING EVENT

INIT EVENT	OCCUR	FREQ	(RANK)	% REDUCTION IN THE UNCERTAINTY OF LOG RISK	(RANK)	Y.05/TE.05*	Y.95/TE.95*
IE-T7	38	1.00E-02	(1.0)	31.7	(1.0)	1.77	0.95

* Y.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS HELD CONSTANT AT ITS MEAN VALUE
TE.xx IS THE .xx QUANTILE OF THE TOP EVENT FREQUENCY WHEN THE EVENT IS NOT HELD CONSTANT

SURRY PLANT DAMAGE STATE PDS7

CUT SET NUMBERS, CUT SET ORDERS, CUT SET FREQUENCIES,
CUMULATIVE NORMALIZED CUT SET FREQUENCIES AND CUT SETS
FOR TOP EVENT PDS7 WITH TOP EVENT FREQUENCY 1.82E-06

(THE FIRST COLUMN OF NUMBERS IS THE LINE NUMBERS FOR THE FILE TEMACSETS.DNF)

2	1	6	6.09E-07	0.33530	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	RCS-XHE-FO-DPRT7	*
3					REC-XHE-FO-DPRES	*	SGTR-SGSRV-ODMD1	+				
4	2	6	5.18E-07	0.62031	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	RCS-XHE-FO-DPRT7	*
5					REC-XHE-FO-DPRES	*	SGTR-SGSRV-ODMD2	+				
6	3	7	2.21E-07	0.74191	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	PORV-NOT-BLK	*
7					RCS-XHE-FO-DPRT7	*	REC-XHE-FO-DPRES	*	SGTR-SGADV-ODMD	+		
8	9	5	7.81E-08	0.78493	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-ALTS3	*	IE-T7	*
9					RCS-XHE-FO-DPT7D	+						
10	21	3	5.40E-08	0.81467	AFW-PSF-FC-XCONN	*	AFW-XHE-FO-UNIT2	*	IE-T7	+		
11	10	5	4.65E-08	0.84025	BETA-2MOV	*	HPI-MOV-FT	*	HPI-XHE-FO-UN2S3	*	IE-T7	*
12					RCS-XHE-FO-DPT7D	+						
13	22	3	3.60E-08	0.86007	AFW-CCF-LK-STMBD	*	AFW-XHE-FO-UNIT2	*	IE-T7	+		
14	29	8	2.61E-08	0.87444	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-OO-1535	*
15					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
16	30	8	2.61E-08	0.88881	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-OO-1536	*
17					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
18	31	8	2.22E-08	0.90102	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-OO-1535	*
19					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+
20	32	8	2.22E-08	0.91324	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-OO-1536	*
21					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+
22	12	4	1.76E-08	0.92293	HPI-CKV-FT-CV25	*	HPI-XHE-FO-UN2S3	*	IE-T7	*	RCS-XHE-FO-DPT7D	+
23	11	4	1.76E-08	0.93262	HPI-CKV-FT-CV410	*	HPI-XHE-FO-UN2S3	*	IE-T7	*	RCS-XHE-FO-DPT7D	+
24	7	6	1.47E-08	0.94071	IAS-CCF-LF-INAIR	*	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*
25					PORV-NOT-BLK	*	SGTR-SGADV-ODMD	+				
26	4	6	1.22E-08	0.94739	IAS-CCF-LF-INAIR	*	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*
27					REC-XHE-FO-GAGRV	*	SGTR-SGSRV-ODMD1	+				
28	13	3	1.08E-08	0.95334	IE-T7	*	RCS-XHE-FO-DPT7D	*	RWT-TNK-LF-RWST	+		
29	5	6	1.03E-08	0.95903	IAS-CCF-LF-INAIR	*	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*
30					REC-XHE-FO-GAGRV	*	SGTR-SGSRV-ODMD2	+				
31	14	4	1.02E-08	0.96466	IE-T7	*	RCS-XHE-FO-DPT7D	*	SIS-ACT-FA-SISA	*	SIS-ACT-FA-SISB	+
32	34	9	9.47E-09	0.96988	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	PORV-NOT-BLK	*
33					PPS-MOV-OO-1536	*	PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*
34					SGTR-SGADV-ODMD	+						
35	33	9	9.47E-09	0.97509	IE-T7	*	MSS-SOV-OO-ODADV	*	MSS-XHE-FO-BLOCK	*	PORV-NOT-BLK	*
36					PPS-MOV-OO-1535	*	PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*
37					SGTR-SGADV-ODMD	+						
38	6	4	8.12E-09	0.97956	IE-T7	*	MSS-CKV-FT-SGDHR	*	MSS-XHE-FO-ISDHR	*	RCS-XHE-FO-DPRT7	+
39	15	4	7.04E-09	0.98343	HPI-XHE-FO-UN2S3	*	HPI-XVM-PG-XV24	*	IE-T7	*	RCS-XHE-FO-DPT7D	+
40	23	4	3.96E-09	0.98561	AFW-CKV-OO-CV142	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	IE-T7	+
41	24	5	3.81E-09	0.98771	AFW-MDP-FS	*	AFW-TDP-FR-2P6HR	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
42					IE-T7	+						
43	16	4	2.28E-09	0.98897	HPI-CKV-FT-CV225	*	HPI-XHE-FO-ALTIN	*	IE-T7	*	RCS-XHE-FO-DPT7D	+
44	26	4	2.27E-09	0.99022	AFW-CKV-OO-CV157	*	AFW-MDP-FS-FW3A	*	AFW-XHE-FO-UNIT2	*	IE-T7	+
45	25	4	2.27E-09	0.99147	AFW-CKV-OO-CV172	*	AFW-MDP-FS-FW3B	*	AFW-XHE-FO-UNIT2	*	IE-T7	+
46	8	3	1.97E-09	0.99255	IE-T7	*	MSS-XHE-FO-ISAFW	*	RCS-XHE-FO-DPRT7	+		

47	36	8	1.76E-09	0.99352	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-FC-OPER	*
48					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
49	35	8	1.76E-09	0.99449	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-BLK	*	PPS-MOV-FC-OPER	*
50					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD1	+
51	17	4	1.60E-09	0.99537	HPI-CKV-OO-CV258	*	HPI-MDP-FR-1A6HR	*	IE-T7	*	RCS-XHE-FO-DPT7D	+
52	38	8	1.50E-09	0.99620	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-FC-OPER	*
53					PPS-SOV-OO-1455C	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+
54	37	8	1.50E-09	0.99702	IE-T7	*	MSS-SRV-OO-ODSRV	*	PORV-NOT-BLK	*	PPS-MOV-FC-OPER	*
55					PPS-SOV-OO-1456	*	RCS-PORV-ODMD	*	RCS-XHE-FO-DPRT7	*	SGTR-SGSRV-ODMD2	+
56	27	5	1.40E-09	0.99779	AFW-MDP-FS	*	AFW-TDP-FS-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
57					IE-T7	+						
58	28	5	1.27E-09	0.99849	AFW-MDP-FS	*	AFW-TDP-MA-FW2	*	AFW-XHE-FO-UNIT2	*	BETA-AFW	*
59					IE-T7	+						
60	19	4	1.08E-09	0.99908	ACP-BAC-ST-4KV1H	*	HPI-MOV-FT-1867D	*	IE-T7	*	RCS-XHE-FO-DPT7D	+
61	18	4	1.08E-09	0.99968	ACP-BAC-ST-1H1	*	HPI-MOV-FT-1867D	*	IE-T7	*	RCS-XHE-FO-DPT7D	+
62	20	6	5.83E-10	1.00000	BETA-STR	*	CPC-STR-PG-6HR	*	CPC-XHE-FO-REALN	*	HPI-XHE-FO-UN2S3	*
63					IE-T7	*	RCS-XHE-FO-DPT7D	.				

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11. [redacted]STRACT *(200 words or less)*
This document contains the accident sequence analyses of internally initiated events for the Surry Nuclear Station, Unit 1. This is one of the five plant analyses conducted as part of the NUREG-1150 effort by the Nuclear Regulatory Commission. NUREG-1150 documents the risk of a selected group of nuclear power plants. The work performed and described here is an extensive reanalysis of that published in November 1986 as NUREG/CR-4550, Volume 3. It addresses comments from numerous reviewers and significant changes to the plant systems and procedures made since the first report. The uncertainty analysis and presentation of results are also much improved. The context and detail of this report are directed toward PRA practitioners who need to know how the work was performed and the details for use in further studies. The mean core damage frequency at Surry was calculated to be 4.0E-5 per year, with a 95% upper bound of 1.3E-4 and 5% lower bound of 6.8E-6 per year. Station blackout type accidents (loss of all AC power) were the largest contributors to the core damage frequency, accounting for approximately 68% of the total. The next type of dominant contributors were Loss of Coolant Accidents (LOCAs). These sequences account for 15% of core damage frequency. No other type of sequence accounts for more than 10% of core damage frequency.

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